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January 10, 1994

Ms. Eileen Kramer
Wisconsin Department of Natural Resources
Industrial Parkway, Box 16
Marinette, Wisconsin 54143

Re: Ansul Fire Technology Center, Marinette, Wisconsin
LUST Case #38-01345

Dear Eileen:

Enclosed is a copy of the site investigation report for the above-referenced site. Please call if you have any questions.

Sincerely,

DAMES & MOORE, Inc.

Kristine M. Casper
Project Manager/Hydrogeologist

Enclosure

cc: Mr. George E. Rogers

SITE INVESTIGATION REPORT
ANSUL FIRE TECHNOLOGY CENTER
PIERCE AVENUE
MARINETTE, WISCONSIN

LUST# 38-01345

JANUARY 1994

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1.0 INTRODUCTION

Presented in this report are the results of a Site Investigation at the Ansul Fire Technology Center facility (AFTC) in Marinette, Wisconsin. The investigation was conducted to evaluate the vertical and lateral boundaries of impact to the environment resulting from one 560-gallon underground storage tank, formerly containing gasoline. During the tank removal in November, 1992, adverse environmental impact to the soils surrounding the tank was discovered. Ansul retained Dames & Moore to prepare a Leaking Underground Storage Tank Site Investigation Work Plan to address the Wisconsin Department of Natural Resources (WDNR) site investigation requirements. Following WDNR approval of the work plan, site investigation activities were initiated.

1.1 Site Location and Description

The AFTC property is located on Pierce Avenue, Marinette, Wisconsin, Marinette County, Wisconsin (Figure 1). The location occupies part of the north half of the northeast quarter of Section 13, Township 31 north, Range 27 west (N½, NE¼, Sec. 13, T31N, R27W), based on the USGS 7.5-minute series topographic map, Marinette West, Wisconsin-Michigan Quadrangle (1963; photorevised, 1976). The property is located within the Marinette Industrial park. The property surrounding the AFTC facility consists of undeveloped land owned by Ansul. The site area is shown in Figure 2.

The property is currently used by Ansul as a fire-fighter's training school, with operations consisting of classroom lectures and field exercises. The facilities noted on Figure 2 southwest and east of the former tank location are associated with field training activities.

1.2 Prior Investigation

In November 1992, the 560-gallon gasoline tank was removed by E&K Hazardous Waste Services of Sheboygan, Wisconsin. Upon removal of the tank, E&K personnel identified

gasoline fractions in the surrounding soil, indicating that a release from the tank system had occurred. E&K staff collected one confirmation soil sample from the north-central area of the excavation and submitted for laboratory analysis of total petroleum hydrocarbons - gasoline range organics (Wisconsin GRO method). Based on the laboratory data, detectible concentrations of petroleum fractions were identified in the sample collected during tank closure activities.

1.3 Purpose and Scope

The purpose of the site investigation was to evaluate the boundaries of impact to the soil, determine if ground water quality had been impacted, evaluate the potential for risk to the public health or the environment, and to evaluate corrective measures, if appropriate.

The scope of work included:

- Installation of four soil borings, three of which were converted into ground water monitoring wells and one of which was nested as a piezometer;
- Collection of soil samples for in-field screening and laboratory analysis;
- Collection and laboratory analysis of ground water samples from the three monitoring wells and piezometer;
- Elevation survey of the wells;
- Collection of ground water elevation data; and
- In-field testing of aquifer characteristics.

In-field soil analyses were conducted using a Micro Tip photoionization detector (PID) equipped with a 10.6 eV lamp. Laboratory analytical methods were selected based on the likelihood of the method to identify the suspected contaminants in the sample, as identified

in the WDNR Leaking Underground Storage Tank (LUST) Analytical Guidance (April 1992). Each soil sample selected for laboratory analysis was analyzed for total petroleum hydrocarbons - gasoline range organics (GRO; Wisconsin GRO method), petroleum volatile organic compounds (PVOCs; Wisconsin-modified SW846 method 8020), and total lead (SW846 method 7421 or 6010). Additionally, soil samples were analyzed for total organic carbon (TOC, SW846 method 160.4) and grain size (sieve method ASTM D-4749 and Bouyoucous method).

Ground water samples were analyzed for volatile organic compounds (VOCs; Wisconsin-modified SW846 method 8021), GRO (Wisconsin GRO method), and dissolved lead (SW846 method 7421 or 6010).

In response to particular field conditions, several deviations from the original work plan were necessary, as identified and discussed below:

- Changing the locations of the borings and wells.
- Soil sampling was conducted to depths of 9 to 11 feet, instead of to depths of at least 15 feet.
- Use of a 10.6 eV lamp in the PID instead of an 11.7 eV lamp.
- Omitting the preservative from one of the ground water samples collected for volatile compound analysis.
- Collecting and analyzing one field blank water sample for VOCs.

The proposed locations of the soil borings and monitoring wells had to be changed in response to the underground and aboveground hazards encountered at the investigation site. Ms. Eileen Kramer, the WDNR project manager for the site, approved the new locations during her site visit of May 19, 1993.

The proposed location of AFTC1 (through the middle of the tank excavation area) was within ten feet of aboveground flammable liquid storage tanks. As required by OSHA, a minimum distance of 20 feet was required for safe use of the drilling equipment. AFTC1 was located west of the former tank location, the location originally proposed for AFTC3. AFTC3 was located east of the former tank location, generally to replace the location proposed for AFTC4; however, the location was more east than southeast due to the density of underground utilities located southeast of the former tank location. AFTC2 was located northeast of the former tank location, as proposed. A deeper well was nested with AFTC2 (the shallow well was identified as AFTC2A and the deeper well was identified as AFTC2B) to evaluate the vertical extent of impact in this area. The AFTC2 location was selected for the nested wells based on in-field observations that this location contained the highest concentrations of petroleum impact of those locations investigated. The boring/well locations are shown in Figure 2.

Soil sampling was originally proposed to terminate at a depth no less than 15 feet. However, heaving sand conditions encountered at the site precluded competent sampling much below four to six feet into the saturated zone, corresponding to a depth of 9 to 11 feet below ground surface. Ms. Kramer was also advised of this condition on May 19, 1993.

The 10.6 eV lamp was used instead of the 11.7 eV lamp because of the moisture content of the soil samples screened. Because the 11.7 eV lamp has a very low moisture threshold, the 10.6 eV lamp was used to provide more consistent and reliable results.

The ground water sample collected from AFTC3 reacted with the hydrochloric acid recommended to preserve ground water samples for analysis of VOCs and GRO. The reaction created head-space in the sample that could not be eliminated. Therefore, a variance from the field procedure was granted by Ms. Kramer. Expedited turn-around was secured from the laboratory for that sample to ensure the highest analytical quality possible in the absence of sample preservation.

One field blank water sample was collected and analyzed for VOCs. The sample was collected because ambient gasoline odors, emanating from the aboveground gasoline tanks,

were noticeably present during the investigative activities. The concern was that the gasoline vapors in the ambient air may contaminate the water samples collected from the wells during sample collection procedures. The field blank consisted of a known clean source of water (Marinette municipal water system) and was containerized in the investigative area to most effectively identify the potential for water samples to be contaminated by the vapors during sample collection.

2.0 REGIONAL AND LOCAL SETTING

2.1 Topography

The regional topography of the Lake Michigan Basin consists of rolling hills of moderate relief. Elevations range from 585 feet above mean sea level (MSL) at the Menominee River and Green Bay to elevations of approximately 630 feet MSL within Menominee County. Elevations of 650 feet MSL are found atop local glacial features (drumlins) within the Menominee County area (USGS 15-minute series topographic map, Marinette Michigan-Wisconsin, 1963). The higher ground elevations are associated with east-west or southeast-northwest trending ridges, consisting largely of sand and gravel deposits. One such ridge is located approximately 2,000 feet southwest of the AFTC facility. Approximate surface elevation at the former tank site is 610 feet MSL.

2.2 Geology

According to the Soil Conservation Service, soils near the surface of the property are classified as Udorthents. Udorthents are generally deep, loamy soils consisting primarily of fill materials placed in drainageways, depressions, and areas along the margins of lakes and reservoirs. The soils are poorly suited to cultivated crops, pasture, woodland and most engineering uses (USDA, 1991). The fill material associated with the Udorthents are naturally-occurring sands and gravels associated with the river. Soil excavated during removal of the tank consisted almost exclusively of sand.

Bedrock is encountered at depths of approximately 40 feet below the current ground surface (Dames & Moore, 1976; STS, 1981). The bedrock consists of the Ordovician Sinnipee Group dolomite with limestone and shale (Greenberg, 1980; Mudrey, 1982). The Sinnipee Group includes the Galena, Decorah and Plattville formations.

2.3 Surface Water and Ground Water Hydrology

The nearest surface-water body to the site is an intermittent stream that originates at the northeast corner of the AFTC property. The stream flows generally southward with an east-flowing segment approximately 2,000 feet south of the AFTC property, into the Little River. The Little River flows eastward into Green Bay. The local ground water flow direction is east-southeast, toward Green Bay.

Ground water is not used for municipal, residential, commercial, or industrial purposes in the vicinity of the AFTC property, according to Ansul representatives. Water and sewer services are provided by the City of Marinette; however, some of the buildings on the AFTC property use septic systems.

2.4 Climate

The Marinette area is characterized by a temperate continental climate with marked seasonality (NOAA, 1989), although the close proximity of Green Bay and the Great Lakes system tends to moderate temperature extremes. The greatest precipitation occurs as rainfall during the spring months, while thunderstorms occur most frequently during the summer months of June, July and August. The average precipitation is approximately 1.5 inches during the winter months and 3.5 inches during the summer months. The average winter and summer temperatures in the area are in the teens to 30s (degrees Fahrenheit) and in the 50s to 80s, respectively.

3.0 SOIL AND GROUND WATER QUALITY INVESTIGATION

During May 19, 1993 and May 20, 1993, Twin City Testing Corp., Inc. Appleton, Wisconsin, under the direction of Dames & Moore personnel, installed four soil borings at the AFTC facility. Three of the soil borings were converted into ground water monitoring wells. The fourth soil boring was converted into a piezometer, nested with monitoring well AFTC2A, and identified as AFTC2B.

3.1 Soil Boring/Monitoring Well Locations

The investigation focused on the area surrounding the former tank area (Figure 2). Boring/well locations, as shown on Figure 2 were modified from the locations proposed in the Site Investigation Work Plan, based on aboveground and underground hazards identified on the site during the site visit of May 19, 1993. The modifications to the planned locations were approved by Ms. Eileen Kramer, WDNR, during her May 19, 1993 site visit. The rationale for soil boring and monitoring well locations are as follows:

- AFTC1 — AFTC1 is located in the center of the asphalt access road to the immediate west of the former tank excavation. This boring was used to investigate the western horizontal boundary of impact.

- AFTC2A — AFTC2A was located near the northeast corner of the former tank location, outside of the excavated area. This boring was used to evaluate the northeastern horizontal boundary of impact.

- AFTC2B — AFTC2B was nested with AFTC2A to evaluate the vertical boundary of impact to the ground water in the location identified by in-field observations as likely to have the greatest vertical extent of impact (of those areas that could be safely investigated).

- AFTC-3 — AFTC-3 was located east of the former tank location, outside of the excavated area. This boring was used to investigate the eastern horizontal boundary of impact.

3.2 Field Methodology

The following is a summary of the field methodologies used during soil boring and ground water monitoring well installation, sample collection, and other aspects of the field investigation. Details of the methodologies are presented in Appendix A.

Soil boring installation and soil sampling was conducted, in general, using standard ASTM methodologies and undisturbed soil sample-collection techniques. Soil boring logs (Form 4400-122) are presented as Appendix B.

Soil samples intended for laboratory analysis were collected in appropriate laboratory-supplied jars. Co-located samples were collected in resealable plastic bags for in-field screening with a photoionization detector (PID). PID screening results are provided on the soil boring logs (Appendix B).

All ground water monitoring well installation, development and sampling was conducted in accordance with Wisconsin Administrative Code NR 141, when possible (adjustments from the code were made to accomodate the shallow ground water at the site). Details of the monitoring well construction and development are presented on the Monitoring Well Construction and Development forms (Form 4400-113A/B) in Appendix C. Ground water samples were collected in appropriate laboratory-supplied jars, using standard methodologies (except as noted in Section 1.3 for AFTC3).

Soil and ground water samples were transported to Anatech Analytical Laboratories, Ludington, Michigan, via overnight courier. Appropriate chain-of-custody documents are presented in Appendices D and E.

The well locations were surveyed by Dames & Moore personnel, with reference to the elevations established in the USGS 7.5-minute series topographic map, Marinette West, Wisconsin-Michigan Quadrangle (1963; photorevised, 1976). A summary of the elevation survey data is presented in Table 2.

3.3 Soil Types Encountered

Soil types encountered during the Site Investigation consisted primarily of brown and yellowish brown fine and medium sands. The top one to three feet of soil encountered was generally darker and contained silt, trace clay and organic fractions.

3.4 Laboratory Analysis

Soil and ground water samples were transported on ice to Anatech Analytical Laboratory for chemical analyses. The analytical list was based on the requirements identified in the WDNR LUST Analytical Guidance (April 1992).

3.4.1 Soil Samples

Five soil samples were collected and submitted for laboratory analysis from soil borings AFTC1, AFTC2A and AFTC3. The samples were analyzed for GRO (Wisconsin GRO method), PVOCs (Wisconsin-modified SW846 method 8020), and total lead (SW846 method 7421 or 6010). Additionally, soil samples were analyzed for total organic carbon (TOC, SW846 method 160.4) and grain size (sieve method ASTM D-4749 and Bouyoucous method). The samples selected for analyses were selected to represent the interval most likely to be impacted by gasoline fractions, based on in-field analysis and observations. Additionally, in borings AFTC2A and AFTC3, the samples from the greatest depth that could be effectively sampled (AFTC2-4 and AFTC3-4, respectively) were submitted for analysis to define the character of the soil with depth. Sample AFTC3-4 also had the highest PID reading for that boring. Sample AFTC1-1 was selected for analysis to identify the presence or absence of petroleum fractions in the soil with the highest organic content (highest adsorptive capacity).

The results of the laboratory analyses are discussed in Section 5.0 below. The laboratory analytical results are summarized in Table 1. The laboratory reports and chain-of-custody documentation are presented in Appendix D.

3.4.2 Ground Water Samples

Ground water samples were collected and laboratory analyzed from all three ground water monitoring wells and the piezometer. The samples were analyzed for GRO (Wisconsin GRO method), VOCs (Wisconsin-modified SW846 method 8021) and dissolved lead (SW846 method 7421 or 6010), as recommended in the WDNR LUST Analytical Guidance (April 1992). The results of the laboratory analyses are discussed in Section 5.0 below. The laboratory analytical results are summarized in Table 3. Analytical reports and chain-of-custody documentation are presented in Appendix E.

Ground water samples were also analyzed in the field for pH, conductivity, dissolved oxygen, salinity and temperature. The data are presented in Table 3.

4.0 SITE HYDROGEOLOGY

Hydrogeologic data were collected to characterize the shallow aquifer at the AFTC property in terms of:

- Ground water flow direction;
- Vertical and horizontal hydraulic gradients;
- Hydraulic conductivity of the aquifer.

The purpose of the characterization was to evaluate potential contaminant migration directions and the location of potential ground water receptors.

4.1 Local Aquifer Characteristics

As discussed in Sections 2.2 and 2.3 above, the shallow aquifer materials in the vicinity of the AFTC property consist of deep, loamy soils consisting primarily of fill materials placed in drainageways, depressions, and areas along the margins of lakes and reservoirs. The local bedrock is encountered at depths of approximately 40 feet below the ground surface; somewhat deeper than the investigation wells. The local ground water flow direction is east-southeast, toward Green Bay.

Local ground water is not used for municipal, residential, commercial, or industrial purposes in the vicinity of the AFTC property. Water and sewer services are provided by the City of Menominee.

4.2 Ground Water Flow Direction and Gradients

An elevation survey of the monitoring wells was conducted on May 21, 1993. The results of the survey are presented in Table 2. Post-development ground water elevations were measured from all monitoring wells and the piezometer at the site on May 21, 1993 and

August 12, 1993. The data were analyzed to estimate ground water flow direction and gradients using two statistical methods: kriging and least squares, and were cross-checked by hand plotting.

Based on the ground water level data gathered from the monitoring wells, a potentiometric surface map of the site was constructed (Figure 3). The horizontal ground water gradient at the site is estimated to be approximately 0.005 flowing east-southeast toward Green Bay. The vertical gradient expressed at the AFTC2A/B well nest is downward, varying from 0.0015 (May 21, 1993 data) to 0.007 (August 12, 1993 data).

4.3 Hydraulic Conductivity and Ground-Water Velocity

Slug tests were conducted on each monitoring well to estimate the hydraulic conductivity of the shallow ground water system at the site. The data from AFTC1, AFTC2A and AFTC3 were analyzed as described by Bouwer and Rice (1976). Water-level recovery in AFTC2B was nearly instantaneous and could not be accurately measured for analysis. The geometric mean hydraulic conductivity (K) in the shallow system estimated from monitoring wells AFTC1, AFTC2A and AFTC3 is 9×10^{-3} cm/sec.

The average ground water linear velocity is estimated using the following equation:

$$V = \frac{K I}{n_e}$$

Where:

	V	=	Average linear ground water velocity.
	K	=	Geometric mean hydraulic conductivity.
	I	=	Ground water gradient.
	n_e	=	Effective porosity of the aquifer material.

The ground water gradient was estimated to be 0.005, as discussed in Section 4.2. The effective porosity of the aquifer material was estimated to be 0.33 (McWhorter and Sunada,

1988). Given the above estimated variables, the average linear ground water velocity is estimated to be:

$$V = \frac{(9 \times 10^{-3} \text{ cm/sec})(0.005)}{0.33} = 1.4 \times 10^{-4} \text{ cm/sec}$$

It should be noted, however, that this is the average linear ground water velocity. The velocity of petroleum fractions in the ground water may be slower than that of the ground water due to retardation of the compounds by the soil materials, as discussed below.

4.4 Contaminant Transport

Contaminants in ground water often react with the constituents of soil, thereby affecting the rate of contaminant transport. These reactions may include adsorption/desorption, cation exchange, precipitation, and oxidation/reduction. For many organic compounds, migration in the ground water system is significantly retarded, due to adsorption/desorption processes between the compound and the soil media (known as the retardation factor, R_f). At the AFTC site, the rate of contaminant transport is conservatively estimated to be $^1/_7$ of the average linear ground water velocity, as discussed below.

The rate of contaminant transport can be estimated as the inverse of the retardation factor multiplied by the average linear ground water velocity (Freeze and Cherry, 1979).

$$\text{Transport Rate} = \frac{V}{R_f} \quad (1)$$

Where: V = Average linear ground water velocity.
R_f = Retardation factor.

Retardation factors for many organic compounds are estimated based on the distribution coefficients (K_d), as follows:

$$R_f = 1 + (D_b/n_e) \times K_d \quad (2)$$

Where: D_b = Bulk density of aquifer material.
n_e = Effective porosity of the aquifer material.
K_d = Distribution coefficient.

The distribution coefficients (K_d) of many common organic ground water contaminants may be estimated by multiplying the percent organic matter (TOC) in the soils by the soil-water partition coefficient (K_{oc}).

$$K_d = TOC \times K_{oc} \quad (3)$$

Where: TOC = Total organic carbon content of the aquifer material.
K_{oc} = Soil-water partition coefficient.

L_{oc} is defined as the ration of the amount of chemical adsorbed per unit weight of organic carbon (oc) in the soil or sediment to the concentration of chemical in solution at equilibrium (Lyman, *et.al.*, 1982). Values of K_{oc} are derived from laboratory studies and are available for many compounds. The compounds identified in the soil associated with the gasoline tank are of the "high," "moderate" and "low" mobility classes (Fetter, 1988). K_{oc} values for the most common volatile organic compounds found in the ground water at the site range from 97 (benzene; "high" mobility class) to 622 (ethylbenzene; "low" mobility class). The average total organic carbon (TOC) content in the soils within the impacted zone at the site is 1.5% (averaging the TOC results from the two impacted levels in AFTC2 and the two saturated levels from AFTC3). Therefore, the distribution coefficients (K_d) range from 1.4 (benzene) to 9.3 (ethylbenzene), as calculated below.

From equation ❸:

$K_{d(benzene)} = 1.5\% \times 97 = 1.4$

$K_{d(ethylbenzene)} = 1.5\% \times 622 = 9.3$

The bulk density of the aquifer material at the site was estimated to be 1.3 (Foth, 1984). Using these estimated variables, the retardation factors of the contaminants found in the ground water range from approximately 7 (benzene) to 38 (ethylbenzene), meaning that the rate of contaminant transport rates for benzene and ethylbenzene would be $^1/_7$ to $^1/_{38}$ of the average linear ground water velocity, respectively.

From equation ❷:

$R_{f(benzene)} = 1 + (1.3 / 0.33) \times 1.4 = 6.5 \simeq 7$

$R_{f(ethylbenzene)} = 1 + (1.3 / 0.33) \times 9.3 = 37.6 \simeq 38$

As a conservative approach, the retardation factor of $^1/_7$ was selected to estimate the maximum rate of contaminant transport at the site.

From equation ❶:

$$\text{Transport rate} = \frac{1.4 \times 10^{-4} \text{ cm/sec}}{7} = 2.0 \times 10^{-5} \text{ cm/sec}$$

The estimated rate of contaminant transport at the site is 2×10^{-5} cm/sec, or approximately 21 feet per year. The actual rates of transport would be somewhat higher in the area immediately adjacent to the tank and substantially lower as the contaminants moved down-gradient, toward AFTC3, as the TOC content of the soil increases dramatically in the area of AFTC (Table 1).

5.0 NATURE AND EXTENT OF IMPACTED AREA

5.1 Soil Quality

Based on the laboratory analytical results, soil impacted by volatile gasoline fractions is limited to the immediate area surrounding the former tank location, as demonstrated at AFTC1 (35 feet west) and AFTC3 (65 feet east). The soil in the area of AFTC2A (15 feet northeast of the former tank location) contains gasoline fractions in the shallow soils (three to five feet below ground surface), decreasing substantially at a depth seven to nine feet below ground surface (soil sampling below this depth could not be accomplished due to heaving conditions). The soil conditions southeast of the former tank location could not be investigated due to the presence of aboveground flammable liquid storage. However, given the ground water flow direction at the site (east-southeast), the shape of a typical contaminant plume and the lateral extent of impact in the up-gradient direction from the former tank location, impacted soils are expected to be limited to less than 50 feet from the former tank location. Lead was not detected in any of the soil samples at concentrations exceeding expected background concentrations.

5.2 Ground Water Quality

Ground water samples collected from all of the project monitoring wells and the piezometer were found to contain detectable concentrations of volatile organic compounds. However, because gasoline vapors were detected within the investigation area (possibly emanating from fire-school activities) a field blank was collected using water supplied by the Marinette municipal water system (known clean source). The field blank was collected within the investigation area to most effectively identify the potential for water samples to be contaminated by the vapors during sample collection.

As shown in Table 3, the field blank was contaminated with all of the volatile organic compounds found in the other samples. The concentrations detected in the field blank suggest that the compounds detected in samples AFTC1 and AFTC2B may be the result of air-borne contamination and not representative of ground water contamination at those

locations. The lack of contamination in the trip blank suggests that the contamination found in the field blank (and probably in samples AFTC1 and AFTC2B) were not derived at the laboratory or during shipping.

This considered, the ground water in areas of AFTC2A/B (shallow ground water only) and AFTC3 appear to be impacted with gasoline fractions. The substantial decrease in concentrations identified in AFTC3 from those identified in AFTC2A suggest that the leading edge of the ground water contaminant plume may be within 50 to 100 feet of AFTC3.

Dissolved lead concentrations were below the practical quantitation limits, with the exception of sample AFTC2A, which contained 0.06 mg/l dissolved lead.

At the request of the WDNR, dissolved solids analysis was also performed on a sample from AFTC3 in an attempt to determine the reason that the water from that location reacted with the hydrochloric acid preservative. Dissolved solids were detected at a concentration of 4,770 mg/l. However, comparative data from the other monitoring wells located at the property will have to be gathered to make an accurate assessment of the importance of the data. pH and conductivity values for AFTC3 were only slightly higher than in AFTC1 and AFTC2A.

Two of the three dry chemical fire suppressant agents used in fire training exercises at the Pierce Avenue property consist substantially of sodium bicarbonate or potassium bicarbonate. All three of the agents used at the school are non-toxic and non-hazardous (Appendix F). Because of the carbonate bedrock in the area, small additional concentrations of bicarbonate may have caused the sample from AFTC3 to react with the acid.

6.0 SUMMARY AND CONCLUSIONS

At the request of Ansul Fire Protection, Dames & Moore personnel conducted a Site Investigation at the Ansul Fire Technology Center facility in Marinette, Wisconsin. The purpose of the investigation was to evaluate the lateral and vertical boundaries of impact resulting from operation of a former gasoline fuel tank. Petroleum impact to the soils adjacent to the tank were identified during tank closure activities conducted by E&K Hazardous Waste Services, Sheboygan, Wisconsin, in November, 1992.

The investigation consisted of the installation of four soil borings, three of which were converted into ground water monitoring wells and one converted into a piezometer nested with one of the project monitoring wells; laboratory and field analysis of soil and ground-water samples; and aquifer-response testing to estimate aquifer characteristics. Soil samples were field screened using a photoionization detector and laboratory analyzed for GRO, PVOCs and total lead, as recommended in WDNR LUST Analytical Guidance (April, 1992). Additional soil samples were analyzed for total organic carbon and grain size.

Ground water samples were field analyzed for pH, conductivity, dissolved oxygen, percent salinity and temperature. Ground water samples were laboratory analyzed for GRO, VOCs and dissolved lead.

Soil types encountered at the site consisted primarily of brown and yellowish brown fine and medium sands. The top one to three feet of soil encountered was generally darker and contained silt, trace clay and organic fractions.

Ground water was encountered at depths of approximately five feet below the ground surface. The horizontal ground water gradient at the site is estimated to be approximately 0.005 flowing east-southeast toward Green Bay. The vertical gradient expressed at the AFTC2A/B well nest is downward, varying from 0.0015 (May 21, 1993 data) to 0.007 (August 12, 1993 data). Based on slug tests conducted on the wells, the geometric mean hydraulic conductivity (K) in the shallow system estimated from monitoring wells AFTC1, AFTC2A and AFTC3 is 9×10^{-3} cm/sec. Water-level recovery in AFTC2B was nearly

instantaneous and, therefore, could not be accurately measured for analysis. The contaminant transportation rates for the identified gasoline fractions in the ground water and the aquifer material are estimated to range from $^1/_7$ to $^1/_{37}$ of the average linear ground water velocity for benzene and ethylbenzene, respectively. The resulting contaminant velocities are conservatively estimated to be less than 21 feet per year.

Based on the laboratory analytical results, soil impacted by volatile gasoline fractions is limited to the immediate area surrounding the former tank location, as demonstrated at AFTC1 (35 feet west) and AFTC3 (65 feet east). The soil in the area of AFTC2A (15 feet northeast of the former tank location) contains gasoline fractions in the shallow soils (three to five feet below ground surface), decreasing substantially at a depth seven to nine feet below ground surface.

The ground water in areas of AFTC2A/B (shallow ground water only) and AFTC3 appear to be impacted with gasoline fractions. The substantial decrease in concentrations identified in AFTC3 from those identified in AFTC2A suggest that the leading edge of the ground water contaminant plume may be within 50 to 100 feet of AFTC3. The detection of volatile compounds in the samples from AFTC1 and AFTC2B are suspect, due to the fact that similar or greater concentrations of the same compounds were detected in the field blank collected at the site.

7.0 RECOMMENDATIONS

Ground water analytical results, indicating the presence of gasoline fractions in monitoring wells AFTC1 and AFTC2B, are suspect due to the presence of similar concentrations of those compounds detected in the field blank. Without determining the actual concentrations of gasoline compounds in the ground water in these wells, the lateral extent of impact west of the former tank location and the vertical extent of impact near the suspected source area cannot be determined.

Dames & Moore recommends that the wells be resampled during the cooler months of early winter, when vapor pressures are reduced and the potential for airborne contamination of the samples is minimized. Analysis should consist of VOCs and dissolved lead, as GRO analyses were previously found to be largely inconclusive. During that round of sampling, all wells should also be analyzed for total dissolved solids to provide comparative data regarding the dissolved solids concentrations previously identified in AFTC3.

Following sampling and laboratory analysis, the data could be analyzed to determine the need for additional investigative or other actions at the site.

8.0 LIMITATIONS

Dames & Moore certifies to the best of its knowledge and belief that the information contained herein is accurate and complete. The site investigation was conducted in accordance with accepted practices for the environmental consulting profession. Information provided by others was accepted as true and complete and the on-site inspection process was limited to only those activities that were immediately visible and obvious.

Due to the limitations of the inspections and investigative process and the necessary use of unverified data furnished by others, users of this report relying on information contained herein are cautioned that Dames & Moore cannot assume liability if the actual conditions vary from the information contained in this report. The information, conclusions and recommendations provided in this report apply only to the Ansul Fire Technology Center property, Marinette, Wisconsin, as it existed at the time of the investigation. If site uses, conditions, regulations or laws change, conclusions and recommendations may no longer apply.

Respectfully submitted,

DAMES & MOORE, Inc.

Kristine M. Casper
Project Manager/Hydrogeologist

James R. Boddy, P.E.
Managing Principal

9.0 REFERENCES CITED

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TABLE 1

LABORATORY ANALYTICAL RESULTS - SOIL

ANSUL FIRE TECHNOLOGY CENTER

MARINETTE, WISCONSIN

PARAMETER	AFTC1-1	AFTC2-2	AFTC2-4	AFTC3-1	AFTC3-4	TRIP BLANK
GRO (mg/kg)	ND	922	ND	ND	ND	ND
PVOCs (µg/kg)						
Benzene	ND	650	1400	ND	ND	ND
Toluene	ND	2,300	1200	ND	ND	ND
Ethylbenzene	ND	5,000	110	ND	ND	ND
Xylenes (total)	ND	11,800	580	ND	ND	ND
1,3,5-Trimethylbenzene	ND	1,500	370	ND	ND	ND
1,2,4-Trimethylbenzene	ND	3,000	330	ND	ND	ND
Total Lead (mg/kg)	2.0	6	1.1	0.8	1.0	NA
TOC (mg/kg)	19,000	5900	3200	5,000	47,000	NA
% Solids	82.0	75.2	76.6	87.4	82.3	NA
	1-3' bgs	3-5' bgs	7-9' bgs	1-3' bgs	7-9' bgs	

ND: Not detected above practical quantitation limit.

NA: Not analyzed.

"AFTC2" samples are from soil boring AFTC2A.

TABLE 2

ELEVATION SURVEY DATA

ANSUL FIRE TECHNOLOGY CENTER

MARINETTE, WISCONSIN

PARAMETER	AFTC1	AFTC2A	AFTC2B	AFTC3
Ground Elevation (feet MSL)	614.79	614.69	614.69	613.56
Well Elevation (feet MSL)	614.29	614.31	614.19	613.06
Water Elevation (feet MSL; 5/21/93)	610.47	610.40	610.37	610.33
Water Elevation (feet MSL; 8/12/93)	610.07	610.01	609.87	609.94
Screened Interval (feet below ground surface)	5-15	5-15	5-15	32-27
Well Depth (feet below ground surface)	15	15	15	32

TABLE 3

LABORATORY ANALYTICAL AND FIELD SCREENING RESULTS - GROUND WATER

ANSUL FIRE TECHNOLOGY CENTER

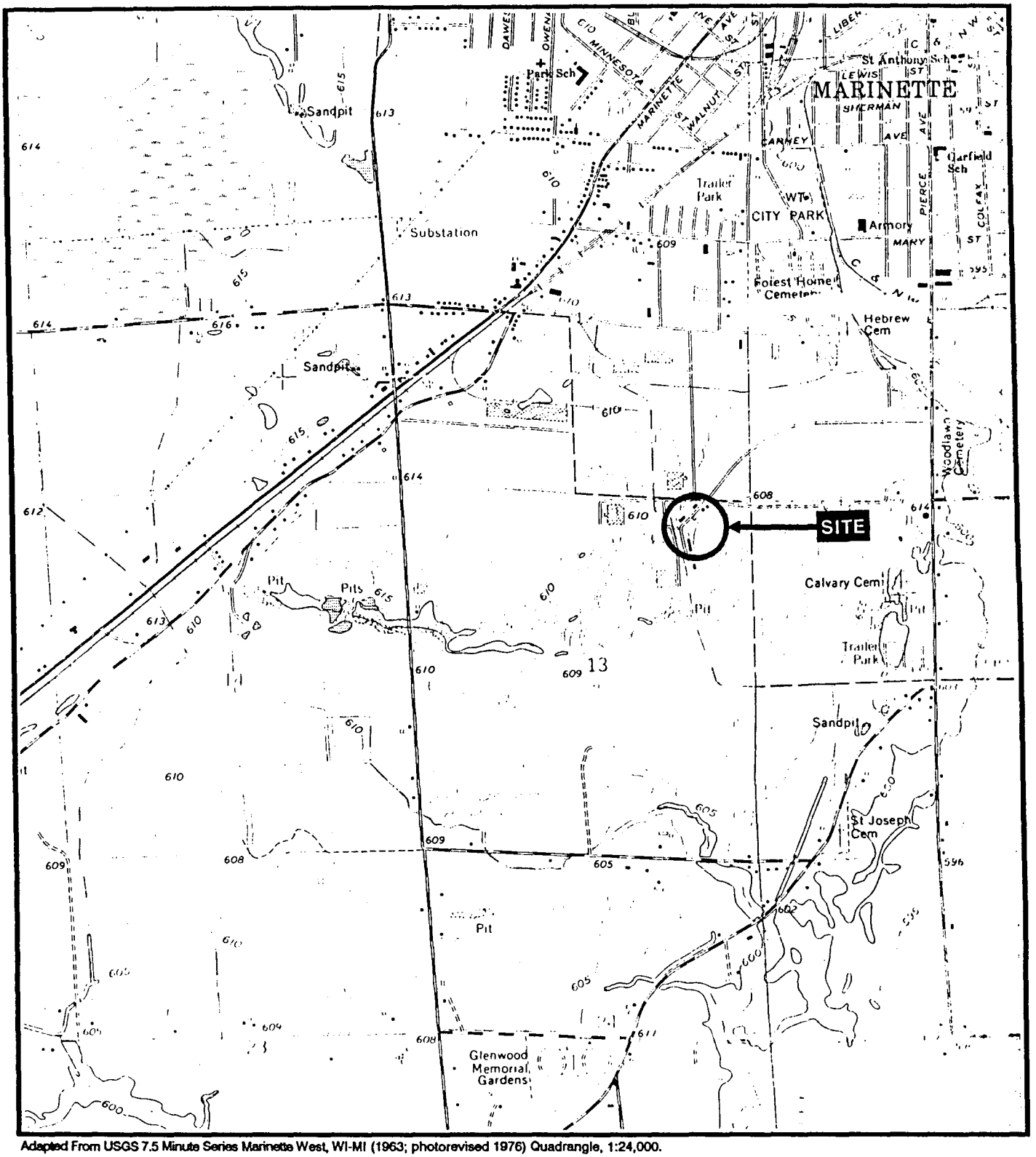
MARINETTE, WISCONSIN

Sample not present

PARAMETER	AFTC1	AFTC2A	AFTC2B	AFTC3	TRIP BLANK	FIELD BLANK
GRO (mg/l)	1.90	5.2	1.2	0.8	ND	NA
VOCs (µg/l)						
Benzene	100	11,800	22	1,200	ND	120
Toluene	140	11,000	71	1,700	ND	520
Ethylbenzene	13	1,500	32	630	ND	65
p-, m-Xylenes	41	3,300	62	2,000	ND	160
o-Xylene	17	1,500	31	890	ND	89
1,3,5-Trimethylbenzene	6	1,300	21	200	ND	40
1,2,4-Trimethylbenzene	11	1,100	45	380	ND	34
Dissolved Lead (mg/l)	ND	0.06	ND	ND	NA	NA
Dissolved Solids (mg/l)	NA	NA	NA	4,770	NA	NA
pH	5.59	6.78	7.02	8.27	NA	NA
Conductivity (mS/cm)	1.8	1.96	0.68	11.4	NA	NA
Dissolved Oxygen (mg/l)	13.03	13.49	15.49	13.16	NA	NA
Salinity (%)	0.08	0.09	0.02	0.65	NA	NA
Temperature (°C)	18.7	14.0	12.3	17.0	NA	NA

ND: Not detected above practical quantitation limit.

NA: Not analyzed.



Adapted From USGS 7.5 Minute Series Marinette West, WI-MI (1963; photorevised 1976) Quadrangle, 1:24,000.

North

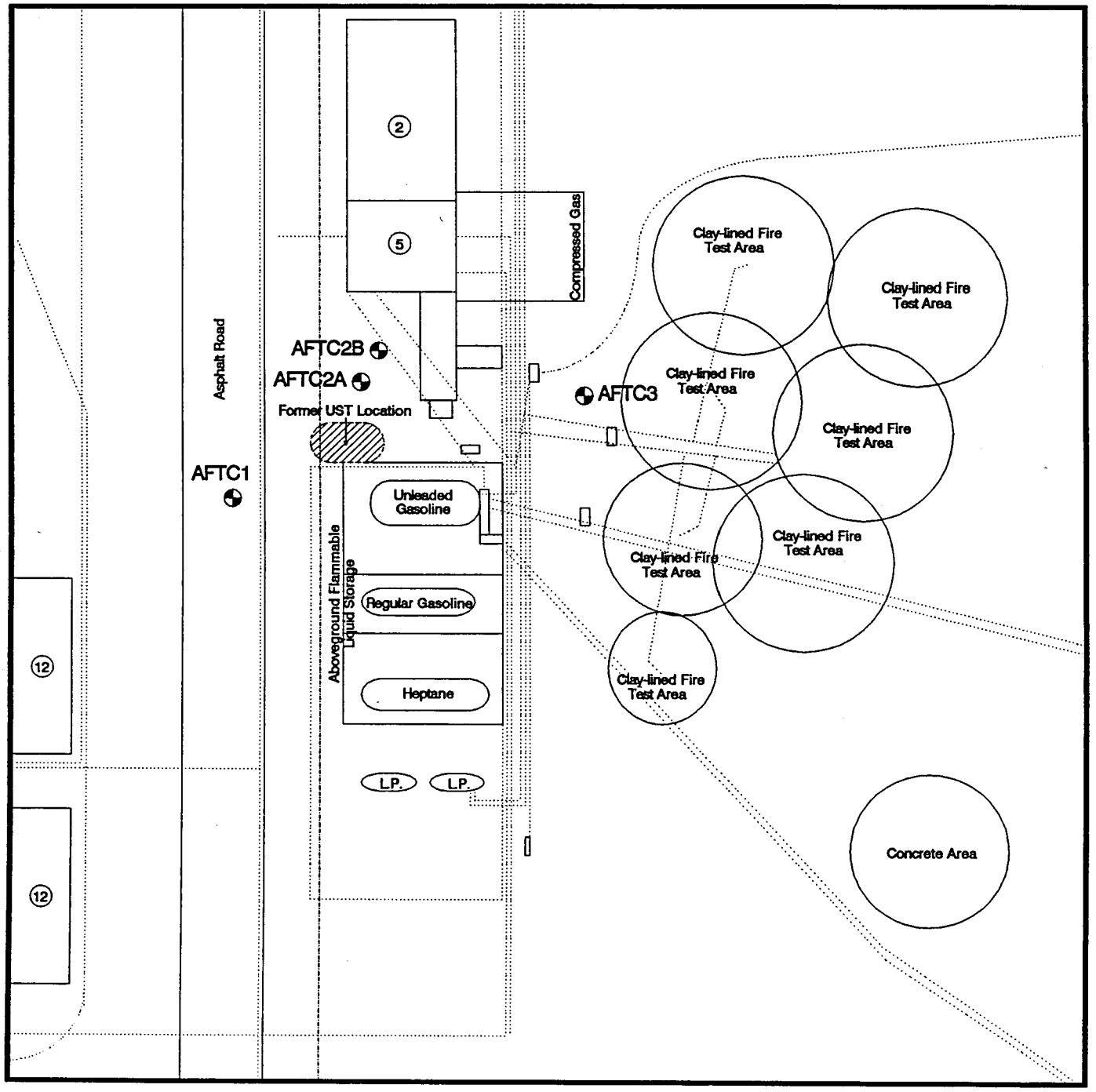
Scale: 2.5" = MILE

0 0.5 1 MILE

Dames & Moore

Figure 1
Site Location Map

Ansul Fire Technology Center
Marinette, Wisconsin



Adapted From The Ansul Company Pierce Avenue drawing number L-100125-1 (1962, revised), 1:480.

Explanation

- (5) Building or facility number
- Soil boring/monitoring well or piezometer location
- Overhead utilities
- Underground utilities

North

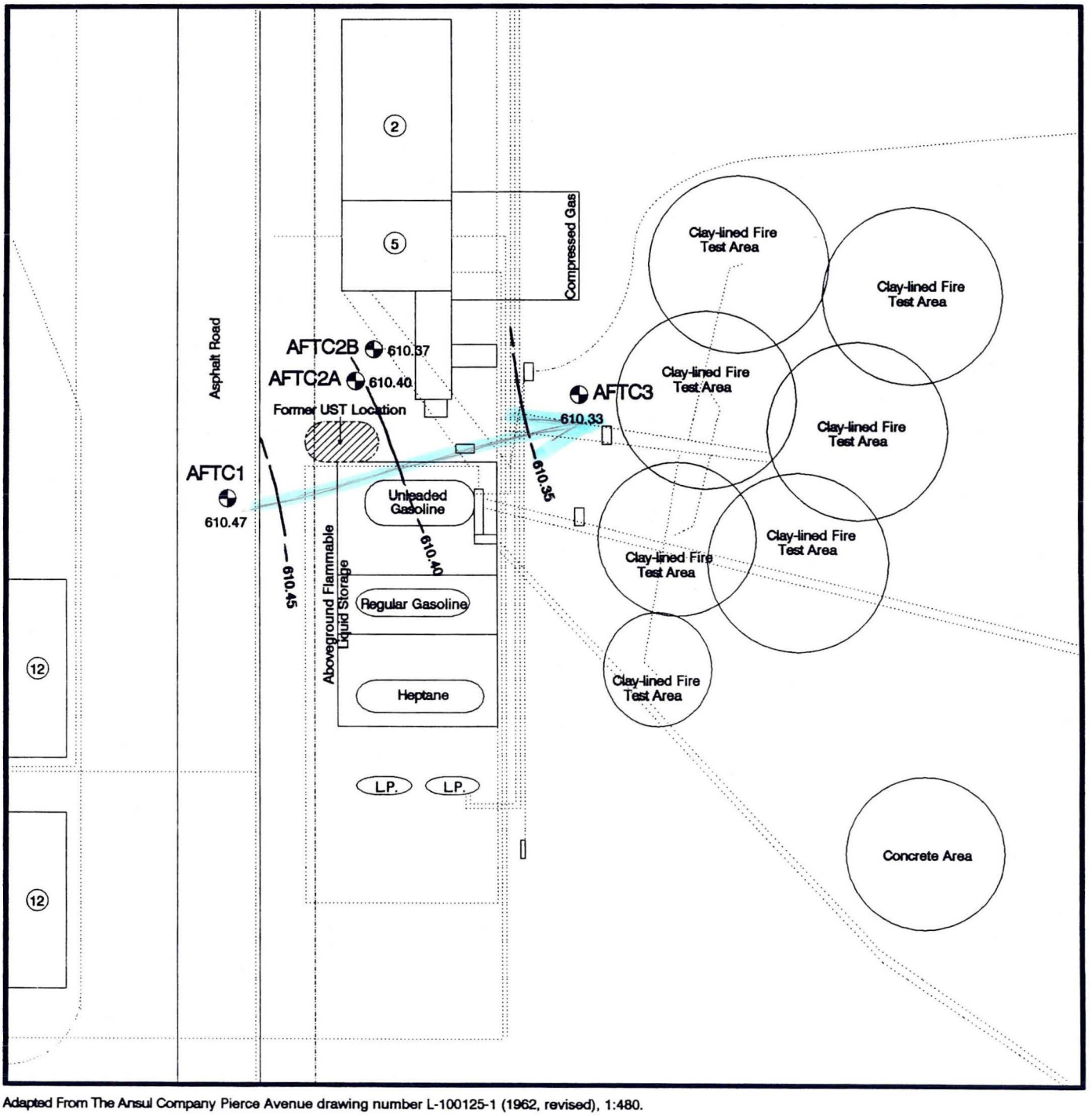
Approximate Scale

0 40 80 Feet

Figure 2
Site Plan
Sample Location Map

Ansul Fire Technology Center
Marinette, Wisconsin

Dames & Moore



Adapted From The Ansul Company Pierce Avenue drawing number L-100125-1 (1962, revised), 1:480.

Explanation

- (5) Building or facility number
- Soil boring/monitoring well or piezometer location with ground water elevation (5/21/93; ft MSL)
- Overhead utilities
- Underground utilities
- Ground water elevation contours

North

Approximate Scale

0 40 80 Feet

Figure 3
Potentiametric Surface Map

Ansul Fire Technology Center
Marinette, Wisconsin

Dames & Moore

FIELD METHODOLOGIES

Soil Boring Installation and Soil Sample Collection

The boreholes were drilled using 4¼-inch hollow stem augers, in accordance with ASTM method D-1586, section 5.1.3. Standard undisturbed-soil sample collection procedures were used in conjunction with the installation of soil borings. A steel split-barrel sampling tube was used for the collection and retrieval of the soil samples in accordance with ASTM method D-1586. Upon retrieval of the sampler, visual and olfactory observation of the recovered materials were made in accordance with ASTM method D-2487 and with reference to method D-2488.

Samples were described in the field with respect to the soil type (Unified Soil Classification System), grain size distribution, color (Munsell color charts), odor, moisture content, consistency and photoionizable constituent content, as appropriate. The observations were recorded in a bound field notebook and later transferred to soil boring logs (Appendix B). Between each sampling episode, the split barreled sampler was washed in a TSP® solution and double rinsed in clean tap water. All down-hole equipment was steam cleaned between borings.

Recovered soil samples were containerized for eventual laboratory analysis ("primary" samples) or in-field analysis ("co-located" samples). Primary samples intended for laboratory analysis of PVOCs and TOC were collected in laboratory-supplied 120 ml glass jars with teflon-lined lids. The jars were tightly packed to minimize headspace and were securely sealed. Samples intended for GRO analysis were collected in 60 ml wide-mouth glass jars with teflon septa. Approximately 25 grams of soil was placed in each jar and preserved in the field with a premeasured, laboratory-provided vial of purge-and-trap grade methanol. The threads of the jar were wiped clean and the jar securely sealed. Samples intended for analysis of total lead and percent solids (for use in the GRO quantitation) were collected in 120 ml glass jars with teflon-lined lids. The jars were filled, but not tightly packed, and securely sealed.

Co-located samples were collected from each sampling interval for in-field screening with a photoionization detector (PID). The PID was calibrated in the field, according to manufacturer's instructions, using 100-ppm isobutylene span gas, and checked between each screening event for proper response. The peak instrument readings were recorded on the soil boring logs. PID readings from the co-located samples were assumed to be similar to the primary samples. As such, the primary samples were not screened. This procedure

reduces the escape of volatile components from the sample submitted for laboratory analysis. The co-located samples were loosely placed in resealable plastic bags to provide sufficient headspace to optimize PID analysis. The samples were allowed to warm, out of direct sunlight, to approximately 70° F. and screened in the field using a MicroTip PID.

Monitoring Well Installation, Development and Ground Water Sample Collection

The monitoring wells and piezometer were installed, developed and sampled in general accordance with NR 141. Details of the well construction and development are presented on the Monitoring Well Construction and Development forms in Appendix C. The wells installed during the site investigation were alternately surged and purged prior to sampling, as identified on the Well Development forms.

Ground water samples were collected using well-dedicated, clear PVC bailers that had been previously washed in a TSP® solution and triple rinsed with distilled water. Samples to be analyzed for PVOCs and GRO were collected in laboratory-supplied 40-ml vials with teflon septa. Sample vials were filled until a positive meniscus was formed, preserved with HCl (except for AFTC3, as identified in Section 1.3 above) and securely capped.

After the sample jars were filled and closed, identification labeling was completed with respect to sampling location, identifier and, for soil samples, depth of sample. The samples were placed in insulated containers and chilled with ice to protect them from sunlight and temperature extremes. The samples were then transported to Anatech Analytical Laboratories, Ludington, Michigan, via over-night courier. All sampling locations were documented in a bound field notebook used to record all daily activities performed at the site.

Soil and Ground Water Sample Custody

Sample custody procedures are designed to comply with U.S. EPA and National Enforcement Investigation Council (NEIC) requirements for sample control. Samples collected during the site investigation were the responsibility of identified persons from the time they were collected until they or their derived data were incorporated into the final report. Stringent chain-of-custody procedures were followed to maintain and document sample possession. A sample or evidence file is considered to be in the custody of the designated person if it is in possession; in view, after being in possession; was in possession and was placed in a secured location; or in a designated secure area.

Chain-of-custody forms were completed to the fullest extent possible prior to sample shipment (copies provided in Appendices D and E). They included the following information: sample number, date collected, source of sample (including type of sample and site identification) and name of sampler. The forms were filled out in a legible manner using waterproof ink and were signed by the sampler. Similar information was provided on the sample tag, which was securely attached to the sample bottle. Samples were always accompanied by a chain-of-custody record. When transferring samples, the individuals relinquishing and receiving them signed, dated and noted the time on the record. The custody record documents sample custody transfer from the sampler to the laboratory.

Samples were packaged properly for shipment and dispatched for analysis to Anatech Analytical Laboratories, Ludington, Michigan, with a separate custody record accompanying each shipment. The original record accompanied the shipment and a copy was retained by the field sampler and filed immediately upon return to the office. Proper documentation was maintained for shipment by common carrier.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Route to:
__ Solid Waste
__ Waste Water
__ Emergency Response
__ Haz. Waste
__ Underground Tanks
__ Water Resources
__ Other _____

Form 4400-122 Jul-91

Facility/Project Name: ANSUL FIRE TECHNOLOGY CENTER		License/Permit/Monitoring Number: ___ ___ ___ ___ ___ ___ ___	Boring Number: AFTC1
Boring Drilled By (Firm Name and Name of Crew Chief): TWIN CITY TESTING CORP., INC./GARY WELLNER		Date Drilling Started: 5/19/93	Date Drilling Completed: 5/19/93 / Drilling Method: 4.25" HS
DNR Facility Well No.: ___ ___ ___	WI Unique Well No.: ___ ___ ___ ___ ___ ___ ___ / Common Well Name: AFTC1	Final Static Water Level: 610.47 Feet MSL	Surface Elevation: 614.79 Feet MSL / Borehole Diameter: 8.25"
Boring Location: State Plane _____ N. _____ E S/C/N; N ½ of NE¼ of Sec. 13, T31N, R27E		Lat. 45° 04' 39" / Long. 87° 36' 25"	Local Grid Locations (If Applicable): ____Feet ___ N ___ S / ____Feet ___ E ___ W
County: MARINETTE	DNR County Code: 38	Civil town/City/Village: MARINETTE	

Sample Number	Length Rec. (in.)	Blow Counts	Depth (Ft.)	Interval (Ft.)	Soil/Rock Description and Geologic Origin for Each Major Unit	USCS	Graphic Log	Well Diagram	PID (IU)	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	RQD/Comments
			0												
1*	19	4	1	1-3	SAND: fine, silty, some clay; root mats, wood; very dark brown (10YR2/2 and 7.5YR3/4) interbedded with dark brown (7.5YR3/4).	SM			9.3		lab sample				Dry, no odor.
			2												
2	17	18	3	3-5	SAND: fine, silty, dark yellowish brown (10YR4/4).	SM			70.1						Moist, wet at tip, no odor.
			4												
3	20	10	5	5-7	SAND: fine, little silt; strong brown (7.5YR5/6). Top 8" silty, trace clay in layers, mottled brown (7.5YR5/4 and 10YR4/3).	SM			20.9						Wet, no odor.
			6												
4	20	7	7	7-9	SAND: fine, becoming medium with depth of sample, little silt; brown (7.5YR4/4).	SP			8.3						Wet, no odor.
			8												
5	20	7	9	9-11	SAND: medium; brown (7.5YR4/4).	SP			15.6						Wet, no odor.
			10												
			11												
			12												
			13												
			14												
			15												
					Boring terminated at 17'.										
					* sample submitted for laboratory analysis										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature] Firm: DAMES & MOORE

This form is authorized by Chapters 144.147 and 162, Wis. Stats. Completion of this report is mandatory. Penalties: Forfeit not less than $10 nor more than $5,000 for each violation. Fined not less than $10 or more than $100 or imprisoned not less than 30 days, or both for each violation. Each day of continued violation is a separate offense, pursuant to ss 144.99 and 162.06 Wis. Stats.

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Route to:
__ Solid Waste
__ Waste Water
__ Emergency Response
__ Haz. Waste
__ Underground Tanks
__ Water Resources
__ Other _____

Form 4400-122 Jul-91

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
ANSUL FIRE TECHNOLOGY CENTER		AFTC2A

Boring Drilled By (Firm Name and Name of Crew Chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
TWIN CITY TESTING CORP., INC./GARY WELLNER	5/19/93	5/19/93	4.25" HS

DNR Facility Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		AFTC2A	610.40 Feet MSL	614.69 Feet MSL	8.25"

Boring Location		Local Grid Locations (If Applicable)
State Plane _____ N. _____ E S/C/N	Lat. 45° 04' 39"	____Feet ___ N ___ S
N ½ of NE¼ of Sec. 13, T31N, R27E	Long. 87° 36' 25"	____Feet ___ E ___ W

County	DNR County Code	Civil town/City/Village
MARINETTE	38	MARINETTE

Sample Number	Sample Length Rec. (in.)	Blow Counts	Depth (Ft.)	Interval (Ft.)	Soil/Rock Description and Geologic Origin for Each Major Unit	USCS	Graphic Log	Well Diagram	PID (IU)	Soil Properties: Standard Penetration	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plastic Limit	Soil Properties: P 200	RQD/Comments
			0												
1	18	16	1	1-3	SAND: fine, silty; root mats, wood; very dark brown (10YR2/2) becoming yellowish brown (10YR5/6) with depth of sample.	SM			131						Dry, no odor.
			2												
2*	20	8	3	3-5	SAND: fine, silty, yellowish brown (10YR5/6).	SM			1763		Lab sample				Moist, wet at tip, no odor.
			4												
3	15	9	5	5-7	SAND: fine, silty; strong brown (7.5YR5/6).	SM			892						Wet, trace gasoline odor.
			6												
4*	20	6	7	7-9	SAND: fine, silty; strong brown (7.5YR5/6).	SM			35.5		Lab sample				Wet, gasoline odor, sheen.
			8												
			9												
			10												
			11												
			12												
			13												
			14												
			15												
					Boring terminated at 17'.										
					* sample submitted for laboratory analysis										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
[signature]	DAMES & MOORE

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Route to:
__ Solid Waste
__ Waste Water
__ Emergency Response
__ Haz. Waste
__ Underground Tanks
__ Water Resources
__ Other _____

Form 4400-122 Jul-91

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
ANSUL FIRE TECHNOLOGY CENTER		AFTC2B

Boring Drilled By (Firm Name and Name of Crew Chief)	Date Drilling Started	Date Drilling Completed	Drilling Method
TWIN CITY TESTING CORP., INC./GARY WELLNER	5/19/93	5/19/93	4.25" HS

DNR Facility Well No.	WI Unique Well No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
		AFTC2B	610.37 Feet MSL	614.69 Feet MSL	8.25"

Boring Location		Local Grid Locations (If Applicable)
State Plane _____ N. _____ E S/C/N	Lat. 45° 04' 39"	____Feet ___N ___S
N ½ of NE¼ of Sec. 13, T31N, R27E	Long. 87° 36' 25"	____Feet ___E ___W

County	DNR County Code	Civil town/City/Village
MARINETTE	38	MARINETTE

Sample Number	Sample Length Rec. (in.)	Blow Counts	Depth (Ft.)	Interval (Ft.)	Soil/Rock Description and Geologic Origin for Each Major Unit	USCS	Graphic Log	Well Diagram	PID (IU)	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	RQD/Comments
			0												
			1		No log maintained for boring AFTC2B.										
			2												
			3												
			4												
			5												
			6												
			7												
			8												
			9												
			10												
			11												
			12												
			13												
			14												
			15												
					Boring terminated at 33'.										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature	Firm
	DAMES & MOORE

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State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Route to:
__ Solid Waste
__ Waste Water
__ Emergency Response
__ Haz. Waste
__ Underground Tanks
__ Water Resources
__ Other _____

Form 4400-122 Jul-91

Facility/Project Name: ANSUL FIRE TECHNOLOGY CENTER	License/Permit/Monitoring Number: ___ ___ ___ ___ ___ ___ ___	Boring Number: AFTC3	
Boring Drilled By (Firm Name and Name of Crew Chief): TWIN CITY TESTING CORP., INC./GARY WELLNER	Date Drilling Started: 5/19/93	Date Drilling Completed: 5/19/93	Drilling Method: 4.25" HS
DNR Facility Well No.: ___ ___ ___ / WI Unique Well No.: ___ ___ ___ ___ ___ ___ ___ / Common Well Name: AFTC3	Final Static Water Level: 610.33 Feet MSL	Surface Elevation: 613.56 Feet MSL	Borehole Diameter: 8.25"
Boring Location: State Plane _____ N. _____ E S/C/N; N ½ of NE¼ of Sec. 13, T31N, R27E	Lat. 45° 04' 39" Long. 87° 36' 25"	Local Grid Locations (If Applicable): ____Feet ___ N ___ S; ____Feet ___ E ___ W	
County: MARINETTE	DNR County Code: 38	Civil town/City/Village: MARINETTE	

Sample Number	Sample Length Rec. (in.)	Blow Counts	Depth (Ft.)	Interval (Ft.)	Soil/Rock Description and Geologic Origin for Each Major Unit	USCS	Graphic Log	Well Diagram	PID (IU)	Soil Properties: Standard Penetration	Moisture Content	Liquid Limit	Plastic Limit	P 200	RQD/Comments
			0												
1*	22	17	1	1-3	SAND: fine, silty; dark yellowish brown (10YR3/6)	SM			4.1	- Lab sample					Moist, odor (not petroleum).
			2												
2	18	11	3	3-5	SAND: fine, silty; brown (7.5YR4/4).	SM			21.3						Wet, no odor.
			4												
3	14	9	5	5-7	SAND: fine; brown (7.5YR4/4).	SM			12.7						Wet, no odor.
			6												
4*	12	2	7	7-9	SAND: fine; pyrite flecks; brown (7.5YR4/4).	SM			35.5	Lab Sample					Wet, trace odor (not petroleum).
			8												
			9												
			10												
			11												
			12												
			13												
			14												
			15												
					Boring terminated at 15'.										
					* sample submitted for laboratory analysis										

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: [signature] Firm: DAMES & MOORE

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State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: AETC	Local Grid Location of Well: _____ ft. ☐N ☐S _____ ft. ☐E ☐W	Well Name: AETC /
Facility License, Permit or Monitoring Number: _____	Grid Origin Location: Lat. _____ Long. _____ or	Wis. Unique Well Number: _____ DNR Well Number: _____
Type of Well: Water Table Observation Well ☒ 11; Piezometer ☐ 12	St. Plane _____ ft. N, _____ ft. E.	Date Well Installed: 5/19/93 (m m d d y y)
Distance Well Is From Waste/Source Boundary: _____ ft.	Section Location of Waste/Source: ___1/4 of ___ 1/4 of Sec. ___, T. ___ N, R. ___ ☐E ☐W	Well Installed By: (Person's Name and Firm) GW & BW; TCT
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient; d ☐ Downgradient n ☐ Not Known	

A. Protective pipe, top elevation _____ ft. MSL
B. Well casing, top elevation _____ ft. MSL
C. Land surface elevation _____ ft. MSL
D. Surface seal, bottom _____ ft. MSL or / ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

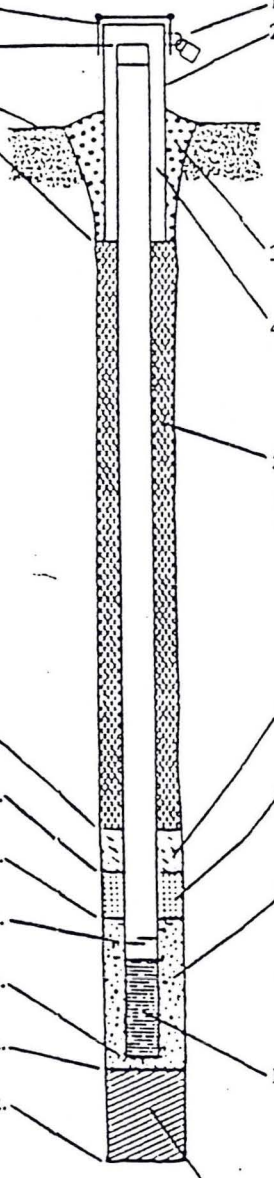
14. Drilling method used: Rotary ☐ 50; Hollow Stem Auger ☒ 41; Other ☐ __ _____

15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☐ 03; None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe _____

17. Source of water (attach analysis):
_____

E. Bentonite seal, top _____ ft. MSL or 1 3/4 ft.
F. Fine sand, top _____ ft. MSL or 3 1/2 ft.
G. Filter pack, top _____ ft. MSL or 4 ft.
H. Screen joint, top _____ ft. MSL or 5 ft.
I. Well bottom _____ ft. MSL or 15 ft.
J. Filter pack, bottom _____ ft. MSL or 15 ft.
K. Borehole, bottom _____ ft. MSL or 17 ft.
L. Borehole, diameter 8 in.
M. O.D. well casing 2.25 in.
N. I.D. well casing 2 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 8 in.
b. Length: / ft.
c. Material: Cast Alum. Steel ☒ 04; Other ☐ __
d. Additional protection? ☒ Yes ☐ No
If yes, describe: Water Tight Locking Cap
3. Surface seal: Bentonite ☐ 30; Concrete ☒ 01; Other ☐ __
4. Material between well casing and protective pipe: Bentonite ☐ 30; Annular space seal ☐ __; Other ☐ __
5. Annular space seal: a. Granular Bentonite ☐ 33; b. _____ Lbs/gal mud weight . . Bentonite-sand slurry ☐ 35; c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31; d. _____ % Bentonite . . . . . Bentonite-cement grout ☐ 50; e. _____ Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☐ 02; Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33; b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite pellets ☒ 32; c. 1 Bag Other ☐ __
7. Fine sand material: Manufacturer, product name & mesh size
a. 430 S. Lion
b. Volume added 25 lb ft³
8. Filter pack material: Manufacturer, product name and mesh size
a. 45 55 RF
b. Volume added 1 Bag ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23; Flush threaded PVC schedule 80 ☐ 24; Other ☐ __
10. Screen material: EJ T PVC
a. Screen type: Factory cut ☒ 11; Continuous slot ☐ 01; Other ☐ __
b. Manufacturer Johnson
c. Slot size: 0.010 in
d. Slotted length: 10. ft
11. Backfill material (below filter pack): None ☐ 14; Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm TCT

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats. and ch. NR 141, Wis. Ad. Code. In accordance with ch.144, Wis Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

MATERIALS USED FOR INSTALLATION

PROJECT#: 8500-93-215 WELL#: AFTC 1

START: 5-19-93 FINISH: 5-19-93

1) SCREEN: Schedule 40 PVC X Schedule 80 PVC _____ Other _____
Screen Length 10 Quantity 1
Couples _____ Flush Joint X Flush Thread X

A. Bottom: Slip Cap _____ Screw Cap _____ Thread Plug X

Supplied By: TCT X Client _____

---

2) CASING: Schedule 40 PVC X Schedule 80 PVC _____ Other _____

(RISER)
A. Top: Slip Cap _____ Thread Cap _____ Coupling & Plug _____
Waterproof Expandable Cap X

Supplied By: TCT X Client _____

---

3) PROTECTIVE COVER: Above Ground _____ Flushmount X

Supplied By: TCT X Client _____

---

4) GUARD POSTS: Yes _____ No X Supplied By: TCT _____ Client _____

A. _____ inch pipe _____ feet long Quantity _____
B. Steel Fence Posts _____ Quantity _____
C. Wooden Fence Posts _____ Quantity _____

---

6) FILTER PACK SAND: Type 45-55 RE Supplied By: TCT X Client ___
No of Bags 1 Size 100

---

7) FINE SAND: Type #30 Silica Supplied By: TCT X Client _____
No of Bags 1 Size 20-40

---

8) BENTONITE: Bentonite Pellets _____ Quantity _____ 5 gallon buckets
Granular Bentonite _____ Quantity _____ Bags
Bentonite Powder _____ Quantity _____ Bags
Bentonite Chips X Quantity 1 Bags

Supplied By: TCT X Client _____

---

9) CONCRETE: No. Bags 1 Size 60 lbs Supplied By: TCT X Client _____

w/ Lock

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: AFTC	Local Grid Location of Well: _____ ft. ☐N ☐S _____ ft. ☐E ☐W	Well Name: AFTC '2
Facility License, Permit or Monitoring Number: _____	Grid Origin Location: Lat. _____ Long. _____ or St. Plane _____ ft. N, _____ ft. E.	Wis. Unique Well Number / DNR Well Number: _____
Type of Well: Water Table Observation Well ☒ 11; Piezometer ☐ 12		Date Well Installed: 5/18/93 (m m d d y y)
Distance Well Is From Waste/Source Boundary: _____ ft.	Section Location of Waste/Source: ___1/4 of ___ 1/4 of Sec. ___, T. ___ N, R. ___ ☐E ☐W	Well Installed By: (Person's Name and Firm): GW & BW
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient; d ☐ Downgradient n ☐ Not Known	

A. Protective pipe, top elevation _____ ft. MSL
B. Well casing, top elevation _____ ft. MSL
C. Land surface elevation _____ ft. MSL
D. Surface seal, bottom _____ ft. MSL or 1 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

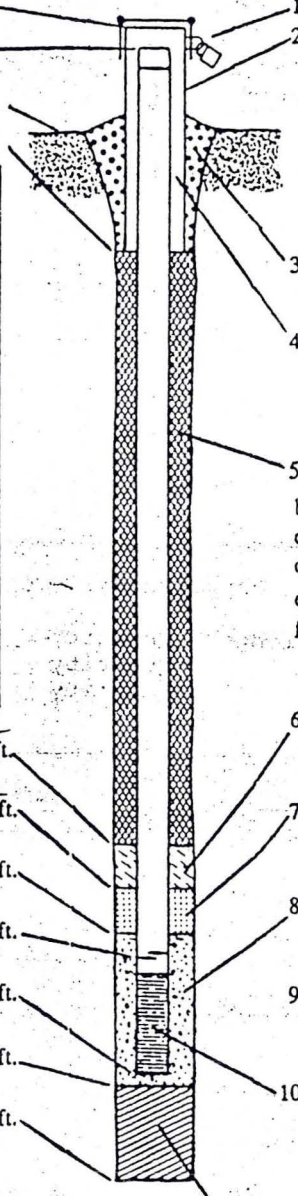
14. Drilling method used: Rotary ☐ 50; Hollow Stem Auger ☒ 41; Other ☐ ___

15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☐ 03; None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe _____

17. Source of water (attach analysis):

E. Bentonite seal, top _____ ft. MSL or 2.5 ft.
F. Fine sand, top _____ ft. MSL or 3.5 ft.
G. Filter pack, top _____ ft. MSL or 4 ft.
H. Screen joint, top _____ ft. MSL or 5 ft.
I. Well bottom _____ ft. MSL or 15 ft.
J. Filter pack, bottom _____ ft. MSL or 17 ft.
K. Borehole, bottom _____ ft. MSL or 17 ft.
L. Borehole, diameter 8 in.
M. O.D. well casing 2.4 in.
N. I.D. well casing 2 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 8 in.
b. Length: 2 ft.
c. Material: Cast Alum Steel ☒ 04; Other ☐ ___
d. Additional protection? ☒ Yes ☐ No
If yes, describe: Water Exp locking
3. Surface seal: Bentonite ☐ 30; Concrete ☒ 01; Other ☐ ___
4. Material between well casing and protective pipe: N/A Bentonite ☐ 30; Annular space seal ☐ ___; Other ☐ ___
5. Annular space seal: a. Granular Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . Bentonite slurry ☐ 31
d. _____ % Bentonite . . . . Bentonite-cement grout ☐ 50
e. _____ Ft³ volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☐ 02; Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☐ 1/4 in. ☒ 3/8 in. ☐ 1/2 in. Bentonite Chips ☒ 32
c. _____ Other ☐ ___
7. Fine sand material: Manufacturer, product name & mesh size
a. 430 Silica
b. Volume added 25 lbs ft³
8. Filter pack material: Manufacturer, product name and mesh size
a. 4555 RF
b. Volume added 1 Bags ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23; Flush threaded PVC schedule 80 ☐ 24; Other ☐ ___
10. Screen material: FJ PVC
a. Screen type: Factory cut ☒ 11; Continuous slot ☐ 01; Other ☐ ___
b. Manufacturer Johnson
c. Slot size: 0.010 in
d. Slotted length: 10 ft
11. Backfill material (below filter pack): None ☒ 14; Other ☐ ___

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature _____ Firm TCT

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats and ch. NR 141, Wis. Ad. Code. In accordance with ch.144, Wis Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

MATERIALS USED FOR INSTALLATION

PROJECT#: 6500-93-213 WELL#: AFTC2

START: 5-18-93 FINISH: 5-19-93

1) SCREEN: Schedule 40 PVC X Schedule 80 PVC ____ Other ____
Screen Length 10 Quantity 1
Couples ____ Flush Joint X Flush Thread X

A. Bottom: Slip Cap ____ Screw Cap ____ Thread Plug X

Supplied By: TCT X Client ____

2) CASING: Schedule 40 PVC X Schedule 80 PVC ____ Other ____

(RISER)
A. Top: Slip Cap ____ Thread Cap ____ Coupling & Plug ____
Waterproof Expandable Cap X

Supplied By: TCT X Client ____

3) PROTECTIVE COVER: Above Ground ____ Flushmount X

Supplied By: TCT X Client ____

4) GUARD POSTS: Yes ____ No X Supplied By: TCT ____ Client ____

A. ____ inch pipe ____ feet long Quantity ____
B. Steel Fence Posts ____ Quantity ____
C. Wooden Fence Posts ____ Quantity ____

6) FILTER PACK SAND: Type 4305 ICA Supplied By: TCT X Client ____
No of Bags 1 Size 25 lbs

7) FINE SAND: Type 4555 RF Supplied By: TCT X Client ____
No of Bags 1 Size 100

8) BENTONITE: Bentonite Pellets ____ Quantity ____ 5 gallon buckets
Granular Bentonite ____ Quantity ____ Bags
Bentonite Powder ____ Quantity ____ Bags
Bentonite Chips X Quantity 1 Bags

Supplied By: TCT X Client ____

9) CONCRETE: No. Bags 1 Size 80 lbs Supplied By: TCT X Client ____

W/ locks

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: AFTC	Local Grid Location of Well: _____ ft. ☐N ☐S _____ ft. ☐E ☐W	Well Name: AFTC 2B
Facility License, Permit or Monitoring Number: _____	Grid Origin Location: Lat. ___ ___ ___ Long. ___ ___ ___ or	Wis. Unique Well Number: _____ DNR Well Number: _____
Type of Well: Water Table Observation Well ☒ 11; Piezometer ☐ 12	St. Plane _____ ft. N, _____ ft. E.	Date Well Installed: 5/19/93 (m m d d y y)
Distance Well Is From Waste/Source Boundary: _____ ft.	Section Location of Waste/Source: ___ 1/4 of ___ 1/4 of Sec. ___, T. ___ N, R. ___ ☐E ☐W	Well Installed By: (Person's Name and Firm) GW BW; TCT
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient; d ☐ Downgradient n ☐ Not Known	

A. Protective pipe, top elevation _____ ft. MSL
B. Well casing, top elevation _____ ft. MSL
C. Land surface elevation _____ ft. MSL
D. Surface seal, bottom _____ ft. MSL or 1 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

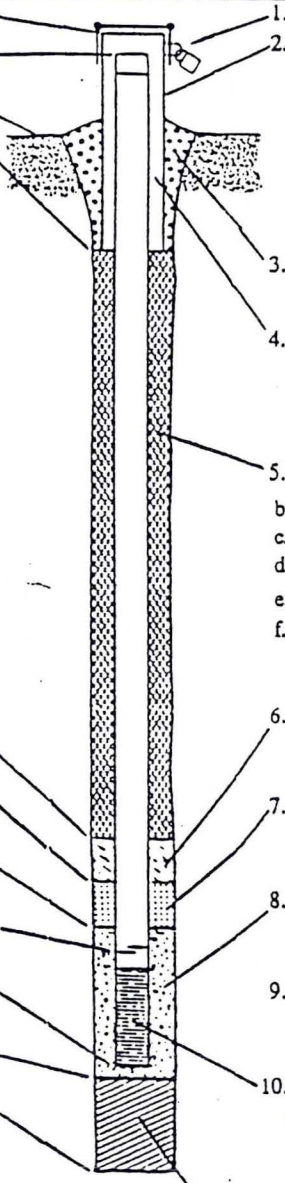
14. Drilling method used: Rotary ☐ 50; Hollow Stem Auger ☒ 41; Other ☐ __ _____

15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☐ 03; None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe _____

17. Source of water (attach analysis):
_____

E. Bentonite seal, top _____ ft. MSL or 1 ft.
F. Fine sand, top _____ ft. MSL or _____ ft.
G. Filter pack, top _____ ft. MSL or 24 ft.
H. Screen joint, top _____ ft. MSL or 27 ft.
I. Well bottom _____ ft. MSL or 32 ft.
J. Filter pack, bottom _____ ft. MSL or _____ ft.
K. Borehole, bottom _____ ft. MSL or 32 ft.
L. Borehole, diameter 8 in.
M. O.D. well casing 2 4 in.
N. I.D. well casing 2 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 8 in.
b. Length: 1 ft.
c. Material: Cast Alum 7; Steel ☒ 04; Other ☐ __
d. Additional protection? ☐ Yes ☐ No
If yes, describe: Water Tight lock CAP
3. Surface seal: Bentonite ☐ 30; Concrete ☒ 01; Other ☐ __ _____
4. Material between well casing and protective pipe: Bentonite ☐ 30; Annular space seal ☐ __; Other ☐ __ N/A
5. Annular space seal: Chips ~~Granular~~ Bentonite ☒ 33
b. _____ Lbs/gal mud weight . . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . . Bentonite slurry ☐ 31
d. _____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. 5 Bags ft³ volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☐ 02; Gravity ☒ 08
6. Bentonite seal: a. Bentonite ~~granular~~ Chips ☒ 33
b. ☐ 1/4 in. ☒ ~~3/8~~ in. ☐ 1/2 in. Bentonite ~~pellets~~ Slurry ☒ 32
c. _____ Other ☐ __
7. Fine sand material: Manufacturer, product name & mesh size
a. N/A
b. Volume added _____ ft³
8. Filter pack material: Manufacturer, product name and mesh size
a. N/A
b. Volume added _____ ft³
9. Well casing: Flush threaded PVC schedule 40 ☒ 23; Flush threaded PVC schedule 80 ☐ 24; Other ☐ __ _____
10. Screen material: FIT PVC
a. Screen type: Factory cut ☒ 11; Continuous slot ☐ 01; Other ☐ __ _____
b. Manufacturer JOHNSON
c. Slot size: 0.010 in
d. Slotted length: 5 ft
11. Backfill material (below filter pack): None ☒ 14; Other ☐ __ NATURAL

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Mary Mellon | Firm: TCT

Please complete both sides of this form and return to the appropriate DNR office listed at the top of this form as required by chs. 144, 147 and 160, Wis. Stats. and ch. NR 141, Wis. Ad. Code. In accordance with ch.144, Wis Stats., failure to file this form may result in a forfeiture of not less than $10, nor more than $5000 for each day of violation. In accordance with ch. 147, Wis. Stats., failure to file this form may result in a forfeiture of not more than $10,000 for each day of violation. NOTE: Shaded areas are for DNR use only. See instructions for more information including where the completed form should be sent.

16.5 26.5 36 43

MATERIALS USED FOR INSTALLATION

PROJECT#: 8500-93-213 WELL#: AFTC

START: 5-19-93 FINISH: 5-20-93

1) SCREEN: Schedule 40 PVC X Schedule 80 PVC _____ Other _____
Screen Length 5 Quantity 1
Couples _____ Flush Joint X Flush Thread X

A. Bottom: Slip Cap _____ Screw Cap _____ Thread Plug X

Supplied By: TCT _____ Client X

2) CASING: Schedule 40 PVC X Schedule 80 PVC _____ Other _____

(RISER)
A. Top: Slip Cap _____ Thread Cap _____ Coupling & Plug _____
Waterproof Expandable Cap X

Supplied By: TCT X Client _____

3) PROTECTIVE COVER: Above Ground _____ Flushmount X

Supplied By: TCT X Client _____

4) GUARD POSTS: Yes _____ No X Supplied By: TCT _____ Client _____

A. _____ inch pipe 4 feet long Quantity _____
B. Steel Fence Posts _____ Quantity _____
C. Wooden Fence Posts _____ Quantity _____

6) FILTER PACK SAND: Type #2/12 Supplied By: TCT _____ Client _____
No of Bags 1 Size _____

7) FINE SAND: Type #3 Supplied By: TCT _____ Client _____
No of Bags 1 Size _____

8) BENTONITE: Bentonite Pellets _____ Quantity _____ 5 gallon bucke
Granular Bentonite _____ Quantity _____ Bags
Bentonite Powder _____ Quantity _____ Bags
Bentonite Chips X Quantity 5 Bags

Supplied By: TCT X Client _____

9) CONCRETE: No. Bags 1 Size 80 lbs Supplied By: TCT X Client _____

State of Wisconsin
Department of Natural Resources

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION
Form 4400-113A Rev. 4-90

Facility/Project Name: AFTC	Local Grid Location of Well: ____ ft. ☐N. ☐S. ____ ft. ☐E. ☐W.	Well Name: AFTC 3
Facility License, Permit or Monitoring Number: _____	Grid Origin Location: Lat. ____ Long. ____ or St. Plane ____ ft. N, ____ ft. E.	Wis. Unique Well Number / DNR Well Number: _____
Type of Well: Water Table Observation Well ☒ 11; Piezometer ☐ 12		Date Well Installed: 5/19/93 (m m d d y y)
Distance Well Is From Waste/Source Boundary: ____ ft.	Section Location of Waste/Source: ___1/4 of ___ 1/4 of Sec. ___, T. ___ N, R. ___ ☐E. ☐W.	Well Installed By: (Person's Name and Firm) GWS BW; TCT
Is Well A Point of Enforcement Std. Application? ☐ Yes ☐ No	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient; d ☐ Downgradient n ☐ Not Known	

A. Protective pipe, top elevation _____ ft. MSL
B. Well casing, top elevation _____ ft. MSL
C. Land surface elevation _____ ft. MSL
D. Surface seal, bottom _____ ft. MSL or 1 ft.

12. USCS classification of soil near screen:
GP ☐ GM ☐ GC ☐ GW ☐ SW ☐ SP ☐
SM ☐ SC ☐ ML ☐ MH ☐ CL ☐ CH ☐
Bedrock ☐

13. Sieve analysis attached? ☐ Yes ☐ No

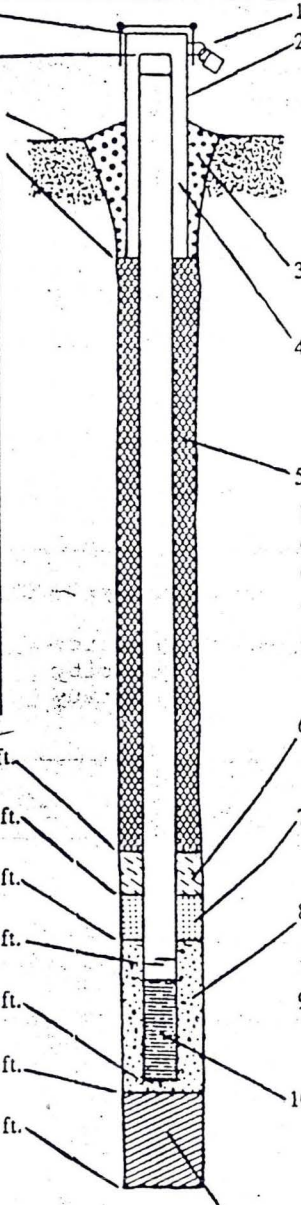
14. Drilling method used: Rotary ☐ 50; Hollow Stem Auger ☒ 41; Other ☐ __

15. Drilling fluid used: Water ☐ 02; Air ☐ 01; Drilling Mud ☐ 03; None ☒ 99

16. Drilling additives used? ☐ Yes ☒ No
Describe _____

17. Source of water (attach analysis):

E. Bentonite seal, top _____ ft. MSL or 1.5 ft.
F. Fine sand, top _____ ft. MSL or 3.5 ft.
G. Filter pack, top _____ ft. MSL or 4 ft.
H. Screen joint, top _____ ft. MSL or 5 ft.
I. Well bottom _____ ft. MSL or 15 ft.
J. Filter pack, bottom _____ ft. MSL or 17 ft.
K. Borehole, bottom _____ ft. MSL or 17 ft.
L. Borehole, diameter 8 in.
M. O.D. well casing 2.4 in.
N. I.D. well casing 2 in.



1. Cap and lock? ☒ Yes ☐ No
2. Protective cover pipe:
a. Inside diameter: 8 in.
b. Length: 1 ft.
c. Material: Cast Alum ☐ Steel ☒ 04; Other ☐ __
d. Additional protection? ☐ Yes ☐ No
If yes, describe: Water Expan. lock cap
3. Surface seal: Bentonite ☐ 30; Concrete ☒ 01; Other ☐ __
4. Material between well casing and protective pipe: NA
Bentonite ☐ 30; Annular space seal ☐ __; Other ☐ __
5. Annular space seal: a. Granular Bentonite ☐ 33
b. _____ Lbs/gal mud weight . . Bentonite-sand slurry ☐ 35
c. _____ Lbs/gal mud weight . . . . Bentonite slurry ☐ 31
d. _____ % Bentonite . . . . . Bentonite-cement grout ☐ 50
e. _____ Ft^3 volume added for any of the above
f. How installed: Tremie ☐ 01; Tremie pumped ☐ 02; Gravity ☐ 08
6. Bentonite seal: a. Bentonite granules ☐ 33
b. ☒ 1/4 in. ☐ 3/8 in. ☐ 1/2 in. Bentonite pellets ☐ 32
c. _____ Other ☐ __
7. Fine sand material: Manufacturer, product name & mesh size
a. 4305 Lo A
b. Volume added 25 lb ft^3
8. Filter pack material: Manufacturer, product name and mesh size
a. 4555 QF
b. Volume added 1.8 ft^3
9. Well casing: Flush threaded PVC schedule 40 ☒ 23; Flush threaded PVC schedule 80 ☐ 24; Other ☐ __
10. Screen material: FIT PVC
a. Screen type: Factory cut ☒ 11; Continuous slot ☐ 01; Other ☐ __
b. Manufacturer Johnson
c. Slot size: 0.010 in
d. Slotted length: 10. ft
11. Backfill material (below filter pack): None ☒ 14; Other ☐ __

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature: Mary Zickler Firm: TCT

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MATERIALS USED FOR INSTALLATION

PROJECT#: 8500-93-213 WELL#: AFTC 3

START: 5-19-93 FINISH: 5-18-93

1) SCREEN: Schedule 40 PVC X Schedule 80 PVC ____ Other ____
Screen Length 10 Quantity 1
Couples ____ Flush Joint X Flush Thread X
A. Bottom: Slip Cap ____ Screw Cap ____ Thread Plug X
Supplied By: TCT X Client ____

2) CASING: Schedule 40 PVC X Schedule 80 PVC ____ Other ____
(RISER)
A. Top: Slip Cap ____ Thread Cap ____ Coupling & Plug ____
Waterproof Expandable Cap X
Supplied By: TCT X Client ____

3) PROTECTIVE COVER: Above Ground ____ Flushmount X
Supplied By: TCT X Client ____

4) GUARD POSTS: Yes ____ No X Supplied By: TCT ____ Client ____
A. ____ inch pipe ____ feet long Quantity ____
B. Steel Fence Posts ____ Quantity ____
C. Wooden Fence Posts ____ Quantity ____

6) FILTER PACK SAND: Type ~~#30 Silica~~ #3 5.5 BT Supplied By: TCT X Client ____
No of Bags 1 Size 100

7) FINE SAND: Type #30 5.1.11 Supplied By: TCT X Client ____
No of Bags ~~2~~ 1 Size 25 lb

8) BENTONITE: Bentonite Pellets ____ Quantity ____ 5 gallon buckets
Granular Bentonite ____ Quantity ____ Bags
Bentonite Powder ____ Quantity ____ Bags
Bentonite Chips X Quantity 1 Bags
Supplied By: TCT X Client ____

9) CONCRETE: No. Bags 1 Size 80 lbs Supplied By: TCT X Client ____

W/Lock

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT
Form 4400-113B Rev. 4-90

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
AFTC	Marinette	AFTC 1
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well Number**
_____	38	_____ / _____

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☒ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐ ___

3. Time spent developing well ~30 min.

4. Depth of well (from top of well casing) 15. ft.

5. Inside diameter of well 2.__ in.

6. Volume of water in filter pack and well casing 10.5 gal.

7. Volume of water removed from well 100.__ gal.

8. Volume of water added (if any) ___.__ gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 3.8 ft.	8.__ ft.
Date	b. 05/21/93 (m m d d y y)	05/21/93 (m m d d y y)
Time	c. 10:30 ☒ a.m. ☐ p.m.	11:00 ☒ a.m. ☐ p.m.
12. Sediment in well bottom	___.__ inches	___.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☐ 20 Turbid ☒ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____.__ mg/l	____.__ mg/l
15. COD	____.__ mg/l	____.__ mg/l

16. Additional comments on development:

H_2O drop to 8' Steady @ 300 Hz.

Well developed by: Person's Name and Firm

Name: Kristine M. Casper

Firm: Dames + Moore

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Kristine M Casper

Print Initials: KMC

Firm: Dames & Moore

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 4-90

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
AFTC	Marinette	AFTC 2A
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well Number**
_____	38	_____ / _____

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☒ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐

3. Time spent developing well ~ 30 min.

4. Depth of well (from top of well casing) 15.__ ft.

5. Inside diameter of well 2.__ in.

6. Volume of water in filter pack and well casing 10.4 gal.

7. Volume of water removed from well 100.__ gal.

8. Volume of water added (if any) __.__ gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 3.9 ft.	11.__ ft.
Date	b. 05/21/93 (m m d d y y)	05/21/93 (m m d d y y)
Time	c. 8:30 ☒ a.m. ☐ p.m.	9:00 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	__.__ inches	__.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☐ 20 Turbid ☒ 25 (Describe)
Fill in if drilling fluids were used and well is at solid waste facility:		
14. Total suspended solids	_____.__ mg/l	_____.__ mg/l
15. COD	_____.__ mg/l	_____.__ mg/l

16. Additional comments on development:

H_2O drop to 11' @ 300 Hz

Well developed by: Person's Name and Firm

Name: Kristine M. Casper

Firm: Dames & Moore

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Kristine M. Casper

Print Initials: KMC

Firm: Dames & Moore

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 4-90

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
AFTC	Marinette	AFTC 2B

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well Number
_____	38	_____	___

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☒ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐ ___

3. Time spent developing well ~ 30 min.

4. Depth of well (from top of well casing) 32. ft.

5. Inside diameter of well 2. in.

6. Volume of water in filter pack and well casing 10. gal.

7. Volume of water removed from well 55. gal.

8. Volume of water added (if any) ___. gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 3.8 ft.	6.5 ft.
Date	b. 05/21/93 m m d d y y	05/21/93 m m d d y y
Time	c. 9:30 ☒ a.m. ☐ p.m.	10:00 ☒ a.m. ☐ p.m.
12. Sediment in well bottom	___. inches	___. inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☒ 20 Turbid ☐ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	_____. mg/l	_____. mg/l
15. COD	_____. mg/l	_____. mg/l

16. Additional comments on development:

H_2O drop to 6.5 steady @ 300 Hz.

Well developed by: Person's Name and Firm

Name: Kristine M. Casper

Firm: Dames & Moore

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Kristine M. Casper

Print Initials: KMC

Firm: Dames & Moore

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 4-90

Route to: Solid Waste ☐ Haz. Waste ☐ Wastewater ☐
Env. Response & Repair ☐ Underground Tanks ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
AFTC	Marinette	AFTC3

Facility License, Permit or Monitoring Number	County Code	Wis. Unique Well Number	DNR Well Number
_____	38	_____	___

1. Can this well be purged dry? ☐ Yes ☒ No

2. Well development method

surged with bailer and bailed	☐ 41
surged with bailer and pumped	☐ 61
surged with block and bailed	☐ 42
surged with block and pumped	☒ 62
surged with block, bailed and pumped	☐ 70
compressed air	☐ 20
bailed only	☐ 10
pumped only	☐ 51
pumped slowly	☐ 50
Other _____	☐ ___

3. Time spent developing well ~30 min.

4. Depth of well (from top of well casing) 15. ft.

5. Inside diameter of well 2. in.

6. Volume of water in filter pack and well casing 11.5 gal.

7. Volume of water removed from well 110. gal.

8. Volume of water added (if any) ___. gal.

9. Source of water added _____

10. Analysis performed on water added? ☐ Yes ☐ No
(If yes, attach results)

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 2.7 ft.	7.5 ft.
Date	b. 05 21 93 (m m d d y y)	05 21 93 (m m d d y y)
Time	c. 11:30 ☒ a.m. ☐ p.m.	12:00 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	___. inches	___. inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe)	Clear ☐ 20 Turbid ☒ 25 (Describe)

Fill in if drilling fluids were used and well is at solid waste facility:

14. Total suspended solids	____. mg/l	____. mg/l
15. COD	____. mg/l	____. mg/l

16. Additional comments on development:

H_2O drop to 7.5' steady @ 300 Hz

Well developed by: Person's Name and Firm

Name: Kristine M. Casper

Firm: Dames + Moore

I hereby certify that the above information is true and correct to the best of my knowledge.

Signature: Kristine M Casper

Print Initials: KMC

Firm: Dames + Moore

NOTE: Shaded areas are for DNR use only. See instructions for more information including a list of county codes.

ANATECH

Analytical Laboratories

Analytical Report

Lab I.D. :	**32095**
Report Date :	**06/15/1993**
Project :	**Dames & Moore - #07724-009**
Client :	**Dames & Moore**
	250 East Wisconsin Ave.
	Suite 1500
	Milwaukee, WI 53202
Attention :	**Ms. Kristine Casper**

7 pages including cover sheet

ANATECH

Analytical Laboratories

Dames & Moore

Sample:	32095-9523	Matrix:	Soil
Client Sample:	AFTC 1-1	Location:	
COLLECTED:	05/19/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/26/1993 12:19	Sampled By:	Kristine Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	2.0	mg/kg	0.1	SW-846 Mtd. 7421	06/11/1993 MC
PHYSICAL PROPERTY ANALYSIS					
Total Organic Content	19,000	mg/kg	10	EPA 160.4	06/10/1993 DO
		Gravimetric, Ignition at 550 DEG C			
% Solids	82.0	%	0.1	Standard Mtd. 2540	06/02/1993 DF
VOLATILE AROMATIC HYDRO.					
Xylenes (Total)	ND	ug/kg	1	SW-846 Mtd. 8020	06/01/1993 EE
1,2,4-trimethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
1,3,5-trimethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
Methyl Tertiary Butyl Ether	ND	ug/kg	1	"	06/01/1993 EE
Benzene	ND	ug/kg	1	"	06/01/1993 EE
Toluene	ND	ug/kg	1	"	06/01/1993 EE
Ethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	ND	mg/kg	10	Wisconsin GRO	06/01/1993 EE
		Note: Results are reported on a dry weight basis.			

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 06/15/1993

Dames & Moore

Sample:	32095-9524	Matrix:	Soil
Client Sample:	AFTC 2-2	Location:	
COLLECTED:	05/19/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/26/1993 12:19	Sampled By:	Kristine Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (ICAP)	6	mg/kg	2	SW-846 Mtd. 6010	06/03/1993 CC
PHYSICAL PROPERTY ANALYSIS					
Total Organic Content	5900	mg/kg	10	EPA 160.4	06/10/1993 DO
		Gravimetric, Ignition at 550 DEG C			
% Solids	75.2	%	0.1	Standard Mtd. 2540	06/02/1993 DF
VOLATILE AROMATIC HYDRO.					
Xylenes (Total)	11,800	ug/kg	10	SW-846 Mtd. 8020	06/01/1993 EE
1,2,4-trimethylbenzene	3000	ug/kg	10	"	06/01/1993 EE
1,3,5-trimethylbenzene	1500	ug/kg	10	"	06/01/1993 EE
Methyl Tertiary Butyl Ether	ND	ug/kg	10	"	06/01/1993 EE
Benzene	650	ug/kg	10	"	06/01/1993 EE
Toluene	2300	ug/kg	10	"	06/01/1993 EE
Ethylbenzene	5000	ug/kg	10	"	06/01/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	922	mg/kg	10	Wisconsin GRO	06/01/1993 EE
		Note: Results are reported on a dry weight basis.			

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/15/1993

Dames & Moore

Sample:	32095-9525	Matrix:	Soil
Client Sample:	AFTC 2-4	Location:	
COLLECTED:	05/19/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/26/1993 12:19	Sampled By:	Kristine Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	1.1	mg/kg	0.1	SW-846 Mtd. 7421	06/11/1993 MC
PHYSICAL PROPERTY ANALYSIS					
Total Organic Content	3200	mg/kg	10	EPA 160.4	06/10/1993 DO
		Gravimetric, Ignition at 550 DEG C			
% Solids	76.6	%	0.1	Standard Mtd. 2540	06/02/1993 DF
VOLATILE AROMATIC HYDRO.					
Xylenes (Total)	580	ug/kg	5	SW-846 Mtd. 8020	06/01/1993 EE
1,2,4-trimethylbenzene	330	ug/kg	5	"	06/01/1993 EE
1,3,5-trimethylbenzene	370	ug/kg	5	"	06/01/1993 EE
Methyl Tertiary Butyl Ether	1600	ug/kg	5	"	06/01/1993 EE
Benzene	1400	ug/kg	5	"	06/01/1993 EE
Toluene	1200	ug/kg	5	"	06/01/1993 EE
Ethylbenzene	110	ug/kg	5	"	06/01/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	ND	mg/kg	10	Wisconsin GRO	06/01/1993 EE
		Note: Results are reported on a dry weight basis.			

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/15/1993

Dames & Moore

Sample:	32095-9526	Matrix:	Soil
Client Sample:	AFTC 3-1	Location:	
COLLECTED:	05/19/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/26/1993 12:19	Sampled By:	Kristine Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	0.8	mg/kg	0.1	SW-846 Mtd. 7421	06/11/1993 MC
PHYSICAL PROPERTY ANALYSIS					
Total Organic Content	5000	mg/kg	10	EPA 160.4	06/10/1993 DO
		Gravimetric, Ignition at 550 DEG C			
% Solids	87.4	%	0.1	Standard Mtd. 2540	06/02/1993 DF
VOLATILE AROMATIC HYDRO.					
Xylenes (Total)	ND	ug/kg	1	SW-846 Mtd. 8020	06/01/1993 EE
1,2,4-trimethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
1,3,5-trimethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
Methyl Tertiary Butyl Ether	ND	ug/kg	1	"	06/01/1993 EE
Benzene	ND	ug/kg	1	"	06/01/1993 EE
Toluene	ND	ug/kg	1	"	06/01/1993 EE
Ethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	ND	mg/kg	10	Wisconsin GRO	06/01/1993 EE

Note: Results are reported on a dry weight basis.

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/15/1993

Dames & Moore

Sample:	32095-9527	Matrix:	Soil
Client Sample:	AFTC 3-4	Location:	
COLLECTED:	05/19/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/26/1993 12:19	Sampled By:	Kristine Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
TOTAL METALS ANALYSIS					
Lead (GFAA)	1.0	mg/kg	0.1	SW-846 Mtd. 7421	06/11/1993 MC
PHYSICAL PROPERTY ANALYSIS					
Total Organic Content	47,000	mg/kg	10	EPA 160.4	06/10/1993 DO
		Gravimetric, Ignition at 550 DEG C			
% Solids	82.3	%	0.1	Standard Mtd. 2540	06/02/1993 DF
VOLATILE AROMATIC HYDRO.					
Xylenes (Total)	ND	ug/kg	1	SW-846 Mtd. 8020	06/01/1993 EE
1,2,4-trimethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
1,3,5-trimethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
Methyl Tertiary Butyl Ether	ND	ug/kg	1	"	06/01/1993 EE
Benzene	ND	ug/kg	1	"	06/01/1993 EE
Toluene	ND	ug/kg	1	"	06/01/1993 EE
Ethylbenzene	ND	ug/kg	1	"	06/01/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	ND	mg/kg	10	Wisconsin GRO	06/01/1993 EE
		Note: Results are reported on a dry weight basis.			

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 06/15/1993

Sample:	32095-9532	Matrix:	Liquid
Client Sample:	Blank	Location:	
COLLECTED:	05/19/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/26/1993 12:19	Sampled By:	Kristine Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
VOLATILE AROMATIC HYDRO.					
Xylenes (Total)	ND	ug/L	1	SW-846 Mtd. 8020	06/01/1993 EE
1,2,4-trimethylbenzene	ND	ug/L	1	"	06/01/1993 EE
1,3,5-trimethylbenzene	ND	ug/L	1	"	06/01/1993 EE
Methyl Tertiary Butyl Ether	ND	ug/L	1	"	06/01/1993 EE
Benzene	ND	ug/L	1	"	06/01/1993 EE
Toluene	ND	ug/L	1	"	06/01/1993 EE
Ethylbenzene	ND	ug/L	1	"	06/01/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	ND	mg/L	0.1	Wisconsin GRO	06/01/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/15/1993

ANATECH
Analytical Laboratories

ANALYTICAL REPORT

CLIENT:	Dames & Moore		
PROJECT:	#07724-009	DATE SAMPLED:	05/10/93
LAB REF. NO.:	32095	DATE RECEIVED:	05/26/93
SAMPLED BY:	RC	DATE FINISHED:	06/15/93
DESCRIPTION:	Soil Sample	REPORT DATE:	06/15/93
ANALYST:	Subcontracted - Commercial Testing & Engineering Co.		

SIEVE ANALYSIS
SAMPLE ID: 32095-9528
CLIENT ID: AFTC GS1

			CUMULATIVE RESULTS	
PASSING	Retained On	%Weight	% Retained	%Passing
------	#8	10.48	10.48	89.52
#8	#16	3.63	14.11	85.89
#16	#30	6.58	20.69	79.31
#30	#50	12.91	33.60	66.40
#50	#100	42.57	76.17	23.83
#100	#200	19.86	96.03	3.97
#200		3.97	100.00	0.00

Texture Class

% Sand	88.00
% Silt	10.00
% Clay	2.00

C. David Hainer
Project Manager

nel

ANATECH
Analytical Laboratories

ANALYTICAL REPORT

CLIENT:	Dames & Moore		
PROJECT:	#07724-009	DATE SAMPLED:	05/10/93
LAB REF. NO.:	32095	DATE RECEIVED:	05/26/93
SAMPLED BY:	RC	DATE FINISHED:	06/15/93
DESCRIPTION:	Soil Sample	REPORT DATE:	06/15/93
ANALYST:	Subcontracted - Commercial Testing & Engineering Co.		

SIEVE ANALYSIS

SAMPLE ID: 32095-9529
CLIENT ID: AFTC GS2

			CUMULATIVE RESULTS	
PASSING	Retained On	%Weight	% Retained	%Passing
------	#8	0.00	0.00	100.00
#8	#16	0.00	0.00	100.00
#16	#30	0.00	0.00	100.00
#30	#50	1.30	1.30	98.70
#50	#100	42.26	43.56	56.44
#100	#200	51.66	95.22	4.78
#200		4.78	100.00	0.00

Texture Class

% Sand	96.00
% Silt	4.00
% Clay	<1.00

C. David Hainer
Project Manager

nel

ANATECH
Analytical Laboratories

ANALYTICAL REPORT

CLIENT:	Dames & Moore		
PROJECT:	#07724-009	DATE SAMPLED:	05/10/93
LAB REF. NO.:	32095	DATE RECEIVED:	05/26/93
SAMPLED BY:	RC	DATE FINISHED:	06/15/93
DESCRIPTION:	Soil Sample	REPORT DATE:	06/15/93
ANALYST:	Subcontracted - Commercial Testing & Engineering Co.		

SIEVE ANALYSIS

SAMPLE ID: 32095-9530
CLIENT ID: AFTC GS3

			CUMULATIVE RESULTS	
PASSING	Retained On	%Weight	% Retained	%Passing
------	#8	0.11	0.11	99.89
#8	#16	0.07	0.18	99.82
#16	#30	0.12	0.30	99.70
#30	#50	8.66	8.96	91.04
#50	#100	61.29	70.25	29.75
#100	#200	25.45	95.70	4.30
#200		4.30	100.00	0.00

Texture Class

% Sand	99.00
% Silt	1.00
% Clay	<1.00

C. David Hainer
Project Manager

nel

ANATECH
Analytical Laboratories

ANALYTICAL REPORT

CLIENT:	Dames & Moore		
PROJECT:	#07724-009	DATE SAMPLED:	05/10/93
LAB REF. NO.:	32095	DATE RECEIVED:	05/26/93
SAMPLED BY:	RC	DATE FINISHED:	06/15/93
DESCRIPTION:	Soil Sample	REPORT DATE:	06/15/93
ANALYST:	Subcontracted - Commercial Testing & Engineering Co.		

SIEVE ANALYSIS

SAMPLE ID: 32095-9531
CLIENT ID: AFTC GS4

			CUMULATIVE RESULTS	
PASSING	Retained On	%Weight	% Retained	%Passing
------	#8	0.24	0.24	99.76
#8	#16	0.20	0.44	99.56
#16	#30	0.26	0.70	99.30
#30	#50	13.11	13.81	86.19
#50	#100	52.31	66.12	33.88
#100	#200	29.26	95.38	4.62
#200		4.62	100.00	0.00

Texture Class

% Sand	99.00
% Silt	1.00
% Clay	<1.00

C. David Hainer
Project Manager

nel

Pg 1 of 2

DAMES & MOORE

250 East Wisconsin Ave, Suite 1500
Milwaukee, Wisconsin 53202
(414) 347-0800 FAX:(414) 347-0288

Lab Ref # 32095

Lab Anatech

Chain of Custody Seal # _____ # _____

Turnaround Time

☐ Rush (preapproved by Lab)
☒ Normal

SHIPPING DETAILS:
Method of Shipment _____
Contents Temperature _____ C
Comments _____

PROJECT NAME: _____

PROJECT #: 07724-009

Send Results To:
PROJECT MANAGER: L. Casper

Change for GRO to 8015 Modified

LAB USE ONLY	DATE	CONTAINERS	No.	SAMPLE ID	SAMPLE TYPE	ANALYSIS REQUESTED: WI GRO	WI PVOCs	total Pb	TOC	Grain Size	% Solid					REMARKS/PRESERVATIVES
1523	5-19-93	120 ml gl	1	AFTC 1-1	Soil			X			X					
		120 ml gl	1	AFTC 1-1	Soil		X		X							
		60 ml gl	2	AFTC 1-1	Soil	X										MEOH
1524		120 ml gl	1	AFTC 2-2	Soil			X			X					
		120 ml gl	1	AFTC 2-2	Soil		X		X							
		60 ml gl	2	AFTC 2-2	Soil	X										MEOH
1525		120 ml gl	1	AFTC 2-4	Soil			X			X					
		120 ml gl	1	AFTC 2-4	Soil		X		X							
		60 ml gl	2	AFTC 2-4	Soil	X										*MEOH
1526		120 ml gl	1	AFTC 3-1	Soil			X			X					
		120 ml gl	1	AFTC 3-1	Soil		X		X							
		120 ml gl	2	AFTC 3-1	Soil	X										MEOH.

CHAIN OF CUSTODY RECORD

SAMPLER: (SIGNATURE)	DATE
Kristin M Casper	5/20/93

COMMENTS
confirm wt. of GRO bottles following analysis
① provide

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Kristin M Casper	5/24/1500	FED EX
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY: BY: (SIGNATURE) / DATE/TIME
		5/25/93 11:40

Pg 2 of 2

DAMES & MOORE

250 East Wisconsin Ave, Suite 1500
Milwaukee, Wisconsin 53202
(414) 347-0800 FAX:(414) 347-0288

Lab Anatech 32075

Chain of Custody Seal # _____ # _____

Turnaround Time
☐ Rush (preapproved by Lab)
☒ ~~Normal~~ (SUB)

SHIPPING DETAILS:
Method of Shipment Fed Ex
Contents Temperature _____ C
Comments _____

PROJECT NAME: _____

PROJECT #: 07724-009

Send Results To:
PROJECT MANAGER: L. Casper

LAB USE ONLY	DATE	CONTAINERS	No.	SAMPLE ID	SAMPLE TYPE	ANALYSIS REQUESTED: WI GRO	WI PVOCs	Total Pb	TOC	Grain Size (SUB)	Method wt.	REMARKS/PRESERVATIVES
1527	5-19-93	120 ml gl	1	AFTC 3-4	Soil			X				
		120 ml gl	1	AFTC 3-4	Soil		X		X			
	↓	60 ml gl	2	AFTC 3-4	Soil	X						MEOH
1528	5-20-93	500 ml gl	2	AFTC GS1	Soil				X			
1529		500 ml gl	2	AFTC GS2	Soil				X			
1530		500 ml gl	2	AFTC GS3	Soil				X			
1531	↓	500 ml gl	2	AFTC GS4	Soil				X			
1532	5-19-93	60 ml gl	1	Blank	~~MEOH~~	X	X			X		MEOH

CHAIN OF CUSTODY RECORD

SAMPLER: (SIGNATURE)	DATE
Kristin M Casper	5-20-93

COMMENTS
Confirm vol. of GRO bottles following analysis

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Kristin M Casper	5-24 1500	Fed Ex
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY: BY: (SIGNATURE) / DATE/TIME
		5/25/93 AM

ANATECH

Analytical Laboratories

Analytical Report

Lab I.D. :	**32069**
Report Date :	**06/09/1993**
Project :	**Dames & Moore - #07724-009**
Client :	**Dames & Moore**
	250 East Wisconsin Ave. **Suite 1500** **Milwaukee, WI 53202**
Attention :	**Ms. Kristine Casper**

13 pages including cover sheet

ANATECH
Analytical Laboratories

Dames & Moore

Sample:	32069-9461	Matrix:	Water
Client Sample:	AFTC 1	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Diss/Lead (GFAA)	ND	mg/L	0.002	SW-846 Mtd. 7421	06/02/1993 SRO
GC/MS VOLATILE ORGANIC					
Dichlorodifluoromethane	ND	ug/L	10	SW-846 Mtd. 8021	05/26/1993 EE
Chloromethane	ND	ug/L	10	"	05/26/1993 EE
Vinyl Chloride	ND	ug/L	10	"	05/26/1993 EE
Bromomethane	ND	ug/L	10	"	05/26/1993 EE
Chloroethane	ND	ug/L	10	"	05/26/1993 EE
Trichlorofluoromethane	ND	ug/L	10	"	05/26/1993 EE
1,1-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Methylene Chloride	ND	ug/L	5	"	05/26/1993 EE
t-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
tert-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
2,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
c-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Chloroform	ND	ug/L	5	"	05/26/1993 EE
Bromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,1,1-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloropropene	ND	ug/L	5	"	05/26/1993 EE
Carbon Tetrachloride	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
Benzene	100	ug/L	5	"	05/26/1993 EE
Trichloroethene	ND	ug/L	5	"	05/26/1993 EE
Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromodichloromethane	ND	ug/L	5	"	05/26/1993 EE
Tetrachloroethene	ND	ug/L	5	"	05/26/1993 EE
Toluene	140	ug/L	5	"	05/26/1993 EE
1,1,2-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Dibromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
Chlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,1,1,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE

ND = Non Detectable

Reported : 06/09/1993

Dames & Moore

Sample:	32069-9461	Matrix:	Water
Client Sample:	AFTC 1	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Ethylbenzene	13	ug/L	5	SW-846 Mtd. 8021	05/26/1993 EE
Para & Meta Xylene	41	ug/L	5	"	05/26/1993 EE
Ortho Xylene	17	ug/L	5	"	05/26/1993 EE
Styrene	ND	ug/L	5	"	05/26/1993 EE
IsopropylBenzene	ND	ug/L	5	"	05/26/1993 EE
Bromoform	ND	ug/L	5	"	05/26/1993 EE
1,1,2,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE
1,2,3-Trichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromobenzene	ND	ug/L	5	"	05/26/1993 EE
n-PropylBenzene	ND	ug/L	5	"	05/26/1993 EE
2-Chlorotoluene	ND	ug/L	5	"	05/26/1993 EE
1,3,5-Trimethylbenzene	6	ug/L	5	"	05/26/1993 EE
4-Chlorotoluene	ND	ug/L	5	"	05/26/1993 EE
1,2,4-Trimethylbenzene	11	ug/L	5	"	05/26/1993 EE
sec-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
p-Isoprpyltoluene	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,4-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
n-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromo-3-Chloropropane	ND	ug/L	5	"	05/26/1993 EE
1,2,4-Trichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
Hexachlorobutadiene	ND	ug/L	5	"	05/26/1993 EE
Naphthalene	ND	ug/L	5	"	05/26/1993 EE
1,2,3-Trichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	1.9	mg/L	0.1	Wisconsin GRO	05/27/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/09/1993

Sample:	32069-9462	Matrix:	Water
Client Sample:	AFTC 2A	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Lead (ICAP)	0.06	mg/L	0.03	SW-846 Mtd. 6010	05/27/1993 GCP
GC/MS VOLATILE ORGANIC					
Dichlorodifluoromethane	ND	ug/L	1000	SW-846 Mtd. 8021	06/03/1993 EE
Chloromethane	ND	ug/L	1000	"	06/03/1993 EE
Vinyl Chloride	ND	ug/L	1000	"	06/03/1993 EE
Bromomethane	ND	ug/L	1000	"	06/03/1993 EE
Chloroethane	ND	ug/L	1000	"	06/03/1993 EE
Trichlorofluoromethane	ND	ug/L	1000	"	06/03/1993 EE
1,1-Dichloroethene	ND	ug/L	500	"	06/03/1993 EE
Methylene Chloride	ND	ug/L	500	"	06/03/1993 EE
t-1,2-Dichloroethene	ND	ug/L	500	"	06/03/1993 EE
tert-Butylbenzene	ND	ug/L	500	"	06/03/1993 EE
1,1-Dichloroethane	ND	ug/L	500	"	06/03/1993 EE
2,2-Dichloropropane	ND	ug/L	500	"	06/03/1993 EE
c-1,2-Dichloroethene	ND	ug/L	500	"	06/03/1993 EE
Chloroform	ND	ug/L	500	"	06/03/1993 EE
Bromochloromethane	ND	ug/L	500	"	06/03/1993 EE
1,1,1-Trichloroethane	ND	ug/L	500	"	06/03/1993 EE
1,1-Dichloropropene	ND	ug/L	500	"	06/03/1993 EE
Carbon Tetrachloride	ND	ug/L	500	"	06/03/1993 EE
1,2-Dichloroethane	ND	ug/L	500	"	06/03/1993 EE
Benzene	11,800	ug/L	500	"	06/03/1993 EE
Trichloroethene	ND	ug/L	500	"	06/03/1993 EE
Dibromoethane	ND	ug/L	500	"	06/03/1993 EE
1,2-Dichloropropane	ND	ug/L	500	"	06/03/1993 EE
Bromodichloromethane	ND	ug/L	500	"	06/03/1993 EE
Tetrachloroethene	ND	ug/L	500	"	06/03/1993 EE
Toluene	11,000	ug/L	500	"	06/03/1993 EE
1,1,2-Trichloroethane	ND	ug/L	500	"	06/03/1993 EE
1,3-Dichloropropane	ND	ug/L	500	"	06/03/1993 EE
Dibromochloromethane	ND	ug/L	500	"	06/03/1993 EE
1,2-Dibromoethane	ND	ug/L	500	"	06/03/1993 EE
Chlorobenzene	ND	ug/L	500	"	06/03/1993 EE
1,1,1,2-Tetrachloroethane	ND	ug/L	500	"	06/03/1993 EE

ND = Non Detectable

Reported : 06/09/1993

Sample:	32069-9462	Matrix:	Water
Client Sample:	AFTC 2A	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Ethylbenzene	1500	ug/L	500	SW-846 Mtd. 8021	06/03/1993 EE
Para & Meta Xylene	3300	ug/L	500	"	06/03/1993 EE
Ortho Xylene	1500	ug/L	500	"	06/03/1993 EE
Styrene	ND	ug/L	500	"	06/03/1993 EE
IsopropylBenzene	ND	ug/L	500	"	06/03/1993 EE
Bromoform	ND	ug/L	500	"	06/03/1993 EE
1,1,2,2-Tetrachloroethane	ND	ug/L	500	"	06/03/1993 EE
1,2,3-Trichloropropane	ND	ug/L	500	"	06/03/1993 EE
Bromobenzene	ND	ug/L	500	"	06/03/1993 EE
n-PropylBenzene	ND	ug/L	500	"	06/03/1993 EE
2-Chlorotoluene	ND	ug/L	500	"	06/03/1993 EE
1,3,5-Trimethylbenzene	1300	ug/L	500	"	06/03/1993 EE
4-Chlorotoluene	ND	ug/L	500	"	06/03/1993 EE
1,2,4-Trimethylbenzene	1100	ug/L	500	"	06/03/1993 EE
sec-Butylbenzene	ND	ug/L	500	"	06/03/1993 EE
p-Isoprpyltoluene	ND	ug/L	500	"	06/03/1993 EE
1,3-Dichlorobenzene	ND	ug/L	500	"	06/03/1993 EE
1,4-Dichlorobenzene	ND	ug/L	500	"	06/03/1993 EE
n-Butylbenzene	ND	ug/L	500	"	06/03/1993 EE
1,2-Dichlorobenzene	ND	ug/L	500	"	06/03/1993 EE
1,2-Dibromo-3-Chloropropane	ND	ug/L	500	"	06/03/1993 EE
1,2,4-Trichlorobenzene	ND	ug/L	500	"	06/03/1993 EE
Hexachlorobutadiene	ND	ug/L	500	"	06/03/1993 EE
Naphthalene	ND	ug/L	500	"	06/03/1993 EE
1,2,3-Trichlorobenzene	ND	ug/L	500	"	06/03/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	5.2	mg/L	0.1	Wisconsin GRO	05/27/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

C. David Hainer

Reported : 06/09/1993

Sample:	32069-9463	Matrix:	Water
Client Sample:	AFTC 2B	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Diss/Lead (GFAA)	ND	mg/L	0.002	SW-846 Mtd. 7421	06/02/1993 SRO
GC/MS VOLATILE ORGANIC					
Dichlorodifluoromethane	ND	ug/L	10	SW-846 Mtd. 8021	05/26/1993 EE
Chloromethane	ND	ug/L	10	"	05/26/1993 EE
Vinyl Chloride	ND	ug/L	10	"	05/26/1993 EE
Bromomethane	ND	ug/L	10	"	05/26/1993 EE
Chloroethane	ND	ug/L	10	"	05/26/1993 EE
Trichlorofluoromethane	ND	ug/L	10	"	05/26/1993 EE
1,1-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Methylene Chloride	ND	ug/L	5	"	05/26/1993 EE
t-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
tert-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
2,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
c-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Chloroform	ND	ug/L	5	"	05/26/1993 EE
Bromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,1,1-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloropropene	ND	ug/L	5	"	05/26/1993 EE
Carbon Tetrachloride	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
Benzene	22	ug/L	5	"	05/26/1993 EE
Trichloroethene	ND	ug/L	5	"	05/26/1993 EE
Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromodichloromethane	ND	ug/L	5	"	05/26/1993 EE
Tetrachloroethene	ND	ug/L	5	"	05/26/1993 EE
Toluene	71	ug/L	5	"	05/26/1993 EE
1,1,2-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Dibromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
Chlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,1,1,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE

ND = Non Detectable

Reported : 06/09/1993

Dames & Moore

Sample:	32069-9463	Matrix:	Water
Client Sample:	AFTC 2B	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Ethylbenzene	32	ug/L	5	SW-846 Mtd. 8021	05/26/1993 EE
Para & Meta Xylene	62	ug/L	5	"	05/26/1993 EE
Ortho Xylene	31	ug/L	5	"	05/26/1993 EE
Styrene	ND	ug/L	5	"	05/26/1993 EE
IsopropylBenzene	ND	ug/L	5	"	05/26/1993 EE
Bromoform	ND	ug/L	5	"	05/26/1993 EE
1,1,2,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE
1,2,3-Trichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromobenzene	ND	ug/L	5	"	05/26/1993 EE
n-PropylBenzene	ND	ug/L	5	"	05/26/1993 EE
2-Chlorotoluene	ND	ug/L	5	"	05/26/1993 EE
1,3,5-Trimethylbenzene	21	ug/L	5	"	05/26/1993 EE
4-Chlorotoluene	ND	ug/L	5	"	05/26/1993 EE
1,2,4-Trimethylbenzene	45	ug/L	5	"	05/26/1993 EE
sec-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
p-Isoprpyltoluene	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,4-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
n-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromo-3-Chloropropane	ND	ug/L	5	"	05/26/1993 EE
1,2,4-Trichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
Hexachlorobutadiene	ND	ug/L	5	"	05/26/1993 EE
Naphthalene	ND	ug/L	5	"	05/26/1993 EE
1,2,3-Trichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	1.2	mg/L	0.1	Wisconsin GRO	05/27/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/09/1993

Sample:	32069-9464	Matrix:	Water
Client Sample:	AFTC 3	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
DISSOLVED METALS ANALYSIS					
Diss/Lead (GFAA)	ND	mg/L	0.002	SW-846 Mtd. 7421	05/27/1993 MAC
PHYSICAL PROPERTY ANALYSIS					
Solids, Dissolved	4770	mg/L	10	EPA 160.1	06/03/1993 NS
GC/MS VOLATILE ORGANIC					
Dichlorodifluoromethane	ND	ug/L	25	SW-846 Mtd. 8021	05/26/1993 EE
Chloromethane	ND	ug/L	25	"	05/26/1993 EE
Vinyl Chloride	ND	ug/L	25	"	05/26/1993 EE
Bromomethane	ND	ug/L	25	"	05/26/1993 EE
Chloroethane	ND	ug/L	25	"	05/26/1993 EE
Trichlorofluoromethane	ND	ug/L	25	"	05/26/1993 EE
1,1-Dichloroethene	ND	ug/L	25	"	05/26/1993 EE
Methylene Chloride	ND	ug/L	25	"	05/26/1993 EE
t-1,2-Dichloroethene	ND	ug/L	25	"	05/26/1993 EE
tert-Butylbenzene	ND	ug/L	25	"	05/26/1993 EE
1,1-Dichloroethane	ND	ug/L	25	"	05/26/1993 EE
2,2-Dichloropropane	ND	ug/L	25	"	05/26/1993 EE
c-1,2-Dichloroethene	ND	ug/L	25	"	05/26/1993 EE
Chloroform	ND	ug/L	25	"	05/26/1993 EE
Bromochloromethane	ND	ug/L	25	"	05/26/1993 EE
1,1,1-Trichloroethane	ND	ug/L	25	"	05/26/1993 EE
1,1-Dichloropropene	ND	ug/L	25	"	05/26/1993 EE
Carbon Tetrachloride	ND	ug/L	25	"	05/26/1993 EE
1,2-Dichloroethane	ND	ug/L	25	"	05/26/1993 EE
Benzene	1200	ug/L	25	"	05/26/1993 EE
Trichloroethene	ND	ug/L	25	"	05/26/1993 EE
Dibromoethane	ND	ug/L	25	"	05/26/1993 EE
1,2-Dichloropropane	ND	ug/L	25	"	05/26/1993 EE
Bromodichloromethane	ND	ug/L	25	"	05/26/1993 EE
Tetrachloroethene	ND	ug/L	25	"	05/26/1993 EE
Toluene	1700	ug/L	25	"	05/26/1993 EE
1,1,2-Trichloroethane	ND	ug/L	25	"	05/26/1993 EE
1,3-Dichloropropane	ND	ug/L	25	"	05/26/1993 EE
Dibromochloromethane	ND	ug/L	25	"	05/26/1993 EE

ND = Non Detectable

Reported : 06/09/1993

Sample:	32069-9464	Matrix:	Water
Client Sample:	AFTC 3	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
1,2-Dibromoethane	ND	ug/L	25	SW-846 Mtd. 8021	05/26/1993 EE
Chlorobenzene	ND	ug/L	25	"	05/26/1993 EE
1,1,1,2-Tetrachloroethane	ND	ug/L	25	"	05/26/1993 EE
Ethylbenzene	630	ug/L	25	"	05/26/1993 EE
Para & Meta Xylene	2000	ug/L	25	"	05/26/1993 EE
Ortho Xylene	890	ug/L	25	"	05/26/1993 EE
Styrene	ND	ug/L	25	"	05/26/1993 EE
IsopropylBenzene	ND	ug/L	25	"	05/26/1993 EE
Bromoform	ND	ug/L	25	"	05/26/1993 EE
1,1,2,2-Tetrachloroethane	ND	ug/L	25	"	05/26/1993 EE
1,2,3-Trichloropropane	ND	ug/L	25	"	05/26/1993 EE
Bromobenzene	ND	ug/L	25	"	05/26/1993 EE
n-PropylBenzene	ND	ug/L	25	"	05/26/1993 EE
2-Chlorotoluene	ND	ug/L	25	"	05/26/1993 EE
1,3,5-Trimethylbenzene	200	ug/L	25	"	05/26/1993 EE
4-Chlorotoluene	ND	ug/L	25	"	05/26/1993 EE
1,2,4-Trimethylbenzene	380	ug/L	25	"	05/26/1993 EE
sec-Butylbenzene	ND	ug/L	25	"	05/26/1993 EE
p-Isoprpyltoluene	ND	ug/L	25	"	05/26/1993 EE
1,3-Dichlorobenzene	ND	ug/L	25	"	05/26/1993 EE
1,4-Dichlorobenzene	ND	ug/L	25	"	05/26/1993 EE
n-Butylbenzene	ND	ug/L	25	"	05/26/1993 EE
1,2-Dichlorobenzene	ND	ug/L	25	"	05/26/1993 EE
1,2-Dibromo-3-Chloropropane	ND	ug/L	25	"	05/26/1993 EE
1,2,4-Trichlorobenzene	ND	ug/L	25	"	05/26/1993 EE
Hexachlorobutadiene	ND	ug/L	25	"	05/26/1993 EE
Naphthalene	ND	ug/L	25	"	05/26/1993 EE
1,2,3-Trichlorobenzene	ND	ug/L	25	"	05/26/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	0.8	mg/L	0.1	Wisconsin GRO	05/27/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/09/1993

Dames & Moore

Sample:	32069-9465	Matrix:	Water
Client Sample:	Trip Blank 009	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Dichlorodifluoromethane	ND	ug/L	10	SW-846 Mtd. 8021	05/26/1993 EE
Chloromethane	ND	ug/L	10	"	05/26/1993 EE
Vinyl Chloride	ND	ug/L	10	"	05/26/1993 EE
Bromomethane	ND	ug/L	10	"	05/26/1993 EE
Chloroethane	ND	ug/L	10	"	05/26/1993 EE
Trichlorofluoromethane	ND	ug/L	10	"	05/26/1993 EE
1,1-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Methylene Chloride	ND	ug/L	5	"	05/26/1993 EE
t-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
tert-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
2,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
c-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Chloroform	ND	ug/L	5	"	05/26/1993 EE
Bromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,1,1-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloropropene	ND	ug/L	5	"	05/26/1993 EE
Carbon Tetrachloride	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
Benzene	ND	ug/L	5	"	05/26/1993 EE
Trichloroethene	ND	ug/L	5	"	05/26/1993 EE
Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromodichloromethane	ND	ug/L	5	"	05/26/1993 EE
Tetrachloroethene	ND	ug/L	5	"	05/26/1993 EE
Toluene	ND	ug/L	5	"	05/26/1993 EE
1,1,2-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Dibromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
Chlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,1,1,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE
Ethylbenzene	ND	ug/L	5	"	05/26/1993 EE
Para & Meta Xylene	ND	ug/L	5	"	05/26/1993 EE
Ortho Xylene	ND	ug/L	5	"	05/26/1993 EE

ND = Non Detectable

Reported : 06/09/1993

Sample:	32069-9465	Matrix:	Water
Client Sample:	Trip Blank 009	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Styrene	ND	ug/L	5	SW-846 Mtd. 8021	05/28/1993 EE
IsopropylBenzene	ND	ug/L	5	"	05/28/1993 EE
Bromoform	ND	ug/L	5	"	05/28/1993 EE
1,1,2,2-Tetrachloroethane	ND	ug/L	5	"	05/28/1993 EE
1,2,3-Trichloropropane	ND	ug/L	5	"	05/28/1993 EE
Bromobenzene	ND	ug/L	5	"	05/28/1993 EE
n-PropylBenzene	ND	ug/L	5	"	05/28/1993 EE
2-Chlorotoluene	ND	ug/L	5	"	05/28/1993 EE
1,3,5-Trimethylbenzene	ND	ug/L	5	"	05/28/1993 EE
4-Chlorotoluene	ND	ug/L	5	"	05/28/1993 EE
1,2,4-Trimethylbenzene	ND	ug/L	5	"	05/28/1993 EE
sec-Butylbenzene	ND	ug/L	5	"	05/28/1993 EE
p-Isoprpyltoluene	ND	ug/L	5	"	05/28/1993 EE
1,3-Dichlorobenzene	ND	ug/L	5	"	05/28/1993 EE
1,4-Dichlorobenzene	ND	ug/L	5	"	05/28/1993 EE
n-Butylbenzene	ND	ug/L	5	"	05/28/1993 EE
1,2-Dichlorobenzene	ND	ug/L	5	"	05/28/1993 EE
1,2-Dibromo-3-Chloropropane	ND	ug/L	5	"	05/28/1993 EE
1,2,4-Trichlorobenzene	ND	ug/L	5	"	05/28/1993 EE
Hexachlorobutadiene	ND	ug/L	5	"	05/28/1993 EE
Naphthalene	ND	ug/L	5	"	05/28/1993 EE
1,2,3-Trichlorobenzene	ND	ug/L	5	"	05/28/1993 EE
Gasoline Range Organics (Volatile Fraction)					
Volatile Fraction TPH	ND	mg/L	0.1	Wisconsin GRO	05/27/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/09/1993

Sample:	32069-9466	Matrix:	Water
Client Sample:	Field Blank 009	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Dichlorodifluoromethane	ND	ug/L	10	SW-846 Mtd. 8021	05/26/1993 EE
Chloromethane	ND	ug/L	10	"	05/26/1993 EE
Vinyl Chloride	ND	ug/L	10	"	05/26/1993 EE
Bromomethane	ND	ug/L	10	"	05/26/1993 EE
Chloroethane	ND	ug/L	10	"	05/26/1993 EE
Trichlorofluoromethane	ND	ug/L	10	"	05/26/1993 EE
1,1-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Methylene Chloride	ND	ug/L	5	"	05/26/1993 EE
t-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
tert-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
2,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
c-1,2-Dichloroethene	ND	ug/L	5	"	05/26/1993 EE
Chloroform	ND	ug/L	5	"	05/26/1993 EE
Bromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,1,1-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,1-Dichloropropene	ND	ug/L	5	"	05/26/1993 EE
Carbon Tetrachloride	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloroethane	ND	ug/L	5	"	05/26/1993 EE
Benzene	120	ug/L	5	"	05/26/1993 EE
Trichloroethene	ND	ug/L	5	"	05/26/1993 EE
Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromodichloromethane	ND	ug/L	5	"	05/26/1993 EE
Tetrachloroethene	ND	ug/L	5	"	05/26/1993 EE
Toluene	520	ug/L	5	"	05/26/1993 EE
1,1,2-Trichloroethane	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichloropropane	ND	ug/L	5	"	05/26/1993 EE
Dibromochloromethane	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromoethane	ND	ug/L	5	"	05/26/1993 EE
Chlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,1,1,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE
Ethylbenzene	65	ug/L	5	"	05/26/1993 EE
Para & Meta Xylene	160	ug/L	5	"	05/26/1993 EE
Ortho Xylene	89	ug/L	5	"	05/26/1993 EE

ND = Non Detectable

Reported : 06/09/1993

Dames & Moore

Sample:	32069-9466	Matrix:	Water
Client Sample:	Field Blank 009	Location:	
COLLECTED:	05/21/1993 :	Project:	Dames & Moore - #07724-009
RECEIVED:	05/25/1993 14:11	Sampled By:	K. Casper

Test Description	Result	Unit	Detection Limit	Method	Date/Analyst
GC/MS VOLATILE ORGANIC					
Styrene	ND	ug/L	5	SW-846 Mtd. 8021	05/26/1993 EE
IsopropylBenzene	ND	ug/L	5	"	05/26/1993 EE
Bromoform	ND	ug/L	5	"	05/26/1993 EE
1,1,2,2-Tetrachloroethane	ND	ug/L	5	"	05/26/1993 EE
1,2,3-Trichloropropane	ND	ug/L	5	"	05/26/1993 EE
Bromobenzene	ND	ug/L	5	"	05/26/1993 EE
n-PropylBenzene	ND	ug/L	5	"	05/26/1993 EE
2-Chlorotoluene	ND	ug/L	5	"	05/26/1993 EE
1,3,5-Trimethylbenzene	40	ug/L	5	"	05/26/1993 EE
4-Chlorotoluene	ND	ug/L	5	"	05/26/1993 EE
1,2,4-Trimethylbenzene	34	ug/L	5	"	05/26/1993 EE
sec-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
p-Isoprpyltoluene	ND	ug/L	5	"	05/26/1993 EE
1,3-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,4-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
n-Butylbenzene	ND	ug/L	5	"	05/26/1993 EE
1,2-Dichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
1,2-Dibromo-3-Chloropropane	ND	ug/L	5	"	05/26/1993 EE
1,2,4-Trichlorobenzene	ND	ug/L	5	"	05/26/1993 EE
Hexachlorobutadiene	ND	ug/L	5	"	05/26/1993 EE
Naphthalene	ND	ug/L	5	"	05/26/1993 EE
1,2,3-Trichlorobenzene	ND	ug/L	5	"	05/26/1993 EE

ND = Non Detectable

Laboratory Manager

C. David Hainer

Reported : 06/09/1993

DAMES & MOORE

250 East Wisconsin Ave, Suite 1500
Milwaukee, Wisconsin 53202
(414) 347-0800 FAX:(414) 347-0288

Lab AnaTech

Chain of Custody Seal # _____ # _____

Turnaround Time
☐ Rush (preapproved by Lab)
☒ Normal

32069

SHIPPING DETAILS:
Method of Shipment Fed Ex
Contents Temperature _____ C
Comments _____

PROJECT NAME: _____
PROJECT #: 07724-009
Send Results To:
PROJECT MANAGER: L. Casper

LAB USE ONLY	DATE	CONTAINERS	No.	SAMPLE ID	SAMPLE TYPE	ANALYSIS REQUESTED: w/ GRO	w/ VOCs (8021)	Dis. Pb *	TDS							REMARKS/PRESERVATIVES
9461	5-21-93	40ml gl	4	AFTC1	Grnd H2O	X	X									HCl
		250ml pl	1	AFTC1	Grnd H2O			X								HNO3
9462		40ml gl	4	AFTC 2A	Grnd H2O	X	X									HCl
		250ml pl	1	AFTC 2A	Grnd H2O			X								HNO3
9463		40ml gl	4	AFTC 2B	Grnd H2O	X	X									HCl
		250ml pl	1	AFTC 2B	Grnd H2O			X								HNO3
9464		40ml gl	4	AFTC 3	Grnd H2O	X	X		X							→unpres. see below
		250ml pl	1	AFTC 3	Grnd H2O			X								HNO3
9465		40ml gl.	2	Trip Blank 009	H2O	X	X									
9466		40ml gl.	2	Field Blank	Grnd H2O		X									HCl.

CHAIN OF CUSTODY RECORD

SAMPLER: (SIGNATURE)	DATE
Kristin M Casper	5-21-93

COMMENTS
AFTC3 (GRO + VOCs) are unpreserved. Expedited turn approved per David Hainer 5-21-93 for AFTC3 only. TDS only if sufficient sample for mixing.

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
Kristin M Casper	5-24 1500	Fed Ex.
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE) / DATE/TIME
		5/24/93 4:40 PM

ANSUL® MARINETTE, WI 54143-2542 MATERIAL SAFETY DATA SHEET

PURPLE-K
QUICK IDENTIFIER (In Plant Common Name)

Manufacturer's Name:	ANSUL FIRE PROTECTION	Emergency Telephone No.:	CHEMTREC (800) 424-9300
Address:	One Stanton Street, Marinette, WI 54143-2542	Other Information Calls:	(715) 735-7411
Prepared By:	Safety and Health Department	Date Prepared:	January 6, 1992

SECTION 1 — IDENTITY

Common Name: (used on label) (Trade Name and Synonyms)	Purple-K Dry Chemical Extinguishing Agent	CAS No.:	N/A
Chemical Name:	N/A This is a Mixture	Chemical Family:	Mixture
Formula:	N/A		

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS			
Principal Hazardous Component(s) (chemical and common name(s)):	CAS No.	ACGIH TLV	Acute Toxicity Data
Muscovite Mica $K_2Al_4[Si_6Al_2O_{20}](OH,F)_4$	12001-26-2	20 mppcf*	NDA
Magnesium Aluminum Silicate	8031-18-3	10 mg/M3	NDA
*Million particles per cubic foot			

PART B — OTHER INGREDIENTS		
Other Component(s) (chemical and common name(s)):	CAS No.	Acute Toxicity Data
Proprietary Mixtures of: Potassium Bicarbonate	298-14-6	NDA
Methyl Hydrogen Polysiloxane	63148-57-2	NDA
Purple Pigment	Mixture	NDA

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point:	N/A			Specific Gravity (H_2O = 1):	N/A	Vapor Pressure (mm Hg):	N/A
Percent Volatile by Volume (%):	N/A	Vapor Density (Air = 1):	N/A	Evaporation Rate (= 1):	N/A		
Solubility in Water:	Slight			Reactivity in Water:	N/A		
Appearance and Odor:	Violet colored powder, no characteristic odor						
Flash Point:	None	Flammable Limits in Air % by Volume:	N/A	Extinguisher Media:	N/A	Auto-Ignition Temperature:	N/A
Special Fire Fighting Procedures:	NONE - THIS IS AN EXTINGUISHING AGENT						
Unusual Fire and Explosion Hazards:	None						

SECTION 4 — PHYSICAL HAZARDS

Stability:	Unstable ☐ Stable ☒	Conditions to Avoid:	N/A
Incompatibility (Materials to Avoid):	Strong acids, NaK alloy and $NH_4H_2PO_4$		
Hazardous Decomposition Products:	CO_2		
Hazardous Polymerization:	May Occur ☐ Will Not Occur ☒	Conditions to Avoid:	N/A

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value:	OSHA nuisance dust limit of 15 mg/M3 or ACGIH nuisance dust value of 10 mg/M3 for the eight hour time-weighted average.
Routes of Entry: Eye Contact:	Mildly irritating for a short period of time.
Skin Contact:	May be mildly irritating.
Inhalation:	Treat as a mineral dust. Irritant to the respiratory tract.
Ingestion:	Not an expected route of entry.
Signs and Symptoms: Acute Overexposure:	Transient cough, shortness of breath.
Chronic Overexposure:	Chronic fibrosis of the lung.
Medical Conditions Generally Aggravated by Exposure:	Reactive airway
Chemical Listed as Carcinogen or Potential:	National Toxicology Program: Yes ☐ No ☒ I.A.R.C. Monographs: Yes ☐ No ☒ OSHA: Yes ☐ No ☒

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Flush with large amounts of water; if irritation persists, seek Medical attention.
Skin Contact:	Wash with soap and water; if irritation persists, seek Medical attention.
Inhalation:	Remove victim to fresh air. Seek Medical attention if discomfort continues.
Ingestion:	If patient is conscious, give large amounts of water and induce vomiting. Seek Medical help.

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Dust mask where dustiness is prevalent, or TLV exceeded. Mechanical filter respirator if exposure is prolonged.		
Ventilation:	Local Exhaust: Discretionary	Mechanical (General):	Recommended
Protective Gloves:	N/A	Eye Protection:	Recommended as mechanical barrier for prolonged exposure.
Other Protective Clothing or Equipment:	If irritation occurs, long sleeves and impervious gloves should be worn.		

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage:	Should be stored in original container or Ansul fire extinguisher.
Other Precautions:	Do not mix agents.
Steps to be Taken in Case Material is Released or Spilled:	Sweep up.
Waste Disposal Methods:	Dispose of in compliance with local, state, and federal regulations.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS

HAZARD INDEX:
4 Severe Hazard
3 Serious Hazard
2 Moderate Hazard
1 Slight Hazard
0 Minimal Hazard

1 HEALTH
0 FLAMMABILITY
0 REACTIVITY

N/A = Not Applicable NDA = No Data Available

ANSUL is a registered trademark.

ANSUL® ANSUL FIRE PROTECTION
MARINETTE, WI 54143-2542

MATERIAL SAFETY DATA SHEET

PLUS-FIFTY C
QUICK IDENTIFIER (In Plant Common Name)

Manufacturer's Name:	ANSUL FIRE PROTECTION	Emergency Telephone No.:	CHEMTREC (800) 424-9300
Address:	One Stanton Street, Marinette, WI 54143-2542	Other Information Calls:	(715) 735-7411
Prepared By:	Safety and Health Department	Date Prepared:	August 26, 1992

SECTION 1 — IDENTITY

Common Name: (used on label) (Trade Name and Synonyms)	PLUS-FIFTY C Dry Chemical Extinguishing Agent	CAS No.:	N/A
Chemical Name:	N/A This is a Mixture	Chemical Family:	Mixture
Formula:	N/A		

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS

Principal Hazardous Component(s) (chemical and common name(s)):	CAS No.	ACGIH TLV	Acute Toxicity Data
Talc $Mg_6[Si_8O_{20}](OH)_4$	14807-96-6	2 mg/m^3	NDA
Magnesium Aluminum Silicate (Attapulgite Clay)	8031-18-3	10 mg/M^3	NDA

*Million particles per cubic foot

PART B — OTHER INGREDIENTS

Other Component(s) (chemical and common name(s)):	CAS No.	Acute Toxicity Data
Proprietary mixture of: Sodium Bicarbonate	144-55-8	Oral LD_{50} (rat) 4220 mg/kg
Methyl Hydrogen Polysiloxane	63148-57-2	NDA
Blue Pigment (Hostaperm Blue)	00147-14-8	Oral LD_{50} (rat) 6400 mg/kg

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point:	N/A			Specific Gravity (H_2O = 1):	N/A	Vapor Pressure (mm Hg):	N/A
Percent Volatile by Volume (%):	N/A	Vapor Density (Air = 1):	N/A	Evaporation Rate (= 1):	N/A		
Solubility in Water:	Slight			Reactivity in Water:	Unreactive		
Appearance and Odor:	Blue colored powder, no characteristic odor						
Flash Point:	None	Flammable Limit: In Air % by Volume:	N/A	Extinguisher Media:	N/A	Auto-Ignition Temperature:	N/A
Special Fire Fighting Procedures:	NONE - THIS IS AN EXTINGUISHING AGENT						
Unusual Fire and Explosion Hazards:	None						

SECTION 4 — PHYSICAL HAZARDS

Stability:	Unstable ☐ Stable ☒	Conditions to Avoid:	N/A
Incompatibility (Materials to Avoid):	Strong acids, NaK alloy and $NH_4H_2PO_4$		
Hazardous Decomposition Products:	CO_2		
Hazardous Polymerization:	May Occur ☐ Will Not Occur ☒	Conditions to Avoid:	N/A

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value:	OSHA nuisance dust limit of 15 mg/M3 or ACGIH nuisance dust value of 10 mg/M3 for the eight hour time-weighted average.
Routes of Entry: Eye Contact:	Mildly irritating for a short period of time.
Skin Contact:	May be mildly irritating.
Inhalation:	Treat as a mineral dust. Irritant to the respiratory tract.
Ingestion:	Not an expected route of entry.
Signs and Symptoms: Acute Overexposure:	*Transient cough*, shortness of breath.
Chronic Overexposure:	Talcosis, pulmonary fibrosis.
Medical Conditions Generally Aggravated by Exposure:	Reactive airway
Chemical Listed as Carcinogen or Potential:	National Toxicology Program: Yes ☐ No ☒ I.A.R.C. Monographs: Yes ☐ No ☐ OSHA: Yes ☐ No ☒

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Flush with large amounts of water; if irritation persists, seek Medical attention.
Skin Contact:	Wash with soap and water; if irritation persists, seek Medical attention.
Inhalation:	Remove victim to fresh air. Seek Medical attention if discomfort continues.
Ingestion:	If patient is conscious, give large amounts of water and induce vomiting. Seek Medical help.

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Dust mask where dustiness is prevalent, or TLV exceeded. Mechanical filter respirator if exposure is prolonged.		
Ventilation:	Local Exhaust: Discretionary	Mechanical (General):	Recommended
Protective Gloves:	N/A	Eye Protection:	Recommended as mechanical barrier for prolonged exposure.
Other Protective Clothing or Equipment:	If irritation occurs, long sleeves and impervious gloves should be worn.		

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage:	Should be stored in original container or Ansul fire extinguisher.
Other Precautions:	Do not mix agents.
Steps to be Taken in Case Material is Released or Spilled:	Sweep up.
Waste Disposal Methods:	Dispose of in compliance with local, state, and federal regulations.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS

HAZARD INDEX:	
4 Severe Hazard	1 HEALTH
3 Serious Hazard	
2 Moderate Hazard	0 FLAMMABILITY
1 Slight Hazard	
0 Minimal Hazard	0 REACTIVITY

N/A = Not Applicable NDA = No Data Available

FORAY
QUICK IDENTIFIER (In Plant Common Name)

Manufacturer's Name:	ANSUL FIRE PROTECTION	Emergency Telephone No.:	CHEMTREC (800) 424-9300
Address:	One Stanton Street, Marinette, WI 54143-2542	Other Information Calls:	(715) 735-7411
Prepared By:	Safety and Health Department	Date Prepared:	April 15, 1992

SECTION 1 — IDENTITY

Common Name: (used on label) (Trade Name and Synonyms)	FORAY Dry Chemical Extinguishing Agent	CAS No.:	N/A
Chemical Name:	N/A This is a Mixture	Chemical Family:	Mixture
Formula:	N/A		

SECTION 2 — INGREDIENTS

PART A — HAZARDOUS INGREDIENTS			
Principal Hazardous Component(s) (chemical and common name(s)):	CAS No.	ACGIH TLV	Acute Toxicity Data
Muscovite Mica	12001-26-2	20 mppcf*	NDA
Magnesium Aluminum Silicate	12174-11-7	10 mg/M^3	NDA
*Million particles per cubic foot			

PART B — OTHER INGREDIENTS		
Other Component(s) (chemical and common name(s)):	CAS No.	Acute Toxicity Data
Proprietary Mixtures of: Monoammonium Phosphate	7722-76-1	Oral (Rat) LD_{50} 5750 mg/kg
Ammonium Sulfate	7783-20-2	Oral (Rat) LD_{50} 3000 mg/kg
Methyl Hydrogen Polysiloxane	63148-57-2	NDA
Yellow Pigment	5468-75-7	NDA

SECTION 3 — PHYSICAL AND CHEMICAL CHARACTERISTICS (Fire and Explosion Data)

Boiling Point:	N/A			Specific Gravity (H_2O = 1):	N/A	Vapor Pressure (mm Hg):	N/A
Percent Volatile by Volume (%):	N/A	Vapor Density (Air = 1):	N/A	Evaporation Rate (= 1):	N/A		
Solubility in Water:	Slight			Reactivity in Water:	Unreactive		
Appearance and Odor:	Yellow colored powder, no characteristic odor						
Flash Point:	None	Flammable Limits In Air % by Volume:	N/A	Extinguisher Media:	N/A	Auto-Ignition Temperature:	N/A
Special Fire Fighting Procedures:	NONE - THIS IS AN EXTINGUISHING AGENT						
Unusual Fire and Explosion Hazards:	None						

SECTION 4 — PHYSICAL HAZARDS

Stability:	Unstable ☐ Stable ☒	Conditions to Avoid:	N/A
Incompatibility (Materials to Avoid):	Strong alkalis, Mg, oxidizers that can release chlorine per NFPA 43A		
Hazardous Decomposition Products:	NH_3 and/or PO_x may be evolved		
Hazardous Polymerization:	May Occur ☐ Will Not Occur ☒	Conditions to Avoid:	N/A

SECTION 5 — HEALTH HAZARDS

Threshold Limit Value:	OSHA nuisance dust limit of 15 mg/M3 or ACGIH nuisance dust value of 10 mg/M3 for the eight hour time-weighted average.
Routes of Entry: Eye Contact:	Mildly irritating for a short period of time.
Skin Contact:	May be mildly irritating.
Inhalation:	Treat as a mineral dust. Irritant to the respiratory tract.
Ingestion:	Not an expected route of entry.
Signs and Symptoms: Acute Overexposure:	Transient cough, shortness of breath.
Chronic Overexposure:	Chronic fibrosis of the lung, pneumoconiosis.
Medical Conditions Generally Aggravated by Exposure:	Reactive airway
Chemical Listed as Carcinogen or Potential:	National Toxicology Program Yes ☐ No X; I.A.R.C. Monographs: Yes ☐ No X; OSHA: Yes ☐ No X

SECTION 6 — EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Flush with large amounts of water; if irritation persists, seek Medical attention.
Skin Contact:	Wash with soap and water; if irritation persists, seek Medical attention.
Inhalation:	Remove victim to fresh air. Seek Medical attention if discomfort continues.
Ingestion:	If patient is conscious, give large amounts of water and induce vomiting. Seek Medical help.

SECTION 7 — SPECIAL PROTECTION INFORMATION

Respiratory Protection (Specify Type):	Dust mask where dustiness is prevalent, or TLV exceeded. Mechanical filter respirator if exposure is prolonged.			
Ventilation:	Local Exhaust:	Discretionary	Mechanical (General):	Recommended
Protective Gloves:	N/A		Eye Protection:	Recommended as mechanical barrier for prolonged exposure.
Other Protective Clothing or Equipment:	If irritation occurs, long sleeves and impervious gloves should be worn.			

SECTION 8 — SPECIAL PRECAUTIONS AND SPILL/LEAK PROCEDURES

Precautions to be Taken in Handling and Storage:	Should be stored in original container or Ansul fire extinguisher.
Other Precautions:	Do not mix agents.
Steps to be Taken in Case Material is Released or Spilled:	Sweep up.
Waste Disposal Methods:	Dispose of in compliance with local, state, and federal regulations.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM RATINGS

HAZARD INDEX:	
4 Severe Hazard 3 Serious Hazard 2 Moderate Hazard 1 Slight Hazard 0 Minimal Hazard	1 HEALTH 0 FLAMMABILITY 0 REACTIVITY

N/A = Not Applicable NDA = No Data Available