file

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Matthew J. Frank, Secretary
Lloyd L. Eagan, Regional Director

South Central Region Headquarters
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711-5397
Telephone 608-275-3266
FAX 608-275-3338
TTY Access via relay - 711

April 14, 2008

Mr. Robert English
HACCO, Inc.
110 Hopkins Drive
Randolph, WI 53032-1060

Subject: Response to the September 2006 *Corrective Measures Study,*
BRRTs #02-14-000900

Dear Mr. English:

The Wisconsin Department of Natural Resources (WDNR) has reviewed the *Corrective Measures Study* (CMS) referenced above and other related file documents. The fees for this review were received on July 24, 2007. This letter addresses what is needed to move the various Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) on your site to a status of no further investigation or remedial action needed (see attached table).

Goal of Closure of Activities Related to Contaminant Investigation and Remediation

HACCO is an exceedingly complex site, in site operational history, the contaminants present (volatile organic compounds, semi-volatile organic compounds, organo-chlorine constituents, organo-phosphate constituents, and urea-carbamate constituents), the geology and the hydrogeology. Because of this, a number of interim remedial measures (groundwater pump and treat system, soil vapor extraction system, and asphalt paving) were performed in order to reduce the amount of contamination entering the groundwater system while an acceptable remedy was pursued. Appropriate site investigation work was performed in an effort to determine the type of remediation that would be needed to progress the site to a condition of '*closure*' (no further investigation or remediation needed). While the interim measures may prove to be appropriate as final corrective measures for some of the AOCs and SWMUs at the site, they are not acceptable as a final measure for the entire site.

Currently twenty (20) AOCs and SWMUs have been identified and numbered at the HACCO facility. Many of the AOCs and SWMUs around the plant might be able to have the interim measures already performed approved as a final remedy. Recent reports describe two additional areas that need to be included in the investigative process to bring the entire site to a point where closure can be considered. They are the areas known as the Treatment Building Spill and the Stressed Vegetation in the area of boring B-46. These two areas need to be identified on an updated map and noted as Areas 21 - Treatment Building Spill and 22 - Stressed Vegetation Area Southeast of Plant.

The Department is requiring the following information to be compiled and submitted within 90 days of this letter for each open area on the HACCO property (2, 3, 4, 5, 6, 7, 8, 10, 12, 13, 15, 16, 17, 21, and 22). This information will be considered to be an Addendum to the CMS.

- The operational history of each area to include the area's usage, discovery of contamination, remedial efforts, and post remedial evaluation.

- A comparison shall be done of the soil contamination in place prior to any interim measures performed and post interim measures (include older borings B-1 through B-18 and SB-19 through SB-20 in areas corresponding to the newer borings associated with the AOCs and SWMUs).

- Estimates of the remaining contaminant mass for each area shall be calculated. A discussion of how much, if any of the mass is located within the smear zone shall be included.

- A discussion of groundwater impacts as related to each area shall be provided.

- Borings and groundwater data should be presented on a map with the AOCs and SWMUs delineated. Borings and groundwater data should also be grouped together by area and presented in an appendix in the follow up CMS Addendum.

Sites for No Further Action (NFA) Consideration: A number of areas, with additional information, are *likely* eligible for a determination of no further action required. Associated fees for no further action determinations can be found in NR749, Wisconsin Administrative Code. The Department will review additional data as provided in the follow up CMS Addendum. We will issue a written decision for a no further action required determination if requested and if the associated fees are submitted. These areas are:

North Side of Plant
Area 7 - West Loading Dock
Area 13 – 1973 Fire Runoff
Area 10 – North Dust Collector
Area 21 – Treatment Building Spill

South Side of Plant
Area 13 – 1973 Fire Runoff

East Side of Plant
Area 6 – Empty Drum Storage Area
Area 22 – Stressed Vegetation Area

Sites that Need Attention Prior to NFA: There are two to three areas on site which require additional measures are taken in order to be protective of the environment and to bring the area to closure. Areas 2 and 12 have historically been reported with high soil contamination and are suspected to be the most significant contributors to the contamination of the aquifers. To a lesser extent, Area 3 is also included in this group. Therefore, a remediation plan is required which will address source control in Areas 2 and 12. This shall include

- an evaluation of the amount (volume) of contamination remaining in place
- a proposal for source control such as soil removal, fixation or some in situ remedy which will be inclusive of the contaminant mass to the water table and/or to bedrock
- a time table for work to be done

Area 3 shall be considered in the plans for source control measures taken at Areas 2 and 12. An analysis of whether to include area 3 in this action at the same time or in the future shall be done. We realize that a remedy of this nature will involve a capital expenditure and possible interruption of work at the facility. Therefore, we will consider a plan that may be performed over a 2-3 year period. The remediation plan and timetable shall be submitted in the CMS Addendum for approval.

Additional Information Areas: There are a few areas on the HACCO property where additional information is needed to ascertain whether the interim measures already performed will be protective of the environment so as to grant no further action status, or if some sort of source control or other remedial measures will be required. These areas are Areas 8 and 15 on the north side, Areas 4, 5, and 17 on the south side, and Area 16 on the west side. Soil and groundwater information may already exist that can be compiled and analyzed by area. If not, additional site investigation is needed. This evaluation shall be completed and submitted to the WDNR within 6 months of the date of this letter.

- An evaluation is needed on the railroad spur and xylene tank area (Area 4) and product storage area (Area 5) on the south side of the plant. Areas 4 and 5 are known locations where routine handling of bulk liquids occurred and where immediate cleanup would not have been required in the past. Releases from Areas 4 and 5 would likely have been random, unintended and of short duration of raw feedstock or undiluted products.
- There appears to be limited information on the drainage ditch south of the plant (Area 17). Soil and groundwater information may already exist that can be compiled.
- The east loading dock (Area 8) and the former loading dock and drum storage area (Area 15) should also be evaluated due to the high number and high concentrations of compounds that were handled there and which remain in the soils.

In regards to Area 16, the CMS said the groundwater was not impacted from the soil remaining after excavation as seen in monitoring well MW-16A. However, the CMS did not include the post excavation confirmation sampling results which indicated high values of total organo-chlorine constituents left in place (data can be found in the *Existing Conditions Report*, dated April 1, 2005). An estimate of the remaining contaminant mass and if the contamination is found in the smear zone in proximity to Area 16 is needed to move Area 16 toward closure or no further action status.

Additional Information Required

Requirements from the WDNR's letter dated November 3, 2004 (see attached) were not included in the CMS submittal. These shall be included in the CMS Addendum. The requirements yet to be addressed include 1, 4, 5, 6, and 7. The listed requirements shall be addressed with emphasis on points 1 and 6.

> 1. Over time, soils have been removed from various areas and you have been installing pavement on the property as an interim remedial strategy. ...The contaminated soil areas must be identified and separated into contaminant groups as well as total composite contaminant mass. ...In addition, include on a site map spatial delineation (contours) of the depth to bedrock across the entire property.
>
> 6. The bench scale study did not evaluate soil contamination in the unsaturated zone. There is considerable contamination in the soil source area and the water table has large seasonal fluctuations thereby continually reintroducing contaminant mass into the groundwater. Please describe in detail how you intend to address the contamination above the water table."

The following requirements also need to be addressed. This work shall be completed and submitted within 6 months of the date of this letter.

1. HACCO was allowed to reduce their groundwater monitoring parameter list to a set of indicator parameters for all chemical groups of concern. The WDNR did indicate that sampling for all constituents of concern would need to be done in the future. Many of the contaminants at the site are very persistent and will not readily degrade. The WDNR is, therefore, requiring a full parameter list/sampling of groundwater parameters to be done at all site wells at this time. An evaluation of any changes with time due either to natural attenuation or interim measures performed or both is required. This will need to be done again in the future (minimally at the time a closure request is submitted).

2. Dioxin congeners are by-products or impurities that result during the manufacture of pentachlorophenol. In October 1984, the United States Environmental Protection Agency (USEPA) collected 37 surface soil samples at the HACCO property. The USEPA's September 20, 1985 letter found no identifiable detects of 2,3,7,8 tetrachlorodibenzo-dioxon. Do these sampling locations coincide with the pentachlorophenol sampling Newfields' did? A comparison of the data sets should be done and submitted or an explanation as to why this can not be done is needed.
3. The CMS did not discuss the waste evaporation basin in detail. Prior documents indicate that the evaporation basin may have been cracked and that significant vertical contamination to the fractured dolomite occurred in this area. The July 1992 Phase III Remedial Investigation Report states;

   - "The results indicate that the soils located beneath the evaporation basin are highly contaminated with VOCs (ethylbenzene and xylenes) and pesticides (primarily chlordane), on the order of hundreds to thousands parts per million (ppm). The soil contamination extends from below the concrete basin and down to bedrock 18.5 feet below the surface of the basin. The contaminant concentrations were elevated throughout the soil profile."
   - Packer tests performed at RW-1 and RW-2 indicate groundwater flow in the dolomite /till aquifer is generally concentrated in a relatively thin zone of shallow bedrock rather than its entire thickness.
   - Results for Ground Penetrating Radar (GPR) survey indicated fractures trending northeast to southwest with a complimentary set trending northwest to southeast. Furthermore, an area of interest was identified. As stated on page 37; "...the GPR survey has identified an area where fractures may breach the entire thickness of dolomite, providing a conduit for downward migration of contaminants to the sandstone. This type of vertical conduit may be localized at this area or may be repeated throughout the site." This area was not identified in this report on a base map relative to roads and buildings on site.

   A discussion on what is known about the contamination in the dolomite, the location of the breached area on a site map, and how the breached area may factor into the distribution and dispersal of contamination from the soil to the groundwater plume at the site is needed and shall be included in the submittal.

4. It is the position of the WDNR that the arsenic exceedances at the site are not all naturally occurring in the unconsolidated soils. The October 1990 Phase II Groundwater Investigation Report attributed the arsenic at HACCO to naturally occurring arsenopyrite. Air introduced into the borehole during drilling was postulated as causing arsenopyrite to release arsenic into the sandstone aquifer. Additionally, the July 1992 Phase III report states; "In comparison to background, the levels of arsenic, barium, and iron were generally elevated 2 to 5 times above the background concentrations... The elevated metals were detected ...to an approximate 8-foot depth. Arsenic was detected at 30 mg/kg in the near surface soil at the tank storage area. According to HACCO representatives, arsenic was not used at the facility."

   A letter from the U.S. Environmental Protection Agency dated June 23, 1993 raised the point that arsenic is a common ingredient in herbicides which HACCO produced and therefore, may have been related to plant activities. Furthermore they disputed the claim that the spatial distribution of arsenic contamination (greater concentrations far from the facility and lower near the facility) indicated a non-facility source, the EPA indicated this spatial distribution may suggest "that a facility release occurred several decades ago." Their letter also stated that the "pervasive presence of arsenic around the facility at concentrations above regulatory levels dictates the need for further investigation, including, at a minimum, X-ray diffraction techniques to establish the mineralogy of consolidated and unconsolidated material at background locations to confirm that arsenic is naturally occurring."

   The WDNR letter dated August 21, 2000 stated "HACCO was known to have handled materials containing Arsenic and local background arsenic concentrations have not been compared to

concentrations at the site." The WDNR is requiring a comparison of background/offsite arsenic values to those found on the HACCO property.

5. A discussion of contaminant pathways to and in the lower sandstone aquifer shall include the following two points. The downgradient extent of contamination is generally accepted to be in the vicinity of MW-3B, MW-10B and MW-21B.

   - The area of MW-10B and MW-21B may present an area of increased communication between the till/dolomite aquifer with the sandstone aquifer. The Annual Groundwater Monitoring Report for 1999 and Spring 2000 states "... the higher heads in the vicinity of MW-10B and MW-21B are the result of increased hydraulic communication in that area due to a lack of confining units."

   - The Annual Groundwater Monitoring Report 2002, dated April 2003 suggests that the anomalously high hydraulic gradient (on average a 25 to 30 foot head loss over a 350 foot horizontal distance) in the sandstone aquifer between monitoring wells MW-1B and MW-8B is due to a north-south trending permeability discontinuity. The contamination in the sandstone aquifer is generally accepted as being limited to the eastern portion of the site. There has been a flow reversal in the deeper wells recorded on the west side of the HACCO property. The direction of flow measured was easterly initially and later westerly. This flow reversal was correlated to an increased recharge through the unconfined portions of the sandstone aquifer.

General Comments

The CMS study states the groundwater extraction system is keeping or helping to keep the groundwater contaminant plume from migrating off site. The plume is not stable or receding at this point in time. A stable or receding groundwater contaminant plume is a condition of final site closure.

The CMS states the asphalt cap prevents infiltration and therefore leaching of contaminants from shallow depths to the water table. This is not entirely accurate as there is a significant amount of contaminants in the smear zone on the east side of the facility. With the large fluctuations seen in the water table over the past 19 years, a considerable amount of contamination is still entering the groundwater from the smear zone. An assessment of the soil concentrations in the smear zone prior to closure will be needed. This can be done by comparing borings installed before interim measures with those that were done later. This information shall be included in the CMS Addendum. Installation of new borings/wells may be necessary to determine whether concentrations of the various contaminants have changed with time. Information from any new borings/wells shall be submitted with the annual groundwater monitoring reports. A review of all soil and groundwater data as they relate to an area where you request a no further action determination shall be submitted with that request and with the associated fees. If you do not request a no further action determination on any of the 'open' areas, then the review of all data as specified will be submitted with your request for site closure.

Two fires occurred at the facility which may have added to the release and distribution of the contamination across the site.

Urea-carbamates historically were used around the plant and on neighboring farm fields to kill woody shrubs. We note these constituents are highly mobile in groundwater and their presence in far perimeter and off-site wells needs to be monitored.

HACCO needs to properly investigate and remediate the petroleum contamination on the site as we bring the site to closure. Area 2 had a number of ASTs (including Tenneco tanks, O.B. oil tank and propylene glycol), Area 3 had a number of tanks (including crop oil and naphthalene) and Area 5 had drums (including oils). This shall be specifically addressed through groundwater monitoring and/or soil monitoring in the annual groundwater monitoring reports HACCO submits to the WDNR.

The proposed soil cleanup levels (SCLs) for HACCO should be compared to current EPA Region 3 guidelines. The proposed values were calculated 10 years ago and are anticipated to be part of the remedial strategy. Therefore, the numbers and the assumptions that went into their calculation need to be reviewed. Include your findings for WDNR's review and approval within 6 months of the date of this letter.

The Department appreciates your efforts to restore the environment at this site. If you have any questions on the requirements outlined in this letter, please contact me at (608) 275-3295 or email janet.dimaggio@wisconsin.gov.

Sincerely,

Janet DiMaggio, P.G.
Hydrogeologist
Bureau for Remediation & Redevelopment

Attachments

cc: Lon Bohannon – COO and President of Neogen Corporation
Mark McColloch – NewFields
Mark Gordon – WDNR via email
Pat McCutcheon – WDNR via email
Case File

Table 1- HACCO Summary

SWMUs/AOCs	Description	Work Required	Deadline
2	Waste Evaporation Basin & Tanks	† ¤	90 days
3	East Tank Area	† ¤	90 days
4	Railroad Spur & Xylene Tank	† *	90 days/6 months
5	Product Storage Area	† *	90 days/6 months
6	Empty Drum Storage Area	†	90 days
7	West Loading Dock	†	90 days
8	East Loading Dock	† *	90 days/6 months
10	North Dust Collector	†	90 days
12	1969 Fire Runoff & Piping	† ¤	90 days
13	1973 Fire Runoff	†	90 days
15	Former Loading Dock Drum Storage Area	† *	90 days/6 months
16	Area at Southwest Corner of Plant	† *	90 days
17	Drainage Ditch South of Plant	† *	90 days/6 months
21	Treatment Building Spill	†	90 days
22	Stressed Vegetation Area Southeast of Plant	†	90 days
		WDNR's November 3, 2004 letter	90 days
		Full parameter sampling of all site wells	6 months
		Comparison of pentachlorophenol & dioxin sampling	6 months
		Dolomite Discussion	6 months
		Arsenic offsite/onsite values	6 months
		Smear Zone Assessment	90 days
		Contaminant Pathways for the Sandstone Aquifer	6 months
		Evaluation of proposed soil cleanup levels (SCLs)	6 months

† Operational history, comparison of pre-interim measure to post interim measure data, estimate of remaining contaminant mass and how much remains in the smear zone, discussion of groundwater impacts (due with in 90 days of the date of this letter)

¤ Proposal for source control measures with timetable for work to be done (due within 90 days of the date of this letter)

* Ascertain whether the interim measures already performed or if some sort of source control or other remedial measures will be required (due within 6 months of the date of this letter)

State of Wisconsin \ DEPARTMENT OF NATURAL RESOURCES

WISCONSIN
DEPT. OF NATURAL RESOURCES

Jim Doyle, Governor
Scott Hassett, Secretary
Ruthe E. Badger, Regional Director

South Central Region Headquarters
3911 Fish Hatchery Road
Fitchburg, Wisconsin 53711-5397
Telephone 608-275-3266
FAX 608-275-3338
TTY Access via relay - 711

November 3, 2004

Lee Schwalenberg
HACCO, Inc.
P.O. Box 7190
Madison, WI 53707-7190

WDNR # 02-14-000900

Subject: HACCO, Inc., Randolph, WI
WID # 006075352; FID # 114010820
July 2004 Annual Groundwater Monitoring Report for 2003
August 2003 Bench-Scale Treatability Testing Report

Dear Mr. Schwalenberg:

The Department has reviewed the above referenced documents and various other recent file documents and has the following comments and requirements.

1. Over time, soils have been removed from various areas and you have been installing pavement on the property as an interim remedial strategy. After reviewing the file information, it is clear that there is no good summary of the steps that have been taken to date. Therefore, you need to submit a new report that documents and delineates all areas of the subject property where contaminated soils have been removed as well as those that have been paved to address either direct contact issues or to reduce infiltration. Site maps must include an overlay of the paved areas and all areas of contaminated soil. The contaminated soil areas must be identified and separated into contaminant groups as well as total composite contaminant mass. Also, include in this report complete documentation of all remedial excavation activities completed to date, including documentation of the locations and depths of excavations (delineated on a site map) along with confirmation soil sample data results. In addition, include on a site map spatial delineation (contours) of the depth to bedrock across the entire property.

2. You have proposed to install an additional groundwater extraction well. Please describe the purpose of the new extraction well (i.e. hydraulic control of the contaminant plume, contaminant mass removal, or both). Also, describe the expected capture zone of the new well and its relationship to the capture zones of the existing extraction wells. In addition, please provide a time schedule for the installation of the well along with the proposed well construction details and system design changes to accommodate the new well.

3. At this time, the Department concurs with your recommendation to shut off the soil vapor extraction (SVE) system due to low efficiency of contaminant removal.

4. HACCO's conclusions based on the results of the November 2002 bench scale study are that oxidation treatment of the site-specific groundwater contaminants by using potassium permanganate and Fenton's reagent destroys some of the contaminants and mobilizes others, and may not be an appropriate remedial strategy at this site. Have you evaluated other cleanup technologies that could be used sequentially or in tandem with an oxidation

technology other than groundwater extraction? Since the bench scale study only evaluated the glacial till aquifer, how would that technology apply to the contamination in the dolomite? Was an analysis completed for the dolomite aquifer?

5. In the bench scale study report and other correspondence, you state that because of the results of the bench scale study you will be evaluating emerging remediation technologies for remediation of the site. Please describe in detail your progress in evaluating additional remediation technologies. Include what types of technologies you have been evaluating, conclusions reached, resources used, future schedule for technology evaluation, etc.

6. The bench scale study did not evaluate soil contamination in the unsaturated zone. There is considerable contamination in the soil source area and the water table has large seasonal fluctuations thereby continually reintroducing contaminant mass into the groundwater. Please describe in detail how you intend to address the contamination above the water table.

7. Please evaluate the possibility of conducting an in-situ pilot test(s) for the unsaturated soil source areas, saturated soil and groundwater.

Please submit the information discussed above to the Department within 90 days of the date of this letter. If some of the requested information has already been submitted to the Department, you may reference those historical submittals, however the information needs to be consolidated into a concise report to facilitate Departmental review.

Upon receipt and subsequent review of the requested information, the Department will then discuss with you the need to evaluate a preliminary timetable and proposed content of a Corrective Measures Study.

If you have any questions regarding this letter, please contact me at (608) 275-3209.

Sincerely,

Denise Nettesheim

Denise Nettesheim
Hydrogeologist
Bureau for Remediation & Redevelopment

cc: Steven Martin, RMT, Inc., 744 Heartland Trail, Madison, WI 53717-1934
Mark Gordon, WDNR (via email)
Case File