MWH

April 17, 2007

Ms. Michelle Tipple
New York State Department of Environmental Conservation
21 South Putt Corners Road
New Paltz, NY 12561-1696

RE: Proposed WorkPlan for Continuation of the Remedial Action
American Candle Company (former Ferroxcube) Site, Saugerties, New York
Site Code #3-56-011
Subsurface Injections of Sodium Lactate Releasing Compound (WILCLEAR®)
Former TCA AST Area

Dear Ms. Tipple:

MWH is pleased to present this WorkPlan on behalf of Philips Electronics North America Corporation (Philips) for continuation of the Remedial Action at the American Candle (former Philips Components) site ("the Site") in Saugerties, New York. This WorkPlan presents details of the proposed augmentation of the anaerobic bioremediation remedial action that has been conducted at the former location of a 1,1,1-trichloroethane (TCA) aboveground storage tank (AST) at the Site (**Figure 1**).

Background

The presence of TCA and other volatile organic compounds (VOCs) were detected in July 2000 at the former TCA AST area of the Site. Beginning in 2001, subsurface injections of a sodium lactate releasing material marketed under the name Hydrogen Releasing Compound (HRC®) have been performed at the former TCA AST area of the Site. HRC® dissociates into volatile fatty acids (or VFAs, e.g. lactic acid). These fatty acids and their breakdown products are readily metabolized by microorganisms which release hydrogen and create a reducing condition in the subsurface. This condition brings about the reductive dechlorination of VOCs, converting them to dissolved gases (ethenes and ethanes).

During the routine monitoring performed for this process, several indicator parameters, including oxidation reduction potential (ORP) and VFAs are measured, which indicate the strength of the reducing environment, and the availability of substrate material which can be utilized by microorganisms for the release of hydrogen. When these parameters begin to change beyond desired boundary criteria, it signifies that the effectiveness of the reductive dechlorination process is diminishing or will soon diminish.

The initial pilot phase application of HRC® was performed at the former TCA AST area of the Site in 2001 to evaluate the ability of this compound's ability to anaerobically degrade the dissolved TCA plume in groundwater located beneath the former AST. Results of this pilot study indicated that the use of HRC® produced subsurface conditions that would be favorable to the degradation of TCA, although ultimately the subsurface

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conditions reverted to a substantial degree to pre-HRC® application conditions.

A second phase of HRC® injection was developed based on the favorable results observed during the 2001 injection and follow-up monitoring. In September 2002, 180 pounds of HRC® was injected into each of 10 points surrounding monitoring well ITMW-1, for a total application of approximately 1,800 pounds of HRC® material. Direct-push injections were performed with a Geoprobe® rig, and the HRC® was injected into the soil zone from 10 to 25 feet below grade.

The results of the second phase of HRC® injection at the Site were also favorable, but the monitored site conditions indicated that the process required the injection of additional lactate releasing substrate material in order to continue. A third phase of injection was performed in 2004, and at the recommendation of the vendor, 3,000 pounds of HRC® and 3,000 pounds of an extended release formulation (HRC-X®)material were injected into abutting target areas at the former TCA AST area of the Site (**Figure 2**). The heaviest application of HRC® was performed in a grid pattern directly up-gradient of ITMW-1, consisting of an area approximately 26 feet by 55 feet and surrounding ITMW-4. HRC® was applied at a rate of approximately 6 pounds per foot at a depth of between five and twenty four feet below ground surface. A total of 32 direct-push borings were completed in this target area, spaced 7.5 feet on center with 7.5 feet between each row. A second, similarly sized, abutting area in the vicinity of ITMW-3 was also treated with HRC®, albeit at a lower application rate. At this area HRC® was applied at a rate of approximately 4 pounds per foot, at a depth interval of five to twenty four feet below ground surface. A total of 30 direct-push borings were completed for this treatment area in four rows, spaced 7.5 feet on center with 7.5 feet between each row.

These injections of sodium lactate releasing compound have resulted in significant (greater than 99%) reductions in the concentration of TCA in wells at the former TCA area, as shown on the VOC trend graph for monitoring well ITMW-1, **Figure 3**. However, deceases in the concentrations of VFAs that are monitored on a quarterly basis indicate that additional sodium lactate releasing material is needed to maintain the reducing conditions that have been established in this area.

Objective of the Proposed Work Plan

The goal of the scope of work proposed in this Work Plan for continuation of the remedial action at the former TCA AST area is to supply additional sodium lactate releasing material to the subsurface to maintain the reducing conditions which have been established, and thereby continue the reductive dechlorination of TCA in groundwater at this location.

Technical Approach

MWH proposes to complete the following tasks to continue the anaerobic bioremediation of TCA at the former TCA ACST area, as described below.

Task 1: Application of Sodium-Lactate Releasing Material

Currently, sodium lactate releasing material has been applied at the former TCA AST Area three times in the form of the commercial product HRC®. A fourth application is

now proposed to further reduce the remaining concentrations of TCA. A new food-grade sodium lactate releasing-product, WILCLEAR®, is proposed for the fourth application. This product is less viscous than HRC®, which may aid in the dissemination of sodium lactate throughout the clayey-silt soils of the project area, and accomplish a greater degree of reduction of TCA in groundwater than has previously been achieved. The subsurface reactions promoted by WILCLEAR® that will enhance subsurface anaerobic biological activity are similar to those produced by previous applications of HRC®, i.e. no appreciable changes in parameters such as pH, color, or alkalinity are anticipated. Details of the proposed subsurface-injection of WILCLEAR® sodium lactate releasing material are described below.

MWH proposes to install approximately 2,400 pounds of WILCLEAR® into the area abutting and downgradient of the former TCA AST. A total of 22 direct-push borings are proposed for the treatment area, located in a grid pattern overlapping and downgradient of the former TCA AST. At each injection point, WILCLEAR® will be applied in a four to one mixture with water. This dilution will assist in forcing the WILCLEAR® laterally away from each injection point and dispersing it throughout the soil. A total of 50 gallons of the water/ WILCLEAR® mixture will be injected at each point, equating to the injection of 7.5 pounds of the WILCLEAR® product per linear foot of each boring at a depth between five and twenty feet below ground surface. Injection points will be placed in four rows, 10 feet on center with 10 foot spacing between each row. Points will be moved as necessary so that they are not immediately adjacent to a monitoring well or subsurface utility line.

This application is similar in lateral extent to the most recent application of HRC® at the Site, and is intended to treat the entire area where VOCs are believed to remain in the subsurface for this area of the Site. MWH will select a qualified subcontractor to perform the subsurface borings and subsequent injection of the WILCLEAR® product. The subcontractor will be selected based on their experience with the methods required for the successful deployment of the WILCLEAR® slurry. Proposed injection locations are shown on **Figure 4**.

A positive displacement pump (Geoprobe® GS-2000 or equivalent) will be utilized to inject the WILCLEAR® slurry under pressure into the subsurface. Field activities will be overseen by an experienced MWH field geologist. It is anticipated that the soil borings and subsequent WILCLEAR® slurry injection will require approximately three days to complete.

Task 2: HRC Application Monitoring

Past indications are that at least a twelve-month period is necessary to observe the effects of this process. In order to accomplish this, MWH personnel will monitor the groundwater in wells ITMW-1, ITDW-1, ITMW-3, ITMW-4, ITMW-6, and MW-7. Wells will be monitored for field parameters monthly, and for laboratory parameters on a quarterly basis. Field parameters to be gathered include dissolved oxygen, oxidation-reduction potential (ORP), pH, conductivity, depth to water, and temperature. Laboratory analysis will include dissolved iron, dissolved manganese, nitrate, sulfate, sulfide, chloride, alkalinity, total organic carbon, VFAs (lactic acid, acetic acid, pyruvic acid,

propionic acid, butyric acid), dissolved methane, dissolved ethane, dissolved ethene, and VOCs (monitoring wells ITMW-6 and MW-7 will be analyzed for VOCs only). These parameters will indicate the effects of the WILCLEAR® application in and beyond the target area. The VOC analyses are intended to show the progressive dechlorination of the VOCs of concern, as well as to document clean conditions in perimeter monitoring wells.

We look forward to your review and approval of this Work Plan for continuing the remedial action at the former TCA area, as we would like to begin preparations for completion of the work during the 2007 field season. If you should have any questions regarding the Proposed Work Plan, please do not hesitate to contact Priscilla Seaburg at (518) 640-6018 or Ray Larkin at (401) 294-0434.

Sincerely,

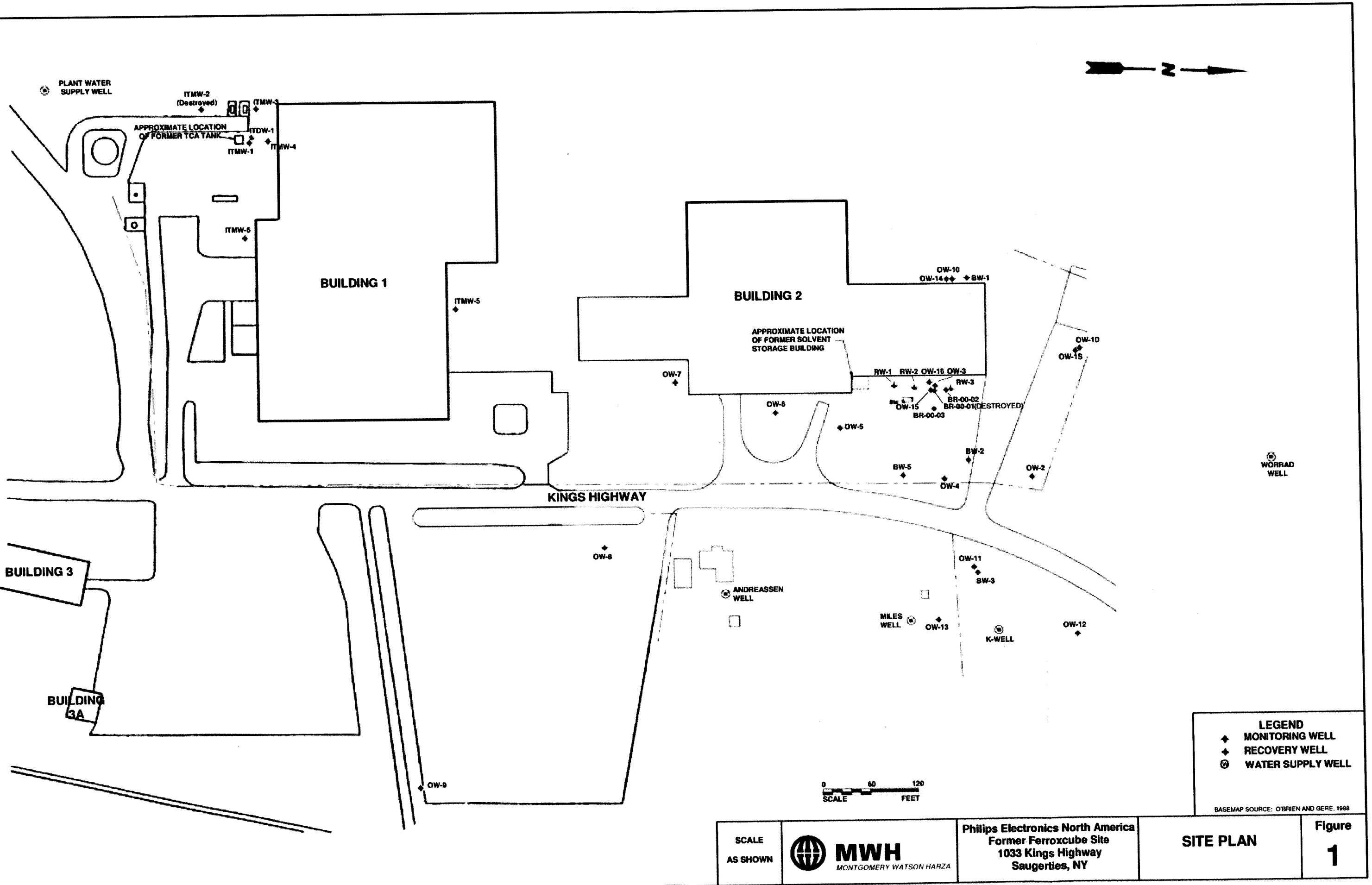
MWH Americas, Inc.

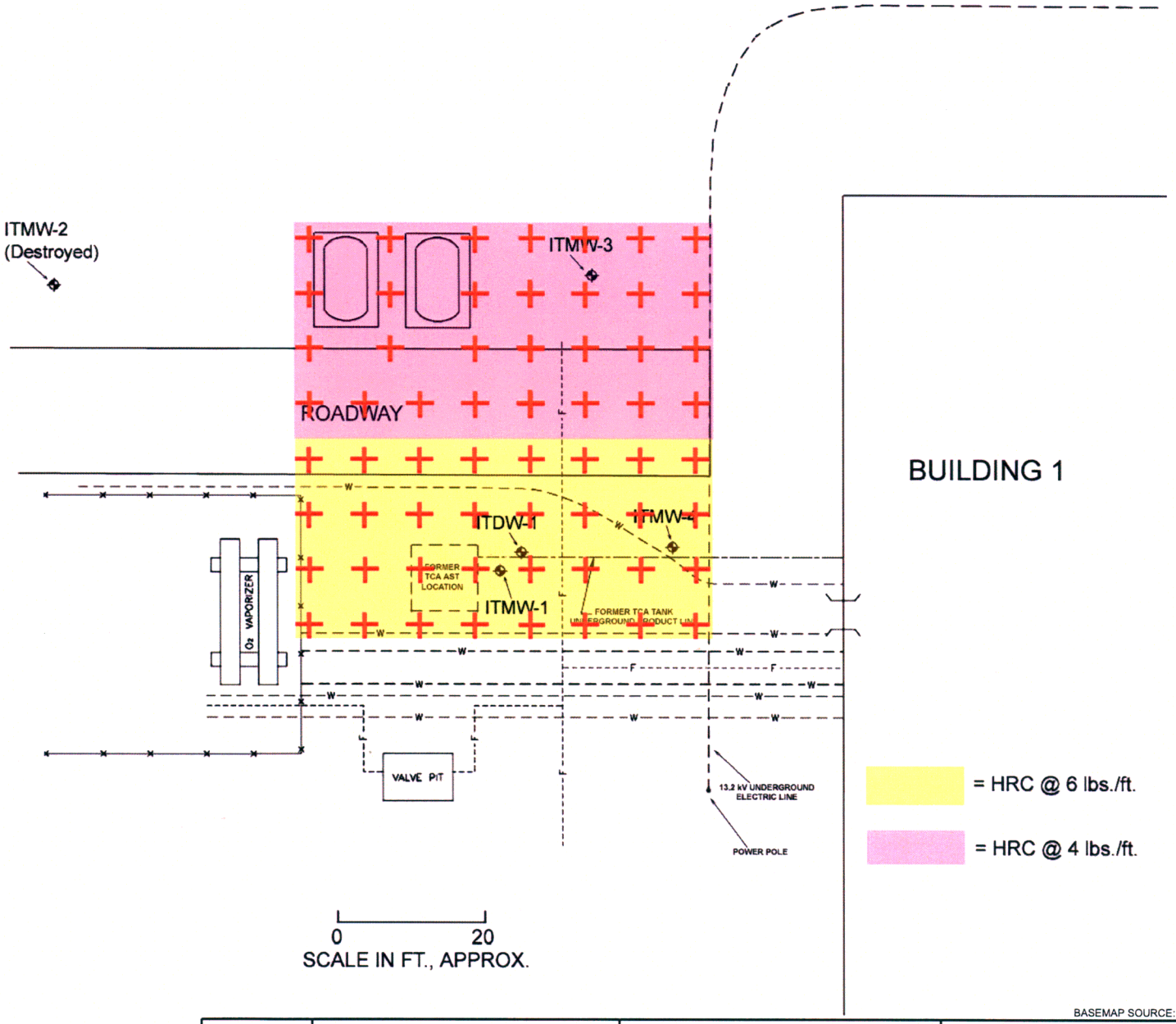
Priscilla Seaburg
Project Manager

Richard Hixon
Principal Hydrogeologist

Enc.: Figure 1 Site Map
Figure 2 2004 HRC® Injection Plan, Former TCA AST Area
Figure 3 VOC Concentrations, ITMW-1
Figure 4 Proposed Sodium Lactate Injection Plan, 2007

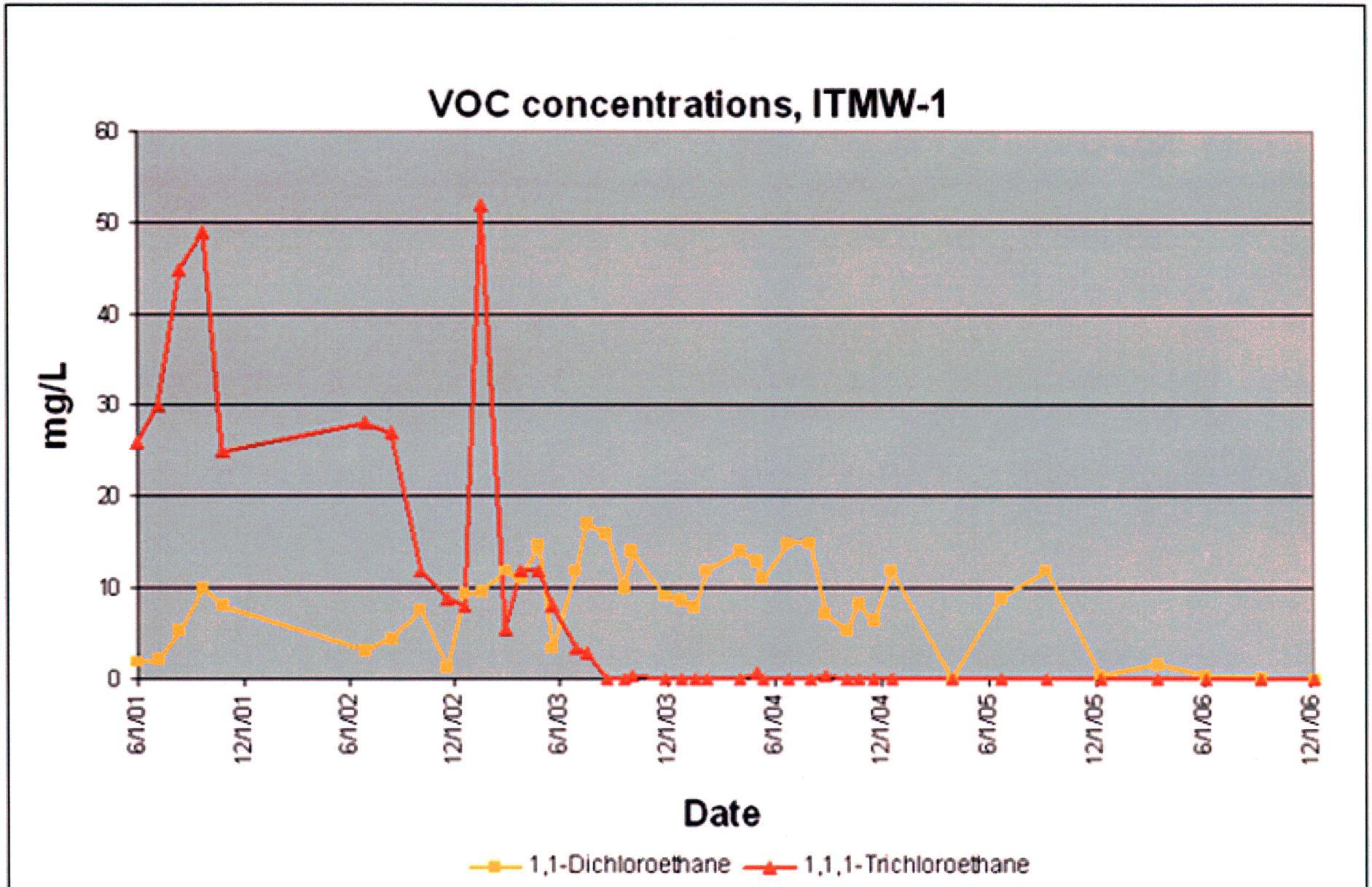
Figures


N
PLANT WATER SUPPLY WELL
ITMW-2 (Destroyed)
ITMW-3
APPROXIMATE LOCATION OF FORMER TCA TANK
ITDW-1
ITMW-1
ITMW-4
ITMW-6
BUILDING 1
ITMW-5
BUILDING 2
OW-10
OW-14
BW-1
APPROXIMATE LOCATION OF FORMER SOLVENT STORAGE BUILDING
OW-1D
OW-1S
OW-7
RW-1
RW-2
OW-16
OW-3
RW-3
OW-6
OW-15
BR-00-02
BR-00-01(DESTROYED)
BR-00-03
OW-5
BW-2
BW-5
OW-4
OW-2
WORRAD WELL
KINGS HIGHWAY
OW-8
BUILDING 3
ANDREASSEN WELL
OW-11
BW-3
MILES WELL
OW-13
K-WELL
OW-12
BUILDING 3A
OW-9
0
60
120
SCALE
FEET
LEGEND
MONITORING WELL
RECOVERY WELL
WATER SUPPLY WELL
BASEMAP SOURCE: O'BRIEN AND GERE, 1988
SCALE
AS SHOWN
MWH
MONTGOMERY WATSON HARZA
Philips Electronics North America
Former Ferroxcube Site
1033 Kings Highway
Saugerties, NY
SITE PLAN
Figure
1

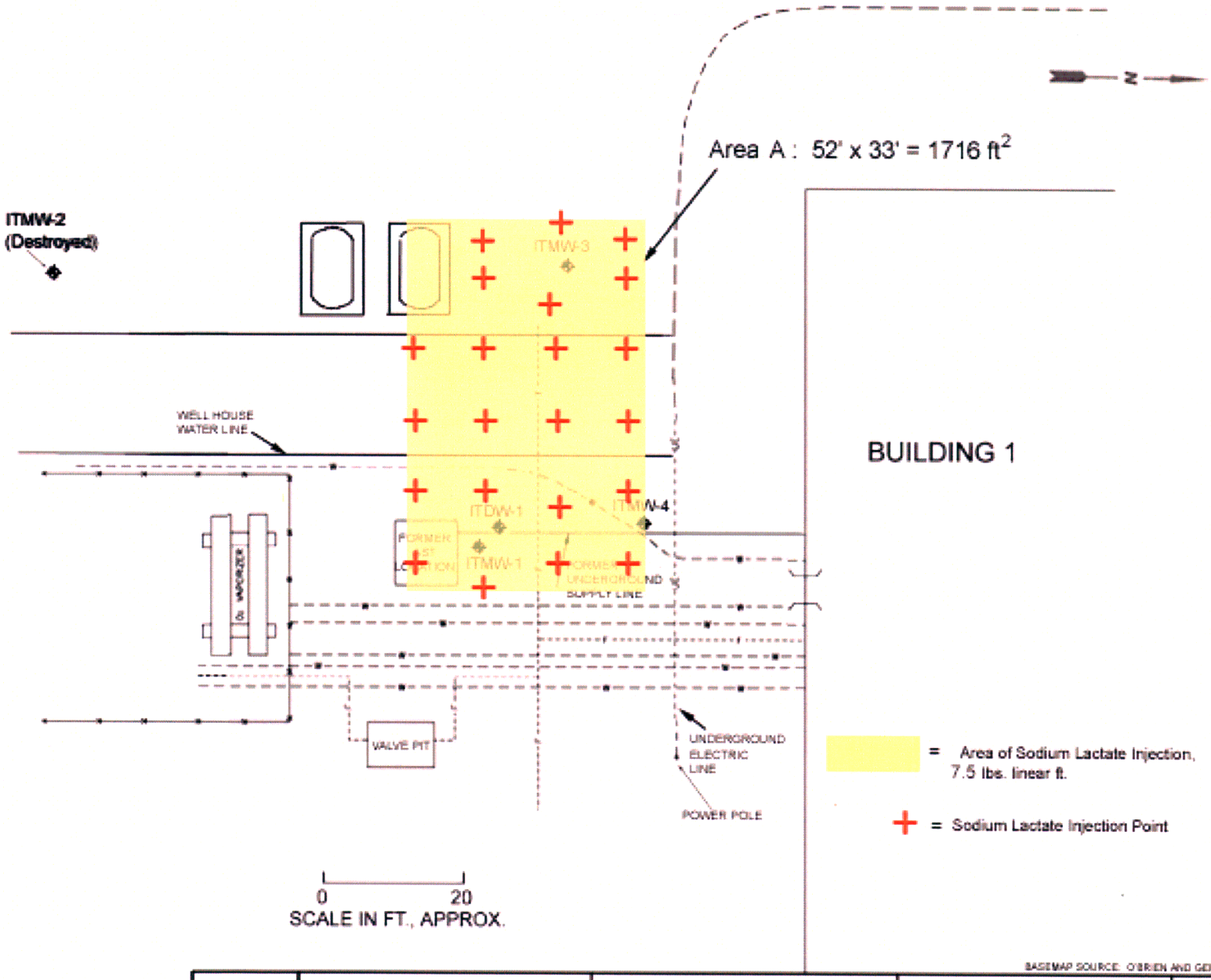


BASEMAP SOURCE: O'BRIEN AND GERE, 1988

SCALE AS SHOWN	MWH MONTGOMERY WATSON HARZA	Philips Electronics North America Former Ferroxcube Site 1033 Kings Highway Saugerties, NY	2004 HRC® INJECTION PLAN FORMER TCA AST AREA	Figure 2



SCALE AS SHOWN	MWH MONTGOMERY WATSON HARZA	Philips Electronics North America Former Ferroxcube Site 1033 Kings Highway Saugerties, NY	VOC Concentrations ITMW-1	3



SCALE AS SHOWN	MWH MONTGOMERY WATSON HARZA	Philips Electronics North America Former Ferroxcube Site 1033 Kings Highway Saugerties, NY	PROPOSED LACTATE INJECTION PLAN, 2007	4