December 16, 2014

Wisconsin Department of Natural Resources
Oshkosh Service Center
625 East County Road Y, Suite 700
Oshkosh, Wisconsin 54901-9731

Attention: Ms. Jennifer Borski

RE: NR 716 Groundwater Investigation Work Plan
Ahlgrimm Explosives Company, Inc.
W9899 Givens Road
Town of Hortonia, Outagamie County, Wisconsin
WDNR BRRTS #02-45-558037 (Prill Area)
Terracon Project No. 58127001

Dear Ms. Borski:

Terracon Consultants, Inc. (Terracon) has prepared this groundwater investigation Work Plan for the ammonium nitrate bin (prill) area at the subject site in general conformance with Wisconsin Administrative Code (WAC), Chapter NR 716. Wisconsin Department of Natural Resources (WDNR) Environmental Repair Program (ERP) case number for the Prill Area is BRRTS #02-45-558037. The responsible party is John Ahlgrimm, owner of Ahlgrimm Explosives Company, Inc. An outline of the project, the scope of services, and potential schedule, are provided in the following sections:

1.0 PROJECT INFORMATION

The WDNR performed a limited sampling effort on November 16, 2011 at the above-referenced facility in the Town of Hortonia. 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 1). 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 (SI) commenced in October 2012. The SI 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 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. That report 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 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 and discussion with the closure committee in April 2014, the WDNR project manager Jennifer Borski indicated that a groundwater investigation in the ammonium-nitrate bin area was necessary to receive site closure. The closure committee also requested information related to the site potable well and soil verification sampling near the ammonium-nitrate bin. This work plan provides our scope of work to collect that data.

2.0 LOCAL GEOLOGY

The local geology consists of a thin veneer of unconsolidated material overlying bedrock. Bedrock lies at a depth of approximately 4 feet below grade (bg) 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. Groundwater is anticipated to be at a depth greater than 10 feet bg within the bedrock.

3.0 SCOPE OF SERVICES

This recommended scope of services to conduct additional investigation was developed in response to the WDNR's request for additional investigation. Specifically, the WDNR requested the following information:

- Sample the residual soil remaining between the footers and analyze soil for ammonia (as nitrogen) and nitrite-nitrate as nitrogen.
- Construct a source area monitoring well immediately adjacent to the prill bin excavation area at the suspected down-gradient side.
- Confirm construction of the potable well.
- Sample the source area monitoring well and onsite potable well for analysis of ammonia (as nitrogen) and nitrite-nitrate as nitrogen.

3.1 Verification Soil Sampling

Terracon will advance two hand borings between the ammonium-nitrate bin footings as shown on the attached Figure 2 to collect soil samples from contaminated soil remaining in place. Ideally each of these borings will be advanced to approximately 5 feet bg. However, the soil is rocky and, as such, it may be difficult to advance the borings that deep. Terracon proposes to collect a sample from each boring at 1 foot bg and from the terminus of each boring at the depth of refusal between 1 and 5 feet bg. The samples will be submitted to a Wisconsin-certified laboratory for analysis of NO_{2-3} as N and NH_{3-4} as N.

3.2 Potable Well Inspection

Terracon proposes to subcontract a licensed well subcontractor to measure the potable well total depth, depth of the well casing, and depth to static groundwater in the onsite potable well. After first measuring the depth to static groundwater, they will then remove the well pump, measure the depth to the bottom of the well, and attempt to measure the depth of the well casing using a magnet. If successful measuring the depth of the well casing with a magnet, the pump will be re-installed, and the well disinfected. If the magnet method to measure the well casing depth does not work due to lime or iron bacteria buildup on the casing, the well will be closed up to allow turbidity to settle out for a minimum of 12 hours. A down well video camera will then be used to video the well to obtain the necessary information, after which the pump will be re-installed and the well disinfected.

3.3 Monitoring Well Construction, Development, and Survey

Due to anticipated groundwater flow to the northwest towards the Wolf River, Terracon proposes to construct the monitoring well to the northwest of the ammonium nitrate bin in the general area shown on the attached Figure 2. The final location may be different than shown in consideration of underground utilities and site operations. In general the well will be placed just to the north of the access drive to the ammonium nitrate bin where heavy trucks frequently pass.

Terracon anticipates using a combination of hollow-stem auger and air rotary (or air hammer) drilling to advance the monitoring well borehole. Hollow-stem augers will be used to advance the borehole through unconsolidated soil to the depth of competent bedrock between approximately 5 and 8 feet bg. Upon encountering the bedrock surface, air rotary (or air hammer) drilling will be used to advance the borehole to the terminal depth. This method typically does not require the introduction of significant quantities of water or drilling fluids to maintain an open borehole and purge the cuttings.

Soil samples will be collected at 2-foot intervals to the depth of bedrock via standard 2-inch diameter split-spoon. One soil sample from a depth of approximately 3 to 5 feet bg (depth of highest contamination at the ammonium nitrate bin) and submitted to a Wisconsin-certified laboratory for analysis of NO_{2-3} as N and NH_{3-4} as N.

During advancement of the boring through bedrock, the drill cuttings will be continuously observed by Terracon's field geologist. Generally, a grab sample of drill cuttings will be collected and logged at 5-foot intervals. Logging intervals, however, may be modified based upon visually noticeable changes in drill cutting characteristics, such as color, moisture content, bit drop, or rate of advancement.

The depth to the static groundwater table will be measured in the potable well by a licensed well subcontractor during the potable well inspection prior to drilling the monitoring well. This will provide an estimate of the depth to groundwater in the prill area. However, for the purposes of preparing this work plan, Terracon assumes that the depth to groundwater at the location of proposed monitoring well MW1 may be approximately 28 feet bg. Monitoring well MW1 will be constructed using a 10-foot screen that spans the water table. Terracon estimates that the bottom of the screen for monitoring well MW1 may be installed to as deep as approximately 35 feet below grade.

Monitoring well MW1 will be constructed in conformance with NR 141, WAC, using 2-inch diameter, No. 10-slot, Schedule 40, polyvinyl chloride (PVC) well screen and riser pipe. The

annular space will be sealed according to the requirements of NR 141, WAC. The well will be completed with an above-grade protective cover and a locked cap.

The monitoring well will be developed per NR 141, WAC by surging and purging with a disposable bailer or by surging and pumping with a submersible pump depending upon how much water the formation produces. As with agricultural chemical sites managed by the Department of Agriculture, Trade and Consumer Protection (DATCP), Terracon proposes to spread the soil cuttings and development/purge water on the ground near the wellhead.

Since there are no benchmarks in the area, the ground surface elevation at the wellhead will be estimated from the Hortonville 7.5 minute quadrangle. The height of the top of casing (TOC) will be measured to establish a TOC reference elevation relative to the ground surface elevation.

3.4 Groundwater Sampling

Prior to purging, the depth to groundwater will be measured in monitoring well MW1 to within 0.01 foot with an electronic water level indicator. Groundwater samples will be collected from both monitoring well MW1 and the site potable well, and submitted to a Wisconsin-certified laboratory for analysis of NO_{2-3} as N and NH_{3-4} as N. The samples will be placed on ice in a cooler and transported to the laboratory for analysis under chain-of-custody protocols.

3.5 Investigation Derived Waste

Soil cuttings from the monitoring well construction will be placed in labeled 55-gallon drums placed onsite until laboratory results are received. If necessary based on the analytic test results, the drums will be profiled and properly disposed at a Subtitle D landfill. Rock cuttings will be spread on the ground.

Development and purge water from the monitoring well will be placed in labeled 55-gallon drums placed onsite until laboratory results are received. If the laboratory results indicate NO_{2-3} as N or NH_{3-4} as N concentrations are above background levels, the drums will be properly disposed.

4.0 REPORTING

Terracon will prepare a Status Report that will document the monitoring well construction, potable well inspection, groundwater sampling results, and soil sampling results following

receipt of the laboratory test results. The report will provide recommendations for closure or additional investigation, as appropriate.

5.0 PROJECT SCHEDULE

The potable well inspection activities will take place prior to the monitoring well construction. The monitoring well construction, groundwater sampling, and soil sampling activities will take place before December 31, 2014. The Status Report will be submitted within approximately 45 days following receipt of the laboratory results. If you have any questions or need additional information, please call or email the undersigned.

Sincerely,

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

SAH/BRS:sah/N:\Projects\2012\58127001\Working Files\GW Investigation\58127001.Ahlgrimm.gw work plan.2014.final.docx

Attachments: Figure 1: Site Map
Figure 2: Proposed Groundwater Monitoring Well and Hand Boring Locations

Copies to: John Ahlgrimm
File

6.0 CERTIFICATION

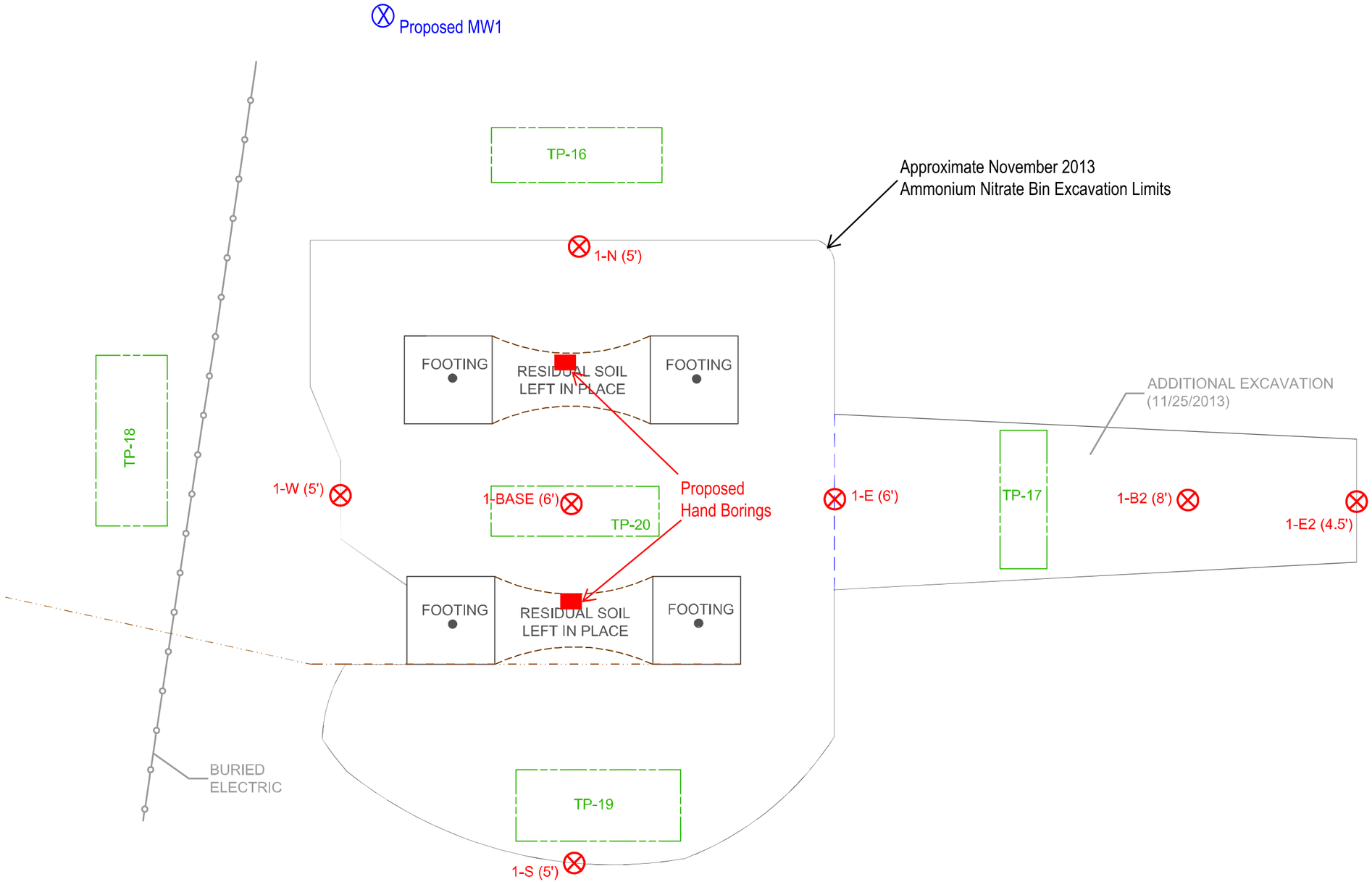
I, Scott A. Hodgson , hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, am registered in accordance with the requirements of ch. GHSS 2, Wis. Adm. Code, or licensed in accordance with the requirements of ch. GHSS 3, Wis. Adm. Code, and that, and that, 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 D. Hodgson PG-1229
Signature

Senior Project Manager
Title

Figure 1: Site Map

Ahlgrimm Explosives
W9899 Givens Road
Town of Hortonia, Outagamie County, WI



N

0 5'

APPROXIMATE SCALE

LEGEND

- Excavation Area
- Sidewall/Base Sample (Depth Shown in Feet)
- Temporary Sidewall
- Fenceline

Project Mngr: PAL	Project No. 58127001
Drawn By: LEB	Scale: AS-SHOWN
Checked By: SAH	Revised By: ~
Approved By: SAH	Date: January 24, 2014

Terracon
Consulting Engineers and Scientists
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PROPOSED MONITORING WELL AND HAND BORING LOCATIONS

AHLGRIMM EXPLOSIVES
W9899 GIVENS ROAD
HORTONVILLE, WISCONSIN

FIGURE 2

N:\Natural Resources\Lauren\DRAFTING\WISCONSIN\58127001 Nitrate Bin Excavation Area.dwg

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