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VIA EMAIL

February 23, 2015

Mr. Bryan Wong
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New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 2
47-40 21st Street
Long Island City, NY 11101

Re: **Product Testing Report**
Former NuHart Plastic Manufacturing Site, NYSDEC #224136
280 Franklin Street, Brooklyn, New York
FPM File No. 1134g-15-08

This report has been prepared by FPM Group (FPM) to document the results of product testing conducted at the above-referenced Site in accordance with our September 25, 2014 Product Testing Work Plan (PTWP), approved by the New York State Department of Environmental Conservation (NYSDEC) on September 30, 2014. The purpose of the product testing was to obtain additional data on the properties of the floating phthalate/Hecla oil mixture (product) present at the Site.

The types and purposes of the testing performed under the PTWP are as follows:

- Field testing to assess the integrity of the screens of select recovery wells and the communication of the wells with the surrounding formation;
- Field testing (bail-down testing) to obtain data concerning the product thickness, mobility, and migration rate in the formation under ambient conditions; and
- Laboratory testing to obtain product viscosity data as a function of temperature for use in evaluating remedial alternatives for the product.

As noted in the PTWP, these activities were originally to have been conducted by others as part of a Supplemental Remedial Investigation (SRI) for this Site. However, as these activities were conducted by FPM, which is not contracted to prepare the SRI, these activities are documented in summary form in this report and will be more fully documented in the Feasibility Study (FS) for this Site, the preparation of which is contracted to FPM.

Additional product testing will be performed during the remedial design phase for this Site, as noted in the PTWP. This later phase of product testing is anticipated to include testing of the product recovery rate under pumping conditions, including both groundwater pumping and product pumping. A detailed scope of work for product recovery testing will be provided once the remedial approach is more fully developed and appropriate wells are identified for this testing.

The below-described product testing activities were conducted by FPM in accordance with the requirements and procedures in the existing Remedial Investigation Work Plan (RIWP) and associated documents approved by the NYSDEC for this Site, to the extent applicable. These requirements and procedures included the provisions of the Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP). Please note that no exceedances of the CAMP monitoring criteria were noted. CAMP monitoring results will be included in the FS.

Product testing included both field testing and laboratory testing activities to obtain additional information concerning product properties. Field activities and data analysis were performed by experienced FPM personnel with specific training in hydrogeologic testing and analyses and the field testing crew included two experienced personnel. Additional services were provided by Aquifer Drilling & Testing, Inc. (ADT, well pumping) and Xray Locating Service (Xray, downhole camera). All waste was containerized onsite in appropriate containers for offsite disposal by others.

Well Screen Integrity Testing Procedures and Results

Three onsite wells that contain product were assessed to evaluate the integrity of the well screens and their communication with the surrounding formation and fluids. The wells selected for this testing included RW-4, RW-10, and RW-8; the locations of these wells are shown on Figure 11 from the RIR (attached). These wells were selected so as to assess well conditions in several areas of the Site where the product is anticipated to contain variable proportions of phthalates and Hecla oil. Each of these wells also contains a significant apparent thickness of product that has been in contact with the well screen for several years.

To evaluate each well's condition, the well was accessed and the depth to product and the depth to groundwater were measured to the nearest 0.01 foot with an interface probe. All measurements were recorded. Other information noted for each well (as obtained from the boring/well installation logs and confirmed in the field) included the well number, casing and borehole diameters, total well depth, screened interval depths, the annular gravel pack, and the lithology of the screened interval. This information is documented on Table 1.

Each well selected for evaluation was tested as follows: a submersible pump was used to remove product and groundwater from the well and develop sufficient drawdown such that the screen interval where product was noted was exposed. Once sufficient drawdown was achieved, a downhole video camera equipped with a lighting system was used to view the well screen and observe its condition and the flow of groundwater and product through the screen. The video was observed on-screen in the field and pumping and video recording was continued as necessary and feasible to provide definitive data. Specific information assessed during the video work included apparent distortions of the well casing and/or screen, widening or obstruction of the screen slots, potential restriction of groundwater and/or product flow into the well, the apparent interval of product flow into the well, encrustations or growths adhering to the casing or screen, or other conditions that may affect the integrity of the well or well screen, or the flow of fluids into the well. All video and video times were recorded for later review.

Video recording was complicated by the cold ambient weather conditions, which resulted in rapid fogging of the camera lens once the equipment was placed into the wells. The camera lens was also periodically fouled by product and groundwater. These conditions resulted in the need for frequent camera cleaning and shortened the recording times. Upon review of the video recording in the office, it was also noted that the quality of the recording was somewhat less than the quality of the video observed in the field by the FPM representative. The representative's detailed observations based on the video in the field are noted below. Example still shots of each well are included in Attachment A.

Field notes from the well screen integrity testing are included in Attachment A and include information pertaining to the pumping rates, duration of pumping, and other pertinent observations. We note the following observations concerning each well tested:

- RW-4:

The well was confirmed to be constructed of solid PVC casing from grade to 8 feet below grade and a screen from 8 to approximately 18 feet below grade. A static measurement of liquids in the well indicated that the depth to product was 12.12 feet and that 2.15 feet of product were present in the well prior to performing any pumping. The pump was able to draw down liquids in the well approximately five feet, thus leaving approximately one foot of liquid at the bottom of the well. Both the casing and screen intervals were observed to be in good condition; no defects or obstructions were noted that could potentially block the flow of liquids into the well screen. The slotted openings throughout the screen appeared to be in good condition; no corrosion, encrustations, or deformation of the slotted screen was observed. During the drawdown, both product and groundwater were observed to sporadically enter the well, generally throughout the entire length of exposed well screen, although it appeared that the majority of product passed through the well screen at a depth between approximately 13 and 15 feet below grade. Although the influx of groundwater and product was noted to remain steady, the process was visibly slow and the pump was routinely shut down for periods of up to five minutes due to lack of enough liquid in the well. The product removed and observed flowing back into the well was noted to be visibly more viscous than the product noted in wells RW-8 and RW-10.

- RW-10:

The well was confirmed to be constructed of solid PVC casing from grade to 8 feet below grade and a screen from 8 to approximately 18 feet below grade. A static measurement of liquids in the well indicated that the depth to product was 13.16 feet and that 2.04 feet of product were present in the well prior to performing any pumping. The pump was able to draw down liquids in the well approximately three feet, thus leaving approximately two feet of liquid at the bottom of the well. Considerable sand and some sludge globules were observed in the well and tended to periodically clog the pump. Both the casing and screen intervals were observed to be in good condition; no defects or obstructions were noted that could potentially block the flow of liquids into the well screen. The slotted openings throughout the screen appeared to be in good condition; no corrosion, encrustations, or deformation of the slotted screen was observed. During the drawdown, both product and groundwater were observed to enter the well throughout the entire length of exposed well screen. The product removed and observed flowing back into the well was noted to be less viscous than the product noted in well RW-4.

- RW-8:

The well was confirmed to be constructed of solid PVC casing from grade to 8 feet below grade and a screen from 8 to approximately 18 feet below grade. A static measurement of liquids in the well indicated that the depth to product was 13.85 feet and that 2.90 feet of product was present in the well prior to performing any pumping. The pump was able to draw down liquids in the well between two and three feet, thus leaving approximately two feet of liquid at the bottom of the well. Considerable sand and some sludge globules were observed in oil being pumped from the well and tended to periodically clog the pump. Both the casing and screen intervals were observed to be in good condition; no defects or obstructions were noted that could potentially block the flow of liquids into the well screen. The slotted openings throughout the screen appeared to be in good condition; no corrosion, encrustations, or deformation of the slotted screen was observed. During the drawdown, both product and groundwater were observed to enter the well throughout the entire length of exposed well screen. The product removed and observed flowing back into the well was noted to be very similar to the product encountered in well RW-10 and less viscous than the product noted in well RW-4.

In summary, none of the video testing results showed any apparent distortions of the well casings or screens, widening or obstruction of the screen slots, restriction of groundwater or product flow into the wells, encrustations or growths adhering to the casings or screens, or other conditions that may affect the integrity of the wells or well screens, or the flow of fluids into the wells. This information supports the continued use of Schedule 40 PVC well materials at this Site for monitoring or other purposes that do not typically require use of alternate well materials, and also indicates that the data obtained from these wells is anticipated to be valid.

The observed presence of sand at RW-8 and RW-10 suggests that additional measures may be necessary to preclude sand intrusion into future wells. These measures may include reducing the screen slot and/or gravel pack size, more intensive well development, or some combination of these measures.

Bail-Down Testing Procedures and Results

As the video testing did not demonstrate any integrity issues with the wells in contact with product, four wells that contain product were accessed and bail-down tests were performed to obtain data to evaluate the rate of product migration. The wells for bail-down testing (MW-21, RW-10, RW-8, and MW-5) were selected so as to test product in several areas of the Site and in the downgradient offsite area and to have a product apparent thickness of at least one foot based on recent monitoring data. The locations of these wells are shown on Figure 11 from the RIR (attached) and were approved by the NYSDEC.

- Procedures

To evaluate each proposed well's suitability for bail-down testing, the well was accessed and the depth to product and the depth to groundwater measured to the nearest 0.01 foot with an interface probe. Each well was confirmed to have at least one foot of apparent thickness of product. All measurements and times of measurement were recorded and other pertinent information was noted for each well (as obtained/estimated from the boring/well installation log and confirmed in the field), including the casing and borehole diameters, total well depth, screened interval depths, annular gravel pack, and the lithology of the screened interval. This information is documented on Table 1.

Each well selected for bail-down testing was tested as follows:

- A large-diameter bailer that fit snugly inside of the casing was used to remove only product from the well. All removed product was containerized and managed as described below. Product removal was conducted quickly and with no direct disturbance of the underlying groundwater, to the extent feasible. Product was removed sufficiently rapidly so as to result in at least one foot of drawdown in the product within the well;

- Following product removal, measurement of the product recovery began. Measurements of the depth to the top of the product were made to the nearest 0.01 foot with an interface probe during the recovery period at a frequency dependent on the rate of recovery. All measurements and measurement times were recorded and monitoring of recovery was continued until the well recovered significantly. Each selected well was tested at least once, with two wells (RW-10 and MW-21) tested twice;

- The bail-down testing results were field-checked to ensure that sufficient data were obtained and properly recorded. Following testing, the wells were re-secured and the removed product that was not to be used for laboratory testing and the fluids removed during the video work were properly containerized onsite in the designated product and fluid containers. The removed fluids will be properly disposed offsite in accordance with the established product disposal protocols for this Site; and

- The bail-down testing results were tabulated and evaluated as described below to assess product thickness and potential migration rates.

➢ <u>Results</u>

The bail-down testing data are summarized on tables included in Attachment A and were used together with the well and lithologic information to calculate hydraulic conductivity (K) for the product, a key parameter for assessment of product mobility. This parameter was then used together with other hydraulic information (gradient) to estimate the product migration rate.

It should be noted that the measurements of depth to product and depth to groundwater obtained during the bail-down tests may be somewhat affected by the nature of the product, which has a tendency to coat the interface probe sensors and somewhat delay responses. The field personnel regularly cross-checked the measurements and cleaned to probe to reduce the potential for error and/or anomalous readings.

It should also be noted that recovery responses were observed for both fluids (product and groundwater) during the tests, although only product was bailed from the wells. This observation suggests that the product is depressing the water table surface, as is typical, and confirms that water level data from within the product area should not be used for evaluation of the water table elevation unless they are corrected for the effect of the product.

The recovery response of the groundwater beneath the product also affects the measurements of product recovery, and is anticipated to somewhat increase the measured recovery rate of the product surface relative to what would be observed if the groundwater surface remained static. As the K values were calculated using the product recovery data (so as to assess the rate of product movement), we anticipate that the effect of the groundwater recovery somewhat increases the calculated K values for the product.

To make an initial assessment of the product recovery behavior, the product apparent thicknesses were plotted relative to elapsed time, as shown on the graphs included in Attachment A. The following observations were noted from these graphs:

- Each test showed an initial period of relatively rapid recovery of product apparent thickness followed by a generally longer period of slower recovery. The initial recovery period is likely affected by initial inflow of product from the high-permeability wellbore gravel pack and is not representative of flow from the surrounding formation. Therefore, these early data were not considered when calculating K;

- For those tests for which longer-term data are available (RW-10 test 1 and MW-21 test 1), the late-time data suggest that product recovery over the longer term (hour scale) is even slower than over a moderate term (10 to 30-minute scale). For these tests K values have been calculated for both scales; and

- The product apparent thicknesses did not fully recover over the duration of any of the bail-down tests (typically about 30 minutes, although two tests were run for about 2 hours). Generally a recovery of about 20% to 50% was observed. This suggests that the apparent thicknesses of product observed in the wells are affected by effects and processes (interactions with well casing/screen, water table fluctuations) that typically act to increase the apparent thickness in the well relative to what may be present in the formation.

The product recovery data were used to evaluate the K of the formation relative to product. This analysis was performed using the Aqtesolv Pro software (v. 4.01, HydroSOLV, Inc.). The recovery data and appropriate formation and well data were input into the slug test module, checked, and then evaluated using the Dagan solution (1978), which is a straight-line solution appropriate for partially-penetrating wells screened across the water table in an unconfined aquifer. In each case the early recovery data were omitted from the analysis by using the manual line-fitting method, as shown on the well test analysis graphs in Attachment A. K values were determined for each bail-down test and are summarized on Table 2. As noted above, for those tests with late-time data two K values were calculated; however, for consistency and to be conservative, only the moderate-term data were used in the subsequent calculations. The calculated K values for the product range from 1.099×10^{-6} to 8.991×10^{-5} feet/minute (ft/min).

Sensitivity analyses were performed to assess the impact of the input formation and well data values on the calculated K values. In the case of these tests, nearly all of the well and formation values are reasonably well known, with the exception of the aquifer anisotropy ratio (ratio of vertical to horizontal hydraulic conductivity). The initial solutions utilized a typical aquifer anisotropy ratio of 0.1 (Todd, 1980). However, as the formation at the Site contains a significant amount of silt, a lower anisotropy ratio may be more appropriate. Additional solutions were calculated using an anisotropy ratio of 0.01 and demonstrated little change in the calculated K values (see Table 2). None of the other values are anticipated to vary significantly from the values used during the analysis and, therefore, further sensitivity testing was not conducted.

Once the K values had been calculated, they were integrated with groundwater gradient (i) values calculated from the water table contours previously presented in the Remedial Investigation Report (see Figure 10, attached) to calculate the potential flow rate of the product under existing aquifer conditions. The i values calculated from Figure 10 range from 0.002 to 0.004. Using these i values and the range of K values (moderate-term data only) shown in Table 2, we calculate a product flow rate of between 2.2×10^{-9} and 3.6×10^{-7} ft/min. Converting these values to feet per year results in calculated product flow rates of between 0.0012 and 0.18 feet/year, which indicates that the product is essentially immobile.

It should be noted, as discussed above, that the calculated K values for the product include the effect of the water table recovery and, therefore, may be somewhat higher than actual K values for the product alone. This further supports our conclusion that the product is essentially immobile.

➢ Discussion

The above-described calculated flow rate values were assessed relative to the presumed source(s) and known information concerning former Site operations and the extent of the product. We note that the subject property was used for plastic manufacturing from about 1950 until 2004. Although the date of tank installation is not known, presumably, the tanks, piping, and associated infrastructure were onsite since about 1950 as they were an integral part of the plastic manufacturing operations. The tanks, piping, and associated trench system were cleaned and closed in mid-2006. Based on this information, the releases that resulted in the presence of the product on the water table could have occurred during the 1950 to 2006 interval. Based on the apparent volume and extent of the product (including its extent in 2006) and its variable composition, it is likely that the releases occurred from multiple sources and were ongoing for a number of years.

We also note that the initial subsurface investigation of the property, conducted in late 2006 by ASR, included installation of many of the wells located onsite, in the surrounding sidewalks, and offsite to the northwest. At that time product (as indicated by free-phase NAPL, highly-contaminated soil at the water table, and/or elevated dissolved levels) was documented to be present beneath much of the western portion of the Site and extended downgradient to offsite wells MW-5 through MW-7, MW-15 and MW-16, but not to offsite wells MW-11 through MW-14 (none of the other offsite wells had been installed at this time). This information indicates that by late 2006, when the tanks and other potential sources of the releases were closed, the product was already present beneath much of the Site and had moved somewhat offsite, which suggests that the releases likely began early during the property's history of plastic manufacturing and were likely ongoing for a number of years.

Additional wells have been added on several occasions and product monitoring and recovery have been ongoing since 2006. The available data were reviewed and it was noted that all wells that now contain product have contained product (or significant indications of product) since their installation. Wells that did not contain product (or exhibit significant indications of product) at the time of their installation still do not contain product. These observations suggest that there has been no apparent change in the configuration of the product plume since at least

2006, which is consistent with the calculated negligible product migration rate and with the closure of the tanks, piping system, and associated infrastructure in 2006 (thereby eliminating the release sources).

The extent of the onsite product and the variable nature of its composition (see discussions above and below) suggest that the product likely originated from several onsite releases. The majority of the tanks from which the releases may have occurred are located in the southwestern portion of the Site. This area is approximately 100 feet upgradient of the apparent location of the leading edge of the product at present (see Figure 11, attached). A simple arithmetic calculation using this information would suggest a product migration rate of between 1.7 feet per year (if the releases started in 1955) and about 3 feet a year (if the releases did not start until after the facility had been operating for a couple of decades). However, it should be recognized that initial product migration, particularly while a release is ongoing, is generally faster than later migration due to a number of factors, including driving forces during the release associated with continuous vertical columns of product extending from the release site to the water table surface, initial lateral expansion of the product mound(s) under gravitational forces, and the likely lower viscosity of the released product before subsurface weathering processes further increased its viscosity. These factors typically result in an initial product migration rate that is higher than the migration rate that is observed later in the life of a product plume, after the release source is ended, the product has finished spreading out under gravitational forces, and the viscosity has increased due to weathering. Therefore, a sample arithmetic calculation of the product migration rate based on the locations of the apparent source(s) of the releases and the current downgradient edge of the product will not accurately represent the product's current migration rate under the forces that presently act on the product.

It was noted that product did re-accumulate in the wells during both the well screen integrity testing and the bail-down testing. As indicated by the bail-down testing observations, it is likely that at least some of this product migrated into the wells from the surrounding formation. It has been suggested that this re-accumulation indicates that the product is more readily mobile under in-situ conditions than the calculations from the bail-down tests would suggest. However, we note that during both types of testing the fluid levels in the wells were drawn down to generally 2 to 5 feet below their static levels and recovery was very slow. This results in a very steep gradient (high i value) in proximity to the wellbore during much of each test. The fluid volumes removed during the well screen integrity testing were about 30 gallons; using the range of drawdown values we estimate that these fluids likely originated from within 1 to 2 feet of the well. Based on these distances and the observed drawdowns, we estimate that the induced i values in proximity to the wells during testing may reasonably have ranged from 1 to 5. Using these induced i values, the calculated product velocity in proximity to the wellbores during testing ranges from 0.6 to 236 feet per year. Thus, while we would agree that under high induced gradients the product may move more rapidly, the actual gradient under in-situ conditions in the formation (which is what presently drives the movement of product) is very low and, therefore, the calculated product migration rate under in-situ conditions is very low.

Laboratory Viscosity Testing Procedures and Results

During the field testing program samples of the product from each of the four selected wells, including offsite downgradient well MW-5 and onsite wells RW-8, RW-10, and MW-21, were retained for laboratory testing for viscosity. Testing was performed by Texas Oil Tech

Laboratories, Inc. of Houston, TX, an established oil testing laboratory. The sample quantities and management were in accordance with the laboratory's requirements for product samples.

The samples were analyzed for kinematic viscosity over a range of temperatures, starting from the in-situ ground temperature (estimated at 55 degrees F) and proceeding in 10 degree F increments up to 125 degrees F. Based on our experiences and literature review of thermal treatment projects, we anticipate that this temperature range may reasonably be anticipated to occur during remediation via thermal treatment. The laboratory reported the viscosity result at each temperature increment for each sample, as noted in the laboratory report included in Attachment B. These results are summarized in Table 3 (attached); the highlighted values are representative of the kinematic viscosity of the product at the in-situ formation temperature.

To facilitate a comparison to published viscosity values, the kinematic viscosity laboratory data were converted to calculated dynamic viscosity values using an average of published values of product and Hecla oil density, as shown on Table 4. Hecla oil is reported to have a density of 0.92 kg/m^3 at a temperature of about 60 degrees F and phthalates are reported to have densities ranging from about 0.96 to about 0.99 kg/m^3 at temperatures of about 68 degrees F (the lowest temperature for which phthalate density data were identified). We used an average density value of 0.96 kg/m^3 for the product, which is at the low end of the phthalate density range and results in a lower (more conservative) calculated dynamic viscosity. The equation used was:

$$\text{kinematic viscosity } (mm^2/s) \text{ X density } (kg/m^3) = \text{dynamic viscosity (mPa s)}$$

In general, these data indicate that the in-situ product kinematic viscosity under ambient conditions (about 55 degrees F) ranges from 28.25 mm^2/s (or centiStokes) at onsite well MW-21 to 273.69 centiStokes at onsite well RW-8. At offsite well MW-5 the kinematic viscosity of the in-situ product was measured at 192.48 centiStokes. As the density of the product appears to be very close to 1, the calculated dynamic viscosity values for the in-situ conditions are similar, ranging from 27.12 to 262.74 mPa s (or centiPoise). These data indicate that the in-situ product is highly viscous. For comparison, the viscosity of water under in-situ conditions in the formation is about 1 centiStoke or centiPoise; in this case the in-situ product viscosity generally ranges between that of vegetable oil and maple syrup. The highly-viscous nature of this product is consistent with the calculated K values (discussed above) and with the calculated low flow rate of the product.

Published information concerning the viscosity of phthalates (including the phthalate products reported to have been formerly used onsite) and Hecla oils (which are presently manufactured by ExxonMobil Oil Corporation), was obtained via a literature search. These data are summarized on Table 4 (attached) together with published viscosity values for water, for reference. Values within the range of natural in-situ formation temperatures and temperatures that might be obtained during thermal treatment are indicated by shading. These data indicate that the viscosity of phthalate products is significantly higher than the viscosity of the groundwater on which the product is present and the viscosity of the Hecla oil is even higher than that of phthalates. Specifically, the published viscosity values for phthalate products at temperatures near the natural in-situ formation temperature (up to 77 degrees F) range from 55 to 80 centiPoise. Hecla oil viscosity is reported to range from 680 to 1,000 centiStokes at 104 degrees F (the lowest temperature for which data could be located).

A comparison of the viscosity data for the in-situ product versus published information indicates that, in general, the in-situ product viscosities for the product on the western side of the Site (RW-8 and RW-10) and offsite downgradient (MW-5) are higher than the published values for phthalates, but lower than the values for Hecla oil. These data suggest that the product in this area consists of a mixture of phthalates and Hecla oil, which is consistent with the locations of former underground storage tanks (USTs) in which these products were stored (see Figure 4, attached). The in-situ viscosity values may also be affected by weathering processes, which typically increase the viscosity of in-situ product relative to its original viscosity.

The viscosity data for the onsite well located in a more upgradient position (MW-21) indicate a somewhat lower viscosity than the published values for phthalates, but well above the viscosity of water. This well is located away from the USTs in which Hecla oil was formerly stored and is closest to UST #16, which was formerly used to store unspecified "plasticizer". It is possible that the material formerly stored in UST #16 was somewhat different than the other plasticizers reported to have been used onsite. We note that this well is located in an upgradient position on the Site and not in an area where the product is likely to migrate offsite.

The March 31, 2010 report from Friedman & Bruya, Inc. (Attachment B) was reviewed to assess the recently-obtained viscosity data relative to previous product "fingerprint" testing data. The previous testing was conducted on samples from wells RW-12 and MW-4 and the results indicated that the product in both wells contained compounds consistent with phthalates, and that the sample from RW-12 (near the western side of the Site, in proximity to the RW-8 and MW-5 wells) also contained compounds consistent with a high boiling-point paraffinic oil. This information is consistent with the locations of these wells relative to the former USTs (see Figures 11 and 4, attached). RW-12 is located in proximity to USTs where both phthalates and Hecla oil were stored and well MW-4 is located near the center of the Site (and near MW-21) in an area where USTs formerly containing phthalates are the closest USTs. Thus, the previous 'fingerprint' data are consistent with the viscosity data, all of which indicate that the product near the western portion of the Site and offsite downgradient of this area is consistent with a mixture of phthalates and Hecla oil, while the product in the more upgradient portion of the Site is consistent with phthalates and does not appear to have a petroleum component.

As noted above, laboratory testing was performed, in part, to obtain product viscosity data as a function of temperature for use in evaluating remedial alternatives for the product, particularly thermal treatment options. At present, we note that the testing data shows that product viscosity does decrease with increasing temperature, but that significant reductions in product viscosity are not achieved until higher temperatures (generally over 100 degrees F) are obtained. In all cases, the product viscosity remains significantly above that of water. These data will be evaluated more fully in the FS for this Site.

Very truly yours,

Stephanie O. Davis, CPG
Senior Project Manager
Vice President

Attachments

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