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MEMORANDUM

TO: John Fitzgerald, P.E., Environmental Engineer IV
FROM: Nancy Bettinger, Environmental Analyst I MB
DATE: September 28, 1987

SUBJECT: Review of Sampling Plan for Alewife Center -
Source Identification

This memorandum is to document the writer's review of the Sampling Plan for Alewife Center prepared by Haley and Aldrich for W.R.Grace, specifically that portion of the plan which concerns the identification of possible contamination source areas. In Table 1 of the Sampling Plan, Haley and Aldrich itemized potential sources of contamination, data from sampling points nearest those areas, and recommendations regarding the necessity of additional sampling to ascertain whether the areas in question are sources of contamination. The writer's review of Table 1 is presented below, according to Source I.D. number, Building number and Storage Area number.

SOURCE (TANK) AREAS:

- #1 Haley and Aldrich recommend that the area of the former underground acetone tank be evaluated as a continuing source based on the analysis of groundwater samples from monitoring well B203-OW. In the writer's opinion, however, the construction of this well is not optimum for determining the contaminant concentration at any particular vertical location. The well is screened from 20 to 30 feet, and is not sealed above the screen. Since the annular space above the screen is filled with pea stone, groundwater from any depth down to 30 feet can enter the well. The analysis of groundwater from this well can provide information on the presence or absence of contamination, but cannot demonstrate the absence of a continuing source of contamination at this location. A shallow, short-screened well should be installed in the vicinity of B203-OW to obtain samples more representative of the groundwater at shallower depths, where the heaviest contamination from leaking tanks is likely to be found.
- #2 Haley and Aldrich have recommended that groundwater samples from B203-OW be collected to determine conditions in the vicinity of the former white oil tank. For the reas-

ons stated in the comments regarding source I.D. #1, this well is not ideal for the purpose. Additionally, since it is not screened across the groundwater surface, B203-OW cannot be used to monitor for floating product. The well recommended above should be monitored for contamination from this location also.

#3 According to Stan Fielding, vadose zone analysis using a field gas chromatograph as well as tenax vapor sampling tubes is the proposed method of analysis for this area, the location of an underground tank previously used for naptha and toluene storage. The applicability of field gas chromatography (at ambient temperatures) to the chemicals of concern at this location must be documented, in terms of both detectability and partitioning properties. In the writer's opinion, vadose zone analysis is a useful technique for comparing contaminant levels at different locations and for tentative qualitative identification of contaminants. It cannot, however, be used to determine the quantity or vertical distribution of contaminants in the soil or groundwater. Therefore, the results of vadose zone analysis alone cannot lead to a conclusion as to whether a "hot spot" or continuing source of contamination exists in a particular area. It should be used to obtain information that will enable a sampling program to be conducted more efficiently and to reduce the number of samples necessary to characterize a particular area. The writer agrees that this technique is appropriate as an initial measure, but plans for follow-up sampling should be submitted. Groundwater samples to evaluate contamination from this location should be collected from the well recommended in comments regarding Source I.D. #1.

#4 The writer agrees with the Haley and Aldrich recommendation.

#5 The writer agrees with the Haley and Aldrich recommendation.

#6 and #7 The writer agrees with the Haley and Aldrich recommendation.

#8 The writer agrees with the Haley and Aldrich recommendation.

#9 The conclusion that the area where the DAXAD tank was located is not a continuing source of contamination is not supported by the information provided in Table 1. Low levels of naphthalene in the groundwater indicate the presence of this chemical, but the construction of wells 702 and 704 is not well suited to determining whether the groundwater is affected by a continuing source of contamination in the area. These wells are screened from 5 to

30 feet, so samples collected from them do not necessarily represent contaminant concentrations at shallow depths, where chemicals from the tank would be found in the highest concentrations. Recently installed monitoring wells B805 and B806 would provide more accurate data on these locations. Additionally, the soil samples that were analyzed from test pits 12 and 16 at site 3 were collected from depths up to 7 feet and may not have been from the correct lateral location or vertical depth to determine whether the Daxad tank caused significant soil contamination. Soil samples from the area immediately adjacent to and under the tank should be sampled for naphthalene.

#10 The writer agrees with the Haley and Aldrich recommendation.

#11, #12, #13 The writer agrees with the Haley and Aldrich recommendation. Based on the results of test excavation and sampling in this area (the former location of three underground fuel tanks), the need for a shallow well to monitor for floating petroleum product should be evaluated.

#14 According to Stan Fielding, vadose zone analysis using a field gas chromatograph as well as tenax tube samples will be used for the analysis at this location. The comments presented for I.D. #3 regarding the applicability of vadose zone monitoring to source identification apply to I.D. #14 as well. A follow-up sampling plan should be specified.

#15 The writer agrees that soil sampling for volatile and extractable organics is appropriate at the settling tank area, but also recommends that any non-priority pollutant constituents be identified. A sample selection plan and documentation of sufficient sampling depth should be presented.

#16 The detection of 20 ppb naphthalene in the groundwater collected from B705-OW, near the former location of an above ground naphthalene tank, indicates the presence of naphthalene in the area, but since this well is screened from 1.8 to 34.8 feet, samples collected from it will not necessarily represent the contaminant concentrations at shallow depths, where the highest levels of contamination would most likely be found. Monitoring well B-807 would be a better sampling point for this purpose. Additionally, soil samples should be collected from several depths beneath the former above ground storage tank and analyzed for naphthalene.

#17 The Writer agrees with the Haley and Aldrich recommendation.

- #18 To check for floating petroleum product that may have originated at this above ground fuel oil tank, the recently installed well B807 should be monitored quarterly, assuming that well is screened across the groundwater surface.
- #19 The writer agrees with the Haley and Aldrich recommendation.
- #20 The writer agrees with the Haley and Aldrich recommendation.
- #21 The evaluation of this area as a potential source of formaldehyde contamination should be based on the areal extent of the soil contamination in this area as well as the fate and transport of formaldehyde in the soil environment. Soil and groundwater data presented for the Building 27 area show significant levels of contaminants in this area. Additional soil sampling as well as more extensive data analysis is necessary to evaluate whether the soil at this location constitutes a continuing source of contamination.
- #22 The writer agrees with the Haley and Aldrich recommendation.
- #23 The writer agrees with the Haley and Aldrich recommendation.
- #24 The writer disagrees with the statement that zinc "is not of environmental concern", but recognizes that it may not be of concern in this case. The 24 hour aquatic criteria for fresh water is 47 ug/l, two orders of magnitude below the level found in groundwater at this location. A decision on the need for further samples should be justified by considering the fate and transport of zinc in the environment, and the predicted concentration at the nearest receptor.
- #25 The writer agrees with the Haley and Aldrich recommendation.
- #26 The writer agrees with the Haley and Aldrich recommendations.
- #27 To check for floating petroleum product that may have originated at the fuel oil tank at this location, well B804 should be monitored quarterly for floating product, assuming this well is screened across the surface of the groundwater.
- #28 The writer agrees with the Haley and Aldrich recommendation.

- #29 In addition to priority pollutant volatile organic compounds, the soil from the vicinity of the tank farm east of Parkway Pond should be analyzed for other non-priority pollutants previously detected at the site, as well as extractable organic compounds. This location is near one of the most heavily contaminated areas of the site, and warrants a thorough evaluation. A more specific plan for sample selection should be submitted.
- #30 and 31 The writer considers the lagoon, settling ponds and process waste areas to be important potential source areas. The locations of the sampling points cited in Table 1 do not appear to correspond well with the areas of concern. Several borings should be advanced in each of these areas, to evaluate the severity, and vertical and horizontal extent of contamination that may remain at these locations.
- #32 A specific sample selection and analysis plan should be presented for the area of the process waste storage areas and the areas used for sludge solidification.
- #33 The writer agrees with the Haley and Aldrich recommendation.
- #34 The writer agrees with the Haley and Aldrich recommendation.
- #35 The test pit program recommended for Source I.D. #11, 12 and 13 should be expanded to include this area, which is nearby.
- #36 The writer agrees with the Haley and Aldrich recommendation.

For many of the potential source areas, groundwater analysis data was used to determine whether a continuing contamination source exists. In most cases, only one sample was collected and analyzed, and contaminant levels in the monitoring wells have not been monitored over time. Long-term groundwater monitoring is necessary, however, to detect trends that can indicate the presence or absence of a continuing source of contamination with any certainty. For this reason, the collection and analysis of soil samples will provide the best information on many of these locations within a short period of time. To determine whether or not soil in an area constitutes a continuing source, the areal extent of the soil contamination and the predicted fate and transport of the contaminants at that location must be considered as well as the contaminant concentrations.

BUILDINGS:

- 1,2 and 3 Haley and Aldrich's conclusion that no continuing source exists in these areas is based upon analysis of groundwater from monitoring well B205-OW. In the writer's opinion, however, the construction of this well is not optimum for obtaining a quantitative analysis of groundwater in the most heavily contaminated vertical zone. The well is screened from 20.4 feet to 30.4 feet, and was not sealed above the screen. Since the annular space above the screen is filled with pea stone, groundwater from any depth could possibly enter the well. The analysis of groundwater from this well can provide information on the presence or absence of contamination, but cannot demonstrate the absence of a continuing source of contamination at this location. In fact, the boring log for this well indicates a strong chemical odor at the 4 to 8 foot depth. No soil data for this area is available so additional soil samples should be collected and analyzed. A specific plan for sample collection and analysis should be submitted.
- 4 Haley and Aldrich concluded that there is no continuing source in this area based on the analysis of groundwater from well B701-OW, which is screened from 5.1 to 40 feet. For reasons discussed in the previous paragraph, this data does not demonstrate the absence of heavily contaminated soil that might constitute a continuing source of contamination.
- 5 For reasons presented above, the wells cited as evidence of no continuing source at Building 5 do not provide adequate quantitative information for that purpose.
- 6 The writer agrees with the Haley and Aldrich recommendation.
- 7, 11, 12 and 15 Since these buildings appear to have been located in the area that will be excavated for Building Site 2, and since the available information does not indicate a continuing source in the area, the Department agrees that additional sampling in this area is not necessary at this point in time. The excavation process should provide an opportunity to discover any additional sources that may exist in this area. Furthermore, additional sampling has been recommended for the area adjacent to Building 11 (at Building 25).
- 8 Sampling well B203-OW for solvents will not provide quantitative analytical information on the groundwater quality, for reasons cited in the comments regarding Building 1. Additionally, since the well is not screened at the surface, it cannot be used to monitor for floating petroleum product. An additional well in the vicinity of well B203 has been recommended in the comments regarding Source I.D. #1. Groundwater

samples from that well should provide better information as to the existence of a continuing source of contamination in that area.

- 9 The writer agrees with the Haley and Aldrich recommendation.
- 10 The writer agrees with the Haley and Aldrich recommendation.
- 13 The writer agrees with the Haley and Aldrich recommendation.
- 14 The writer agrees with the Haley and Aldrich recommendation.
- 16 Most of the contaminants detected in the soil from Test Pit 16 in Site 3 are usually associated with oil contamination. Although no recommendations were made under this item, Haley and Aldrich has recommended excavating a test pit at the former oil tank location near Building 16.
- 17 The writer agrees with the Haley and Aldrich recommendation.
- 18 In the writer's opinion, all laboratories are potential sources of contamination. Soil samples should be collected from around any sumps or sewer or drain lines leading from the lab. These should be analyzed for priority pollutants as well as any other chemicals used routinely in the lab.
- 19 The writer agrees with the Haley and Aldrich recommendation.
- 20 The writer agrees with the Haley and Aldrich recommendation.
- 21 The writer agrees with the Haley and Aldrich recommendation.
- 25 Sampling recommendations for this area are addressed under Source I.D. #15 in this memo.
- 26 The writer agrees with the Haley and Aldrich recommendation.
- 27 Sampling recommendations for this area are addressed under Source I.D. #21 in this memo.
- 28 The writer agrees with the Haley and Aldrich recommendation.

- 30 The writer agrees with the Haley and Aldrich recommendation, but would add soil sampling. To the extent possible, the sampling program for this building should be combined with those recommended by the writer for Buildings 8 and 18.
- 31 Sampling recommendations at this location are addressed under Source I.D. #14 in this memo.
- 33,35,37, and 38 The writer agrees with the Haley and Aldrich recommendation that additional soil samples be collected from the footprints of these former buildings and analyzed for priority pollutant compounds, but would also recommend collection of soil samples from just outside of the buildings' perimeters.
- 32 and 34 The additional sampling performed for buildings 33,35,37 and 38 should also encompass nearby buildings 32 and 34. It is not clear from the comments in Table 1 why these were determined not to be continuing sources since the available data for the locations of buildings 32 and 34 is not substantially different from that for the other buildings.
- 36 Sampling recommendations at this location are addressed under Source I.D. #16 in this memo.
- 39 The writer agrees with the Haley and Aldrich recommendation.
- 40 In the writer's opinion, for reasons cited in the comments regarding Building 1, samples collected from well B203 cannot be assumed to represent the contaminant levels in the most contaminated stratum, and therefore, cannot be used to determine the presence or absence of a continuing source of contamination in the area.
- 41,43,44,45 and 46 The writer agrees with the Haley and Aldrich recommendation.
- 42 The writer agrees with the Haley and Aldrich recommendation.

In some cases, indicator compounds for the building locations appear to have been chosen based on data from the nearest sampling points rather than on building use information, and so the need for additional data was determined essentially by comparing existing data with existing data. This procedure does not really check the adequacy of existing data with respect to chemical handling activities in each building, and therefore has limitations in identifying data gaps.

STORAGE AREAS:

The writer agrees with the Haley and Aldrich recommendations.

UTILITIES:

The writer agrees with the Haley and Aldrich recommendations.



S. RUSSELL SYLVA
Commissioner

The Commonwealth of Massachusetts
Department of Environmental Quality Engineering
Metropolitan Boston - Northeast Region
5 Commonwealth Avenue
Woburn, Massachusetts 01801

October 7, 1987

W.R.Grace and Co.
62 Whittemore Avenue
Cambridge. MA

Attn: Mark Stoler

Re: CAMBRIDGE, Alewife
Center Sampling
Plan, DEQE Case #3-277

CAMBRIDGE MA

1987 OCT 19 PM 4: 46

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Dear Mr. Stoler:

The Department is in receipt of the Sampling Plan for Alewife Center dated July 1987 prepared for W.R.Grace and Co. by Haley and Aldrich, Inc. This letter is to present in writing the Department's comments on the plan as it concerns the identification of areas of the site that are contaminated to the extent that they constitute continuing contaminant sources. The plan for long-term monitoring will be addressed at a later date.

The stated objectives of the sampling plan are: (1) to provide sufficient information to determine whether or not locations identified as chemical storage, use, or disposal areas act as continuing sources of contamination, (2) to obtain more detailed information on areas of the site where there is little data, (3) to establish a database of groundwater and surface water quality information as part of the long-term monitoring program, and (4) to determine the soil quality within the outline of proposed Building Sites #6 and #7 that are on the Grace property.

To address the first objective mentioned above, Haley and Aldrich presented in Table 1 of the Sampling Plan a detailed summary of the potential source areas, data from sampling points nearest those areas, and recommendations as to the necessity of additional sampling to ascertain whether the areas in question are continuing sources of contamination. The Department's comments on Table 1 are detailed in the enclosed internal memorandum, and the specific recommendations for additional sampling at the suspected source areas are summarized below:

- (1) Source I.D.#3, the location of an underground tank used for naptha and toluene - According to Stan Fielding, vadose zone analysis using a field gas chromatograph as

well as tenax vapor sampling tubes is the proposed method of analysis for this area. The Department agrees that this is an appropriate screening method, but because of the limitations of vadose zone analysis outlined in the enclosed memorandum, a follow-up plan for sampling based on the screening results should be presented. Should vadose zone analysis indicate the absence of contamination in the area, only limited confirmatory sampling would be required. Additionally, for reasons outlined in the enclosed memorandum, the Department recommends the installation of a shallow, short screened well in the vicinity of B203-OW. Analysis of samples from this well should also address concerns about Source I.D. #s 2 and 3 and Buildings 8 and 40.

- (2) Source I.D. #2, the former location of an underground white oil tank - To determine whether this area constitutes a source of free floating product or dissolved petroleum product constituents, groundwater samples should be collected from the additional well recommended in the comments regarding source I.D. #1. The recommended well should be screened from above the groundwater table to enable the detection of floating product if any exists.
- (3) Source I.D. #3, the former location of an underground tank used for naphtha and toluene storage - To evaluate groundwater contamination originating at this location, samples should be collected from the well recommended in the comments regarding source I.D. #1. Additionally, for reasons outlined in the enclosed memorandum, a sampling plan to follow the vadose zone screening program should be submitted. If vadose zone sampling indicates the absence of contamination in the area, only limited confirmatory sampling will be required.
- (4) Source I.D. #9, the location of an underground DAXAD tank - For reasons discussed in the enclosed memorandum, the Department considers wells B805 and B806 more appropriate sampling points than B702 and B704 for evaluating groundwater conditions near this location. Additionally, soil from immediately adjacent to and beneath the tank should be analysed for naphthalene.
- (5) Source I.D. #14, the location of an underground diesel fuel tank at the N.E. corner of Building 17 - The comments regarding vadose zone analysis at Source I.D. #3 apply to this location also.
- (6) Source I.D. #15, location of settling tank for drum re-conditioning operations - Specific plans for sample sel-

ection and approximate number of samples should be presented. In addition to analysis of soil samples for volatile and extractable priority pollutants, non-priority pollutant, non-petroleum product constituents included in the mass spectrometer data base must be identified.

- (7) Source I.D. #16, location of above ground naphthalene tank on the south side of Building 36 - For reasons given in the enclosed memorandum, monitoring well B807 should be used to obtain ground water quality data at this location.
- (8) Source I.D.#21, location of former above ground formaldehyde tank - The evaluation of this area as a potential continuing source should be based on the areal extent of the soil contamination as well as the fate and transport of formaldehyde in the soil environment. Soil and groundwater data presented in the Sampling Plan for the building 27 show significant levels of contamination at this location. Additional soil sampling as well as more extensive data analysis is necessary to evaluate this area.
- (9) Source I.D. #27, former location of above ground fuel oil tank - To check for contamination that may have originated at this tank, well B804 should be monitored quarterly for floating product.
- (10) Source I.D. #29, location of the tank farm east of Parkway Pond - In addition to priority pollutants, analysis of the soil from this area should include the identification of any non-priority, non-petroleum product constituents that are included in the mass spectrometer data base. This location is near the area of highest groundwater contamination on the site, and warrants thorough investigation. A specific plan for sample selection should be submitted.
- (11) Source I.D. #30 and #31, locations of wash lagoon, settling pond and process waste areas - The Department considers these areas to be important potential source areas, and the locations of the sampling points cited in Table 1 do not appear to correspond well with the areas of concern. Several borings should be advanced in each of these areas to evaluate the severity and vertical and horizontal extent of any contamination remaining at these locations. The borings should be advanced below the elevation of the bottoms and to the perimeters of the former ponds and lagoons.
- (12) Source I.D. #35, former location of a 10,000 gallon oil tank - The test pit program recommended for Source I.D. #s 11, 12 and 13 should be expanded to include this

area.

BUILDINGS:

- (1) Buildings 1,2,3 4 and 5 - For reasons discussed in the enclosed memorandum, the Department does not consider the groundwater analysis data from well B205-OW adequate information to characterize contaminant conditions in this location. Since very little soil analysis data was cited for this area, and the boring log for B205-OW noted a strong chemical odor at a depth of 4 to 8 feet, a plan for sampling and analyzing soil from the vicinity of these buildings and B205-OW should be submitted.
- (2) Building 8 - To evaluate groundwater conditions in this area, samples should be collected from an additional well installed in the vicinity of MW203-OW (see comments and recommendations under Source I.D. #s 1 and 8 in the enclosed memorandum.)
- (3) Building 18 - Soil samples should be collected from around any sumps, drains or sewer lines leading from the laboratory. These should be analyzed for priority pollutants as well as any other hazardous materials used routinely (in the past or at present) in the lab.
- (4) Building 30 - The Department agrees with the Haley and Aldrich recommendation, but would add soil sampling. A specific sample selection plan should be submitted.
- (5) Buildings 33, 35, 37 and 38 - The Department agrees with the Haley and Aldrich recommendation that additional soil samples be collected from the footprints of these former buildings, but would also recommend collection of soil samples from just outside of the buildings' perimeters.
- (6) Buildings 32 and 34 - The additional sampling performed for buildings 33, 35, 37 and 38 should also encompass nearby buildings 32 and 34.

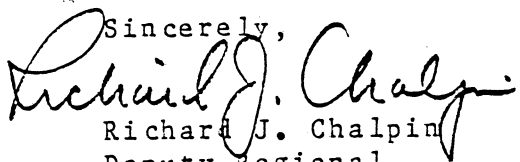
The comments above are based, for the most part, on the information presented in the sampling plan, and are only as comprehensive as that information. New information received by the Department in the future may warrant additional sampling requirements.

Additionally, please be advised that these requirements relate to the identification of continuing sources of contamination, but may not be sufficient to provide all of the data necessary for decisions on the removal and treatment of

contaminated materials at the site. The feasibility study may indicate the need for additional sampling data, but before that study is initiated, it is not possible to predict such requirements.

You are reminded that samples must be collected and analysed according to applicable EPA protocols. To enable the Department to monitor the implementation of the Sampling Plan, please notify Nancy Bettinger at least one day in advance of specific sampling locations and plans.

If you have further questions regarding this matter, contact Nancy Bettinger at the letterhead address or 935-2160. All future communications concerning this site must reference the DEQE case number designated in this letter's heading.

Sincerely,

Richard J. Chalpin
Deputy Regional
Environmental Engineer

RJC/NAB/nab

Enclosure

cc: Madeline Snow, DEQE/DHW, 5th Floor, One Winter Street
Boston, MA 02108

Karen Stromberg, DEQE/DHW, 5th Floor, One Winter Street,
Boston, MA 02108

Wesley Stimpson, Haley and Aldrich, Inc., 238 Main
Street, P.O.Box 60, Cambridge, MA 02142
Cambridge, MA

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Comm. from Richard J. Chaplin, Deputy Regional Environmental Engineer, Mass. DEQE, transmitting for informational purposes a copy of its comments on the sampling plan for Alewife Center dated July, 1987 prepared by Haley & Aldrich, Inc. for W.R. Grace.

In City Council,

October 26, 1987

Placed on File