UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
230 SOUTH DEARBORN ST.
CHICAGO, ILLINOIS 60604

REPLY TO THE ATTENTION OF:

5HS-11

FEB 21 1990

VIA EXPRESS MAIL

RECEIVED
MAR 08 1990
BUREAU OF SOLID - HAZARDOUS WASTE MANAGEMENT

Mr. Briand C. Wu
Murata Erie North America
1900 W. College Avenue
State College, PA 16801

Re: Stoughton City Landfill Site,
Stoughton, Wisconsin - Review Comments
to Revised Remedial Investigation Report

Dear Mr. Wu:

Enclosed herein please find the U.S. EPA and WDNR review comments to the Revised Remedial Investigation (RI) Report for the above referenced site. As discussed at our meeting of February 5, 1990 and as further stated in my letter of February 13, 1990 to you, the Final RI Report is to be submitted to U.S. EPA and WDNR by close of business, Wednesday, March 14, 1990.

Please submit ten copies of this document to me and three (3) copies to Robin Schmidt of the WDNR. As I stated in my February 13th letter, I would like to hold a teleconference during the week of March 5th to discuss the status of the deliverables being prepared by both ENSR and ERM. I would prefer to have this teleconference during the morning of March 7th. Please respond by telephone as to your availability on this date.

Sincerely,

Michael A. Valentino

Michael A. Valentino
Remedial Project Manager

Enclosures (2)

cc: T. C. Wright, The Jesup Group, w/ enc.
Robert Kardasz, City of Stoughton, w/ enc.
John Imse, ERM, w/ enc.
Robin Schmidt, WDNR, w/ enc.
Michael Schmoller, WDNR, w/ enc.
Michael Strimbu, Jacobs Engineering, w/ enc.

Technical Review Comments on PRPs
January 19, 1990
Draft Remedial Investigation Report
Stoughton City Landfill
Stoughton, Wisconsin

The subject document was reviewed for compliance with the following: 1) Guidance for Conducting Remedial Investigation and Feasibility Studies Under CERCLA (OSWER Directive 9355.3-01, October 1988); 2) Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A) [EPA/540/1-89/002, Interim Final, December 1989]; 3) Superfund Exposure Assessment Manual (OSWER Directive 9285.5-1, EPA/540/1-88/001, April 1988); 4) Superfund Public Health Evaluation Manual (OSWER Directive 9285.4-1, EPA/540/1-86/060, October 1986). The subject document was also reviewed for compliance with the Administrative Order by Consent (AOC) for the site, for whether previous comments on the October 23, 1989 Draft Remedial Investigation Report and various technical memoranda have been adequately addressed in this report, and on the basis of sound scientific and engineering practice.

SPECIFIC COMMENTS

Table of Contents, List of Appendices: No report on the results of surface water and sediment sampling on August 2-4, 1989 is listed.

Section 1.1 Purpose of Report, p. 1-3, paragraph 1: The paragraph references a March 1988 RI/FS Guidance. The more current guidance is October 1988.

Section 1.2 Report Organization, p. 1-6, last paragraph: Section 7 Summary and Conclusions should also recommend remedial action objectives.

Section 1.3.3.1 Ground Water, p. 1-14, paragraph 1: The October 23, 1989 Draft RI Report included and referenced Table 1-4 which showed construction details of six pre-RI monitoring wells (SB series). As this paragraph indicates that analytical results for indicator parameters from these wells have been useful and applicable to particular phases of the RI/FS, the construction details of these wells are both pertinent and of interest in the RI report. The table should be reintroduced and referenced.

Section 1.3.1.1 Ground Water, p. 1-15, paragraph 1: The text references January 25, 1984 sampling of the SP series wells by Strand Associates, Inc. for the City of Stoughton, and states that laboratory data are included in Table 1-3. No data is presented for the January 25, 1984 sampling in Table 1-3. Please revise the table to incorporate the data.

Section 1.3.3.1 Ground Water, p. 1-16, paragraph 3: Again, the Table 1-4 from the October 1989 Draft RI Report would be a useful reference.

Table 1-3: The 02/28/84 and 11/21/84 sampling dates shown in the Sampling Date column are not shown in Table 1-2, nor referenced in the text in Section 1.3.3.1. The data for the 01/25/84 sampling date shown in Table 1-2, and referenced in the text in Section 1.3.3.1, are not presented in this table.

Section 2.2 Surface Features, p. 2-2, paragraph 1: The former Section 3.7.3 Historical Aerial Photo Analysis (October 1989 Draft RI Report) contains excellent information that should be reintroduced here, as well as the former Figures 3-6 through 3-11. As presented in review comments on Technical Memorandum 1, prints of the eight historical aerial photographs used for the analysis should also be presented.

Section 2.5 Surface Water and Sediment Investigations, p. 2-5, second bullet: Several typographical errors of commission and omission are apparent: 1) SL2R2-1-W (sic) should read SL2R1-2-W per Table 4-1; 2) samples SL2R1-2-S and SL2R2-2-S should be added per Table 4-1. Also, replicate samples are not depicted on Figure 2-2.

Section 2.5 Surface Water and Sediment Investigations, p. 2-6, paragraphs 2 and 3: The last sentence in paragraph two should be rewritten to indicate the frequency of collection of field blank samples and trip blank samples specific to each sampling round. It is noted that no trip blanks are presented in Table 4-1. The last sentence in paragraph three should be rewritten to clarify that collocated samples were collected with some of the sediment samples, i.e., two replicates of sediment samples from sampling location SL2 were collected from each of the two sampling rounds, SL2R1-1-S and SL2R2-1-S from the first round, and SL2R1-2-S and SL2R2-2-S from the second round.

Section 2.8 Ground Water Investigations, p. 2-7: Review comments on the former Section 3.7.4 Area Ground Water Usage Survey (October 1989 Draft RI Report), requested that information on methodology, area surveyed, number of wells, well depths, density of wells within a three mile radius of the site, etc. be incorporated here in Section 2, with important findings included in Section 3. Instead, the PRPs contractor has totally deleted this information from the revised draft of the RI report.

Section 2.8 Ground Water Investigation, p. 2-9, first paragraph: Please briefly elaborate on the alterations in the construction design which were undertaken. This comment from the review of the October 1989 Draft RI Report has not been addressed.

Section 2.8 Ground Water Investigation, p. 2-9, second paragraph: The text in this paragraph references a bouldery layer encountered while drilling MW-3D, yet this layer is not shown at the depth of MW-3D in Cross Section A-A' in Figure 3-4. In reference to MW-2D, it is realized that the sampling plan specified that "the well screen be placed immediately below the confining layer." However, 1) what data was used to define the confining layer and how was it determined that this layer was not just a clay stringer since it was not encountered in other borings (e.g., field testing or lab testing of a sample), and 2) by placing this well much higher up in the formation than the other deep wells, it is not monitoring the same zone as the other deep wells, and since MW-2D is the only well completed in this interval there is nothing to compare data from this well against. The request to discuss the significances of the placement of MW-2D in greater detail was made in the review of the October 1989 Draft RI Report, and has not been addressed.

Section 2.9 Ambient Air Investigations, pages 2-9 through 2-10: The EPA suggested report format indicates that this section should summarize the ambient air sampling activities that were conducted, e.g., duration of sampling, number of upwind and downwind sample points for each sampling date, sample collection methods, analytical parameters, collection of meteorological data pertinent to interpretation of analytical data (ambient air temperature, relative humidity, atmospheric pressure, wind speed, wind direction, etc.). This section does not present any of this information. The referenced summary presented in Section 4.7 does not present the requested information, nor does Appendix C, the technical memorandum on ambient air sampling.

Figure 2-2: Replicates SL2R1-1-W, SL2R1-1-S, and SL2R2-1-S are not depicted in the figure, contrary to the assertion of the text in Section 2.5.

Section 3.2 Climate, pages 3-4 through 3-5: Section 3.2 should present information on site meteorologic data collected during the RI as per Section 2.4 and the EPA suggested report format. This comment, presented in the review of the October 1989 Draft RI Report, has not been addressed.

Section 3.4.2 Site Geology, page 3-9, last paragraph: The text references Figure 3-4. It would be useful to post groundwater levels at each well location on Figure 3-4. This comment, presented in the review of the October 1989 Draft RI Report, has not been addressed. Also with regard to Figure 3-4, SB-2 is identified but no information is presented for it on Cross Section D-D'.

Section 3.6.1 Regional Hydrogeologic Setting, page 3-13, paragraph 4: This paragraph presents useful regional groundwater indicator parameters, such as hardness, specific conductance, pH, and iron. Please briefly elaborate on whether these values were correlated to site values, and if so, discuss the correlation in Section 3.6.2 Site Hydrogeology.

Section 3.6.2 Site Hydrogeology, page 3-14, paragraph two: In regards to Figure 3-6 referenced here, why was this figure constructed using April 13, 1989 data instead of data from a later date when the new monitoring wells could be incorporated into the map. This comment, presented in the review of the October 1989 Draft RI Report, has not been addressed. Consideration should be given to adding on additional figure using data from the new wells as a means of verifying the assertion that groundwater flow direction does not significantly change over time.

Section 3.6.2 Site Hydrogeology, page 3-15, last paragraph: Why were the shallow aquifer parameter values in the former Table 3-2 (October 1989 Draft RI Report) deleted. The last two sentences from paragraph two of Section 3.6.5 (October 1989 Draft RI Report) should be added here, and comparison should be made to the values cited at the top of the current page 3-13, Section 3.6.1 Regional Hydrogeolic Setting. Also, discussion needs to be presented as to lack of background value due to radial groundwater flow patterns, radial mounding, and a local groundwater divide. The lack of an upgradient well and subsequent background data is a significant problem, the solution of which needs to be discussed in some detail. This comment, presented in the review of the October 1989 Draft RI Report, has not been addressed.

Section 3.8 Ecology, page 3-17: The last two sentences from the former Section 3.8 (October 1989 Draft RI Report) should be inserted here after the first sentence.

Figure 3-4: See comments above under Section 3.4.2.

Figure 3-6: See comments above under Section 3.6.2, page 3-14.

Section 4.0 Nature and Extent of Contamination, general: The QA/QC report for TCL semivolatiles and TAL inorganics completed by Environmental Standards Incorporated and cited throughout Section 4.0 (see for example, page 4-18, paragraph 2) was missing from Appendix F.

Section 4.3 Surface Water Sampling and Analysis, page 4-6: The first sentence in the paragraph should be corrected to read "...within the adjacent wetlands..." not "adjacent methods."

Section 4.3 Surface Water Sampling and Analysis, page 4-7, paragraph two: This paragraph needs to discuss whether methylene chloride and acetone were found in trip blanks in addition to field and lab blanks. The last sentence of the paragraph needs revision to address this issue and for correction of grammatical errors.

Section 4.3 Surface Water Sampling and Analysis, page 4-8, paragraph two: In the last sentence, dichlorofluoromethane (sic) should be corrected to dichlorodifluoromethane.

Section 4.4 Sediment Sampling and Analysis,page 4-11, paragraph three: Phthalates are known to be "ubiquitous" environmental contaminants in urban areas. Their presence in background samples does not necessarily indicate laboratory contamination.

Section 4.5 Soil Sampling and Analysis, page 4-17, paragraph two: Inorganic compound concentrations at the site should be compared to regional background values (not national) if available.

Section 4.7 Air Sampling and Analysis, page 4-25: Section 2.4 indicated that site meteorological data that were collected would be reported in this section, yet the section contains no such meteorological data. Wind velocities, wind direction, ambient air temperature, relative humidity, atmospheric pressure, etc. are important parameters pertinent to interpretation of analytical results. These parameters are not presented anywhere in the RI Report proper, nor in Appendix C, Technical Memorandum 3, Ambient Air Sampling Results Report. Further, this section reports detection of VOCs slightly above the method detection limit (MDL) in one down wind duplicate sample and not in the original sample, and concludes that the single "hit" was due to field contamination. This conclusion is premature since statistical variability could have resulted in the same set of data (that is, a sample having concentrations slightly below the MDL and the duplicate having concentrations slightly above the MDL). If this data was conservatively assumed to be a "hit", and given that a total of six downwind samples were taken, then the positive detect rate for VOCs in air would be ca. 17 percent. Therefore there is a reasonable probability that VOCs are escaping from the site via the air pathway.

Section 4.7 Air Sampling and Analysis, page 4-26: No information is presented on field blanks or trip blanks. Absent such information, the detection of volatile organics in an air sample cannot be summarily dismissed as "attributed either to media handling prior to or subsequent to sampling," especially since the limited VOCs analyzed for were found in the waste samples collected at MW-2 and MW-6 (1,2-

dichloroethene), were found in groundwater at the site (xylenes), were found in pre-RI sampling at the site, or were otherwise known or suspected to be historically disposed at the site. The text needs to be rewritten to reflect the detected airborne release of volatile organics from the site. This revision will also necessitate the introduction of air as a separate media of concern to be presented in discussions and summary tables which present potential contaminants of concern, intermedia impacts, in the baseline risks assessment, and throughout the report.

Section 4.8 Summary of Analytical Results and Inter-media Impact, page 4-26: The last paragraph on this page needs revision. The third sentence, which begins "Impact of the ground water from the soil..." should be corrected to read "Impact to the ground water...". Also, the text refers to "soil" samples at MW-2S and MW-6S as having been collected "within the refuse." This is an important point that is underplayed by the wording, both here and throughout the balance of the report. To better emphasize this point, these two samples should be termed "waste samples," and referred to as such throughout the report. This results in the addition of waste as a separate media to be presented in discussions and summary tables which present potential contaminants of concern, contaminants of concern, intermedia impacts, and in the baseline risk assessment. See also the comment above under Section 4.7 with regard to air as a separate media to be presented in discussions and summary tables.

Section 4.8 Summary of Analytical Results and Inter-media Impact, page 4-28, last paragraph: Revise the text in light of comments presented above under Section 4.7. Additional revisions need to be made to this section to present a discussion on the relationship of concentrations of PAHs found in waste samples to PAH concentrations in sediment samples.

Section 5.1 Volatile Organic Compounds, page 5-1 and beyond: Revise the text to address waste and air as separate media. Also revise Table 5-1 to address this issue.

Section 5.1.2 Intermedia Transport, page 5-2: The first paragraph of this section needs revision to reflect detection of VOCs in ambient air. Further, the paragraph misrepresents the open burning of "refuse and most liquid wastes" as "incineration." The text also needs revision to discuss the historic disposal of liquid wastes down auger holes at the landfill. As to the second paragraph, the first sentence should be corrected to read "...concentrations of VOCs in ground water detected at the landfill."

Section 5.1.2 Intermedia Transport, page 5-3, second paragraph: The text needs to present a discussion of the detection of benzene and chloroform in waste samples (from MW-2S and MW-6S), while these compounds were not detected in ground water at these monitoring wells (MW-25, 2D, 6S, 6D) nor in other media at the site.

Section 5.1.2 Intermedia Transport, page 5-4: The first paragraph needs revision to present discussions of the basis for using an assumed effective porosity value, and the basis for using the infiltration rate value. Further, the calculations yielding the dilution factor should be presented (e.g., calculations of groundwater and leachate flows, calculation of the dilution factor). As to the second paragraph, the basis of the groundwater velocity value of 285 ft/year needs to be presented - Appendix G, Hydrogeologic Studies, Table G-10, Calculation of Horizontal Flow Gradients and Velocity, presents an average groundwater velocity of 0.184 m/day, which, when multiplied by 1 ft/0.3048 m and by 365.25 days/yr, converts to 220 ft/year, not 285 ft/year.

Section 5.1.2 Intermedia Transport, page 5-5: The second variable presents v_g as 285 ft/yr; see comment immediately above. The fourth variable presents K_d based on a f_{oc} of 0.001 kg/kg, and references Table 5-3. Yet Table 5-3 presents K_d values based both on $f_{oc} = 0.001$ and $f_{oc} = 0.01$. Please expand the discussion presented in the first paragraph pertaining to the usage of the 0.001 value; e.g., usage of the 0.001 value results in a smaller retardation factor (R), hence a quicker compound travel velocity (v), which is used so as to be more conservative in protecting public health. The fifth variable symbolizes aquifer particle bulk density as DEN, rather than as Bb (beta b) as used in Figure 5-1. In the second paragraph, xylenes and 1,2-dichloroethene are offhandedly dismissed. Xylenes were detected at a frequency of 3/36 in ground water and 1/7 in air. Comparison should be made to oral and inhalation reference doses (RfDs) and slope factors in addition to proposed MCLGs which pertain only to drinking water. See also the comments presented above under Sections 4.7 and 4.8 with regard to the need to address these compounds. In the last line on the page, "subsurface soils" should be changed to "subsurface samples of waste."

Section 5.1.2 Intermedia Transport, page 5-6: The seventh line in the first paragraph needs a similar correction: "detected in the soil samples" should be revised to "detected in the waste samples." With regards to the first line in the second paragraph, Table 4-3 (and revised Table 6-1 enclosed with these comments) shows 2-butanone detected at a frequency of 1/7 in sediment samples. The paragraph should be expanded to present a more complete discussion of 2-butanone, referencing tables which show the data and frequency of detection. The text on this page also needs revision to present a discussion of the detection of dichloromethane as a tentatively identified compound (TIC). The last paragraph on this page needs revision to incorporate xylenes and 1,2-dichloroethene as compounds that may represent a concern, and should refer to the revised Table 6-1.

Section 5.1.1 Intermedia Transport, page 5-7: The first sentence of the paragraph needs revision: "soil concentration detected at the same monitoring well" should be revised to read "concentration detected in waste at the same monitoring well."

Section 5.2.2 Intermedia Transport, page 5-8, first paragraph: A revision needs to be made in the second line: "the soil sample" should be revised to read "the waste sample." The following should be added at the end of the paragraph, "However, it has been detected in 3 of the 36 groundwater samples at a range of 2.0J to 44J ug/L (see Table 6-1)."

Section 5.3.2 Intermedia Transport, page 5-10: The following text should be added to the beginning of the third line of the first paragraph of this section: "were collected within the refuse, and." Line seven of the second paragraph should be revised to read "Asphalt, observed at sampling location SL2 but not at SL1,..." With regard to the last sentence of the second paragraph, the risk resulting from all detected PAHs, as shown in the revised Table 6-1 transmitted with these comments, should be evaluated in Section 6.0. The text should also refer to Table 6-1.

Section 5.4.1 General Fate and Transport, page 5-11: The second paragraph should be revised to read "4,4'-DDD" not "DDD." The text should also be revised to present a discussion of the semivolatile tentatively identified compounds (TICs), and to refer to Table 6-1. Thirteen unknown hydrocarbon and four unknown other semivolatile component peaks at significant concentrations were reported in the groundwater sample from MW-1D, while samples from MW-2S had peaks indicative of small concentrations of unknown semivolatiles. Review comments of Technical Memoranda 4 and 5 requested that the RI Report address the presence of semivolatile TICs, yet the comment clearly has not been addressed in this report.

Section 5.4.2 Intermedia Transport, page 5-11: The phrase in the first sentence "...the soil sample collected..." should be revised to "...the sample collected..." The following should be inserted as a new second sentence: "However, it was not detected in the sample collected at MW-6 which was also collected within the refuse."

Section 5.4.2 Intermedia Transport, page 5-12, second paragraph: The second sentence states that pentachlorophenol and benzoic acid in groundwater samples may have been the result of laboratory or field contamination. However, neither of the two field blanks from the first sampling round, nor the two field blanks from the second sampling round, contained benzoic acid. The laboratory QA/QC review does not indicate either of these compounds as laboratory blank contaminants. Unknown carboxylic acids were also tentatively identified in surface water at the site. Pentachlorophenol is commonly used as a fungicide, as a contact herbicide, and as a wood preservative. Given the nature of the wastes disposed at the site, and the information presented above, the detection of benzoic acid and pentachlorophenol can not be dismissed as attributable to laboratory contamination or field contamination during sample handling. This paragraph must be revised. Reference should also be made to Table 6-1.

Section 5.5.1 Fate and Transport, pages 5-13 through 5-15: Review comments on Technical Memoranda 4 and 5 requested that the RI Report include discussion of the detection of numerous inorganics, especially as some were significantly elevated above quantities detected in background samples. The revised Table 6-1 included with the present RI review comments attempts to partially address this issue. Technical memoranda review comments specifically requested the evaluation of these analytical results and explanation of apparently elevated concentrations of aluminum, barium, cadmium, calcium, chromium, iron, lead, magnesium, nickle, sodium, and zinc. This section fails to address aluminum, barium, calcium, magnesium, and sodium. Calcium has been shown to compose a significant portion of landfill leachates as $CaCl_2$; magnesium, likewise, as $MgCl_2$. Sodium has also been shown to compose a significant portion of landfill leachates. Additionally, this section needs to present a discussion of cobalt, as it is addressed in Section 6.0, and a discussion of potassium, as it has been shown to compose a significant portion of landfill leachates. A discussion of vanadium should also be presented. Reference should also be made to Table 6-1.

Section 5.5.2 Intermedia Transport, pages 5-15 through 5-16: This section will need revision to reflect requested revisions in Section 5.5.1 as shown above, and to refer to Table 6-1.

Section 5.6 Transport of Contaminants in Ground Water, general comments: This section appears out of place. No attempts at discussion of transport of contaminants in other media--soil, surface water, sediment, air--is made as separate sections in Section 5.0. Hence, Section 5.6 would probably be more germane following Section 6.2.3.3 Ground Water and preceding Section 6.2.4 Comparison with ARARs. If Section 5.6 is to be moved into Section 6.0, Tables 5-12 through 5-17 and Figure 5-1 should also be moved to Section 6.0.

Section 5.6 Transport of Contaminants in Ground Water, page 5-18: The first paragraph should present a discussion of adjustments utilized to compensate for the use of a point-source nomograph for an area source. The fourth line of the second paragraph indicates that the effective aquifer thickness is assumed to be 6 meters, whereas Table 5-14 indicates 10 meters. Please resolve this discrepancy.

Table 5-1: Revise to add air and waste as separate media columns, and to add ethylbenzene, toluene, and dichloromethane (TIC). See the revised Table 6-1 enclosed with these review comments.

Table 5-2: Revise to add ethylbenzene, toluene and dichloromethane to the table, and to present appropriate values for the characteristics of each, as per requested revisions to Table 5-1.

Table 5-3: Revise to add dichloromethane to the table and to present appropriate values for the characteristics shown.

Table 5-4: Revise to add dichloromethane to the table, and to present appropriate values for the parameters shown. The values presented have been verified as correct using a groundwater velocity of 285 ft/yr; however, as mentioned previously, Appendix G Table G-10 presents a groundwater velocity of 220 ft/year, not 285. The velocity values in the column may need to be recalculated. If so, appropriate revisions to the text in Section 5.1.2 at the bottom of p. 5-4 should also be made.

Table 5-5: Revise the table to add air and waste as separate media columns, and to add di-n-butyl phthalate. See the revised Table 6-1 enclosed with these review comments.

Table 5-6: Revise to add di-n-butyl phthalate to the table, as per requested revisions to Table 5-5, and to present appropriate values for the characteristics shown.

Table 5-7: Revise to add air and waste as separate media columns. See the revised Table 6-1 enclosed with these review comments.

Table 5-9: Revise to add air and water as separate media columns. See the revised Table 6-1 enclosed with these review comments for tentatively identified compounds (TICs) to be added to this table.

Table 5-10: Revise to add TICs shown in the revised Table 6-1 enclosed with these review comments.

Table 5-11: Revise to add air and waste as separate media columns. See previous comments under Section 5.5.1, and the revised Table 6-1 enclosed with these review comments, for additional inorganics to add to this table.

Table 5-12: Revise to list all inorganics shown in revised Table 6-1 and corresponding MCLs; identifying as appropriate primary or secondary MCLs and as to final or proposed; if no MCL exists for a given inorganic, so identify.

Table 5-13: Revise to add other compounds as requested above under Sections 5.0 through 5.5.2, and Tables 5-2, 5-4, 5-6, 5-9, 5-10, 5-11, and 5-12. See also general comments above under Section 5.6 pertaining to moving to Section 6.0. In regard to Note (1), Sections 5.1 through 5.5 do not adequately define contaminants of concern.

Table 5-14: See general comment above under Section 5.6 pertaining to moving to Section 6.0.

Table 5-15: Explain rationale for using MW-2 concentrations for inorganics, e.g., MW-2 is the monitoring well closest to the potential receptors located to the southeast of the site, has highest values of these parameters. Add additional inorganics as called for in requested revisions under Section 5.5.1 above, and under Tables 5-11, 5-12, and 5-13 above. See also general comment under Section 5.6 above pertaining to moving to Section 6.0.

Table 5-16: See comments above regarding Table 5-13. See also general comments above under Section 5.6 pertaining to moving to Section 6.0.

Table 5-17: See comments above regarding Table 5-16.

Figure 5-1: See general comments above under Section 5.6 pertaining to moving to Section 6.0.

Section 6.0 Baseline Risk Assessment, general comments: The following is an assessment of the technical adequacy of the baseline risk assessment (BRA) based upon the most recent EPA guidance, Risk Assessment Guidance for Superfund (RAGS). On reviewing the BRA it was apparent that preparation of the document was in progress when RAGS was issued--the BRA references both the Superfund Public Health Evaluation Manual (SPHEM) and RAGS as key guidance documents. In cases such as this, the guidance presented in RAGS is not meant to invalidate methodology which conforms more closely to the SPHEM format. The majority of the comments offered below, however, do not involve the issue of old versus new methodology.

Comment #1: The BRA lacked an adequate "Contaminants of Concern" analysis. The list of contaminants of concern was actually developed in the "Contaminant Fate and Transport" section (Section 5) of the remedial investigation (RI). However, the methods used to include contaminants on the list were neither consistent with SPHEM, nor RAGS. If RAGS methodology had been used to develop the list of contaminants of concern, the following contaminants would likely be added to the list:

- Xylenes and 1,2-dichloroethene, based upon the fact that they were detected in groundwater during both the RI, as well as, in the previous site studies (the qualitatively relevant groundwater data was noted in the RI). In the case of xylenes, there is also historical evidence of disposal of these compounds at the site.

- A number of Polycyclic Aromatic Hydrocarbons (PAHs) additional to pyrene, benzo(k)fluoranthene, and benzo(b)fluoranthene. Addition of a wider range of PAHs would be based upon their presence in source areas, and their apparent transport to sediments via surface water mechanisms (the fact that three of the PAHs were found in sediments implies the transport of other PAHs).

- A number of Volatile Organic Compounds (VOCs) such as perchloroethylene (PCE), trichloroethylene (TCE), and toluene. Addition of these compounds would be based upon information from the pre-RI studies which give qualitative evidence that these compounds have been present in groundwater. In the case of toluene, there is also historical evidence that it could be present onsite.

Some of the contaminants listed above may show relatively low risks when taken through the analysis using the available quantitatively relevant data. However, the importance of listing these as contaminants of concern becomes apparent during the analysis of uncertainties, when the potential for underestimating site risks is discussed.

Comment #2: The BRA lacked an uncertainties analysis. The uncertainties analysis should address the potential for overestimation of site risks, as well as, the potential for underestimation of risks. Pre-RI data indicates (at least qualitatively) the presence of a number of contaminants which were not detected in the RI. The uncertainties analysis should address the temporal representativeness of the sampling data collected during the RI. Could the difference in sampling results between the pre-RI studies and the RI be due to varying rainfall/groundwater conditions? (Note that page 4-21, paragraph 2 of the RI presented a similar rationale to explain fluctuations in chlorofluorocarbon concentrations) Alternatively, have site sources been depleted by efficient transport mechanisms?

Comment #3: The BRA discounted the possibility of future residential development at the site, citing current city plans to use it for recreational purposes. However, given that Dane county population is expected to increase significantly in the near future (see page 3-17 of the RI), and also assuming that the site's future land use has not been guaranteed, an onsite residential scenario represents a reasonable maximum exposure for potential future land use. Potential media of concern at the future site residence would include: groundwater, site soils, outdoor and indoor air, surface water and sediments.

Comment #4: The environmental effects due to the site need to be addressed in a more thorough fashion. At the least, the risk assessment should present a basic inventory of the current status of selected components of the area's biological community (e.g.. a list of the rare or endangered species in the area which could be affected by the site).

Comment #5: The RI documented that a Preliminary Health Risk Assessment was completed by the Wisconsin Division of Health, Department of Health and Social Services (WDHSS) for the Agency for Toxic Substances and Disease Registry (ATSDR). However, the BRA did not compare its results to the ATSDR Risk Assessment. According to RAGS this comparison should be made and any inconsistencies between the two studies should be analyzed.

Per Risk Assessment Guidance for Superfund, Section 5.6.2, TICs should be presented as chemicals of potential concern in the risk assessment, and the uncertainty in both identity and concentration should be noted. Table 6-1 as presented does not adequately show potential contaminants of concern over all media. Air and waste are neglected as separate media. Table 6-1 should be revised to show air and waste as separate media, and to show TICs. A revised Table 6-1 is enclosed with these review comments. The text needs to present information on potential contaminants of concern, grouping them into classes on basis of similar mobility and toxicity, and then narrowing potential contaminants of concern down into a table listing contaminants of concern and their respective media, so that a baseline risk assessment can be properly conducted.

Section 6.1 Identification of Contaminants: The section should be retitled "Identification of Contaminants of Concern." The first sentence of the section should be revised to read "The potential contaminants of concern..." As shown under previous review comments above, Section 5.0 presented an inadequate discussion and analysis of potential contaminants of concern. Table 6-2 does not adequately summarize an analysis conducted in Section 5.0, because the section did not conduct the analysis. TICs cannot be dismissed summarily as presented in the one sentence in this section.

Section 6.2.1 Exposure Pathways Identification: The exposure pathway identification section presents a discussion of potential release mechanisms and an estimation of the probability that these mechanism are in effect. A number of inconsistencies are apparent in this analysis. For example, the last bullet item on page 6-4 is inconsistent with the data, as well as with the first bullet item on page 6-5. The fact that low concentrations of contaminants were detected in groundwater at the landfill indicates a moderate to high probability that organic compounds have been transported from landfill wastes to groundwater (although the magnitude of this process may currently be low). Furthermore, if (as is stated on page 6-5) leaching of inorganic analytes from the buried waste to the groundwater is of moderate probability, then the same would be expected of the more mobile organic contaminants. Section 6.2 should be revised to make it internally consistent and also consistent with the data.

Section 6.2.1 Exposure Pathways Identification, page 6-7, first and second Bullet Items: Recreational exposure to surface water and sediments should include ingestion of these media, or else it should be shown that these pathways are insignificant compared to dermal contact.

Section 6.3.1.6 Benzo(b)fluoranthene and Section 6.3.1.7 Benzo(k)fluoranthene, page 6-15: Toxicity information on these two compounds can be obtained from EPA's Health Effects Assessment document for PAHs and/or ATSDR Toxicity Profiles.

Section 6.3.1.19 Zinc, page 6-19: Consult EPA's Health Effects Assessment document and/or ATSDR's Toxicity Profile for toxicity information on zinc.

Section 6.3.3 Estimation of Chemical Intakes, page 6-20: For the residential scenario, children aged 0-6 years would represent a more sensitive subpopulation than children from 6-12 years.

Section 6.3.3 Estimation of Chemical Intakes, page 6-22, line 12 ("For dermal exposure..."): Change "surface water" to "groundwater".

Section 6.3.3 Estimation of Chemical Intakes, page 6-22, line 14: Assumption (2) assumes that 80% of the body surface area is available for contact during bathing. Superfund Exposure Assessment Manual (SEAM) suggests using the value 100%.

Section 6.3.3 Estimation of Chemical Intakes, page 6-23, line 4: Why should frequency of exposure to sediments be less than contact with surface water? A reasonably conservative assumption is that frequency of exposure to sediments is the same as frequency of exposure to surface water.

Section 6.3.3 Estimation of Chemical Intakes, page 6-24, equations for lifetime exposure: Exposures averaged over a lifetime are appropriate for the calculation of carcinogenic risks. However, for the calculation of the hazard index, exposures should be averaged over the period of exposure.

Section 6.3.3 Estimation of Chemical Intakes, page 6-27: In line 1, the risk value of 9.9×10^{-6} should be reported to one significant figure (as per RAGS): 1×10^{-5}. In line 2, the risk range 10^{-4} to 10^{-7} is more appropriately termed the "range of concern". Risks of 10^{-4} are not always deemed acceptable.

Table 6-11: Should the slope factor for benzo(b)fluoranthene be associated with footnote (3)? Otherwise, it is not available in IRIS or HEAST. An oral slope factor of 1.75 may be calculated for arsenic using the IRIS unit risk value of 5×10^{-5}/ug/L. Reference doses (RfDs) for lead may be obtained from SPHEM. EPA's Environmental Criteria and Assessment Office (ECAO) may be consulted for advice on deriving RfDs for tetrahydrofuran and trichlorofluoromethane. An attempt should be made to characterize the risks due to these contaminants.

Section 7.0 Summary, Conclusions, and Feasibility Study Overview: This section will need revision after the remainder of the document has been revised to address the review comment presented above. Therefore, no review of this section has been conducted.

Executive Summary: This section will need revision after the remainder of the document has been revised to address the review comments presented above. Therefore, no review of this section has been conducted.

Table 6-1 (page 1 of 4)

POTENTIAL CONTAMINANTS OF CONCERN
Stoughton City Landfill
Stoughton, Wisconsin

	WASTE (ug/kg) (i.e., @ MW2, MW6)		SOIL (ug/kg)		GW (ug/l)	
CHEMICAL	Freq	Detected Range	Freq	Detected Range	Freq	Detected Range
VOLATILE ORGANICS						
Benzene	1/6	2.0J				
2-butanone						
Chloroform	1/6	1.0J				
1,2-dichloroethene (cis and trans)					1/36	8.0
1,2-dichloroethene (trans only)						
Ethyl benzene						
Toluene						
Xylenes (total)					3/36	1.0J
Dichlordifluoromethane					7/42	16J - 240J
Trichlorofluoromethane					6/42	6.4J - 24J
Tetrahydrofuran					6/44	27 - 660J
SEMIVOLATILE ORGANICS						
Benzoic acid					1/36	2.0J
Benzyl alcohol						
Bis(2-ethylhexyl)phthalate	4/6	95J - 600000J			3/36	2.0J - 44J
Butyl benzyl phthalate	1/6	230J				
Di-n-butyl phthalate	1/6	39J				
Acenapthene	1/6	72J				
Acenapthylene	1/6	88J				
2-methyl napthalene	1/6	52J				
Napthalene	1/6	180J				
Pentachlorophenol					1/36	3.0J
Anthracene	1/6	210J				
Benzo(a)anthracene	3/5	46J - 480				
Benzo(b)fluoranthene (coelutes w/ Benzo(k)fluoranthene)	4/6	120J - 730J				
Benzo(g,h,i)perylene	4/6	54J - 210J				
Benzo(a)pyrene	4/6	72J - 370J				
Chrysene	4/6	63J - 340J				
Dibenzo(a,h)anthracene	1/6	71J				
Fluoranthene	4/6	53J - 700				
Fluorene	1/6	160J				
Ideno(1,2,3-cd)pyrene	4/6	43J - 180J				
Phenanthrene	2/6	860 - 1800J				
Pyrene	2/6	61J - 570				
Tentatively identified compounds:						
Adipate						
Aldol condensates					1/30	12J
Alkane	1/2	2160J	3/5	250J - 590J		
Benzene derivative	1/2	170J				
N-butyl benzene sulfonamide					1/30	14J
N,N-diethyl,1,3-methyl benzamide					2/30	18J - 36J
Carboxylic acids						
1-(ethyloxy) pentane						
Phosphoric acid derivative	1/2	17610J				
Phthalate esters	1/2	4910J				
Polyaromatic hydrocarbon	2/2	260J - 4310J				
Unknown hydrocarbons					1/30	340J
Sulfur Molecular	1/2	450J				
Vitamin E						
PESTICIDES/PCBs						
4,4'-DDD	1/6	270				

Table 6-1 (page 2 of 4)

POTENTIAL CONTAMINANTS OF CONCERN
Stoughton City Landfill
Stoughton, Wisconsin

	SW (ug/l)		SEDIMENT (ug/kg)		AIR (ppm)	
CHEMICAL	Freq	Detected Range	Freq	Detected Range	Freq	Detected Range
VOLATILE ORGANICS						
Benzene						
2-butanone			1/7	8.0J		
Chloroform						
1,2-dichloroethene (cis and trans)						
1,2-dichloroethene (trans only)					1/7	0.06
Ethyl benzene					1/7	0.02
Toluene					1/7	0.04
Xylenes (total)					1/7	0.08
Dichlordifluoromethane	2/14	1.5J - 3				
Trichlorofluoromethane						
Tetrahydrofuran						
SEMIVOLATILE ORGANICS						
Benzoic acid			2/7	100J - 2800J(b)		
Benzyl alcohol			1/7	170J		
Bis(2-ethylhexyl)phthalate			5/7	68J - 590J(b)		
Butyl benzyl phthalate						
Di-n-butyl phthalate						
Acenapthene						
Acenapthylene						
2-methyl napthalene						
Napthalene						
Pentachlorophenol						
Anthracene						
Benzo(a)anthracene						
Benzo(b)fluoranthene (coelutes w/ Benzo(k)fluoranthene)			1/7	64J		
Benzo(g,h,i)perylene						
Benzo(a)pyrene						
Chrysene			1/7	66J		
Dibenzo(a,h)anthracene						
Fluoranthene			1/7	110J		
Fluorene						
Ideno(1,2,3-cd)pyrene						
Phenanthrene			1/7	69J		
Pyrene			2/7	72J - 82J		
Tentatively identified compounds:						
Adipate			1/7	470J		
Aldol condensates						
Alkane			6/7	580J - 9300J		
Benzene derivative						
N-butyl benzene sulfonamide						
N,N-diethyl,1,3-methyl benzamide						
Carboxylic acids	1/6	54J	1/7	10600J		
1-(ethyloxy) pentane			1/7	360J		
Phosphoric acid derivative						
Phthalate esters						
Polyaromatic hydrocarbon			1/7	1300J		
Unknown hydrocarbons			6/7	3880J -67130J		
Sulfur Molecular			1/7	3900J		
Vitamin E			3/7	970J - 4100J		
PESTICIDES/PCBs						
4,4'-DDD						

Table 6-1 (page 3 of 4)

POTENTIAL CONTAMINANTS OF CONCERN
Stoughton City Landfill
Stoughton, Wisconsin

CHEMICAL	WASTE (mg/kg) [B] (i.e., @ MW2, MW6)		SOIL (mg/kg) [B]		GW (ug/l)	
	Freq	Detected Range	Freq	Detected Range	Freq	Detected Range
INORGANICS						
Aluminum					3/15	48.2J - 131J
Antimony	1/2	15.8J			2/15	33.2J - 33.6J
Arsenic					6/15	1.4J - 5.2J
Barium					15/15	83.1J - 391
Beryllium	1/2	0.37J				
Cadmium	1/2	27				
Calcium	1/2	35200J	3/7	68400J - 108552J	15/15	61300 -175000
Chromium	1/2	40J			1/15	8J
Cobalt						
Copper						
Iron					6/15	161 - 1360
Lead	1/2	460J				
Magnesium			3/7	38000 - 39922	15/15	31800 - 83400
Manganese					15/15	43.3J - 2330
Mercury	1/2	0.62				
Nickel						
Potassium					1/15	3580J
Selenium					1/5	7.4J
Sodium			1/7	611J	12/15	17200 -156000
Vanadium						
Zinc						

Table 6-1 (page 4 of 4)

POTENTIAL CONTAMINANTS OF CONCERN
Stoughton City Landfill
Stoughton, Wisconsin

	SW (ug/l) [B]		SEDIMENT (mg/kg) [B]		AIR (ppm)	
CHEMICAL	Freq	Detected Range	Freq	Detected Range	Freq	Detected Range
INORGANICS						
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium			3/7	29400 - 73100		
Chromium	3/6	14.8 - 16.5				
Cobalt	3/6	15.3J - 16.3J				
Copper	1/6	33.9				
Iron	1/6	46600J				
Lead	2/6	31.8J - 68.6J	1/7	172J		
Magnesium	2/6	123000 - 125000				
Manganese						
Mercury						
Nickel	2/6	42.3J - 51.2J				
Potassium	3/6	30700 - 49100				
Selenium						
Sodium	3/6	45300 - 50900				
Vanadium	2/6	47.4J - 54.2				
Zinc						

NOTES: [B] denotes that values were compared to background; only those in excess of twice background are presented as detections.

(b) denotes compound was also detected in background samples.

Samples not analysed (NA), or flagged as R or as background samples are not included in the frequency determination.

RESPONSES TO TECHNICAL REVIEW COMMENTS ON JANUARY 19, 1990 (REVISION NO. 1) DRAFT REMEDIAL INVESTIGATION REPORT

STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

SUBMITTED BY:
STOUGHTON CITY LANDFILL STEERING COMMITTEE

AUGUST 10, 1990

PREPARED BY:
ENSR CONSULTING AND ENGINEERING
740 PASQUINELLI DRIVE
WESTMONT, IL 60559

RESPONSES TO TECHNICAL REVIEW COMMENTS ON JANUARY 19, 1990 (REVISION NO. 1) DRAFT REMEDIAL INVESTIGATION REPORT

STOUGHTON CITY LANDFILL
STOUGHTON, WISCONSIN

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AUGUST 10, 1990

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WESTMONT, IL 60559

Preface

Responses to address the following agency technical review comments on the Draft Remedial Investigation Report (Revision 1) dated January 19, 1990 for the Stoughton City Landfill are presented herein as follows:

Comment 1:

Table of Contents, List of Appendices: No report on the results of surface water and sediment sampling on August 2-4, 1989 is listed.

Response 1:

Surface water and sediment sampling were performed on August 2 and 4, 1989 (Round 1). A total of six surface water samples and eight sediment samples were collected at locations along the perimeter of the landfill. During data validation, Environmental Standards, Inc., (ESI) noted several major deviations for nonstandard volatile organic compound (VOC) analysis from the project QAPP for this sampling event. Due to these deviations, a second round of surface water and sediment sampling for nonstandard VOCs was conducted on October 25, 1989. Since the Draft Remedial Investigation (RI) Report was scheduled to be submitted on October 23, 1989, analytical data from Round 1 were included in the initial Draft RI Report (Sections 4.3 and 4.4). Round 2 results for nonstandard VOCs were presented in the January 19, 1990, Draft RI Report (Revision 1) (Sections 2.5, 4.3, and 4.4). The results of both Round 1 and Round 2 surface water and sediment sampling are contained in Appendix F. A separate technical memorandum was not submitted for surface water and sediment sampling.

Comment 2:

Section 1.1 Purpose of Report, p. 1-3, paragraph 1: The paragraph references a March 1988 RI/FS Guidance. The more current guidance is October 1988.

Response 2:

The last sentence of paragraph 1 of both Sections 1.1 and 1.2 have been revised to reflect the most current guidance manual.

Comment 3:

Section 1.2 Report Organization, p. 1-6, last paragraph: Section 7 Summary and Conclusions should also recommend remedial action objectives.

Response 3:

The last paragraph of Section 1.2 (referencing Section 7.0) has been revised to address this comment.

Comment 4:

Section 1.3.3.1 Ground Water, p. 1-14, paragraph 1: The October 23, 1989 Draft RI report included a referenced Table 1-4 which showed construction details of six pre-RI monitoring wells (SB series). As this paragraph indicates that analytical results for indicator parameters from these wells have been useful and applicable to particular phases of the RI/FS, the construction details of these wells are both pertinent and of interest in the RI report. The table should be reintroduced and referenced.

Response 4:

Table 1-4 of the October 23, 1989, Draft RI Report has been added as Table 1-2A. Page 1-15 of the text has been revised to incorporate this table.

Comment 5:

Section 1.3.1.1 Ground Water, p. 1-15, paragraph 1: The text references January 25, 1984 sampling of the SP series wells by Strand Associates, Inc. for the City of Stoughton, and states that laboratory data are included in Table 1-3. No data is presented for the January 25, 1984 sampling in Table 1-3. Please revise the table to incorporate the data.

Response 5:

Samples collected by Strand Associates, Inc., for the City of Stoughton were collected on January 25, 1984, but were mislabeled in Table 1-3 as having a sampling date of February 28, 1984, which was the date the laboratory report was issued. Table 1-3 has been revised appropriately.

Comment 6:

Section 1.3.3.1 Ground Water, p. 1-16, paragraph 3: Again, the Table 1-4 from the October 1989 Draft RI report would be a useful reference.

Response 6:

See Response 4.

Comment 7:

Table 1-3: the 02/28/84 and 11/21/84 sampling dates shown in the Sampling Date column are not shown in Table 1-2, nor referenced in the text in Section 1.3.3.1. The data for the 01/25/84 sampling date shown in Table 1-2, and referenced in the text in Section 1.3.3.1, are not presented in this table.

Response 7:

As noted in Response 5, the February 28, 1984, sampling date was mislabeled in Table 1-3. The last pre-RI samples taken for VOC analysis at the Stoughton City Landfill were collected by Strand Associates, Inc., on November 16, 1984. Samples were collected and split, and sent to two different laboratories, Swanson Laboratory Services and Aqualab, Inc. Table 1-2 has been revised to differentiate these laboratory analyses.

Comment 8:

Section 2.2 Surface Features, p. 2-2, paragraph 1: The former Section 3.7.3 Historical Aerial Photo Analysis (October 1989 Draft RI report) contains excellent information that should be reintroduced here, as well as the former Figures 3-6 through 3-11. As presented in review comments on Technical Memorandum 1, prints of the eight historical aerial photographs used for the analysis should also be presented.

Response 8:

The former Section 3.7.3 of the October 1989 Draft RI Report has been summarized and reintroduced as Section 3.1.4 and includes former Figures 3-6 through 3-11, now designated Figures 3-2A through 3-2H.

Prints of the eight historical aerial photographs were provided previously.

Comment 9:

Section 2.5 Surface Water and Sediment Investigations, p. 2-5, second bullet: Several typographical errors of commission and omission are apparent: 1) SL2R2-1-W (sic) should read SL2R1-2-W per Table 4-1; 2) samples SL2RQ-2-SA and SL2R2-2-S should be added per Table 4-1. Also, replicate samples are not depicted on Figure 2-2.

Response 9:

Section 2.5 has been revised to incorporate the appropriate sample designations from the Round 1 and 2 sampling events. Only general sample locations are depicted on Figure 2-1 (formerly Figure 2-2). Specific sample designations, including replicates, can be discerned from the sample identification scheme (Section 2.1) and the detailed narrative in Section 2.5.

Comment 10:

Section 2.5 Surface Water and Sediment Investigations, p. 2-6, paragraphs 2 and 3: The last sentence in paragraph two should be rewritten to indicate the frequency of collection of field blank samples and trip blank samples specific to each sampling round. It is noted that no trip blanks are presented in Table 4-1. The last sentence in paragraph three should be rewritten to clarify that collocated samples were collected in some of the sediment samples, i.e., two replicates of sediment samples from sampling location SL2 were collected from each of the two sampling rounds, SL2R1-1-S and SL2R2-1-S from the first round, and SL2R-1-2-S and SL2R-2-2-S from the second round.

Response 10:

This paragraph has been revised to address concerns relative to the frequency of collocated (replicate), field, and trip blanks. Because of the frequency of trip blank analysis, no trip blank data are included in Table 4-1. This data is presented in Appendix F. Also, the last sentence of paragraph 3 on the former page 2-6 has been deleted.

Comment 11:

Section 2.8 Ground Water Investigations, p. 2-7: Review comments on the former Section 3.7.4 Area Ground Water Usage Survey (October 1989 Draft RI report), requested that information on methodology, area surveyed, number of wells, well depths, density of wells within a three mile *radius of the site, etc. be incorporated here in Section 2, with important findings included in Section 3. Instead, the PRPs contractor has totally deleted this information from the revised draft of the RI report.*

Response 11:

Summary and reference information pertaining to the groundwater usage survey has been added to Section 2.8. Pertinent findings of the survey have been added to Sections 3.6.1 and 3.6.2.

Comment 12:

Section 2.8 Ground Water Investigation, p. 2-9, first paragraph: Please briefly elaborate on the alterations in the construction design which were undertaken. This comment from the review of the October 1989 Draft RI report has not been addressed.

Response 12:

This paragraph has been revised to address the comment. Please see paragraph 1 on page 2-10.

Comment 13:

Section 2.8 Ground Water Investigation, p. 2-9, second paragraph: The text in this paragraph references a boulder layer encountered while drilling MW-3D, yet this layer is not shown at the depth of MW-3D in Cross Section A-A' in Figure 3-4. In reference to MW-2D, it is realized that the sampling plan specified that "the well screen be placed immediately below the confining layer." However, 1) what data was used to define the confining layer and how was it determined that this layer was not just a clay stringer since it was not encountered in other borings (e.g., field testing or lab testing of a sample), and 2) by placing this well much higher up in the formation than the other deep wells, it is not monitoring the same zone as the other deep wells, *and since MW-2D is the only well completed in this interval there is nothing to compare data from this well against. The request to discuss the significances of the placement of MW-2D in greater detail was made in the review of the October 1989 Draft RI report, and has not been addressed.*

<u>Response 13</u>:

The boulder layer was not encountered while drilling MW-3D. The text has been corrected to address this concern.

The potential confining layer encountered in MW-2D was identified initially by characterizing samples collected during drilling. This information is contained in Appendix B of Technical Memorandum 2 (Appendix B of RI Report). An undisturbed sample was collected from the interval 9.5 to 11.5 feet below grade from MW-2D and submitted for various geotechnical analyses. These analyses are presented in Appendix G. The material from this sample was classified as clay with a permeability of 2.6×10^{-8} cm/s. This material was continuous in MW-2D from 5 to 26 feet below grade. While sand was present in the sample (15.3% based on grain-size analysis) and sand stringers were noted during drilling, sample characterization (conducted using ASTM visual-manual procedures approved in the Field Sampling Plan) performed during drilling is more than sufficient to conclude that the layer was not "just a clay stringer."

The well screen of MW-2D was placed below the potential confining layer as specified in the Field Sampling Plan (FSP). The placement of MW-2D as such has provided important information on the groundwater flow system as shown in hydrogeologic cross-sections B-B' and E-E' of revised Figure 3-4. Higher hydraulic head at MW-2D and hydraulic head data for the other monitoring wells indicate that groundwater is discharging to the wetlands through highly organic, fine-grained materials, including clay.

It is not considered pertinent that this well is not completed in the same interval as the other deeper monitoring wells. Rather, what is most important is its positioning within the groundwater flow system relative to potential migration routes for landfill releases. We feel

this well is ideally located and screened to intercept these potential releases; however, based on groundwater sampling results, chemicals of concern have not been detected in MW-2D.

Comment 14:

Section 2.9 Ambient Air Investigations, pages 2-9 through 2-10: The EPA suggested report format indicates that this section should summarize the ambient air sampling activities that were conducted, e.g., duration of sampling, number of upwind and downwind sample points for each sampling date, sampling collection methods, analytical parameters, collection of meteorological data pertinent to interpretation of analytical data (ambient air temperature, relative humidity, atmospheric pressure, wind speed, wind direction, etc.). This section does not present any of the this information. The referenced summary presented in Section 4.7 does not present the requested information, nor does Appendix C, the technical memorandum on ambient air sampling.

Response 14:

All information pertaining to ambient air sampling can be found in Technical Memorandum 3 as follows:

- **Section 2.0 - Sampling procedures including absorbent media, sampling flow rates, number of samples, locations, duration of sampling, and QA sampling procedures;**

- **Section 3.0 - Analytical results in Table 3;**

- **Appendix A - Field calibration records; and**

- **Appendix B - All meteorological data collected including date, time, temperature, barometric pressure, wind direction, wind speed, rainfall, and relative humidity.**

In addition, sampling locations, weather station locations, and prevailing wind directions for each sampling event are shown in Figures 4-8 and 4-9 (Section 4.7). Duplication of this information in this section is unnecessary.

Comment 15:

Figure 2-2: Replicates WL2R1-1-W, SL2R1-1-S, and SL2R2-1-S are not depicted in the figure, contrary to the assertion of the text in Section 2.5.

Response 15:

See Response 9.

Comment 16:

Section 3.2 Climate, pages 3-4 through 3-5: Section 3.2 should present information on site meteorologic data collected during the RI as per Section 2.4 and the EPA suggested report format. This comment, presented in the review of the October 1989 Draft RI report, has not been addressed.

Response 16:

General climatic characteristics are well described. However, for clarity, additional references to Appendix B of Technical Memorandum 3 have been inserted in Sections 2.4 and 3.2. Also, wind rose information obtained through a telephone interview with a representative of the U.S. Weather Service in Madison, Wisconsin, has been added at the end of Section 3.2.

Comment 17:

Section 3.4.2 Site Geology, page 3-9, last paragraph: The text references Figure 3-4. It would be useful to post groundwater levels at each well location on Figure 3-4. This comment, presented in the review of the October 1989 Draft RI report, has not been addressed. Also with regard to Figure 3-4, SB-2 is identified but no information is presented for it on Cross Section D-D'.

Response 17:

Figure 3-4 has been modified to incorporate the water table and hydraulic head data measured on September 15, 1989, and information from SB-2. The discussion of the groundwater flow system in the vicinity of the landfill has also been modified based on this reinterpretation of available data (See Section 3.6.2).

Comment 18:

Section 3.6.1 Regional Hydrogeologic Setting, page 3-13, paragraph 4: This paragraph presents useful regional groundwater indicator parameters, such as hardness, specific conductance, pH, and iron. Please briefly elaborate on whether these values were correlated to site values, and if so, discuss the correlation in Section 3.6.2 Site Hydrogeology.

Response 18:

These values have been correlated with site values as discussed in Section 3.6.2. See Response 20. In addition, a listing of water quality data for the sand and gravel aquifer in Dane County has been added as Table 3-2. The regional groundwater indicator parameters reported by Cline (1965) are for all groundwater in Dane County, not just that from the Quaternary (sand and gravel) aquifer. The text has been modified appropriately.

Comment 19:

<u>Section 3.6.2 Site Hydrogeology, page 3-14, paragraph two</u>: In regards to Figure 3-6 referenced here, why was this figure constructed using April 13, 1989 data instead of data from a later date when the new monitoring could be incorporated into the map. This comment, presented in the review of the October 1989 Draft RI report, has not been addressed. Consideration should be given to adding on additional figure using data from the new wells as a means of verifying the assertion that groundwater flow direction does not significantly change over time.

<u>Response 19</u>:

Figure 3-6 was included to show: (1) a "general" groundwater flow pattern for the site and (2) that this flow pattern does not differ significantly from subsequent characterizations. Various groundwater level maps are presented in Appendix H. Figure H-4 has been added to Section 3.6.2 as Figure 3-6A to affirm the generally unvarying groundwater flow pattern. The text has been modified to incorporate this new figure. Further discussion on groundwater flow patterns has been added in this section based on hydraulic head data presented on the hydrogeologic cross-sections (Figure 3-4).

<u>Comment 20</u>:

<u>Section 3.6.2 Site Hydrogeology, page 3-15, last paragraph</u>: Why were the shallow aquifer parameter values in the former Table 3-2 (October 1989 Draft RI report) deleted. The last two sentences from paragraph two of Section 3.6.5 (October 1989 Draft RI report) should be added here, and comparison should be made to the values cited at the top of the current page 3-13, Section 3.6.1 Regional Hydrogeologic Setting. Also, discussion needs to be presented as to lack of background value due to radial groundwater flow patterns, radial mounding, and a local groundwater divide. The lack of an upgradient well and subsequent background data is a significant problem, the solution of which needs to be discussed in some detail. This comment, presented in the review of the October 1989 Draft RI report, has not been addressed.

Response 20:

The last paragraph of page 3-15 (Section 3.6.2) of the October 1989 Draft RI Report has been modified to complete the response to Comment 19. In addition, a paragraph was added to the bottom of page 3-15 to discuss the addition of former Table 3-2 as Table 3-3. The latter part of this comment pertaining to the upgradient well is addressed at the top of page 3-22. A background groundwater sample was collected from an upgradient residential well (Section 2.8). Data from this well have been used to interpret the results of groundwater sampling and analysis performed as part of the RI (Section 4.6).

Comment 21:

Section 3.8 Ecology, page 3-17: The last two sentences from the former Section 3.8 (October 1989 Draft RI report) should be inserted here after the first sentence.

Response 21:

The requested information from the former Section 3.8 of the October 1989 Draft RI report has been inserted (see page 3-26).

Comment 22:

Figure 3-4: See comments above under Section 3.4.2.

Response 22:

See Response 17.

Comment 23:

Figure 3-6: See comments above under Section 3.6.2, page 3-14.

Response 23:

See Response 19.

Comment 24:

Section 4.0 Nature and Extent of Contamination, general: The QA/QC report for TCL semivolatiles and TAL inorganics completed by Environmental Standards Incorporated and cited throughout Section 4.0 (see for example, page 4-18, paragraph 2) was missing from Appendix F.

Response 24:

The nature of this comment is unclear. First, the data validation reports prepared by ESI pertain to all TCL organics including volatiles, semivolatiles, and PCBs/pesticides. In addition, they include validation of TAL inorganic data and data from nonstandard method analyses. Second, the reference in the cited paragraph is to the U.S. EPA data validation report that is the last entry in Appendix F, rather than the ESI report.

For clarification, please note the following locations of data validation reports:

- **Appendix D - Data validation for soil sampling included as Appendix B of Technical Memorandum 4.**
- **Appendix E - Data validation for Round 1 groundwater sampling included as Appendix C of Technical Memorandum 5.**

- **Appendix F - Data validation for surface water and sediment sampling (Rounds 1 and 2) and groundwater sampling (Rounds 2 and 3). Also, includes U.S. EPA data validation report.**

- **Appendix J - Data validation for background surface water/sediment and groundwater sampling conducted on May 31 and June 1, 1990.**

Comment 25:

Section 4.3 Surface Water Sampling and Analysis, page 4-6: The first sentence in the paragraph should be corrected to read "...within the adjacent wetlands..." not "adjacent methods."

Response 25:

The correction has been made (see bottom of page 4-12).

Comment 26:

Section 4.3 Surface Water Sampling and Analysis, page 4-7, paragraph two: This paragraph needs to discuss whether methylene chloride and acetone were found in the trip blanks in addition to field and lab blanks. The last sentence of the paragraph needs revision to address this issue and for correction of grammatical errors.

Response 26:

A discussion on whether methylene chloride and acetone were found in the trip blanks has been included (see top of page 4-14). In addition, the last sentence of the paragraph has been revised to correct grammatical errors.

Comment 27:

Section 4.2 Surface Water Sampling and Analysis, page 4-8, paragraph two: In the last sentence, dichlorofluoromethane (sic) should be corrected to dichlorodifluoromethane.

Response 27:

The correction has been made (see top of page 4-15).

Comment 28:

Section 4.4 Sediment Sampling and Analysis, page 4-11, paragraph three: Phthalates are known to be "ubiquitous" environmental contaminants in urban areas. Their presence in background samples does not necessarily indicate laboratory contamination.

Response 28:

The paragraph has been revised to address the comment (see pages 4-20 and 4-21).

Comment 29:

Section 4.5 Soil Sampling and Analysis, page 4-17, paragraph two: Inorganic compound concentrations at the site should be compared to regional background values (not national) if available.

Response 29:

We are not aware of any regional background values for soil that are available for comparison. The comparison to national soil data for inorganics (former Table 4-9) has been deleted. Comparison of the results of soil analysis is limited to background soil samples collected in the vicinity of the site.

Comment 30:

Section 4.7 Air Sampling and Analysis, page 4-25: Section 2.4 indicated that site meteorological data that were collected would be reported in this section, yet the section contains no such meteorological data. Wind velocities, wind direction, ambient air temperature, relative humidity, atmospheric pressure, etc. are important parameters pertinent to interpretation of analytical results. These parameters are not presented anywhere in the RI Report proper, nor in Appendix C, Technical Memorandum 3, Ambient Air Sampling Results Report. Further, this section reports detection of VOCs slightly above the method detection limit (MDL) in one down wind duplicate sample and not in the original sample, and concludes that the single "hit" was due to field contamination. This conclusion is premature since statistical variability could have resulted in the same set of data (that is, a sample having concentrations slightly below the MDL and the duplicate having concentrations slightly above the MDL). If this data was conservatively assumed to be a "hit", and given that a total of six downwind samples were taken, then the positive detect rate for VOCs in air would be ca. 17 percent. Therefore, there is a reasonable probability that VOCs are escaping from the site via the air pathway.

Response 30:

Site meteorological data collected during the air monitoring study are presented in Appendix B of Technical Memorandum 3. Prevailing wind directions for each day's sampling are also clearly shown on Figures 4-8 and 4-9. Additional details of the number of samples has been added to the text.

The detection of volatiles in a single sample may be an indicator of these compounds being near their detectable limits on the day of sampling. Section 4.7, page 4-38, has been amended to reflect this conclusion. Air pathway and impact analysis statements for the detected compounds are therefore included in the amended report. Additional impact analysis, as a consequence of the additional pathway, has been included as necessary in Sections 4.8 and 5.1.1, and in the baseline risk assessment (Chapter 6).

Comment 31:

Section 4.7 Air Sampling and Analysis, page 4-26: *No information is presented on field blanks or trip blanks. Absent such information, the detection of volatile organics in an air sampling cannot be summarily dismissed as "attributed either to media handling prior to or subsequent to sampling," especially since the limited VOCs analyzed for were found in the waste samples collected at MW-2 and MW-6 (1,2-dichloroethene), were found in groundwater at the site (xylenes), were found in pre-RI sampling at the site, or were otherwise known or suspected to historically disposed at the site. The text needs to be rewritten to reflect the detected airborne release of volatile organics from the site. This revision will also necessitate the introduction of air as a separate media of concern to be presented in discussions and summary tables which present potential contaminants of concern, intermedia impacts, in the baseline risks assessment, and throughout the report.*

Response 31:

Field trip blank data are included in Appendix D of Technical Memorandum 3 (Appendix C of RI Report). These results indicate that no compounds were detected in this sample. Reference to the QA data has been added to Section 4.7.

Comment 32:

Section 4.8 Summary of analytical Results and Inter-media Impact, page 4-26: *The last paragraph on this page needs revision. The third sentence, which begins "Impact of the ground water from the soil..." should be corrected to read "Impact to the ground water...". Also, the text refers to "soil" samples at MW-2S and MW-6S as having been collected "within the refuse." This is an important point that is underplayed by the working, both here and throughout the balance of the report. To better emphasize this point, these two samples should be termed "waste samples," and referred to as such throughout the report. This results in the addition of waste as a separate media to be presented in discussions and summary tables which present potential contaminants of concern, contaminants of concern, intermedia impacts, and in the baseline risk assessment.*

See also the comment above under Section 4.7 with regard to air as a separate media to be presented in discussions and summary tables.

<u>Response 32</u>:

Section 4.8 has been completely revised to reflect the results of background sampling of surface water/sediment and groundwater. Also, waste and air have been considered as separate media throughout the revised Draft RI Report. The discussion of intermedia impacts (except as they influence the summary of analytical results) has been appropriately positioned in Chapter 5 (Contaminant Fate and Transport).

<u>Comment 33</u>:

<u>Section 4.8 Summary of Analytical Results and Inter-media Impact, page 4-28, last paragraph</u>: Revise the text in light of comments presented above under Section 4.7. Additional revisions needs to be made to this section to present a discussion on the relationship of concentrations of PAHs found in waste samples to PAH concentrations in sediment samples.

<u>Response 33</u>:

See Response 32.

<u>Comment 34</u>:

<u>Section 5.1 Volatile Organic Compounds, page 5-1 and beyond</u>: Revise the text to address waste and air as separate media. Also revise Table 5-1 to address this issue.

<u>Response 34</u>:

Chapter 5 has been completely revised to match the format suggested in the most current RI/FS guidance. A new Table 5-1 has been prepared that summarizes the results of waste

and environmental media sampling and analysis, including soil, sediment, surface water, groundwater, and air. Waste and air have been addressed as separate media throughout the revised Draft RI Report.

Comment 35:

Section 5.1.2 Intermedia Transport, page 5-2: The first paragraph of this section needs revision to reflect detection of VOCs in ambient air. Further, the paragraph misrepresents the open burning of "refuse and most liquid wastes" as "incineration." The text also needs revision to discuss the historic disposal of liquid wastes down auger holes at the landfill. As to the second paragraph, the first sentence should be corrected to read "...concentrations of VOCs in ground water detected at the landfill."

Response 35:

See Response 34.

The misrepresentation of the open burning of refuse and liquid waste as incineration has been removed. In addition, reference to the historical disposal of liquid waste down auger holes in the west-central portion of the landfill has been added.

Comment 36:

Section 5.1.2 Intermedia Transport, page 5-3, second paragraph: The text needs to be present a discussion of the detection of benzene and chloroform in waste samples (from MW-2S and MW-6S), while these compounds were not detected in ground water at these monitoring wells (MW-2S, 2D, 6S, 6D) nor in other media at the site.

Response 36:

As discussed in Section 4.2.4 (Waste Sampling and Analysis), chloroform was reported present in waste sample SLMW6SB1S at an estimated concentration of 1 µg/kg, significantly below the Contract-Required Quantitation Limit (CRQL) of 5 µg/kg. An estimated concentration of 2 µg/kg benzene was reported for the waste sample collected from the soil boring at MW-2S (CRQL for benzene is 5 µg/kg). As noted in the data validation report in Technical Memorandum 4 (Appendix D), the sample from MW-2S was analyzed immediately after a sample from another project; the possibility exists that this detection may be the result of the instrument carryover.

As listed in revised Table 5-1 and noted in the comment, these compounds were not detected in any other media. In addition, they were not detected in replicate samples or matrix spike and matrix spike duplicate samples collected at these same locations. The only conclusion is that if these compounds are indeed present in the analyzed samples, they are not widely distributed at the site.

Comment 37:

Section 5.1.2 Intermedia Transport, page 5-4: The first paragraph needs revision to present discussions of the basis for using an assumed effective porosity value, and the basis for using the infiltration rate value. Further, the calculations yielding the dilution factor should be presented (e.g., calculations of groundwater and leachate flows, calculation of the dilution factor). As to the second paragraph, the basis of groundwater velocity value of 28 ft/year needs to be presented - Appendix G, Hydrogeologic Studies, Table G-10, Calculation of Horizontal Flow Gradients and Velocity, presents an average groundwater velocity of 0.184 m/day, which, when multiplied by 1 ft/0.0348 m and by 365.25 days/yr, converts to 220 ft/year, not 285 ft/year.

Response 37:

This discussion has been eliminated from the revised Chapter 5. The horizontal groundwater velocity of 0.604 feet/day (0.184 meter/day), as shown in Table 3-3, is correct. As noted in the last part of the comment, this converts to a groundwater velocity of 225 feet/year rather than 285 feet/year.

Comment 38:

Section 5.1.2 Intermedia Transport, page 5-5: The second variable presents v_g *as 285 ft/yr; see comment immediately above. The fourth variable presents* K_d *based on a* f_{oc} *of 0.001 kg/kg, and references Table 5-3. Yet Table 5-3 presents* K_d *values based both on* $F_{oc} = 0.001$ *and* $f_{oc} = 0.01$. *Please expand the discussion presented in the first paragraph pertaining to the usage of the 0.001 value; e.g., usage of the 0.001 value presents in a smaller retardation factor (R), hence a quicker compound travel velocity (v), which is used so as to be more conservative in protection public health. Take fifth variable symbolizes aquifer particle bulk density as DEN, rather than as Bb (beta b) as used in Figure 5-1. In the second paragraph, xylenes and 1,2-dichloroethene are offhandedly dismissed. Xylenes were detected at a frequency of 3/36 in ground water and 17 in air. Comparison should be made to oral and inhalation reference doses (RFDs) and slope factors in addition to proposed MCLGs which pertain only to drinking water. See also the comments presented above under Sections 4.7 and 4.8 with regard to the need to address these compound. In the last line on the page, "subsurface soils" should be changed to "subsurface samples of waste."*

Response 38:

As noted previously, Section 5 of Draft RI Report has been completely revised. Tables 5-3 and 5-4, and Figure 5-1 have been eliminated.

The occurrence of total xylenes in the air and groundwater media has been discussed in Chapters 4 and 5. In addition, potential exposure to xylenes has been considered in both the groundwater and air media as part of the revised baseline risk assessment (Chapter 6).

Comment 39:

Section 5.1.2 Intermedia Transport, page 5-6: The seventh line in the first paragraph needs a similar correction: "detection in the soil samples" should be revised to "detected in the waste samples." With regards to the first line in the second paragraph, Table 4-3 (and revised Table 6-1 enclosed with these comments) shows 2-butanone detected at a frequency of 1/7 in sediment samples. The paragraph should be expanded to present a more complete discussion of 2-butanone, referencing tables which show the data and frequency of detection. The text on this page also needs revision to present a discussion of the detection of dichloromethane as a tentatively identified compound (TIC). The last paragraph on this page needs revision to incorporate xylenes and 1,2-dichloroethene as compounds that may represent a concern, and should refer to the revised Table 6-1.

Response 39:

As previously noted, Chapter 5 has been revised to consider waste and soil as separate media. In addition, revised Table 5-1 shows the frequency of occurrence of all compounds measured in the various site media, including tentatively identified compounds (TICs). As noted in the previous response, all measured compounds have been considered in the risk assessment with the exception of common nutrients and TICs that were only measured in one medium.

Comment 40:

Section 5.1.1 Intermedia Transport, page 5-7: The first sentence of the paragraph needs revision: "soil concentration detected at the same monitoring well" should be revised to read "concentration detected in waste at the same monitoring well."

Response 40:

As previously noted, waste and soil have been considered as separate media throughout the revised Draft RI Report.

Comment 41:

Section 5.2.2 Intermedia Transport, page 5-8, first paragraph: A revision needs to be made in the second line: "the soil sample" should be revised to read "the waste sample." The following should be added at the end of the paragraph, "However, it has been detected in 3 of the 36 groundwater samples at a range of 2.0J to 44J µg/L (see Table 6-1)."

Response 41:

Waste and soil have been treated as separate media throughout the revised Draft RI report. Revised Table 5-1 shows the frequency of detection and detected range of concentrations for bis(2-ethyl hexyl) phthalate.

Comment 42:

Section 5.3.2 Intermedia Transport, page 5-10: The following text should be added to the beginning of the third line of the first paragraph of this section: "were collected within the refuse, and." Line seven of the second paragraph should be revised to read "Asphalt, observed at sampling locations SL2 but not at SL1,..." With regard to the last sentence of the second paragraph, the risk resulting from all detected PAHs, as shown in the revised Table 6-1 transmitted with these comments, should be evaluated in Section 6.0. The text should also refer to Table 6-1.

Response 42:

See Response 39.

Comment 43:

Section 5.4.1 General Fate and Transport, page 5-11: The second paragraph should be revised to read "4,4-DDD not "DDD." The text should also be revised to present a discussion of the semivolatile tentatively identified compounds (TICs), and to refer to Table 6-1. Thirteen unknown hydrocarbon and four unknown other semivolatile component peaks at significant concentrations were reported in the groundwater sample from MW-1D, while samples from MW-2S had peaks indicative of small concentrations of unknown semivolatiles. Review comments of Technical Memoranda 4 and 5 requested that the RI Report address the presence of semivolatile TOCs, yet the comment clearly has not been addressed in this report.

Response 43:

The pesticide 4,4-DDD has been correctly labeled throughout the revised report.

Table 5-1 lists TICs measured at the site, including VOCs and semivolatile organic compounds. These compounds have been included in the baseline risk assessment (Chapter 6).

Comment 44:

Section 5.4.2 Intermedia Transport, page 5-11: The phrase in the first sentence "...the soil sample collected..." should be revised to "...the sample collected..." The following should be inserted as a new second sentence: "However, it is not detected in the sample collected at MW-6 which was also collected with the refuse."

Response 44:

See Response 34.

Comment 45:

Section 5.4.2 Intermedia Transport, page 5-12, second paragraph: The second sentence states that pentachlorophenol and benzoic acid in groundwater samples may have been the result of laboratory or field contamination. However, neither of the two field blanks from the first sampling round, nor the two field blanks from the second sampling round, contained benzoic acid. The laboratory QA/QC review does not indicate either of these compounds as laboratory blank contaminants. Unknown carboxylic acids were also tentatively identified in surface water at the site. Pentachlorophenol is commonly used as a fungicide, as a contact herbicide, and as a wood preservative. Given the nature of the wastes disposed at the site, and the information presented above, the detection of benzoic acid and pentachlorophenol can not be dismissed as attributable to laboratory contamination or field contamination during sample handling. This paragraph must be revised. Reference should be made to Table 6-1.

Response 45:

The detection of benzoic acid and pentachlorophenol in groundwater in the vicinity of monitoring well cluster MW-6 has been addressed in the revised Draft RI Report. In addition, these compounds have been added to the summary of results of waste and environmental media sample analysis (revised Table 5-1) and have been included as chemicals of potential concern in the baseline risk assessment (revised Table 6-1).

Comment 46:

Section 5.5.1 Fate and Transport, pages 5-13 through 5-15: Review comments on Technical Memoranda 4 and 5 requested that the RI Report include discussion of the detection of numerous inorganics, especially as some were significantly elevated above quantities detected in background samples. The revised Table 6-1 included in the present RI review comments attempts to partially address this issue. Technical memoranda review comments specifically requested the evaluation of these analytical results and explanation of apparently elevated concentrations of aluminum, barium, cadmium, calcium, chromium, iron, lead, magnesium, *nickel, sodium, and zinc. This section fails to address aluminum, barium, calcium, magnesium, and sodium. Calcium has been shown to compose a significant portion of landfill leachates as $CaCl_2$; magnesium, likewise, as $MgCl_2$. Sodium has also been shown to compose a significant portion of landfill leachates. Additionally, this section needs to present a discussion of cobalt, as it is addressed in Section 6.0, and a discussion of potassium, as it has been shown to compose a significant portion of landfill leachates. A discussion of vanadium should also be presented. Reference should also be made to Table 6-1.*

Response 46:

As previously discussed, additional background sampling of surface water/sediment and groundwater was performed subsequent to the collection and analysis of samples as part of the RI. Appropriate sections of Chapter 4 (Nature and Extent of Contamination) discuss the detection of inorganics. Where appropriate, the results of inorganic analysis are discussed in light of federal and state standards. Lastly, inorganic constituents were considered in the baseline risk assessment where the concentration in a medium exceeded two times the concentration measured in background samples.

Comment 47:

Section 5.5.2 Intermedia Transport, pages 5-15 through 5-16: This section will need revision to reflect requested revisions to Section 5.51 as shown above, and to refer to Table 6-1.

Response 47:

See Comment 46.

Comment 48:

Section 5.6 Transport of Contaminants in Ground Water, general comments: This section appears out of place. No attempts at discussion of transport of contaminants in other media--

soil, surface water, sediment, air--is made as separate sections in Section 5.0. Hence, Section 5.6 would probably be more germane following Section 6.2.3.3 Ground Water and preceding Section 6.2.4 Comparison with ARARs. If Section 5.6 is to be moved into Section 6.0, Tables 5-12 through 5-17 and Figure 5-1 should also be moved in Section 6.0.

Response 48:

As previously noted, Chapter 5 of the revised Draft RI Report has been completely revised. Potential migration routes for all media are considered, followed by a discussion of the environmental fate of individual compounds or classes of compounds measured in waste and environmental media at the site. In addition, the interrelatedness of the various migration pathways is considered.

Comment 49:

Section 5.6 Transport of Contaminants in Ground Water, page 5-18: The first paragraph should present a discussion of adjustments utilized to compensate for the use of a point-source nomograph for an area source. The fourth line of the second paragraph indicates that the effective aquifer thickness is assumed to be 6 meters, whereas Table 5-14 indicates 10 meters. Please resolve this discrepancy.

Response 49:

The point-source nomograph has been eliminated from Chapter 5. Instead, emphasis is placed on potential migration routes and the transport and fate of constituents of concern in the environment. However, it should be noted that concentrations of constituents of concern measured in groundwater on the periphery of the landfill will be reduced by dispersion and attenuation processes as they migrate away from the landfill toward discharge areas.

Comment 50:

Table 5-1: Revise to add air and waste as separate media columns, and to add ethylbenzene, toluene, and dichloromethane (TIC). See the revised Table 6-1 enclosed with these review comments.

Response 50:

The former Table 5-1 has been eliminated in revised Chapter 5. A revised Table 5-1 has been prepared that summarizes the results of waste and environmental media sample analyses. This table includes frequency and range of concentration information for all constituents measured at the site including VOCs, semivolatile organics, pesticides, organic TICs, and inorganics.

Comment 51:

Table 5-2: Revise to add ethylbenzene, toluene, and dichloromethane to the table, and to present appropriate values for the characteristics of each, as per requested revisions to Table 5-1.

Response 51:

Table 5-2 has been revised to include information for ethylbenzene and toluene. In addition, the density of individual chemicals has been added to the table.

Comment 52:

Table 5-3: Revise to add dichloromethane to the table and to present appropriate values for the characteristics shown.

<u>Response 52</u>:

Table 5-3 has been eliminated from the revised Draft RI Report. Dichloromethane has been added to Table 5-1, which summarizes the results of waste and environmental media sample analyses as a TIC.

<u>Comment 53</u>:

<u>Table 5-4</u>: Revise to add dichloromethane to the table and to present appropriate values for the parameters shown. The values presented have been verified as correct using a groundwater velocity of 285 ft/yr; however, as mentioned previously, Appendix G Table G-10 presents a groundwater velocity of 220 ft/year, not 285. The velocity values in the column may need to be recalculated. If so, appropriate revisions to the text in Section 5.1.2 at the bottom of p. 5-4 should also be made.

<u>Response 53</u>:

See Responses 37 and 52.

<u>Comment 54</u>:

<u>Table 5-5</u>: Revise the table to add air and waste as separate media columns, and to add di-n-butyl phthallate. See the revised Table 6-1 enclosed with these review comments.

<u>Response 54</u>:

Table 5-5 has been eliminated from the revised Draft RI Report. The semivolatile organic compound di-n-butylphthalate is included in the revised Table 5-1 that lists air and waste as separate media.

<u>Comment 55</u>:

<u>Table 5-6</u>: Revise to add di-n-butyl phthallate to the table, as per requested revisions to Table 5-5, and to present appropriate values for the characteristics shown.

<u>Response 55</u>:

Table 5-6 of the revised Draft RI Report has been revised to include environmental fate information for di-n-butylphthalate. This table has been relabeled Table 5-4.

<u>Comment 56</u>:

<u>Table 5-7</u>: Revise to add air and waste as separate media columns. See the revised Table 6-1 enclosed with these review comments

<u>Response 56</u>:

Table 5-7 has been eliminated from the revised Draft RI Report. Waste and air have been added to revised Table 5-1 as separate media.

<u>Comment 57</u>:

<u>Table 5-9</u>: Revise to add air and water as separate media columns. See the revised Table 6-1 enclosed with these review columns for tentatively identified compounds (TICs) to be added to this table.

<u>Response 57</u>:

See Response 56.

<u>Comment 58</u>:

<u>Table 5-10</u>: Revise to add TICs shown in the revised Table 6-1 enclosed with these review comments.

<u>Response 58</u>:

TICs have been included in revised Table 5-1. In addition, TICs have been considered in the baseline risk assessment (Chapter 6) where they have been detected in more than one environmental medium.

<u>Comment 59</u>:

<u>Table 5-11</u>: Revise to add air and waste as separate media columns. See previous comments under Section 5.5.1, and the revised Table 6-1 enclosed with these review comments, for additional inorganics to add to this table.

<u>Response 59</u>:

See Responses 32 and 34.

<u>Comment 60</u>:

<u>Table 5-12</u>: Revise to list all inorganics shown in revised Table 6-1 and corresponding MCLs; identifying as appropriate primary or secondary MCLs and as to final or proposed; of no MCL exists for a given inorganic, so identify.

<u>Response 60</u>:

Table 5-12 has been eliminated from the revised Draft RI Report. Where appropriate, various water quality standards that may apply to the potential constituents of concern are discussed in the text of the revised Draft RI Report.

Comment 61:

Table 5-13: Revise to add other compounds as requested above under Sections 5.0 through 5.5.2, and Tables 5-2, 5-4, 5-6, 5-9, 5-10, 5-11, and 5-12. See also general comments above under Section 5.6 pertaining to moving to Section 6.0. In regard to Note (1), Sections 5.1 through 5.5 do not adequately define contaminants of concern.

Response 61:

Table 5-13 has been eliminated from the revised Draft RI Report.

Comment 62:

Table 5-14: See general comment above under Section 5.6 pertaining to moving to Section 6.0

Response 62:

Table 5-14 has been eliminated from the revised Draft RI Report along with the dispersion nomograph.

Comment 63:

Table 5-15: Explain rational for using MW-2 concentrations for inorganics, e.g., MW-2 is the monitoring well closest to the potential receptors located to the southeast of the site, has highest values of these parameters. Add additional inorganics as called for in requested revisions under Section 5.5.1 above, and under Tables 5-11, 5-12, and 5-13 above. See also general comment under Section 5.6 above pertaining to moving to Section 6.0.

Response 63:

Table 5-15 has been eliminated from the Draft RI Report.

Comment 64:

Table 5-16: See comments above regarding Table 5-13. See also general comments above under Section 5.6 pertaining to moving to Section 6.0.

Response 64:

Table 5-16 has been eliminated from the revised Draft RI Report.

Comment 65:

Table 5-17: See comments above regarding Table 5-16.

Response 65:

Table 5-17 has been eliminated from the revised Draft RI Report.

Comment 66:

Figure 5-1: See general comments above under Section 5.6 pertaining to moving to Section 6.0.

Response 66:

Figure 5-1 has been eliminated from the revised Draft RI Report.

<u>Comment 67</u>:

<u>Section 6.0 Baseline Risk Assessment, general comments:</u>: The following is an assessment of the technical adequacy of the baseline risk assessment (BRA) based upon the most recent EPA guidance, Risk Assessment Guidance for Superfund (RAGS). On reviewing the BRA it was apparent that preparation of the document was in progress when RAGs was issued -- the BRA references both the Superfund Public Health Evaluation Manual (SPHEM) and RAGS as key guidance documents. In case such as this, the guidance presented in RAGs is not meant to invalidate methodology which conforms more closely to the SPHEM format. The majority of the comments offered below, however, do not involve the issue of old versus new methodology.

<u>Response 67</u>:

The baseline risk assessment (Chapter 6) has been completely revised. The revised baseline risk assessment was conducted in accordance with guidance described in the "Superfund Public Health Evaluation Manual (SPHEM)" (U.S. EPA, 1986), and Risk Assessment Guidance for Superfund (RAGS)" (U.S. EPA, 1989).

<u>Comment 68</u>:

<u>Comment #1</u>: The BRA lacked and adequate "Contaminants of Concern" analysis. The list of contaminants of concern was actually developed in the "Contaminant Fate and Transport" section (Section 5) of the remedial investigation (RI). However, the methods used to include contaminants on the list were neither consistent with SPHEM, nor RAGs. If RAGS methodology had been used to develop the list of contaminants of concern, the following contaminants would likely be added to the list:

- *Xylenes and 1,2-dichloroethene, based upon the fact that they were detected in groundwater during both the RI, as well as; in the previous site studies (the qualitatively relevant groundwater data was noted in the RI). In the case of* *xylenes, there is also historical evidence of disposal of these compounds at the site.*

- *A number of Polycyclic Aromatic Hydrocarbons (PAHs) additional to pyrene, benzo[k]fluoranthene, and benzo[b]fluoranthene. Addition of a wider range of PAHs would be based upon their presence in source areas, and their apparent transport to sediments via surface water mechanisms (the fact that three of the PAHs were found in sediments implies the transport of other PAHs).*

- *A number of Volatile Organic Compounds (VOCs) such as perchloroethylene (PCE), trichloroethylene (TCE), and toluene. Addition of these compounds would be based upon information from the pre-RI studies which give qualitative evidence that these compounds have been present in groundwater In the case of toluene, there is also historical evidence that it could be present onsite.*

Some of the contaminants listed above may show relatively low risks when taken through the analysis using the available quantitatively relevant data. However, the importance of listing these as contaminants of concern becomes apparent during the analysis of uncertainties, when the potential for underestimating site risks is discussed.

Response 68:

The potential chemicals of concern are listed in Table 6-1 of the revised baseline risk assessment. All chemical constituents that were measured at the site are included as potential chemicals of concern with the exception of the following: sodium, potassium, calcium, magnesium, and sulfur. These were eliminated from further consideration as prescribed by U.S. EPA guidelines for risk assessment. In addition, iron was eliminated because it too is generally considered to be of low-order toxicity to humans. TICs that were not detected in more than one medium were eliminated from the risk assessment as well.

Comment 69:

Comment #2: The BRA lacked an uncertainties analysis. The uncertainties analysis should address the potential for overestimating of site risks, as well as, the potential for underestimation of risks. Pre-RI data indicates (at least qualitatively) the presence of a number of contaminants which were not detected in the RI. The uncertainties analysis should address the temporal representativeness of the sampling data collected during the RI. Could the difference in sampling results between the pre-RI studies and the RI be due to varying rainfall/groundwater conditions? (Note that page 4-21, paragraph 2 of the RI presented a similar rationale to explain fluctuations in chlorofluorocarbon concentrations) Alternatively, have site sources been depleted by efficient transport mechanisms?

Response 69:

An uncertainties analysis has been added to the revised baseline risk assessment as Section 6.8.

Comment 70:

Comment #3: The BRA discounted the possibility of future residential development at the site, citing current city plans to use it for recreational purposes. However, given that Dane county population is expected to increase significantly in the near future (see page 3-17 of the RI), and also assuming that the site's future land use has not been guaranteed, an onsite residential scenario represents a reasonable maximum exposure for potential future land use. Potential media of concern at the future site residence would include: groundwater, site soils, outdoor and indoor air, surface water, and sediments.

Response 70:

Future residential development at the site is prohibited by the Wisconsin Administrative Code NR 504.07(8)(b). In addition, because most of the land adjacent to west, north, and

east property boundary are wetlands, it is highly unlikely that residential development in these areas would be allowed or desired. Therefore, the possibility of future residential development on the site was not considered as part of the revised baseline risk assessment.

Comment 71:

Comment #4: The environmental effects due to the site need to be addressed in a more thorough fashion. At the least, the risk assessment should present a basic inventory of the current status of selected components of the area's biological community (eg. a list of the rare or endangered species in the area which could be affected by the site).

Response 71:

An inventory of rare or endangered species was requested from the WDNR as noted above. An inventory of these species has been added to Section 6.7 of the revised baseline risk assessment which generally addresses environmental effects at the site.

Comment 72:

Comment #5: The RI documented that a Preliminary Health Risk Assessment was completed by the Wisconsin Division of Health, Department of Health and Social Services (WDHSS) for the Agency for Toxic Substances and Disease Registry (ATSDR). However, the BRA did not compare its results to the ATSDR Risk Assessment. According to RAGS this comparison should be made and any inconsistencies between the two studies should be analyzed.

Response 72:

The results of the baseline risk assessment are compared to the results of the ATSDR risk assessment in Section 6.9 of the revised baseline risk assessment.

Comment 73:

Section 5.6.2: Per Risk Assessment Guidance for Superfund, Section 5.6.2. TICs should be presented as chemicals of potential concern in the risk assessment, and the uncertainty in both identity and concentration should be noted. Table 6-1 as presented does not adequately show potential contaminants of concern over all media. Air and waste are neglected as separate media. Table 6-1 should be revised to show air and waste as separate media, and to show TICs. A revised Table 6-1 is enclosed with these review comments. The text needs to present information on potential contaminants of concern, grouping them into classes on basis of similar mobility and toxicity, and then narrowing potential contaminants of concern down into a table listing contaminants of concern and their respective media, so that a baseline risk assessment can be properly conducted.

Response 73:

TICs are presented as chemicals of potential concern in Table 6-1. In addition, air and waste media are included as separate media.

Comment 74:

Section 6.1 Identification of Contaminants: The section should be retitled "Identification of Contaminants of Concern." The first sentence of the section should be revised to read "The potential contaminants of concern..." As shown under previous review comments above, section 5.0 presented an inadequate discussion and analysis of potential contaminants of concern. Table 6-2 does not adequately summarize an analysis conducted in Section 5.0, because the section did not conduct the analysis. TICs cannot be dismissed summarily as presented in the one sentence in this section.

Response 74:

As previously noted, the baseline risk assessment has been completely revised as part of the revised Draft RI Report. TICs are included in the revised baseline risk assessment.

Comment 75:

Section 6.2.1 Exposure Pathways Identification: The exposure pathway identification section presents a discussion of potential release mechanisms and an estimation of the probability that these mechanism are in effect. A number of inconsistencies are apparent in this analysis. For example, the last bullet item on page 6-4 is inconsistent with the data, as well as, with the first bullet item on page 6-5. The fact that low concentrations of contaminants were detected in groundwater at the landfill indicates a moderate to high probability that organic compounds have been transported from landfill wastes to groundwater (although the magnitude of this process may currently be low). Furthermore, if (as is stated on page 6-5) leaching of inorganic analyses from the buried waste to the groundwater is of moderate probability, then the same would be expected of the more mobile organic contaminants. Section 6.2 should be revised to make it internally consistent and also consistent with the data.

Response 75:

The exposure pathways have been completely revised as part of the revised baseline risk assessment. These are presented in Section 6.3.2.

Comment 76:

Section 6.2.1. Exposure Pathways Identification, page 6-7, first and second Bullet Items: Recreational exposure to surface water and sediments should include ingestion of these media, or else it should be shown that these pathways are insignificant compared to dermal contact.

Response 76:

In the revised baseline risk assessment, dermal contact exposure is considered for surface water, whereas dermal contact and incidental ingestion exposure routes are considered for sediment (Section 6.3.2).

Comment 77:

Section 6.3.1.6 Benzo(b)fluoranthene and Section 6.3.1.7 Benzo(k)fluoranthene, page 6-15: Toxicity information on these two compounds can be obtained from EPA's Health Effects Assessment document for PAHs and/or ATSDR Toxicity Profiles.

Response 77:

These compounds are listed as potential chemicals of concern in Table 6-1.

Comment 78:

Section 6.3.1.19 Zinc, page 6-19: Consult EPA's Health Effects Assessment document and/or ATSDR's Toxicity Profile for toxicity information on zinc.

Response 78:

Zinc was measured at concentrations two times above background in surface water in the southeast wetland water body. Dermal contact exposure was considered for surface water. Table 6-11 of the baseline risk assessment includes information on the source of the dermal permeability constant used for this chemical.

<u>Comment 79</u>:

<u>Section 6.3.3 Estimation of Chemical Intakes, page 6-20</u>: For the residential scenario, children aged 0-6 years would represent a more sensitive subpopulation than children from 6-12 years.

<u>Response 79</u>:

As previously noted, the residential scenario was not included as part of the revised baseline risk assessment. Children aged 1 through 6, however, were evaluated in other chemical intake scenarios.

<u>Comment 80</u>:

<u>Section 6.3.3 Estimation of Chemical Intakes, page 6-22, line 12 ("For dermal exposure...")</u>: Change "surface water" to "groundwater".

<u>Response 80</u>:

No response required due to complete revision of the revised baseline risk assessment.

<u>Comment 81</u>:

<u>Section 6.3.3 Estimation of Chemical Intakes, page 6-22, line 14</u>: Assumption (2) assumes that 80% of the body surface area is available for contact during bathing. Superfund Exposure Assessment Manual (SEAM) suggests using the value 100%.

<u>Response 81</u>:

The pertinent assumptions used in the revised baseline risk assessment are contained in Section 6.4.

Comment 82:

Section 6.3.3 Estimation of Chemical Intakes, page 6-23, line 4: Why should frequency of exposure to sediments be less than contact with surface water? A reasonably conservative assumption is that frequency of exposure to sediments is the same as frequency of exposure to surface water.

Response 82:

No response required due to complete revision of revised baseline risk assessment.

Comment 83:

Section 6.3.3 Estimation of Chemical Intakes, page 6-24, equations for lifetime exposure: Exposures averaged over a lifetime are appropriate for the calculation of carcinogenic risks. However, for the calculation of the hazard index, exposures should be averaged over the period of exposure.

Response 83:

The calculations for noncarcinogenic hazard index are presented in Section 6.6.1 of the revised baseline risk assessment. The total lifetime average daily dose is divided by the reference dose (RfD) to determine the noncarcinogenic hazard index for each compound in each exposure pathway.

Comment 84:

Section 6.3.3 Estimation of Chemical Intakes, page 6-27: In line 1, the risk value of 9.9 x 10^{-6} *should be reported to one significant figure (as per RAGS); 1 x* 10^{-5}*. In line 2, the risk range* 10^{-4} *to* 10^{-7} *is more appropriately termed the "range of concern". Risks of* 10^{-4} *are not always deemed acceptable.*

Response 84:

Risk values calculated as part of the revised baseline risk assessment are presented in Tables 6-24 through 6-32. The risk values are not reported to one significant figure. However, these values may be converted to one significant figure by rounding. Also, the risk range of concern for the revised baseline risk assessment is 10^{-4} to 10^{-6}.

Comment 85:

Table 6-11: Should the slope factor for benzo[b]fluoranthene be associated with footnote (3)? Otherwise, it is not available in IRIS or HEAST. An oral slope factor of 1.75 may be calculated for arsenic using the IRIS unit risk value of 5 x 10^{-5}/ug/L. Reference doses (RfDs) for lead may be obtained from SPHEM. EPA's Environmental Criteria and Assessment Office (ECAO) may be consulted for advice on deriving RfDs for tetrahydrofuran and trichlorofluoromethane. An attempt should be made to characterize the risks due to these contaminants.

Response 85:

The various tables prepared as part of the baseline risk assessment reference the sources for slope factors and reference doses, as appropriate.

Comment 86:

Section 7.0 Summary, Conclusions, and Feasibility Study Overview: This section will need revision after the remainder of the document has been revised to address the review comment presented above. Therefore, no review of this section has been conducted.

Response 86:

This section has been revised appropriately.

Comment 87:

Executive Summary: This section will need revision after the remainder of the document has been revised to address the review comment presented above. Therefore, no review of this section has been conducted.

Response 87:

This section has been revised appropriately.

Comment 88:

Page 3-10: The last paragraph describes the thickness of the refuse materials and their depth at which they were deposited at the time of disposal. It should be clearly stated in this paragraph the relation of the water table with the wastes. Were wastes deposited directly in wetlands, filling in some of the surrounding wetlands? If that is the case, the water table would be in contact with waste. This should be explicitly stated here.

Also, the report needs to clearly state that a detailed cap study was not a part of the remedial investigation for this site. Perhaps the last sentence would better read "cover materials encountered during well installation showed the cover over the refuse is clay or silty clay."

Response 88:

The first two sentences of the referenced paragraph have been deleted. A substantial discussion on the occurrence of refuse materials in monitoring wells MW-2S/MW-2D and MW-6S/MW-6D, and piezometers P-5 and P-6 has been added to the text in Section 3.4.2. This discussion references boring logs for these monitoring wells and piezometers. Hydrogeologic aspects of this comment have been addressed in Section 3.6.2 (Site Hydrogeology) by adding a discussion on groundwater flow patterns based on revised Figure 3-4. Also, the suggested statement regarding cover materials has been added to Section 3.4.2 (see bottom of page 3-16).

Comment 89:

Figure 3-4: The presence of cross sections of the site is important for an overall perspective on the site conditions. The consultant should improve these cross sections by at a minimum including the water table and trying to better connect units (including refuse) where appropriate.

Response 89:

Cross-sections presented in Figure 3-4 have been revised to include information on the water table; hydraulic head data from the various monitoring wells and piezometers as measured on September 15, 1989; refuse; and a more complete connection of geologic units, where technically feasible. These cross-sections have been relabeled as hydrogeologic cross-sections.

Comment 90:

Page 4-6: The consultant should identify what source is used when describing typical landfill gas composition. It is not appropriate to compare site specific situations with a generalized report that identifies "typical" gas generation for all landfills.

Response 90:

The source of this information is not known to the present consultant. This paragraph has been deleted from the revised Draft RI Report.

Comment 91:

Page 4-8: The fact that dichlorofluormethane was found at one sampling location does not mean the contaminant is only as (sic) a single location. It only means that the contaminant was only found in the one sampling location of the few that were selected.

Response 91:

See pages 4-14 and 4-15 of revised Draft RI Report.

Comment 92:

Page 4-9: On what basis does the consultant make the statement that the primary source of water for two wetland locations is from "rainfall, with limited groundwater interaction or discharge to those locations"? This statement does not seem to be supported on Page 4-9, where inorganic concentrations are compared with typical inorganic values for groundwater in similar geologic formations. If these areas are dominated by rainfall, why compare the concentrations to groundwater? Given the geology and hydrology of the area and the drought conditions recently experienced in the state, I doubt whether rainfall is the primary source of water for these wetlands.

Response 92:

This discussion has been eliminated from the revised Draft RI Report. The primary source of water for the wetlands is likely groundwater, not rainfall.

Comment 93:

Page 4-11: With respect to the comments that bis(2-ethylhexy)phthalate is not present in sediment samples, I have some concerns. If this compound was found in background samples, it appears that it is present in the sediment. The questions that could be raised is whether the suspected background sample is truly background. If there were doubts as to the presence of this compound, those doubts would occur if the compound was also found in field or laboratory blanks that were analyzed. Was this the case for this compound?

<u>Response 93</u>:

This compound may be present in sediment samples collected as part of the RI. In addition, this compound was detected in a background sediment sample. The discussion of the occurrence of this compound has been revised. (see page 4-15). See Response 113 pertaining to bis(2-ethylhexyl)phthalate.

<u>Comment 94</u>:

<u>Page 4-13</u>: Please define "the original source material for the sediments". What does this mean. Are these sediment samples or waste samples?

<u>Response 94</u>:

This discussion has been eliminated from the revised Draft RI Report.

<u>Comment 95</u>:

<u>Page 4-16</u>: The consultant needs to differentiate between soil samples and waste samples. This should be done throughout the text and the sample results should be labelled as such.

<u>Response 95</u>:

See Responses 32 and 34.

<u>Comment 96</u>:

<u>Page 4-24</u>: The comparison of levels of inorganic constituents to regional groundwater quality is not appropriate. These compounds need to be compared to background groundwater quality at the site. Any other comparison is inappropriate. This also holds true with comparison of soils found at the site with national averages of soil constituents.

Response 96:

See Responses 20 and 29.

Comment 97:

Page 4-26: Please differentiate between a soil sample and a waste sample.

Response 97:

See Responses 32 and 34.

Comment 98:

Page 4-27: As previously stated, please compare site specific soil concentrations with background samples. If no background samples were taken, a comparison is not possible.

Response 98:

See Response 29.

Comment 99:

Page 5-8: The top two paragraphs on this page do not seem to be well connected. If the bis(2-ethylhexyl)phthalate has a high organic carbon-water partition coefficient, you would not expect it to be in water samples. Therefore, the fact that it was not found in the surface water samples makes sense. What doesn't make sense is how it got into the sediment samples. This explanation needs to be better presented or eliminated. It is not clear to me whether this was or was not a field or laboratory contaminant.

Response 99:

See Sections 5.2.3 and 5.3.4 of the revised Draft RI Report.

Comment 100:

Page 5-10: In discussing PAH's, please indicate whether you are discussing waste or sediment/soil samples. This should be clarified.

Response 100:

See Sections 5.2.2, 5.3.1, and 5.3.4 of the revised Draft RI report.

Comment 101:

Page 6-2: Please define low, medium and high probability when using these terms in this section. How were these probabilities established?

Response 101:

Chapter 6 of the revised Draft RI Report has been completely revised. Reference to these terms is not included.

Comment 102:

Section 3: We would like to see a better description/explanation of the boulder layer encountered during well installation. The PRP contractor should provide additional reference material on the boulder layer. Does this layer appear in other well logs of the area? How were the boulders deposited? Of what materials are the boulders comprised? How extensive are the boulders?

Response 102:

Section 3.42 (Site Geology) has been revised to include more information on the boulder layer. Based on information from Cline (1965), boulders have been reported in Dane County in outwash deposits. Also, based on the bedrock elevation encountered in a residential well located approximately 1,000 feet southeast of the site, the interpretation of a boulder unit at this elevation, rather than bedrock, is most probable.

Comment 103:

Section 3: The WDNR would also like a more detailed description of the finer grained deposits found on the site. What is the nature and extent of these deposits? Are these wetland deposits or deposits from another source? How extensive are the deposits? Please describe the deposits using the physical laboratory analyses that were conducted on the samples.

Response 103:

Sections 1.3.1 and 3.4.2. of the Draft RI Report have been revised to present a clearer description of the site geology and its relationship to area wetlands. Also, a paragraph has been added to Section 3.4.2 to describe the results of physical laboratory analyses that were performed on the various geologic deposits that occur at the site.

Comment 104:

Section 3: The cross sections presented in the Report are inadequate. There is no attempt to connect deposits. There is no delineation of depth and extent of waste. It is clear in the well construction reports that refuse was encountered in areas outside of the waste site as delineated through geophysical methods. This needs to be clearly mapped on the cross sections. In addition, location of the water table must be included. Is the waste in contact with the water table, and to what extent? This is critical information to have to determine the nature of groundwater contamination and to adequately address protectiveness of the environment. Is there cover material over the site? If so, that is the extent of the cover material (i.e., depth) and of what materials is it comprised? This also should be included in the cross sections. The cross sections should include information from all available well construction reports for this site and should be at a scale that is appropriate for the purpose of the cross section.

Response 104:

As noted in the response to Comment 17 and other comment responses, Figure 3-4 has been revised to include water table and hydraulic head information, and to better connect geologic units. In addition, Sections 3.4.2 and 3.6.2 of the text have been revised to address comments pertaining to waste thickness, waste saturation, and the nature of the cover material encountered.

Comment 105:

Site Hydrology: This report does not adequately address the site hydrology. There is not delineation of wetlands, nor is there a discussion of surface water and groundwater interaction. The Report is contradictory in discussions of the role of surface water runoff vs. groundwater discharge. We note that the background samples taken are not indicative of true background samples. We believe the elevated compounds found in the background samples can be attributed to this site, and therefore, should not be used as background samples. If true background samples are necessary, we suggest that additional sampling be conducted, based *on the information we have to date. Those samples should be taken off-site, since the entire site area seems to be affected by either surface water runoff from the waste or groundwater discharge from the waste. In addition, since the sediments and surface water around the site show elevated levels of various compounds, the RI report should present a discussion about the origination of those compounds.*

Response 105:

Section 1.3.1 (Site Description) of the Draft RI report has been significantly revised to include information on wetlands delineated within and adjacent to the site, including the addition of Figure 1-2A showing the wetlands in the vicinity of the Stoughton City Landfill.

The interrelationship of surface water and groundwater at the site has been clearly stated in the revised Section 3.6.2 and revised Figure 3-4 (Hydrogeologic Cross Sections).

Additional background surface water/sediment samples have been collected at the direction of U.S. EPA and WDNR. In addition, a background groundwater sample was collected from an upgradient residential well. The appropriate sections of the text have been revised to incorporate this additional background sampling information. Also, the analytical results and appropriate comparison of background data are presented in Section 4 of the Draft RI Report. Appendix J, which has been added to the Draft RI Report, presents background sampling procedures and validated analytical results.

Comment 106:

Site Hydrology: We have attached EPA Region II guidance on determining Environmental Reviews to ensure functional equivalence to NEPA and recommend that this be used for evaluating the wetlands adjacent to the site. In addition, the comments from the Bureau of Water Resources Management address contaminated sediments and surface water and show that surface water quality standards are exceeded. This area of wetlands quality and surface water quality in the RI Report needs to be improved and contain more complete discussions. The RI

Report should address the wetland species present and any other wetlands information pertinent to this site. The Water Resources comments are intended to partially define the wetlands for this site; more detailed work is necessary as part of this RI. Wetlands have been designed by the State through our Wetland Mapping program.

Response 106:

As discussed at the meeting at U.S. EPA Region V on March 26, 1990, attended by representatives of U.S. EPA, WDNR, and the Stoughton City Landfill PRP Technical Committee, the PRPs do not feel it is necessary to conduct the wetlands study in accordance with the referenced guidance. However, as stated in Response 105, the Draft RI Report has been significantly revised to incorporate valuable information on wetlands located within and adjacent to the site. Surface water quality standards are referenced in Chapter 4.

Comment 107:

Figure 3-1 through 3-6: We note that the outline of the waste on these figures does not correspond to what was found during well installation. In some areas there is at least nine feet of waste in the borings as wells were installed. What is the lateral extent of the waste? We not that this information is significant to the RI. In some areas it appears that waste is off the site property boundary. Please confirm the extent of waste by reviewing the existing data and delineating this information on the appropriate maps.

Response 107:

As discussed in Response 88, the comments regarding the thickness, areal extent, and water saturation of refuse have been addressed by revising Sections 3.4.2 and 3.6.2 of the RI. As stated in the text, the southern extent of landfilling likely extended to near the current southern property line, rather than as represented by the results of the geophysical survey. All pertinent figures have been revised to extend the southern landfill boundary.

<u>Comment 108</u>:

<u>Section 3</u>: In addition, we believe that additional water table elevations should be drawn using data from the additional sampling event. This can be used as a comparison and help in describing the contaminant migration pathways. We reiterate that information about depth to waste and depth to water are imperative in selecting remedial action alternatives and must be presented in this report. At this time, we can only assume that significant portions of waste are directly in contact with the water table.

<u>Response 108</u>:

As discussed in Response 19, Figure 3-6A has been added to represent the groundwater flow patterns at the site from another time period. The text has been appropriately modified to incorporate this new figure. In addition, the text of Section 3.6.2 has been revised to present a discussion of the relation of waste to the water table at the site. Based on this information, a maximum of 5 feet of refuse are saturated in the southeast portion of the site (initial disposal area) and a lesser amount in the extreme north portion of the site.

<u>Comment 109</u>:

<u>Section 4</u>: Figure 4-2 through 4-5 do not include landfill boundary information nor do they include the location of wells both on and off-site. Please add this information so that interpretations can be made as to the location of higher concentrations of soil gas with the extent of waste and groundwater sampling information. In general, there needs to be more of a link between suspected waste characteristics and migration pathways. Since there is no waste characterization as part of this remedial investigation, we are forced to make conservative assumptions about the wastes. The results of the soil gas survey can help identify areas where wastes may continue to discharge contaminants into the migration pathways.

<u>Response 109</u>:

Revised landfill boundary information and the locations of monitoring wells have been added to Figures 4-2 through 4-5. See Chapter 5 for discussions pertaining to the interrelationship between waste and site environmental media.

<u>Comment 110</u>:

In addition, the question of whether methane gas generation is a problem at this site has not been adequately addressed in this report. Please update the Report to adequately answer this question and include in this discussion the data that was used to reach the conclusion made. Please provide a map that shows the methane level encountered at this site as part of the Remedial Investigation activities.

<u>Response 110</u>:

The results of the two methane surveys are presented in Appendix I and include figures illustrating sampling locations. Also, the text has been revised to address the comment.

<u>Comment 111</u>:

<u>Page 4-8</u>: Page 4-8 discusses the presence of dichlorodifluoromethane in surface water and suggests that it may not be present at the site, or if it is, it is present at low concentrations and only at one location. We would like to note that this compound was also found in the groundwater samples and that this should be used to establish a migration pathway from the site to the surface water. The WDNR notes that migration pathways are a major component of this Report that needs to be addressed.

Response 111:

A potential migration pathway for dichlorodifluoromethane to surface water exists at the site as discussed in Section 5.1.2. However, as presented in Section 5.3.3, this compound has a high potential to volatilize from surface water.

Comment 112:

Page 4-9: Page 4-9 discusses the potential sources for inorganic compounds. The WDNR believes the discussions here need to be either substantiated or removed. For examples, there is a discussion of barite being the source of barium. Does this relate to the sandstone bedrock in the vicinity of the site. From what source does the author believe the limestone comes from, since Chapter three identifies the bedrock of the region to be sandstone? I believe this discussion is misleading and unsubstantiated and unless it can be documented, it should be removed from this Report. Elevated levels of inorganic compounds including sodium are more likely to have come from landfill leachate as generated from this site. Without documentation of the regional water quality this section is not appropriate for this report and should be removed. The last sentence on this page confirms the need for more information on the hydrology of this site. What data leads the author to make this conclusion?

Response 112:

The discussion of the potential sources of inorganic compounds has been removed. Also, more in-depth discussion of hydrology and the interrelationship of groundwater and surface water at the site has been provided throughout the revised Draft RI Report.

Comment 113:

Page 4-11: Page 4-11 identifies 2-Butanone as a common laboratory compound and suggests that it is a result of lab contamination. What data does the consultant use to reach this conclusion? It should be stated in the Report that at the Hagen Farm Superfund site, which is *documented to have wastes from the same generator as the Stoughton Landfill, 2-butanone is a major contaminant of concern. I suggest that the sentence suggesting this compound is a lab contaminant be removed if the data is not substantiated in the QC of the samples. In addition, a statement that this compound was found in a similar site that accepted waste from the same generator as this site should be included in this section. Please remove the sentence that suggests that bis(2-ethylhexyl) phthalate is not likely present in actual sediment samples. This is misleading in that the data passed QA/QC and therefore, was not found to be a lab contaminant at this site. In fact, these compounds were present in waste samples analyzed for this site, as stated on Page 4-16. Again, this information should be used to show a migration pathway that directly links waste from the site to contaminants in the sediment. Based on the history of this site, I do not believe this contaminant was introduced in the laboratory.*

Response 113:

Suggested references to stating that 2-butanone occurs at another site are inappropriate. Also, it remains possible that this compound may be a laboratory contaminant in that it is generally acknowledged by U.S. EPA as such in Section 5.5 of RAGS (U.S. EPA, 1989). The fact that it was not detected in any of the laboratory blanks only means that it was not present in them at the time they were analyzed.

For the same reasons, bis(2-ethylhexyl)phthalate may be a laboratory contaminant. As suggested in the data validation reports, these data should be used continuously.

Comment 114:

Section 4: In general, the Remedial Investigation Report should be introducing preliminary remediation goals. These would be the Applicable and/or Relevant and Appropriate Requirements where available. At this site, it is apparent that Maximum Contaminant Levels and State Groundwater Standards (NR 140) are potential ARARs that will have to be met. Yet there is no mention of State groundwater standards and minimal mention of MCLS. The Report should at a minimum address groundwater standards, MCLs and MCL goals. I also note that the *attached WRM memo identifies NR 105 standard exceedances found in the surface water at this site. This should be clearly identified in the RI Report. In addition, preliminary remedial goals should be identified for contaminated soil and debris, as well.*

Response 114:

References to potential ARARs have been made where appropriate throughout the revised Draft RI Report.

Comment 115:

Section 5: In addition, the Chapter 5 portion of the Remedial Investigation Report should identify migration pathways/contaminant fate and transport of various contaminants found at the site. There does not seem to be a discussion of migration pathways in this section. How did the contaminants reach the points at which they were found? This needs substantial upgrading to address the migration and transport of contaminants at this site.

Response 115:

Chapter 5 has been revised to address this comment.

Comment 116:

Page 5-2: Page 5-2, this paragraph contains the following incorrect statement: "no significant release of VOCs was detected at the Stoughton City Landfill during the RI." In fact, the Report identifies VOC contamination of the groundwater that exceeds State enforcement standards and soil gas results suggest that there are high levels of VOCs in the site itself that would be contributing to the groundwater contamination. This misstatement must be removed from the report.

Response 116:

As previously stated, Chapter 5 has been completely revised, including the deletion of this statement.

Comment 117:

Section 5: The WDNR notes that because a waste characterization study did not take place at this site, we cannot make assumptions about what was placed there and what sources remain. This is a serious flaw in the investigation, and therefore, conclusions made with respect to the waste must be conservative until substantiated through an on-site investigation.

Response 117:

No response required.

Comment 118:

Section 5: The reference to a rusty appliance found near a surface water samples as the source of the dichlorodifluoromethane is inappropriate. This compound was found in groundwater from the site and should be attributable to the site. Perhaps the rusty appliance can be more clearly identified and sampled if the consultant wishes to keep this sentence in the report.

Response 118:

See Response 111. References to a rusty appliance have been removed.

Comment 119:

Section 5: The equation used on Page 5-3 is meaningless in that none of the factors used in the equation were measured in the field during the Remedial Investigation. There have not been *aquifer pump tests, nor has the organic carbon content of the soil been analyzed. There is not enough data to confirm the assumptions made at this site. Please remove this section or verify the numbers through field investigations that are used for making this analysis.*

Response 119:

This section has been removed in the revised Draft RI Report.

Comment 120:

Page 5-7: Page 5-7 suggests that pthalates are relatively immobile and any sampling results that identify these compounds in the environment are lab contaminants. These compounds were also found in the waste samples and the claim that they are the results of lab contamination has not been substantiated in the QA/QC of the data. The consultant has to either substantiate that these are indeed lab contaminants or remove this from the Report. It is the belief of the WDNR that these compounds are attributable to the site unless otherwise documented by the PRPs.

Response 120:

See Response 113. Phthalates were also identified in background surface water and sediment samples.

Comment 121:

Section 5.3: The discussion of Polynuclear Aromatic Hydrocarbons is inadequate at this time. PAHs were found in the waste samples that were analyzed for monitoring well 2 and in the sediment downgradient from that well. Please explain why these two facts are not related?

Response 121:

See Section 5.3.4 of the revised Draft RI report.

<u>Comment 122</u>:

<u>Page 5-12</u>: On page 5-12, the consultant contends that the benzoic acid found in the sample results could likely come from the scent glands of beavers, prunes or ripe cloves. The WDNR questions the presence of beavers at this site, and asks that the PRPs provide us with documentation of prune or ripe clove disposal occurring at this site. The WDNR also questions how many scent glands would be necessary to obtain the level of benzoic acid found in the sample, and how is that substantiated. The WDNR suggests that the benzoic acid is more likely from the landfill, as this is a common breakdown compound from waste decomposition in landfills.

<u>Response 122</u>:

The discussion regarding the potential natural sources of benzoic acid has been removed. However, please note that this compound was also detected in a background sediment sample.

<u>Comment 123</u>:

<u>Section 5-6</u>: Section 5-6 of this report discusses the use of a nomograph technique to estimate the groundwater flow from this site to the nearest possible receptors (residences). The WDNR notes that this section is irrelevant to the purpose of the RI, which is intended to characterize the site and determine whether there are impacts or potential impacts to human health or the environment. This model ignores impacts on the environment. In addition, the methods uses assumptions that are not verified by any field data collected as part of the RI. The model does not take into account groundwater in direct contact with the wastes, as is the assumption for this site. The WDNR would like to see this portion of the RI removed as it is not relevant to the report.

<u>Response 123</u>:

The nomograph technique has been removed from the revised Draft RI Report.

<u>Comment 124</u>:

<u>Chapter 6</u>: In conclusion, I note that we have not provided a detailed review of Chapter 6 of the RI Report with these comments, as we believe there are significant revisions needed for the RI Report. In also note that the state is unable to determine whether RCRA issues will apply to this site, as we have not received the 104e letters submitted to EPA with respect to this site.

<u>Response 124</u>:

Chapter 6 of the Draft RI Report has been revised in its entirely. No response necessary for latter portion of comment.

<u>Comment 125</u>:

<u>Site Description, Page 1-7</u>: There needs to be a better characterization of the wetlands involved and a complete picture of the hydrogeological relationship between the landfill site, the adjacent wetlands, the Yahara River, and groundwater types and flow directions. Also, information is needed on the surface water hydroperiodicity. Does the Yahara River routinely overflow and flood the wetland adjacent to the landfill site during the spring runoff period? What is the hydrologic regime of the wetlands? Do the wetlands serve as groundwater recharge or discharge areas? Is there standing surface water throughout the year in the wetland? What is the depth of the water? Is the surface water present seasonally or only intermittently? What is the depth of the water table below the surface during the year? What type of vegetation is present on the wetlands?

<u>Response 125</u>:

As presented in Comment 105, significant revisions to the text of the Draft RI Report have been made to better characterize wetlands within and adjacent to the Stoughton City Landfill site. Section 3.6.2 has been revised to present a clear description of the hydrogeological relationship of surface water and groundwater at the site. Section 3.3

(Surface Water Hydrology) has been revised to address the frequency of flooding of the Yahara River in the vicinity of the site.

Comment 126:

Site Description, Page 1-7: Water Regulation and Zoning (Figure 1) maps have the wetlands adjacent to the landfill site classified as a standing water, paulstrine wetland (E2H) and a wet soil palustrine wetland (E2K). An extension of the E2H wetland within the landfill boundaries apparently served as the primary area of waste disposal.

Response 126:

Section 1.3.1 of the Draft RI Report has been revised to incorporate information on wetlands available from the WDNR Bureau of Water Regulation and Zoning. Figure 1-2A was added to show the distribution of these wetlands in relation to the Stoughton City Landfill site.

Comment 127:

Page 4-9: How can sample location SL8-1 be designated as a background location when the site is in the same waterbody as the other three sample locations in the wetland east of the landfill? The four sites are all hydraulically connected. Contaminants being transported out of the wetlands into the surface waters of the landfill may have a tendency to be deposited in wetland soils at sites proximal to the landfill, but the possibility of contaminants remaining in solution and being transported to more distance locations, such as SL8-1-W has to be considered. If SL8 is the designated background site, how can the DRIR state that specific compounds are elevated at that location? Elevated relative to what? Are the levels elevated above some expected background level?

<u>**Response 127**</u>**:**

Samples collected from adjacent wetland areas have been determined to be non-representative of background conditions because the areas are hydraulically connected. U.S. EPA and WDNR located similar wetland conditions outside the influence of the Stoughton City Landfill. These wetlands were sampled and analyzed for background characteristics (see Appendix J). The results of these analyses have been incorporated into the text where appropriate.

<u>Comment 128</u>:

<u>Page 4-9</u>: Is it reasonable to locate a sample site in a wetland in the vicinity that has a comparable soil type and water regime to serve as the background location? This site would be outside of any groundwater and surface water influences as a results of contaminants moving out of the landfill.

<u>**Response 128**</u>**:**

See Response 127.

<u>Comment 129</u>:

<u>Page 4-9</u>: Since water quality in a wetland can change significantly from season to season and the water quality changes could affect bioavailability of any contaminants present from the landfill in the surface water and soil of the wetland, is sampling of the surface waters and soils on a seasonal basis feasible?

Response 129:

At this time surface water and sediment sampling of the wetlands on a seasonal basis is not considered critical to the conduct of the Feasibility Study. Therefore, seasonal sampling is unnecessary.

Comment 130:

Section 4.3: Based on the Water Regulation and Zoning Wetland Maps, the wetland to the east of the landfill is classified as E2H or a palustrine wetland with emergent hydrophytic vegetation and a water regime of surface water present for much of the growing season. Wetlands are classified as a surface water under NR 1-4.32(3)(b), Wis. Adm. Code. Under NR 104.2(3)(b), wetlands are in the Limited Aquatic Life Subcategory (Marginal Surface Waters). An initial application of the water quality criteria established under NR 105 to protect the Limited Aquatic Life Subcategory is shown in Table 1. The average hardness of the surface water in the wetland is assumed to be 250 ppm $CaCo_3$. *Comparison of the surface water standards in Table 1 to the Table 4 surface water sampling results of the DRIR indicates the concentrations of several compounds exceed the standards as indicated in the following Table II.*

Response 130:

The hardness of each surface water sample was calculated using methods described by Hem (1978).* Using the formula presented in NR 105 to calculate toxicity values for those constituents whose toxicity is related to hardness, only zinc marginally exceeds chronic toxicity criteria established under NR 105.

*** Hem, John D., "Study and Interpretation of the Chemical Characteristics of Natural Water," U.S. Geological Survey Water Supply Paper 1473, p. 224.**

<u>*Comment 131*</u>*:*

<u>Section 4.3</u>: Determination that spring flooding of the wetland provides habitat for warm water sports fish may cause an adjustment to the above water quality standards.

<u>Response 131</u>:

Based on discussions with a hydrologist with the Water Resources Division of the U.S. Geological Survey in Madison, Wisconsin, it is doubtful that spring flooding occurs with great frequency (see Section 3.3). Therefore, it is doubtful that an adjustment is necessary.

<u>*Comment 132*</u>*:*

<u>Section 4.3</u>: It is important that a representative background site or sites be found for the wetland surface waters in order to establish the natural metals concentration to distinguish any contribution of metals to surface waters originating from the landfill.

<u>Response 132</u>:

See Response 127.

<u>*Comment 133*</u>*:*

<u>Section 4.3</u>: In the wetland surface water testing done for organic compounds, only dichlorodifluoro-methane was detected. There is no NR 105 water quality criteria for this compound.

<u>Response 133</u>:

We acknowledge that there is no water quality criteria for dichlorodifluoromethane in NR 105. However, the potential threat to human health due to dermal contact with

dichlorodifluoromethane and other compounds in surface water was considered as part of the revised baseline risk assessment.

<u>Comment 134</u>:

<u>Page 4-10</u>: It is indicated that elevated concentrations of sodium in the surface waters may be a result of winter road salt runoff from streets above (north) of the site. There does not appear to be streets north of the site other than private driveways

<u>Response 134</u>:

We concur that no major roadways exist immediately north of the site. However, there are private and public roads just south of the site.

<u>Comment 135</u>:

<u>Page 4-10</u>: A distinction needs to be made between classified wetland soil types and sediments. What are being sampled are either wet mineral soils or organic soils in the wetland adjacent to the landfill. While transport of sediment may be a small component of the soils, the soils have formed in place, have distinct characteristics and horizons, and may have different chemicals and physical properties compared to bottom sediments that are deposited on stream bottom and subject to resuspension and transport by water currents.

<u>Response 135</u>:

A discussion on wetlands has been added to Section 1.3.1. Wetland soils are discussed in Section 3.5.1.

<u>*Comment 136*</u>*:*

<u>Page 4-12</u>: Site SL-7-1-S and SL8-1-S are designated as background sampling locations in the DRIR. As discussed above, we have problems with designating SL-8-1-S as a background site because it is potentially in the zone of influence of contaminants originating from the landfill that enter the surface water sand groundwater of the wetland.

<u>Response 136</u>:

See Response 127.

<u>*Comment 137*</u>*:*

<u>Section 4.4</u>: We also have a problem designating SL7-1-S as a background location. The soil type in the wetland to the east of the landfill is classified as a Palms muck. The upper profiles (approximately 30 inches) consist of organic materials in various stages of decomposition underlain by gray silt loam and fine sand. The soils are very poorly drained and water ponds are floods the area for varying portions of the year. This is an organic soil or histisol????. Water Regulation and Zoning classifies the area of the soil as a wetland. The soil type in the area where SL7-1-S is located, west of the landfill is classified as belonging to a soil type called the Marshan series. The surface layer is siltloam with the subsoil being mottled and consisting of silty clay loam. Clay loam, and loamy sand. The soils are very poorly drained and may pond water for short periods. The Water Regulation and Zoning wetland classification maps do not designate the area of Marchan soil as wetland. In general physical make-up organic matter content, and water regime, SL7-1-S is significantly different from the soils in the classified wetland to the east of the landfill.

<u>Response 137</u>:

See Response 127.

<u>Comment 138</u>:

<u>Page 4-8</u>: the DRIR indicates SL5-1-S is located in a pond isolated from the wetland. Figure 2-2 would appear to indicate site SL5-1-S was taken in a drainage ditch that is connected to the wetland.

<u>Response 138</u>:

This is correct. The sample SL5-1-S is a sediment sample collected from the east side of the earthen walkway that crosses the drainage ditch north of the landfill (page 2-6, bullet 2). Water sample SL5-1-W was collected at the west side of the pond located approximately 75 feet north of the drainage ditch, as indicated on revised Figure 2-1.

<u>Comment 139</u>:

<u>Page 4-9 and 4-12</u>: Page 4-9 designates SL8-1-S as the background location and Page 4-12 designates sites SL7-1-S as background locations. Why the difference in the background locations cited?

<u>Response 139</u>:

These background sample locations were approved by representatives of WDNR. Additional background sediment samples were collected as described in Response 127.

<u>Comment 140</u>:

<u>Page 4-12, second paragraph</u>: Why is SL6-1-S brought into the discussion of wetland soils at this point? SL6 is west of the landfill and is north of SL7. What is the soil classification, hydrologic regime, and Water Regulation and Zoning classification of the are SL6 is located in?

<u>Response 140</u>:

Soils at the SL6 location would likely be classed in the Houghton series. The wetlands classification would likely be E2H or E1K.

Comment 141:

Page 4-13: In establishing background levels in substances in the organic wetland soil type involved, it is not entirely appropriate to be using ranges of substances found in what are assumed to be minimally human-impacted upland soil types found nationwide. What is the source being referenced? This is much too wide a universe to making a valid comparison for establishing background levels. The establishment of a background site to compare with a study site should be based on soils of common geochemical origin and formation factors, such as water regimes and comparable organic matter content. Wetland organic or wetland mineral soils should be compared with comparable wetland soil types. It would appear that since the wetlands to the east of the landfill that form an arc that goes toward the river are potentially influenced by the landfill, similar soil types nearby out of the influence of the landfill should be sampled for background.

Response 141:

See Response 127.

Comment 142:

Sections 4.4 and 4.5: Because there is no background wetland soil metals concentration information, a preliminary comparison was made between the metals concentrations in soils and sediments found in three studies (Table III) and the concentrations reported in Table 4-3 of the DRIR for the wetland soils east of the landfill. The studies used to establish background levels were generally done on soils/sediments in the same geochemical region of Wisconsin as the landfill site. One study was done on 3 Illinois Rivers. Additionally, metal concentrations in referenced upland soil sites used in the DRIR were also included for comparison. The *comparison generally indicates the metals concentrations at some of the sites in the wetland exceed the referenced values (Table IV).*

Response 142:

See Response 127.

Comment 143:

Section 4.0: Use of the metals concentrations in the soil from the referenced upland soil background sites (SLBKG1B1S and SLBKG2A1S), page 4-17 of the DRIR, would also appear to confirm that metals levels at the wetland sampling sites are elevated as indicated in Table III (See Column 1 of Table III).

Response 143:

See Response 127.

Comment 144:

Section 4.4: The elevated zinc and lead levels in the wetland soils are possibly related to the elevated levels of the substances in the overlying surface waters that cause the water quality criteria for these compounds to be exceeded as discussed in the surface water section above.

Response 144:

The chemical status of wetland sediment has been reassessed as a result of additional background sediment sampling. Few metals significantly exceed background concentrations.

<u>*Comment 145*</u>*:*

<u>*Sections 4.4 and 4.5*</u>*: It is not established whether the landfill is the contributing source for the elevated metals levels in the surface waters and soils of the adjacent wetland. Is the wetland acting as a collection sink from other sources such as nonpoint discharges or periodic loads of contaminated sediment being carried in and deposited from the flooding of the Yahara River? Is the high amount of organic matter in the wetland soils enhancing the absorption of metals from natural sources?*

<u>Response 145</u>:

See Responses 131, 134, and 144.

<u>*Comment 146*</u>*:*

<u>*Section 4.4*</u>*: The analytical data for organic compounds reported for the sediments (wet soils) from sample locations in the wetland to the east of the landfill are heavily qualified in the discussion beginning on page 4-10 of the DRIR. Low levels of polycyclic aromatic hydrocarbons (PAHs) were found at sites SL1-1-S and SL2R1-1-s and high levels of unknown hydrocarbons found at SL2R1-1-S, SL2R2-1-S, and SL8-1-S. PAHs will sorb onto the organic matter in the organic soils. To determine the significance of the hydrocarbon compound levels found in the soils of the wetland, the level of hydrocarbon compounds in a comparable nearby wetland soil, uninfluenced by the landfill is needed for comparison.*

<u>Response 146</u>:

See Response 127.

Comment 147:

Section 4.4: It would appear a background sample needs to be taken on a similar wetland soil outside of the influence of the landfill to verify if in fact the levels of metals are and organics elevated. Ideally, two background sites could be established, both outside the landfill-associated wetland with one subject to flooding by the river and the other not. This would help determine if the river is the potential source of any metals found in the wetlands, as stated in the DRIR (page 4-13).

Response 147:

See Response 127.

Comment 148:

Page 4-13: It is stated "all soils encountered above the watertable were screened." Were soils samples taken from below the watertable?

Response 148:

Soil sampling was performed during the installation of monitoring wells. Soil samples from the shallow boring at each well cluster were screened in the field for trace gases (primarily volatile organics). Laboratory samples were taken from above the water table from each shallow boring exhibiting the highest trace gas reading above background. Additionally, soil samples were collected from the screened interval (below the water table) from each monitoring well installed at the site and analyzed for grain-size distribution.

Comment 149:

Page 4-16: In the soils samples collected in the refuse (MW-2 and MW-6), was the material collected part soil and part refuse, or was the majority or all refuse material? In samples *collected in the refuse area adjacent to the wetland to the east are the soils collected the buried soils from the wetland that extend into the landfill?*

Response 149:

Samples collected from within the refuse at MW-2S and MW-6S were predominantly soil. However, some refuse was intermixed.

Samples collected adjacent to the southeastern portion of the landfill (SL2) were from sediment that included brick fragments, cardboard, asphalt fragments, and pieces of plastic paper.

Comment 150:

Page 4-27: The statement is made that "as noted in section 4.3, all shallow groundwater and surface water in the wetlands located to the east are in communication." This relationship is not established in section 4.3 of the DRIR.

Response 150:

This relationship has been established in the revised Draft RI Report, as noted in previous responses.

Responses to Technical Review Comments on Draft Remedial Investigation Report (Revision 2)

Stoughton City Landfill
Stoughton, Wisconsin

Submitted By:

Stoughton City Landfill Steering Committee

Document No. 6885-002-531A

Prepared By:
ENSR Consulting and Engineering
740 Pasquinelli Drive
Westmont, Illinois 60559

January 17, 1991

OFFICE COPY

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TABLE OF CONTENTS

Comment 1:

2.5 Surface Water and Sediment Investigations, p. 2-7: The designations for soils presented here in the text (i.e., EH2 and EK2) do not correspond to those presented earlier on p. 1-9 (i.e., E2H and E2K).

Response 1:

The correct designations for soils are E2H and E2K. The text on page 2-7 will be changed to read E2H and E2K.

Comment 2:

3.4.2 Site Geology, pp. 3-15 through 3-16: In the last paragraph on p. 3-15, it is stated "Approximately 9 feet of fill....was identified in MW-2S". In the first paragraph of p. 3-16, it is stated "a maximum of about 7 feet of fill material may be present in the southeast portion of the site". This discrepancy should be resolved.

Response 2:

The maximum amount of fill will be changed on page 3-16 to read 9 feet.

Comment 3:

In the last paragraph of p. 3-16, the assumption that no waste was deposited below water surface levels at the time of filling is unsubstantiated. The relevance of this assumption is also questionable since the elevations of water surface levels at the time of filling have not been determined. In addition, several borings indicate that the bottom of refuse is currently up to 5 feet below the water table (see Figure 3-4 and discussions on pp. 3-24 and 5-4). These issues should be resolved.

Response 3:

Disposal occurred initially in wetlands that make up the current southeast portion of the landfill; however, the depth of surface water at the time of initial disposal is unknown. Based on observations made during field activities throughout the course of the RI, the maximum depth of surface water in the adjacent wetlands is 1 foot. The last paragraph on page 3-16 will be changed accordingly.

Comment 4:

6.0 Baseline Risk Assessment: Most of the comments to the previous version of the Stoughton City Landfill risk assessment contained in the Draft RI Report Revision 1 have been adequately addressed in Revision 2 of the subject document. One of the previous comments however, was *not addressed.*

In comments to the January 1990 draft, it was noted that an improper averaging time was employed for calculating chronic exposure to non-carcinogens. The same problems was repeated in the August 1990 version. The RAGS states:

> *"The averaging time selected depends upon the type of toxic effect being assessed. When evaluating longer-term [longer than acute] exposure to noncarcinogenic toxicants, intakes are calculated by averaging intakes over the period of exposure." For carcinogens intakes are calculated by prorating the total cumulative dose over a lifetime."*

Therefore, the averaging time for intakes used to calculate hazard indices should be 30 years for adults and 5 years for children. The averaging time for calculating carcinogenic risks should be a lifetime (70 years). One further note on averaging times. An averaging time of 70 years for a lifetime may be more appropriate that one of 75 years (even through 75 years is the current average U.S. lifespan) since Slope Factors have been developed for an assumed 70 year 8lifespan.

Response 4:

We concur that a more appropriate averaging time of 70 years for a lifetime should be used in the risk assessment because slope factors are developed for an assumed 70-year lifetime. Exposure durations will be changed to 30/70 years for adults and 5/70 years for children for carcinogenic compounds. Exposure durations of 30/30 years for an adult and 5/5 years for a child will be used for noncarcinogenic compounds.

Comment 5:

The current version of the baseline risk assessment included a more complete presentation of intake and risk calculations than the original draft and this improved the reviewability of the document. However, a number of questions arise regarding the choice of some of the exposure factors presented in these tables.

In keeping with the discussion above, values for exposure duration should be adjusted to reflect the appropriate averaging times for the characterization of non-carcinogenic effects.

Response 5:

See Response 4.

Comment 6:

6.3.2 Exposure Pathways Identification, p. 6-6: The second paragraph should be revised to also indicate the rationale for not considering exposure to soil within the landfill. A brief discussion on NR 504.07(8)(b), as presented on p. 6-4 with minor elaboration, would be appropriate here.

<u>Response 6:</u>

The comment is unclear. Both exposure to soil inside the landfill (surface solid waste) and outside the landfill (surface soil) were considered. A casual (i.e., shallow) excavation scenario was considered for both cases. This scenario is appropriate for recreational activity and transient visitation at the site.

As stated earlier, Wisconsin Administrative Code (WAC) NR 504.07 (8)(b) prohibits the development of landfill sites. This lends further credence to the assumption of a casual excavation scenario.

<u>Comment 7:</u>

<u>Tables 6-7 and 6-8</u>: What is the justification or reference documentation for the choice of a gastrointestinal absorption adjustment factor (GAAF) of 0.5 for nickel and 0.15 for chromium?

<u>Response 7:</u>

The gastrointestinal absorption adjustment factor of 0.15 for chromium was used based upon a study by R.M. Donaldson and R.F. Barreras (1966) entitled "Intestinal absorption of trace quantities of chromium" that appeared in the <u>Journal of Laboratory and Clinical Medicines</u>, 68: 484-493. The GI absorption adjustment factor for nickel will be changed to a more conservative value of 1 in the risk assessment.

<u>Comment 8:</u>

<u>Tables 6-9 and 6-10</u>: The exposure time of (0.2/24 hours/day) listed in these tables is incorrect. The correct value is 0.2 hours/day. The dermal permeability constant (DPC) of aluminum was used for metal contaminants evaluated in the dermal pathway. However, in the previous (January 1990) draft, the DPC of water was used to evaluate dermal absorption of metals. The SEAM suggests that the DPC of water be used when a DPC for a specific contaminant is not known. Please provide the rationale or references supporting the change to less conservative DPCs for metals other than aluminum.

<u>Response 8:</u>

The correct exposure time is 0.2 hours/day. Because the dermal permeability constant of a metal (rather than water) is more appropriate to evaluate the absorption of a metal, the dermal permeability constant for aluminum was used.

<u>Comment 9:</u>

<u>Tables 6-12 and 6-13</u>: What is the justification or reference used to develop a dermal absorption adjustment factor (DAAF) of 0.001 for lead?

<u>Response 9:</u>

The listed dermal absorption adjustment factor of 0.001 for lead should be 0.01 based on a study by M.R. Moore, P.A. Meredith, W.S. Watson, D.J. Sumner, J.K. Taylor, and A.

Goldberg (1980) entitled "The percutaneous absorption of lead - 203 in humans from the cosmetic preparations containing lead acetate, as assessed by whole-body counting and other techniques" that appeared in Food and Cosmetic Toxicology; 18:399-405.

Comment 10:

Tables 6-14, 6-15, 6-18, and 6-19: Please justify or provide a reference for the GAAFs used in these tables, particularly the GAAFs for lead.

Response 10:

Where little or no toxicological information was available, a conservative gastrointestinal absorption adjustment factor of 1 was used. For PAH compounds, a GI absorption adjustment factor of 0.9 was used based upon a study by S.S. Hecht, W. Grabowski, and K. Croth (1979) entitled "Analysis of feces for B[a]P after consumption of charcoal-broiled beef by rats and humans." Food and Cosmetic Toxicology; 17:223-227. A GI absorption adjustment factor of 0.3 for lead was used for children based on a study by S. Drill, J. Knoz, J. Mahar, M. Morse (1979) entitled "The environmental lead problem: an assessment of lead in drinking water from a multimedia perspective." Washington, D.C.: EPA. EPA 570/9-79-003. NTIS PB-296556. We also used 0.3 as a GI absorption adjustment factor for the adult scenario to be conservative.

Comment 11:

Tables 6-16 and 6-17: Provide justification/reference for DAAFs used in these calculations.

Response 11:

Where little or no toxicological information was available, a conservative dermal absorption adjustment factor of 1 was used. For PAH compounds, a dermal absorption adjustment factor of 0.05 was used based upon a study by J.K. Kao, F.K. Patterson, and J. Hall (1985) entitled "Skin penetration and metabolism of topically applied chemicals in six mammalian species, including man: An in vitro study with benzo[a]pyrene and testosterone." Toxicology and Applied Pharmacology. 81:502-516.

Comment 12:

Table 6-21: An interim inhalation reference concentration for xylenes of 0.3 (mg/cu m) is available in the Health Effects Assessment Summary Tables (HEAST), 3rd Quarter, 1990. This corresponds to an inhalation RfD of 0.09 (mg/kg-day). It should be noted that the reference concentration given above is less than the exposure point concentration of 0.347 (mg/cu m) for xylenes used in the risk assessment. Using the intake equations of the risk assessment corrected as indicated in the comments above gives the following hazard quotient for children:

> *[Concentration (.347 mg/cu m) x Breathing rate (17.6 cu m/day x Fraction of day exposed (8/24) x Exposure duration (1825 days)] / [Child body weight (16 kg) x Averaging time (1825 days) x Inhalation Rfd (.09 mg/kg-day)] = 1.4*

Use of an inhalation absorption adjustment factor in these calculations is not appropriate. For *those cases where an inhalation RfD exists for a contaminant, consideration of the percent absorption is already included in the RfD value. For cases in which only an oral RfD is available for a chemical, the inhalation RfD may not be simply extrapolated from compounds of similar structure. See RAGS on the derivation of inhalation RfDs.*

Response 12:

We concur. The inhalation RfD for xylenes, 9E-2 mg/kg/day, will replace the oral RfD for xylenes.

Comment 13:

Risks are calculated for chromium III. Is there any evidence for the presence of chromium VI which has a lower oral RfD?

Response 13:

Risks for potential groundwater and surface water exposure were calculated for chromium III. There is no known evidence for the presence of chromium VI.

Comment 14:

The dermal risk calculations presented in the tables need to include an adjustment factor which converts administered dose RfDs as given in IRIS and HEAST to absorbed dose RfDs consistent with the dermal absorbed doses calculated via the intake equations. See RAGS Appendix A for details on this adjustment.

Response 14:

We concur. According to new RAGS guidelines, Appendix A, oral RfDs should be adjusted for dermal risk calculations. The U.S. EPA Environmental Criteria and Assessment Office was contacted for guidance on adjustment factors. Where numerical values were available, these were used to calculate risk; otherwise, a qualitative assessment of risk was performed.

Comment 15:

APPENDIX J Results Of Additional Background Sampling Of Surface Water/Sediment And Groundwater, 2.1 Surface Water/Sediment, p. 1: The designations for soils presented here in the text (i.e., EH2 and EK2) do not correspond to those presented in Figure J-1 (i.e., E2H and E2K). The later designations correspond to those presented in Volume 1 of the RI Report on p. 1-9.

Response 15:

The soil designations in the text of Appendix J will be changed to E2H and E2K.

Comment 16:

4.1 Surface Water/Sediment: The text discusses the detection of benzene in sample SLB-3-S at an estimated concentration of 3 ug/L. The analytical results presented in Section 3.0 do not indicate the detection of benzene.

Response 16:

The correct sample reference is SLB9-3-S. An inspection of the raw analytical data indicates that benzene was detected. The summary table of organic analytical results presented in Section 2.A of Attachment 1 will be revised.

Comment 17:

The detection of both di-n-butyl phthalate and bis(2-ethylhexyl)phthalate is most likely due to contamination introduced either during sample collection or in the laboratory. At concentrations of 110 ug/L and 3 ug/L, these results should be considered as present in the original sample.

Response 17:

The comment is unclear. The concentrations are considered to have been present in the original sample because every precaution was taken to avoid contamination during sample collection and because these constituents were not measured in the field blank.

Comment 18:

It should also be mentioned that the identification and quantitation of Tentatively Identified Compounds (TICs) is speculative. This data should be used for informational purposes only. Also note that while benzoic acid and pentachlorophenol were detected in sample SLB11-3-S, these compounds were not detected in the duplicate sample SLB11-R1-3-S.

Response 18:

The requested changes will be made in Section 4.1 of Appendix J.

Comment 19:

4.2 Groundwater: The texts suggests that elevated concentrations of cadmium, copper, lead, and zinc detected in the background sample may be due to corrosion of the casing and/or pump. This explanation should include a discussion of any background information regarding general water quality in the area or potential contributions of these analyses by the formation.

Response 19:

General water quality data for the area do not include information for these constituents. Because of the relatively low concentration of cadmium, it is possible that this constituent is contributed by the formation. However, the other constituents have likely been contributed by corrosion, as stated.

Comment 20:

Section 1 Quality Assurance Review: In reviewing the Quality Assurance Review, Section 1 of Appendix J, the following items were specifically evaluated:

1. *The consistency of the review with U.S. EPA Contract Laboratory Program (CLP) data review guidances "Functional Guidelines for the Evaluation of Organic Analyses" and "Functional Guidelines for the Evaluation of Inorganic Analyses" (U.S. EPA, 1988);*
2. *The validity of the data qualifiers based upon the QA/QC information submitted;*
3. *Data report tables were checked to assure that qualifiers had been correctly placed on the appropriate results; and*
4. *The general quality of the data based upon the QA/QC information submitted.*

In all cases, the data qualifiers identified and discussed in the Quality Assurance Review were consistent with CLP data review guidelines and were appropriately placed on the data report sheets. The analytical results reported in Section 2 are acceptable with the exception of the compound benzene allegedly detected in SLB-9-3-S, as discussed above, which does not appear on the data report sheets. Because the raw data has not been submitted, the validity of this alleged result cannot be checked.

Response 20:

Comments noted. See Response 16 relative to SLB-9-3-S.

Comment 21:

A. Organic Data, Correctable Deficiencies, Item Number 4, p. 2: One significant deficiency noted by the data reviewer which was not discussed by ENSR in the summary section was that the only supporting QA/QC data provided for the analysis of Freon 11, Freon 12, and tetrahydrofuran were matrix spikes (MS) and matrix spike duplicates (MSD). MS/MSD analyses provide an indication of the accuracy and precision of the analyses; however, as the data reviewer later points out, "the validity of the 'not detected' results reported ... cannot be ascertained". In order to substantiate the results for Freon 11, Freon 12, and tetrahydrofuran, ENSR should submit additional QA/QC information.

Response 21:

The deficient information noted in Section 1.A (Item 4) of Attachment 1 was forwarded to Environmental Standards, Inc. (ESI), for data validation. The results of ESI's revised data validation will be submitted to the U.S. EPA and WDNR along with the Final RI Report.

Comment 22:

Organic Data Qualifiers, p. 3: The data reviewer has qualified the detection limit for the compound pentachlorophenol in sample SLB9-3-S as "UL". This designation means that the *actual detection limit was most likely higher than reported. The reviewer cites low MS/MSD recoveries as the reason for the qualifier; however, it should be noted that U.S. EPA Contract Laboratory Program (CLP) guidelines for data review state that data should not be qualified on the basis of MS/MSD data alone. The "UL" qualifier is not necessarily incorrect, but it is more conservative than the CLP protocols dictate.*

Response 22:

Comment noted.

Comment 23:

Overall comment. Throughout the report there is reference to "hypothetical" use of groundwater for drinking water. I believe the more commonly used and understood terminology should be "potential" as there clearly is the potential for the groundwater in the area to be used for drinking water.

I was please to see the inclusion of historical aerial photograph analysis; this is a useful tool in evaluating site conditions over time.

Information regarding the wastes disposed of at the site need to be included in order to determine the appropriate ARARs for this site. Specifically, we need to determine whether there are hazardous wastes at the site and the information provided in the RI are not sufficient to make that determination. In addition, the consultant needs to identify the volume of wastes at the site to adequately determine ARARs.

Throughout the text, qualitative statements are added to quantitative evaluations, for example, "marginal exceedance of a standard". The determination of a groundwater standard exceedance is not a qualitative one, it is quantitative. Therefore, the qualifiers need to be removed throughout the text. A groundwater or surface water standard exceedance is a yes or no event, not a marginal or slight yes or no event.

Response 23:

The use of the term "hypothetical" is considered appropriate. Groundwater is not used in the vicinity of the landfill. Future development of groundwater is considered highly unlikely for the following reasons:

- **Development of landfill sites is prohibited by WAC NR 504.07(8)(b);**
- **The installation of a water supply well within 1,200 feet of a landfill is prohibited under WAC NR 112.07 (2)(q) unless a variance is granted;**
- **Land to the west, north, and east of the site is wetland and will not be developed; and**
- **Water supplies for land developments south of the landfill are, and would continue to be, supplied by the city. Further, the city would pass an ordinance to restrict well development.**

The information on wastes disposed at the site provided in the RI was summarized from information supplied by the U.S. EPA in response to 104(e) requests. It represents the full extent of information known by the current PRPs. If additional information is required by the WDNR, it should be obtained through the State RCRA program or through the U.S. EPA.

The volume of wastes at the site will be estimated using existing data and provided in the Final RI Report.

Lastly, the use of the term "marginal" or variations thereof is considered appropriate in that it points out that a standard is on the border or edge of exceedance. For situations of this type, enforcement action may not be supportable under WAC NR 140.14(1)(b) and (2).

Comment 24:

Page 3-24. The report states that "the absence of vertical downward hydraulic gradients, except as would be expected in the recharge area, suggests that constituents released from the landfill would not migrate downward to deeper, bedrock water supply wells within the vicinity of the site." I would note that contaminant transport mechanisms are not necessarily tied to downward gradients at a site. We have witnessed at several sites in Wisconsin, deeper bedrock contamination due to the dense nature of the compounds or other transport mechanisms in the presence of upward gradients. Therefore, I believe this statement is an over generalization and misleading and recommend that it be taken out of the text. It is sufficient to state the hydraulic gradients found as a result of the investigation.

Response 24:

The hydraulic characteristics and types of constituents measured at other sites in Wisconsin are not pertinent to the Stoughton City Landfill site unless they are similar. Few such dense constituents were measured at the Stoughton City Landfill, and those only in low concentrations. Further, the results were sporadic in that they were not repeated in all sampling rounds.

The data collected as part of the RI support the statements made on the subject page.

Comment 25:

Page 3-27. The consultant states that "no significant environmental impact from the landfill was identified as a result of the groundwater, surface water, and surface water sediment investigations." I do not agree with this statement as it currently reads. We have clear violations of state standards at this site and to make such a generalized statement is not appropriate. I ask that this sentence be taken out of the document.

Response 25:

Although some State standards have been exceeded, these primarily pertain to groundwater as a potential drinking water source and not to environmental impact. Also, surface water standard exceedances for zinc are uncertain. Therefore, the statement is supported by the RI data.

Comment 26:

I am also confused in that I was not aware the consultant made a conscious decision to not conduct an ecological investigation. Was the need for an ecological evaluation discussed with the Agencies at an early stage of the remedial investigation prior to my involvement, or was this made after the fact? I would be surprised if the State agreed to not conduct this type of an *investigation if it were brought to our attention. The remedial investigation report should simply state that an ecological investigation was not conducted.*

Response 26:

The conditions for the conduct of an ecological investigation are as stated in the text. The WDNR reviewed and approved RI/FS work plans prior to their implementation. Information will be added to the subject sentence to clarify the basis of the statement.

Comment 27:

Page 4-9. Previous information presented in this report identifies xylene as a compound disposed of and detected in previous sampling at the site and in waste disposed of at the site. Therefore, I do not agree with the statement that xylene is not attributable to the site. I would agree with the statement that the limited sampling for this compound was inconclusive.

Response 27:

Previous sampling at the site, outside the scope of the RI, is not pertinent. These samples were not collected using current protocols and are considered suspect as described in Technical Memorandum No. 1 (Appendix A of RI). WAC NR 140.16 specifies monitoring and laboratory data requirements for data used to determine compliance with groundwater quality standards. It is our interpretation that previous samples do not meet these requirements.

Comment 28:

Page 4-12. In the discussion of the methane gas survey, there is a statement that "no control of the migration of methane gas is required". I do not believe it is appropriate for the consultant to be making this determination. In fact, there will likely be the need for gas migration control as part of the remedial actions for this site, per state requirements. I believe this statement should be eliminated from this discussion.

Response 28:

According to Rovers, Tremblay, and Mooij (1977) (Procedures for Landfill Gas Monitoring and Control. EPS 4-EC-77-4, Waste Management Branch, Environment Canada, Ottawa), two decomposition groups exist for organic refuse: a rapidly decomposing group and a intermediate-decomposing group. The first group decays over a period of 1 to 5 years and the second group has a degradation half-life of 5 to 25 years. Based on this information and the age of the Stoughton City Landfill, the rate of gas production would be expected to steadily decrease with time. Therefore, active gas migration control is not likely to be necessary.

Although passive gas migration control may be required depending on the type of cap upgrade chosen for the site, the data show it is not currently required to abate potential problems caused by off-site migration. The word "presently" will be added to clarify the

statement.

Comment 29:

Page 4-13. Additional background samples were requested by both the WDNR and the EPA, as this is a federal lead Superfund site. Both agencies were in agreement with the need for additional background sampling locations. The State should not be singled out in identifying this need.

Response 29:

The sentence will be clarified to indicate that the WDNR requested the sampling "through the U.S. EPA".

Comment 30:

Page 4-18. This section compares the concentration of surface water samples with Wisconsin water quality criteria (both acute and chronic), however a table of Wisconsin water quality criteria is not provided. Please provide the criteria as calculated by the consultant in a table for review. I note that the water quality criteria for wetlands assumes no dilution and that this analyses is also appropriate for groundwater concentrations of contaminants, as the groundwater discharges to the wetlands (again, no dilution for acute water quality criteria is used in calculating the standards). I also note that the Wisconsin DNR will be calculating water quality criteria for this site in the near future for use in determining ARARs and discharge criteria resulting from remedial actions.

Response 30:

A table listing the applicable water quality criteria as calculated will be prepared and added to this section. No dilution will be assumed for wetlands. Also, the groundwater concentrations will be compared to surface water quality criteria. If necessary, a table will be added to the groundwater section also.

Comment 31:

Page 4-20. With respect to 2-butanone, the QA/QC should have identified whether there was a problem with laboratory contamination with this compound. I note that this compound was reported to have been disposed of at this site, and if QA/QC did not show this to be qualified data, we should assume that it is a result of the site.

Response 31:

The last sentence of the first paragraph on page 4-20 states that 2-butanone may possibly be attributable to the site. The use of the word "possibly" is valid because the compound was measured below its CRQL, was not detected in the duplicate, and is a common laboratory contaminant. The fact that a common laboratory contaminant was not measured in the method blank only means that it was not present at the time the method blank was

analyzed.

Comment 32:

Page 4-21. The report states that with the exception of sediment samples collected at SL1, SL2, and SL8, the concentration of bis(2-ethylhexyl)phthalate measure in sediment was equal to or less than the background concentration. I recommend that the statement be clarified to state that the concentration of bis(2-ethylhexyl)phthalate in samples SL1, SL2, and SL8 were above background concentrations.

Response 32:

The suggested change is just a different way of saying the same thing. We do not see a reason to make the suggested change.

Comment 33:

Page 4-24. Please add that the background soil sample locations are topographically downgradient of the site.

Response 33:

Background soil sample locations were in fact topographically upgradient of the site.

Comment 34:

Page 4-26. Finding compounds in laboratory samples does not necessarily mean they are not attributable to the site, it means that those samples are inconclusive. I would ask that the statement saying that semi-volatile compounds measured are not attributable to the site be reworded to reflect this.

Response 34:

This sentence will be removed.

Comment 35:

Page 4-30. I disagree with the statement that xylene is not interpreted to be characteristic of groundwater quality at the site. Based on the site history and nature of the wastes at the site, I would state that xylene was not found in high concentrations in the limited groundwater sampling (both number of samples and location of samples) at this site.

Response 35:

See Response 27.

Comment 36:

Page 4-32. The relative concentration of tetrahydrofuran at MW-4D is irrelevant in that it exceeds the groundwater standard. The fact that the standard is exceeded means the compound is present at significant concentrations.

Response 36:

The last sentence of paragraph 2 on page 4-32 compares the concentration of tetrahydrofuran (THF) measured at MW-4D to that measured at MW-3D. The data support the use of the word "relatively." The status of the concentrations relative to Wisconsin groundwater quality standards is clearly stated in the text.

Comment 37:

Page 4-33. Again, the presence of tetrahydrofuran above a PAL means that it is present at significant concentrations. Wording minimizing the importance of this compound at levels exceeding standards should be stricken.

In the summary, it should be noted that during different sampling events, tetrahydrofuran was found at significant concentrations in numerous wells, and thus the presence of tetrahydrofuran is not limited to any portion of the site.

Response 37:

Again, the data support the comparison of the concentrations of THF at the individual monitoring locations. THF was only measured in wells along the west landfill boundary. Therefore, its presence is limited to that portion of the site.

Comment 38:

Please provide an explanation of the unknown hydrocarbons found in relatively high concentrations at various sampling points and time.

Response 38:

Unknown compounds are precisely that. No explanation is possible. Please note that TICs were considered in the baseline risk assessment.

Comment 39:

Page 4-36 - 4-37. I disagree that MW1s and MW1d are hydraulically upgradient of the landfill. Mounding at the site could certainly influence the groundwater at these wells.

Response 39:

Water table maps and hydrogeologic cross-sections indicate that these wells are upgradient

of the landfill. The groundwater flow pattern at the site is not a result of mounding; a similar pattern likely existed at the site prior to landfilling.

Comment 40:

Page 4-39. The consultant should relate the soil gas survey to the air monitoring conducted at this site. Based on the results of the soil gas survey, I would tend to believe the results of the air sampling. This should be added to this section.

Response 40:

Extrapolation of the soil gas survey results leads to the conclusion that ambient VOC levels should be below detectable limits as discussed below.

Using Farmer's equation for the estimation of volatile emissions from a covered landfill (from Air/Superfund National Technical Guidance Study Series, Volume II - Estimation of Baseline Air Emissions at Superfund Sites: EPA 450/1/89-002), emission rates for various target volatiles can be estimated.

$$Q = Di\left(\frac{PA^{10/3}}{PT^2}\right)\left(\frac{Ci}{L}\right)A$$

where Q = emission rate (g/sec)

Di = diffusion coefficient of chemical i in air (cm^2/sec)

PA = air-filled soil porosity (dimensionless)

PT = total soil porosity (dimensionless)

Ci = concentration of chemical i (g/cm^3) in the soil vapor at depth L

L = depth of soil cover (cm)

A = surface area of the landfill (cm^2)

From Table 2 of the Hydrologic Evaluation of Landfill Performance (HELP) Model, Volume I, U.S. Department of Commerce for a silt loam cover soil:

$PT = 0.535$

$PA = PT - \text{Field Capacity} = 0.535 - 0.421 = 0.114$

From Table 2-3 of the Superfund Exposure Assessment Manual (EPA-540/1-88-001)

Di (for xylene) = $0.06742\ cm^2/sec$ @ 10°C

$$Ci\ (mg/m^3) = \frac{Ci\ (ppm)(Mi)}{24.5}$$

where Mi = molecular weight for chemical i (xylene in this case)
Ci(ppm) = 0.22 from Table 1-4 Summary of Soil Gas Survey Results

$$Ci(mg/m^3) = \frac{(0.22\ ppm)(106.2\ mg/mmole)}{24.5}$$

$$= 0.95\ mg/m^3$$

To convert to g/cm³:

$$Ci\ (g/cm^3) = \frac{0.95\ mg}{m^3} \times \frac{1\ g}{1000\ mg} \times \frac{1\ m^3}{1 \times 10^6 cm^3} = 9.5 \times 10^{-10}$$

Therefore, the emission rate for xylene from the Stoughton City Landfill site is estimated by:

$$Q = 0.06742\ cm^2/sec\ \frac{(0.114^{10/3})}{0.535^2}\ \frac{(9.5 \times 10^{-10} g/cm^3)}{91.5\ cm}(1.24 \times 10^9 cm^2)$$

$$= (0.06742)(0.0025)(0.013)$$

$$= 2.2 \times 10^{-6}\ g/sec$$

or

$0.2\ g/day$

or

$2.2\ mg/sec$

Using the Gaussian Model for an Area Source and the emission rate calculated for xylene, the estimated concentration of xylene in the ambient air at the Stoughton City Landfill site during air monitoring can be determined. The equation is as follows:

$$C = \frac{16\ Q}{L_v\sqrt{2\Pi}\ 0_z U}$$

where:

C = concentration of contaminant (g/m^3)

Q = emission rate (g/sec)

U = wind speed (m/sec)

0_z = standard deviation of the plume concentration in the vertical (z) direction (m)

L_v = L + L^1

L = distance from the site center to the receptor (air sampling station D-5d)(m)

L^1 = distance from the site center to the virtual upwind point source; is given by 2.5 times the cross-wind width of the site (m)

The wind speed, U, was as high as 25 mph during the air sampling investigation.

$$U\ (m/\text{sec}) = 25\ \frac{miles}{hour} \times \frac{44.7\ cm}{\text{sec}} \times \frac{1\ m}{100\ cm} = 11.2$$

0_z from D.B. Turner 1970 <u>Workbook of Atmospheric Dispersion Estimates</u>

0_z = 175 meters

L = 213 meters

L^1 = 2.5 (213 meters) = 532 meters

Lv = 213 + 532 = 745 meters

Therefore,

$$C = \frac{16\ (2.2 \times 10^{-6}\ g/\text{sec})}{(745m)\sqrt{2(3.14)}(175m)(11.2\ m/\text{sec})}$$

$$= 9.6 \times 10^{-12}\ g/m^3 = 2.2 \times 10^{-6}\ ppb$$

By using Farmer's equation to determine the estimated emission rate for xylene at the Stoughton Landfill, and the Gaussian model for area sources to determine the ambient air concentration of xylene at the receptor site (air sampling station D-5d), it has been shown that the ambient concentration of xylene at the landfill was not high enough to exceed the method detection limit for the air sampling and analysis protocol. These same conclusions can be drawn for all other compounds detected during the soil gas survey.

Comment 41:

Page 4-43. Again, tetrahydrofuran was detected at levels that exceeded groundwater standards at various locations at various times. That fact cannot be dismissed and the qualitative statement "at relatively low concentrations" must be removed from the text.

Response 41:

See Responses 36 and 37.

Comment 42:

Page 4-44. The ambient air monitoring needs to be compared with the soil gas survey conducted as part of this investigation, especially because the soil gas survey found chlorinated as well as petroleum derived compounds, similar to those found in the ambient air monitoring. The soil gas survey discussion should be moved to the ambient air monitoring section of the summary.

Response 42:

See Response 40. We see no basis for the suggested text move.

Comment 43:

Section 6.0 Baseline Risk Assessment. This section should also contain an environmental risk assessment since this site is located in an environmentally sensitive area (surrounded by wetlands).

Response 43:

See Response 26.

Comment 44:

At other Wisconsin Superfund sites, the consultants have been directed by EPA toxicologists to use the highest concentration of compounds in the most highly contaminated wells to determine the risk for drinking groundwater. This seems to make sense since that is more representative if someone were to be drinking groundwater from that well. Therefore, I recommend that the risk from drinking groundwater be recalculated to account for this. We should use the most conservative approach, as recommended by EPA. Also, why was selenium not included in the risk assessment for this site?

Response 44:

Pursuant to RAGS, the use of the 95% upper confidence limit was used to estimate exposure concentrations. Selenium was measured in only one monitoring well (MW-1S) that is interpreted to be upgradient of the landfill.

Comment 45:

Page 6-5. Please use the term "potential" rather that "hypothetical" as this term is more appropriate for this discussion and is the term of usage by EPA.

Response 45:

See Response 23.

Comment 46:

Also, if the sediment exposure route includes incident ingestion, why is that not included for the surface water route. For most sites where surface water is used for recreation, incidental ingestion of surface water is included in the risk assessment. I recommend that this be included as the Yahara River is used for recreation.

Response 46:

The surface water route of exposure included a hunting scenario where dermal exposure would occur in the wetlands. A swimming exposure scenario was not conducted because it was assumed that recreational swimming would not occur in the wetlands. The southeast wetland was selected as the surface water point of exposure rather than the Yahara River, because of the wetlands' proximity to residential areas and because the highest number and the greatest concentrations of chemicals were measured in this wetland. This is considered a very conservative approach in conducting the risk assessment.

Comment 47:

Page 6-7. Groundwater mounding is occurring at the site and therefore, all of the wells are or could be impacted by the site.

Response 47:

As previously noted, use of the term groundwater mounding is inappropriate at this landfill site. The monitoring well system was designed to intercept constituents that may be migrating from the landfill; however, based on the results of the RI, this is not occurring at the scope that the commentator indicates.

Comment 48:

Page 6-8. Whether groundwater is currently used at this site for drinking water is irrelevant to the risk assessment process. In addition, the presence of municipal water supply is irrelevant. The statements discussing these should be deleted from this discussion. Has the municipal water supply well downgradient from the site been factored into the potential risk from this site?

Also, the concentrations should be revised for drinking water (groundwater) to use the maximum concentrations at the worst well.

Response 48:

The fact that groundwater is not currently used at the site for drinking water and that a present municipal water supply exists is relevant to the risk assessment process. According to RAGS, in Step 1 of the risk assessment process (characterization of exposure setting), a determination of current and future land use must be made. Under Step 2 (identification of exposure pathways), pathways by which identified populations may be exposed to the chemicals at or originating from the site are identified. Therefore, because groundwater is currently not being used for drinking water, future groundwater use is highly improbable, and municipal water is available, these statements are relevant to the risk assessment.

Comment 49:

Table 6-2. Why were the sediment areas separated in terms of conducting the risk assessment? It seems that if someone is in one wetlands area they have access to all of the wetland areas. Therefore, the potential exposure to chemicals should be calculated using the area with the highest concentration of chemicals one could come in contact with. Please explain the consultants justification for using these concentrations.

Response 49:

Sediments in the southeast wetland were chosen as the exposure point because the largest number and the highest concentrations of chemicals of concern were measured there. This is considered a conservative approach to the risk assessment.

Comment 50:

Table 6-5. Since there was only one sampling of waste material from 2' - 4', the concentrations found in that sample should be the concentrations used in the risk assessment. How did the consultant determine the concentrations listed in this table?

Response 50:

Matrix spike (MS) and matrix spike duplicate (MSD) samples were also analyzed for this sample. These sample results were also used to calculate exposure point concentrations. The text and footnotes on Table 6-5 describe the specifics for each constituent.

Comment 51:

Table 6-6. Why was there no mention of the soil gas survey for the risk assessment? It seems that there are definitely gases that will volatize and that air monitoring is very difficult to conduct in the field. Is there a model that can be used to calculate air emissions from soil gas surveys? This should be investigated.

Response 51:

See Response 40.

Comment 52:

Section 7. This section needs to be revised based on comments made previously (i.e., take out words like "marginally", and include a discussion of how groundwater will or won't meet surface water quality criteria).

Response 52:

See previous responses with respect to the use of the word "marginally." The section will be revised appropriately with respect to meeting surface water quality criteria.

Comment 53:

Page 7-1. Please define "small" when quantifying the "small amount of tetrahydrofuran" disposed of at the landfill.

Response 53:

The term "small" is used in the Uniroyal Plastics Co. 104(e) response to the Hagen Farm site. This response formed the basis for Uniroyal's 104(e) response for the Stoughton site.

Comment 54:

Page 7-6. The discussion of the Yahara River being a regional discharge area and thus groundwater contaminants would be diluted is not a relevant discussion for this report. This should be removed from the text.

Response 54:

On the contrary, this discussion is relevant because of its relation to transport and fate of constituents in the groundwater.

Comment 55:

Page 7-7. Again, please replace "hypothetical" with "potential" when discussing potential groundwater users.

Response 55:

See Response 23.

Comment 56:

Page 7-12. The remedial action objectives should be the following:

- *Soil/Solid Waste Operable Unit - 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;*
- *Groundwater Operable Unit - there are more compounds than tetrahydrofuran that exceed Wisconsin groundwater quality standards. This must be changed to reflect achievement of all groundwater quality standards for this site. In addition, the goal of preventing the release of contaminants from leaving the site once they are in the groundwater must be added, as well as a goal of protecting the adjacent wetlands from both contamination and changed in hydrologic conditions. Also, the term "eventual" should be deleted in this context and replaced with "within a reasonable period of time". Finally, EPA has established as an expectation that groundwater will be restored to its beneficial use within a reasonable time frame. This should be included here as well.*

Response 56:

The words "direct contact" will be added to the soil/solid waste operable unit remedial action objectives. See Response 33 under Final AAD comment responses pertaining to groundwater operable unit objectives.

Comment 57:

In conclusion, the following questions remain unanswered as a result of the remedial Investigation: the presence of chlorinated compounds in the deeper groundwater and the effects of any municipal wells across the River causing the contaminants found deeper in the aquifer to migrate under the River.

Response 57:

See Response 24.

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HAZARDOUS WASTE MANAGEMENT

Responses to U.S. EPA Technical Review Comments on Final Remedial Investigation Report

(Revision 3)

Stoughton City Landfill
Stoughton, Wisconsin

Submitted By:

Stoughton City Landfill Steering Committee

Document No. 6885-002-532A

Prepared by:

ENSR Consulting and Engineering
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June 14, 1991

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June 14, 1991

ENSR Project No: 6885-002-532

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BUREAU OF SOLID -
HAZARDOUS WASTE MANAGEMENT

Mr. Michael A. Valentino
Remedial Project Manager
U.S. Environmental Protection Agency
Region V (Mail Code: 5HS-11)
230 South Dearborn Street
Chicago, IL 60604

SUBJECT: Transmittal of Modifications to Final Remedial Investigation Report for the Stoughton City Landfill RI/FS

Dear Mike:

At the direction of the Stoughton City Landfill Steering Committee, we are providing you with 10 copies of modifications to the subject report, including instructions for incorporating them into the document. The Final RI Report (Revision 4) has been modified to address U.S. EPA technical review comments dated March 15, 1991. Individual responses to these review comments are also provided.

If you have any questions, please do not hesitate to contact me.

Sincerely,

Louis H Meschede

Louis H. Meschede
Project Manager

OFFICE COPY

LHM/saa

Reference No. 91-06-A076

cc: Ms. Robin Schmidt/WDNR (3 copies)
Mr. Robert Kardasz (1 copy)
Mr. Michael Doran (1 copy)
Mr. Tim Wright, Esq. (1 copy)

Responses to U.S. EPA Technical Review Comments

on Final Remedial Investigation Report

(Revision 3)

Stoughton City Landfill
Stoughton, Wisconsin

Submitted By:

Stoughton City Landfill Steering Committee

Document No. 6885-002-532A

Prepared by:

ENSR Consulting and Engineering
740 Pasquinelli Drive
Westmont, IL 60559

June 14, 1991

NOTE: Letter comment designations indicate new comments following U.S. EPA review of the Final RI report (Revision 3) dated January 17, 1991. Number comment designations reference the comment numbering system in "Responses to Technical Review Comments on Draft Remedial Investigation Report (Revision 2)" dated January 17, 1991 (ENSR Document No. 6885-002-531A).

Comment A:

<u>Section 1.0, 1.3.3.1 Groundwater</u>, p. 1-17: The discussion references samples collected simultaneously from the same wells by the City of Stoughton and WDNR as duplicates. These are more appropriately referred to as split samples. The distinction is important as "duplicate" sample implies analysis under the same conditions (i.e., consistent holding times, analytical methods, etc.). As stated in the text this cannot be verified and as such comparing the results to make conclusions concerning the validity of either sample as is done by implication in the text is inappropriate. The statement that analyses from Swanson and Aqualab, as it relates to the November 16, 1984, sampling event, do not show close agreement for most wells, is misleading and should be removed. Table 1-3 reports 13 compounds analyzed by both labs. Eight compounds were non-detected for both labs. Results for a ninth compound were 1,200 ug/L versus 1,050 ug/L which shows excellent agreement. Results for a tenth were 12,700 ug/L versus 8,400 ug/L which is considered acceptable correlation. The three compounds that were more variable were all detected in the low part per billion range.

Response A:

The text has been revised to refer to the samples as split samples and to indicate that split sample analyses show close agreement for most parameters and wells.

Comment B:

<u>Table 1-3</u>: It appears that the heading for analytical results from soil boring SB-1 has incorrectly been labeled as SB-2.

Response B:

The heading has been changed to SB-1.

Comment 1:

<u>Section 2.0, 2.5 Surface Water and Sediment Investigations</u>, p. 2-7: Revision is responsive to comment. It is noted that according to Figure 2-1, SL6 and SL7 are located almost 400 feet from the landfill boundary. This gives considerable distance for contaminant attenuation to occur. A suggested location for potential additional samples would be immediately offsite on the west boundary. Another suggested location would be the drainage ditch on the south boundary of the property. This latter location is suggested because, as topographic information developed in the RI shows, a large portion of the area formerly utilized for landfilling drains into this ditch. U.S. EPA and WDNR acknowledge the need for further sediment sampling and this will be discussed further in a letter which is forthcoming.

Response 1:

Sediment sampling locations SL-6 and SL-7 were selected as shown because the wetlands are quite removed from the west boundary of the landfill. The Stoughton PRPs have received the U.S. EPA letter dated April 30, 1991, notifying them to complete additional site

investigation work. The PRP response was contained in a letter dated May 14, 1991, sent by ENSR (at the direction of the PRPs) to the U.S. EPA RPM. A draft Work Plan and Sampling Plan will be submitted no later than June 14, 1991, covering work requests acceptable to the PRPs as discussed in the May 14, 1991, letter.

Comment C:

<u>2.8 Groundwater Investigations</u>, p. 2-10: The figure reference for the location of the RI monitoring wells is incomplete. Reference should be made to Figure 2-4.

Response C:

A figure reference has been added.

Comment 2:

<u>Section 3.0, 3.4.2 Site Geology</u>, p. 3-15, par. 1: No revision is necessary.

Response 2:

No response necessary.

Comment 3:

<u>3.4.2 Site Geology</u>, p. 3-15, par. 2: Revision is acceptable.

Response 3:

No response necessary.

Comment D:

<u>3.4.2 Site Geology</u>, p. 3-16, par. 1: It is noted that the text has been revised to incorporate an estimate of volume in place at the landfill.

Response D:

No response necessary.

Comment E:

<u>4.6 Groundwater Sampling and Analysis</u>: In reviewing monitoring well locations in conjunction with the newly gathered hydrogeologic data from the RI, a suggested location for a potential additional groundwater monitoring well cluster is downgradient of MW-3. This location is suggested for several reasons. Tetrahydrofuran results in MW-3D have indicated that contaminant plumes may be fairly localized. Water table maps presented in Figure 3-6 and 3-6A suggest that groundwater flowing through or beneath a large portion of the site formerly utilized

as a landfill passes beneath the site boundary in this area. The newly gathered RI data suggest that the groundwater investigation would be more complete with a well cluster completed in that area. U.S. EPA and WDNR are concerned with whether THF may impact the bedrock aquifer. High THF concentrations were detected in deep wells at the Hagen Farm Superfund Site, as well as at considerable distances from the site. Because THF is the primary contaminant at the Stoughton Landfill Site, as well, and because THF, apparently due to its miscibility in water and low retardation factor, moves readily in the aquifer, there is the concern that THF may reach the bedrock aquifer from which the municipal wells draw their water. Current data do not sufficiently address concerns over potential contamination in the deeper aquifer nor whether contamination may have been carried west of the Yahara River. U.S. EPA will expand upon its position in this regard in a forthcoming letter.

Response E:

See Response 1.

Comment F:

<u>Section 5.0, 5.13 Groundwater</u>, p. 5-4: The horizontal hydraulic conductivity is presented in Table 3-3, not Table 3-2 as referenced.

Response F:

The table reference has been changed to Table 3-3.

Comment 4:

<u>Section 6.0, 6.0 Baseline Risk Assessment</u>: Revision is acceptable.

Response 4:

No response necessary.

Comment 5:

<u>6.0 Baseline Risk Assessment</u>: Revision is acceptable.

Response 5:

No response necessary.

Comment 6:

<u>6.3.2 Exposure Pathways Identification</u>, p. 6-6, par. 2: Revision is responsive to comment.

Response 6:

No response necessary.

Comment G:

<u>Introductory Comment</u>: *The current revision of the risk assessment addressed most of the comments to the previous version. Comments 7, 9, I, 12, 14, and J given below will significantly change the outcome of the risk assessment calculations.*

Response G:

The Stoughton PRPs acknowledge the significant change in the risk assessment calculations. The most significant change was the reduced risk of dermal contact and ingestion of sediment.

Comment 7:

<u>Tables 6-7 and 6-8</u>: *Responses are responsive to comment. However, the use of a gastrointestinal absorption adjustment factor (GAAF) for Cr (VI) in the groundwater pathway (see Tables 6-7 and 6-8) is unjustified since the Cr (VI) RfD is based upon exposure via drinking water. The GAAF is already incorporated into the RfD. Revision to these tables would also require revision to Tables 6-23 and 6-24.*

Response 7:

The use of a GAAF for chromium in Tables 6-7 and 6-8 has been removed. Tables 6-23 and 6-24 have been revised accordingly.

Comment 8:

<u>Tables 6-9 and 6-10</u>: *Revisions are acceptable.*

Response 8:

No response necessary.

Comment 9:

<u>Tables 6-12 and 6-13</u>: *Revision to lead dermal absorption adjustment factor (DAAF) as requested by comment is noted. Why do the DAAFs for PAHs in sediments (Tables 6-12 and 6-13) differ from the DAAFs for PAHs in waste (Table 6-16 and 6-17)? Revision to these two tables would also require revision to Tables 6-23 and 6-28.*

Response 9:

The DAAFs for PAHs in sediments have been revised to agree with those for waste. Tables 6-23 and 6-28 have been changed accordingly. The DAAFs for 2-butanone and bis (2-ethylhexyl) phthalate have also been changed in Tables 6-12 and 6-13 based on consultation with the U.S. EPA. Similarly, the DAFs for chloroform and butyl-n-benyl phthalate have been revised. Table 6-22B has been added to show the basis for all DAAFs used in the risk assessment.

Comment 10:

Tables 6-14, 6-15, 6-18 and 6-19: Response is acceptable. No revision is necessary.

Response 10:

No response necessary.

Comment 11:

Tables 6-16 and 6-17: Response is acceptable. No revision is necessary.

Response 11:

No response necessary.

Comment I:

Table 6-20: The DAAF in Table 6-20 appears to be in error. Isn't 8.0E-04 the value for the dermal permeability constant of water as given in the Superfund Exposure Assessment Manual? Revision to this table would also require revision to Tables 6-23 and 6-27.

Response I:

The DAAF in Table 6-20 has been changed. Tables 6-23 and 6-27 have been revised accordingly.

Comment 12:

Table 6-21: As noted in the last set of comments, the use of inhalation absorption adjustment factors for toluene and xylenes is inappropriate since percent absorption is already factored into the inhalation RfDs of these contaminants.

Response 12:

Revisions to Table 6-21 have been made. Also revisions to Tables 6-32 have been made with respect to inhalation RfD values for ethylbenzene, toluene, and xylenes (total). The inhalation RfD values for these three chemicals have been converted from mg/m^3 (as they

appear in the Health Effects Assessment Summary Tables - Annual FY 1991) to mg/kg/day as reflected in Table 6-32 using the following formula:

$$\frac{Inhalation\ RfD}{mg/kg/day} = \frac{Inhalation\ RfD\ mg/m^3}{Body\ Wt\ (kg)} \times Respiration\ Rate\ (m^3/day)$$

Additionally, the following assumption was made: an adult weighs an average of 70 kg and has a respiration rate of 20 m^3/day, and a child weighs 16 kg and has a respiration rate of 17.6 m^3/day.

Comment 13:

Re: Chromium III: Response is acceptable.

Response 13:

No response necessary.

Comment 14:

Dermal Risk Tables: See Comments 9 and I above, and J below.

Response 14:

The dermal risk tables have been revised as recommended.

Comment J:

Tables 6-22A through 6-32: Referring to Table 6-22A, it is not appropriate to use the slope factor of benzo[a]pyrene (B[a]P) as a surrogate slope factor for unknown hydrocarbon TICs without a sound toxicological argument as to why each of these TICs is expected to have similar carcinogenic properties as B[a]P. This comment also applies to Tables 6-28 and 6-29. For the same reasons it is inappropriate to use the RfD for benzoic acid as a surrogate for semivolatile TICs. This comment also applies to Tables 6-26, 6-28 and 6-29. Revisions to these tables would also require revision to Table 6-23. In reference to the "" footnote in Table 6-22A, and similar footnotes in other tables, the assumptions used in the "value calculation" should be stated. It is preferable to state what the assumptions were in order to develop the adjusted values and also that the assumptions were developed in consultation with the EPA. Revise appropriate footnotes in the tables.*

Response J:

The report has been revised to indicate that slope factors for unknown hydrocarbon and semivolatile TICs are not available. All tables have been revised appropriately, including footnotes.

Comment 15:

<u>Appendix J, 2.1 Surface Water/Sediment</u>, p. 1: Revision is acceptable.

Response 15:

No response necessary.

Comment 16:

<u>4.1 Surface Water/Sediment</u>: Revisions have been made per the Responses. Revisions are acceptable.

Response 16:

No response necessary.

Comment 17:

<u>4.1 Surface Water/Sediment</u>: No revision is necessary.

Response 17:

No response necessary.

Comment 18:

<u>4.1 Surface Water/Sediment</u>: Revision is acceptable.

Response 18:

No response necessary.

Comment 19:

<u>4.2 Groundwater</u>: The comment directed the PRPs to discuss background information regarding general water quality as it concerns the suggestion that elevated cadmium, copper, lead and zinc in the background groundwater may be due to corrosion of the casing and/or pump. In their response to the comment, the PRPs stated there was no data available for the constituents of concern. Neither the text here, nor in the RI Report proper at 4.6.4 TAL Inorganic Results, pp. 4-29 and 4-30, has been changed in any way to address the comment. Response is acceptable. No revision is necessary.

Response 19:

No response necessary.

Comment 20:

<u>Attachment 1, Section 1 Quality Assurance Review</u>: Revised data report sheet has been submitted. Revision is acceptable.

Response 20:

No response necessary.

Comment 21:

<u>Attachment 1, Section 1 Quality Assurance Review</u>, A. Organic Data, Correctable Deficiencies, Item 4, p. 2: The comment directed the PRPs to submit additional QA/QC information relating to Freon 11, Freon 12, and THF. Information has been provided. Revision is responsive to comment.

Response 21:

No response necessary.

Comment 22:

<u>Attachment 1, Section 1 Quality Assurance Review</u>, A. Organic Data, Organic Data Qualifiers, p. 3: No revision is necessary.

Response 22:

No response necessary.