NR 716 SUPPLEMENTAL SITE INVESTIGATION REPORT

Ahlgrimm Explosives Prill Area
W9899 Givens Road
Hortonville, Wisconsin

January 15, 2018
Terracon Project No. 58127001
BRRTS #02-45-558037

Prepared for:
Ahlgrimm Explosives, Inc.
Hortonville, Wisconsin

Prepared by:
Terracon Consultants, Inc.
Franklin, Wisconsin

January 15, 2018

Wisconsin Department of Natural Resources
Remediation and Redevelopment Program
625 East County Road Y, Suite 700
Oshkosh, Wisconsin 54901

Attn: Ms. Jennifer Borski
P: [920] 424-7887
E: Jennifer.Borski@wisconsin.gov

Re: NR 716 Supplemental Site Investigation Report
Ahlgrimm Explosives - Prill Area
W9899 Givens Road
Town of Hortonia, Outagamie County, Wisconsin
BRRTS #02-45-558037 (Prill Area)
Terracon Project No. 58127001

Dear Ms. Borski:

Terracon Consultants, Inc. (Terracon) has prepared this *NR 716 Supplemental Site Investigation Report* for the Ahlgrimm Explosives Prill Area project located at W9899 Givens Road, Town of Hortonia, Outagamie County, Wisconsin. This report documents construction of an additional upgradient observation well, groundwater sampling of selected monitoring wells, and verification hand auger soil borings and soil sampling beneath the former prill bin. Based on the results of the supplemental soil and groundwater investigation, Terracon, on behalf of Ahlgrimm Explosives, requests technical review of this report along with Terracon's September 18, 2017, *NR 716 Groundwater Investigation and Supplemental Remedial Action Report* and a written response to closure-related questions provided in this report. A check for the technical review fee of $1,050 was previously submitted. Please contact our office if you have questions or require additional information.

Sincerely,
Terracon Consultants, Inc.

Scott A. Hodgson, P.G.
Senior Project Manager

Edmund A. Buc, P.E., CHMM
Senior Project Engineer

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Copies to: John Ahlgrimm, Ahlgrimm Explosives
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W9899 GIVENS ROAD
HORTONVILLE OUTAGAMIE COUNTY, WISCONSIN

January 15, 2018
Terracon Project No. 58127001

1.0 INTRODUCTION

Terracon Consultants, Inc. (Terracon) was retained to perform environmental site investigation and remediation services at the Ahlgrimm Explosives facility located at W9899 Givens Road in the Town of Hortonia, Wisconsin (Ahlgrimm Site). The site is currently owned by Rodney Martin and is operated by Ahlgrimm Explosives.

This report documents construction of an additional upgradient observation well, groundwater sampling of selected monitoring wells, and verification hand auger soil borings and soil sampling beneath the former prill bin.

2.0 PROPERTY LOCATION AND DESCRIPTION

The Ahlgrimm Site is located on the south side of Givens Road in the Western ½ of the Northeast ¼ of Section 33, Township 22 North, Range 15 East, Town of Hortonia, Outagamie County, Wisconsin. The Prill Area of the Ahlgrimm Site is located in the Southwest ¼ of the Northeast ¼ of Section 33, Township 22 North, Range 15. A Site Location Map is included as Figure 1, Appendix A. Figure 2, Appendix A, provides a site and vicinity map illustrating the location of the Prill Area. The Ahlgrimm Site contact is Mr. John Ahlgrimm.

Based on information received from the Town of Hortonia, Clerk of Court, the Ahlgrimm Site is zoned Prime Agricultural District and includes a steel building and gravel parking area located in the northwest part of the property in the main compound area. The Prill Area, in the southwest part of the site, is primarily used as a staging area for equipment associated with the Ahlgrimm Explosives facility as well as a cow pasture for Rodney Martin. The majority of the Prill Area of the Ahlgrimm Site has a vegetative surface and is at an elevation of approximately 870 feet above mean sea level. The Ahlgrimm Site is bound on the south, east, and west by agricultural parcels. The Wolf River flows generally east to west approximately 1 mile to the north of the site.

3.0 GEOLOGIC SETTING

The local geology consists of a thin veneer of unconsolidated material overlying bedrock. Bedrock lies at a depth of approximately 4 feet below ground surface (bgs) in the area, but varies by several feet across the site. Bedrock in this area consists of dolomite and sandy limestone of the Lower

Ordovician Prairie du Chien Group. The Prairie du Chien Group overlies Cambrian Sandstone from which local potable wells draw their water. The contact between the Prairie du Chien and Cambrian sandstone is exposed in a road cut along Highway 15 a short distance to the northwest of the site. Shallow groundwater in the area generally flows northward toward the Wolf River.

4.0 BACKGROUND

The Wisconsin Department of Natural Resources (WDNR) performed a limited sampling effort at the Ahlgrimm Site on November 16, 2011. A total of six (S-01 through S-06) soil samples were collected from four separate areas: 1) in an area where trucks were routinely washed outside the east door of a building, 2) outside the building near where a pipe discharges fluids generated during drill bit sharpening, 3) at a burn pit area, and 4) in the area where granular ammonium nitrate is stored in an aboveground bin (Figure 2). Based on the soil testing results, WDNR opened four separate case numbers. Terracon prepared a work plan for an NR 716 Site Investigation to concurrently investigate via test pit soil sampling the contaminants of concern in each area including volatile organic compounds (VOCs); various metals; polycyclic aromatic hydrocarbons (PAHs); nitrite-nitrate as nitrogen (NO_{2-3} as N); and ammonia-ammonium as nitrogen (NH_{3-4} as N).

Following WDNR approval of the work plan with several minor modifications on September 28, 2012, the site investigation commenced in October 2012, which consisted of excavating a total of 20 test pits including three background test pits to help determine background concentrations of aluminum, iron, copper, and zinc. Based on the results of the site investigation (SI), Terracon proposed remedial action excavation of soil from small areas associated with the drill bit grinding area, burn pit area, and prill area as described in Terracon's *NR 716 Site Investigation Report* dated July 31, 2013, which also included a Remedial Action Plan (RAP). On September 11, 2013, WDNR approved Terracon's SI and RAP with the following condition:

- At the completion of the excavation, confirmation samples must be collected and analyzed for the appropriate parameters.

Based on the data presented in the SI report, WDNR required no additional work for the East Door-Truck Wash Area (BRRTS #02-45-558040) and reclassified the case to "No Action Required". The proposed remedial action for the Prill Area (BRRTS #02-45-558037), Drill Bit Grinding Area (BRRTS #02-45-558038), and Burn Pit Area (BRRTS #02-45-558039), proceeded in November 2013. The remedial action was documented in Terracon's *Remedial Action Documentation Report* (RAR) dated February 3, 2014.

Upon review of the RAR, WDNR agreed that the Drill Bit Grinding Area (BRRTS #02-45-558038) and Burn Pit Area (BRRTS #02-45-558039) could be reviewed for regulatory closure. Following submittal of closure requests, both the Drill Bit Grinding Area (BRRTS #02-45-558038) and Burn Pit Area (BRRTS #02-45-558039) were closed on June 5, 2015.

With respect to the Prill Area, the WDNR closure committee indicated that the case could not be reviewed for closure until a groundwater investigation was performed, including obtaining information related to the site potable well. Further, WDNR requested additional soil investigation in the ammonium-nitrate bin (Prill) area because potentially contaminated soil was left in place between the ammonium-nitrate bin footers during the initial excavation that took place in November 2013.

Following submittal and approval of a Work Plan, the site investigation proceeded in December 2014 with the construction, development, and sampling of one monitoring well downgradient from the ammonium nitrate bin and inspection and sampling of the site potable well located at the main compound to the north (Figure 2). Following preliminary review of data collected during the initial groundwater investigation, the WDNR determined that additional groundwater monitoring wells and quarterly groundwater sampling were necessary. Following approval of a monitoring well construction variance to allow smaller diameter wells to be constructed by Ahlgrimm Explosives, nine groundwater monitoring wells were constructed in September 2015. The monitoring wells, consisting of eight observation wells and one piezometer, were developed and sampled in September 2015 following by quarterly groundwater sampling events in December 2015, and March and June 2016.

The additional soil investigation included advancing two hand auger borings, HA-1 and HA-2, in December 2014 between the footings where soil was left in place during the 2013 excavation. The results indicated $NO_{2\text{-}3}$ as N concentrations up to 561.1 milligrams per kilogram (mg/kg) remained between the footings. An attempt to remove as much of that remaining contaminated soil as possible via additional excavation was made in September 2015. However, because it was inaccessible to the reach of the backhoe, excavation limit samples indicated that a thin veneer of contaminated soil remained along the north sidewall of the south excavation, the south sidewall of the north excavation, and along the soil-bedrock interface (Table 1, Appendix B). Prior to backfilling, a heavy plastic liner was placed in the excavations and under the prill bin.

The results of the investigation and remedial activities were documented in Terracon's *NR 716 Groundwater Site Investigation and Supplemental Remedial Action Report*, dated September 18, 2017. The report recommended regulatory closure of the site. In preparation for site closure, Ahlgrimm Explosives submitted a fee and requested a technical review of the report. Following a preliminary review of the data, the WDNR requested additional investigation, including soil sampling and construction of an additional offsite, upgradient groundwater monitoring well. Ahlgrimm Explosives requested a pause in the technical review in order to collect that data. Terracon prepared a *Supplemental NR 716 Site Investigation Work Plan*, dated December 13, 2017, for the requested additional site investigation work. The WDNR approved the work plan in email correspondence dated December 18, 2017. The work plan was implemented on December 19, 2017. This report provides documentation of that work.

5.0 SCOPE OF SERVICES

To address the WDNR request for additional information, Terracon performed the following scope of services documented in this report:

- Prepared a Work Plan for the NR 716 Supplemental Site Investigation in the Prill Area which included one additional upgradient offsite monitoring well and additional soil sampling near the ammonium nitrate bin;
- Obtained approval for a monitoring well construction variance for the additional monitoring well on December 18, 2017;
- Advanced two hand-auger soil borings beneath the ammonium nitrate bin on December 17, 2014;
- Constructed, developed, and surveyed one additional offsite upgradient bedrock observation well in December 2017;
- Performed one round of groundwater monitoring (December 2017); and
- Prepared this NR 716 Supplemental Site Investigation Report.

5.1 Verification Hand Auger Borings and Soil Sampling

During preliminary review of the *NR 716 Groundwater Site Investigation and Supplemental Remedial Action Report*, the WDNR indicated concern that the local sand material used to backfill the previous ammonium nitrate bin excavations was contaminated. The WDNR was also concerned that the area had been re-contaminated by continuing releases. In response they requested additional hand auger borings beneath the ammonium nitrate bin to test the fill at the same depths as the sidewall samples collected during the 2015 “between the footings” excavations. To address these concerns, hand auger borings HA-3 and HA-4 were advanced to depths of 4 feet bgs at the approximate locations shown on Figure 3, Appendix A, on December 19, 2017. A sample was collected at 1 foot and 4 feet bgs in each boring, placed on ice in a cooler, and transported to a Wisconsin-certified laboratory for analysis of NO_{2-3} as N, under chain-of-custody protocols. At these boring locations, the heavy plastic liner placed after the 2015 footing excavations was present at a depth of approximately 6 inches bgs. To test whether there had been additional releases following the previous contaminated soil excavations, a soil sample was collected at a depth of approximately 3 inches bgs, (above the plastic) directly under the loadout chute and submitted for analysis of NO_{2-3} as N.

5.2 Groundwater Investigation

On December 19, 2017, Terracon observed drilling and construction of an offsite groundwater monitoring well (MW-9) in the farm field upgradient (south) of existing observation well MW-6 on property owned by Jim and Gloria Bauer. The approximate monitoring well location is shown on Figure 4, Appendix A. Monitoring well MW-9 is located approximately 100 feet upgradient and

topographically upslope from existing observation well MW-6. Monitoring well MW-9 was constructed as an observation well in a manner similar to the existing monitoring wells and in conformance with the monitoring well construction variance that was approved by the WDNR on December 18, 2017. A copy of the variance and approval is included in Appendix C.

5.2.1 Monitoring Well Construction

On December 19, 2017, the well borehole was drilled by Ahlgrimm Explosives personnel using their own air hammer drilling rig to advance the monitoring well borehole. An approximate 6-inch diameter hole was initially drilled approximately 1 foot into competent bedrock at a depth of approximately 12 feet bgs, and cased with 6-inch diameter polyvinyl chloride (PVC) piping to prevent caving of unconsolidated materials. The casing extended approximately 1.5 feet above grade. An approximate 4-inch diameter hole was drilled inside the casing to the terminal depth of the boring at approximately 31.9 feet bgs in bedrock. In conformance with the approved work plan, soil samples were not collected. The cuttings were observed by Terracon at approximate 5-foot intervals and the driller informed Terracon of bit-drop intervals during the air-hammer drilling. One significant void was noted from approximately 16 to 16.5 feet bgs, which is correlative with a void noted in observation well MW-6 at 13 to 14 feet bgs. This drilling method did not require the introduction of significant quantities of water or drilling fluids to maintain an open borehole and purge the cuttings. The unconsolidated soil and bedrock cuttings were thinspread onsite near the location of the boring as described in the work plan.

On December 19, 2017, Terracon observed construction of observation well MW-9 in conformance with the approved variance. Observation well MW-9 was constructed using a 1-inch diameter, No. 10-slot, Schedule 40, PVC well screen and riser pipe. Water was noted in the borehole at between 25 and 28 feet bgs and therefore the bottom of the 10-foot-long screen was placed at approximately 31 feet bgs. Coarse filter pack sand was placed around the screen to approximately 2 feet above the screen. The annular space was sealed according to the requirements of NR 141, WAC. The well was completed with an above-grade protective casing and a locked cap. A boring log and well construction form are included in Appendix C. Photographs of the drilling and monitoring well construction are included as Appendix D.

5.2.2 Monitoring Well Development and Survey

New observation well MW-9 was developed per Chapter NR 141, WAC, by pumping with dedicated tubing and a peristaltic pump. The water purged from MW-9 during development became clear after only 5 gallons were pumped. The well readily yielded water. As with agricultural chemical sites managed by the Department of Agriculture, Trade and Consumer Protection (DATCP) and as described in the work plan, the development/purge water was spread on the ground near the wellhead. A monitoring well development form is included in Appendix C.

Upon completion of monitoring well MW-9, the ground surface elevation and top of the well casing elevation was surveyed to an accuracy of 0.01 foot using an automatic level. Because there are no benchmarks in the area, the well was surveyed relative to the top-of-casing elevation of existing observation well MW-6.

5.2.3 Groundwater Monitoring

Following construction and development of observation well MW-9, a limited groundwater monitoring event was conducted on December 20, 2017. The groundwater monitoring event included measuring the static water level in each accessible well in the monitoring well network and collecting groundwater samples from selected monitoring wells MW-1, MW-6, and MW-9.

Terracon measured and recorded static groundwater levels from each accessible monitoring well in the network after opening the monitoring well caps and allowing water levels to equilibrate. Groundwater levels were measured to the nearest 0.01 foot using an electronic water level indicator that was decontaminated prior to each measurement. Water levels could not be measured in observation wells MW-3 and MW-5 because they were dry, and in MW-8 because the well had been damaged by cows such that the casing was cracked, which allowed bentonite to flow into the well and seal it.

The selected monitoring wells were sampled for NO_{2-3} as N during the December 2017 event in general accordance with the WDNR-approved work plan. The work plan included sampling observation wells MW-2, MW-3, and MW-4. Observation well MW-3, located farthest downgradient to the northeast, was dry and could not be sampled. Samples were not collected from monitoring wells MW-2 and MW-4 due to time constraints and an impending snow storm.

The three observation wells were sampled using a peristaltic pump and dedicated polyethylene drop tubing in each well. Groundwater sampling field sheets are included in Appendix E.

Samples were collected in laboratory-provided sample containers, placed on ice in a cooler, and transported under chain-of-custody protocols to a Wisconsin-certified laboratory for analysis of NO_{2-3} as N. A blind duplicate was also collected from observation well MW-1 and analyzed for NO_{2-3} as N as part of the quality assurance/quality control program.

6.0 SITE INVESTIGATION RESULTS

6.1 Geology

Near the ammonium nitrate bin the surficial materials include approximately 2 to 2.5 feet of silty topsoil, dolomite and limestone cobbles, sand, and gravel. Below surficial materials lies mainly red-brown silty sand to fine grained sand with varying amounts of silt to depths ranging from 1.2

feet bgs to 3.1 feet bgs. Below the silty sand to sand layer lies mainly reddish brown clay with varying amounts of silt and with trace to little gravel up to 1 inch in diameter. The clay generally thickens to the north and south as the depth to bedrock increases. Laterally discontinuous layers of silt and sand occur at variable depths within the clay unit. Beneath the unconsolidated materials is dolomite bedrock. The bedrock is typically weathered in the upper 1-2 feet and fairly competent below the weathered portion of bedrock. At the location of observation well MW-9, unconsolidated materials were present to approximately 10 feet bgs overlying approximately 1 foot of weathered bedrock. Competent dolomite was encountered at approximately 11 feet bgs. A significant bit drop suggesting a void space was noted from 16 to 16.5 feet bgs at the MW-9 location. Significant bit drops and/or softer bedrock were noted by the drillers at several other monitoring well locations.

6.2 Soil Sampling Results

Hand auger borings HA-3 and HA-4 were advanced on December 19, 2017, at the locations shown on Figure 3. The approximate location of the sample collected above the plastic is also shown on Figure 3. The soil analytic test results are summarized in Table 1. The results indicated that the NO_{2-3} as N concentrations ranged from 3.1 mg/kg (HA-3 [1']) to 6.2 mg/kg (Above Plastic [3"]). These results are far below the 100 mg/kg DATCP cleanup guideline for agricultural sites. The laboratory analytic test reports and chain-of-custody record are included in Appendix E.

6.3 Hydrogeology

Groundwater levels were measured at each accessible monitoring well prior to purging during the December 2017 groundwater monitoring event. Groundwater elevations are presented in Table 2, Appendix B, and are shown graphically as groundwater hydrographs on Figure 5, Appendix A. A groundwater contour map for the December 2017 monitoring event is included as Figure 6, Appendix A.

The groundwater flow pattern at the water table shown on Figure 6 is generally consistent with the previous sampling events with overall flow to the north to northeast. The groundwater elevation of new observation well MW-9 was not used to calculate the groundwater contours because it appeared to not yet be equilibrated at the time of measurement. Because observation well MW-9 is upgradient based on historical groundwater elevations and location relative to the Wolf River to the north, and because it is topographically higher than observation well MW-6, the groundwater elevation at MW-9, should be higher than at MW-6 when equilibrated.

The groundwater contours and flow pattern depicted on Figure 6 represent project historical low groundwater levels. The groundwater levels measured December 20, 2017, indicated the depth to groundwater from the top of casing elevation varied from approximately 11.46 to 26.18 feet bgs in the water table observation wells, which is generally 2 to 4 feet lower than previous

measurements. The historical low groundwater elevations reflect a dry fall and the earliest time the ground has frozen during the project.

6.4 Groundwater Results

6.4.1 Regulatory Criteria for Groundwater

The WDNR has established groundwater quality standards, which are set forth in Chapter NR 140, WAC. For each regulated compound, two standards have been established, the Groundwater Quality Enforcement Standard (ES) and the Groundwater Quality Preventive Action Limit (PAL). In general, if the regulated contaminant exceeds the PAL value, but is below the ES value, the WDNR may require additional investigation / continued monitoring. If the regulated contaminant is above the ES value, the WDNR may require additional investigation, continued monitoring and/or remediation.

6.4.2 Analytic Test Results

NO_{2-3} as N was detected above the ES of 10 milligrams per liter (mg/L) in each of the monitoring wells sampled during the December 2017 sampling event. The groundwater analytic test results are summarized in Table 3, Appendix A. The laboratory analytic test reports and chain-of-custody records are included in Appendix E.

The NO_{2-3} as N concentration at new offsite upgradient observation well MW-9 was 14.3 mg/L, which was higher than the NO_{2-3} as N concentration at onsite upgradient observation well MW-6 (11.9 mg/L). The highest NO_{2-3} as N concentration was detected at source area observation well MW-1, which had 15.8 mg/L.

6.5 Analysis and Evaluation

6.5.1 Soil

The hand auger soil samples collected at 1 and 4 feet bgs beneath the liner in the fill material from the 2013 excavations had minimal concentrations of NO_{2-3} as N. Hand auger boring HA-3 was located less than 1 foot south of the 2015 north footing excavation south sidewall sample. Hand auger boring HA-4 was located less than 1 foot north of the 2015 south footing excavation north sidewall sample. This confirms that there is a minimal volume (less than 0.5 to 1 cubic yard) of soil left in place with total nitrogen concentrations above 100 mg/kg, as the 2015 footings excavations removed soil to the bedrock surface at the base (leaving a thin veneer of soil in place) and to the extent practicable between the pillars, leaving a thin veneer of impacted soil in place along the sidewalls where the backhoe could not reach as necessary to preserve the structural

integrity of the bin. The minimal amount of contaminated soil left in the 2015 excavations was due to structural impediments.

The low NO_{2-3} as N concentration in the soil sample collected at a depth of approximately 3 inches bgs and above the plastic liner confirms that minimal, if any, additional releases occurred after the 2013 and 2015 excavations. The results of the five soil samples collected in December 2017 also confirm that the local material used to backfill the 2013 and 2015 excavations had, at most, minimal concentrations of NO_{2-3} as N.

6.5.2 Groundwater

The distribution of NO_{2-3} as N in groundwater during the December 2017 event is presented as Figure 7, Appendix A. The map shows that NO_{2-3} as N concentrations were above the ES at both onsite upgradient observation well MW-6 and offsite upgradient observation well MW-9, with the higher concentration at MW-9. This indicates that background concentrations in the shallow groundwater are above the ES, even after a dry fall and early freezing of the ground limited leaching of NO_{2-3} as N from the soil. The primary source of the background NO_{2-3} as N concentrations is fertilizer spread on the farm field in the spring, which is dissolved and carried into the groundwater by infiltrating precipitation.

The NO_{2-3} as N concentration at source area observation well MW-1 was only 1.5 mg/L higher than the background concentration at offsite upgradient well MW-9 and 3.9 mg/L higher than onsite upgradient observation well MW-6. This suggests that there may be a small contribution of NO_{2-3} as N from prill bin releases to the NO_{2-3} as N area wide groundwater conditions in a limited area just downgradient from the prill bin source.

NO_{2-3} as N concentration trends compared to groundwater elevations are shown on Figure 8, Appendix A, for observation wells MW-1, MW-6, and MW-9. Comparing the groundwater elevation data with the NO_{2-3} as N data, it is apparent that when the groundwater levels at the site are lower, concentrations of NO_{2-3} as N are generally lower in the monitoring wells. Conversely, when the water levels are higher, the concentrations of NO_{2-3} as N are generally higher in the monitoring wells. There are also seasonal fluctuations in the background NO_{2-3} as N concentrations related to spreading fertilizer in the spring in the adjacent, upgradient farm field. The December 2017 groundwater elevations reflect project historical low concentrations due to a dry fall and early ground frost. However, the pattern remains the same, with NO_{2-3} as N concentrations at observation well MW-1 (only) slightly above the background concentrations, regardless of groundwater elevations. Further, NO_{2-3} as N concentrations at MW-1 have consistently decreased over time in relation to the background concentrations.

7.0 INVESTIGATION DERIVED WASTE

Investigation derived waste (IDW) generated during this investigation included purge water from sampling observation wells MW-1 and MW-6. The purge water was contained in a drum left onsite. The partial drum of purge water will be removed and disposed by Rock Oil Refining (Rock) at their facility in the future. Soil/rock cuttings and development/purge water from observation well MW-9 were thinspread on the ground near the wellhead as described in the work plan.

8.0 CONCLUSIONS AND RECOMMENDATIONS

The supplemental soil investigation verified that only a small volume (less than 1 cubic yard) of contaminated soil remains and that the local material used as backfill during the 2013 and 2015 excavations was at most minimally impacted by NO_{2-3} as N concentrations. The supplemental groundwater investigation verified that offsite upgradient background NO_{2-3} as N concentration is above the ES and above the onsite upgradient NO_{2-3} as N concentrations. The source area well NO_{2-3} as N concentrations are only slightly above the background concentrations. Terracon recommends regulatory closure of the Ahlgrimm Explosives Prill Area site.

As such, Terracon recommends preparation and submittal of a closure request for the site with Geographic Information Systems (GIS) registry for the residual NO_{2-3} as N groundwater concentrations at observation well MW-1 above ES. In summary, data to support closure at this time include the following:

- NO_{2-3} as N groundwater concentrations remain at or below approximate background levels in all monitoring wells except MW-1.
- Concentrations of NO_{2-3} as N in observation well MW-1 appear to be stable to decreasing and are only approximately 1.5 mg/L above background concentrations detected at upgradient observation well MW-9 and 3.9 mg/L above concentrations at upgradient observation well MW-6.
- Observation well MW-1 is located just downgradient from the ammonium nitrate bin and, therefore, should be representative of the highest groundwater NO_{2-3} as N concentrations at the site.
- Soil impacted with NO_{2-3} as N and NH_{3-4} as N has been excavated and disposed at a licensed landfill, removing the vast majority of the contaminant mass. As demonstrated by the soil results from hand auger borings HA-3 and HA-4, only thin veneers of soil remain above the bedrock surface and within sidewalls between bin footing pillars that could not be excavated due to structural impediments.
- As demonstrated by the results of the “above plastic” soil sample, there were minimal, if any, additional releases after the 2015 excavations.
- The soil results confirm that the local material used as fill after the 2013 and 2015 excavations, was, at most, minimally contaminated.

- As of January 2017, use of the ammonium nitrate prill at this site was discontinued. Prill is currently obtained from an offsite source and contained in sealed WDOT-approved trucks. As such, the bin is no longer a potential source of contamination.
- Because there is minimal impacted soil remaining, probably less than 1 cubic yard, we consider this to be a *de minimis* condition and not necessary to close with GIS registry of residual soil contamination.
- If conditions change and ammonium nitrate is once again stored/used from an onsite bin, the new bin will be constructed with a concrete pad and containment to minimize the impact of potential releases.

In preparation for closure, Ahlgrimm Explosives had submitted a technical review fee for review of Terracon's *NR 716 Groundwater Investigation and Supplemental Remedial Action Report, dated September 8, 2017,* Following a preliminary review, Ahlgrimm requested the review be paused in order to submit additional data that is contained within this *NR 716 Supplemental Site Investigation Report*. On behalf of Ahlgrimm Explosives, Terracon requests review of both these reports and written response regarding general closure implications, and specifically answer the following questions:

- The December 2017 soil sampling results verified that there is minimal remaining soil in the prill bin source area with total nitrogen concentrations above the 100 mg/kg DATCP cleanup goal for agricultural sites, likely less than 0.5 to 1 cubic yard. The results also verified that the local material used as backfill in the 2013 and 2015 excavations was at most minimally impacted with NO_{2-3} as N and that there had not been additional releases after the 2015 excavation. Other than the prill bin, there are not nor have there been any other sources of ammonium nitrate sources at the site. As such, it appears that a *de minimis* condition exists with regards to the soil contamination. As such, is soil GIS registry necessary?

- The December 2017 groundwater results verified that offsite background groundwater NO_{2-3} as N concentrations were higher than the ES and higher than upgradient onsite NO_{2-3} as N concentrations. It has also been demonstrated that downgradient observation wells MW-2, MW-3, and MW-4 had average NO_{2-3} as N concentrations at or below average NO_{2-3} as N concentrations at upgradient observation well MW-6 indicating that background NO_{2-3} as N concentrations from the farm field to the south (MW-9) are present on the site. Does the WDNR agree that background NO_{2-3} as N concentrations above the ES have impacted the site? Does the WDNR agree that the impacted groundwater plume from prill bin releases has been defined?

- Although NO_{2-3} as N concentrations at source area observation well MW-1 fluctuate with seasonal background concentrations, the NO_{2-3} as N concentrations

at MW-1, although above the ES, are only slightly higher than background concentrations. As such, it appears that the contribution of NO_{2-3} as N in groundwater from prill bin source releases is minimal, only 1 to 4 mg/L above background concentrations. Because that contribution is less than the NO_{2-3} as N ES of 10 mg/L, is groundwater GIS registry actually necessary?

- Are there any other obstacles or conditions that would inhibit closure for this site?

9.0 CERTIFICATIONS

I, Scott A. Hodgson, P.G., hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this document is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code.

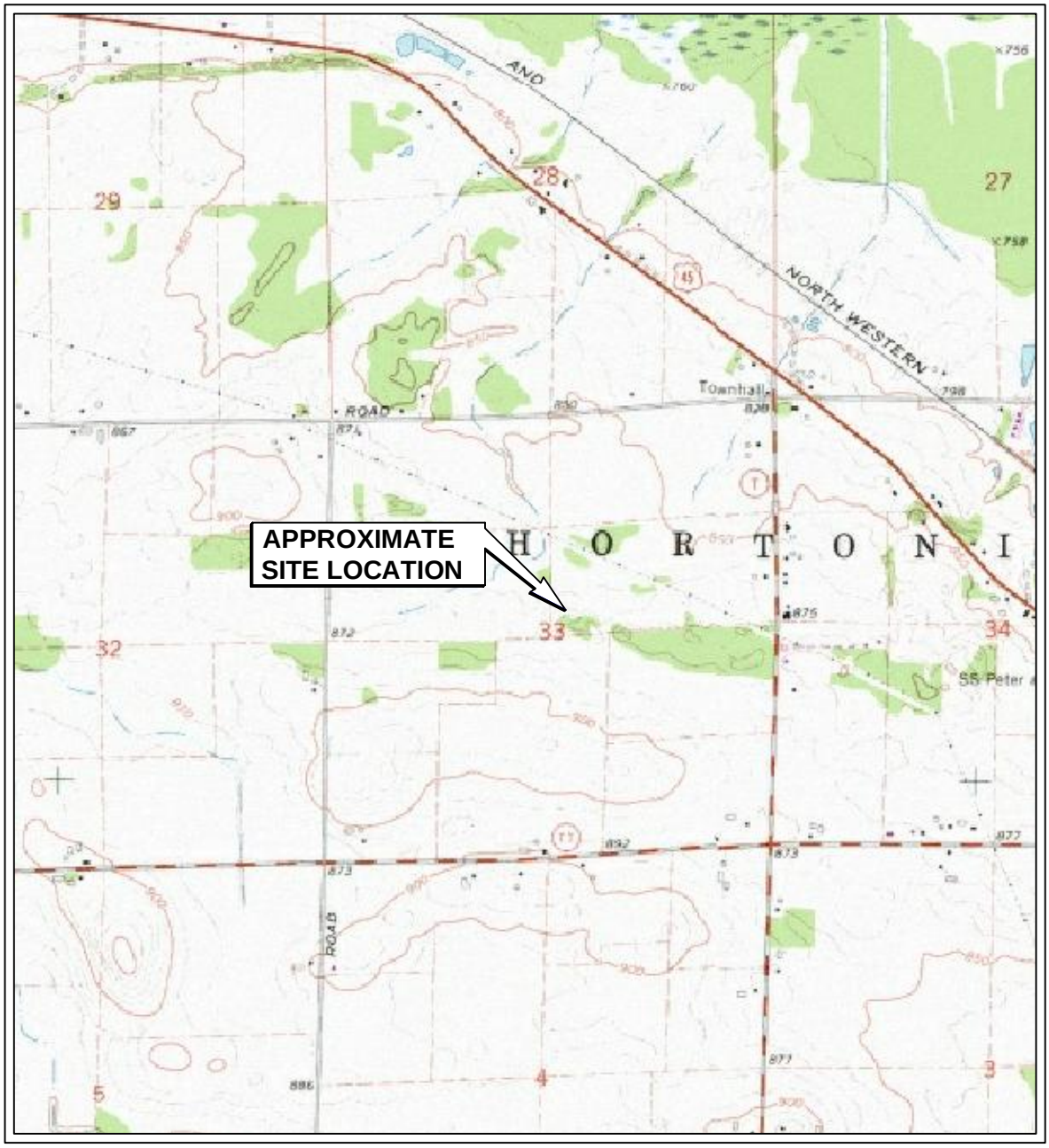
Scott A. Hodgson PG-1229 Date 1/15/18
Signature and P.G. number

Project Geologist
Title

APPENDIX A

FIGURES 1 to 8

UNITED STATES – DEPARTMENT OF THE INTERIOR – GEOLOGICAL SURVEY



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MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

CONTOUR INTERVAL 10 FEET

NATIONAL GEODETIC VERTICAL DATUM OF 1929

HORTONVILLE QUADRANGLE
OUTAGAMIE COUNTY ~ WISCONSIN
1975
7.5 MINUTE SERIES (TOPOGRAPHIC)

DIAGRAM IS FOR GENERAL LOCATION ONLY AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	SAH
Drawn By:	JLM (41)
Checked By:	SAH
Approved By:	SAH

Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C1
Date:	6/2017

Terracon
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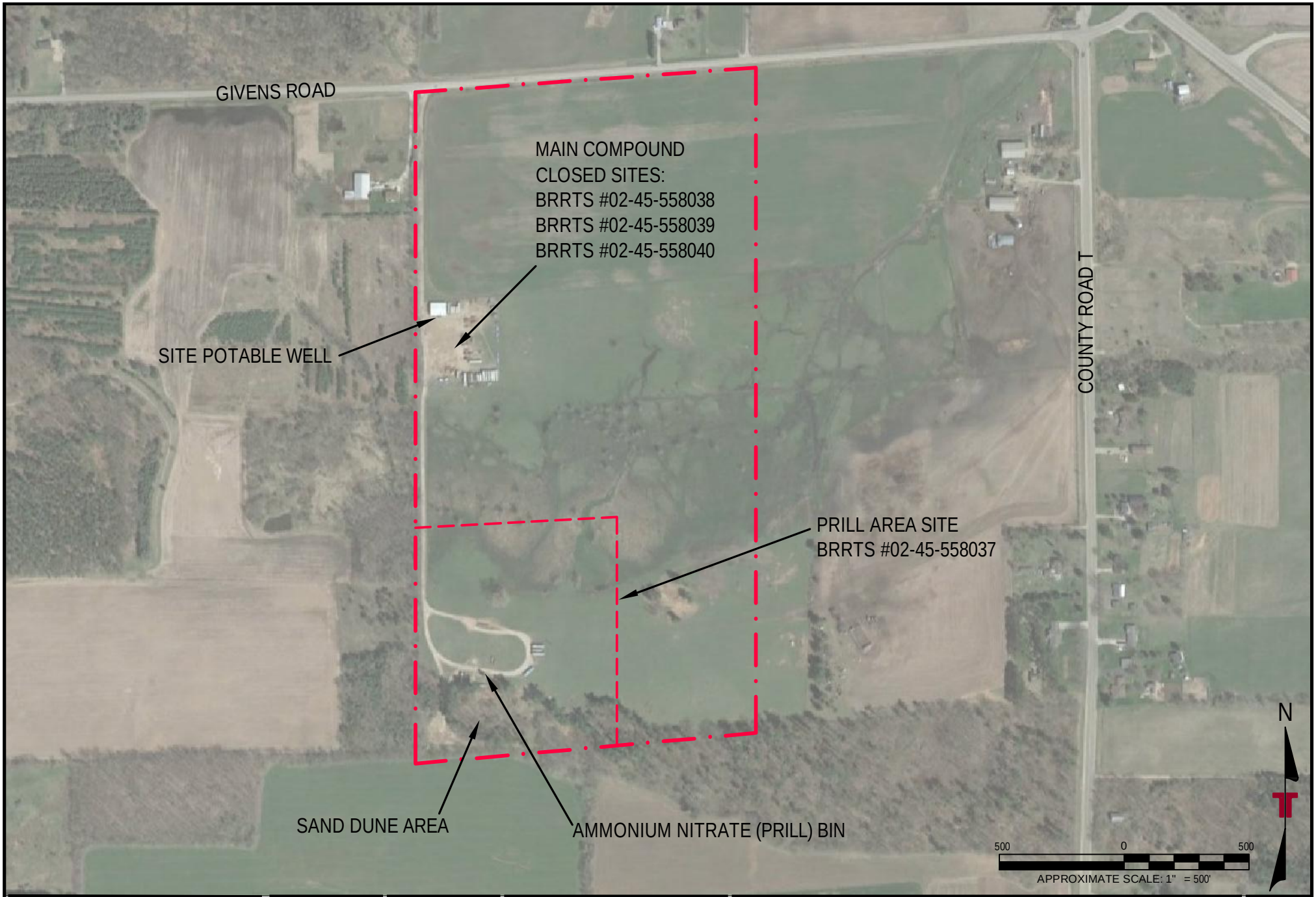
PH (414) 423-0255 FAX (414) 423-0566

SITE LOCATION MAP

AHLGRIMM EXPLOSIVES
W9899 GIVENS ROAD
HORTONVILLE WISCONSIN

FIGURE
1
(FIG1 TOPO)



LEGEND

APPROXIMATE AHLGRIMM EXPLOSIVES BOUNDARY

IMAGE SOURCE: GOOGLE EARTH PRO; DATED: 4/2015

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	SAH
Drawn By:	JLM (41)
Checked By:	SAH
Approved By:	SAH

Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C1
Date:	9/2017

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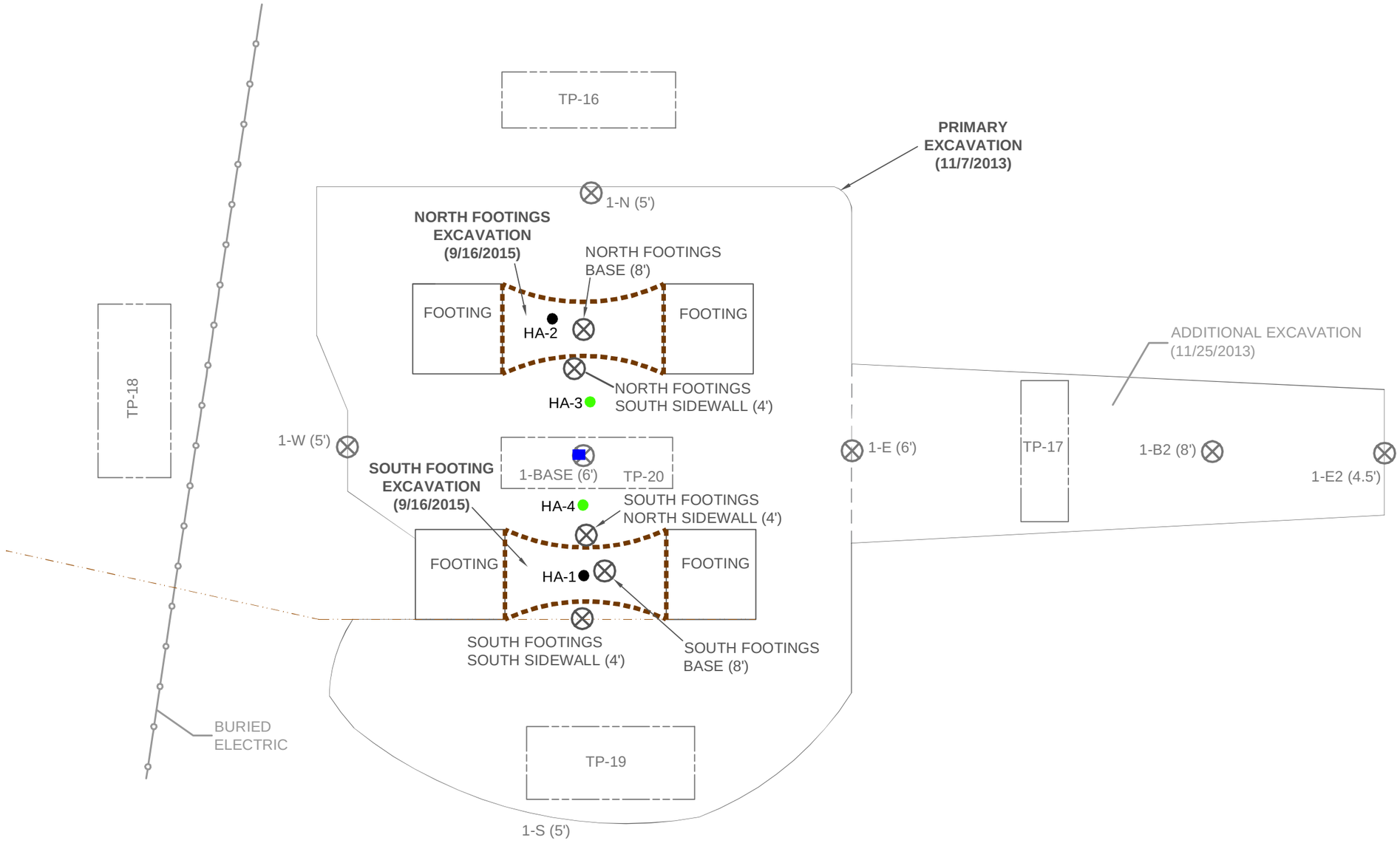
SITE MAP

AHLGRIMM EXPLOSIVES
W9899 GIVENS ROAD
HORTONVILLE WISCONSIN

FIGURE
2



N

5 0 5

APPROXIMATE SCALE: 1" = 5'

LEGEND

- SOIL SAMPLE ABOVE PLASTIC (3")
- HAND AUGER BORING (2017)
- HAND AUGER BORING LOCATIONS
- SIDEWALL/BASE SAMPLE (DEPTH SHOWN IN FEET)
- PREVIOUS EXCAVATION SIDEWALL/BASE SAMPLE (DEPTH SHOWN IN FEET)
- EXCAVATION AREA
- TEMPORARY SIDEWALL
- FENCELINE

DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES.

C:\Users\jlmarkel\Desktop\Terracon Projects\WISCONSIN OFFICE\2012\58127001\58127001C2-NBEA.dwg

Project Mngr:	PAL
Drawn By:	LEB
Checked By:	SAH
Approved By:	SAH
Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C2-NBEA
Date:	12/2017

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Consulting Engineers and Scientists
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SOIL SAMPLE LOCATIONS

AHLGRIMM EXPLOSIVES - PRILL AREA
W9899 GIVENS ROAD
HORTONVILLE, WISCONSIN

FIGURE 3

LEGEND

- OBSERVATION WELL
- PIEZOMETER
- APPROXIMATE PROPERTY LINE

IMAGE SOURCE: GOOGLE EARTH PRO; DATED: 4/2015
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	SAH
Drawn By:	JLM (41)
Checked By:	SAH
Approved By:	SAH
Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C1
Date:	12/2017

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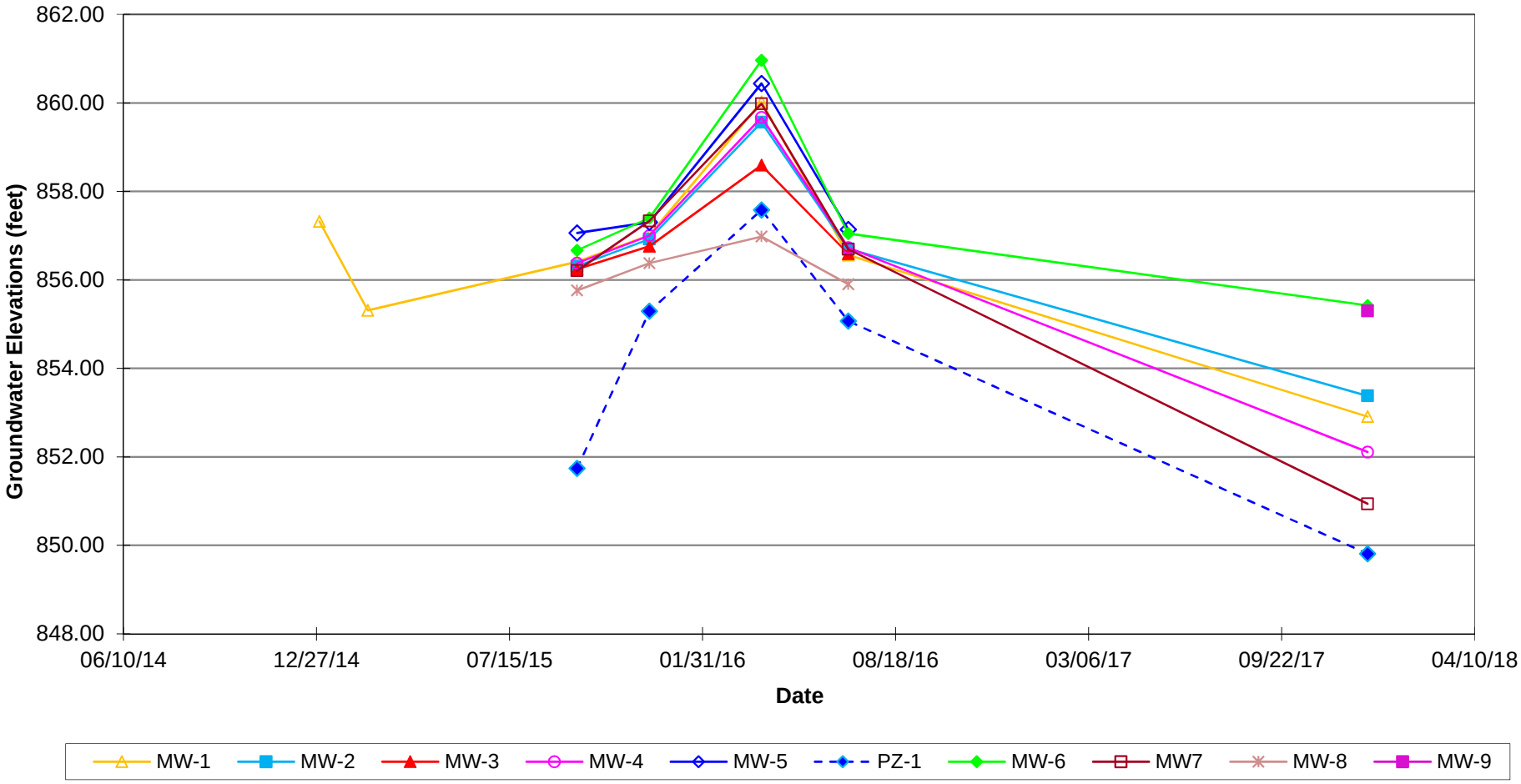
MONITORING WELL LOCATIONS

AHLGRIMM EXPLOSIVES - PRILL AREA
W9899 GIVENS ROAD
HORTONVILLE WISCONSIN

FIGURE
4

FIGURE 5
Groundwater Hydrographs

Ahlgrimm Explosives Prill Area
Hortonville, Wisconsin
Terracon Project No. 58127001



LEGEND

- GROUNDWATER CONTOUR, DASHED WHERE INFERRED
- (856.56) GROUNDWATER ELEVATION
- FLOW DIRECTION
- OBSERVATION WELL
- PIEZOMETER
- APPROXIMATE PROPERTY LINE

IMAGE SOURCE: GOOGLE EARTH PRO; DATED: 4/2015
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	SAH
Drawn By:	JLM (41)
Checked By:	SAH
Approved By:	SAH
Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C1
Date:	12/2017

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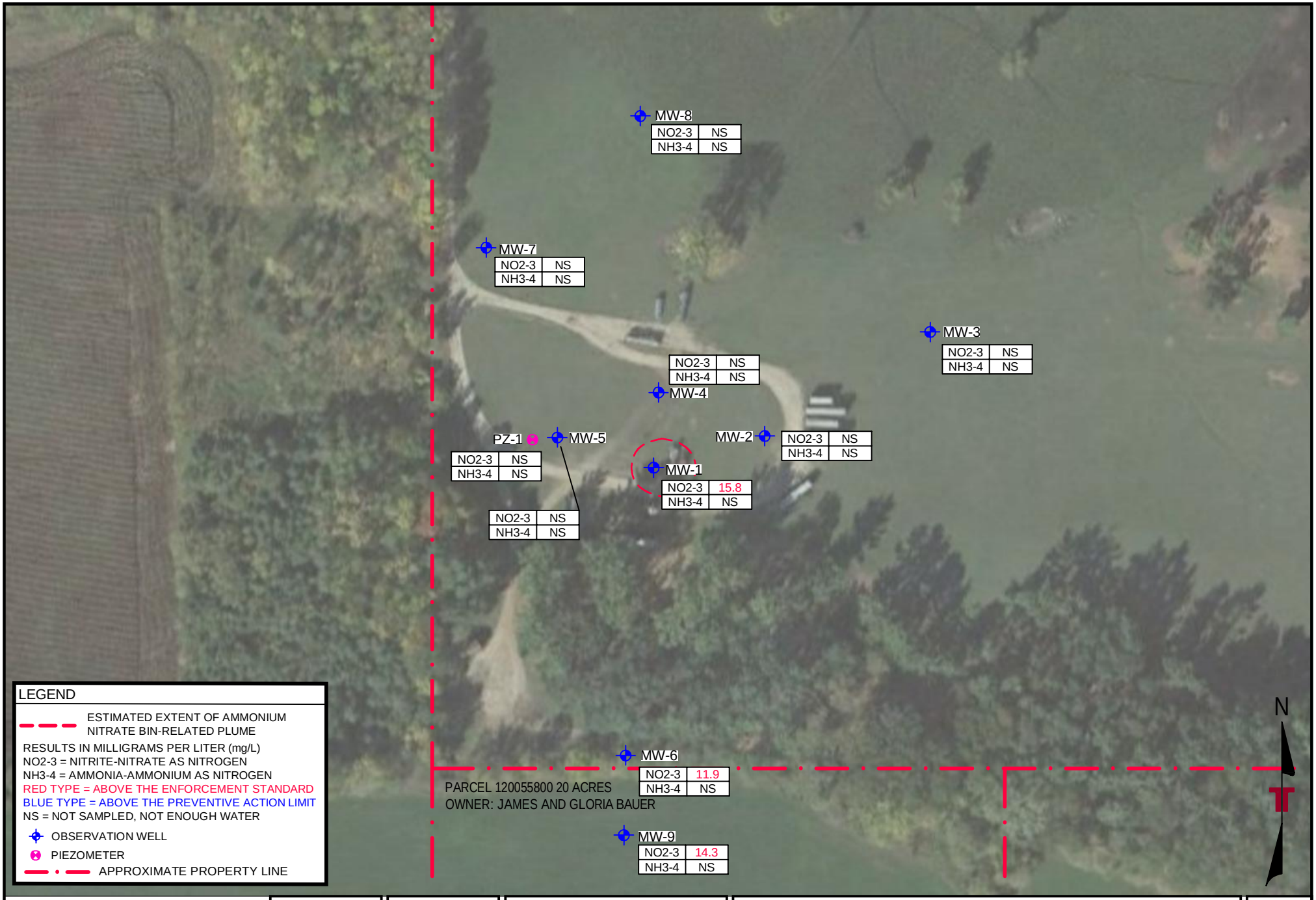
GROUNDWATER TABLE CONTOUR MAP (12/20/2017)

AHLGRIMM EXPLOSIVES - PRILL AREA
W9899 GIVENS ROAD
HORTONVILLE WISCONSIN

FIGURE
6



LEGEND

ESTIMATED EXTENT OF AMMONIUM NITRATE BIN-RELATED PLUME

RESULTS IN MILLIGRAMS PER LITER (mg/L)
NO2-3 = NITRITE-NITRATE AS NITROGEN
NH3-4 = AMMONIA-AMMONIUM AS NITROGEN
RED TYPE = ABOVE THE ENFORCEMENT STANDARD
BLUE TYPE = ABOVE THE PREVENTIVE ACTION LIMIT
NS = NOT SAMPLED, NOT ENOUGH WATER

OBSERVATION WELL

PIEZOMETER

APPROXIMATE PROPERTY LINE

150 0 150

APPROXIMATE SCALE: 1" = 150'

IMAGE SOURCE: GOOGLE EARTH PRO; DATED: 4/2015
DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

Project Mngr:	SAH
Drawn By:	JLM (41)
Checked By:	SAH
Approved By:	SAH

Project No.	58127001
Scale:	AS SHOWN
File No.	58127001C1
Date:	12/2017

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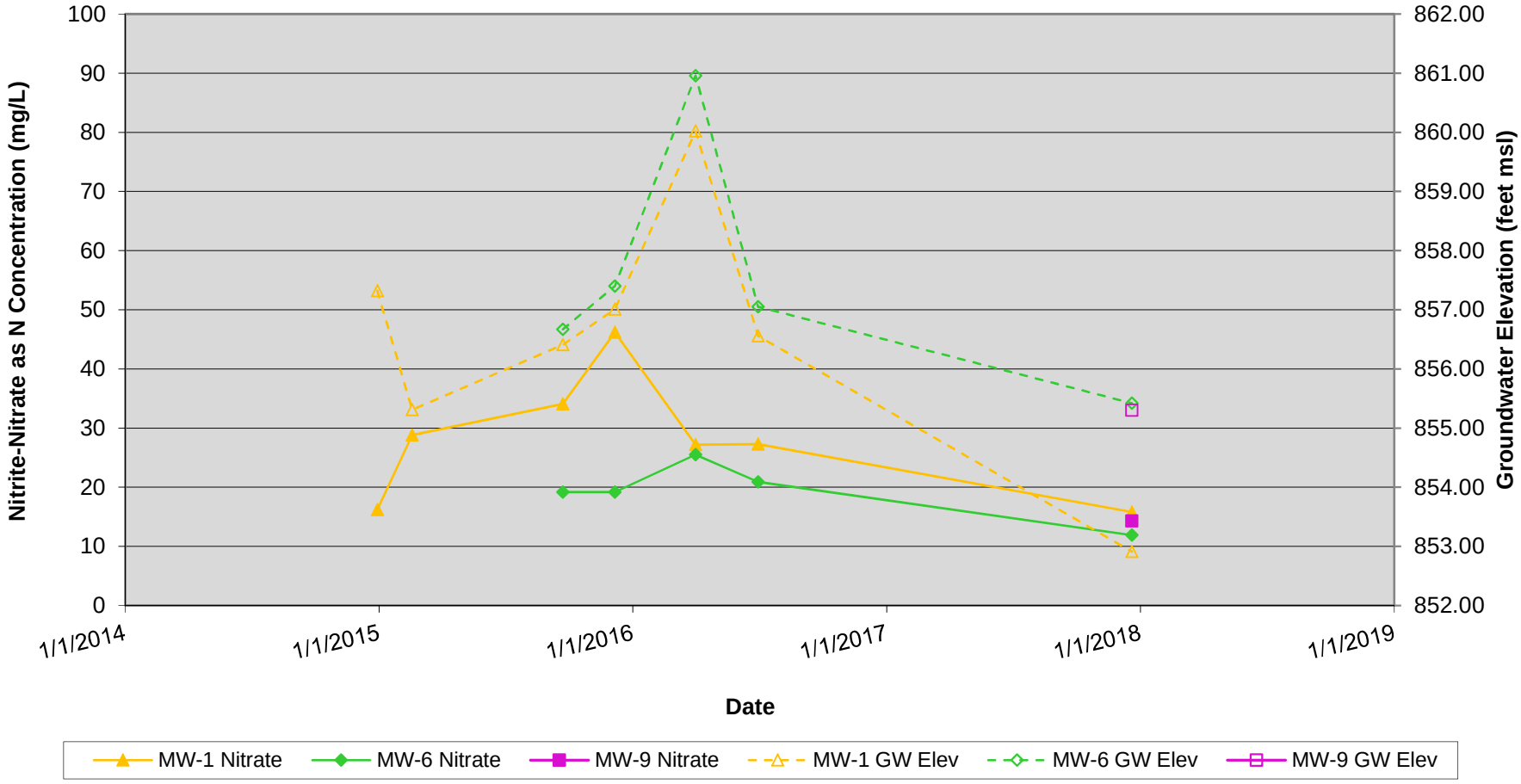
GROUNDWATER NITRATE DISTRIBUTION MAP (12/20/2017)

AHLGRIMM EXPLOSIVES - PRILL AREA
W9899 GIVENS ROAD
HORTONVILLE WISCONSIN

FIGURE
7

FIGURE 8
Groundwater Nitrate Concentration Trends: MW-1 / MW-6 / MW-9

Ahlgrimm Explosives Prill Area
Hortonville, Wisconsin
Terracon Project No. 58127001



APPENDIX B

TABLES 1 to 3

TABLE 1
Prill Area Soil Analytic Test Results Summary[1]

Ahlgrimm Explosives Prill Area
Town of Hortonia, Wisconsin
Terracon Project No. 58127001

Sample ID	Sample Depth (feet)	Sample Date	Nitrogen (mg/kg)		
			NO_{2-3} as N	NH_{3-4} as N	Total N (<100)
Ammonium Nitrate Bin (Prill) Area					
1-N	5	11/7/2013	23.7	<6.5	23.7
1-S	5	11/7/2013	13.6	21.6	35.2
1-W	5	11/7/2013	6.5	<8.5	6.5
1-E	6	11/7/2013	290	47.9	**337.9**
1-E-2	4.5	11/25/2013	14.8	47.3	62.1
1-BASE	6	11/7/2013	11.7	<7.8	11.7
1-BASE-2	8	11/25/2013	18.6	43.6	62.2
MW-1	5-10	12/17/2014	<1.4	12.5	12.5
HA-1 (1')	1	12/17/2014	4.7	24.4	29.1
HA-1 (4')	4	12/17/2014	198	105	**303.0**
HA-2 (1')	1	12/17/2014	80.7	149	**229.7**
HA-2 (4')	4	12/17/2014	544	17.1	**561.1**
N Footing, South Sidewall	4	9/16/2015	336	130.0	**466**
North Footing, Base	8	9/16/2015	486	20.5	**507**
S Footing, South Sidewall	4	9/16/2015	17.3	15.3 J	**33**
S Footing, North Sidewall	4	9/16/2015	245	156.0	**401**
South Footing, Base	8	9/16/2015	154	12.3 J	**166**
Above Plastic (3")	0.25	12/19/2017	6.2	--	**6.2**
HA-3 (1')	1	12/19/2017	3.1 J	--	**3.1**
HA-3 (4')	4	12/19/2017	5.4	--	**5.4**
HA-4 (1')	1	12/19/2017	5.8	--	**5.8**
HA-4 (4')	4	12/19/2017	3.7	--	**3.7**
Direct Contact Non-Industrial RCL[2]			**100,000**	**--**	**--**
Soil to Groundwater Pathway RCL[3]			--	--	--
Cleanup Goal for Agricultural Sites[4]			--	--	**100**

Notes:

[1] Parameters per approved Remedial Action Plan

[2] Residual Contaminant Levels (RCLs) for Direct Contact per the WDNR RCL Spreadsheet (March 2017). WDNR Soil Residual Contaminant Level Determinations were calculated using the US EPA Regional Screening Level Web Calculator as described in WDNR PUB-RR-890 (June 2013, with updates through RR052e-March 2017)

[3] RCLs for Protection of Groundwater per the WDNR RCL Spreadsheet (March 2017). WDNR Soil Residual Contaminant Level Determinations were calculated using the US EPA Regional Screening Level Web Calculator as described in WDNR PUB-RR-890 (June 2013, with updates through RR052e-March 2017).

[4] Department of Agriculture, Trade and Consumer Protection (DATCP) Cleanup Goal for agricultural sites for comparison

mg/kg = milligrams per kilogram

Bold and pink = Exceeds Non-industrial Direct Contact RCL

Underlined and blue = Excee Exceeds Soil to Groundwater Pathway RCL

Bold = Excceds the DATCP Cleanup Goal for total nitrogen

"J" = Detected above the laboratory limit of detection (LOD), but below the laboratory limit of quantitation (LOQ)

-- Indicates standard not established, not calculated or not analyzed

TABLE 2
Groundwater Elevation Summary

Ahlgrimm Explosives Prill Area
Town of Hortonia, Wisconsin
Terracon Project No: 58127001

Measured Location	Date	Depth to Groundwater*	Reference Elevation **	Water Table Elevation	Screened Interval	Ground Surface Elevation
MW-1	12/30/2014	12.68	870.00	857.32	853.9 - 863.9	870.25
MW-1	2/18/2015	14.69	870.00	855.31	853.9 - 863.9	870.25
MW-1	9/23/2015	13.59	870.00	856.41	853.9 - 863.9	870.25
MW-1	12/7/2015	12.99	870.00	857.01	853.9 - 863.9	870.25
MW-1	4/1/2016	9.98	870.00	860.02	853.9 - 863.9	870.25
MW-1	6/30/2016	13.44	870.00	856.56	853.9 - 863.9	870.25
MW-1	12/20/2017	17.09	870.00	852.91	853.9 - 863.9	870.25
MW-2	9/23/2015	12.86	869.17	856.31	851.4 - 861.4	869.42
MW-2	12/7/2015	12.25	869.17	856.92	851.4 - 861.4	869.42
MW-2	4/1/2016	9.61	869.17	859.56	851.4 - 861.4	869.42
MW-2	6/30/2016	12.47	869.17	856.70	851.4 - 861.4	869.42
MW-2	12/20/2017	15.79	869.17	853.38	851.4 - 861.4	869.42
MW-3	9/23/2015	11.87	868.11	856.24	850.5 - 860.5	866.00
MW-3	12/7/2015	11.35	868.11	856.76	850.5 - 860.5	866.00
MW-3	4/1/2016	9.52	868.11	858.59	850.5 - 860.5	866.00
MW-3	6/30/2016	11.52	868.11	856.59	850.5 - 860.5	866.00
MW-3	12/20/2017	Dry	868.11	Dry	850.5 - 860.5	866.00
MW-4	9/23/2015	11.62	868.00	856.38	850.5 - 860.5	865.98
MW-4	12/7/2015	11.00	868.00	857.00	850.5 - 860.5	865.98
MW-4	4/1/2016	8.33	868.00	859.67	850.5 - 860.5	865.98
MW-4	6/30/2016	11.27	868.00	856.73	850.5 - 860.5	865.98
MW-4	12/20/2017	15.89	868.00	852.11	850.5 - 860.5	865.98
MW-5	9/23/2015	13.77	870.83	857.06	852.5 - 862.5	868.53
MW-5	12/7/2015	13.53	870.83	857.30	852.5 - 862.5	868.53
MW-5	4/1/2016	10.39	870.83	860.44	852.5 - 862.5	868.53
MW-5	6/30/2016	13.69	870.83	857.14	852.5 - 862.5	868.53
MW-5	12/20/2017	Dry	870.83	Dry	852.5 - 862.5	868.53
PZ-1	9/23/2015	18.83	870.57	851.74	832.3 - 837.3	867.20
PZ-1	12/7/2015	15.28	870.57	855.29	832.3 - 837.3	867.20
PZ-1	4/1/2016	12.99	870.57	857.58	832.3 - 837.3	867.20
PZ-1	6/30/2016	15.50	870.57	855.07	832.3 - 837.3	867.20
PZ-1	12/20/2017	20.76	870.57	849.81	832.3 - 837.3	867.20
MW-6	9/23/2015	20.99	877.66	856.67	853.0 - 863.0	877.04
MW-6	12/7/2015	20.26	877.66	857.40	853.0 - 863.0	877.04
MW-6	4/1/2016	16.7	877.66	860.96	853.0 - 863.0	877.04
MW-6	6/30/2016	20.61	877.66	857.05	853.0 - 863.0	877.04

TABLE 2
Groundwater Elevation Summary

Ahlgrimm Explosives Prill Area
Town of Hortonia, Wisconsin
Terracon Project No: 58127001

Measured Location	Date	Depth to Groundwater*	Reference Elevation **	Water Table Elevation	Screened Interval	Ground Surface Elevation
MW-6	12/20/2017	22.24	877.66	855.42	853.0 - 863.0	877.04
MW-7	9/23/2015	6.19	862.40	856.21	846.9 - 856.9	860.91
MW-7	12/7/2015	5.07	862.40	857.33	846.9 - 856.9	860.91
MW-7	4/1/2016	2.42	862.40	859.98	846.9 - 856.9	860.91
MW-7	6/30/2016	5.71	862.40	856.69	846.9 - 856.9	860.91
MW-7	12/20/2017	11.46	862.40	850.94	846.9 - 856.9	860.91
MW-8	9/23/2015	6.43	862.19	855.76	837.8 - 847.8	858.82
MW-8	12/7/2015	5.81	862.19	856.38	837.8 - 847.8	858.82
MW-8	4/1/2016	5.21	862.19	856.98	837.8 - 847.8	858.82
MW-8	6/30/2016	6.29	862.19	855.90	837.8 - 847.8	858.82
MW-8	12/20/2017	NA/Damaged	862.19	NA/Damaged	837.8 - 847.8	858.82
MW-9†	12/20/2017	26.18	881.48	855.30	848.9 858.9	879.91

Notes

*Depth to ground water presented in feet below top of casing

**Top of riser on well casing; Due to lack of available benchmarks, the top of casing (TOC) elevation at MW-1 was estimated to be 870 feet above mean sea level from the Hortonville WI 7.5 minute USGS Topographic Map. The MW-1 TOC was then used as a benchmark for surveying the other monitoring wells.

† MW-9 TOC elevation was surveyed relative to the MW-6 TOC. The groundwater level may not yet have been fully equilibrated on 12/20/17 when water levels were measured and therefore may be low-biased compared to the static level.

Elevations presented in feet above mean sea level

TABLE 3
Groundwater Analytic Test Results Summary

Ahlgrimm Explosives - Prill Area
Town of Hortonia, Wisconsin
Terracon Project Number 58127001

Sample ID	Sample Date	Groundwater Elevation (Feet)[1]	NO_{2-3} as N (mg/L)	NH_{3-4} as N (mg/L)
NR 140, WAC, Enforcement Standard (ES)[2]			**10**	**9.7**
NR 140, WAC, Preventive Action (PAL)[3]			*2*	*0.97*
Site Potable Well	11/11/2014	--	6.55	--
Site Potable Well	12/30/2014	--	5.5	<0.25
MW-1	12/30/2014	857.32	**16.2**	<0.25
MW-1	2/18/2015	855.31	**28.8**	<0.25
MW-1	9/23/2015	856.41	**34.1**	<0.25
MW-1	12/7/2015	857.10	**46.2**	<0.25
MW-1	4/1/2016	860.02	**27.2**	<0.25
MW-1	6/30/2016	856.56	**27.3**	<0.25
MW-1	12/20/2017	852.91	**15.8**	--
MW-2	9/23/2015	856.31	**18.9**	<0.25
MW-2	12/7/2015	856.92	**18.3**	<0.25
MW-2	4/1/2016	859.56	**27.4**	<0.25
MW-2	6/30/2016	856.70	**21.5**	<0.25
MW-2	12/20/2017	853.38	--	--
MW-3	9/23/2015	856.24	**21.3**	<0.25
MW-3	12/7/2015	856.76	**19.7**	<0.25
MW-3	4/1/2016	858.59	**24.3**	<0.25
MW-3	6/30/2016	856.59	**21.7**	<0.25
MW-3	12/20/2017	Dry	--	--
MW-4	9/23/2015	856.38	**15.9**	<0.25
MW-4	12/7/2015	857.00	**13.8**	<0.25
MW-4	4/1/2016	859.67	**12.7**	<0.25
MW-4	6/30/2016	856.73	**15.4**	<0.25
MW-4	12/20/2017	852.11	--	--
MW-5	9/23/2015	857.06	**--**	**--**
MW-5	12/8/2015	857.30	**63.0**	<0.25
MW-5	4/1/2016	860.44	**11.7**	<0.25
MW-5	6/30/2016	857.14	*3.1*	*1.5*
MW-5	12/20/2017	Dry	--	--

TABLE 3
Groundwater Analytic Test Results Summary

Ahlgrimm Explosives - Prill Area
Town of Hortonia, Wisconsin
Terracon Project Number 58127001

Sample ID	Sample Date	Groundwater Elevation (Feet)[1]	NO_{2-3} as N (mg/L)	NH_{3-4} as N (mg/L)
NR 140, WAC, Enforcement Standard (ES)[2]			**10**	**9.7**
NR 140, WAC, Preventive Action (PAL)[3]			*2*	*0.97*
PZ-1	9/23/2015	851.74	*8.3*	<0.25
PZ-1	12/8/2015	855.29	1.6	<0.25
PZ-1	4/1/2016	857.58	0.25 J	<0.25
PZ-1	6/30/2016	855.07	0.11 J	<0.25
PZ-1	12/20/2017	849.81	--	--
MW-6	9/23/2015	856.67	**19.2**	<0.25
MW-6	12/7/2015	857.40	**19.2**	<0.25
MW-6	4/1/2016	860.96	**25.5**	<0.25
MW-6	6/30/2016	857.05	**20.9**	<0.25
MW-6	12/20/2017	855.42	**11.9**	--
MW-7	9/23/2015	856.21	*3.3*	<0.25
MW-7	12/7/2015	857.33	1.4	<0.25
MW-7	4/1/2016	859.98	1.5	<0.25
MW-7	6/30/2016	856.69	1.1	<0.25
MW-7	12/20/2017	850.94	--	--
MW-8	9/23/2015	855.76	*2.2*	<0.25
MW-8	12/7/2015	855.76	*2.2*	<0.25
MW-8	4/1/2016	856.98	*2.9*	<0.25
MW-8	6/30/2016	855.90	1.2	<0.25
MW-8	12/20/2017	Damaged	--	--
MW-9	12/20/2017	855.30	**14.3**	--

Notes:
mg/L = milligrams per liter
-- = not tested or not measured, no data available
[1]Reference elevation (top of MW-1 PVC well casing), estimated to be 870 feet from Hortonville Quadrangle (7.5 minute), 1969
[2]NR 140, Wisconsin Administrative Code, Enforcement Standard (ES), Register, January 2012, No. 673
[3]NR 140, Wisconsin Administrative Code, Preventive Action Limit (PAL), Register, January 2012, No. 673
XX.XX = Exceeds NR 140 ES
XX.XX = Exceeds NR 140 PAL

APPENDIX C

SOIL BORING LOG, MONITORING WELL VARIANCE, MONITORING WELL CONSTRUCTION FORM, AND MONITORING WELL DEVELOPMENT FORM

State of Wisconsin
Department of Natural Resources

SOIL BORING LOG INFORMATION

Form 4400-122 Rev. 7-98

Route To: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐

Facility/Project Name	License/Permit/Monitoring Number	Boring Number
58127001 Ahlgrimm Explosives Company Inc.		MW-9

Boring Drilled By: Name of crew chief (first, last) and Firm	Date Drilling Started	Date Drilling Completed	Drilling Method
Merv Ahlgrimm Explosives Co., Inc.	12/19/2017	12/19/2017	Air Hammer

WI Unique Well No.	DNR Well ID No.	Common Well Name	Final Static Water Level	Surface Elevation	Borehole Diameter
			Feet MSL	Feet MSL	4.5 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☐
State Plane N, E S/C/N
1/4 of 1/4 of Section , T N, R
Lat ° ' "
Long ° ' "
Local Grid Location ☐ N ☐ E Feet ☐ S Feet ☐ W

Facility ID	County	County Code	Civil Town/City/ or Village
	Outagamie	45	Hortonia

Sample Number and Type	Sample Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties: Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			2.5	Over Burden (Unconsolidated)										
			5.0											
			7.5											
			10.0											
			12.5	Bedrock (Dolomite)										
			15.0											
			17.5	Driller notes a void at 16-16.5 feet										
			20.0											
			22.5											
			25.0											
			27.5											
			30.0											
				End of Boring @ 31.9'										

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

Signature

Firm Terracon Consultants, Inc.
9856 South 57th Street / Franklin, Wisconsin 53132
Tel: 414-423-0255
Fax: 414-423-0566

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Ahlgrimm Explosives	Local Grid Location of Well ☐ N. _____ ft. ☐ S. _____ ft. ☐ E. ☐ W.	Well Name: **Proposed Variance**
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No. / DNR Well ID No.
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed m m / d d / y y y y
Type of Well Well Code 11/ MW	Section Location of Waste/Source _____ 1/4 of _____ 1/4 of Sec, _____, T. _____ N, R. _____ ☐ E ☐ W	Well Installed By: Name (first, last) and Firm: Ahlgrimm Explosives and Terracon Consultants
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number

A. Protective pipe, top elevation _____ ft. MSL

B. Well casing, top elevation +2.0 ft. MSL

C. Land surface elevation _____ ft. MSL

D. Surface seal, bottom _____ ft. MSL or 1.0 ft.

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

13. Sieve analysis performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☐ 50 / Hollow Stem Auger ☐ 41 / Air Hammer / 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, if required):

E. Bentonite seal, top _____ ft. MSL or 1.0 ft.

F. Fine sand, top _____ ft. MSL or none ft.

G. Filter pack, top _____ ft. MSL or 8.5 ft.

H. Screen joint, top _____ ft. MSL or 10.5 ft.

I. Well bottom _____ ft. MSL or 20.5 ft.

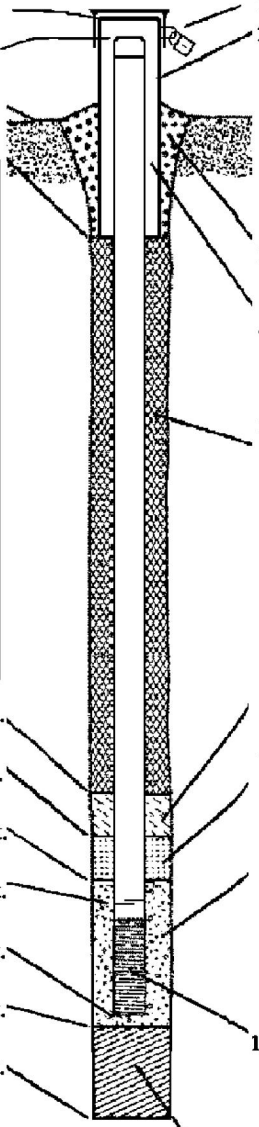
J. Filter pack, bottom _____ ft. MSL or 21.0 ft.

K. Borehole, bottom _____ ft. MSL or 21.0 ft.

L. Borehole, diameter 4.0 in.

M. O.D. well casing 1.0 in.

N. I.D. well casing _____ in.



1. Cap and lock? friction cap over PVC riser ☐ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: _____ in.
b. Length: _____ ft.
c. Material: Steel ☐ 04 / Other ☐ _____
d. Additional protection? ☒ Yes ☐ No
If yes, describe: inside fenced area with locked gate

3. Surface seal: Bentonite ☒ 30 / Concrete ☐ 01 / Other ☐ _____

4. Material between well casing and protective pipe: Bentonite ☒ 30 / Other ☐ _____

5. Annular space seal: a. Granular/Chipped 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 chips ☒ 32
c. _____ Other ☐ _____

7. Fine sand material: Manufacturer, product name & mesh size
a. none
b. Volume added _____ ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. coarse sand
b. Volume added _____ ft^3

9. Well casing: Flush threaded PVC schedule 40 ☒ 23 / Flush threaded PVC schedule 80 ☐ 24 / Other ☐ _____

10. Screen material: _____
a. Screen type: Factory cut ☒ 11 / Continuous slot ☐ 01 / Other ☐ _____
b. Manufacturer _____
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

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

Hodgson, Scott A.

From:	Borski, Jennifer - DNR <Jennifer.Borski@wisconsin.gov>
Sent:	Friday, December 15, 2017 3:02 PM
To:	Hodgson, Scott A.
Cc:	johnahlgrimm@yahoo.com
Subject:	Notice to Proceed & Approval: Variance to s. NR 141.07, WAC for Ahlgrimm Explosives Co Inc - Prill Area, BRRTS #02-45-558037

Scott,

This is your notice to proceed with the work proposed in the *Supplemental NR 716 Site Investigation Work Plan* for BRRTS #02-45-558037, received 12/14/17, including installation of an off-site monitoring well in fractured bedrock.

In May 2015, the DNR Drinking & Groundwater Program reviewed the initial proposal for alternative construction of monitoring wells at this site. An approval was emailed on May 5, 2015. This e-mail also serves as approval for the requested variance to s. NR 141.07, Wis. Adm. Code to allow use of 1" diameter PVC pipe where the contaminant of concern is nitrates and the screen will be placed in fractured bedrock.

Please call or e-mail with any further questions.

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Jennifer Borski
Hydrogeologist – Remediation & Redevelopment Program
Wisconsin Department of Natural Resources
625 E. County Road Y, STE 700, Oshkosh, WI 54901-9731
Phone: (920) 424-7887
Cell Phone: (920) 360-0853
jennifer.borski@wisconsin.gov

dnr.wi.gov

State of Wisconsin
Department of Natural Resources

MONITORING WELL DEVELOPMENT

Form 4400-113B Rev. 7-98

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

Facility/Project Name	County Name	Well Name
Ahlgrimm Explosives	Outagamie	MW-9
Facility License, Permit or Monitoring Number	**County Code**	**Wis. Unique Well Number** / **DNR Well ID Number**
	45	_____ / ___

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 150 min.

4. Depth of well (from top of well casisng) 32.71 ft.

5. Inside diameter of well 1.0 in.

6. Volume of water in filter pack and well casing ~25 gal.

7. Volume of water removed from well 180 gal.

8. Volume of water added (if any) 0. gal.

9. Source of water added N/A

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

	Before Development	After Development
11. Depth to Water (from top of well casing)	a. 24.39 ft. TD = 32.60	26.22 ft. TD = 32.71
Date	b. 12/19/2017 (m m d d y y y y)	12/19/2017 (m m d d y y y y)
Time	c. 13:15 ☐ a.m. ☒ p.m.	16:00 ☐ a.m. ☒ p.m.
12. Sediment in well bottom	___.__ inches	___.__ inches
13. Water clarity	Clear ☐ 10 Turbid ☒ 15 (Describe) Water brown with silt in suspension and solution mud	Clear ☒ 20 Turbid ☐ 25 (Describe) Clear, no odor

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. Well developed by: Name (first, last) and Firm
First Name: Paul Last Name: Bonaker
Firm: Terracon

17. Additional comments on development:

Well clean up after ~5 gallons purged – used tubing to surge / purge well

Name and Address of Facility Contact /Owner/Responsible Party
First Name: John Last Name: Ahlgrimm
Facility/Firm: Ahlgrimm Explosives
Street: 1829 Ravenswood Ct
City/State/Zip: Appleton, WI 54913

I hereby certify that the above information is true and correct to the best of my knowledge.
Signature: PL
Print Name: Paul Bonaker
Firm: Terracon

NOTE: See instructions for more information including a list of county codes and well type codes.

State of Wisconsin
Department of Natural Resources

Route to: Watershed/Wastewater ☐ Waste Management ☐
Remediation/Redevelopment ☐ Other ☐ _____

MONITORING WELL CONSTRUCTION

Form 4400-113A Rev. 7-98

Facility/Project Name: Ahlgrimm Explosives	Local Grid Location of Well: _____ ft. ☐ N. ☐ S. _____ ft. ☐ E. ☐ W.	Well Name: MW-9
Facility License, Permit or Monitoring No.	Local Grid Origin ☐ (estimated: ☐) or Well Location ☐ Lat. ° ' " Long. ° ' " or	Wis. Unique Well No. / DNR Well ID No.
Facility ID	St. Plane _____ ft. N, _____ ft. E. S/C/N	Date Well Installed: 12/19/2017 (m m d d y y y y)
Type of Well: Well Code ____/____	Section Location of Waste/Source: ____ 1/4 of ____ 1/4 of Sec. ____, T. ____ N, R. ____ ☐ E ☐ W	Well Installed By: Name (first, last) and Firm: PAL – Terracon; Mcw – Ahlgrimm
Distance from Waste/Source _____ ft. / Enf. Stds. Apply ☐	Location of Well Relative to Waste/Source: u ☐ Upgradient s ☐ Sidegradient d ☐ Downgradient n ☐ Not Known	Gov. Lot Number: _____

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 performed? ☐ Yes ☐ No

14. Drilling method used: Rotary ☒ 50
Hollow Stem Auger ☐ 41
Air hammer 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, if required):
N/A

E. Bentonite seal, top _____ ft. MSL or 0 ft.

F. Fine sand, top _____ ft. MSL or N/A ft.

G. Filter pack, top _____ ft. MSL or 18.9 ft.

H. Screen joint, top _____ ft. MSL or 21.0 ft.

I. Well bottom _____ ft. MSL or 31.0 ft.

J. Filter pack, bottom _____ ft. MSL or 31.9 ft.

K. Borehole, bottom _____ ft. MSL or 31.9 ft.

L. Borehole, diameter 4.0 in.

M. O.D. well casing 1.32 in.

N. I.D. well casing 1.0 in.

1. Cap and lock? ☒ Yes ☐ No

2. Protective cover pipe:
a. Inside diameter: N/A ___ in.
b. Length: ___ ft.
c. Material: Steel ☐ 04
Other ☐
d. Additional protection? ☐ Yes ☐ No
If yes, describe: 6" PVC to 12" bgs + bentonite seal

3. Surface seal: Bentonite ☒ 30
Concrete ☐ 01
Other ☐

4. Material between well casing and protective pipe:
Bentonite ☒ 30
Other ☐

5. Annular space seal: a. Granular/Chipped 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 chips ☒ 32
c. _____ Other ☐

7. Fine sand material: Manufacturer, product name & mesh size
a. _____
b. Volume added _____ ft^3

8. Filter pack material: Manufacturer, product name & mesh size
a. #40 Red Flint
b. Volume added 3 3/4 bags ft^3

9. Well casing: Flush threaded PVC schedule 40 ☒ 23
Flush threaded PVC schedule 80 ☐ 24
Other ☐

10. Screen material: 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

Please complete both Forms 4400-113A and 4400-113B and return them to the appropriate DNR office and bureau. Completion of these reports is required by chs. 160, 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats., and ch. NR 141, Wis. Adm. Code. In accordance with chs. 281, 289, 291, 292, 293, 295, and 299, Wis. Stats., failure to file these forms may result in a forfeiture of between $10 and $25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on these forms is not intended to be used for any other purpose. NOTE: See the instructions for more information, including where the completed forms should be sent.

APPENDIX D

SUPPLEMENTAL SITE INVESTIGATION PHOTOLOG

Photo #1 Photo looking south at MW-6 with drill rig set-up at MW-9 location, 100 feet to south in field.

Photo #2 Photo looking north at installation of MW-9.

Photo #3 Photo of 6-inch casing seal that was set 1-foot into the bedrock at MW-9.

Photo #4 Photo looking south at MW-9 depicting 1-inch well inside 6-inch outer casing. MW-6 is located 100 feet to north.

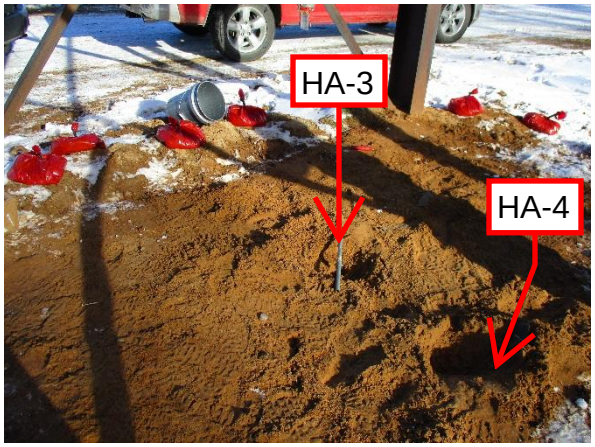


Photo #5 Photo looking north east at location of hand auger borings between footings.

APPENDIX E

LABORATORY ANALYTIC TEST REPORTS AND
GROUNDWATER SAMPLING FIELD SHEETS

December 2017 Hand Auger Soil and Groundwater
December 2017 MW-9 Groundwater

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

December 22, 2017

Scott Hodgson
Terracon, Inc. - Franklin
9856 South 57th Street
Franklin, WI 53132

RE: Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Dear Scott Hodgson:
Enclosed are the analytical results for sample(s) received by the laboratory on December 20, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky
dan.milewsky@pacelabs.com
(920)469-2436
Project Manager

Enclosures

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40162700001	**HA-3 (1')**	Solid	12/19/17 12:00	12/20/17 13:30
40162700002	**HA-3 (4')**	Solid	12/19/17 12:05	12/20/17 13:30
40162700003	**HA-4 (1')**	Solid	12/19/17 12:10	12/20/17 13:30
40162700004	**HA-4 (4')**	Solid	12/19/17 12:15	12/20/17 13:30
40162700005	**ABOVE PLASTIC (3")**	Solid	12/19/17 12:20	12/20/17 13:30
40162700006	**MW-6**	Water	12/20/17 09:30	12/20/17 13:30
40162700007	**MW-1**	Water	12/20/17 11:10	12/20/17 13:30
40162700008	**DUPLICATE**	Water	12/20/17 00:00	12/20/17 13:30

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40162700001	**HA-3 (1')**	ASTM D2974-87	SSM	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40162700002	**HA-3 (4')**	ASTM D2974-87	SSM	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40162700003	**HA-4 (1')**	ASTM D2974-87	SSM	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40162700004	**HA-4 (4')**	ASTM D2974-87	SSM	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40162700005	**ABOVE PLASTIC (3")**	ASTM D2974-87	SSM	1	PASI-G
		EPA 353.2	DAW	1	PASI-G
40162700006	**MW-6**	EPA 353.2	DAW	1	PASI-G
40162700007	**MW-1**	EPA 353.2	DAW	1	PASI-G
40162700008	**DUPLICATE**	EPA 353.2	DAW	1	PASI-G

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40162700001	**HA-3 (1')**					
ASTM D2974-87	Percent Moisture	4.1	%	0.10	12/20/17 17:56	
EPA 353.2	Nitrogen, NO2 plus NO3	3.1J	mg/kg	3.3	12/22/17 13:18	
40162700002	**HA-3 (4')**					
ASTM D2974-87	Percent Moisture	5.4	%	0.10	12/20/17 17:56	
EPA 353.2	Nitrogen, NO2 plus NO3	5.4	mg/kg	3.4	12/22/17 13:19	
40162700003	**HA-4 (1')**					
ASTM D2974-87	Percent Moisture	4.3	%	0.10	12/20/17 17:56	
EPA 353.2	Nitrogen, NO2 plus NO3	5.8	mg/kg	3.2	12/22/17 13:20	
40162700004	**HA-4 (4')**					
ASTM D2974-87	Percent Moisture	4.8	%	0.10	12/20/17 17:56	
EPA 353.2	Nitrogen, NO2 plus NO3	3.7	mg/kg	3.4	12/22/17 13:21	
40162700005	**ABOVE PLASTIC (3'')**					
ASTM D2974-87	Percent Moisture	4.1	%	0.10	12/20/17 17:56	
EPA 353.2	Nitrogen, NO2 plus NO3	6.2	mg/kg	3.3	12/22/17 13:22	
40162700006	**MW-6**					
EPA 353.2	Nitrogen, NO2 plus NO3	11.9	mg/L	1.2	12/22/17 13:33	
40162700007	**MW-1**					
EPA 353.2	Nitrogen, NO2 plus NO3	15.8	mg/L	2.5	12/22/17 13:34	
40162700008	**DUPLICATE**					
EPA 353.2	Nitrogen, NO2 plus NO3	15.8	mg/L	2.5	12/22/17 13:35	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Method: **EPA 353.2**
Description: 353.2 Nitrogen, NO2/NO3
Client: Terracon, Inc. - Franklin
Date: December 22, 2017

General Information:
5 samples were analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Sample Preparation:
The samples were prepared in accordance with EPA 353.2 with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Method: **EPA 353.2**
Description: 353.2 Nitrogen, NO2/NO3 pres.
Client: Terracon, Inc. - Franklin
Date: December 22, 2017

General Information:
3 samples were analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Sample: HA-3 (1') **Lab ID: 40162700001** Collected: 12/19/17 12:00 Received: 12/20/17 13:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**4.1**	%	0.10	0.10	1		12/20/17 17:56		
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.1J**	mg/kg	3.3	1.0	1	12/21/17 11:01	12/22/17 13:18		

Sample: HA-3 (4') **Lab ID: 40162700002** Collected: 12/19/17 12:05 Received: 12/20/17 13:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**5.4**	%	0.10	0.10	1		12/20/17 17:56		
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**5.4**	mg/kg	3.4	1.0	1	12/21/17 11:01	12/22/17 13:19		

Sample: HA-4 (1') **Lab ID: 40162700003** Collected: 12/19/17 12:10 Received: 12/20/17 13:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**4.3**	%	0.10	0.10	1		12/20/17 17:56		
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**5.8**	mg/kg	3.2	0.97	1	12/21/17 11:01	12/22/17 13:20		

Sample: HA-4 (4') **Lab ID: 40162700004** Collected: 12/19/17 12:15 Received: 12/20/17 13:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**4.8**	%	0.10	0.10	1		12/20/17 17:56		
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**3.7**	mg/kg	3.4	1.0	1	12/21/17 11:01	12/22/17 13:21		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Sample: ABOVE PLASTIC (3") **Lab ID: 40162700005** Collected: 12/19/17 12:20 Received: 12/20/17 13:30 Matrix: Solid

Results reported on a "dry weight" basis and are adjusted for percent moisture, sample size and any dilutions.

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
Percent Moisture	Analytical Method: ASTM D2974-87								
Percent Moisture	**4.1**	%	0.10	0.10	1		12/20/17 17:56		
353.2 Nitrogen, NO2/NO3	Analytical Method: EPA 353.2 Preparation Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**6.2**	mg/kg	3.3	1.0	1	12/21/17 11:01	12/22/17 13:22		

Sample: MW-6 **Lab ID: 40162700006** Collected: 12/20/17 09:30 Received: 12/20/17 13:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**11.9**	mg/L	1.2	0.48	5		12/22/17 13:33		

Sample: MW-1 **Lab ID: 40162700007** Collected: 12/20/17 11:10 Received: 12/20/17 13:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**15.8**	mg/L	2.5	0.95	10		12/22/17 13:34		

Sample: DUPLICATE **Lab ID: 40162700008** Collected: 12/20/17 00:00 Received: 12/20/17 13:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**15.8**	mg/L	2.5	0.95	10		12/22/17 13:35		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

QC Batch: 277706 Analysis Method: ASTM D2974-87
QC Batch Method: ASTM D2974-87 Analysis Description: Dry Weight/Percent Moisture
Associated Lab Samples: 40162700001, 40162700002, 40162700003, 40162700004, 40162700005

SAMPLE DUPLICATE: 1632573

Parameter	Units	40162664001 Result	Dup Result	RPD	Max RPD	Qualifiers
Percent Moisture	%	6.7	6.6	1	10	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

QC Batch: 277765 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite
Associated Lab Samples: 40162700001, 40162700002, 40162700003, 40162700004, 40162700005

METHOD BLANK: 1632727 Matrix: Solid
Associated Lab Samples: 40162700001, 40162700002, 40162700003, 40162700004, 40162700005

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	<0.97	3.2	12/22/17 13:16	

LABORATORY CONTROL SAMPLE: 1632728

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/kg	25	23.6	94	80-120	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1632729 1632730

Parameter	Units	40162700005 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/kg	6.2	25.8	25.7	31.8	30.2	100	94	80-120	5	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

QC Batch: 277874 Analysis Method: EPA 353.2
QC Batch Method: EPA 353.2 Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 40162700006, 40162700007, 40162700008

METHOD BLANK: 1633358 Matrix: Water
Associated Lab Samples: 40162700006, 40162700007, 40162700008

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	<0.095	0.25	12/22/17 13:26	

LABORATORY CONTROL SAMPLE: 1633359

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1633360 1633361

Parameter	Units	40162825003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	<0.48	12.5	12.5	11.4	11.4	91	92	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1633362 1633363

Parameter	Units	40162627001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	13.0	12.5	12.5	25.6	25.6	101	101	90-110	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162700

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40162700001	**HA-3 (1')**	ASTM D2974-87	277706		
40162700002	**HA-3 (4')**	ASTM D2974-87	277706		
40162700003	**HA-4 (1')**	ASTM D2974-87	277706		
40162700004	**HA-4 (4')**	ASTM D2974-87	277706		
40162700005	**ABOVE PLASTIC (3")**	ASTM D2974-87	277706		
40162700001	**HA-3 (1')**	EPA 353.2	277765	EPA 353.2	277873
40162700002	**HA-3 (4')**	EPA 353.2	277765	EPA 353.2	277873
40162700003	**HA-4 (1')**	EPA 353.2	277765	EPA 353.2	277873
40162700004	**HA-4 (4')**	EPA 353.2	277765	EPA 353.2	277873
40162700005	**ABOVE PLASTIC (3")**	EPA 353.2	277765	EPA 353.2	277873
40162700006	**MW-6**	EPA 353.2	277874		
40162700007	**MW-1**	EPA 353.2	277874		
40162700008	**DUPLICATE**	EPA 353.2	277874		

UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

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www.pacelabs.com

CHAIN OF CUSTODY

401627001

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

(Please Print Clearly)	
Company Name:	Terracon
Branch/Location:	Franklin, WI
Project Contact:	Scott Hodgson
Phone:	(414) 209-7640
Project Number:	58127001
Project Name:	Ahlgrimm Explosives
Project State:	WI
Sampled By (Print):	PAL
Sampled By (Sign):	PAL
PO #:	Regulatory Program:

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	SAME
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes

A = Air	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
SI = Sludge	WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested: NO3-23 and 2, 4oz plastic cup	Analyses Requested: NO3-23 and 2, 250ml plastic cup	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	HA-3 (1')	12/19/17	1200	S	X	A	1			1-4ozpA	
002	HA-3 (4')		1205	S			1				
003	HA-4 (1')		1210	S			1				
004	HA-4 (4')		1215	S			1				
005	Above plastic (3")	12/19/17	1220	S			1				
006	MW-6	12/20/17	0930	GW				1		1-250mlpC	
007	MW-8 (MW-1)		1110	GW				1			
008	Duplicate	12/20/17	X	GW				1			

PAL

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed: ~~X~~ 2-day *

Transmit Prelim Rush Results by (complete what you want):

Email #1:	Tyler 12/22
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
PAL	12/20/17 1330	Susan Kuffel	12/20/17 1330
Relinquished By:	Date/Time:	Received By: Paul	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:
Relinquished By:	Date/Time:	Received By:	Date/Time:

PACE Project No.
401627001

Receipt Temp = 20.7 °C

Sample Receipt pH
(OK) Adjusted

Cooler Custody Seal
Present / ~~Not Present~~
Intact / Not Intact

Version 6.0 06/14/06

C019a(27Jun2006)

ORIGINAL

Sample Condition Upon Receipt

Pace Analytical Services, LLC. - Green Bay WI
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Project # **WO# : 40162700**

40162700

Client Name: Terracon

Courier: ☐ Fed Ex ☐ UPS ☒ Client ☐ Pace Other: _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other

Thermometer Used N/A **Type of Ice:** (Wet) Blue Dry None ☒ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROT /Corr: **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☒ no

Person examining contents:
Date: 12-20-17
Initials: SW

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

				Comments:
Chain of Custody Present:	☑Yes	☐No	☐N/A	1.
Chain of Custody Filled Out:	☑Yes	☐No	☐N/A	2.
Chain of Custody Relinquished:	☑Yes	☐No	☐N/A	3.
Sampler Name & Signature on COC:	☐Yes	☑No	☐N/A	4.
Samples Arrived within Hold Time:	☑Yes	☐No	☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes	☐No		Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes	☑No	☐N/A	6.
Rush Turn Around Time Requested:	☑Yes	☐No	☐N/A	7. 2 day TAT 12-20-17 SW
Sufficient Volume:	☑Yes	☐No	☐N/A	8.
Correct Containers Used:	☑Yes	☐No	☐N/A	9.
-Pace Containers Used:	☑Yes	☐No	☐N/A	
-Pace IR Containers Used:	☐Yes	☐No	☑N/A	
Containers Intact:	☑Yes	☐No	☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes	☐No	☑N/A	11.
Sample Labels match COC:	☑Yes	☐No	☐N/A	12.
-Includes date/time/ID/Analysis Matrix: SW				
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☑Yes	☐No	☐N/A	13. ☐ HNO3 ☑ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 <2; NaOH+ZnAct ≥9, NaOH ≥12)	☑Yes	☐No	☐N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes	☑No		Initial when completed SW / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes	☐No	☑N/A	14.
Trip Blank Present:	☐Yes	☐No	☑N/A	15.
Trip Blank Custody Seals Present	☐Yes	☐No	☑N/A	
Pace Trip Blank Lot # (if purchased):				

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AL for DMO **Date:** 12-20-17

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

December 22, 2017

Scott Hodgson
Terracon, Inc. - Franklin
9856 South 57th Street
Franklin, WI 53132

RE: Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Dear Scott Hodgson:
Enclosed are the analytical results for sample(s) received by the laboratory on December 20, 2017. The results relate only to the samples included in this report. Results reported herein conform to the most current, applicable TNI/NELAC standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Dan Milewsky
dan.milewsky@pacelabs.com
(920)469-2436
Project Manager

Enclosures

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

CERTIFICATIONS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Green Bay Certification IDs

1241 Bellevue Street, Green Bay, WI 54302
Florida/NELAP Certification #: E87948
Illinois Certification #: 200050
Kentucky UST Certification #: 82
Louisiana Certification #: 04168
Minnesota Certification #: 055-999-334
New York Certification #: 12064
North Dakota Certification #: R-150
Virginia VELAP ID: 460263
South Carolina Certification #: 83006001
Texas Certification #: T104704529-14-1
Wisconsin Certification #: 405132750
Wisconsin DATCP Certification #: 105-444
USDA Soil Permit #: P330-16-00157
Federal Fish & Wildlife Permit #: LE51774A-0

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE SUMMARY

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Lab ID	Sample ID	Matrix	Date Collected	Date Received
40162706001	**MW-9**	Water	12/20/17 09:45	12/20/17 13:30

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

SAMPLE ANALYTE COUNT

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Lab ID	Sample ID	Method	Analysts	Analytes Reported	Laboratory
40162706001	**MW-9**	EPA 353.2	DAW	1	PASI-G

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

SUMMARY OF DETECTION

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Lab Sample ID / Method	Client Sample ID / Parameters	Result	Units	Report Limit	Analyzed	Qualifiers
40162706001	**MW-9**					
EPA 353.2	Nitrogen, NO2 plus NO3	14.3	mg/L	1.2	12/22/17 14:07	

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

PROJECT NARRATIVE

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Method: **EPA 353.2**
Description: 353.2 Nitrogen, NO2/NO3 pres.
Client: Terracon, Inc. - Franklin
Date: December 22, 2017

General Information:
1 sample was analyzed for EPA 353.2. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

Hold Time:
The samples were analyzed within the method required hold times with any exceptions noted below.

Method Blank:
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

Laboratory Control Spike:
All laboratory control spike compounds were within QC limits with any exceptions noted below.

Matrix Spikes:
All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

Additional Comments:

This data package has been reviewed for quality and completeness and is approved for release.

Pace Analytical Services, LLC
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Green Bay, WI 54302
(920)469-2436

ANALYTICAL RESULTS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Sample: MW-9 **Lab ID: 40162706001** Collected: 12/20/17 09:45 Received: 12/20/17 13:30 Matrix: Water

Parameters	Results	Units	LOQ	LOD	DF	Prepared	Analyzed	CAS No.	Qual
353.2 Nitrogen, NO2/NO3 pres.	Analytical Method: EPA 353.2								
Nitrogen, NO2 plus NO3	**14.3**	mg/L	1.2	0.48	5		12/22/17 14:07		

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

QC Batch: 277874
QC Batch Method: EPA 353.2
Analysis Method: EPA 353.2
Analysis Description: 353.2 Nitrate + Nitrite, preserved
Associated Lab Samples: 40162706001

METHOD BLANK: 1633358 Matrix: Water
Associated Lab Samples: 40162706001

Parameter	Units	Blank Result	Reporting Limit	Analyzed	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	<0.095	0.25	12/22/17 13:26	

LABORATORY CONTROL SAMPLE: 1633359

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limits	Qualifiers
Nitrogen, NO2 plus NO3	mg/L	2.5	2.5	101	90-110	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1633360 1633361

Parameter	Units	40162825003 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	<0.48	12.5	12.5	11.4	11.4	91	92	90-110	0	20	

MATRIX SPIKE & MATRIX SPIKE DUPLICATE: 1633362 1633363

Parameter	Units	40162627001 Result	MS Spike Conc.	MSD Spike Conc.	MS Result	MSD Result	MS % Rec	MSD % Rec	% Rec Limits	RPD	Max RPD	Qual
Nitrogen, NO2 plus NO3	mg/L	13.0	12.5	12.5	25.6	25.6	101	101	90-110	0	20	

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.

REPORT OF LABORATORY ANALYSIS

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALIFIERS

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above LOD.

J - Estimated concentration at or above the LOD and below the LOQ.

LOD - Limit of Detection adjusted for dilution factor and percent moisture.

LOQ - Limit of Quantitation adjusted for dilution factor and percent moisture.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected at or above the adjusted LOD.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-G Pace Analytical Services - Green Bay

Pace Analytical Services, LLC
1241 Bellevue Street - Suite 9
Green Bay, WI 54302
(920)469-2436

QUALITY CONTROL DATA CROSS REFERENCE TABLE

Project: 58127001 AHLGRIMM EXPLOSIVES
Pace Project No.: 40162706

Lab ID	Sample ID	QC Batch Method	QC Batch	Analytical Method	Analytical Batch
40162706001	**MW-9**	EPA 353.2	277874		

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UPPER MIDWEST REGION
MN: 612-607-1700 WI: 920-469-2436

CHAIN OF CUSTODY

401627706

(Please Print Clearly)	
Company Name:	Terracon
Branch/Location:	Franklin, WI
Project Contact:	Scott Hodgson
Phone:	414 423-0255
Project Number:	58127001
Project Name:	Ahlgrimm Explosives
Project State:	WI
Sampled By (Print):	PAL
Sampled By (Sign):	RL
PO #:	
Regulatory Program:	

*Preservation Codes
A=None B=HCL C=H2SO4 D=HNO3 E=DI Water F=Methanol G=NaOH
H=Sodium Bisulfate Solution I=Sodium Thiosulfate J=Other

Quote #:	
Mail To Contact:	
Mail To Company:	
Mail To Address:	
Invoice To Contact:	
Invoice To Company:	
Invoice To Address:	
Invoice To Phone:	

Data Package Options (billable)
☐ EPA Level III
☐ EPA Level IV

MS/MSD
☐ On your sample (billable)
☐ NOT needed on your sample

Matrix Codes

A = Air	W = Water
B = Biota	DW = Drinking Water
C = Charcoal	GW = Ground Water
O = Oil	SW = Surface Water
S = Soil	WW = Waste Water
SI = Sludge	WP = Wipe

PACE LAB #	CLIENT FIELD ID	COLLECTION DATE	COLLECTION TIME	MATRIX	FILTERED? (YES/NO) Y/N	PRESERVATION (CODE)* Pick Letter	Analyses Requested	CLIENT COMMENTS	LAB COMMENTS (Lab Use Only)	Profile #
001	MW-9	12/20/17	0945	GW	N	C	1,2,3-TCP, 1,2,3-TCP Plastic Cup	*HOLD until Notified*	1-250mL pC	

Rush Turnaround Time Requested - Prelims
(Rush TAT subject to approval/surcharge)
Date Needed: *2-day*

Transmit Prelim Rush Results by (complete what you want):

Email #1:	
Email #2:	
Telephone:	
Fax:	

Samples on HOLD are subject to special pricing and release of liability

Relinquished By:	Date/Time:	Received By:	Date/Time:
RL	12/20/17 1330		

PACE Project No.: 401627706
Receipt Temp = 0.7 °C
Sample Receipt pH OK / Adjusted
Cooler Custody Seal Present / Not Present
Intact / Not Intact

C019a(27Jun2006)

Version 6.0 06/14/06

ORIGINAL

Sample Condition Upon Receipt

Pace Analytical Services, LLC. - Green Bay WI
1241 Bellevue Street, Suite 9
Green Bay, WI 54302

Pace Analytical™

Project #: **WO# : 40162706**

40162706

Client Name: Terracon

Courier: ☐ Fed Ex ☐ UPS ☒ Client ☐ Pace Other: _____

Tracking #: _____

Custody Seal on Cooler/Box Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Custody Seal on Samples Present: ☐ yes ☒ no Seals intact: ☐ yes ☐ no

Packing Material: ☐ Bubble Wrap ☐ Bubble Bags ☒ None ☐ Other

Thermometer Used N/A **Type of Ice:** (Wet) Blue Dry None ☒ Samples on ice, cooling process has begun

Cooler Temperature Uncorr: ROT /Corr: **Biological Tissue is Frozen:** ☐ yes ☐ no

Temp Blank Present: ☐ yes ☒ no

Person examining contents:
Date: 12-20-17
Initials: SW

Temp should be above freezing to 6°C.
Biota Samples may be received at ≤ 0°C.

		Comments:
Chain of Custody Present:	☑Yes ☐No ☐N/A	1.
Chain of Custody Filled Out:	☑Yes ☐No ☐N/A	2.
Chain of Custody Relinquished:	☑Yes ☐No ☐N/A	3.
Sampler Name & Signature on COC:	☐Yes ☑No ☐N/A	4.
Samples Arrived within Hold Time:	☑Yes ☐No ☐N/A	5.
- VOA Samples frozen upon receipt	☐Yes ☐No	Date/Time:
Short Hold Time Analysis (<72hr):	☐Yes ☑No ☐N/A	6.
Rush Turn Around Time Requested:	☑Yes ☐No ☐N/A	7. 2 day TAT 12-20-17 SW
Sufficient Volume:	☑Yes ☐No ☐N/A	8.
Correct Containers Used:	☑Yes ☐No ☐N/A	9.
-Pace Containers Used:	☑Yes ☐No ☐N/A	
-Pace IR Containers Used:	☐Yes ☐No ☑N/A	
Containers Intact:	☑Yes ☐No ☐N/A	10.
Filtered volume received for Dissolved tests	☐Yes ☐No ☑N/A	11.
Sample Labels match COC:	☑Yes ☐No ☐N/A	12.
-Includes date/time/ID/Analysis Matrix: W		
All containers needing preservation have been checked. (Non-Compliance noted in 13.)	☑Yes ☐No ☐N/A	13. ☐ HNO3 ☑ H2SO4 ☐ NaOH ☐ NaOH +ZnAct
All containers needing preservation are found to be in compliance with EPA recommendation. (HNO3, H2SO4 ≤2; NaOH+ZnAct ≥9, NaOH ≥12)	☑Yes ☐No ☐N/A	
exceptions: VOA, coliform, TOC, TOX, TOH, O&G, WIDROW, Phenolics, OTHER:	☐Yes ☑No	Initial when completed SW / Lab Std #ID of preservative / Date/ Time:
Headspace in VOA Vials (>6mm):	☐Yes ☐No ☑N/A	14.
Trip Blank Present:	☐Yes ☐No ☑N/A	15.
Trip Blank Custody Seals Present	☐Yes ☐No ☑N/A	
Pace Trip Blank Lot # (if purchased):		

Client Notification/ Resolution: If checked, see attached form for additional comments ☐

Person Contacted: _____ Date/Time: _____

Comments/ Resolution: _____

Project Manager Review: AL for DM **Date:** 12-20-17

TERRACON GROUND WATER SAMPLING INFORMATION SHEET

PROJECT NAME: Alliant Energy Explosives		PROJECT NO. 58127001	
PROJECT LOCATION: Hartonville, WI			
SAMPLE POINT: MW-1/Duplicate	SAMPLE POINT DESCRIPTION: Flush mount North of Ammonium Nitrate bin		
CASING DIAMETER: 2"			
WELL DEPTH: 29.13			
DATE: 12/20/17	TIME: 0955 AM /PM	DEPTH TO GROUND WATER (FT): 17.09	

CALCULATION:

SAMPLING METHOD: low-flow (peristaltic pump)

DATE	TIME (AM/PM)	GALLONS REMOVED	COMMENTS
12/20	0955	0	begin purge
			finish purge
	1010	5	Sample

DISSOLVED OXYGEN:	FERROUS IRON:	NITRATE
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pH:	ORP:	TEMP:	SPECIFIC CONDUCTANCE (uS/cm) x1000
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SAMPLE APPEARANCE: VERY TURBID / TURBID / SLIGHTLY TURBID / CLEAR	ODOR: YES / NO / NOT NOTED	ANALYSES: Nitrate/Nitrite

CLEANING PERFORMED IN FIELD: *METHANOL AND DISPOSABLE GLOVES* *INITIAL TO VERIFY OR NOTE OTHER CLEANING METHOD PERFORMED
PAL

COMMENTS:
Collect Duplicate for $NO_{2,3}$ as N
* 1036 pump stopped during purge (after ~1.5 gal) when checked on purge tubing was frozen - Change tubing + purge + resume purge)

SAMPLED BY:	DATE:
PAL	12/20/17

REVIEWED BY:	DATE:
Scott A. Hodgson	1/15/18

TERRACON GROUND WATER SAMPLING INFORMATION SHEET

PROJECT NAME: Ahlgrimm Explosives	PROJECT NO. 58127001
PROJECT LOCATION: Horton Wi/b, WI	
SAMPLE POINT: MW-6	SAMPLE POINT DESCRIPTION: South well just North of property line
CASING DIAMETER: 1"	
WELL DEPTH: 24.92	
DATE: 12/20/17 TIME: 0830 AM /PM	DEPTH TO GROUND WATER (FT): 22.24

CALCULATION:

SAMPLING METHOD: low-flow (peristaltic pump)

DATE	TIME (AM/PM)	GALLONS REMOVED	COMMENTS
12/20/17	0830	0	begin purge
		5	finish purge
	0930	~~5~~ 5	Sample

DISSOLVED OXYGEN:	FERROUS IRON:	NITRATE
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pH:	ORP:	TEMP:	SPECIFIC CONDUCTANCE (uS/cm) x1000
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SAMPLE APPEARANCE: VERY TURBID TURBID SLIGHTLY TURBID (CLEAR)

ODOR: YES (NO) NOT NOTED

ANALYSES: Nitrite/Nitrate

CLEANING PERFORMED IN FIELD: *METHANOL AND DISPOSABLE GLOVES* *INITIAL TO VERIFY OR NOTE OTHER CLEANING METHOD PERFORMED

DR

COMMENTS:

SAMPLED BY: DR DATE: 12/20/17

REVIEWED BY: Scott D. Hodgson DATE: 1/15/18

TERRACON GROUND WATER SAMPLING INFORMATION SHEET

PROJECT NAME: Ahlgrimm Explosives	PROJECT NO. 58127001
PROJECT LOCATION: Horton Wilco, WI	
SAMPLE POINT: MW-9	SAMPLE POINT DESCRIPTION: In neighbors field South of Site ~100 feet South of MW-6
CASING DIAMETER: 1 in	
WELL DEPTH: 32.71	
DATE: 12/20/17 TIME: 0840 AM/PM	DEPTH TO GROUND WATER (FT): 26.18

CALCULATION:

SAMPLING METHOD: low-flow (peristaltic pump)

DATE	TIME (AM/PM)	GALLONS REMOVED	COMMENTS
12/20	0840	0	begin purge
			finish purge
	0945	3.5	Sample

DISSOLVED OXYGEN:	FERROUS IRON:	NITRATE
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pH:	ORP:	TEMP:	SPECIFIC CONDUCTANCE (uS/cm) x1000
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SAMPLE APPEARANCE: VERY TURBID / TURBID / SLIGHTLY TURBID / CLEAR (circled)

ODOR: YES / NO (circled) / NOT NOTED

ANALYSES: Nitrate/Nitrate

CLEANING PERFORMED IN FIELD: *METHANOL AND DISPOSABLE GLOVES* *INITIAL TO VERIFY OR NOTE OTHER CLEANING METHOD PERFORMED

DR

COMMENTS:

SAMPLED BY: DR DATE: 12/20/17

REVIEWED BY: Scott A. Hodgson DATE: 1/15/18