

**FEHR GRAHAM**  
ENGINEERING & ENVIRONMENTAL

October 5, 2015

File # 2015-398630

Mr. Binyoti Amungwafor  
WDNR  
2300 N. Dr. Martin Luther King Jr. Dr.  
Milwaukee, WI 53212

**RE: Request for NR 140 Groundwater Exemption for Chemical Addition as Part of Remedial Action, Master Cleaners Remediation, 6326 Bluemound Road, Wauwatosa, WI 53212, BRRTS # 02-41-545142**

Dear Binyoti:

Per our conversation earlier today:

We hope to begin the remedial action on November 30, 2015, and prompt review of this plan is requested. As you know, I have obtained the WPDES permit from the WDNR in Madison, but I still need a permit from your office prior to the actual injection.

There is considerable work to be done to be prepared for inject, and I need to order shipment of the chemical. If you can let me know if it is practical to expect to be able to plan for injection on the 30<sup>th</sup>, I would appreciate it.

**Background Information**

The remedial action plan was our Remedial Action Bid, dated January 24, 2014. It was approved by J. Hnat on March 17, 2015 for implementation.

The Site Investigation was completed by Sigma, and is dated March 2013. The WDNR has both of these documents in their files, but I can provide additional information from either document upon request if you need additional information.

**Checklist Items**

You sent me a checklist of items that should be addressed to request the exemption. They are answered below:

**1) Fee Payment?**

We paid a \$700 fee to the WDNR with a check dated September 30, 2015. The check accompanied our October 5, 2015 WPDES permit application, and the check was sent to Ms. Victoria Stovall of the WDNR Milwaukee office.

**2) Has the Water Program been notified regarding Project?**

We have already received the WPDES permit from the WDNR Water Program, dated November 9, 2015. It was sent to you in earlier emails.

### 3) SIR Complete and Adequate? (Items a to f)

The Site Investigation report was prepared by Sigma Environmental, and was dated March 2013. It was approved by the WDNR, and the site proceeded to the remedial action bidding process, which is when Fehr Graham prepared a bid and was awarded the remedial action.

Excerpts from the Fehr Graham Remedial Action Proposal (approved work plan) and additional supplemental information are provided to answer the Site Conditions items:

The contaminants consist of both petroleum and drycleaning solvent. Sigma Environmental completed the site investigation from 2006 to 2013, including removal of the underground storage tanks from the property in 2006, and installation of borings, wells, and vapor sampling to evaluate both the drycleaning and the petroleum issues. Sufficient information was obtained to demonstrate the petroleum contamination could be closed with a required cap over remaining contaminated soil. Additional remediation of the drycleaning compounds is needed before closure can be pursued.

Elevated levels of PCE and related compounds have been identified, as described in Section 2 below. The main areas of contamination appear centered on the drycleaning machine and immediately east of the rear building door. There is no free product present.

#### 1.4 Geology and Hydrogeology

The site geology consists of up unconsolidated deposits to only approximately 15 to 17 feet, where dolomite bedrock is encountered. The material overlying bedrock consists of approximately two to four feet of surficial silty to sandy fill, underlain by alternating silt and clay intervals. On top of the bedrock there are several feet of saturated sand.

Two borings (PZ-1 and PZ-2) were advanced into the bedrock to a depth of 35 feet using air rotary drilling methods. The bedrock is Silurian-age dolomite of the Niagara formation. The depth to water is approximately ten feet below grade, and fluctuates by about one to two feet seasonally. The groundwater flow direction is north / northwest on a relatively strong horizontal gradient, and the saturated till formation has a hydraulic conductivity estimated at  $10^{-4}$  cm/sec range. The calculated horizontal groundwater flow is approximately 40 feet per year.

The two sets of nested wells (SMW-9 / PZ-1 and SMW-4 and PZ-2) display downward vertical hydraulic gradients.

#### 1.5 Potential Contaminant Migration Pathways and Receptors

The highest concentrations of drycleaning solvents are present in the saturated soil immediately above the bedrock surface next to the rear (east) door of the drycleaning building (SMW-9, 14-

15', 214 mg/kg PCE). Elevated PCE levels in unsaturated soil are present beneath the Master Drycleaning building and in areas to the east, north, and south of the building.

Elevated groundwater concentrations containing drycleaning solvents are present in the same areas as contaminated soil, and extend off-site to the north. The extent of groundwater contamination extends onto an estimated five properties located east, north, and northeast of the site.

The neighboring residence to the north (518 64<sup>th</sup> Street) has a basement beneath the main building that likely extends to a depth of approximately eight feet below grade, which is only a few feet above the water table surface. Contaminated groundwater is mapped as extending beneath the basement of the residence, and testing of subsurface vapors beneath the basement indicates there is a potential for migration of contamination of soil vapors into the building air at elevated levels. Testing of the indoor air at the 518 property indicates no contamination is present inside the house.

Based on the depth of the water table surface and utility line locations, no significant migration of contamination along utility lines is expected.

The site and all residences nearby are connected to municipal water, which is obtained from surface water from Lake Michigan. To the best of our knowledge there are no water supply wells within 100 or 1000 feet of the site.

#### **4. Injection Proposal Specifications, Items a) through h)**

The proposed injection details were outlined in the cover letter to the WPDES permit application, and in the Remedial Action Plan. Additional details are provided below:

The plan includes pressure injection of a solution containing 20 to 25% by weight of Provect-IR Antimethanogenic ISCR Reagent, added to the subsurface formation at a proposed 24 soil injection borings. The proposed boring locations are shown on the attached map, and will be spaced within the marked box on approximate 8 to 10 foot centers in an approximate grid. Specific boring locations have not been plotted, as locations may vary based on drilling conditions or observations during injection. The objective is to add the chemical solution upgradient along the southwest corner of the building, east of the building, and off the northwest corner of the building, to treat the contaminant source area.

Each boring will receive approximately 100 to 150 gallons of solution, depending on the ability of the boring to accept the material. The anticipated pumping velocity will be one to ten gallons per minute, with initial maximum pressures ranging up to 100 psi, and sustained pressures once the liquids flow into the formation of an estimated 25 to 50 psi.

According to the Safety Data Sheet for Provect-IR, it contains up to 40% iron, two to four percent calcium dipropionate, and the remainder is proprietary organic carbon sources.

A subcontractor geoprobe firm will complete the actual injection activities, with oversight by Fehr Graham. A private utility contractor will be hired to locate utilities prior to injection. Injection will occur using a Geoprobe drill rig inside the steel rods, with a side discharge screened interval opened to allow side injection into the formation - not from the bottom of the drill rods. The screened section spans approximately 18 to 24 inches in length. The depth of injection will range from the borehole base at an estimated 15 to 18 feet below grade, to depths as shallow as five feet below grade.

The solution will be mixed on site in mobile tanks using City of Wauwatosa potable water from the adjacent hydrant located in the right of way on the Property. The material will need to be kept agitated during injection to remain in suspension. Tanks and paddle mixers will be used to keep the material properly mixed.

The total anticipated water use is roughly 1500 gallons for the mixture, with perhaps an additional 500 gallons of straight water added as a flush to disburse the solution after injecting and to clear the drill rods of product. The total volume to be injected is 3,200 pounds of product and approximately 2000 gallons of water.

#### **5. Monitoring Proposal Specifications (a to c)**

Proposed monitoring was laid out in the remedial action proposal, and includes measurement of water levels, pH, ORP, dissolved oxygen, and conductivity at nearby monitoring wells, with testing of vapors at accessible monitoring points using a four-gas meter and a photoionization detector (PID).

Attached is a map showing the site layout, proposed injection area, and proposed monitoring points. The monitoring frequency and parameters of analysis are proposed below, and are in conformance with the approved Remedial Action Plan that was approved by the WDNR:

Location	Frequency / Timing	Water Level	Gases (PID, four gas meter-O2, CO2, SO2, % LEL)	Water Chemistry (ph, T, Cond, ORP)	Comments
(11) SMW-3, 4, 6, 7, 8, 9, 10, MW-1, MW-3, PZ-1, PZ-2	(8) Before, 4 hrs day 1, End Day 1, Before Day 2, End Day 2, Before Day 3, End Day 3, Post two weeks	X	X	X	88 Readings
(6) Catch basin (cb) S in Bluemound, San Drain inside Master Cleaners, CB S and N on East 6310 Bluemd, San. Sewer Manhole in 64 <sup>th</sup> St at Site and N of site	(5) Before, End Day 1, End Day 2, End Day 3, Post two weeks		X	If Possible	30 Readings
(4) Basement Vapor Probes VP-1, VP-2, Sump headspace, and Ambient Basement S Wall at 518 N 64 <sup>th</sup> St	(5) Before, End Day 1, End Day 2, End Day 3, Post two weeks	Sump Only	X	Sump Only, if Possible	20 readings

**6. Inventory of Injection Well Form Submitted?**

Since no injection wells are being proposed, only injection borings, I assume there is no inventory of injection well form required. If not, please let me know where to find this form, and what is should display.

We intend to track the depth and quantity of material being injected at each boring, and at which depth at each boring.

I trust these documents meet your needs, and you have enough information to issue the permit. If you need additional information, please call and let me know as soon as possible, so we can keep this project on schedule.

Thanks,

Sincerely,

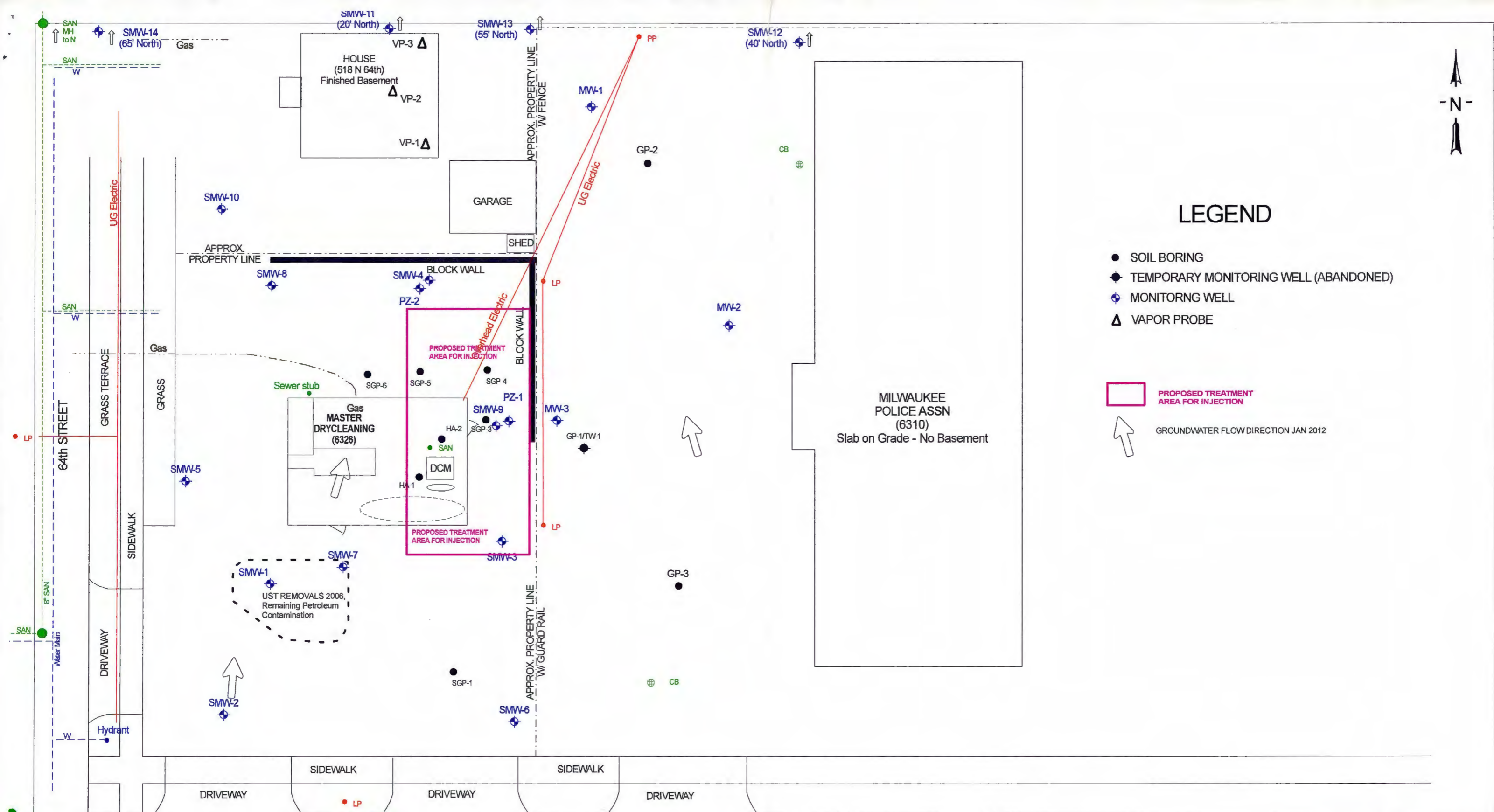
A handwritten signature in black ink that reads "Kendrick A. Ebbott". The signature is written in a cursive style with a prominent horizontal line at the end.

Kendrick A. Ebbott, PG., CGWP  
Branch Manager

Attachments: Figure 1: Proposed Injection Areas

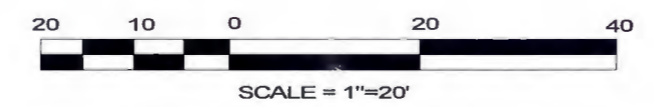
Cc: Mr. J. Hnat, WDNR, Milwaukee, WI 53212 via Email, w/ Attachments  
Mr. Tom Shipshock, Son of Master Cleaners Owner, via Email w/ Attachments  
o:\master drycleaning\15-1209\reports and correspondence\wpdes permit application\final cover letter to wdnr.docx





### LEGEND

- SOIL BORING
  - TEMPORARY MONITORING WELL (ABANDONED)
  - ⊕ MONITORING WELL
  - △ VAPOR PROBE
- 
- ▭ PROPOSED TREATMENT AREA FOR INJECTION
  - ↑ GROUNDWATER FLOW DIRECTION JAN 2012



TITLE: <b>PROPOSED INJECTION AREAS</b>			
SITE: <b>MASTER DRY CLEANING, WAUWATOSA, WI</b>			
SCALE: 1"=20'	ATS PROJECT NUMBER:	DATE: 1/17/14	DWG #... master site Tosa 2014.skf
REV.	DATE:	DESCRIPTION:	APPVD.: DRAWN BY: AH
			<b>FIGURE 1</b>