RESPONSES TO TECHNICAL REVIEW COMMENTS

ON DRAFT FEASIBILITY STUDY

STOUGHTON CITY LANDFILL

STOUGHTON, WISCONSIN

SUBMITTED BY:

STOUGHTON CITY LANDFILL STEERING COMMITTEE

JUNE 20, 1991

PREPARED BY:

ENSR CONSULTING AND ENGINEERING
740 PASQUINELLI DRIVE
WESTMONT, ILLINOIS 60559

ENSR DOCUMENT NO. 6885-002-430A

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TABLE OF CONTENTS

Comment 1:

1.2.3.2 Groundwater, p. 1-17, par. 6: The RI Report presented no information to support the claim that MW-2S is not hydraulically connected to groundwater in the sand and gravel aquifer. Please elaborate or provide justification for this statement.

Response 1:

Hydraulic head information presented on cross-section B-B' and E-E' on Figure 3-4 of the RI Report indicates that groundwater flows vertically upward in the area of MW-2S. The subject statement regarding hydraulic connection has been removed and replaced with narrative that describes the groundwater flow direction at this location. We do maintain, however, that groundwater at MW-2S is not representative of the sand and gravel aquifer because of the upward flow condition at this location.

Comment 2:

Section 1.2.6: The conclusion that the Site "presents minimal environmental risk" should be deleted pending the results of an ecological assessment to be conducted later this year.

Response 2:

The narrative has been changed to state that "the site may present minimal environmental risk."

Comment 3:

Table 1-2: This table will need to be revised to reflect revisions requested by the RI review comments. Accompanying text which discusses risks will also need revision.

Response 3:

Table 1-2 and the associated text have been revised to reflect requested changes by U.S. EPA in its technical review comments dated March 15, 1991.

Comment 4:

2.1 General Remedial Action Goals, p. 2-1: The general remedial action goals should be worded to include specific goals for the source control final remedy and groundwater interim remedy. The source control operable unit's goal should be to reduce infiltration into the landfill and to contain the leaching of hazardous substances from the site to the surrounding environment, including the adjacent wetlands. The goal of the groundwater interim remedy should be to contain known contaminated groundwater in the surficial aquifer. Upon further delineation of the vertical and horizontal extent of groundwater contamination, the specific goals of the final groundwater remedy can be stated.

Response 4:

Specific remedial action goals have been revised and are presented in Section 2.2. The Stoughton PRPs do not believe specific goals should be included under a discussion of "general" remedial action goals.

Regarding groundwater, the PRPs do not believe the goal of the interim groundwater remedy should be to contain affected groundwater. In the PRPs' view, the reason that the groundwater remedy or operable unit is considered interim at this time is because of the uncertainty associated with the extent of the THF plume in the vicinity of MW-3D. The Final FS Report considers alternatives, other than active groundwater collection and treatment, that may be adequate to protect public health and the environment. In the event that releases are found to be more widespread, the potential consequences will be considered and appropriate remediation alternatives will be evaluated.

Comment 5:

2.2 Site Specific Remedial Action Goals, p. 2-5: The groundwater operable unit should not be limited to the vicinity of monitoring well MW-3D because long-term monitoring will be required for all groundwater potentially affected by the landfill. See also the RI review comments which discuss better definition of the extent of groundwater contamination by THF. Further, attainment of groundwater standards for barium, chromium and selenium need to be added to the discussion of the remedial action goal for the groundwater operable unit.

Response 5:

For the purposes of preparing the Final FS Report, remediation alternatives for the interim groundwater operable unit, including natural attenuation, are limited to the vicinity of MW-3D, because this is the only location where groundwater consistently exceeded enforcement standards for THF. However, because long-term groundwater monitoring is included as part of all alternatives, the interim groundwater operable unit may be viewed as the sand and gravel aquifer in the vicinity of the landfill. This has been added as a remedial action objective.

The PRPs have received and responded to the U.S. EPA and WDNR request for additional investigation. In their view, attainment of groundwater standards for barium, chromium, and selenium is not required because the enforcement standards for these constituents were not exceeded.

Comment 6:

Tables 3-3B and 3-3C: It is noted that these options would only serve to limit direct contact with soils and waste, not prevent direct contact. Deed restrictions and similar institutional controls can be too easily violated or ignored.

Response 6:

Comment noted and text changed accordingly. It should also be noted here that local governments have the responsibility to supervise and enforce any deed restrictions and other institutional controls. Failure to enforce the restrictions tends to support the unreliability of these measures. However, trespassing is less likely if a properly constructed fence is in place around the site.

Comment 7:

Tables 3-3E through 3-3H: It is noted that these alternatives would also limit or prevent leaching of chemicals of concern from the landfill to the groundwater.

Response 7:

Comment noted and text changed accordingly.

Comment 8:

Tables 3-4: No mention is made in the tables regarding attaining the State PALs for barium, chromium and selenium.

Response 8:

See Response 5.

Comment 9:

Table 3-4K: Documentation should be provided in the text supporting the claim that the City of Stoughton POTW would not likely be able to handle increased flow volume from the site.

Response 9:

Documentation has been added to Table 3-4K to support the statement that, not only can the City of Stoughton POTW not handle the increased flow, but the increased hydraulic loading would also present a problem.

Comment 10:

Figure 3-1: Soil vapor extraction should be retained for further analysis as it may be an effective means of removing volatile organic vapor from soil interstices, although it is recognized that it would be ineffective in addressing inorganics. While I agree that in situ vitrification (ISV) may be eliminated at this time, I do not agree with the consultant's attempt at justifying this screening out based upon the technology being in the developmental stage. U.S. EPA considers ISV to be an innovative technology suitable for remediation at Superfund sites. ISV has undergone extensive testing and technical scrutiny, including in-field tests of various sizes on a wide array of contaminants in over 30 different soil types. I acknowledge the existence of saturated wastes

in certain areas of the landfill and the potential adverse effects high moisture soils can have on the ISV process. I would therefore require that ISV be eliminated from further consideration at this point due to anticipated difficulty in implementing this alternative because of saturated soil conditions. This could result not only in operational difficulties in the advancement and completion of the melt but also in prohibitive operating costs as a great deal of energy would be expended in generating steam.

Response 10:

Comment noted and Figure 3-1 changed accordingly.

Comment 11:

Figure 3-3; The summaries for both institutional control process options need to discuss that they are not stand alone response actions and that they would be used in conjunction with other response measures.

Response 11:

Comment noted and Figure 3-3 changed accordingly.

Comment 12:

4.3.1 Alternative 1: No Action, p. 4-5: See Comment 5 above.

Response 12:

The meaning of this comment is not understood.

Comment 13:

Sections 4.3.5 and 4.3.6: It should be noted that NPDES permits may not be required for discharge to the Yahara River, but the substantive requirements of such a permit would need to be met, as well as routine monitoring to ensure these requirements are being complied with.

Response 13:

Comment noted and text changed accordingly. Because discharge to the Yahara River would be considered an on-site activity, only the substantive requirements would need to be met.

Comment 14:

6.0 Individual Analysis of Alternatives, general: The issue of natural attenuation and dispersion as a method of addressing groundwater contamination and potential associated ARARs is central to several alternatives presented in this section. It is recognized that the Interim Final RI/FS Guidance has an appendix which suggests that natural attenuation of groundwater contamination

in conjunction with other measures (i.e., capping) is appropriately considered as a remedial alternative. If such an alternative is to remain it is critical that estimates be made of the time required for natural attenuation to reduce contaminant levels below ARAR levels. This is especially important to a comparative analysis of the various alternatives.

Response 14:

Estimates of the time required for natural attenuation to reduce the concentration of THF to levels below the enforcement standards have been made using a combination of two models: Version 2 of Hydrologic Evaluation of Landfill Performance (HELP) (Schroeder et al. 1984)[1] and Horizontal Plane Source (HPS) (Galya, 1987)[2]. These estimates have been made for those alternatives that do not include groundwater collection and treatment. The results of the modeling activity are included in Appendix C of the Final FS Report.

[1]Schroeder, P.R., J.M. Morgan, T.M. Walski, and A.C. Gibson. 1984. Hydrologic Evaluation of Landfill Performance (HELP) Model, Volumes I and II. EPA/530-SW-84-009 and EPA/530-SW-84-010, Cincinnati, OH.

[2]Galya, Donald P., 1987. A Horizontal Plane Source Model for Groundwater Transport. Groundwater, Vol. 25, No. 6, pp. 733-739.

Comment 15:

Section 6.1.2.1: Wisconsin PALs are the ARARs, not Enforcement Standards. In this and other sections it should be made clear that while THF exceeds the State ES, the clean-up goal required to be met is the PAL.

Response 15:

As documented in the Final RI Report (Revision 3) and the Draft FS Report, only one constituent exceeded Wisconsin groundwater quality enforcement standards for the protection of public health during the course of the RI: THF at monitoring well MW-3D. In the PRPs' view, the enforcement standards are the applicable or relevant and appropriate requirement (ARAR) for assessing the potential need for groundwater remediation. This view is based on language in Chapter 160 of the Wisconsin Statutes, which indicate that a preventive action limit (PAL) "...is not intended to be an absolute standard at which remedial action is always required." The WDNR is proposing modifications to the Wisconsin groundwater quality standards (NR140) which include a new section [NR140.02(3)] that provides clarification of the purpose of the PALs.

Further, the point of application of the enforcement standards is viewed by the PRPs as being the closer of either the design management zone (DMZ) boundary or the property boundary. The DMZ is believed to extend 300 feet from the waste boundary in the case of the Stoughton City Landfill, as presented in NR 140.22.

Comment 16:

6.1.2.7 Cost, p. 6-4: It is noted that the Interim Final RI/FS Guidance calls for the conservative use of 5% discount factor before taxes and after inflation, rather than the 7% factor used. Cost data for all alternatives, as presented in Appendix B and in accompanying text throughout the FS report, will also need to be revised.

Response 16:

Comment noted. Costs and text have been changed accordingly.

Comment 17:

Section 6.2.1: The conclusion that "the existing landfill cover is sound" cannot be completely supported and further investigation as to the soundness of the cap may be required during design phase activities.

Response 17:

The text has been revised to indicate that the final cover installed as part of the approved landfill closure is generally intact.

Comment 18:

Section 6.3.2.2: The conclusion that "enforcement standards for tetrahydrofuran would be met naturally in the long term" is unsupported by any analysis or reference to a groundwater contamination dispersion model. In the absence of such data, the statement should be removed from the text. Furthermore, the Wisconsin PAL is the standard which must be met, absent a waiver.

Response 18:

See Responses 14 and 15.

Comment 19:

6.2.2.7 Cost, p. 6-9: It is suggested that since a formal evaluation of the existing cover has not been made, the PRPs should conservatively cost an effort to upgrade the cap across the entire site rather than one half.

Response 19:

Comment noted. Text and costs have been changed accordingly.

Comment 20:

6.5.2.1 Overall Protection of Human Health and the Environment, p. 6-18: The correct reference at the bottom of this page is Appendix C.

Response 20:

Comment noted and text changed accordingly.

Comment 21:

Section 6.5.2.6: If the carbon units must be replaced, there needs to be a discussion of ARARs pertaining to the disposal of the spent carbon, should disposal be opted over thermal regeneration of the carbon. This discussion should address land disposal restrictions (LDRs) under RCRA as well. Section 121(e)(1) of SARA states that permits are not required for any remedial action conducted entirely on-site. Therefore, a WPDES permit may not be required for discharge of treated water to the Yahara River, but the substantive requirements of the WPDES permit would need to be met, and NPDES treatment standards would be considered relevant and appropriate for this response action. Discharge to the Yahara would be considered an "on-site" activity as the National Contingency Plan defines "on-site" to include "all suitable areas in very close proximity to the contamination necessary for implementation of the response action."

Response 21:

Comment noted; text changes were made to Section 6.5.2.6 in the appropriate places.

Comment 22:

Page 1-17: For clarification, references to the mean groundwater concentrations are misleading, in that the Department does not consider the mean concentration when the number of samples taken are not statistically significant, as is the case for the Stoughton Landfill. If the purpose of the sampling was to gather statistically significant samples, than a far greater number of sampling would have to had occurred. What is relevant for this report is the exceedances of groundwater standards at various wells. I believe the public will be confused by statements in the text that refer to the mean concentration of specific compounds being below standards. I ask that this be clarified prior to approval of this report.

Response 22:

The referenced sentence has been removed from the text. In cases where replicate samples have been analyzed, reference to a mean concentration is appropriate and this language has been retained.

Comment 23:

On the last paragraph, the consultant states that MW-2S is not hydraulically connected to the groundwater in the sand and gravel aquifer. However, I do not recall the RI report documenting

an aquitard in this area. I do not believe the consultant is accurate in making this statement and ask that this statement be removed from the text. We clearly do not have sufficient hydrologic data to support such a finding.

Response 23:

See Response 1.

Comment 24:

In addition, a statement has been added to clarify that the extent of contamination in the bedrock aquifer has not been evaluated at this site. The extent of contamination in the deep aquifer, therefore, has not been determined. It should be noted that the highest levels of tetrahydrofuran are found in the "deep" wells at the site (70 feet). Further information regarding the bedrock aquifer is necessary to fully evaluate the site.

Response 24:

A statement has been added to the text that the presence of potential contamination in the bedrock aquifer was not evaluated as part of the RI. It is presumptuous to state that the extent of contamination has not been determined. The PRPs note that THF was detected in one deep well (MW-3D) at a concentration above the enforcement standards and acknowledge the U.S. EPA and WDNR request for additional RI work. A Work Plan and Sampling Plan are being submitted concurrently covering requested work that is agreeable to the PRPs.

Comment 25:

Page 1-20: The report should document that contamination at a depth of 70 feet has the potential to migrate underneath the River due to the pumping of a municipal well within 1/2 mile, and the extent of that contamination is unknown at this time.

Response 25:

Because lithologic, stratigraphic, and hydraulic head data do not exist to evaluate the potential for affected groundwater at the site to migrate to the municipal well located west of the Yahara River, it is premature to document this potential as requested.

Comment 26:

Page 1-10 - 1-24 Baseline Risk Assessment: I believe that these numbers need to be updated with the final numbers that you have calculated, once you are satisfied with those numbers. The risk assessment, however, as prepared by the consultant does identify a risk from dermal exposure to sediment of 5.88E-4, in excess of EPA's acceptable risk range. Does this correlate with what you calculated?

Response 26:

The risk assessment summary table and associated text have been revised to address the comments dated March 15, 1991, on the Final RI Report (Revision 3). The risk from dermal exposure to sediment is shown to be significantly reduced.

Comment 27:

Page 1-25: I would argue strongly that exceedances of acute or chronic toxicity criteria for the protection of aquatic life suggest that the site does present minimal environmental risk. I would recommend that the suggestion that the site presents minimal environmental risk be removed from the text prior to approval of this report.

Response 27:

See Response 2.

Comment 28:

Page 2-2: At the top of the page, the consultant states that the final cleanup levels are established by the U.S. EPA in the record of decision. I ask that the statement "in consultation with the State" be added to this sentence.

Response 28:

Comment noted and text changed accordingly.

Comment 29:

I am not satisfied with the discussion on Site Specific Remedial Action Goals, beginning on page 2-2. I do not see anywhere in this section what the Site Specific Remedial Action Goals are for this site. Clearly these should be stated somewhere in this section. While I support the concept of operable units as represented in the remedial action objectives on page 2-5, I do not agree with the specific objectives identified by the consultant. There is no discussion of the threshold criteria of protectiveness of human health and the environment, nor is there any discussion of the program expectations of restoring groundwater to its beneficial use (i.e., drinking water).

Response 29:

The remedial action goals are the same as the remedial action objectives. These objectives recognize protection of human health and the environment; however, we reiterate that groundwater in the sand and gravel aquifer is not currently used, and future use is unlikely in the vicinity of the site.

Comment 30:

I suggest that this be rewritten, considering that this is intended to be reviewed by the public and help them understand how we determined actions to be taken at this site. Leaving this section as written is misleading at a minimum. This section could be shortened to simply state that the RI documented contamination of the groundwater and surface water, as well as determining that wastes were in direct contact with the wetlands and groundwater at the site. I note that the risk assessment as prepared by the consultant identified an unacceptable risk for ingestion of sediment and inhalation at the site. I suggest that the Site Specific Remedial Action Goals be clearly stated in this section and include protecting the groundwater, surface water, wetlands, and air from exposure to contaminants at this site.

Response 30:

Because site-specific remedial action goals are based on the results of the risk assessment and on ARARs, the PRPs believe it is appropriate to summarize these results as presented in this section. The goals have been revised to include the suggested media, excluding air. For this medium, conservative assumptions made in the risk assessment resulted in hazard index (HI) values marginally greater than 1.0, the benchmark for assessing potential human health risk. The PRPs believe it is premature to specify remedial action goals for this medium. As stated in the Draft FS Report, the need for air emissions treatment following cap repair or upgrade can only be determined based on actual site data when, or if, systems are installed.

Comment 31:

If this section is rewritten as suggested, the statement made in the third to the last paragraph that 5.9×10^{-4} is outside the acceptable risk range would be eliminated. If this is not rewritten, this sentence should be corrected as necessary.

Response 31:

See Response 26.

Comment 32:

With respect to the concept of operable units, I agree with the consultant's breakdown of the soil/solid waste operable unit and the groundwater operable unit. I suggest that the soil/solid waste operable unit include the concept of containment of hazardous substances in the wastes from both the groundwater as well as surface water and wetlands. As suggested in by November 1, 1990 comment to you, I suggested that the remedial action objective for the soil/solid waste operable unit be to prevent public from direct contact exposure to landfill refuse and potential hazardous substances contained therein; and to contain wastes such that they are not released to the environment, including air emissions of landfill gas. The objectives of the soil/solid waste operable unit as proposed by the consultant would be considered acceptable if minor changes including the following were made: Prevent or contain the leaching of hazardous substances

from the landfill to the environment to protect public health and the environment, including protection of aquatic life in the adjacent wetlands.

Response 32:

A remedial action objective has been added for the soil/solid waste operable unit to minimize migration of leachate from saturated refuse to the adjacent wetlands and associated surface water.

See Response 30 regarding air emissions.

Comment 33:

With respect to the groundwater operable unit, as per discussions, I agree that we have sufficient information to implement an interim groundwater remedy, with a final groundwater remedy to be determined after further investigation of the bedrock aquifer and extent of contamination in the deep aquifer. Therefore, the groundwater operable unit, at this time, should have the remedial action objectives of containing contaminated groundwater at the landfill. The final remedy for the groundwater will have more specific remedial action objectives. I note again, that this interim action would also serve as an integral component of the solid waste/soil operable unit, as this would ensure that the contaminants that are leached to the groundwater would be contained and not be released to the environment. Since this is not a final remedy for the groundwater, cleanup levels (i.e. groundwater standards) are not specified at this time.

Response 33:

See Response 4.

Comment 34:

Page 3-3: I do not agree that the soil/solid waste containment response be limited to horizontal barriers. The use of vertical barriers to contain wastes and contaminants at the site has been shown to be effective. I suggest that limiting barriers to horizontal be removed and the concept of barriers be broadened to include both horizontal as well as vertical barriers for the soil/solid waste operable unit. This is supported by the fact that wastes are in direct contact with a portion of the wetlands and groundwater at the site. In addition, other barriers including sheet piling have been used at hazardous waste sites to limit the contact of waste with the environment. This type of technology, when combined with a groundwater extraction system, can be very effective at containing substances and preventing their release to the environment. I note that the WDNR has asked previously for this technology to be carried through the evaluation of alternatives.

Response 34:

Alternatives including vertical barriers (i.e., bio-trench/slurry wall) as process option technologies have been added.

Comment 35:

Page 3-4: I do not agree with eliminating all in-situ treatment technologies. Given the EPA's preference for treatment, I believe that the potential for soil vapor extraction should be retained for further analyses. While I agree that not all chemicals of concern would be treated through this technology, clearly the soil gas survey identifies volatile organic compounds that may be effectively treated using this technology. In addition, eliminating vitrification due to the technology still in the developmental stage is not appropriate. If this is the only reason why vitrification is being eliminated, it should be kept in for further analyses.

Response 35:

Comment noted and text on Figure 3-1 changed accordingly.

Comment 36:

Page 3-5: Please retain slurry wall and sheet piling as potential alternatives for further analyses. The barrier system does not have to be connected to the bedrock in order for an effective containment system, considering most of the compounds found in the groundwater are not dense compounds (i.e., sinkers).

Response 36:

Comment noted. Slurry walls have been retained as part of the barrier system; however, sheet pilings will not be considered further because of their poor integrity. Sheet pilings have not proven to be effective for retaining groundwater in the long term. They may be used as a temporary measure during bio-trench construction.

Comment 37:

Page 3-8: The RI/FS guidance states that the key aspect of the screening evaluation is the effectiveness of each alternative in protecting human health and the environment. Each alternative should be evaluated as to its effectiveness in providing protection and the reductions in toxicity, mobility, or volume it will achieve. In addition, both short term (i.e. construction and implementation period) as well as long-term (i.e. the period after the remedial action is complete) effectiveness need to be addressed. This section should be rewritten to consider these factors for each alternative screened, especially considering the new remedial action objectives and operable unit definition. The effectiveness evaluation is currently limited to "ability to meet remedial action objectives, ability to handle areas or volumes of media, potential impacts to human health and the environment during construction and implementation, and level of development and reliability of process". I also do not see any definitions of what the effectiveness evaluation sections mean (i.e. what does ability to handle areas or volumes of media mean?). Because this section needs to be rewritten, I have not provided specific comments on each alternative for the effectiveness evaluation.

Response 37:

The PRPs do not agree with this comment. Contrary to what the commentor perceives, alternatives are not screened in Section 3.0, as the title of the section indicates. In this section, technologies are screened prior to development of alternatives (in Section 4.0) to reduce the number of alternatives that will undergo a more detailed analysis.

Figures 3-1 and 3-2 represent initial technology screening; Tables 3-3 and 3-4 screen technologies using broader criteria that include effectiveness, implementability, and cost.

Only after alternatives have been assembled does the screening for protectiveness of human health and the environment; reduction of toxicity, mobility, and volume; and short-term and long term effectiveness take place.

Comment 38:

Section 3.4 - Overall Comment: What type of permits would be needed for each of these activities described in Table 3-4? Please specify whether these are considered on-site or off-site activities. I believe the statements regarding whether permits are needed may be in error, if these are considered on-site activities. I note that substantive requirements would need to be met, but permits for on-site activities are not required. Perhaps for some of these, specific WDNR approvals may be needed, however, that is different than a permit requirement.

Response 38:

Comment noted; changes have been made to Section 3.4 accordingly.

Comment 39:

Page 3-24: It is my understanding that carbon adsorption is not very effective at removing tetrahydrofuran. A bench scale or treatability study will be needed to adequately design an effective carbon adsorption system. Some discussion of this should be provided in this section. Again, what permit is necessary for carbon adsorption?

Response 39:

This alternative has been modified to include bioremediation prior to carbon adsorption. A permit would not be necessary unless thermal regeneration of carbon took place on-site. In this case, only the substantive requirements would need to be met.

Comment 40:

Page 3-32: While deed restrictions and fencing could hinder human direct contact with soil and waste, they would not protect animals from coming into contact with soils and waste, nor would they serve to prevent contact between waste and other media such as groundwater, unless they are physically placed between the waste and the soil and groundwater.

Response 40:

The remedial action goal related to preventing direct contact exposure is intended to protect the "public," and does not purport to protect animals.

Comment 41:

Section 4: This section needs to be rewritten to include a discussion of the source containment operable unit and interim groundwater operable unit. In addition, while I believe it is helpful to speculate as to the treatment technology necessary to discharge the extracted groundwater, it will be necessary to conduct a pump test, as well as a treatability test on the extracted groundwater to determine which technologies will result in compliance with WPDES permits as well as BAT technology. Again, a barrier system will need to be included in this discussion as well.

Response 41:

Section 4.0 has been rewritten consistent with the revised remedial action goals. The need for pump and treatability tests is discussed as appropriate in Section 6.0. Discussion of a trench system has been added as requested.

Comment 42:

Page 4-1: The No Action alternative should state that monitoring would be required on a quarterly basis, not a semi-annual basis.

Response 42:

Comment noted and text changed accordingly.

Comment 43:

Alternative 2 should also include a discussion of how the environmental impacts from this site would be addressed. How would fencing the site protect animals from coming in contact with soil and solid waste?

Response 43:

See Response 40.

Comment 44:

Page 4-3: Alternative 5 limits the treatment of groundwater to tetrahydrofuran. As stated previously, groundwater would need to meet WPDES as well as BAT requirements prior to discharge for both organics as well as any inorganics that may be present in the groundwater. This would include acute and chronic toxicity testing requirements. The exact treatment

technology is likely to be determined after a treatability test is conducted as part of remedial design.

Response 44:

Comment noted. See Responses 4 and 5 regarding limiting treatment of groundwater to THF. In treating this constituent of concern, it is recognized that other chemicals that are not of concern to public health will have to be considered as part of the overall option of the treatment system.

Comment 45:

Page 4-5: The discussion of Alternative 2 needs to state that this alternative would not contain contaminated groundwater, nor would it prevent migration of hazardous substances to the groundwater, as wastes are in direct contact with the groundwater. Thus, continued release of contaminants to the surface water and wetlands would occur with this alternative. This alternative would not result in compliance with Wisconsin groundwater regulations.

Response 45:

Comment noted; changes to page 4-5 have been made accordingly.

Comment 46:

Page 4-8: Alternative 3 specifies a 1.5 foot cover layer. This layer is intended as a frost protection layer, and the exact depth of that layer would be determined by the frost depth for the area. The word "minimum" should be place prior to the 1.5 foot depth reference. Also, there is no discussion of a gas extraction system, which would be necessary with any landfill cap installation. The gas extraction system would need to comply with NR 445, Wisconsin Administrative Code.

Response 46:

Comment noted. The word "minimum" has been added to page 4-3 and Figure 4-3. However, a gas extraction system would not be necessary in this case.

Comment 47:

Page 4-10: The exact location of groundwater extraction wells would need to be determined after a pump test was conducted. The purpose of the extraction wells would be to act as a hydraulic barrier for the continued release of contaminants from the site. There may need to be shallow extraction wells to the east portion of the site, as well as the western portion of the site, especially if no physical barriers are incorporated into the remedy.

Response 47:

As discussed at the meeting on March 27, 1991, the location of constituents of concern is most important in determining the location of extraction wells; the results of a pump test are most important in determining the number of wells. Remainder of comment noted; alternatives have been added to minimize leachate migration to wetlands north and east of the waste boundary.

Comment 48:

Page 4-11: While carbon adsorption is the likely treatment required for the extracted groundwater, the FS should be broad based and recognize that the exact treatment technology may change as a result of the WPDES effluent limits, BAT determination, and treatability studies.

Response 48:

Comment noted and text on page 4-11 changed accordingly.

Comment 49:

Alternative 7 should state that containment of the site would be incomplete, as there would be no barrier to prevent the continued release of contaminants from the site to the groundwater or surrounding wetlands and surface water. While bioremediation may be effective at treating the groundwater, it would not serve as a complete containment system without either hydraulic or physical barriers. Hazardous substances in the source would not be reduced with this alternative.

Response 49:

The alternatives in the Final FS Report have been changed or modified. Barriers are now included in the detailed analysis. Alternative 7 has been removed from consideration.

Comment 50:

Page 4-12: It is likely that bioremediation would need to include the addition of nutrients as well as oxygen. Often, the use of indigenous species is difficult for in-situ bioremediation. In addition, extraction wells as part of the design, would be necessary if nutrients are necessary to enhance biological activity.

Response 50:

In-situ bioremediation alone is no longer being considered as a viable alternative. Surface bioremediation, along with the in-situ bioremediation concept presented in the Draft FS Report, is now being considered. Extraction wells are included as part of the revised system.

Comment 51:

Also, in the discussion of Alternative 8, I believe there is a typo on the second line. I don't believe "texting" is a word.

Response 51:

Alternative 8 has been removed from consideration.

Comment 52:

Page 5-1 The overall protection of human health and the environment should also discuss any uncertainties present at the site.

Response 52:

Commented noted; a discussion of data uncertainties has been added.

Comment 53:

Page 6-1 - 6-3: The discussion regarding the overall protection of human health and the environment needs to be rewritten to better reflect the realities and uncertainties at the site. Clearly, surface water, sediment and groundwater contamination have occurred as a result of this site, and the no action alternative is not protective of human health or the environment. If the consultant does not wish to state this in this section, I believe the Agencies should rewrite this section of the report. This entire discussion is unacceptable to the WDNR as currently written. Statements made in this section are not supported by the RI findings with respect to the risk assessment, the water quality sampling conducted as well as the uncertainties present at the site.

Response 53:

The PRPs believe the statements made in this section are supported by the RI findings. However, the PRPs do acknowledge data uncertainties at the site. A discussion of these uncertainties has been added.

Comment 54:

The discussion of compliance with ARARs should clearly state that the no action alternative does not comply with chemical specific or action specific ARARs. Groundwater standards, capping requirements, and surface water standards are exceeded at this site.

Response 54:

The PRPs believe the discussion regarding final cover requirements and groundwater enforcement standards is clear. No discussion of surface water standards is included

because it is uncertain whether total recoverable zinc exceeds applicable standards at this time.

Comment 55:

Page 6-4: The short term effectiveness should be restated to reflect the fact that the groundwater remedy is an interim remedy.

Response 55:

See Response 4.

Comment 56:

The groundwater monitoring requirements would likely be expanded to quarterly, as opposed to semi-annual monitoring.

Response 56:

Comment noted and text changed accordingly.

Comment 57:

How does the consultant define "sound" with respect to the condition of the cap, especially when the cap was never investigated and waste can be seen through portions of the cap?

Response 57:

See Response 17.

Comment 58:

Page 6-6: This alternative is not protective of human health and the environment. This section should be rewritten to clearly reflect the concerns at the site with respect to environmental uncertainties as well as lack of source containment. The cap would not be protective over time, in that no frost protective layer would be included, as required by the current landfill closure regulations. Because wastes are in contact with the groundwater, this alternative would not prevent the continued release of contaminants to the groundwater, nor would it prevent the migration of contaminants from the site to the adjacent surface water and wetlands, where there are already water quality criteria exceeded. This report should not be acceptable without these changes. While this remedy would be more "protective" of the environment and human health than the no action alternative, it clearly would not meet the test of protectiveness. Since this document will be presented to the public for review, this analyses as currently written is misleading and inaccurate and needs to be corrected prior to being acceptable. Finally, the remedial action objectives would not be met with this alternative.

Response 58:

This section has been rewritten to reflect data uncertainties at the site. One such uncertainty is whether recoverable zinc exceeds surface water quality criteria, contrary to what is stated in the comment--that these criteria have already been exceeded.

Comment 59:

Page 6-7: This alternative does not comply with ARARs in that there would not be compliance with State capping regulations (NR 504), nor would there be compliance with the State groundwater law (NR 140).

Response 59:

A statement has been added that the cap for this alternative is consistent with WAC NR 506.08(3) regulations. The results of groundwater modeling included in the Final FS Report indicate that enforcement standards would be achieved in the short term after capping; however, there is uncertainty regarding the amount and concentration of the source in the landfill.

Comment 60:

Since this alternative does not include the addition of a frost protection layer, the long term effectiveness and permanence of this alternative is questionable. Please explain how tracking the constituents relates to the evaluation of long-term effectiveness and permanence.

Response 60:

Narrative has been added regarding the vulnerability of this cap to frost. The discussion of groundwater monitoring ("tracking") will be moved to Section 6.2.2.2.

Comment 61:

Please confirm that a permit would be required from the US Army Corp of Engineers if capping materials need to be placed over a portion of the wetlands. Would not wetlands mitigation be required as well?

Response 61:

We believe a permit would be required. As a part of this permit, wetlands mitigation would be presented.

Comment 62:

The cost for the alternative should include quarterly monitoring of the groundwater, as that would likely be required at this site.

Response 62:

Comment noted and text changed accordingly.

Comment 63:

Page 6-9: The description of the cap should include flexibility with respect to the frost protection layer. The cap description should state "at least a 1.5' frost protection layer", depending on the depth of frost in the area.

Response 63:

Comment noted and text changed accordingly.

Comment 64:

Page 6-10: Please ensure that quarterly monitoring of the groundwater is included in this alternative.

Response 64:

Comment noted and text changed accordingly.

Comment 65:

This alternative alone is not protective of human health and the environment. This alternative does not serve to contain contaminants from leaving the site and entering the adjacent wetlands, as has already occurred. In addition, while the cap would serve to reduce infiltration of water through the wastes, since wastes are in contact with the groundwater, capping the site alone does not constitute containment and is not protective of the groundwater.

Response 65:

The discussion under Section 6.3.2.1 has been revised to indicate uncertainties associated with the site.

Comment 66:

There are not low concentrations of contaminants in the groundwater, as this discussion states. There are groundwater exceedances of more than 15 times the enforcement standards and 100 times the PAL for tetrahydrofuran. This statement should be removed from the text. Natural attenuation of contaminants will not result in reducing the concentration of contaminants in the groundwater in an acceptable time frame.

Response 66:

The phrase "low concentrations" has been removed from the text. A dispersion model presented in the Final Draft FS Report shows that natural attenuation to below the enforcement standard levels would occur in about 2 years. The PRPs also maintain that PALs are not ARARs at this site (see Response 15).

Comment 67:

Page 6-11 : The alternative alone does not comply with ARARs, in that there would not be compliance with Wisconsin groundwater law. Chapter 160, Wisconsin Statutes places a non-discretionary requirement to take actions to prevent the continue release of contaminants at concentrations that would result in Enforcement Standards exceedances, at the point of standards application (i.e. the waste boundary for Superfund sites). Without proper containment of wastes, this requirement is not meet, and therefore, ARARs are not met.

Response 67:

See Response 15.

Comment 68:

The fact that remedial action objectives for the soil/solid waste operable unit are not met with this alternative alone, should be included in the discussion of long term effectiveness and permanence. The groundwater operable unit will be addressed in a subsequent FS.

Response 68:

A discussion has been added regarding the ability of this alternative to meet the revised remedial action objectives for the soil/solid waste operable unit.

Comment 69:

Page 6-13: Costs should include quarterly monitoring of groundwater.

Response 69:

Comment noted; costs in the Final FS Report have been modified to include quarterly groundwater monitoring costs.

Comment 70:

Page 6-14: The Subtitle C cap alone is not protective of human health and the environment, in that it alone does not act to contain wastes from coming into contact with the groundwater and prevention of the leaching of contaminants to the groundwater. The comments that were stated above regarding the Subtitle D cap are also relevant here.

Response 70:

Alternative 4 in the Draft FS Report has been removed.

Comment 71:

With respect to compliance with ARARs, again the comments for the Subtitle D cap also apply to this discussion. ARARs would not be met with this alternative alone. Again, remedial action objectives would not be met with this alternative as the sole alternative for the soil/solid waste operable unit, and thus the comments with respect to long term effectiveness and permanence of the Subtitle D cap apply here as well.

Response 71:

See Response 70.

Comment 72:

Page 6-16: Costs should include quarterly monitoring of groundwater.

Response 72:

See Response 70.

Comment 73:

Page 6-17: The report should state that it is anticipated that carbon adsorption would be the method of treatment of groundwater. Flexibility is needed should additional treatment be required as a result of the WPDES or BAT requirements.

Response 73:

See Response 50.

Comment 74:

Page 6-18: I would agree that this alternative would result in overall protection of human health and the environment. Again, the cap requirements should include a statement that identifies a minimum of 1.5 foot frost protection layer. The groundwater collection and treatment system would act to contain contaminated groundwater from discharging to the surface water or wetlands. Since wastes will still be in contact with the groundwater, the extraction system is necessary to meet remedial action objectives.

Response 74:

This alternative has been retained in the Final FS Report. A statement will be added regarding the thickness of the frost protection layer.

Comment 75:

Page 6-19: This alternative complies with ARARs - both the capping requirements, as well as the groundwater law.

Response 75:

Comment noted.

Comment 76:

The groundwater recovery system would remove more than tetrahydrofuran from the groundwater and as such would reduce the total volume of hazardous substances in the groundwater.

Response 76:

Comment noted.

Comment 77:

Page 6-20: The groundwater collection and treatment system is likely to be necessary for at least 30 years, in order to continue to successfully contain wastes from being released to the groundwater. For the purposes of this report, it is unrealistic to expect that the groundwater extraction and treatment system would be shut down in less than 30 years.

Response 77:

Comment noted and text changed accordingly.

Comment 78:

Page 6-22: The cost figures need to be updated to reflect the operation of the groundwater extraction system for 30 years, as well as quarterly groundwater monitoring.

Response 78:

Comment noted; costs have been changed accordingly.

Comment 79:

My comments with respect to the Subtitle D cap with groundwater collection and treatment are also relevant to the discussion of Alternative 6 - Subtitle C cap with groundwater extraction and treatment, therefore will not be repeated here.

Response 79:

Alternative 6 has been removed from the Draft FS Report.

Comment 80:

Page 6-27: This alternative should be rewritten to reflect the need for groundwater extraction in order to be in compliance with the State's groundwater law. I will not provide additional comments on this alternative until the discussion is rewritten. I believe bioremediation should be kept in this analyses, as that may be the most effective way to treat tetrahydrofuran. However, additional treatment of the extracted groundwater would be necessary prior to discharge of the groundwater to the surface water.

Response 80:

The in-situ bioremediation alternative, as presented in the Draft FS Report, is no longer considered. Instead, groundwater extraction followed by surface bioremediation and reinjection is considered.

Comment 81:

Page 6-32: The above comment applies to Alternative 8 - Subtitle C cap with in-situ groundwater bioremediation.

Response 81:

See Responses 70 and 80.

Comment 82:

Page 7-1 This section needs to be rewritten based on the above comments, and the fact that we have changed the concept of the source control/containment operable unit to include interim groundwater actions and are not addressing the final groundwater remedy in this Record of Decision. Therefore, I will not provide a detailed review of this section, as clearly it reflects the report as currently written. In an effort to expedite this review, I believe that either the Agencies should prepare this portion of the report based on comments from both agencies, or the consultant should resubmit this section after incorporating our comments.

Response 82:

This section has been rewritten based on agency technical review comments.

Comment 83:

Page 8-1: I believe this section is misleading and confusing to the public, as clearly the consultant's preferred alternative is not the agencies preferred alternative. I suggest that either this be removed from the report prior to report approval, or placed in the report as an appendix. The appendix should clearly state that this is the PRP's preferred action and not necessarily the Agencies preferred action at the site.

Response 83:

As discussed at the March 27, 1991, meeting, this section will remain in the same place in the Final FS Report.

Comment 84:

Appendix A: Why are federal drinking water standards not applicable at this site?

Response 84:

Table A-1 has been revised to indicate that these standards are applicable.

Comment 85:

The same comment applies to the National Emission Standards for Hazardous Air Pollutants. Since there are hazardous substances present at this site, and likely gas extraction will occur, this should be listed as an ARAR. The determination of whether hazardous air emissions occur will be made once the remedy is implemented.

Response 85:

These standards have been listed as applicable in the Final FS Report.

Comment 86:

NR 140, Wisconsin Administrative Code, as stated in past comments to EPA, are applicable at this site, as is NR 141, monitoring well requirements. In addition, Chapter 160, Wisconsin Statutes is applicable and should be included in this table as well. The consultant does not specify whether Chapter 144 is applicable or relevant and appropriate. This should be included here.

Response 86:

NR 140, NR 141, Chapter 160, and Chapter 144 are listed as applicable in the Final FS.

Comment 87:

Page A-18: NR 140 is an applicable requirement for this site. In addition, the point of standards application for Superfund sites is the waste boundary, consistent with the NCP.

Response 87:

See Response 86 regarding applicable requirement. See Response 15 regarding point of standards application.

Comment 88:

Page A-21: Preliminary water quality effluent limits are currently being calculated for this site for extracted groundwater discharge to surface water. These limits should be included as ARARs in the ROD.

Response 88:

Comment noted.