July 17, 2015 Reference No. 037191

Mr. Jaspal Walia
Division of Environmental Remediation, Region 9
New York State Department of Environmental Conservation
270 Michigan Avenue
Buffalo, NY 14203-2999

Dear Mr. Walia:

Re: Supplemental Work Plan for Additional Rounds of In Situ Chemical Oxidation Groundwater Treatment Former Buffalo China Site C915209

1. Introduction

Pursuant to the Brownfield Cleanup Agreement Index #B9-0732-06-11 between Buffalo China, Inc. (Buffalo China) and the New York State Department of Environmental Conservation (NYSDEC) and the Site Management Plan (SMP) prepared for the Former Buffalo China Site, GHD is submitting this Work Plan to complete additional in situ chemical oxidation (ISCO) groundwater treatment as a supplement to the SMP. The SMP, which was approved in December 2012, mandates operation, maintenance, monitoring, and reporting measures for the engineering controls (ECs) and institutional controls (ICs) at the Site.

2. Background

The groundwater treatment system and monitoring well network are ECs that serve as the groundwater remedy for both the on-Site and off-Site groundwater contamination. The Operation and Maintenance (O&M) Plan (Section 5.0 of the SMP) for the groundwater remedy prescribed the applications for the ISCO treatment program and the substrate and microbial inoculum and nutrient applications for the in situ enhanced biological (ISEB) follow-up treatment. Section 5.1.1 of the SMP anticipated that the ISCO program would consist of six injection events; however, the plan also allows for the frequency and number of events to be adjusted based on groundwater monitoring results.

A review of the groundwater monitoring results presented in the first Periodic Review Report (PRR) submitted May 27, 2015 showed a reduction of the contaminants of concern during the ISCO treatment; however, a rebound of concentrations was observed for most contaminants at both overburden and bedrock wells. The concentrations in the bedrock wells are high enough that initiation of ISEB would not be effective at this time. The PRR recommended that two additional rounds of ISCO treatment and associated activities be implemented to bring the concentrations below 10,000 ug/L for all contaminants at all wells and below 1,000 ug/L for as many contaminants and at as many locations as possible.

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The following sections detail the proposed additional work.

3. Additional Overburden Injection Well Installation

A review of the notes from the ISCO program identified that overburden injection wells IW-24 and IW-26, located on Harrison Street, did not accept the prescribed volume of oxidant. Because the oxidant was observed leaking out of the adjacent roadway surface, the volume injected in these areas was reduced to prevent oxidant from "daylighting" rather than contacting groundwater.

As part of the additional ISCO treatment, two new overburden injection wells will be installed in the general area shown on Figure 1. There are underground utilities located in the area and the actual locations will be determined in the field based on the utility clearance.

Additionally, two new overburden wells will also be installed between monitoring wells MW-6 and MW-20/MW-20A to increase treatment along the southern property boundary.

The new overburden injection wells will be constructed of 2-inch diameter PVC and will be screened from 5 feet below ground surface (bgs) to the top of bedrock. The screen length will depend on the depth to bedrock. All wells will be completed with a flush-mount road box.

4. Bedrock Perforations

The bedrock surface will be perforated at 15 locations. The perforations will be installed by coring 10 feet into the bedrock at locations to be selected in the field based on the underground utility locations. The perforations will be installed in the vicinity of injection wells IW-1, IW-3, and MW-13A, between MW-6 and MW-20A, and in the foot print of the injection gallery. The intent of the perforations is to allow for better distribution of the oxidant solution in the bedrock groundwater.

The perforations will be filled with coarse sand or pea gravel up to 5 feet below ground surface then grouted to the surface.

5. ISCO Injections

Two rounds of ISCO injections will be completed at a reduced catalyst/oxidant concentration than prescribed in the SMP. Approximately 1,230 gallons of 25 percent sodium hydroxide catalyst and 6,270 gallons of 15 percent sodium persulfate oxidant will be injected per event. The following areas/wells will be targeted for injections:

- Infiltration Gallery
- Bedrock injection wells IW-1, IW-4
- Overburden Injection wells IW-3, IW-5, IW-7, IW-9, and four new injection wells

The target areas are shaded on Figure 2. The distribution of the total volume of oxidant and catalyst will be approximately 5,000 gallons to the infiltration gallery and 2,500 gallons to the wells listed above. These anticipated volumes will be adjusted/redistributed in the field based on how well the

subsurface accepts the injected catalyst/oxidant. The method of injections will be the same as described in the SMP.

6. Groundwater Monitoring

Groundwater monitoring will be conducted as specified in the SMP. It is recommended that monitoring well MW-20A be included in the monitoring program to monitor bedrock groundwater conditions along the southern boundary between MW-13A and MW-7A.

7. Proposed Schedule

A proposed schedule is attached as Table 1.

8. Amendments to SMP

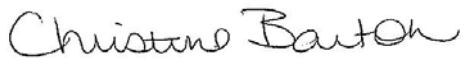
Upon approval of this work plan, the following amendments would be required to be made to the SMP:

- Update Section 5.1.1 to document the injections completed and detail the proposed additional ISCO injection plan
- Update and replace Figure 2.9 to show new injection wells
- Update and replace Figure 4.1 to show monitoring well MW-20A in the monitoring well network
- Update and replace Table 4.1

Please contact me at 716-856-2142 with any questions or if you need any additional information.

Sincerely,

GHD



Christine Barton

CMB/ck/48

Encl.

cc: Paul Tresco, Buffalo China (electronic only)
Erika Schoenberger, Buffalo China (electronic only)
Jeff Vogel, Buffalo China (electronic only)
Rick Kennedy, Hodgson Russ (electronic only)
Charles Malcomb, Hodgson Russ (electronic only)
Rick Shepherd, GHD (electronic only)

TABLE 1

REVISED PROJECT SCHEDULE
GROUNDWATER TREATMENT/MONITORING PROGRAM ACTIVITIES
FORMER BUFFALO CHINA SITE
BUFFALO, NEW YORK

Task	Anticipated Start Date
Well Repairs, new injection well installation, and bedrock perforations	8/11/2015
ISCO Injection	8/17/2015
Groundwater monitoring event	10/5/2015
ISCO Injection	11/16/15
Groundwater monitoring event	December*
The start of the ISEB program is dependent on the groundwater monitoring results.	
ISEB Field measurements and Soy Lactate	May 2016
ISEB monitoring event 1	October 2016
ISEB nutrient application 1	November 2016
ISEB monitoring event 2	April 2017
ISEB nutrient application 2	May 2017
ISEB monitoring event 3	October 2017
ISEB nutrient application 3	November 2017
ISEB monitoring event 4	April 2018
ISEB soy lactate and nutrient application 4	May 2018
The start of post treatment monitoring is dependent on the groundwater monitoring results.	
Post Treatment semiannual monitoring event 1	October 2018
Post Treatment semiannual monitoring event 2	April 2019
Post Treatment semiannual monitoring event 3	October 2019
Post Treatment semiannual monitoring event 4	April 2020
Submit groundwater monitoring report	July 2020
NYSDEC approval of groundwater monitoring report	October 2020
decommission injection wells, gallery and monitoring wells	November 2020

* Activities scheduled December through March may be adjusted due to weather conditions.

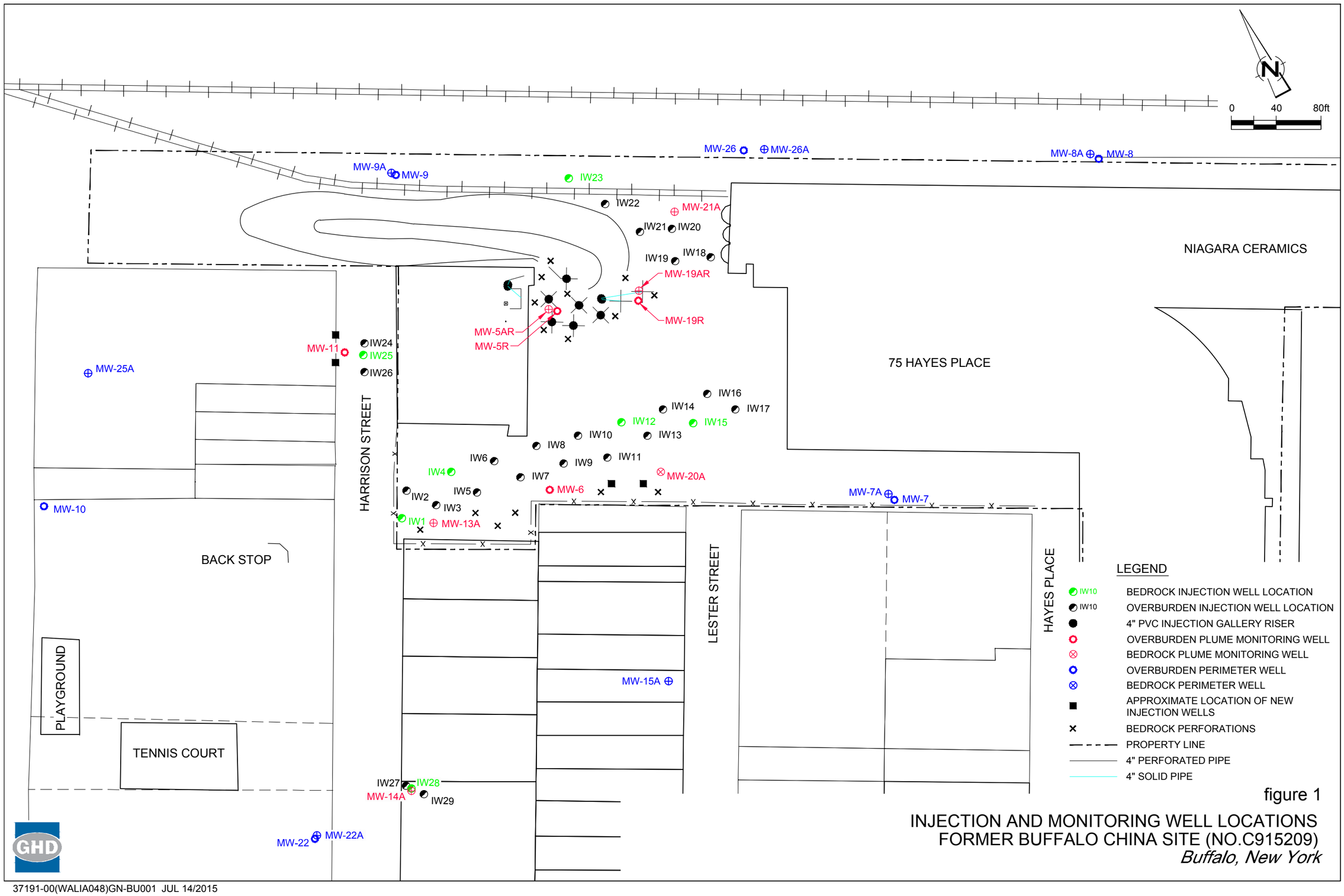


figure 1

INJECTION AND MONITORING WELL LOCATIONS
FORMER BUFFALO CHINA SITE (NO.C915209)
Buffalo, New York

N

0 40 80ft

MW-26 MW-26A

MW-8A MW-8

MW-9A MW-9

IW23

IW22

MW-21A

IW21 IW20

IW19 IW18

MW-19AR

MW-19R

MW-5AR

MW-5R

NIAGARA CERAMICS

75 HAYES PLACE

MW-11 IW24 IW25 IW26

MW-25A

IW16

IW14 IW17

IW12 IW15

IW10 IW13

IW8

IW6 IW9 IW11

IW4 IW7

IW2

MW-20A

IW5 MW-6

MW-7A MW-7

IW3

IW1 MW-13A

HARRISON STREET

MW-10

BACK STOP

LESTER STREET

HAYES PLACE

MW-15A

PLAYGROUND

TENNIS COURT

IW27 IW28

MW-14A

IW29

MW-22 MW-22A

LEGEND

- IW10 BEDROCK INJECTION WELL LOCATION
- IW10 OVERBURDEN INJECTION WELL LOCATION
- 4" PVC INJECTION GALLERY RISER
- OVERBURDEN PLUME MONITORING WELL
- BEDROCK PLUME MONITORING WELL
- OVERBURDEN PERIMETER WELL
- BEDROCK PERIMETER WELL
- APPROXIMATE LOCATION OF NEW INJECTION WELLS
- BEDROCK PERFORATIONS
- PROPERTY LINE
- 4" PERFORATED PIPE
- 4" SOLID PIPE
- ISCO INJECTION TARGET AREA

figure 2

INJECTION AND MONITORING WELL LOCATIONS
FORMER BUFFALO CHINA SITE (NO.C915209)
Buffalo, New York

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