

IN-SITU CHEMICAL OXIDATION INJECTION PROGRAM FINAL REPORT

SITE:

**CHAMPAIGN FORMER MGP SITE
CHAMPAIGN, ILLINOIS**

JANUARY 10, 2014

PREPARED FOR:

**PSC INDUSTRIAL OUTSOURCING, LP
210 WEST SAND BANK ROAD
COLUMBIA, ILLINOIS 62236**

PROJECT No. 901144

PREPARED BY:



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1.0 INTRODUCTION

In-Situ Oxidative Technologies, Inc. (ISOTEC) was retained by PSC Industrial Outsourcing, LP (PSC) to conduct an in-situ chemical oxidation (ISCO) injection program at the former Manufactured Gas Plant (MGP) located at 308 N. 5th Street, in Champaign, Illinois (**Figure 1**). In this report the former Champaign MGP site is also identified as the “site”.

The purpose of the ISCO injection program was to address the perimeter of the site where concentrations of organic constituents of concern (COCs) exceeded Tier 1 Remedial Objectives (ROs) for the soil inhalation exposure pathway in the upper 10 feet of soil. The remediation technology chosen for the site was ISOTEC’s proprietary modified Fenton’s Reagent (MFR) technology.

The field activities conducted by ISOTEC to date have occurred during three separate injection events (Phase 2A, Phase 2B and Phase 2C) between April 29 and August 20, 2013. Field operations completed by ISOTEC during the Phase 2A injection event were detailed in the *In-Situ Chemical Oxidation Remediation Program Interim Report- Phase 2A*, dated June 18, 2013. Field operations completed by ISOTEC during the Phase 2B injection event were detailed in the *In-Situ Chemical Oxidation Remediation Program Interim Report- Phase 2B*, dated July 24, 2013. The field activities were performed in accordance with the *In-Situ Chemical Oxidation Work Plan* that was prepared by PSC and submitted to the Illinois Environmental Protection Agency (IEPA) in March 2013.

This *In-Situ Chemical Oxidation Injection Program Final Report* describes the field activities completed by ISOTEC during all three injection events.

1.1 SITE-SPECIFIC CHARACTERISTICS

The original ISCO treatment area occupied approximately 35,000 square feet (sq. ft.) of the 2.5 acre site and encompassed the western and northern portion of the site perimeter. The extent of the treatment area was determined from post-excavation soil confirmation sample analytical data.

According to data provided by PSC, the remediation site had vadose and saturated zone soils impacted by inorganics, metals, volatile aromatics and polycyclic aromatic hydrocarbons (PAHs). The primary COCs at the site were benzene, toluene, ethylbenzene, and xylenes (BTEX) and naphthalene.

The treatment interval for the ISCO injection program was from 3 to 10 feet below ground surface (bgs). Two additional treatment intervals, 20 to 25 feet bgs and 36 to 44 feet bgs, were identified by PSC at three limited areas within the designated ISCO injection treatment area. The first area was located along the northern perimeter and had exceedances in soils from 3 to 10 feet bgs and 20 to 25 feet bgs. The second area was located in the middle portion of the site and had soil exceedances present from 20 to 25 feet bgs. The third area was located along the southern perimeter of the site and had soil

exceedances from 3 to 10 feet bgs and potential groundwater exceedances present at approximately 36 to 44 feet bgs. Injection locations utilized during the injection program are shown on **Figure 2** (Phase 2A), **Figure 3** (Phase 2B) and **Figure 3** (Phase 2C).

Review of lithologic logs for soil borings advanced across the site indicated that the subsurface soils consist of fill material from grade surface to depths of 3 to 4 feet bgs. This surficial fill unit along the perimeter of the site is underlain by a clay and silty-clay unit to a depth of approximately 16 to 20 feet bgs. Below this unit is a weathered till unit present from 16 feet bgs to a maximum depth explored of 33 feet bgs. This weathered till unit is comprised of silty-clay and sandy-clay with some gravel and fine-grained sand. According to PSC, depth to groundwater ranges from 2 to 10 feet bgs.

1.2 ISCO INJECTION PROGRAM OBJECTIVES

The objective of the ISCO injection program was to reduce benzene, ethylbenzene, toluene, xylenes and naphthalene concentrations in the upper 10 feet of soil to their respective Tier 1 ROs for the soil inhalation exposure pathway.

The Tier 1 ROs for the soil inhalation pathway are:

- Benzene - 0.8 mg/kg
- Ethylbenzene - 400 mg/kg
- Toluene - 650 mg/kg
- Xylenes - 320 mg/kg
- Naphthalene - 170 mg/kg

Based on post-excavation soil confirmation data and past experience, it was determined that multiple injection events would be required to reach the injection program objective.

1.3 ISCO REMEDIATION PROGRAM DESIGN

ISOTEC proposed to utilize neutral-pH, chelated iron catalyst and stabilized 8% hydrogen peroxide to implement an MFR ISCO program. ISOTEC was to utilize direct-push technology (DPT) to introduce reagents into the subsurface at the site. The ISCO program was designed to address vadose zone and saturated zone soils within the treatment areas specified by PSC (**Figure 2**).

The design was based upon data supplied by PSC and had several potentially limiting factors to implementation success. Limiting factors at the site included the presence of previous investigative penetrations and the fact that the majority of the target treatment interval is shallow vadose zone soils (3 to 10 feet bgs). These factors, in unison, presented potential problems for the injection of modified Fenton's reagent. The presence of previous penetrations in the treatment area may provide vertical conduits through which produced gas can travel to the surface. Surfacing was a significant issue during the Phase 1 2009 ISCO pilot test and was expected during Phase 2. Chemical oxidation remediation is a dissolved phase/saturated zone technology. Since the majority of the Phase 2 target treatment interval is shallow vadose zone soils, ISOTEC would have

to attempt to saturate the vadose zone soils with reagent in order to achieve the project objectives, which would most likely result in varying amounts of surfacing. In order to achieve project success, the site's limiting factors were taken into account when the injection program was designed.

Based on review of site data provided by PSC, ISOTEC anticipated that two full-scale injection applications and one reduced application would be required. ISOTEC assumed that the full-scale ISCO remediation program would be designated Phase 2 and that each injection event would be given the following alphabetical designations:

- Phase 2A – First Injection Event (Entire Treatment Area)
- Phase 2B – Second Injection Event (Entire Treatment Area)
- Phase 2C – Third Injection Event (50% of the Treatment Area)

During Phase 2A, also referred to as the “first event”, temporary injection screens were to be installed at approximately 120 injection locations within the on-site perimeter treatment areas. Two screen installations were to be completed at each location; one screen deployed from approximately 3 to 6 feet bgs to target the upper shallow vadose zone soils and the second screen deployed from approximately 6 to 10 feet bgs to target the lower shallow vadose/saturated zone soils.

The injection locations within the on-site perimeter ISCO treatment areas would be spaced approximately 15 feet apart based on an anticipated 7.5-foot radius of influence (ROI). The actual spacing for the locations were to likely vary due to underground utilities, above-ground impediments and other associated field conditions. The injection locations were to be placed on a triangular grid-like pattern across the treatment areas. The subsequent injection event locations (Phase 2B and Phase 2C) would be shifted laterally from the first event locations.

The effectiveness of the injection program was to be determined by comparing the concentrations of soil samples collected by PSC prior to injection activities with the concentrations of soil samples collected by PSC during post-injection sampling events. The post-injection soil samples were to be collected from the 3 to 6 feet bgs interval and the 6 to 10 feet bgs interval at multiple selected locations within the treatment area(s). The post injection performance soil samples would be collected at locations immediately adjacent to the baseline boring locations and from the same associated depth intervals. This would allow for the most direct comparison possible of concentration reductions as a result of the injection application. In the event that a specific post-injection soil sample reported all of the target COC concentrations at or below the Tier 1 ROs for the soil inhalation exposure pathway, that specific boring location and/or depth interval would no longer be sampled and injections in the immediate vicinity of the boring(s) and/or depth interval(s) would be eliminated from the subsequent injection applications. These soil sampling and evaluation procedures would be repeated following each of the injection applications.

2.0 ISCO INJECTION PROGRAM

ISOTEC conducted three injection events at the site from April 29 to August 20, 2013. Specifically, Phase 2A was conducted from April 29 to May 15, 2013, Phase 2B was conducted from June 19 through 26, 2013 and Phase 2C was conducted from August 14 through 20, 2013. Over the course of the three events, ISOTEC injected 23,041 gallons of reagent (oxidizer and catalyst) through 411 injection screens installed at 219 injection locations. For identification purposes, each injection screen was labeled with an injection event identifier (“1I” for the Phase 2A injection event, “2I” for the Phase 2B injection event and “3I” for the Phase 2C injection event), followed by an injection location number and finally an injection interval identifier (“A”, “B”, “C” or “D”). The “A” designation indicates a 3 to 6 feet bgs screen, the “B” designation indicates a 6 to 10 feet bgs screen, the “C” designation indicates a 20 to 25 feet bgs screen, and the “D” designation indicates a 36 to 44 feet bgs screen. According to this method the injection screen labeled “2I-31B” indicates a screen installed from 6 to 10 feet bgs at location 31 during the Phase 2B injection event. A total of 192 “A” screens, 183 “B” screens, 25 “C” screens and 11 “D” screens were installed during the injection program. Phase 2A, Phase 2B and Phase 2C injection locations are shown on **Figure 2**, **Figure 3** and **Figure 4**, respectively.

2.1 FIELD METHODS

Field operations completed by ISOTEC during each injection event included equipment mobilization and demobilization, temporary injection screen installations and abandonments, reagent preparation, and reagent injections. The following sections describe in detail the field methods, procedures, and equipment utilized by ISOTEC during implementation of each injection event.

2.1.1 Injection Screen Installation and Abandonment

Temporary injection screens installed with direct-push technology (DPT) were used to deliver ISOTEC’s modified Fenton’s reagents into the target depth intervals. The injection screens were installed with a DPT drill rig operated by Bulldog Drilling (Bulldog). The equipment and tooling provided by Bulldog included a track-mounted AMS drill rig, 1.25-inch and 1.5-inch diameter direct-push drill rods, extension rods used to deploy injection screens, and decontamination equipment. Tooling provided by ISOTEC included specialized 0.5-inch diameter injection screens designed to pass through the center of the drill rods, specialized point holders designed to hold the injection screens in place within the target injection interval, and 1-inch expendable drive points.

Bulldog began each screen installation by advancing drill rods to the desired depth at each injection location. Once the proper depth was reached, an injection screen was lowered through the center of the rods to the bottom of the rod string and held in place with extension rods. The rod string was then slowly retracted until the desired length of injection screen was exposed across the specific target treatment interval. A direct-push

injection screen schematic illustrating the A- and B-screen installation (3 to 6 and 6 to 10 feet bgs) is included as **Figure 5**.

Following daily injection activities, ISOTEC oversaw the proper abandonment of each injection location by Bulldog. After removing the rod string, each borehole was abandoned by slowing hand pouring 3/8-inch bentonite chips from the bottom of the borehole to approximately 6-inches bgs. The bentonite was hydrated and the borehole was then completed with a concrete patch.

2.1.2 Reagent Preparation

ISOTEC reagents consist of a neutral-pH, chelated ferrous iron solution (catalyst) and dilute stabilized hydrogen peroxide (oxidizer). During each phase of the injection program, ISOTEC utilized an oxidizer concentration of 8%. Hydrogen peroxide at a concentration of 30% was shipped directly to the site immediately prior to field injection activities and stored in DOT-approved 55-gallon drums. The 30% hydrogen peroxide was diluted to an 8% concentration in 300-gallon polyethylene bulk tanks with water obtained from a fire hydrant located in the southwest corner of the site. ISOTEC's proprietary catalyst is a pH buffered (pH of approximately 7) ferrous iron complex. The catalyst components were shipped to the site in dry form and mixed with water in 300-gallon polyethylene bulk tanks. A reagent mixing schematic is included as **Figure 6**.

2.1.3 Injection Method

The injections were accomplished using air-operated double-diaphragm pumps, flow meters, polyvinyl chloride (PVC) reinforced tubing, cam-lock valves & fittings, and steel wellhead assemblies. The wellhead assemblies, with pressure gauges and relief valves, were attached to the uppermost drill rod at each injection screen location. The wellhead assemblies were attached with PVC reinforced tubing to an air-operated diaphragm pump and from the pump to either the oxidizer, catalyst or water tanks with additional PVC tubing. Oxidizer, catalyst and water were conveyed through the PVC tubing using a pneumatic diaphragm pump with air supplied from a portable air compressor.

In general, the injection process was similar for each injection screen. First, water was injected, followed by catalyst, a second water flush to clear the injection equipment of catalyst, then the oxidizer, and a final water flush to clear the injection equipment of oxidizer. An injection method schematic detailing the injection process is included as **Figure 7**.

Reagent volumes, flow rates, and injection pressures were monitored at regular intervals and recorded in a field log during the injection process at each injection screen. Reagent volumes and flow rates were measured with battery-operated turbine flow meters/totalizers. Injection pressures were measured with pressure gauges attached to the wellhead assemblies.

2.2 PHASE 2A INJECTION EVENT FIELD ACTIVITIES

During the Phase 2A injection event, ISOTEC attempted to inject catalyst and oxidizer into 203 injection screens installed at 99 locations (**Figure 2**). As previously noted, screens were not installed at some locations because the locations were within the excavation limits. These locations included 1I-42, 1I-64, 1I-65, 1I-66, 1I-76, 1I-77, 1I-85, 1I-86 and 1I-87, and combined for a total of 21 screens not installed. The Phase 2A treatment area occupied approximately 22,500 sq. ft. At locations where multiple injection screens were required in order to target separate treatment intervals, the individual screens were installed in separate boreholes spaced approximately two feet apart. The majority of the Phase 2A injection locations utilized two injection screens; the A-screen deployed from 3 to 6 feet bgs and the B-screen deployed from 6 to 10 feet bgs. In addition to using two screens to deliver reagents across the 3 to 10 feet bgs interval, six injection locations (1I-73, 1I-74, 1I-75, 1I-79, 1I-80, and 1I-81) utilized an injection screen that was deployed from 20 to 25 feet bgs. Injection locations 1I-104 through 1I-106 also had a screen deployed from 36 to 44 feet bgs. Injection locations 1I-94, 1I-95, 1I-96 and 1I-97 utilized only one injection screen deployed from 20 to 25 feet bgs.

ISOTEC was able to inject 9,664 gallons of reagent (catalyst and oxidizer) into the 203 injection screens (95 A-screens, 95 B-screens, 10 C-screens and 3 D-screens) installed during the Phase 2A injection event. Surfacing of reagent occurred at 40% of the A-screens, 27% of the B-screens and 10% of the C-screens. Surfacing is described as the migration of gasses, groundwater and/or reagent to the ground surface through natural or man-made conduits in the subsurface. When surfacing occurred, the injection process at the screen observed to be surfacing was stopped and no further injection activities were attempted at that particular injection screen location. Surfacing did not occur while injecting into the D-screens.

The average volume of reagent (oxidizer and catalyst) injected into the A-screens (3 to 6 feet bgs) was approximately 41 gallons per screen. The average volume of total reagent injected into the B-screens (6 to 10 feet bgs) was approximately 49 gallons per screen. The average volume of total reagent injected into the C-screens (20 to 25 feet bgs) was approximately 83 gallons per screen. The average volume of total reagent injected into the D-screens (36 to 44 feet bgs) was 100 gallons per screen.

Reagent flow rates ranged from approximately 1.8 to 2.8 gallons per minute (gpm). Injection pressures ranged from approximately 0 to 30 pounds per square inch (psi) during injection activities. A summary of the volumes injected at each location during the first event is presented in **Table 1**.

2.3 PHASE 2B INJECTION EVENT FIELD ACTIVITIES

Post-Phase 2A soil confirmation sampling data provided by PSC showed that several sampling intervals and locations met the Tier 1 ROs for the injection program. Injection locations immediately adjacent to these intervals and/or sampling locations were omitted

from the Phase 2B injection event. As a result, the Phase 2B treatment area was reduced from the first event size of approximately 22,500 to approximately 12,750 sq. ft.

During the Phase 2B injection event, ISOTEC attempted to inject catalyst and oxidizer into 128 injection screens installed at 72 locations (2I-2 through 2I-13, 2I-16 through 2I-23, 2I-25, 2I-29 through 2I-37, 2I-39 through 2I-41, 2I-44, 2I-45, 2I-49, 2I-50, 2I-54, 2I-55, 2I-59 through 2I-91, 2I-93 and 2I-94, **Figure 3**). At locations where multiple injection screens were required in order to target separate treatment intervals, the individual screens were installed in separate boreholes spaced approximately two feet apart. The majority of the Phase 2B injection locations utilized two injection screens; the A-screen deployed from 3 to 6 feet bgs and the B-screen deployed from 6 to 10 feet bgs. In addition to utilizing either an A-screen or a B-screen, five injection locations (2I-68, 2I-69, 2I-70, 2I-73, and 2I-74) utilized an injection screen that was deployed from 20 to 25 feet bgs (C-screen). Injection locations 2I-84 through 2I-87 utilized only one injection screen deployed from 20-25 feet bgs (C-screen). Injection locations 2I-88 through 2I-91 utilized only one injection screen deployed from 36 to 44 feet bgs (D-screen).

ISOTEC was able to inject 8,175 gallons of reagent (catalyst and oxidizer) into the 128 injection screens (61 A-screens, 53 B-screens, 10 C-screens and 4 D-screens) installed during the Phase 2B injection event. Surfacing of reagent occurred at approximately 56% of the A-screens, approximately 55% of the B-screens and 60% of the C-screens. When surfacing occurred, the injection process at the screen observed to be surfacing was stopped and no further injection activities were attempted at that particular injection screen location. Surfacing did not occur while injecting into the D-screens. It is important to note that in some instances a “redo” screen was installed at locations where surfacing occurred after relatively little reagent was injected. These screens were installed within 5 feet of the original location and were designated with an “-R” at the end of the screen identifier (i.e. 2I-50A-R). A total of 9 “redo” screens were installed during Phase 2B.

The average volume of total reagent (oxidizer and catalyst) injected into the A-screens was approximately 47 gallons per screen. The average volume of total reagent injected into the B-screens was approximately 59 gallons per screen. The average volume of total reagent injected into the C-screens was approximately 93 gallons per screen. The average volume of total reagent injected into the D-screens was 315 gallons per screen.

Reagent flow rates ranged from approximately 1.8 to 2.8 gallons per minute (gpm). Injection pressures ranged from approximately 0 to 30 pounds per square inch (psi) during injection activities. A summary of the volumes injected at each location during the second event is presented in **Table 2**.

2.4 PHASE 2C INJECTION EVENT FIELD ACTIVITIES

Post-Phase 2B soil confirmation sampling showed that additional sampling intervals and locations met the Tier 1 ROs for the injection program. Injection locations immediately

adjacent to these intervals and/or sampling locations as well as those that had previously met Tier 1 ROs were omitted from the Phase 2C injection event. The reduced Phase 2C treatment area covered approximately 8,650 sq. ft.

During the Phase 2C injection event, ISOTEC attempted to inject catalyst and oxidizer into 84 injection screens installed at 49 locations (3I-1 through 3I-49, **Figure 4**). At locations where multiple injection screens were required in order to target separate treatment intervals, the individual screens were installed in separate boreholes spaced approximately two feet apart. The majority of the Phase 2C injection locations utilized two injection screens; the A-screen deployed from 3 to 6 feet bgs and the B-screen deployed from 6 to 10 feet bgs. In addition to utilizing either an A-screen or a B-screen, seven injection locations (3I-29, 3I-31, 3I-32 and 3I-40 through 3I-43) utilized an injection screen that was deployed from 20 to 25 feet bgs (C-screen). Injection locations 3I-44 through 3I-47 utilized only one injection screen deployed from 36 to 44 feet bgs (D-screen).

ISOTEC was able to inject 5,202 gallons of reagent (catalyst and oxidizer) into the 84 injection screens (36 A-screens, 35 B-screens, 9 C-screens and 4 D-screens) installed during the Phase 2C injection event. Surfacing of reagent occurred at approximately 69% of the A-screens, approximately 66% of the B-screens and 44% of the C-screens. When surfacing occurred, the injection process at the screen observed to be surfacing was stopped and no further injection activities were attempted at that particular injection screen location. Surfacing did not occur while injecting into the D-screens. It is important to note that in some instances a “redo” screen was installed at locations where surfacing occurred after relatively little reagent was injected. These screens were installed within 5 feet of the original location and were designated with an “-R” at the end of the screen identifier (i.e. 3I-18B-R). A total of 14 “redo” screens were installed during Phase 2C.

The average volume of total reagent (oxidizer and catalyst) injected into the A-screens was approximately 36 gallons per screen. The average volume of total reagent injected into the B-screens was approximately 44 gallons per screen. The average volume of total reagent injected into the C-screens was approximately 119 gallons per screen. The average volume of total reagent injected into the D-screens was 325 gallons per screen.

Reagent flow rates ranged from approximately 2 to 4 gallons per minute (gpm). Injection pressures ranged from approximately 0 to 80 pounds per square inch (psi) during injection activities. A summary of the volumes injected at each location during the third event is presented in **Table 3**.

3.0 CONCLUSIONS

The objective of the ISCO injection program was to reduce COCs in soil to below Tier 1 ROs for the soil inhalation pathway in the upper 10 feet of soil. To achieve this goal, ISOTEC estimated that three separate injection mobilizations would be required. To date, ISOTEC has completed three injection events at the site.

As stated in **Section 1.3**, the effectiveness of the injection program was to be determined by comparing the concentrations of soil samples collected prior to injection activities with the concentrations of soil samples collected during post-injection sampling events. If a specific post-injection soil sample reports all of the target COC concentrations at or below the Tier 1 ROs for the soil inhalation exposure pathway, that specific boring location and/or depth interval would no longer be sampled and injections in the immediate vicinity of the boring(s) and/or depth interval(s) would be eliminated from the subsequent injection applications.

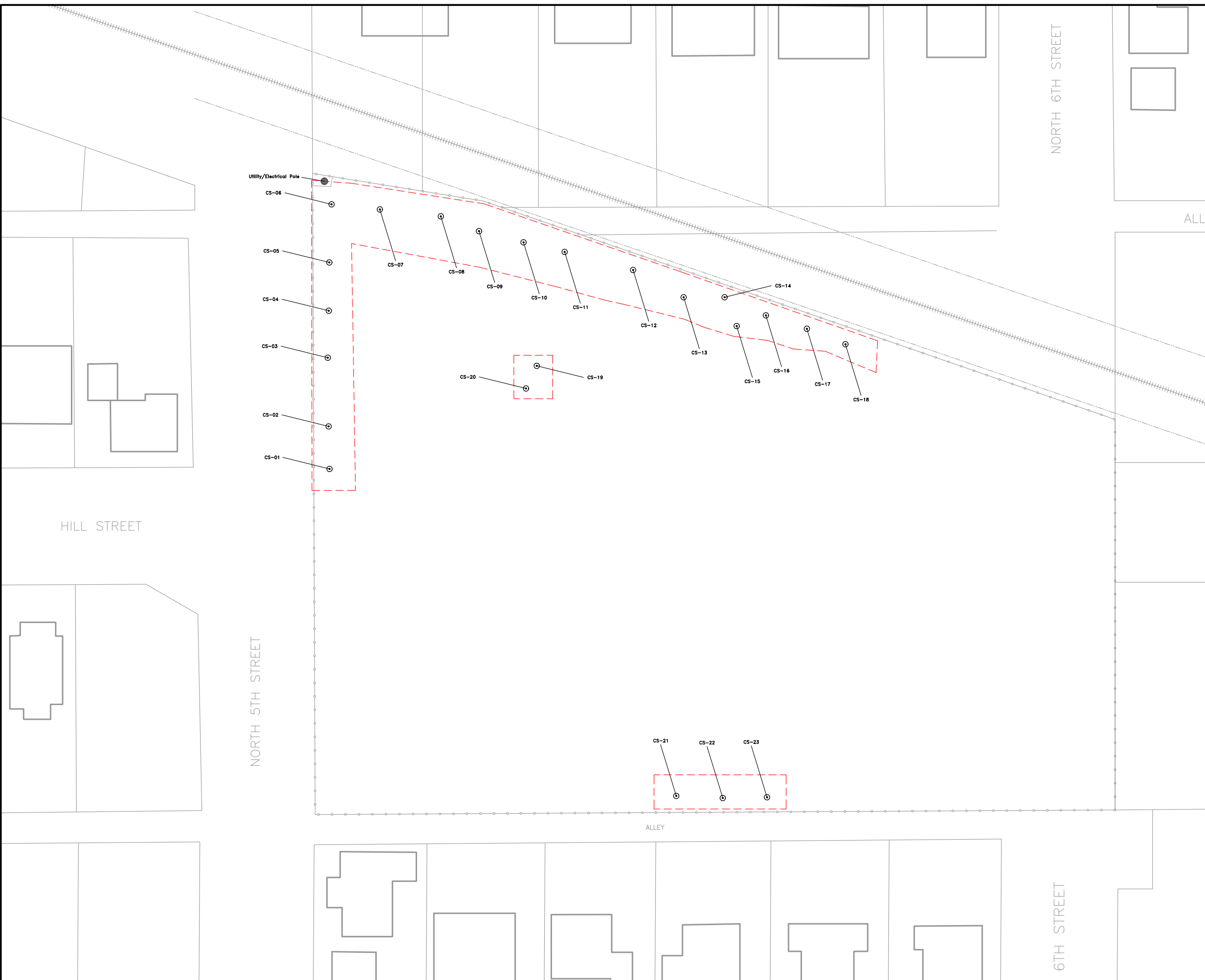
During the Post-Phase 2A sampling event a total of 46 samples were taken from 23 confirmation soil sampling locations. During the Post-Phase 2B and Post-Phase 2C sampling events these numbers were reduced to 29 samples taken from 18 locations and 23 samples taken from 16 locations, respectively.

Post-injection event sampling results translate directly to the size of the treatment area for the subsequent injection event. During Phase 2A, the treatment area for the A and B intervals (3 to 6 and 6 to 10 feet bgs) covered approximately 22,500 sq. ft. During Phase 2B, injections took place across an area that was approximately 12,750 sq. ft., a treatment area reduction of 43%. The third injection event (Phase 2C) treatment area covered approximately 8,650 sq. ft.; which represents 32% reduction when compared to Phase 2B, and an overall ISCO treatment area reduction of 62% when compared to the first event (Phase 2A). Following the third event, the upper 10 feet treatment area was reduced to approximately 7,950 sq. ft., a reduction of 65% when compared to baseline.





Comparison of the number of sampling locations and size of the ISCO treatment area before injections to the post-third injection event (Phase 2C) site conditions indicates that the ISOTEC process was effective at reducing COC concentrations in the upper 10 feet of soil across approximately 65% of the ISCO treatment area.

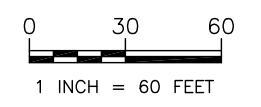


FIGURES



LEGEND

-  Existing Structure
-  Fence/Remediation Site Boundary
-  Approximate Extent of ISCO Treatment Area
-  Confirmation Soil Sample Location

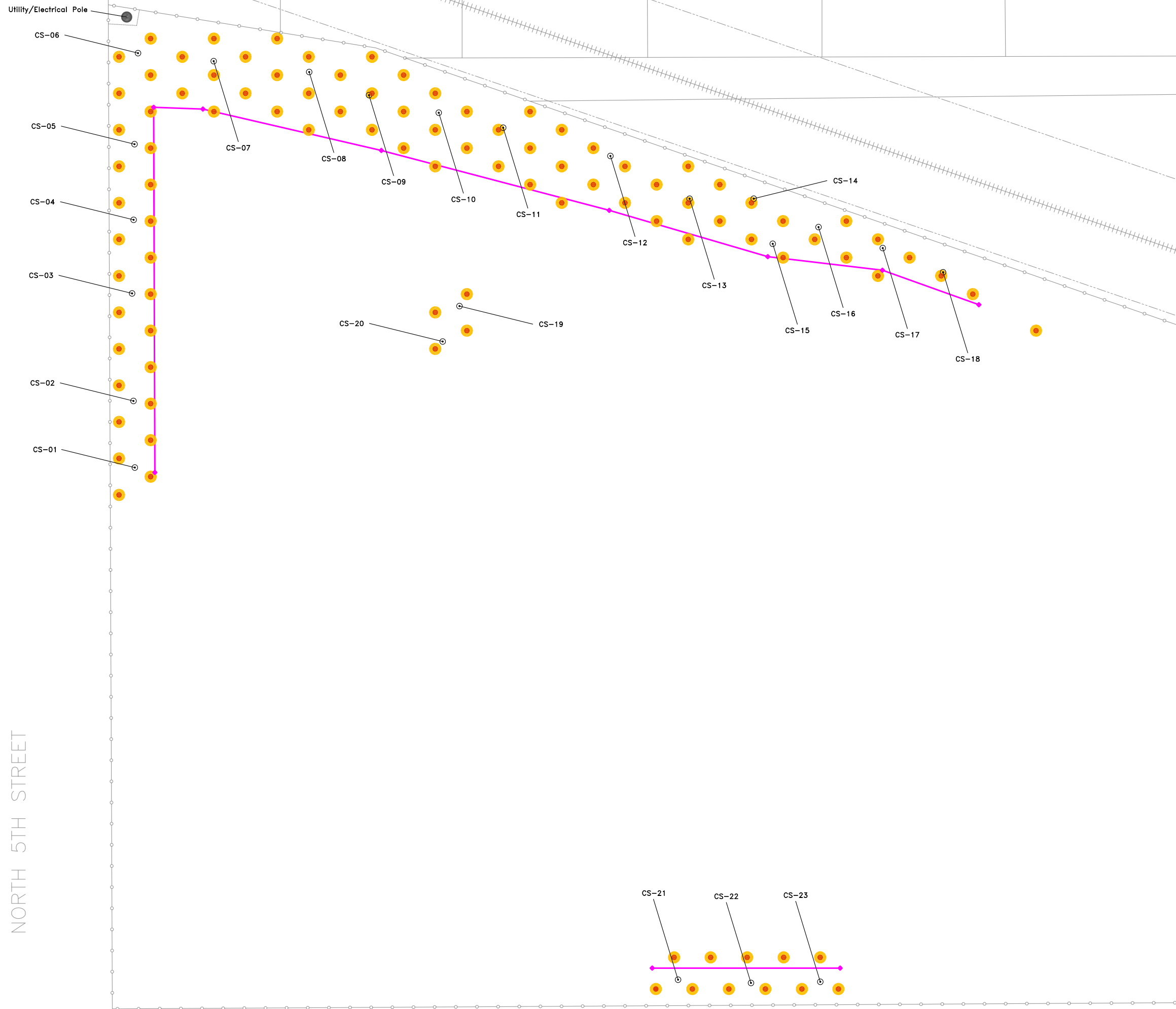


Base map provided by PSC Industrial Outsourcing, LP.

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SITE MAP
ISCO INJECTION PROGRAM
 Former Champaign MGP Site
 Champaign, Illinois

DRAWN BY: TE	DATE: 7/23/2013	FIGURE
CHECKED BY: SH	PROJECT NO: 901144	1

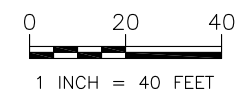


LEGEND

- Existing Structure
- Fence/Remediation Site Boundary
- Approximate Extent of Excavation Limits
- Confirmation Soil Sample Location
- Injection Locations**
- Phase 2A Injection Location

Injection Screen Intervals

- A 3 to 6 feet bgs
- B 6 to 10 feet bgs
- C 20 to 25 feet bgs
- D 36 to 44 feet bgs

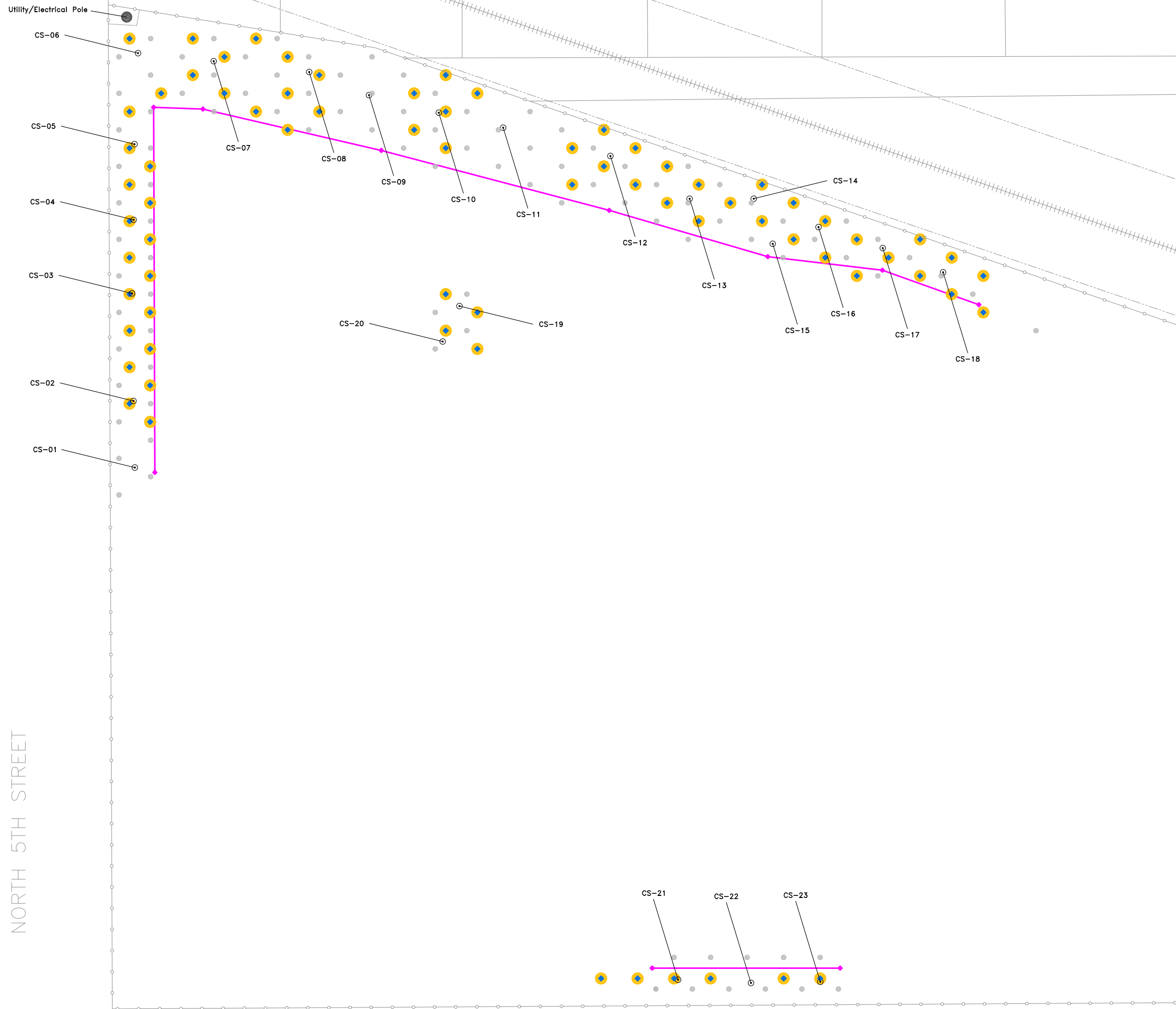


Base map provided by PSC Industrial Outsourcing, LP.







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PHASE 2A INJECTION LOCATION MAP
ISCO INJECTION PROGRAM
 Former Champaign MGP Site
 Champaign, Illinois

DRAWN BY: TE	DATE: 9/26/2013	FIGURE
CHECKED BY: SH	PROJECT NO: 901144	2

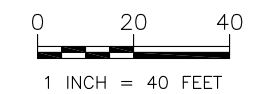


LEGEND

-  Existing Structure
-  Fence/Remediation Site Boundary
-  Approximate Extent of Excavation Limits
-  Confirmation Soil Sample Location
- Injection Locations**
-  Phase 2A Injection Location
-  Phase 2B Injection Location

Injection Screen Intervals

- A 3 to 6 feet bgs
- B 6 to 10 feet bgs
- C 20 to 25 feet bgs
- D 36 to 44 feet bgs

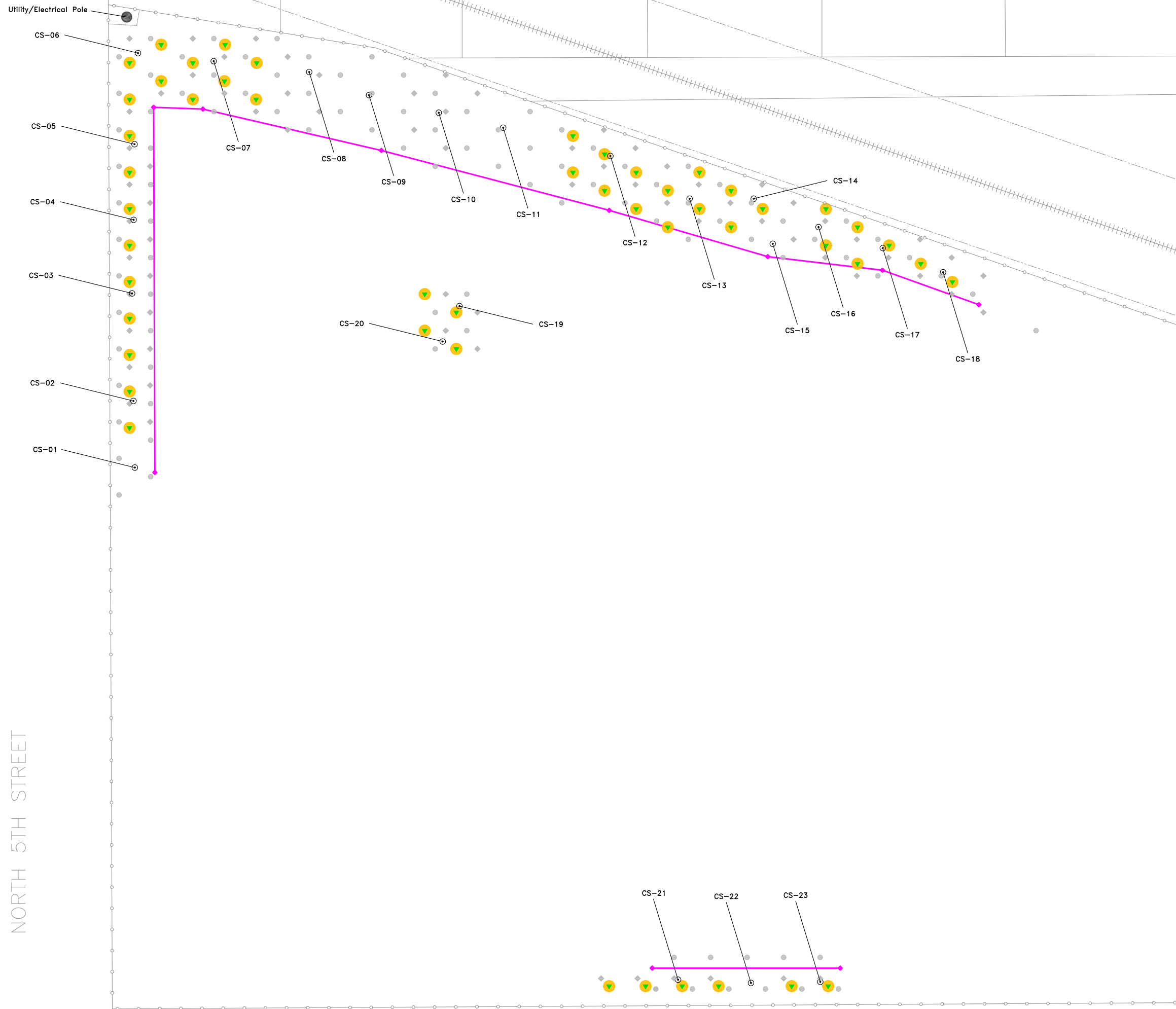


Base map provided by PSC Industrial Outsourcing, LP.

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**PHASE 2B INJECTION LOCATION MAP
 ISCO INJECTION PROGRAM
 Former Champaign MGP Site
 Champaign, Illinois**

DRAWN BY: TE	DATE: 9/26/2013	FIGURE
CHECKED BY: SH	PROJECT NO: 901144	3

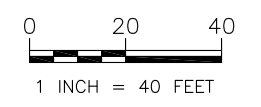


NORTH 5TH STREET

LEGEND

-  Existing Structure
 -  Fence/Remediation Site Boundary
 -  Approximate Extent of Excavation Limits
 -  Confirmation Soil Sample Location
- Injection Locations**
-  Phase 2A Injection Location
 -  Phase 2B Injection Location
 -  Phase 2C Injection Location

- Injection Screen Intervals**
- A 3 to 6 feet bgs
 - B 6 to 10 feet bgs
 - C 20 to 25 feet bgs
 - D 36 to 44 feet bgs



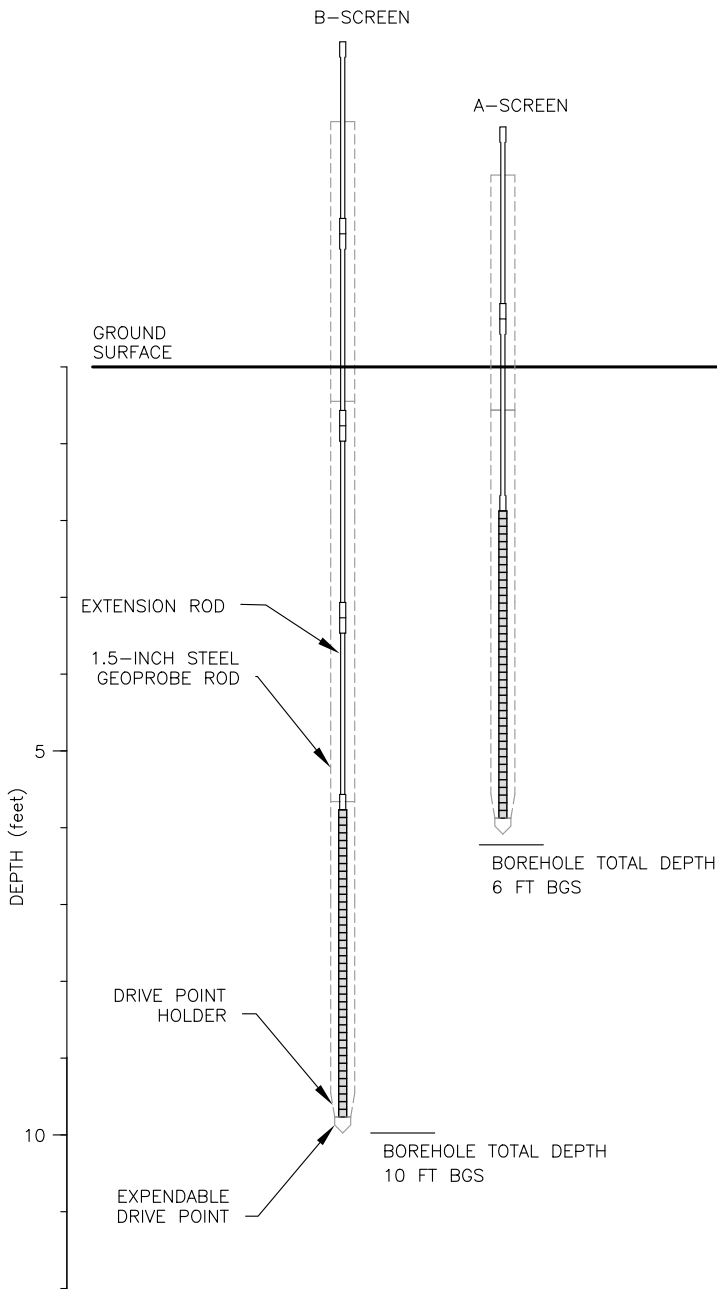
Base map provided by PSC Industrial Outsourcing, LP.

In-Situ Oxidative Technologies, Inc.
ISOTEC
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 Arvada, Colorado 80004
 www.insituoxidation.com
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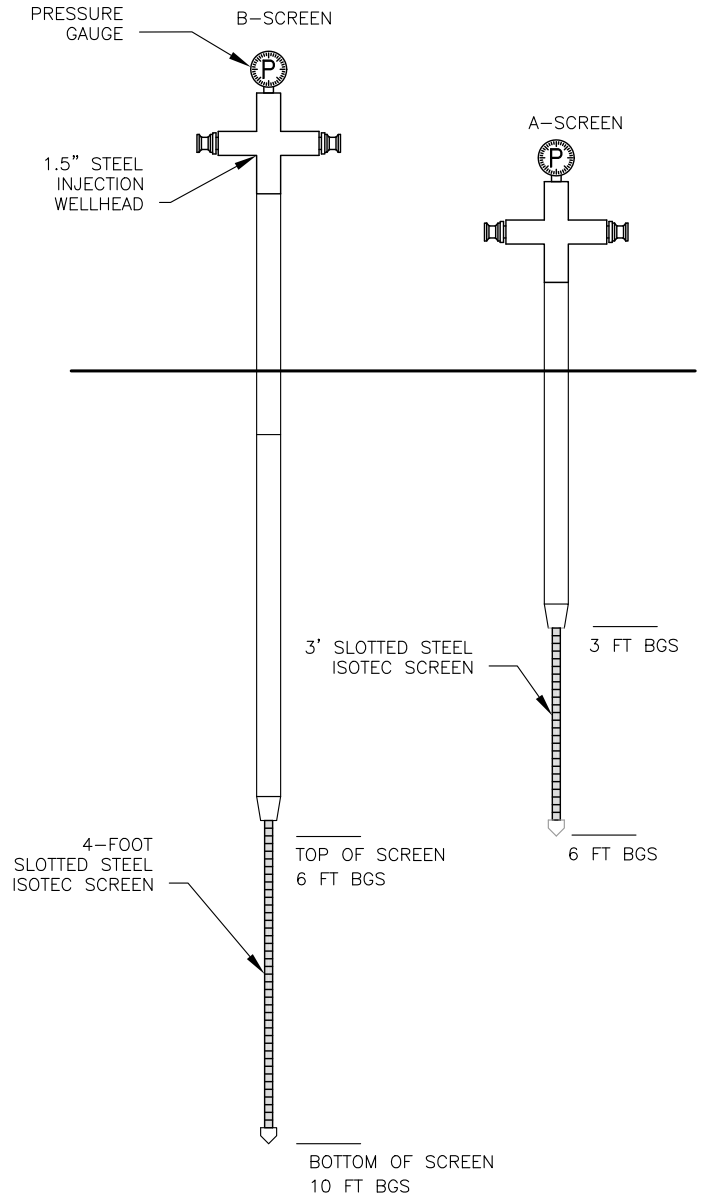
PHASE 2C INJECTION LOCATION MAP
 ISCO INJECTION PROGRAM
 Former Champaign MGP Site
 Champaign, Illinois

DRAWN BY: TE	DATE: 9/26/2013	FIGURE
CHECKED BY: SH	PROJECT NO: 901144	4

BEFORE INJECTION SCREEN EXPOSURE



AFTER INJECTION SCREEN EXPOSURE



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DIRECT-PUSH INJECTION SCHEMATIC
"A" AND "B" INTERVALS
ISCO INJECTION PROGRAM
Former Champaign MGP Site
Champaign, Illinois

DRAWN BY: KH

DATE: 5/21/2013

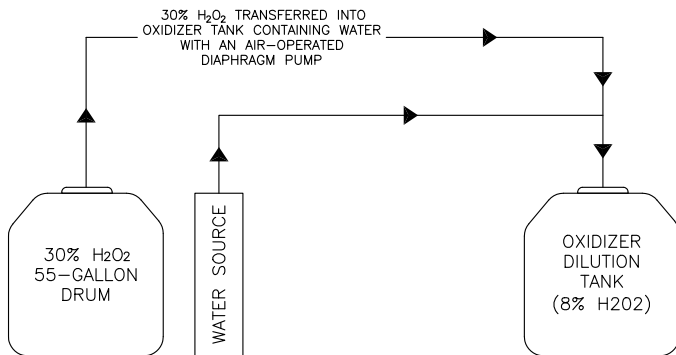
FIGURE

CHECKED BY: SH

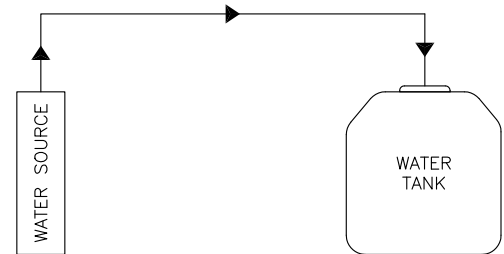
PROJECT NO: 901144

5

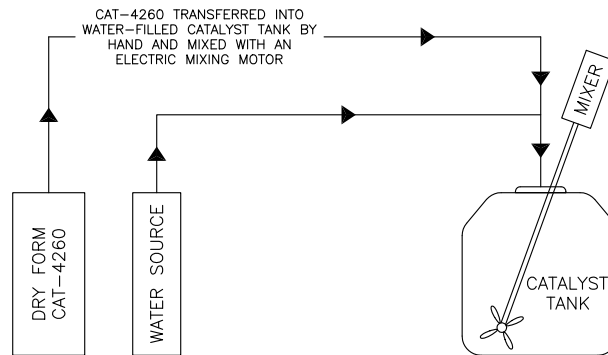
OXIDIZER TANK PROCEDURES



WATER TANK PROCEDURES



CATALYST TANK PROCEDURES



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REAGENT MIXING SCHEMATIC
ISCO INJECTION PROGRAM
Former Champaign MGP Site
Champaign, Illinois

DRAWN BY: KH

DATE: 5/21/2013

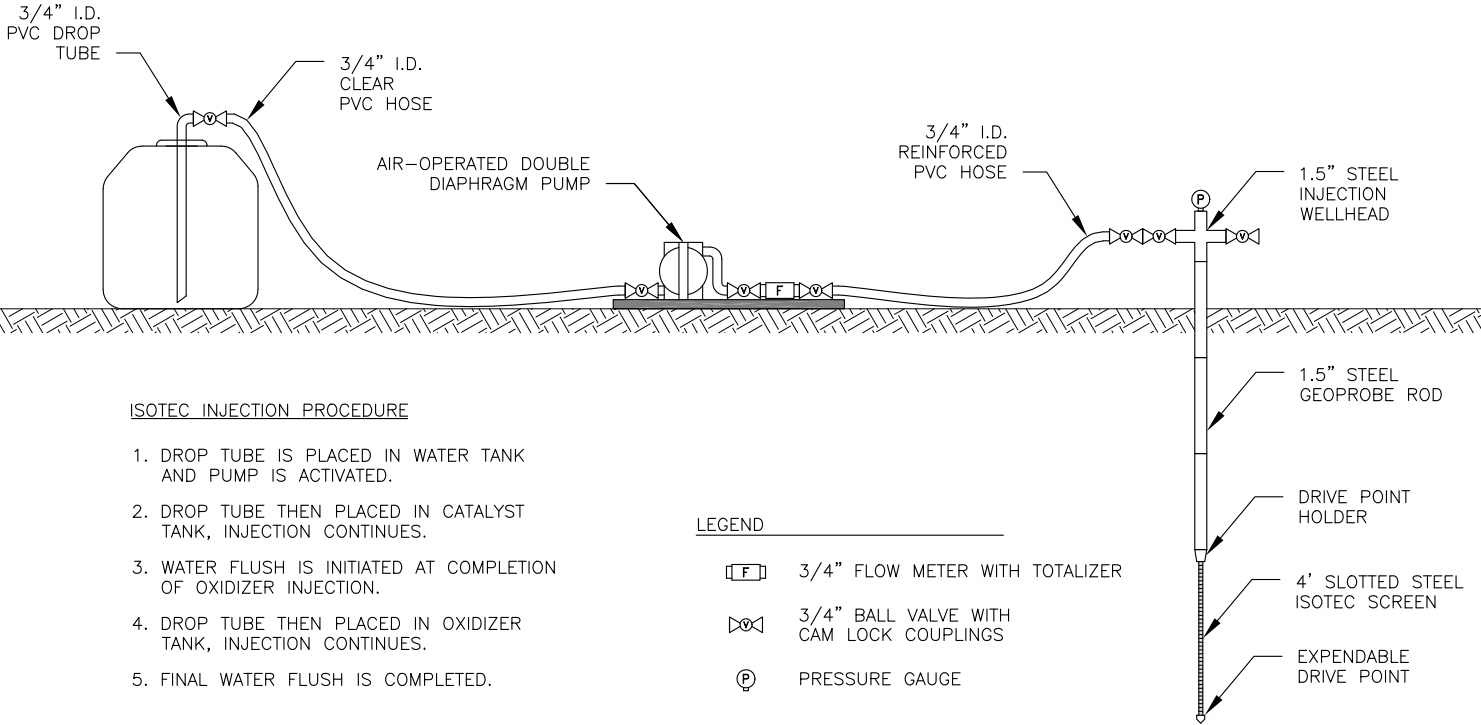
FIGURE

CHECKED BY: SH

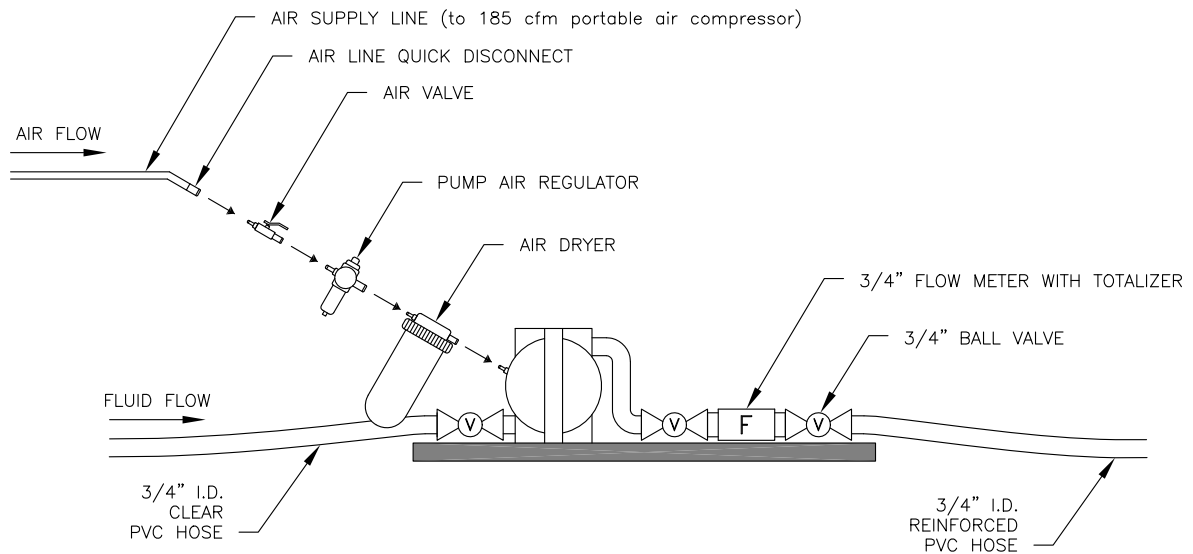
PROJECT NO: 901144

6

REAGENT INJECTION DIAGRAM



INJECTION PUMP INSTALLATION



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INJECTION METHOD SCHEMATIC
ISCO INJECTION PROGRAM
Former Champaign MGP Site
Champaign, Illinois

DRAWN BY: KH

DATE: 5/21/2013

FIGURE

CHECKED BY: SH

PROJECT NO: 901144

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TABLES

**Table 1
PHASE 2A INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
5/1/13	1I-35A	3-6	0	0	0	-	-	Surfaced 11 ft southeast
	1I-35B	6-10	20	25	45	2.0	5-10	Surfaced 11 ft southeast
	1I-37A	3-6	25	25	50	2.0	0-35	
	1I-37B	6-10	25	25	50	2.0	0-25	
	1I-39A	3-6	25	25	50	2.0	0-5	Surfaced 30 ft southeast
	1I-39B	6-10	25	25	50	2.0	0-5	
	1I-41A	3-6	0	12	12	2.0	0-5	Surfaced 9 ft northeast
	1I-41B	6-10	25	25	50	2.0	5-15	
	1I-55A	3-6	25	25	50	2.0	0-10	
	1I-55B	6-10	25	25	50	2.0	5-15	
	1I-57A	3-6	0	25	25	2.0	0-5	Surfaced 12 ft southwest
	1I-57B	6-10	25	25	50	2.0	5-10	Surfaced 12 ft southwest
	1I-59A	3-6	0	10	10	2.0	0-5	Surfaced 15 ft southwest
	1I-59B	6-10	25	25	50	2.0	0-10	Surfaced 15 ft southwest
	1I-61A	3-6	25	25	50	2.0	10-12	Surfaced 9 ft east
	1I-61B	6-10	25	25	50	2.0	10-15	
1I-63B	6-10	25	25	50	2.0	15-35		
5/2/13	1I-4A	3-6	25	25	50	2.0	0-5	
	1I-4B	6-10	25	25	50	2.0	5-10	
	1I-20A	3-6	25	25	50	2.0	0-5	
	1I-20B	6-10	25	25	50	2.0	0-5	
	1I-23A	3-6	25	25	50	2.0	10-15	
	1I-23B	6-10	25	25	50	2.0	0-10	
	1I-26A	3-6	25	25	50	2.0	0-5	
	1I-26B	6-10	25	25	50	2.0	5-10	
	1I-46A	3-6	5	25	30	2.0	0-5	Surfaced 21 ft southwest
	1I-46B	6-10	25	25	50	2.0	15-20	
	1I-49A	3-6	0	10	10	2.0	0-5	Surfaced 15 ft east
	1I-49B	6-10	25	25	50	2.0	10-20	Surfaced 15 ft east
	1I-52B	6-10	5	25	30	2.0	0-5	Surfaced 4 ft north
	1I-63A	3-6	15	25	40	2.0	5-25	Surfaced 1 ft west
	1I-81B	6-10	0	25	25	2.0	0-5	
1I-84B	6-10	0	25	25	2.0	5-10		
5/3/13	1I-2A	3-6	20	25	45	2.0	5-10	Surfaced 7 ft west
	1I-2B	6-10	25	25	50	2.0	10-15	
	1I-6A	3-6	25	25	50	2.0	0-5	
	1I-6B	6-10	20	25	45	2.0	5-15	Surfaced 12 ft east
	1I-9A	3-6	25	25	50	2.0	0-5	

**Table 1
PHASE 2A INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	1I-9B	6-10	12	25	37	2.0	10-15	Surfaced along annulus
	1I-12A	3-6	2	25	27	2.0	10-12	Surfaced along annulus
	1I-12B	6-10	25	25	50	2.0	5-10	
	1I-43A	3-6	25	25	50	2.0	10-15	
	1I-43B	6-10	25	25	50	2.0	10-20	
	1I-52A	3-6	6	25	31	2.0	5-10	Surfaced 4 ft north
	1I-78A	3-6	10	25	35	2.0	0-5	Surfaced 10 ft southwest
	1I-78B	6-10	20	25	45	2.0	10-20	Surfaced 10 ft southwest
	1I-81A	3-6	25	25	50	2.0	10-15	
	1I-81B	6-10	25	25	50	2.0	0-15	
	1I-84A	3-6	8	25	33	2.0	20-60	Injection stopped due to high pressure
	1I-84B	6-10	25	25	50	2.0	5-10	
	1I-88A	3-6	0	15	15	2.0	0	Surfaced 12 ft southwest
	1I-88B	6-10	25	25	50	2.0	0-5	
	1I-91A	3-6	21	25	46	2.0	0-12	Surfaced 2 ft northwest
	1I-91B	6-10	20	25	45	2.0	10-20	Surfaced 9 ft south
	1I-93A	3-6	0	0	0	-	-	Injection stopped due to high pressure
	1I-93B	6-10	15	25	40	2.0	10-50	Injection stopped due to high pressure
	1I-97C	20-25	25	25	50	2.0	10-25	
5/4/13	1I-18A	3-6	25	25	50	2.0	5-15	
	1I-18B	6-10	25	25	50	2.0	10-15	
	1I-21A	3-6	25	25	50	2.0	10-25	
	1I-21B	6-10	25	25	50	2.0	0-10	
	1I-24A	3-6	25	25	50	2.0	0-5	
	1I-24B	6-10	25	25	50	2.0	0-5	
	1I-34A	3-6	25	25	50	2.0	0-5	
	1I-34B	6-10	25	25	50	2.0	10-15	
	1I-38A	3-6	25	25	50	2.0	0-5	
	1I-38B	6-10	25	25	50	2.0	0-5	
	1I-67A	3-6	25	25	50	2.0	0-5	
	1I-67B	6-10	25	25	50	2.0	10-15	
	1I-70A	3-6	25	25	50	2.0	5-12	
	1I-70B	6-10	25	25	50	2.0	2-10	
	1I-73A	3-6	25	25	50	2.0	5-60	
	1I-73B	6-10	25	25	50	2.0	5-15	
	1I-73C	20-25	25	25	50	2.0	5-15	
	1I-89A	3-6	15	25	40	2.0	0-5	Surfaced 23 ft southwest
	1I-89B	6-10	15	25	40	2.0	10-35	Surfaced 23 ft southwest

**Table 1
PHASE 2A INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	1I-92A	3-6	25	25	50	2.0	15-22	
	1I-92B	6-10	25	25	50	2.0	0-12	
5/5/13	1I-7A	3-6	25	25	50	2.0	0-25	
	1I-7B	6-10	25	25	50	2.0	10-20	
	1I-10A	3-6	25	25	50	2.0	0-5	
	1I-10B	6-10	25	25	50	2.0	10-15	
	1I-13A	3-6	0	1	1	2.0	0-5	Surfaced 9 ft southeast
	1I-13B	6-10	25	25	50	2.0	2-15	Surfaced 9 ft southeast
	1I-16A	3-6	25	25	50	2.0	0-10	
	1I-16B	6-10	25	25	50	2.0	0-30	
	1I-28A	3-6	25	25	50	2.0	0-15	
	1I-28B	6-10	25	25	50	2.0	20-25	
	1I-44A	3-6	8	25	33	2.0	15-20	Surfaced 12 ft southwest
	1I-44B	6-10	25	25	50	2.0	0-15	Surfaced 12 ft southwest
	1I-47A	3-6	25	25	50	2.0	0-15	
	1I-47B	6-10	25	25	50	2.0	20-25	
	1I-50A	3-6	25	25	50	2.0	0-5	Surfaced 12 ft southeast
	1I-50B	6-10	10	25	35	2.0	10-15	Surfaced 3 ft west
	1I-79A	3-6	25	25	50	2.0	0-5	Surfaced 4 ft southeast
	1I-79B	6-10	25	25	50	2.0	15-20	
	1I-82A	3-6	25	25	50	2.0	0-15	
	1I-82B	6-10	25	25	50	2.0	0-5	
5/6/13	1I-5A	3-6	25	25	50	2.0	5-10	
	1I-5B	6-10	25	25	50	2.0	5-10	
	1I-14A	3-6	25	25	50	2.0	10.20	
	1I-14B	6-10	25	25	50	2.0	5-20	
	1I-29A	3-6	25	25	50	2.0	5-15	
	1I-29B	6-10	25	25	50	2.0	5-15	Surfaced 18 ft southwest
	1I-32A	3-6	25	25	50	2.0	5-20	Surfaced 4 ft east
	1I-32B	6-10	25	25	50	2.0	5-45	
	1I-53A	3-6	15	25	40	2.0	5-10	Surfaced 12 ft southeast
	1I-53B	6-10	14	25	39	2.0	5-15	Surfaced 12 ft southeast
	1I-56A	3-6	15	25	40	2.0	0-10	
	1I-56B	6-10	25	25	50	2.0	0-5	
	1I-68A	3-6	25	25	50	2.0	10-15	
	1I-68B	6-10	25	25	50	2.0	0-10	
	1I-71A	3-6	15	25	40	2.0	0-10	Surfaced 6 ft north
	1I-71B	6-10	25	25	50	2.0	10-20	

**Table 1
PHASE 2A INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	1I-74A	3-6	5	25	30	2.0	10-80	Injection stopped due to high pressure
	1I-74B	6-10	25	25	50	2.0	30-50	
	1I-74C	20-25	25	25	50	2.0	10-40	
	1I-90A	3-6	25	25	50	2.0	5-10	
	1I-90B	6-10	25	25	50	2.0	0-10	
5/7/13	1I-15A	3-6	25	25	50	2.0	5-15	
	1I-15B	6-10	25	25	50	2.0	10-35	
	1I-19A	3-6	25	25	50	2.0	0-30	
	1I-19B	6-10	25	25	50	2.0	0-10	
	1I-22A	3-6	25	25	50	2.0	0-15	
	1I-22B	6-10	25	25	50	2.0	0-10	
	1I-40A	3-6	25	25	50	2.0	0-15	
	1I-40B	6-10	25	25	50	2.0	0-15	
	1I-60A	3-6	25	25	50	2.0	0-5	
	1I-60B	6-10	15	25	40	2.0	10-12	Surfaced 30 ft west
	1I-80A	3-6	25	25	50	2.0	0-15	
	1I-80B	6-10	25	25	50	2.0	0-20	
	1I-80C	20-25	50	50	100	2.0	20-50	
	1I-83A	3-6	3	25	28	2.0	50-80	Injection stopped due to high pressure
	1I-83B	6-10	25	25	50	2.0	10-35	
	1I-100A	3-6	0	0	0	2.0	0-80	Injection stopped due to high pressure
	1I-100B	6-10	25	25	50	2.0	0-5	
	1I-103A	3-6	25	25	50	2.0	5-15	Surfaced 6 ft southeast
	1I-103B	6-10	25	25	50	2.0	0-5	
1I-108A	3-6	15	25	40	2.0	0-5	Surfaced 3 ft northwest	
1I-108B	6-10	25	25	50	2.0	0-8		
5/8/13	1I-17A	3-6	25	25	50	2.0	0-20	
	1I-17B	6-10	25	25	50	2.0	15-20	
	1I-30A	3-6	25	25	50	2.0	0-10	Surfaced 12 ft south
	1I-30B	6-10	25	25	50	2.0	5-10	
	1I-58A	3-6	15	25	40	2.0	0-10	Surfaced 22 ft west
	1I-58B	6-10	12	25	37	2.0	5-10	Surfaced 22 ft west
	1I-62A	3-6	0	16	16	2.0	0-5	Surfaced 14 ft southeast
	1I-62B	6-10	15	30	45	2.0	0-12	Surfaced 14 ft southeast
	1I-98A	3-6	6	25	31	2.0	0-80	Injection stopped due to high pressure
	1I-98B	6-10	25	25	50	2.0	0-30	
	1I-101A	3-6	6	25	31	2.0	0-80	Injection stopped due to high pressure
	1I-101B	6-10	25	25	50	2.0	0-15	

**Table 1
PHASE 2A INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
5/14/13	1I-3A	3-6	25	25	50	2.0	0-10	
	1I-3B	6-10	25	25	50	2.0	5-15	
	1I-25A	3-6	24	25	49	2.0	20-25	Surfaced 10 ft south
	1I-25B	6-10	25	25	50	2.0	5-20	
	1I-36A	3-6	0	4	4	2.0	-	Surfaced 20 ft southwest
	1I-36B	6-10	25	25	50	2.0	5-10	
	1I-54A	3-6	0	15	15	2.0	5-10	Surfaced 15 ft southeast
	1I-54B	6-10	17	25	42	2.0	10-20	Surfaced 15 ft southeast
	1I-69A	3-6	25	25	50	2.0	5-20	
	1I-69B	6-10	25	25	50	2.0	0-5	
	1I-72A	3-6	25	25	50	2.0	0-5	
	1I-72B	6-10	25	25	50	2.0	0-5	
	1I-75A	3-6	5	25	30	2.0	40-80	Injection stopped due to high pressure
	1I-75B	6-10	3	25	28	2.0	0-80	Injection stopped due to high pressure
	1I-75C	20-25	50	25	75	2.0	20-30	Surfaced 18 ft west
	1I-94C	20-25	50	50	100	2.0	5-35	
	1I-99A	3-6	5	25	30	2.0	45-80	Injection stopped due to high pressure
	1I-99B	6-10	10	25	35	2.0	0-80	Injection stopped due to high pressure
	1I-107A	3-6	12	25	37	2.0	0-5	Surfaced 2 ft east
	1I-107B	6-10	25	25	50	2.0	0-5	
5/15/13	1I-8A	3-6	0	0	0	2.0	-	Surfaced along annulus
	1I-8B	6-10	17	25	42	2.0	0-10	Surfaced along annulus
	1I-11A	3-6	25	25	50	2.0	5-10	
	1I-11B	6-10	25	25	50	2.0	0-10	
	1I-31A	3-6	25	25	50	2.0	0-5	
	1I-31B	6-10	25	25	50	2.0	0-10	
	1I-45A	3-6	0	25	25	2.0	5-10	Surfaced 20 ft east
	1I-45B	6-10	25	25	50	2.0	5-15	
	1I-48A	3-6	15	25	40	2.0	15-25	Surfaced 6 ft north
	1I-48B	6-10	25	25	50	2.0	5-10	Surfaced 6 ft north
	1I-51A	3-6	25	25	50	2.0	10-15	Surfaced 16 ft south
	1I-51B	6-10	25	25	50	2.0	10-25	
	1I-72A	3-6	0	20	20	2.0	-	Surfaced 10 ft south
	1I-72B	6-10	25	25	50	2.0	5-10	
	1I-81C	20-25	50	50	100	2.0	0-25	
	1I-96C	20-25	50	50	100	2.0	10-20	
	1I-104A	3-6	25	25	50	2.0-3.0	4	
1I-104B	6-10	25	25	50	2.0	0-5		

**Table 1
PHASE 2A INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	1I-104D	36-44	50	50	100	3.0	4	
	1I-105B	6-10	25	25	50	2.0	0-5	
	1I-106A	3-6	25	25	50	2.0	0-2	
	1I-106B	6-10	25	25	50	2.0	0-5	
	1I-106D	36-44	50	50	100	3.0-3.2	0-5	
5/16/13	1I-1A	3-6	25	25	50	2.0	0-5	
	1I-1B	6-10	25	25	50	2.0	5-10	
	1I-27A	3-6	25	25	50	2.0	0-15	
	1I-27B	6-10	25	25	50	2.0	0-15	
	1I-33A	3-6	25	25	50	2.0	0-15	
	1I-33B	6-10	25	25	50	1.5-2.0	10-30	
	1I-79C	20-25	50	50	100	2.0	5-45	
	1I-95C	20-25	50	50	100	2.0	0	
	1I-102A	3-6	25	25	50	2.0	0-2	Surfaced 9 ft south
	1I-102B	6-10	25	25	50	2.0	5-10	
	1I-105A	3-6	25	25	50	2.0	8-10	
1I-105D	36-44	50	50	100	3.2	0-5		
PHASE 2A REAGENT TOTAL			4,481	5,183	9,664			

**Table 2
PHASE 2B INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
6/19/13	2I-4A	3-6	25	25	50	2.0	0-30	
	2I-4B	6-10	25	25	50	2.0-3.0	10-15	
	2I-7A	3-6	20	25	45	2.0-3.0	0-12	Surfaced along annulus
	2I-7B	6-10	25	25	50	2.0-3.0	10-15	
	2I-10A	3-6	25	25	50	2.0-3.0	0-2	
	2I-10B	6-10	40	40	80	2.0-3.0	0-15	
	2I-13B	6-10	15	25	40	2.0-3.0	0-5	Surfaced 25 ft east
	2I-16A	3-6	30	30	60	2.0-3.0	0-5	
	2I-16B	6-10	30	30	60	2.0-3.0	0-5	
	2I-30A	3-6	30	30	60	2.0-3.0	0-20	
	2I-30B	6-10	25	25	50	2.0-3.0	0-10	
	2I-40A	3-6	25	25	50	2.0-3.0	0-15	
	2I-44A	3-6	25	25	50	2.0-3.0	5-20	
	2I-60A	3-6	15	25	40	2.0-3.0	0-5	Surfaced 12 ft south
	2I-60B	6-10	33	40	73	2.0-3.0	5-20	Surfaced 12 ft south
	2I-63A	3-6	2	25	27	2.0-3.0	50-80	Injection stopped due to high pressure
	2I-63B	6-10	25	25	50	2.0-3.0	10-30	
	2I-73A	3-6	11	25	36	2.0-3.0	5-15	Surfaced 1 ft north
	2I-73C	20-25	50	50	100	2.0-3.0	0-30	
	2I-76A	3-6	12	25	37	2.0	0-15	Surfaced 12 ft southwest
2I-79A	3-6	0	0	0	-	80	Injection stopped due to high pressure	
2I-79B	6-10	25	25	50	2.0-3.0	0-5	Surfaced 13 ft southwest	
6/20/13	2I-10A	3-6	30	30	60	2.0-3.0	0-5	
	2I-10B	6-10	15	15	30	3.0	0-15	
	2I-19A	3-6	30	30	60	2.0-3.0	0-10	
	2I-19B	6-10	30	30	60	2.0-3.0	5-15	
	2I-22A	3-6	7	15	22	3.0	5-10	Surfaced 12 ft south
	2I-22B	6-10	30	30	60	3.0	15-25	Surfaced 12 ft south
	2I-25B	6-10	25	25	50	3.0	5-15	
	2I-34B	6-10	30	30	60	3.0	5-15	Surfaced 24 ft east
	2I-37A	3-6	30	30	60	3.0	0-10	Surfaced 18 ft south
	2I-55A	3-6	30	30	60	3.0	0-5	
	2I-56A	3-6	30	30	60	3.0	2-4	
	2I-65A	3-6	15	15	30	3.0	10-15	Surfaced 30 ft south
	2I-65B	6-10	15	30	45	3.0	0-5	Surfaced 30 ft south
	2I-68A	3-6	15	15	30	3.0	12-14	Surfaced at CS-14
2I-68C	20-25	0	5	5	3.0	0-5	Surfaced at CS-14	
2I-71A	3-6	0	0	0	-	-	Injection stopped due to high pressure	

**Table 2
PHASE 2B INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	2I-71B	6-10	0	0	0	-	-	Injection stopped due to high pressure
	2I-81A	3-6	30	30	60	3.0	5-10	Surfaced 11 ft west
	2I-81B	6-10	30	30	60	3.0	5-17	Surfaced 11 ft west
	2I-85C	20-25	50	50	100	3.0	15-40	
6/21/13	2I-17A	3-6	45	45	90	2.0-3.0	05	
	2I-17B	6-10	45	45	90	2.0-3.0	0-15	
	2I-20A	3-6	45	45	90	2.0-3.0	5-20	
	2I-20B	6-10	45	45	90	2.0-3.0	0-10	
	2I-23A	3-6	45	45	90	2.0-3.0	0-5	
	2I-23B	6-10	45	45	90	2.0-3.0	0-5	
	2I-34A	3-6	0	7	7	3.0	0-5	Surfaced 12 ft southwest
	2I-34B	6-10	15	15	30	2.0-3.0	0-5	Surfaced 12 ft southwest
	2I-45A	3-6	15	15	30	2.0-3.0	0-5	Surfaced 15 ft northwest
	2I-54A	3-6	0	13	13	3.0	0-2	Surfaced 10 ft southeast
	2I-54B	6-10	13	15	28	2.0-3.0	0-5	Surfaced 10 ft southeast
	2I-68A	3-6	15	15	30	2.0-3.0	0-5	Surfaced 9 ft southwest
	2I-68C	20-25	0	15	15	3.0	0-5	Surfaced 9 ft southwest
	2I-75A	3-6	30	30	60	2.0-3.0	0-5	
	2I-75B	6-10	30	30	60	2.0-3.0	10-15	
	2I-78A	3-6	45	45	90	2.0-3.0	0-30	Surfaced 6 ft southeast
	2I-78B	6-10	45	45	90	2.0-3.0	0-15	
	2I-88D	36-44	150	150	300	4.0-5.0	0-5	
	2I-90D	36-44	150	150	300	3.0-4.5	0-5	
	2I-93B	6-10	15	15	30	2.0-3.0	10-12	Surfaced 3 ft east
6/22/13	2I-3B	6-10	30	30	60	2.0-3.0	5-15	
	2I-5A	3-6	15	15	30	2.0-3.0	4-6	
	2I-5B	6-10	30	30	60	2.0-3.0	0-15	
	2I-8A	3-6	11	15	26	2.0-3.0	0-5	Surfaced 5 ft south
	2I-8B	6-10	30	30	60	2.0-3.0	0-10	
	2I-33B	6-10	30	30	60	2.0-3.0	0-5	
	2I-36A	3-6	28	30	58	2.0-3.0	8-30	Surfaced 14 ft south
	2I-49A	3-6	15	15	30	2.0-3.0	8-12	Surfaced 6 ft northwest
	2I-64B	6-10	30	30	60	2.0-3.0	5-12	
	2I-67B	6-10	25	30	55	2.0-3.0	2-24	Surfaced 12 ft west
	2I-72A	3-6	30	30	60	2.0-3.0	0-10	
	2I-74B	6-10	30	30	60	2.0-3.0	2-4	
	2I-75B	6-10	15	15	30	2.0-3.0	10-12	Surfaced 12 ft south
	2I-83B	6-10	15	15	30	2.0-3.0	0-5	

**Table 2
PHASE 2B INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	2I-86C	20-25	50	50	100	2.5-3.0	10-30	
6/23/13	2I-3A	3-6	45	45	90	2.0-3.0	0-15	
	2I-3B	6-10	30	30	60	2.0-3.0	0-10	
	2I-5A	3-6	15	15	30	2.0-3.0	0-10	
	2I-8B	6-10	15	15	30	2.0-3.0	0-5	
	2I-11A	3-6	30	30	60	2.0-3.0	0-5	
	2I-11B	6-10	45	45	90	2.0-3.0	0-5	
	2I-31A	3-6	30	30	60	2.0-3.0	2-50	
	2I-31B	6-10	30	30	60	2.0-3.0	0-20	
	2I-33A	3-6	15	30	45	2.0-3.0	0-10	Surfaced 3 ft southeast
	2I-39B	6-10	10	15	25	2.0-3.0	2-4	Surfaced 25 ft west
	2I-50A	3-6	13	15	28	2.0-3.0	5-10	Surfaced 8 ft southwest
	2I-61A	3-6	15	15	30	2.0-3.0	0-5	Surfaced 15 ft north
	2I-61B	6-10	30	30	60	2.0-3.0	2-10	
	2I-64A	3-6	15	15	30	2.0-3.0	2-12	
	2I-67A	3-6	15	15	30	2.0-3.0	10-12	
	2I-74C	20-25	50	50	100	2.0-3.0	5-25	Surfaced 12 ft south
	2I-75A	3-6	15	15	30	2.0-3.0	0-2	
	2I-82A	3-6	0	4	4	3.0	0-5	Surfaced 1 ft north
	2I-82B	6-10	15	15	30	2.0-3.0	2-4	Surfaced 1 ft north
	2I-83A	3-6	30	30	60	2.0-3.0	10-14	
2I-83B	6-10	15	15	30	2.0-3.0	5-10		
2I-84C	20-25	50	50	100	2.0-3.0	5-10		
6/24/13	2I-6A	3-6	45	45	90	2.5-3.0	0-10	
	2I-6B	6-10	15	15	30	2.0-3.0	5-10	Surfaced 2 ft north
	2I-9A	3-6	10	15	25	2.5-3.0	0-5	Surfaced 12 ft south
	2I-9B	6-10	15	15	30	2.0	10-14	Surfaced 12 ft south
	2I-11A	3-6	15	15	30	2.0-3.0	0-5	
	2I-29B	6-10	30	30	60	2.0-3.0	0-6	Surfaced 30 ft west
	2I-32A	3-6	30	30	60	2.0-3.0	0-19	Surfaced 12 ft south
	2I-55B	6-10	15	15	30	2.5-3.0	0-5	Surfaced 2 ft north
	2I-59A	3-6	30	30	60	2.5-3.0	0-5	
	2I-59B	6-10	30	30	60	2.0-3.0	10-15	
	2I-62A	3-6	0	6	6	3.0	-	Surfaced 6 ft south
	2I-62B	6-10	15	15	30	3.0	10-20	Surfaced 6 ft south
	2I-70B	6-10	15	15	30	2.0-3.0	0-15	Surfaced 6 ft northwest
	2I-70C	20-25	50	50	100	2.5	10-30	
	2I-77A	3-6	15	15	30	2.0-3.0	15-20	Surfaced 20 ft west

**Table 2
PHASE 2B INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	2I-80A	3-6	15	15	30	2.5-3.0	20-22	Surfaced 8 ft south
	2I-80B	6-10	30	30	60	2.0-3.0	0-5	
	2I-87C	20-25	50	50	100	3.5	10-25	
6/25/13	2I-18A	3-6	15	15	30	3.0	0-5	Surfaced 7 ft northwest
	2I-18B	6-10	30	30	60	2.5-3.0	2-10	
	2I-21A	3-6	15	15	30	2.5-3.0	5-12	Surfaced 2 ft west
	2I-21B	6-10	29	30	59	2.5-3.0	0-5	Surfaced 2 ft west
	2I-35A	3-6	4	15	19	3.0	2-4	Surfaced 20 ft southwest
	2I-35B	6-10	15	15	30	2.5-3.0	10-12	Surfaced 18 ft southwest
	2I-41A	3-6	15	15	30	2.5-3.0	2-4	Surfaced 8 ft west
	2I-66A	3-6	0	15	15	3.0	5-10	Surfaced 6 ft north
	2I-66B	6-10	30	30	60	2.5-3.0	10-15	Surfaced 6 ft northwest
	2I-69B	6-10	30	30	60	2.5-3.0	2-15	Surfaced 12 ft west
	2I-69C	20-25	30	25	55	2.5-3.0	5-20	Surfaced 4 ft east
	2I-89D	36-44	150	150	300	4.0-5.0	0	
	2I-91D	36-44	150	150	300	4.0-5.0	0	
2I-94B	6-10	4	15	19	2.5-3.0	14-15	Surfaced along annulus	
6/26/13	2I-6B-R	6-10	59	60	119	2.5-3.0	5-20	Surfaced 24 ft northeast
	2I-50A-R	3-6	45	45	90	2.0-3.0	0-5	Surfaced 12 ft west
	2I-60A-R	3-6	15	15	30	2.5-3.0	0-5	Surfaced 12 ft south
	2I-68C-R	20-25	75	75	150	2.5-3.0	2-10	Surfaced 6 ft southwest
	2I-69B	6-10	15	15	30	2.0-3.0	2-4	Surfaced 15 ft east
	2I-69C	20-25	0	9	9	3.0	-	Surfaced 10 and 25 ft west
	2I-71A-R	3-6	30	30	60	3.0	15-20	
	2I-71B-R	6-10	30	45	75	2.5-3.0	0-2	Surfaced 8 ft south
	2I-77A-R	3-6	15	15	30	2.5-3.0	2-4	Surfaced 18 ft west
	2I-79A-R	3-6	30	30	60	3.0	2-22	
	2I-89D	34-44	35	25	60	5.0	0	
2I-94B-R	6-10	15	15	30	2.5-3.0	2-4	Surfaced 3 ft east	
PHASE 2B REAGENT TOTAL			3,966	4,209	8,175			

**Table 3
PHASE 2C INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
8/14/13	3I-1A	3-6	30	30	60	2.0-3.0	0-5	
	3I-1B	6-10	30	30	60	2.0-3.0	0-5	
	3I-4A	3-6	30	30	60	2.0-3.0	0-5	
	3I-4B	6-10	30	30	60	2.0-3.0	0-10	
	3I-7A	3-6	13	15	28	2.0-3.0	0-5	Surfaced 12 feet southeast
	3I-7B	6-10	30	30	60	2.0-3.0	0-5	
	3I-28A	3-6	7	15	22	2.0-3.0	15-80	Injection stopped due to high pressure
	3I-28B	6-10	15	15	30	2.0-3.0	5-10	Surfaced 12 feet southeast
	3I-34A	3-6	2	15	17	2.0-3.0	0-80	Injection stopped due to high pressure
	3I-34A-R	3-6	30	30	60	2.0-3.0	0-5	Surfaced 20 feet southwest
3I-40C	20-25	50	50	100	2.0-3.0	0-5		
8/15/13	3I-2A	3-6	30	30	60	2.0-3.0	0-10	
	3I-2B	6-10	30	30	60	2.0-3.0	0-5	
	3I-5A	3-6	25	30	55	2.0-3.0	0-5	Surfaced 2 feet southwest
	3I-5B	6-10	25	30	55	2.0-3.0	0-10	Surfaced 17 feet northeast
	3I-7B	6-10	15	15	30	2.0-3.0	0-5	
	3I-22A	3-6	15	15	30	2.0-3.0	0-5	Surfaced 9 feet east
	3I-22B	6-10	30	30	60	2.0-3.0	0-20	Surfaced 5 and 9 feet northeast
	3I-29A	3-6	30	30	60	2.0-3.0	0-20	
	3I-29C	20-25	25	40	65	2.0-3.0	0-10	Surfaced 9 feet west
	3I-36A	3-6	18	30	48	2.0-3.0	0-10	Surfaced 12 feet south
	3I-38A	3-6	30	30	60	2.0-3.0	0-10	Surfaced 15 feet northeast
3I-41C	20-25	50	50	100	2.0-3.0	5-20		
8/16/13	3I-8A	3-6	30	30	60	2.0-3.0	0-5	
	3I-8B	6-10	30	30	60	2.0-3.0	0-20	
	3I-17B	6-10	30	30	60	2.0-3.0	0-5	
	3I-21A	3-6	10	15	25	2.0-3.0	0-5	Surfaced 5 feet south
	3I-21B	6-10	24	15	39	2.0-3.0	5-10	Surfaced 5 feet south
	3I-23A	3-6	0	9	9	2.0-3.0	10-15	Surfaced 7 feet southwest
	3I-23B	6-10	13	15	28	2.0-3.0	0-5	Surfaced 7 feet southwest
	3I-24A	3-6	30	30	60	2.0-3.0	0-5	
	3I-24B	6-10	30	30	60	2.0-3.0	0-5	
	3I-30A	3-6	15	15	30	2.0-3.0	0-10	
	3I-30B	6-10	15	15	30	2.0-3.0	0-15	Surfaced 20 feet east
	3I-32A	3-6	2	15	17	2.0-3.0	0-5	Surfaced 11 feet southeast
	3I-32C	20-25	28	25	53	2.0-3.0	20-30	Surfaced 9 feet southeast
3I-42C	20-25	50	50	100	2.0-3.0	0-15		

**Table 3
PHASE 2C INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
8/17/13	3I-9B	6-10	30	30	60	2.0-3.0	0-15	
	3I-16B	6-10	10	13	23	2.0-3.0	10-20	Surfaced 8 feet south
	3I-20A	3-6	1	15	16	2.0-3.0	0-5	Surfaced 12 feet southwest
	3I-20B	6-10	13	15	28	2.0-3.0	0-5	Surfaced 15 feet southwest
	3I-26A	3-6	10	15	25	2.0-3.0	0-5	Surfaced 17 feet southwest
	3I-26B	6-10	15	15	30	2.0-3.0	0-5	Surfaced 20 feet southwest
	3I-30A	3-6	15	15	30	2.0-3.0	0-5	
	3I-35A	3-6	30	30	60	2.0-3.0	0-5	Surfaced 1 foot north
	3I-37A	3-6	5	10	15	2.0-3.0	0-5	Surfaced at historic probe hole
	3I-39A	3-6	10	10	20	2.0-3.0	10-16	
	3I-42C	20-25	25	25	50	2.0-3.0	0-5	
	3I-44D	36-44	150	150	300	3.0-4.0	0-5	
	3I-46D	36-44	150	150	300	3.0-4.0	0-5	
	3I-49B	6-10	15	25	40	2.0-3.0	0-5	Surfaced 2 feet north
8/18/13	3I-9B	6-10	15	15	30	2.0-3.0	0-5	
	3I-12B	6-10	20	20	40	2.0-3.0	0-5	
	3I-19B	6-10	20	20	40	2.0-3.0	0-5	Surfaced 20 feet southwest
	3I-25A	3-6	10	10	20	2.0-3.0	0-5	Surfaced 15 feet south
	3I-25B	6-10	18	30	48	2.0-3.0	5-10	Surfaced 15 and 20 feet south
	3I-27A	3-6	10	10	20	2.0-3.0	0-5	Surfaced 15 feet northwest
	3I-27B	6-10	10	10	20	2.0-3.0	0-15	Surfaced 17 feet northwest
	3I-31A	3-6	10	10	20	2.0-3.0	0-5	Surfaced 12 feet southwest
	3I-31C	20-25	23	25	48	2.0-3.0	10-30	Surfaced 12 feet southwest
	3I-37A	3-6	10	20	30	2.0-3.0	0-5	Surfaced 18 feet southwest
	3I-39A	3-6	12	10	22	2.0-3.0	0-12	Surfaced 10 feet southwest
	3I-45D	36-44	150	150	300	3.0-4.0	0-5	
	3I-47D	36-44	150	150	300	3.0-4.0	0-5	
	3I-48B	6-10	30	30	60	2.0-3.0	0-15	
3I-49B	6-10	10	4	14	2.0-3.0	0-5	Surfaced 2 feet north	
8/19/13	3I-3A	3-6	20	20	40	2.0-3.0	0-15	
	3I-3B	6-10	10	20	30	2.0-3.0	0-20	Surfaced 6 feet southeast
	3I-6A	3-6	18	20	38	2.0-3.0	0-5	Surfaced 6 feet north
	3I-6B	6-10	30	30	60	2.0-3.0	0-5	
	3I-10B	6-10	15	15	30	2.0-3.0	0-15	
	3I-13B	6-10	20	20	40	2.0-3.0	0-22	
	3I-14B	6-10	15	15	30	2.0-3.0	0-5	Surfaced 5 feet northwest
	3I-18B	6-10	10	10	20	2.0-3.0	2-5	Surfaced 12 feet south
3I-32C-R	20-25	27	25	52	2.0-3.0	10-15	Surfaced 15 feet southwest	

**Table 3
PHASE 2C INJECTION LOG**

ISCO Injection Program
Former Champaign MGP Site
Champaign, Illinois 61820

Inj. Date	Injection Point	Injection Interval (feet bgs)	ISOTEC REAGENT			FIELD OBSERVATIONS		
			H ₂ O ₂ (gallons)	Catalyst (gallons)	Total (gallons)	Rate (gpm)	Pressure (psi)	Notes (surfacing, refusal, pressure or flow rate changes, etc.)
	3I-33A	3-6	10	10	20	2.0-3.0	5-10	Surfaced 15 feet south
	3I-43C	20-25	150	150	300	2.0-3.0	0-35	
8/20/13	3I-5A-R	3-6	10	10	20	2.0-3.0	0-5	Surfaced 10 feet southwest
	3I-5B-R	6-10	20	20	40	2.0-3.0	0-10	Surfaced 19 feet northeast
	3I-7A-R	3-6	30	30	60	2.0-3.0	0-5	
	3I-7B-R	6-10	20	20	40	2.0-3.0	0-10	Surfaced 8 feet south
	3I-11B	6-10	10	10	20	2.0-3.0	0-5	Surfaced 12 feet south
	3I-15B	6-10	10	10	20	2.0-3.0	0-5	Surfaced 12 feet south
	3I-18B-R	6-10	15	15	30	2.0-3.0	0-5	Surfaced 12 feet south
	3I-27A-R	3-6	10	10	20	2.0-3.0	0-5	
	3I-27B-R	6-10	20	20	40	2.0-3.0	0-5	Surfaced 18 feet southwest
	3I-31A-R	3-6	10	10	20	2.0-3.0	0-5	Surfaced 12 feet southwest
	3I-35A-R	3-6	10	2	12	2.0-3.0	0-5	Surfaced 1 foot north
	3I-37A-R	3-6	10	10	20	2.0-3.0	10-22	Surfaced 18 feet southwest
	3I-39A-R	3-6	10	10	20	2.0-3.0	0-5	Surfaced 10 feet southwest
	3I-42C-R	20-25	100	100	200	2.0-3.0	5-20	
	3I-47D	36-44	50	50	100	2.0-3.0	0-5	
PHASE 2C REAGENT TOTAL			2,534	2,668	5,202			