2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammunition Plant

Prepared for:

United States Department of the Army
Badger Army Ammunition Plant
S7560 U.S. Highway 12
North Freedom, Wisconsin 53951-9588

February 2014

Badger Technical Services, LLC
Badger Army Ammunition Plant
North Freedom, Wisconsin 53951-9588

TABLE OF CONTENTS

1.0 INTRODUCTION AND BACKGROUND 1
2.0 DETERRENT BURNING GROUND PLUME 2
2.1 DNT Degradation 3
2.2 Sulfate 4
2.3 Recommendations 4
3.0 CENTRAL PLUME 4
4.0 OTHER PRODUCTION AREAS 5
5.0 SUMMARY OF RECOMMENDATIONS 6
5.1 Deterrent Burning Ground Plume 7
5.2 Central Plume 7
5.3 Other Production Areas 7

LIST OF ATTACHMENTS

Figure 1 Site Layout Map
Figure 2 Sulfate Concentrations - DBG Plume

Table 1 Sample Frequency and Contaminant History

1.0 INTRODUCTION AND BACKGROUND

The Department of the Army (Army) proposes to optimize the sampling of monitoring wells at the Badger Army Ammunition Plant (BAAP). This optimization plan is focused on the areas associated with the Deterrent Burning Ground (DBG) Plume, Central Plume, and the other areas not associated with the Propellant Burning Ground (PBG) Plume. This optimization plan includes monitoring wells located both on-site and off-site. Recommendations for optimizing the monitoring well sampling plan for wells associated with the PBG Plume will be made after the Modified Interim Remedial Measures (MIRM) Shutdown Plan has been implemented.

Per NR 716.13 (9), Wisconsin Administrative Code, a responsible party shall make a good faith effort to sample public or private water supply wells as part of a regular monitoring program or to determine the extent of groundwater contamination, or both. The Army has complied with this requirement by sampling numerous monitoring wells in regular intervals and defining the extent of groundwater contamination in the three groundwater plumes.

On July 16, 2013, the Wisconsin Department of Natural Resources (WDNR) approved a modification to the private well sampling being conducted by the Army. The new plan includes the annual sampling of 51 private wells and semiannual sampling of one private well.

The Army provided the WDNR with a *Revised Alternative Feasibility Study, Groundwater Remedial Strategy* (December 2011) that implemented a modified groundwater monitoring program relying on monitored natural attenuation (MNA). On June 28, 2012, the WDNR conditionally approved the Army's remedial strategy. As a condition of approval, the WDNR required that the Army propose modifications to the groundwater monitoring program with the goal of providing data on the long-term effectiveness of MNA as a remedial alternative.

Extensive groundwater sampling results have shown that less frequent testing of monitoring wells is warranted. Additionally, many currently sampled monitoring wells are located outside the pathway of groundwater plumes originating from BAAP. The purpose of this optimization plan is to revise all existing plans/approvals and allow the Army to sample the monitoring wells that provide the best data to monitor long-term trends. This optimization plan will modify the focus of sampling to monitor source reduction, lateral plume boundaries, plume axis (center), and transects across plumes.

Since 1990, the Army has performed some level of routine sampling (quarterly, semiannually, or annually) of monitoring wells located to the east, south, and west of the BAAP. Over the past two decades, the Army has worked with the WDNR to adequately monitor groundwater.

The Army has performed monitoring well sampling in accordance with the In-Field Conditions Report (IFCR) issued by the WDNR on September 14, 1987 and all subsequent IFCRs issued by the WDNR. The most recent Groundwater Plan Modification approved by the WDNR is dated August 15, 2005. Also on November 23, 2009, the WDNR approved a modification to groundwater monitoring near the DBG. The 2009 modification adjusted the sampling frequency and parameters analyzed for monitoring wells and private wells in the DBG area.

During groundwater sample collection from a monitoring well, the following field parameters/geochemical parameters are collected: depth to groundwater, dissolved oxygen, oxidation reduction potential, pH, specific conductance, and temperature. These field parameters will continue to be collected whenever a groundwater sample is collected from a monitoring well.

Badger Technical Services, LLC (BTS) utilized the on-site geographic information system (GIS) and the groundwater database to assist with generating the data included in this submittal. The data contained in the groundwater database has previously been submitted in electronic format to the WDNR. The WDNR stores their groundwater data in the on-line accessible Groundwater and Environmental Monitoring System (GEMS) database.

The monitoring wells are sampled for a variety of the following laboratory methods: dinitrotoluene (DNT), DNT degradation (see Section 2.1), volatile organic compounds (VOCs), base neutral acids (BNA), and sulfate in some cases. The six DNT isomers (2,3- 2,4- 2,5- 2,6- 3,4- and 3,5) are analyzed by gas chromatography (GC) and a mass spectrometer (MS) detector utilizing the selected ion monitoring (SIM) technique outlined in EPA method SW 8270D. The DNT degradation compounds are analyzed by GC/MS utilizing EPA method SW 8270D. VOCs are analyzed with a GC/MS utilizing EPA method 8260C. BNAs are analyzed by GC/MS utilizing EPA method SW 8270D. Sulfate is analyzed by ion chromatography utilizing EPA method SW 9056A.

2.0 DETERRENT BURNING GROUND PLUME

The DBG consists of seven acres that was used as a waste disposal site from the 1940s to the 1970s. Coal ash, construction rubble, trash, and burned garbage were deposited inside the DBG. The DBG was also used for open burning of deterrent, a liquid organic extract from surplus propellant, composed mostly of DNT and di-n-butyl phthalate, as well as minor amounts of diphenylamine, benzene, and nitrocellulose. Investigations showed DNT spread vertically in the subsurface soils and reached groundwater. Contaminated soil was excavated from the three burn pits and the entire DBG area was covered with clean soil and an engineered cap. DNT has been detected in the groundwater above the NR 140 Enforcement Standard (ES) downgradient of the DBG. DNT is the main contaminant of concern in the DBG Plume. Sulfate, 1,1,1-trichloroethane, and 1,1,2-trichloroethane have been detected in the groundwater above the NR 140 Preventive Action Limit (PAL), downgradient of the DBG.

Landfill #5 is located to the northeast of the DBG. The landfill received office waste, demolition debris, laboratory waste, and coal ash. No hazardous materials were reported to have been disposed in Landfill #5. The landfill was opened in the early 1940s when operations began and was closed in 1989 with an engineered cap. Sulfate has been detected in the groundwater above the NR 140 ES, downgradient of Landfill #5. The following VOCs, 1,2-dichloropropane, 1,1,1-trichloroethane, and 1,1,2-trichloroethane, have been detected in the groundwater above the NR 140 PAL, downgradient of Landfill #5.

Groundwater flow in the DBG Plume area is from the northwest to the southeast, towards the Wisconsin River/Weigand's Bay (see Figures 1 and 2).

Since 1998, the Army has been conducting some level of quarterly groundwater sampling near the DBG and Landfill #5. To monitor the DBG Plume, the Army currently samples 23 monitoring wells quarterly, 31 monitoring wells semiannually, and one well annually. Figure 1 shows the locations of the monitoring wells, private wells, and the proposed monitoring well sampling frequency. The extent of the DBG Plume shown on Figure 1 represents the area where groundwater concentrations exceed a NR 140 PAL for total DNT. Table 1 displays the current and proposed sampling frequency, testing methods, frequency reasoning, well depth, last year well was sampled, and a summary of the contaminants of concern. The contaminants shown on Table 1 include DNT, carbon tetrachloride, chloroform, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene. Sulfate and 1,2-dichloropropane were not included in Table 1 due to their limited number of detections.

To address vertical sampling gaps in the monitoring well network near the DBG, three wells (DBN-1001B, DBN-1001C, and DBN-1001E) are being added to the sampling plan (see Figure 1 and Table 1). To address vertical sampling gaps in the monitoring well network downgradient of the DBG, two wells (DBN-1002C and DBN-1002E) are being added to the sampling plan. A total of 16 monitoring wells are no longer needed to monitor the DBG Plume (see Figure 1 and Table 1). These 16 monitoring wells remain clean, located outside the extents of the DBG Plume, and are located on-site.

To address sampling gaps in the monitoring well network downgradient of the DBG, the Army proposes to install seven monitoring wells (see Figure 1). Six of these monitoring wells (ELN-1401A, ELN-1401C, ELN-1402A, ELN-1402C, ELN-1403A, and ELN-1403C) would be installed halfway between the DBG and Weigand's Bay. These monitoring wells would be installed in a line or transect across the plume, help to define the horizontal and vertical extent of the plume and monitor the plume axis. The seventh monitoring well (ELN-1404B) would be installed at the leading edge of the plume, just west of Weigand's Bay. Table 2 contains a listing of the additional monitoring wells and their proposed depths.

2.1 DNT Degradation

The current groundwater sampling plan specifies that DNT degradation testing is conducted semiannually on two monitoring wells (DBM-8201 and DBM-8202) located adjacent to the DBG (DNT source area). Based on data collected at BAAP and available research, a list of potential DNT degradation compounds is shown below.

DNT Degradation Compound	Synonym
2-Nitroaniline	o-Nitroaniline
3-Nitroaniline	m-Nitroaniline
4-Nitroaniline	p-Nitroaniline
2-Amino-3-nitrotoluene	2-Methyl-6-nitroaniline
2-Amino-4-nitrotoluene	2-Methyl-5-nitroaniline
2-Amino-6-nitrotoluene	2-Methyl-3-nitroaniline
3-Amino-4-nitrotoluene	5-Methyl-2-nitroaniline
4-Amino-2-nitrotoluene	4-Methyl-3-nitroaniline
4-Amino-3-nitrotoluene	4-Methyl-2-nitroaniline

Between 1998 and 2005, the DNT breakdown product 2-nitroaniline was routinely detected in DBM-8202. Since 2006, 2-, 3-, and 4-nitroaniline have not been detected in either DBM-8201 or DBM-8202. Since 2008, the six aminonitrotoluenes have not been detected in either DBM-8201 or DBM-8202 (testing of the aminonitrotoluenes began in 2008).

2.2 Sulfate

Sulfate monitoring in monitoring wells located in the DBG Plume area has been conducted since 1990. Sulfate concentrations above the NR 140 ES (250 milligrams per liter) are present downgradient from both the DBG and Landfill #5. Landfill #5 is located to the northeast of the DBG and is a capped landfill. Both the DBG and Landfill #5 are potential sources of sulfate contamination. Elevated sulfate concentrations in groundwater can be the result of microorganisms breaking down organic compounds that would have originated from a landfill or disposal site. Sulfate concentrations in monitoring wells have slightly declined since the early 1990's. Elevated sulfate concentrations in the groundwater have not been migrating to the east or southeast towards the private wells.

Since 1990, multiple monitoring wells have been sampled for sulfate. Since March 2010, twenty monitoring wells have been annually sampled for sulfate. Figure 2 represents a map of the March and June 2013 sulfate testing results. Sulfate exceeds the NR 140 ES in ELN-8203A and ELN-8203B and the NR 140 PAL (125 milligrams per liter) in ELN-8203C, ELM-8901, ELM-9110, and S1134R. The map shows that sulfate, above the NR 140 ES, has remained close to Landfill #5. The extent of the DBG Plume shown on Figure 1 does not represent the sulfate detections mentioned above.

2.3 Recommendations

We recommend a total of 43 existing monitoring wells and seven future monitoring wells associated with the DBG Plume be sampled semiannually. Because DNT is the main contaminant of concern, DNT will be tested in each monitoring well that is sampled. Based on the limited detections of VOCs in the monitoring wells downgradient of the DBG and Landfill #5, we recommend that VOC testing be conducted only annually. We are not recommending that BNA compounds be tested in the wells associated with the DBG Plume. The Army recently submitted a separate request regarding BNA testing of monitoring wells. Based on the lack of detections, we recommend that monitoring wells no longer be tested for DNT degradation compounds. Based on the limited migration of sulfate, we recommend that 19 monitoring wells, associated with the DBG Plume, be annually sampled for sulfate (see Table 1).

3.0 CENTRAL PLUME

The source of DNT contaminated groundwater is believed to be from the north-central portion of BAAP where rocket paste and rocket propellant were produced (see Figure 1). The extent of the Central Plume shown on Figure 1 represents the area where groundwater concentrations exceed a NR 140 PAL for total DNT. The Water's Edge subdivision is located south of BAAP and on the south end of the Central Plume (see Figure 1). Groundwater flow in this area is from the north to the south, towards the Wisconsin River/Gruber's Grove Bay. During January 2005, the Army installed eight monitoring wells (SEN series) in The Water's Edge subdivision. These eight

wells along with all the private wells in The Water's Edge subdivision have been sampled quarterly since March 2005 and analyzed for BNA, DNT, and VOCs.

Figure 1 shows the locations of the monitoring wells, private wells, and the proposed monitoring well sampling frequency. Table 1 displays the current and proposed sampling frequency, testing methods, frequency reasoning, well depth, last year well was sampled, and a summary of the contaminants of concern. The contaminants shown on Table 1 include DNT, carbon tetrachloride, chloroform, 1,1,1-trichloroethane, 1,1,2-trichloroethane, and trichloroethylene.

DNT is the main contaminant of concern in the Central Plume. DNT is routinely detected, above the NR 140 PAL, in monitoring wells and one private well located within The Water's Edge subdivision. DNT has also been detected, above the NR 140 PAL and NR 140 ES, in monitoring wells located between the source area and The Water's Edge subdivision. Sampling of the monitoring wells north of The Water's Edge subdivision has been infrequent.

Chloroform is the only VOC of concern that has a history of detections in The Water's Edge subdivision. However, chloroform concentrations have always remained just above the PAL. Chloroform detections in monitoring wells located upgradient of The Water's Edge subdivision also remain near the NR 140 PAL and well below the NR 140 ES.

To address horizontal and vertical sampling gaps in the monitoring well network north of The Water's Edge subdivision, nineteen wells are being added to the sampling plan (see Figure 1 and Table 1). Three monitoring wells (SPN-0406A, SPN-0406B, and SPN-0406C) are no longer needed to monitor the Central Plume (see Figure 1 and Table 1). These three monitoring wells are located outside the extents of the Central Plume and serve no other monitoring purpose.

To address sampling gaps in the monitoring well network in the Central Plume, the Army proposes to install six monitoring wells (see Figure 1). The six monitoring wells (RIN-1401A, RIN-1401C, RIN-1401D, RIN-1402A, RIN-1402C, and RIN-1402D) would be installed along the eastern edge of the Central Plume. These monitoring wells would be installed to help define the horizontal and vertical extent of the plume. Table 2 contains a listing of the additional monitoring wells and their proposed depths.

We recommend a total of 29 monitoring wells and six future monitoring wells associated with the Central Plume be sampled annually. To address the issue that a majority of the monitoring wells in the Central Plume have not been sampled routinely, the Army will sample the 35 monitoring wells semiannually for three rounds and switch over to annual sampling. Because DNT is the main contaminant of concern, DNT will be tested in each monitoring well that is sampled. Based on the history of chloroform detections, the eight monitoring wells located in the Water's Edge subdivision will be annually tested for VOCs. We are not recommending that BNA compounds be tested in the wells associated with the Central Plume. The Army recently submitted a separate request regarding BNA testing of monitoring wells.

4.0 OTHER PRODUCTION AREAS

Since 1991, the Army has been routinely monitoring three background wells (BGM-9101, BGM-9102, and BGM-9103) that are located on the far west side of BAAP (see Figure 1).

Groundwater monitoring results from these background wells have been used to indicate if contaminants have been migrating onto BAAP and provide a reference for groundwater quality. Groundwater data from BGM-9101 and BGM-9102 have shown no consistent NR 140 exceedances. Trichloroethylene has a history of being detected in BGM-9103 above the NR 140 PAL or ES. Trichloroethylene was first detected in BGM-9103 during 2002 and reached the ES in 2004. The trichloroethylene concentration in BGM-9103 has declined to below the PAL. Groundwater is flowing from the west side of Highway 12 towards BGM-9103; therefore, the trichloroethylene contamination is from an off-site source. We recommend that the three background wells no longer be sampled.

The 2009 groundwater plan modification required that NLM-0302R be annually sampled for DNT and VOC. NLM-0302R was installed as an upgradient well for the active landfill. NLM-0302R is located approximately 2,500 feet south of the DBG Plume. Groundwater data from NLM-0302R has shown that the DBG Plume has not migrated south towards the active landfill. We recommend that NLM-0302R no longer be sampled in conjunction with the DBG Plume. This recommendation does not affect the WDNR's requirement to sample this well in accordance with the groundwater monitoring schedule for demolition landfill license #3646.

Nine monitoring wells (SPN-0401A, SPN-0402A, SPN-0402C, SPN-0403A, SPN-0403C, S1104, S1105, S1106, and SPN-0404D) near the Settling Ponds are not associated with a groundwater plume (see Figure 1 and Table 1). These nine monitoring wells are located between the Central Plume and PBG Plume and serve no other monitoring purpose. They were intended to monitor groundwater quality downgradient of the Settling Ponds. Carbon tetrachloride concentrations in SPN-0402C and SPN-0403C have remained at or above the NR 140 PAL. These wells are screened approximately 100 feet deeper than SPN-0402A and SPN-0403A (nested wells). Carbon tetrachloride has never been detected in either SPN-0402A or SPN-0403A indicating that a source of carbon tetrachloride may be located upgradient of the Settling Ponds. Since 2005, 2,4-DNT has been consistently detected in S1106 between the NR 140 PAL and ES. This well is located in a nest with three other wells (S1104, S1105, and SPN-0404D) and screened approximately 60 feet below the water table. 2,4-DNT has only been sporadically detected in the other nested wells. The Army provided the WDNR with an *Alternative Feasibility Study, Final Creek, Settling Ponds and Spoils Disposal Areas* (August 2012) documenting that previous studies indicate that contaminants in the Settling Ponds are not leaching from the soil into the groundwater. On June 11, 2013, the WDNR approved the Army's remedial strategy along with agreeing that the Settling Ponds do not appear to be impacting groundwater quality. The source of the carbon tetrachloride and DNT may be associated with past production activities in the Magazine Area or Rocket Area. We recommend that these nine monitoring wells no longer be sampled.

5.0 SUMMARY OF RECOMMENDATIONS

The following is a summary of the Army's proposed recommendations for optimizing the monitoring well sampling plan for the DBG Plume, Central Plume, and other production areas (excluding the PBG Plume). The reductions in groundwater monitoring do not pose a threat to public health and welfare or the environment. The enclosed groundwater monitoring plan will provide data to support the long-term effectiveness of MNA. If a groundwater NR 140 ES is

detected in a private well, then additional sampling or responses will be discussed with the WDNR. We recommend that this sampling plan be implemented as soon as possible.

5.1 Deterrent Burning Ground Plume

To address sampling gaps in the monitoring well network, the Army proposes to install seven monitoring wells. These monitoring wells would help define the horizontal and vertical extent of the plume and monitor the plume axis.

We recommend a total of 43 monitoring wells and seven future monitoring wells associated with the DBG Plume be sampled semiannually. Based on the limited detections of VOCs in the monitoring wells downgradient of the DBG and Landfill #5, we recommend that VOC testing be conducted annually. The proposed monitoring well network located downgradient of the DBG and Landfill #5 is designed to intersect both the horizontal and vertical distribution of contaminants. The monitoring wells associated with the DBG Plume would be sampled semiannually for DNT. Sulfate concentrations have not varied in monitoring wells and appear to be stable. Based on the limited migration of sulfate and its low risk of migration, we recommend that sulfate be annually sampled in 19 monitoring wells. We recommend that monitoring wells in the DBG Plume be no longer tested for DNT degradation compounds or BNA compounds. The Army recently submitted a separate request regarding BNA testing of monitoring wells.

5.2 Central Plume

To address sampling gaps in the monitoring well network, the Army proposes to install seven monitoring wells. These monitoring wells would help define the horizontal and vertical extent of the plume and monitor the plume axis.

We recommend a total of 29 monitoring wells and six future monitoring wells associated with the Central Plume be sampled annually for DNT. Based on the history of chloroform detections, the eight monitoring wells located in the Water's Edge subdivision will be annually tested for VOCs. To address the issue that a majority of the monitoring wells in the Central Plume have not been sampled routinely, the Army will sample the 35 monitoring wells semiannually for three rounds and then switch over to annual sampling. The proposed Central Plume monitoring well network is designed to intersect both the horizontal and vertical distribution of contaminants. We recommend that monitoring wells in the Central Plume be no longer tested for BNA compounds. The Army recently submitted a separate request regarding BNA testing of monitoring wells.

5.3 Other Production Areas

We recommend that the three background wells are no longer sampled. We also recommend that an additional nine monitoring wells near the Settling Ponds and NLM-0302R near the existing landfill are no longer sampled.

Figures

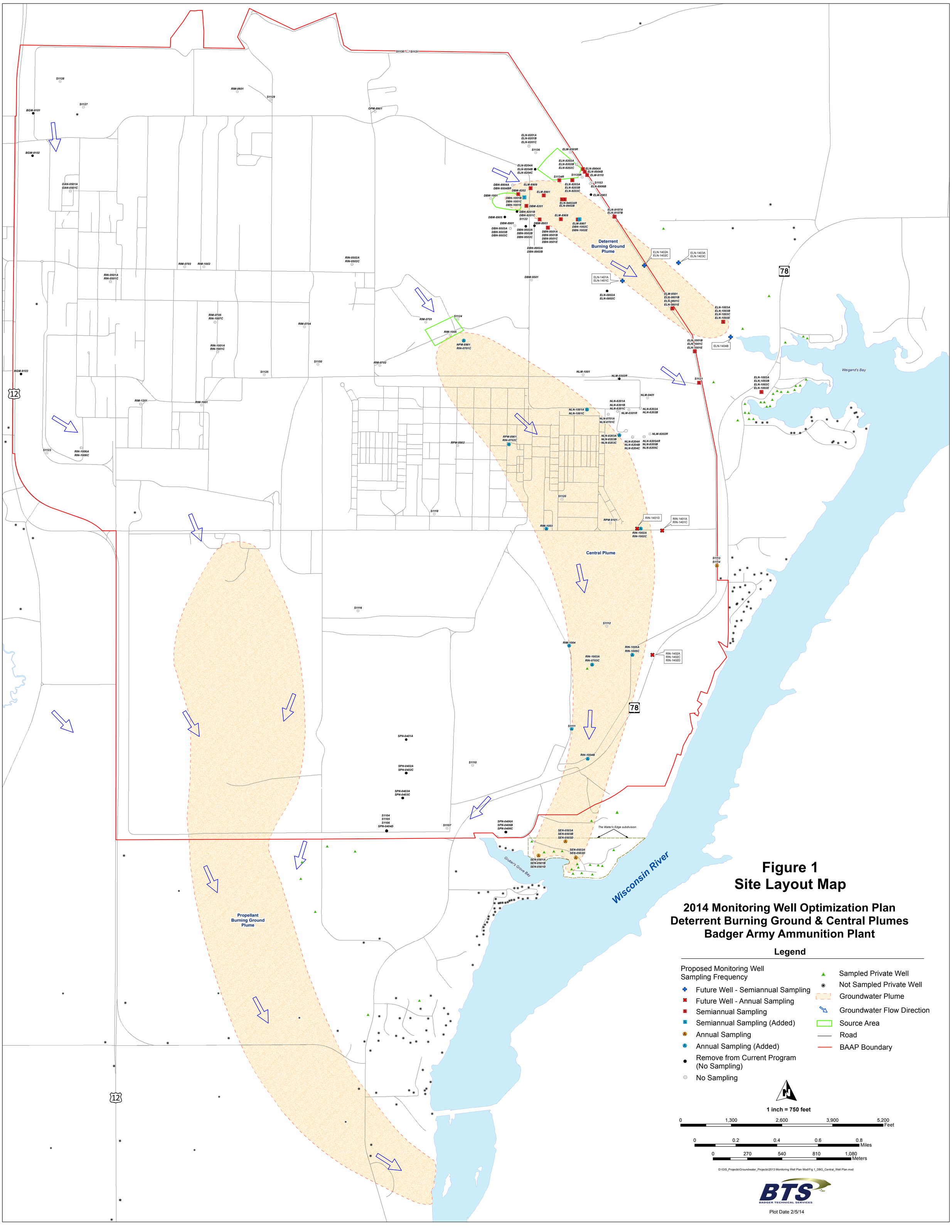
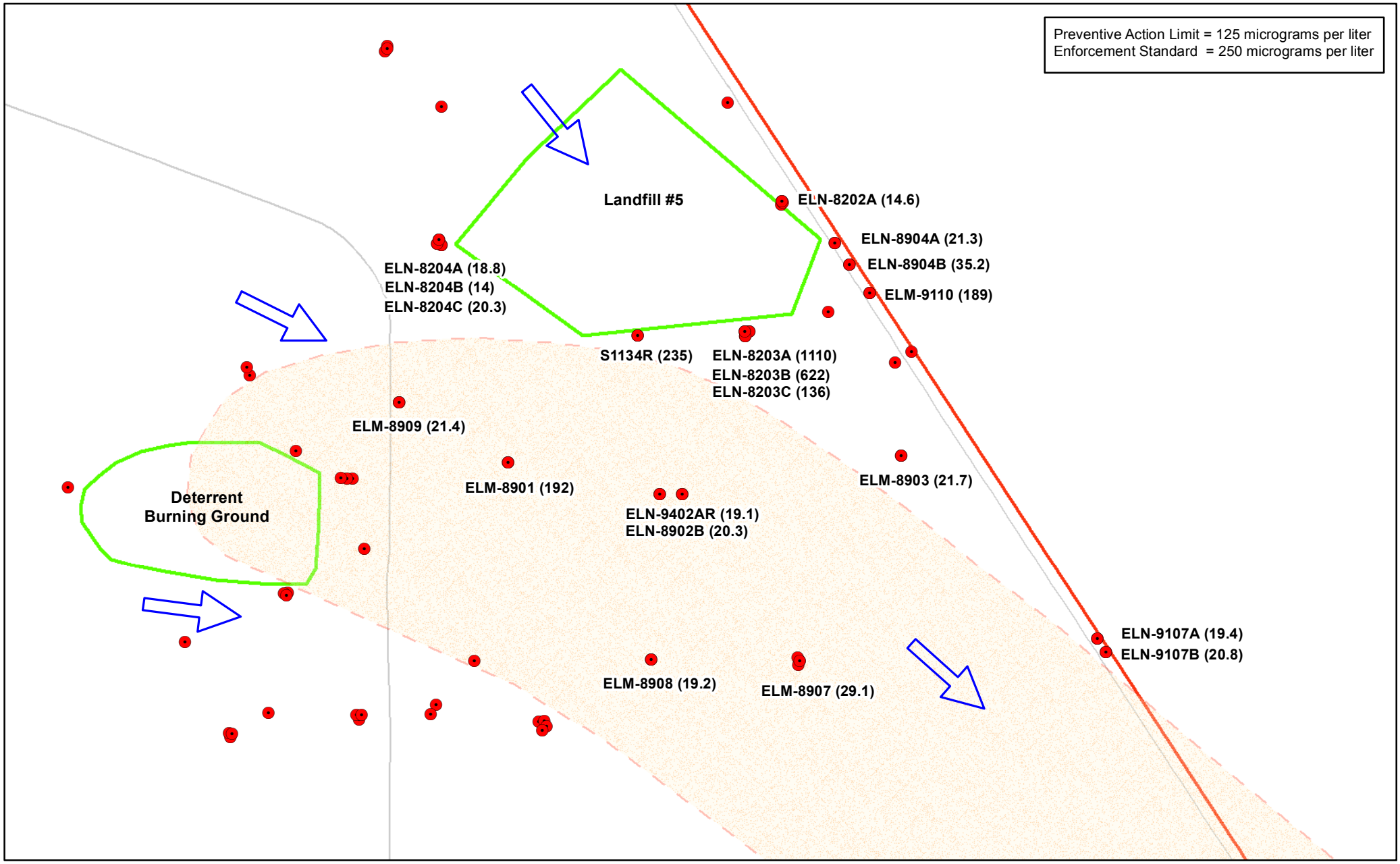


Figure 1
Site Layout Map

2014 Monitoring Well Optimization Plan
Deterrent Burning Ground & Central Plumes
Badger Army Ammunition Plant

Legend



Legend

- Monitoring Well
- Groundwater Contaminant Plume
- Source Area
- Groundwater Flow Direction
- (20.8) Sulfate Concentration in milligrams per liter (Data collected during March & June 2013)
- Road
- Plant Boundary

Figure 2

Sulfate Concentrations - DBG Plume
2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammunition Plant

1 inch = 400 feet

0 460 920 Feet

BTS
BADGER TECHNICAL SERVICES

Tables

Table 1
Sample Frequency and Contaminant History
2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammuntion Plant

Plume Area	License Area	Well Name	Well ID	Level Type	Total Depth	Proposed Sampling Frequency	Proposed Sampling Tests			Current Sampling Frequency	Dinitrotoluene		Carbon Tetrachloride		Trichloroethylene		Chloroform		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Year Last Sampled	Frequency Reasoning
							DNT	VOC	Sulfate		Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend		
Central	3038	S1113	753	A	66.1	A	A			A	ND		ND		ND		ND		ND		ND		2013	Sentinel Location
Central	3038	S1114	754	C	105.4	A	A			A	ND		ND		ND		ND		ND		ND		2013	Sentinel Location
Central	4330	SEN-0501A	580	A	32.0	A	A	A		Q	ND		ND		ND		< ES		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0501B	581	B	87.0	A	A	A		Q	ND	↓	ND		ND		ND		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0501D	582	D	190.0	A	A	A		Q	ND		ND		ND		< ES		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0502A	583	A	33.0	A	A	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0502D	584	D	187.0	A	A	A		Q	ND		ND		ND		< PAL		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0503A	585	A	55.5	A	A	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0503B	586	B	110.0	A	A	A		Q	< ES	↓	ND		ND		< PAL		ND		ND		2013	Sentinel Location - off site
Central	4330	SEN-0503D	587	D	213.0	A	A	A		Q	ND		ND		ND		PAL		ND		ND		2013	Sentinel Location - off site
Central	3646	NLN-1001A	331	A	111.5	A-add	A			N	ES		ND		ND		ND		ND		ND		2013	Plume Transect
Central	3646	NLN-1001C	332	C	154.5	A-add	A			N	ES		ND		ND		ND		ND		ND		2013	Plume Transect
Central	3118	NLN-8203A	258	A	115.5	A-add	A			N	ND		ND		ND		ND		ND		ND		2011	Monitor lateral plume boundary
Central	3118	NLN-8203B	259	B	127.5	A-add	A			N	ND		ND		ND		ND		ND		ND		1998	Monitor lateral plume boundary
Central	3118	NLN-8203C	260	C	138.5	A-add	A			N	< ES		ND		ND		ND		ND		ND		2011	Monitor lateral plume boundary
Central	3487	NPM-8901	506	A	100.0	A-add	A			N	< ES		ND		ND		ND		ND		ND		2008	Plume axis
Central	3487	RIM-1003	491	A	114.3	A-add	A			N	< ES		ND		ND		ND		ND		ND		2010	Plume Transect
Central	3487	RIM-1004	494	A	70.5	A-add	A			N	ND		ND		ND		ND		ND		ND		2010	Monitor lateral plume boundary
Central	3487	RIN-0701C	443	C	180.0	A-add	A			N	ND		ND		ND		ND		ND		ND		2008	Plume axis
Central	3487	RIN-0702C	444	C	201.0	A-add	A			N	< ES		ND		ND		ND		ND		ND		2008	Plume Transect
Central	3487	RIN-0703C	445	C	207.0	A-add	A			N	ND		ND		ND		< ES		ND		ND		2008	Plume Axis
Central	3487	RIN-1002A	492	A	92.2	A-add	A			N	ND		ND		ND		ND		ND		ND		2010	Plume Transect
Central	3487	RIN-1002C	493	C	179.8	A-add	A			N	< ES		ND		ND		< PAL		ND		ND		2010	Plume Transect
Central	3487	RIN-1003A	495	A	90.5	A-add	A			N	ND		ND		ND		ND		ND		ND		2010	Plume Axis
Central	3487	RIN-1004B	498	B	146.7	A-add	A			N	> ES		ND		ND		< PAL		ND		ND		2010	Plume Axis
Central	3487	RIN-1005A	496	A	60.5	A-add	A			N	ND		ND		ND		ND		ND		ND		2010	Plume Axis
Central	3487	RIN-1005C	497	C	147.0	A-add	A			N	> ES		ND		ND		< ES		ND		ND		2010	Plume Axis
Central	3487	RPM-8901	507	A	124.3	A-add	A			N	< ES		ND		ND		ND		ND		ND		2008	Plume Transect
Central	3038	S1111	751	A	99.0	A-add	A			N	ND		ND		ND		ND		ND		ND		2008	Monitor lateral plume boundary
Central		RIN-1401A (new)		A		A-add	A																	New Well - Plume Transect
Central		RIN-1401C (new)		C		A-add	A																	New Well - Plume Transect
Central		RIN-1401D (new)		D		A-add	A																	New Well - Plume Transect
Central		RIN-1402A (new)		A		A-add	A																	New Well - Monitor lateral plume boundary
Central		RIN-1402C (new)		C		A-add	A																	New Well - Monitor lateral plume boundary
Central		RIN-1402D (new)		D		A-add	A																	New Well - Monitor lateral plume boundary
Central	3499	SPN-0406A	736	A	43.4	D				Q	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
Central	3499	SPN-0406B	737	B	98.5	D				Q	ND		ND		ND		PAL		ND		ND		2013	Well is clean - not needed
Central	3499	SPN-0406C	738	C	149.4	D				Q	ND		< PAL		ND		< ES		ND		ND		2013	Well is clean - not needed
Central	3646	NLM-1001	330	A	106.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
Central	3646	NLN-0701A	297	A	125.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
Central	3646	NLN-0701C	298	C	155.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
Central	3118	NLN-8204A	261	A	125.5	N				N	ND		ND		ND		ND		ND		ND		2011	Not needed
Central	3118	NLN-8204B	262	B	137.5	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
Central	3118	NLN-8204C	263	C	150.0	N				N	ND		ND		ND		ND		ND		ND		2011	Not needed
Central	3487	RIM-0701	438	A	124.0	N				N	ND		ND		ND		ND		ND		ND		2008	Not needed - upgradient
Central	3487	RIM-0702	439	A	115.0	N				N	ND		ND		ND		ND		ND		ND		2008	Not needed - upgradient
Central	3487	RIM-1005	490	A	110.2	N				N	ND		ND		ND		ND		ND		ND		2010	Not needed
Central	3487	RPM-8902	508	A	111.8	N				N	ND		ND		ND		ND		ND		ND		2008	Not needed
Central	3487	RPM-9101	509	A	105.8	N				N	< ES		ND		ND		ND		ND		ND		2008	Not needed
Central	3038	S1112	752	A	91.7	N				N	> ES		ND		ND		ND		ND		ND		2008	Not needed
Central	3487	S1118	500	A	108.4	N				N	ND		ND		ND		ND		ND		ND		2008	Not needed
Central	3487	S1120	502	A	122.8	N				N	< ES		ND		ND		ND		ND		ND		2008	Not needed
Central	3487	S1124	503	A	128.8	N				N	ND		ND		ND		ND		ND		ND		2008	Not needed - upgradient

Table 1
Sample Frequency and Contaminant History
2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammuntion Plant

Plume Area	License Area	Well Name	Well ID	Level Type	Total Depth	Proposed Sampling Frequency	Proposed Sampling Tests			Current Sampling Frequency	Dinitrotoluene		Carbon Tetrachloride		Trichloroethylene		Chloroform		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Year Last Sampled	Frequency Reasoning
							DNT	VOC	Sulfate		Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend		
DBG	3037	DBM-8201	301	A	174.7	S	S	A	A	Q	> ES		ND		ND		ND		< PAL		ND		2013	Source Reduction
DBG	3037	DBM-8202	302	A	157.4	S	S	A	A	Q	> ES	↓	ND		ND		ND		< PAL	↓	< PAL		2013	Source Reduction - Vertical Profile
DBG	3037	DBM-8903	306	A	133.0	S	S	A		Q	ND	↓	ND		ND		ND		ND		ND		2013	Plume Edge
DBG	3037	DBN-9501A	314	A	120.0	S	S	A		S	ND		ND		ND		ND		ND		ND		2013	Plume Edge - Vertical Profile
DBG	3037	DBN-9501B	315	B	172.5	S	S	A		S	ND		ND		ND		ND		ND		ND		2013	Plume Edge - Vertical Profile
DBG	3037	DBN-9501C	316	C	228.5	S	S	A		S	ND	↓	ND		ND		ND		ND	↓	ND		2013	Plume Edge - Vertical Profile
DBG	3037	DBN-9501E	317	E	255.5	S	S	A		S	ND		ND		ND		ND		ND		ND		2013	Plume Edge - Vertical Profile
DBG	2813	ELM-8901	216	A	165.0	S	S	A	A	S	> ES	↓	ND		ND		ND		< PAL	↓	< PAL		2013	Plume Axis
DBG	2813	ELM-8907	220	A	150.3	S	S	A	A	Q	> ES		ND		ND		ND		< PAL		ND		2013	Plume Axis - Vertical Profile
DBG	2813	ELM-8908	221	A	145.0	S	S	A	A	Q	> ES	↓	ND		ND		ND		ND		ND		2013	Plume Axis
DBG	2813	ELM-8909	222	A	155.0	S	S	A	A	S	ND	↓	ND		ND		ND		< PAL	↓	ND		2013	Plume Axis
DBG	2813	ELM-9110	229	A	154.0	S	S	A	A	S	ND		ND		ND		ND		ND		ND		2013	Plume Edge - Landfill #5 monitoring
DBG	2813	ELM-9501	234	A	69.0	S	S	A		Q	< ES	↓	ND		ND		ND		ND		ND		2013	Plume Axis
DBG	2813	ELN-0801B	455	B	105.0	S	S	A		Q	< ES	↓	ND		ND		ND		ND		ND		2013	Plume Axis
DBG	2813	ELN-0801C	456	C	150.5	S	S	A		Q	> ES	↓	ND		ND		ND		ND		ND		2013	Plume Axis
DBG	2813	ELN-0801E	457	E	207.7	S	S	A		Q	< ES	↓	ND		ND		ND		< PAL		ND		2013	Plume Axis
DBG	2813	ELN-1001B	460	B	96.1	S	S	A		Q	ND		ND		ND		ND		< PAL		ND		2013	Sentinel Location
DBG	2813	ELN-1001C	461	C	160.2	S	S	A		Q	ND		ND		ND		ND		< PAL		ND		2013	Sentinel Location
DBG	2813	ELN-1001E	462	E	245.5	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location
DBG	2813	ELN-1002A	463	A	70.3	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1002B	464	B	116.2	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1002C	465	C	164.1	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1002E	466	E	236.5	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1003A	467	A	31.2	S	S	A		Q	< ES		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1003B	468	B	96.5	S	S	A		Q	< ES	↑	ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1003C	469	C	160.1	S	S	A		Q	< ES		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-1003E	470	E	230.6	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location - off site
DBG	2813	ELN-8203A	210	A	157.5	S	S	A	A	S	ND		ND		ND		ND		ND		< PAL		2013	Plume Edge - Landfill #5 monitoring
DBG	2813	ELN-8203B	211	B	166.0	S	S	A	A	S	ND		ND		ND		ND		ND		< ES		2013	Plume Edge - Landfill #5 monitoring
DBG	2813	ELN-8203C	212	C	176.0	S	S	A	A	S	ND		ND		ND		ND		ND		< ES		2013	Plume Edge - Landfill #5 monitoring
DBG	2813	ELN-8902B	224	B	178.5	S	S	A	A	S	ND		ND		ND		ND		ND		ND		2013	Plume Axis
DBG	2813	ELN-8904A	225	A	162.0	S	S	A	A	S	ND		ND		ND		ND		ND		ND		2013	Plume Edge - Landfill #5 monitoring
DBG	2813	ELN-8904B	226	B	199.0	S	S	A	A	S	ND		ND		ND		ND		ND		ND		2013	Plume Edge - Landfill #5 monitoring
DBG	2813	ELN-9107A	227	A	126.0	S	S	A	A	S	ND		ND		ND		ND		ND		ND	↓	2013	Plume Edge
DBG	2813	ELN-9107B	228	B	145.0	S	S	A	A	S	ND		ND		ND		ND		ND		ND	↓	2013	Plume Edge
DBG	2813	ELN-9402AR	231	A	145.0	S	S	A	A	S	ND		ND		ND		ND		< PAL		ND		2013	Plume Axis
DBG	3038	S1121	755	A	59.3	S	S	A		Q	ND		ND		ND		ND		ND		ND		2013	Sentinel Location
DBG	2813	S1134R	236	A	151.0	S	S	A	A	S	ND		ND		ND		ND		< PAL		< ES		2013	Plume Edge - Landfill #5 monitoring
DBG	3037	DBN-1001B	472	B	159.5	S-add	S	A		N	> ES		< PAL		ND		ND		< PAL		ND		2010	Source Reduction - Vertical Profile
DBG	3037	DBN-1001C	473	C	197.0	S-add	S	A		N	ND		ND		ND		ND		ND		ND		2010	Source Reduction - Vertical Profile
DBG	3037	DBN-1001E	474	E	279.9	S-add	S	A		N	ND		ND		ND		ND		ND		ND		2010	Source Reduction - Vertical Profile
DBG	3037	DBN-1002C	476	C	210.1	S-add	S	A	A	N	< ES		< PAL		ND		ND		< PAL		ND		2010	Plume Axis - Vertical Profile
DBG	3037	DBN-1002E	477	E	280.6	S-add	S	A	A	N	ND		ND		ND		ND		ND		ND		2010	Plume Axis - Vertical Profile
DBG		ELN-1401A (new)		A		S-add	S	A																New Well - Plume Transect
DBG		ELN-1401C (new)		C		S-add	S	A																New Well - Plume Transect
DBG		ELN-1402A (new)		A		S-add	S	A																New Well - Plume Transect
DBG		ELN-1402C (new)		C		S-add	S	A																New Well - Plume Transect
DBG		ELN-1403A (new)		A		S-add	S	A																New Well - Plume Transect
DBG		ELN-1403C (new)		C		S-add	S	A																New Well - Plume Transect
DBG		ELN-1404B (new)		B		S-add	S	A																New Well - Monitor lateral plume boundary
DBG	3037	DBM-8905	307	A	127.0	D				S	ND		ND		ND		ND		< PAL		ND		2013	Well is clean - not needed
DBG	3037	DBN-8201B	303	B	159.5	D				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	3037	DBN-8201C	304	C	169.5	D				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	3037	DBN-8902A	308	A	119.5	D				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	3037	DBN-8902B	309	B	150.0	D				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	3037	DBN-9502A	318	A	113.0	D				S	ND		ND		ND		ND		< PAL		ND		2013	Well is clean - not needed
DBG	3037	DBN-9502B	319	B	165.5	D				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	3037	DBN-9502C	320	C	220.3	D				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed

Table 1
Sample Frequency and Contaminant History
2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammuntion Plant

Plume Area	License Area	Well Name	Well ID	Level Type	Total Depth	Proposed Sampling Frequency	Proposed Sampling Tests			Current Sampling Frequency	Dinitrotoluene		Carbon Tetrachloride		Trichloroethylene		Chloroform		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Year Last Sampled	Frequency Reasoning
							DNT	VOC	Sulfate		Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend		
DBG	2813	ELM-8903	217	A	150.0	D				S	ND		ND		ND		ND		ND		ND	↓	2013	Not needed
DBG	2813	ELN-0802A	458	A	107.5	D				Q	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	2813	ELN-0802C	459	C	180.8	D				Q	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	2813	ELN-8202A	207	A	144.5	D				A	ND		ND		ND		ND		ND		ND		2013	Not needed
DBG	2813	ELN-8204A	213	A	151.0	D				S	ND		ND		ND		ND		< PAL		ND		2013	Not needed - upgradient
DBG	2813	ELN-8204B	214	B	165.0	D				S	ND		ND		ND		ND		ND		ND		2013	Not needed - upgradient
DBG	2813	ELN-8204C	215	C	173.0	D				S	ND		ND		ND		ND		< PAL		ND		2013	Not needed - upgradient
DBG	3037	S1122	300	A	144.0	D				S	ND		ND		ND		ND		< PAL		ND		2013	Well is clean - not needed
DBG	3037	DBM-1001	471	A	125.3	N				N	ND		ND		ND		ND		< PAL		ND		2010	Not needed - upgradient
DBG	3037	DBM-8901	305	A	125.8	N				N	ND		ND		ND		ND		ND		ND		1992	Well is clean - not needed
DBG	3037	DBM-9501	313	A	107.0	N				S	ND		ND		ND		ND		ND		ND		2013	Well is clean - not needed
DBG	3037	DBN-8904A	310	A	155.0	N				N	ND		ND		ND		ND		< ES		ND		1998	Not needed
DBG	3037	DBN-9503A	321	A	141.0	N				N	ND		ND		ND		ND		ND		ND		1998	Well is clean - not needed
DBG	3037	DBN-9503B	322	B	186.3	N				N	ND		ND		ND		ND		ND		ND		1998	Well is clean - not needed
DBG	3037	DBN-9503C	323	C	230.3	N				N	ND		ND		ND		ND		ND		ND		1998	Well is clean - not needed
DBG	3037	DBN-9504BR	312	B	190.0	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
DBG	2813	ELM-9505R	235	A	135.0	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed - upgradient
DBG	2813	ELN-8201A	204	A	134.5	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed - upgradient
DBG	2813	ELN-8201B	205	B	146.0	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed - upgradient
DBG	2813	ELN-8201C	206	C	156.0	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed - upgradient
DBG	2813	ELN-8202B	208	B	154.0	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
DBG	2813	ELN-8202C	209	C	165.3	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
DBG	2813	ELN-8906B	219	B	181.9	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
DBG	2813	S1135R	230	A	151.0	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
DBG	2813	S1136	202	B	147.0	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed - upgradient
DBG	2813	S1153	203	A	137.5	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
No Area	2813	BGM-9101	350	A	78.0	D				Q	ND		ND		ND		ND		ND		ND		2013	Delete from program
No Area	2813	BGM-9102	351	A	87.0	D				Q	ND		ND		ND		ND		ND		ND		2013	Delete from program
No Area	2813	BGM-9103	352	A	100.0	D				Q	ND		ND		< PAL	↓	ND		ND		ND		2013	Delete from program - TCE no longer concern
No Area	3646	NLM-0302R	272	A	127.0	D				A	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3499	S1104	703	A	93.5	D				Q	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3499	S1105	704	B	109.5	D				Q	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3499	S1106	705	C	135.7	D				Q	< ES		< PAL		ND		< PAL		ND		ND		2013	Not needed
No Area	3499	SPN-0401A	728	A	92.0	D				Q	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3499	SPN-0402A	729	A	45.0	D				Q	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3499	SPN-0402C	730	C	148.7	D				Q	ND		PAL		ND		PAL		ND		ND		2013	Not needed
No Area	3499	SPN-0403A	731	A	55.8	D				Q	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3499	SPN-0403C	732	C	165.0	D				Q	ND		PAL		ND		PAL		ND		ND		2013	Not needed
No Area	3499	SPN-0404D	733	D	242.0	D				Q	ND		ND		ND		ND		ND		ND		2013	Not needed
No Area	3646	NLM-0301R	271	A	112.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
No Area	3646	NLM-0401	296	A	112.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
No Area	3118	NLM-9202R	270	A	118.2	N				N	ND		ND		ND		ND		ND		ND		2011	Not needed
No Area	3118	NLN-8201A	252	A	120.3	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
No Area	3118	NLN-8201B	253	B	132.5	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
No Area	3118	NLN-8201C	254	C	142.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
No Area	3118	NLN-8202A	255	A	102.9	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
No Area	3118	NLN-8202B	256	B	115.0	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed
No Area	3118	NLN-8205B	265	B	136.5	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
No Area	3118	NLN-8205C	266	C	147.5	N				N	ND		ND		ND		ND		ND		ND		2011	Not needed
No Area	3118	NLN-9205AR	269	A	132.0	N				N	ND		ND		ND		ND		ND		ND		2011	Not needed
No Area	3481	OAN-0501A	448	A	95.4	N				N	ND		ND		ND		ND		ND		ND		2006	Not needed
No Area	3481	OAN-0501C	449	C	144.3	N				N	ND		ND		ND		ND		ND		ND		2006	Not needed
No Area	3495	OPM-8901	105	A	86.5	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
No Area	3487	RIM-0601	149	A	95.1	N				N	ND		ND		ND		ND		ND		ND		2007	Not needed
No Area	3487	RIM-0703	440	A	113.0	N				N	< ES		ND		ND		ND		ND		ND		2008	Not needed - production area
No Area	3487	RIM-0704	441	A	127.0	N				N	ND		ND		ND		ND		ND		ND		2008	Not needed - production area
No Area	3487	RIM-0705	442	A	106.0	N				N	> ES		ND		ND		ND		ND		ND		2010	Not needed - production area

Table 1
Sample Frequency and Contaminant History
2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammuntion Plant

Plume Area	License Area	Well Name	Well ID	Level Type	Total Depth	Proposed Sampling Frequency	Proposed Sampling Tests			Current Sampling Frequency	Dinitrotoluene		Carbon Tetrachloride		Trichloroethylene		Chloroform		1,1,1-Trichloroethane		1,1,2-Trichloroethane		Year Last Sampled	Frequency Reasoning
							DNT	VOC	Sulfate		Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend	Recent Level	Observed Trend		
No Area	3487	RIM-1001	482	A	98.8	N				N	ND		ND		ND		ND		ND		ND		2010	Not needed - production area
No Area	3487	RIM-1002	478	A	110.2	N				N	< ES		ND		ND		ND		ND		ND		2010	Not needed - production area
No Area	3487	RIM-1201	499	A	93.9	N				N	ND		ND		ND		ND		ND		ND		2012	Not needed - production area
No Area	3481	RIN-0501A	446	A	99.4	N				N	ND		< PAL		< ES		< PAL		ND		ND		2006	Not needed
No Area	3481	RIN-0501C	447	C	155.1	N				N	ND		ND		ND		ND		ND		ND		2006	Not needed
No Area	3487	RIN-0502A	409	A	137.4	N				N	ND		< ES		ND		ND		ND		ND		2006	Not needed
No Area	3487	RIN-0502C	410	C	217.4	N				N	ND		ND		ND		ND		ND		ND		2006	Not needed
No Area	3487	RIN-1001A	480	A	106.8	N				N	> ES		ND		ND		ND		ND		ND		2010	Not needed - production area
No Area	3487	RIN-1001C	481	C	181.4	N				N	ND		ND		ND		< PAL		< PAL		ND		2010	Not needed - production area
No Area	3487	RIN-1006A	483	A	100.4	N				N	ND		ND		< PAL		ND		ND		ND		2010	Not needed - production area
No Area	3487	RIN-1006C	484	C	180.4	N				N	ND		ND		ND		ND		ND		ND		2010	Not needed - production area
No Area	3487	RIN-1007C	479	C	175.3	N				N	ND		< PAL		< PAL		< PAL		< PAL		ND		2010	Not needed - production area
No Area	3499	S1107	706	A	75.8	N				N	ND		ND		ND		ND		ND		ND		2009	Not needed
No Area	3499	S1110	750	A	62.0	N				N	ND		ND		ND		ND		ND		ND		2005	Not needed
No Area	3491	S1116	551	C	141.4	N				N	ND		ND		ND		ND		ND		ND		2001	Not needed
No Area	3481	S1123	450	B	134.3	N				N	ND		ND		ND		ND		ND		ND		2009	Not needed
No Area	3487	S1125	504	A	126.5	N				N	< ES		< ES		ND		ND		ND		ND		2008	Not needed - production area
No Area	3483	S1127	150	A	74.8	N				N	ND		ND		ND		ND		ND		ND		1998	Not needed
No Area	3483	S1128	151	A	74.4	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
No Area	3495	S1129	100	A	118.0	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
No Area	3495	S1130	101	B	124.4	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
No Area	3495	S1131	102	A	153.5	N				N	ND		ND		ND		ND		ND		ND		1992	Not needed
No Area	3487	S1150	505	A	138.0	N				N	< ES		ND		ND		ND		ND		ND		2008	Not needed - production area

Notes:
A = Annual
A-add = Annual Added Well
D = Deleted Well
N = Well Not Sampled
Q = Quarterly
S = Semiannual
S-add = Semiannual Added Well
New = Well will be installed
ES = Well Concentration at Enforcement Standard
> ES = Well Concentration Above Enforcement Standard
< ES = Well Concentration Below Enforcement Standard
ND = Not Detected
PAL = Well Concentration at Preventive Action Limit
< PAL = Well Concentration Below Preventive Action Limit
↓ = Noticeable Decreasing Trend
↑ = Noticeable Increasing Trend
The most recent groundwater data for each contaminant and well was used to generate this table

Table 2
Additional Monitoring Well Information
2014 Monitoring Well Optimization Plan
Deterrent Burning Ground and Central Plumes
Badger Army Ammunition Plant

Plume Area	Well Name	Well Depth * (feet)	Well Level	Ground * Elevation (feet MSL)	Groundwater * Elevation (feet MSL)	Well Bottom * Elevation (feet MSL)	Screen Length (feet)
Deterrent Burning Ground Plume	ELN-1401A	112	A	882	780	770	15
	ELN-1401C	187	C	882	780	695	5
	ELN-1402A	130	A	900	780	770	15
	ELN-1402C	205	C	900	780	695	5
	ELN-1403A	91	A	860	779	769	15
	ELN-1403C	165	C	860	779	695	5
	ELN-1404B	40	B	779	775	739	5
Central Plume	RIN-1401A	86	A	848	772	762	15
	RIN-1401C	168	C	848	772	680	5
	RIN-1401D	241	D	861	772	620	5
	RIN-1402A	66	A	825	769	759	15
	RIN-1402C	145	C	825	769	680	5
	RIN-1402D	220	D	825	769	605	5

Notes:
* All footages are preliminary and subject to change
MSL = Mean Sea Level
Layer designation
A = shallow zone in sand and gravel aquifer
B = intermediate zone in sand and gravel aquifer
C = deep zone in sand and gravel aquifer
D = bottom zone in sand and gravel aquifer - above bedrock