AECOM Environment

Prepared for:
NYSDEC
625 Broadway
Albany, NY 12233

Prepared by:
AECOM
Latham, NY
Project 60279080
March 2014

In Situ Thermal Treatment
Final Design Analysis Report
Former Duso Chemical Site and
Off-Site Mid-Hudson Business Park Area
Poughkeepsie, New York
NYSDEC Site No. 314103

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Art Taddeo

Prepared By: Arthur Taddeo

Scott Underhill

Reviewed By: Scott Underhill, P.E.

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Engineering Certification

I certify that I am currently a New York State registered professional engineer and that this in situ thermal treatment design document for the Mid-Hudson Business Park off-site portion of the Duso Site (Site Number # 314103) was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Respectfully submitted,

AECOM Technical Services Northeast, Inc.

SCOTT ANDREW UNDERHILL
075332

Scott A Underhill

March 31, 2014

Scott A. Underhill
Registered Professional Engineer
New York License No. 075332

Date

1.0 Introduction

This Final Design Analysis Report (DAR) has been prepared by AECOM Technical Services Northeast, Inc. (AECOM) for the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER). The Final DAR describes environmental remediation activities that are being proposed for the Former Duso Chemical New York State Superfund Site (“Duso Site”) which includes the Western Publishing property portion of the Mid-Hudson Business Park (MHBP). This area is referred to as the MHBP area, which is off-site and west of the Duso Site. This DAR presents designs, rationale, criteria, calculations and analysis of a thermal treatment remediation design that will be implemented on the off-site MHBP area. The scope of this DAR addresses treatment of soils, groundwater, dense non-aqueous phase liquids (DNAPL), if present, and impacted soil vapors present in the MHBP area. This document is prepared in accordance with the Record of Decision (ROD) issued by the NYSDEC in March 2008 for the Duso Site.

1.1 Scope

The Duso Site and the former Western Publishing property are adjacent to each other and, through the remedial investigation process, have been determined to share a groundwater contaminant plume. These two properties are listed in the NYSDEC Registry of Inactive Hazardous Waste Disposal Site database under separate numbers, but due to their close connection have been addressed under the March 2008 Record of Decision (ROD) for the Duso Site. On-site contamination is being addressed by a separate and independent enhanced in situ bioremediation (EISB) remedial action. The Duso Site is listed as Class 2, meaning that the site poses a significant threat to human health and/or the environment. The MHRP site is presently a Class N site. Class N is used for sites not in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites (Registry) that begin, but do not complete a remedial program (e.g., Brownfield Cleanup Program or BCP) and do not qualify for the Registry.

1.2 Selected Remedy

The conceptual approach to the remediation of the Duso Site was originally presented in the Feasibility Study (FS) prepared for NYSDEC (O’Brien & Gere, 2007). The FS evaluated a number of remedial options for both the Duso Site and the MHBP area. As described in the FS, various forms of in situ thermal treatment (electrical resistance heating, radio-frequency heating, steam injection and extraction, conductive heating, and in situ vitrification) were evaluated for the treatment of soils and groundwater and many of them were determined to be a feasible alternative for the MHBP area.

Due to the number of forms of in situ thermal treatment, only one of the process options was selected as a representative option for detailed evaluation in the FS. The process option evaluated as the most representative was conductive heating. The FS recommended in situ thermal treatment as the treatment alternative for the MHBP facility. The ROD identifies this as the selected remedy; however, it identifies the specific form of in situ thermal treatment to be implemented as conductive heating (also known as in situ thermal desorption or ISTD), even though many designs of this technology could achieve the same results. In discussions with NYSDEC, other forms of in situ thermal treatment were determined to be acceptable and comply with the ROD, as long as they could fulfill the requirements of the DAR.

1.3 On-Site vs. Off-Site Implementation

As mentioned above, a separate in situ bioremediation remedial action was initiated in June of 2013 on the Duso Site to address chemical contaminant impacts in soils and groundwater. The remediation activities on the Duso Site are anticipated to be completed prior to those remediation activities at the MHBP area. Since the Duso Site is hydraulically up-gradient from the MHBP area, regular monitoring of groundwater conditions there during treatment, at the interface of the two sites, and migrating into the MHBP area will be important to understand the interactions between these two sites.

1.4 Site Description

The in situ thermal remediation described in this DAR will be implemented off-site on the former Western Publishing property, now known as the MHBP area. This area is immediately west of the Former Duso Chemical Site, which was historically occupied by the Duso Chemical Company and is now owned and occupied by Star Gas. The Duso Chemical Company operated a chemical warehouse and distribution business from 1950 through 1963.

The MHBP area is located in the Town of Poughkeepsie, New York, approximately 0.4 miles east of the Hudson River, on Fulton Street. A site location map is included as **Figure 1-1**. The area involved in the investigation and remediation activities described is limited to approximately 5 acres. The off-site MHBP area is the southeastern portion of the MHBP property located at the corner of North Road (Route 9N) and Fulton Street. The boundaries of both impacted properties are presented in **Figure 1-2**.

1.5 Site Use, Regulatory, and Investigation History

A review of Sanborn records from 1950 through 1990 indicates that the previous property owner of the adjacent property to the MHBP area prior to Star Gas was the Duso Chemical Company. As a result of a fire at the warehouse in 1963 (Chazen, 1998) and historic site operations, releases of various volatile organic compounds (VOCs) occurred to the environment on both the Duso Site and off-site MHBP properties. Migration of contaminants from the Duso property through the Conrail (now NY Central Lines, LLC) property, to the MHBP area likely took place following a sudden discharge of chemicals during the fire and subsequent fire-fighting activities. In 1972, the Duso property was bought by and is still currently occupied by Star Gas Products, Inc., a propane distribution facility.

From 1910 to 1917 FIAT of Poughkeepsie manufactured approximately 2000 automobiles at what is now the MHBP property. Western Publishing began production in a corner of the property in 1935. By the 1950s the plant grew to nearly 400,000 square feet. Operations at the facility included photography, lithography plate production, printing operations, coating, gluing and binding operations, and general plant operations and maintenance. The facility used inks, dyes and solvents, which were transported to the facility by truck and tanker. Large items like roll paper and some ink products were transported to the facility by rail. Types of chemicals used at the facility, as identified by a former employee, included acetone, benzene, carbon tetrachloride, isopropyl alcohol, kerosene, Salvasol #5, trichloroethene (TCA) and trichloroethene (TCE). Some of these chemicals were reported to have been purchased from the Duso Chemical Company (Chazen 1998).

Elevated levels of chlorinated solvents were first detected in the soil and groundwater at the MHBP area during an investigation in 1994 (Chazen, 1994). Numerous site investigations on the MHBP property followed (Chazen, 1994, 1995, 1998). NYSDEC identified the origin of the contamination to be the Former Duso Chemical property. In April of 1999, the NYSDEC listed the Duso Site as a Class 2 Site in the State's Registry of Inactive Hazardous Waste Disposal Sites.

A State Superfund Remedial Investigation (RI) was initiated for the Duso Site in 2005 and conducted in several phases. The first phase was conducted from June to August of 2005 and a second sampling event was conducted in March of 2007 (O'Brien & Gere, 2007). A Feasibility Study (FS) was then developed (O'Brien & Gere, 2007). NYSDEC prepared the ROD for both properties in March 2008 based on the findings of the RI and the FS (NYSDEC, 2008).

An Interim Remedial Measure (IRM) was conducted at the Duso (Star Gas) site to address exposure pathways of vapor intrusion present from elevated soil vapor levels. A sub-slab depressurization system was installed on the Duso site in February 2006 as PCE and TCE were detected in subsurface vapor and indoor air samples at that property above NYSDOH guidance for the protection of human health. Following installation, the concentrations of all compounds of concern in indoor air were reduced to below their respective action levels (O'Brien & Gere, 2005, 2006). No exceedances were detected at that time on the off-site MHBP property in either the abandoned building or the commercial space currently occupied by Staples.

In 2011, AECOM conducted additional remedial design investigation activities at both the on-site and off-site properties in order to complete feasibility testing for EISB, and collected additional information to assist with remedial design efforts. The additional activities included a Membrane Interface Probe® (MIP) subsurface investigation, installation of soil borings and multi-level groundwater monitoring wells, and collection of soil and groundwater for VOC analysis. The additional investigation was completed to provide updated information and further delineation of impacted areas to better implement the remedial activities recommended by the ROD (AECOM, 2011).

A 2012 supplemental delineation was performed in the off-site MHBP area. Additional multi-level monitoring wells were installed to assist delineation of the thermal remediation treatment zone. Following installation of these new wells, low-flow groundwater sampling was performed at the MHBP area to provide a comprehensive baseline horizontal and vertical delineation of VOCs in groundwater prior to thermal remediation.

Details of the results of the contaminant and thermal treatment zone delineation are provided in Section 2.0, Basis of Design, of this DAR. Field logs from soil borings, well construction, and the MIP investigation are presented in **Appendix A**.

1.6 Site Conditions

The MHBP area is located within a mixed neighborhood of commercial establishments, private properties, and residential buildings. There is a business park and shopping center to the west and north of the MHBP area, and college dormitories are nearby as well. The MHBP area consists of open unpaved and paved ground, and a building. The on-site building is currently vacant. The building immediately to the north is occupied by Staples (office products). The topography of the site and surrounding properties is relatively level, sloping gently to the west. A narrow strip of property owned by NY Central Lines, LLC is present between the Former Duso Site and the MHBP area. This narrow property is the location of a former railroad track bed and intermittent stream/swale which borders the MHBP area to the east. The swale directs flow off-site to the Hudson River. At the eastern property line, the ground surface rises rapidly to the east forming a low ridge.

1.6.1 Geologic and Hydrologic Characteristics

The MHBP area geology consists of three distinguishable unconsolidated soil deposits and bedrock. Based on the RI and supplemental investigation, three unconsolidated deposits appear to be continuous across the MHBP area. The uppermost deposit is a brown fine sand and silt which is described as ranging from 6 to 15 feet in thickness. A gray silt and clay deposit is encountered underlying the sand which is described in thickness ranging from 35 to 60 feet.

A coarse sand and gravel till deposit directly overlies the bedrock encountered beneath the MHBP area, and is described in thickness ranging from 1 to 5 feet. The unconsolidated deposits form a wedge of soil that increases in thickness across the MHBP area toward the south. Saturated soil on the MHBP area has been identified in soil borings at depths ranging from approximately 4.5 to 6 ft bgs.

The bedrock underlying the MHBP area is encountered as near as 10 ft bgs near the northeast corner of the MHBP property, and as deep as 74 ft bgs near the southwestern portion of the Site. In the vicinity of the center of the MHBP area, bedrock dips in opposing directions; in the south the surface faces north-northwest, and in the north the surface faces south-southeast, forming a trough beneath this area which accommodates the wedge of unconsolidated materials. A series of cross-sections depicting subsurface conditions encountered are provided in **Appendix B**.

The MHBP area's hydrogeological setting consists of two aquifers: the unconsolidated soil aquifer and the shallow bedrock aquifer. The unconsolidated soil aquifer exists in an unconfined state and responds to changes in seasonal weather conditions. Groundwater in the unconsolidated soil aquifer flows across the MHBP area to the west and south with an apparent local influence from the intermittent stream. Groundwater flow in the unconsolidated soil aquifer on the Duso Site and further east generally mimics the topography and flows west until it is influenced by the intermittent stream and subsurface utilities located on the NY Central Lines, LLC property. The intermittent stream flows north to south along the abandoned railroad tracks of the NY Central Lines, LLC property, and is directed into a drain and drainage structures to flow below Fulton Street, and continues south.

The shallow bedrock aquifer, monitored by a small network of wells across the MHBP area exhibits semi-confined conditions, which creates a diminished and delayed response to seasonal weather conditions. Groundwater in the shallow bedrock aquifer flows toward the regional discharge point, the Hudson River, southwest of the property. Monitoring has demonstrated that contaminants are limited to the unconsolidated soil aquifer due to the low permeability of deposits overlying the bedrock, and because of this condition, monitoring and reporting focuses on the unconsolidated soil aquifer.

2.0 Basis of Design

This section identifies key information that serves as the basis for defining design parameters and criteria to ensure the in situ thermal treatment will meet the intended objectives.

2.1 Compounds of Concern

2.1.1 Previous Investigations

Several investigations of the MHBP property were performed in the mid-1990s, including a Phase I Environmental Site Assessment (Chazen, 1994a), a Phase II Preliminary Groundwater Investigation (Chazen, 1994b, a Remedial Investigation (Chazen, 1994c), and a Supplemental Remedial Investigation (Chazen, 1998). The Supplemental Remedial Investigation (SRI) was conducted in response to a NYSDEC request and suggested that the contaminants at both the Star Gas and MHBP properties were from the Duso storage and distribution facility. The SRI, conducted from June 1995 to February 1998, encompassed the southeast corner of the MHBP property, the Star Gas property (the Duso facility), and the NY Central Lines, LLC property, which separates the two properties. Ground water, soil, surface water, and sediment samples were analyzed for VOCs. The SRI confirmed the absence of chlorinated VOC (CVOC) impacts in unsaturated soils in the MHBP area.

The SRI also determined that the overburden groundwater in the MHBP area was impacted at high concentrations by 1,1,1-trichloroethane (TCA); 1,1-dichloroethane (1,1-DCA); 1,2-dichloroethane (1,2-DCA); 1,2-DCE; and chloroethane. DNAPL free product was observed in one well in the MHBP area coincidental to a topographic low point in the silt and clay unit in the southeastern portion of the area (well MHC-29) (O’Brien and Gere, 2007). The majority of the groundwater impacts were observed to reside in the southeastern portion of the MHBP area. The same contaminants were also observed in surface waters and sediments from the intermittent stream, between the two properties.

An additional Remedial Investigation (RI) was conducted in two phases in 2005 and 2007 at the Star Gas property, on the adjacent NY Central Lines, LLC property, and the southeast portion of the MHBP property (O’Brien and Gere, 2007). This RI included installation of additional soil borings, monitoring wells (overburden and bedrock), and sampling of soil, groundwater and air samples. The results of the soil boring samples (all obtained below the water table) confirmed impacts in the southeastern portion of the MHBP area, and indicated the compounds of concern consisted of TCA, 1,1-DCA, and 1,2-DCA. Groundwater analysis confirmed previous results from wells in the southeastern portion of the area. DNAPL has not been observed during subsequent monitoring well observations in the MHBP area.

2.1.2 Supplemental Site Investigation (2011)

Supplemental investigation activities were conducted in 2011 by AECOM to collect additional information in the MHBP area to assist with remedial design efforts. The additional activities included a Membrane Interface Probe® (MIP) subsurface investigation, collection of soil samples from six borings advanced, installation of nine stainless steel monitoring wells (three multi-level clusters), and collection of groundwater samples.

AECOM utilized available monitoring well location maps to locate groundwater monitoring wells previously installed to determine their condition and assess appropriate repairs or continued utilization. Samples were collected from 17 monitoring wells during March 2011. Over 85 monitoring wells are in the network including approximately 25 on-site and 60 in the MHBP area, respectively, however not all are currently accessible or available.

A MIP investigation was conducted in the MHBP area utilizing available information to determine supplemental investigation locations. Continuous real-time field logging and monitoring for VOCs and other information was performed at 26 locations to identify zones of significant impacts. The MIP locations that indicated the highest VOC impacts vertically were generally located at depths between 10 and 25 feet below ground surface (ft bgs); however, some impacts extended to 45 ft bgs.

Based on the MIP results, six soil borings (SB-A to SB-F) were advanced using a Geoprobe rig to collect samples for VOC analysis using a fixed laboratory to correlate to field results, as well as to better delineate the extent of impacts. The results confirmed existing information both in terms of compounds of concern, as well as locations and depths of impact.

To complete the 2011 supplemental delineation, a series of nine steel monitoring wells were installed in the MHBP area to provide additional monitoring locations for thermal treatment. The wells were installed in three depth-discrete borings crossing the proposed thermal treatment area and depth to allow a profile of the contaminant concentrations through the saturated soil column during remediation. Each well triplet had screened intervals at or near the bedrock interface, 15 to 20 ft bgs, and an intermediate depth between the two.

Soil and groundwater sampling results from 2011 are provided as **Tables 2-1 and 2-2**, respectively. MIP soil conductivity, soil boring logs and construction logs of the steel multi-level wells are all provided in **Appendix A**. Sampling locations are provided on **Figure 1-2**.

2.1.3 Supplemental Site Investigation (2012)

AECOM performed a supplemental investigation in 2012 to further delineate the MHBP area horizontally and vertically, in order to better define the treatment zone necessary for remediation. During these efforts, additional stainless steel monitoring wells were installed. Stainless steel well materials were used so as not to be damaged by application of high temperatures during in situ thermal remediation. Multi-level monitoring wells (two or three at each location) were installed at seven locations, including two well clusters inside the building, and were generally installed at depths of 10-20 ft bgs (corresponding with the highest PID headspace readings), 25-35 ft bgs, and immediately above bedrock refusal (ranged between 35.5 and 65 ft bgs). During well installation, soil samples were collected for analysis of VOCs and total organic carbon (TOC) at each well location. The soil results indicated that soils were impacted to no more than 30 ft bgs or less in most borings, with mixtures of TCA, DCA, DCE, chloroethane, and VC. TOC results ranged from 1500 to 7600 mg/kg for most soil borings. A comprehensive groundwater elevation survey was completed following installation of new monitoring wells at both the Duso and the MHBP area; groundwater elevation contour maps are provided in **Appendix C**.

Low-flow groundwater sampling was performed at wells in the MHBP area in December 2012 to provide a comprehensive baseline of horizontal and vertical delineation of VOCs in groundwater prior to thermal remediation. Results of the groundwater sampling added further horizontal and vertical delineation to the impacted area to allow a treatment zone to be defined. **Figures 2-1 and 2-2** provide depth-related CVOC concentration contours for the shallow and intermediate groundwater zones of the MHBP area.

Soil laboratory results from 2012 and groundwater laboratory results from 2011 and 2012 are presented in **Tables 2-1 and 2-2**, respectively. Field screening results also indicated that groundwater from these wells exhibited conductivity measurements that ranged between 0.5 and 3.0 mS/cm. The overburden and bedrock wells installed in 2011 and 2012 bounded the plume to the north, west and south. Groundwater contamination appears to be contained within the unconsolidated soil aquifer, and results from the wells open to the bedrock aquifer continue to support this conclusion.

2.2 Conceptual Site Model of Contaminants

Although there are historic reports of chemical use at the MHBP property from Western Publishing operations and possibly before them, the major source of VOC contamination in the MHBP area was through transport via groundwater and surface water (intermittent stream) migration from the Duso Site where surficial releases of VOCs occurred as a result of a warehouse fire in 1963. Below the Duso Site, VOC contamination is observed in vadose soils and in the shallow saturated silty sands, particularly immediately above and in the uppermost portion of the clayey silt (transition to clayey silt observed between 19 and 22 ft bgs, elevation 91 to 94 feet above MSL) along the western property boundary of the Duso Site. In the MHBP area, the highest VOC concentrations in soil and groundwater are generally observed at depths of 15 to 20 ft bgs (elevation 90 to 98 ft above MSL), which corresponds to the depths just above the transition to clayey silt and the highest VOC concentrations on the Duso site.

Groundwater concentrations decrease with depth in the MHBP area, similar to the Duso Site. However, due to the density of 1,1,1-TCA being greater than water, VOC impacts are observed at deeper depths moving west in the direction of groundwater flow, which is also similar to the Duso Site. DNAPL was detected during early site investigations in 1995 (well MHC-29); however, DNAPL presence has not been observed/confirmed since that time, although many of the concentrations observed in the groundwater exceed 1% of the compound’s solubility, which is presumptive evidence that there is DNAPL or at least residual free phase present somewhere in the area (Pankow and Cherry, 1996).

The primary VOC contaminant at the Duso Site and MHBP area is 1,1,1-TCA, with lower levels of 1,1- DCA, chloroethane, and to a lesser extent 1,2-DCA. Some of these latter chemicals detected in groundwater at the MHBP area are a result of partial reductive dechlorination by native bacteria in the slightly reducing groundwater conditions (Oxidation Reduction Potential [ORP] between -90 and 50 mV, DO between 0.2 and 3.0 milligrams per liter [mg/L]). In addition, 1,1-DCE and VC are also measured in groundwater below the MHBP area as a result of abiotic dechlorination and subsequent reductive processes, respectively.

Hydrogeological considerations are important during in situ thermal design and implementation. Often the temperatures necessary to reach the target treatment objectives also boil off soil pore water and saturated soils, creating steam in the subsurface. The steam and vapor recovery process has the effective result of simulating a groundwater extraction. Recharge and re-infiltration of water to this treatment zone can require significant water balancing and other concerns, and may also be required to a certain level to ensure proper maintenance of temperatures. For the MHBP area, based on the hydraulic conductivities of the soils, water table gradients (horizontal and vertical), and groundwater flow velocities, unique complications to the in situ thermal process are not envisioned. Evaluations and estimates of water generation rates are discussed in Section 3.0, Engineering Design, of this document. The actual water removal rates and the treatment and discharge of the recovered steam and water during treatment, as well as the response of the aquifer, will depend on the specific details of the type of in situ thermal system implemented and its final design, to be defined by the implementing Contractor.

2.3 Remediation Objectives and Criteria

Goals for the remedial program were established in the ROD through the remedy selection process stated in 6 NYCRR Part 375. These broad remediation objectives, at a minimum, must eliminate or mitigate all significant threats to public health and the environment, presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

As defined in the ROD, the overarching remediation goals for the off-site MHBP area are to eliminate or reduce to the extent practicable:

- Exposures of persons at or around the site to volatile organic compounds (VOCs) in soil and groundwater;
- The release of contaminants from the saturated soil into groundwater that may create exceedances of groundwater quality standards; and
- The release of contaminants from groundwater into indoor air through soil vapor intrusion.

It is important to maintain flexibility in adopting realistic performance objectives based on specific engineering considerations in order to make significant progress during treatment to reach the final groundwater remediation goals for this off-site area. Given the aggressive and effective ability of the in situ thermal treatment process to achieve dramatic results, more specific target reductions within the treatment zone are achievable.

Therefore, the specific remediation criteria for the site include attaining to the extent practicable (see **Table 2-3** below):

- Protection of Groundwater Soil Criteria for soils within the MHBP treatment area (6 NYCRR, Part 375-6, Remediation Program Soil Cleanup Objectives – SCO), and

- Ambient Water Quality Standards (Class GA) for the groundwater within the MHBP treatment area.

Table 2-3 Thermal Treatment Criteria

Compounds of Concern	**Groundwater Standard[1] (MHBP Treatment Area μg/L)**	**Soil Criteria (MHBP Treatment Area - Groundwater Protection[2] mg/kg)**
1,1,1-Trichloroethane	5	0.68
1,1-Dichloroethane	5	0.27
1,1-Dichloroethene	5	0.33
1,2-Dichloroethane	0.6	0.02
2-Butanone (Methyl ethyl ketone)	50(GV)	0.12
4-Methyl-2-pentanone	NA	NA
Acetone	50 (GV)	0.05
Benzene	1	0.06
Chloroethane	5	NA
Chloromethane	5	NA
cis-1,2-Dichloroethene	5	0.25
Methyl tert-butyl ether	10(GV)	0.93

Methylene chloride	5	0.05
Tetrachloroethene	5	1.3
Trichloroethene	5	0.47
Vinyl chloride	2	0.02

[1] Standards, Criteria, and Guidance Values (SCG), Class GA Ambient Water Quality Standards, per 6 NYCRR Part 375

[2] Soil Cleanup Objectives, per 6 NYCRR Part 375

Effective thermal treatment system operation will be required such that the VOC mass removal and groundwater concentrations reach asymptotic levels for an extended period of time, as discussed further in the System Performance section of this document.

To the extent necessary, the MHBP area may be subsequently treated (polished) using enhanced in situ bioremediation, following in situ thermal treatment.

In addition, the ROD indicates that future site use and development of the property will be limited to commercial/industrial uses through the placement of institutional controls in the form of an Environmental Easement. Other planned restrictions to the site, as per the ROD, include:

- Compliance with an approved site management plan (vapor intrusion evaluation, groundwater monitoring or other use restrictions),
- Restricting groundwater use without prior treatment, and
- Periodic certification of engineering and institutional controls

2.4 Thermal Remediation Treatment Extent

Based on the treatment objectives and criteria summarized in Section 2.3 above, the extent of thermal remediation horizontally and vertically was based on concentrations in soil that exceeded Protection of Groundwater SCOs. Acceptable concentrations outside of the treatment zone (to depths of four ft bgs) are consistent with the Commercial SCOs. The horizontal and vertical extent of the proposed thermal remediation zone is shown on **Figure 2-3**.

The treatment area is bounded by low to non-detectable VOC concentrations in wells MHBP-15 and MHBP-21, and boring GP-18 (to the north); wells OBG-6S, OBG-70B and the OBG-7 series (to the west); and wells OBG-8S and MHBP-14 (to the south). The eastern extent of the thermal treatment includes the eastern MHBP property boundary and extends into the NY Central Lines, LLC railroad property in the area of the highest VOC concentrations. Active treatment will extend beneath the NY Central Lines, LLC property, from just north of well X-PROP-MW-S to just south of well MHBP-12, and is aligned to the west of wells BIW-1S/D and MHC-23 on the Duso Site where significant total VOCs were measured in 2012.

The source of VOC contamination in the MHBP area is primarily via transport of groundwater originating from the Duso Site. In the MHBP area, VOC concentrations are highest in shallow groundwater and decrease with depth. The thermal remediation will target overall vertical depths from five ft bgs (top of the water table ranges seasonally from 4.5 to 6.0 ft bgs) to a maximum terminal treatment depth (based on MIP investigation surveys and multi-level wells) of 50 ft bgs. Since the depths of impact to the saturated soils and groundwater range, depending on the treatment area, the treatment depths in the MHBP area will be separated into three zones, shown in **Figure 2-3**.

- Zone A is the southern portion of the treatment area from a depth of 5 ft bgs to a depth of 25 ft bgs,
- Zone B is the central and northern portion of the treatment area from a depth of 5 ft bgs to a depth of 35 ft bgs, and
- Zone C is a smaller central portion of the treatment area associated with the impacts in the deepest part of the bedrock trough, from a depth of 5 ft bgs to a depth of 50 ft bgs.

2.5 Baseline Contaminant Mass

The aqueous phase mass of CVOCs in the thermal remediation area was estimated by dividing the area into 18 geometric shaped sub-areas, each with two or three vertical segments, using the most recent groundwater data collected (2012) in monitoring wells in the MHBP area. The mass of CVOCs sorbed to the soils in each of the 18 geometric sub-area vertical intervals was estimated by equilibrium partitioning using a single site-specific total organic carbon (TOC) concentration in soil from the MHBP area (geometric mean of 3,720 mg/kg). A NAPL multiplier of 2 was applied to the CVOC sorbed mass in all segments where the groundwater concentration of 1,1,1-TCA exceeded one percent aqueous solubility (equivalent to 44 mg/L) and also where NAPL was observed in 1995. A total mass of 13,250 pounds (3,893 pounds aqueous and 9,364 pounds sorbed) was estimated to be located in the saturated overburden of the proposed treatment area in the off-site MHBP area. The calculation of total CVOC mass is presented as **Appendix D**. This estimated contaminant mass will be used as a basis for design to identify treatment equipment in Section 3.0 of this document. The baseline mass will also be used during treatment operation and monitoring to evaluate treatment performance.

2.6 Impact of Technology on Infrastructure

As in situ thermal treatment heats the subsurface soil and groundwater to elevated temperatures, the type and location of all subsurface structures (e.g., utilities, basements) in the area of treatment, as well as potential preferential pathways to sensitive receptors must be considered. Soils are good thermal insulators of heat, and the transfer of heat in the subsurface is of a fairly limited nature once the boundaries of active treatment have been reached. Heat can migrate out of the treatment zone in the form of heated groundwater or steam vapors, particularly if there are preferential pathways along conductive zones: however, even these processes dissipate heat by way of diffusion over the migration distances.

Polyvinyl chloride (PVC) wells or piping should not be present within the thermal treatment area to avoid deformation during treatment. A distance of at least 10 feet should be maintained between the thermal treatment zone and any up- gradient PVC wells/piping, and a distance of at least 20 feet from down-gradient PVC wells/piping. Chlorinated PVC (CPVC) and other piping materials do have higher temperature tolerances. There are also methods by which such structures, if they cannot be relocated or replaced, can be insulated or heat protected. Any existing subsurface structures or piping shall be identified by the implementing Contractor prior to finalizing their Work Plan submittal and construction along with their review of utility plans and use of one- call clearance services, utility locating contactors and/or geophysical methods. Once identified, such structures shall be evaluated for protection or removal or replaced, as local codes stipulate.

A number of recently installed monitoring wells in the thermal treatment area are constructed of steel and will not be affected by the heat. Any other PVC wells in the thermal treatment area would require removal/abandonment prior to active treatment. Further discussions on specific monitoring well location abandonment and replacement are presented in Section 4.3.1 of this document. Additionally, considerations should be made to monitor and provide corrective actions for any temperature increase to the infrastructure of abandoned or occupied buildings within the influence of the in situ thermal treatment system, that cause operational problems or nuisance (comfort) issues, such as odors or soil vapor intrusion potential.

As the soils, pore space and groundwater, and subsurface vapors are heated, contaminants will be volatilized and steam generated. These vapors should be captured and removed from the subsurface using vapor recovery techniques (horizontal or vertical well screens and vacuum blowers). Often, a key difference in the case of thermal treatment is that the higher vacuums and flow rates used for soil vapor extraction (SVE) are not typically employed for vapor recovery after heating since the motive force created from the pressure and steam front moving in the subsurface drives the vapors towards low pressure capture points (vapor recovery wells).

Proper control and monitoring is necessary in the treatment system’s final construction configuration such that increased pressures, contaminant vapors, groundwater or steam, and NAPL (if present) are captured and treated, rather than migrate outside of the treatment area or increase exposure of receptors to risk such as from vapor intrusion or other concerns. A baseline indoor air and sub-slab sampling program was performed for the abandoned building in the off-site MHBP area, as well as the adjacent commercial space occupied by Staples. Performance monitoring shall include indoor air (and sub-slab sampling if indicated) to allow comparison to baseline conditions in order to evaluate changes to the building conditions. This is discussed further in Sections 4.0 and 5.0.

Thermal treatment will be conducted both inside and outside the abandoned building in the MHBP area. The building is a slab on grade, concrete block and brick construction. The building is currently vacant with a concrete slab floor (approximately 12 inches thick) and ceiling clearance of approximately 15 feet. An inspection of the interior of the building and materials of construction indicated that rubbish and other materials are present. NYSDEC will have this material moved under a separate contract prior to remediation efforts. Building materials did not appear to include any asbestos-containing materials (ACM). A memo documenting these conditions is included in **Appendix E**.

The MHBP area outside the abandoned building is flat and paved, with the exception of limited unpaved areas along the eastern edge of the building. The NY Central Lines, LLC railroad right of way immediately to the east of the MHBP property slopes down from west to east with the surface covered in dirt and/or vegetation. Photographs of key construction areas of the site are included in **Appendix E**. A site plan that describes existing conditions, structures, roads, surface contours, and known utilities is provided as **Figure 2-4**.

2.7 Access Agreements

As identified by the treatment area described in **Figure 2-3**, construction, operation and monitoring of the in situ thermal treatment system will require access to several private properties. Three separate properties may require access during the project for various reasons. These include the off-site MHBP property (property 005836), the NY Central Lines, LLC right of way spur property (011773), and possibly the Star Gas property (property 042826). Information on these properties is included in **Appendix F**. NYSDEC has secured formal access to these properties; the Contractor will be required to return the property to the same condition as prior to the work.

2.8 Treatment of Multiple Media

During in situ heating, treatment will occur on multiple media, including soils, groundwater, and soil gas. Media interact with one another to contribute to potential subsurface and above- ground impacts above human health and environmental standards, and must all be considered during in situ thermal treatment. During recovery of these media, appropriate treatment or disposal of air and waste water, as well as any other waste streams generated, will be required to comply with applicable standards.

2.9 Permits, Notifications and Approvals

Since this site is under the State Superfund Program, the off-site MHBP remediation is exempt from obtaining any formal state permits (under 6 NYCRR, Part 375), though the substantial requirements of any permits shall be met by the Remedial Contractor. Various permits may also be required from the local agencies to implement selected remedial technologies in the off-site area. The Contractor will be responsible to obtain or meet these permitting requirements unless otherwise mentioned in the contract documents. Permits required for such remediation include, but may not be limited to, air discharge, water discharge, underground injection control (UIC), storm water control (SWMPP), electrical connection, gas connection, plumbing connection, and construction permits.

2.9.1 Air

The in situ thermal treatment process will include a component of the system that will recover volatilized contaminants from the subsurface and treat these vapors using above-ground equipment. This project will be exempt from obtaining a formal air discharge permit (under NYS Subchapter A, Part 201); however, all work must still meet the substantial requirements. AECOM contacted NYSDEC Regional representatives and confirmed this conclusion. A memorandum documenting these conversations is included in **Appendix G**.

Although exempted from an air discharge permit, the air being discharged from any component of the in situ thermal treatment system must not cause air pollution and/or must have the appropriate air pollution control equipment installed. According to the Division of Environmental Remediation (DER), emission from remediation systems that have a potential to exceed 0.5 pound/hour of total volatile organic compounds requires air emission controls to achieve the requirements described below. Based on calculations of the mass of contaminants in the subsurface at the MHBP site (13,250 pounds), and the in situ thermal treatment system's ability to effectively remove a majority of this mass, the potential exists to exceed the default limit of 0.5 pounds/hour total VOCs, assuming a conservative removal of 70% of the mass over a period of two months, and therefore air treatment would be necessary.

The Contractor shall be responsible to demonstrate that the emission source will not cause pollution via an impact analysis described in the Division of Air Resources guidance document DAR-1. This guidance outlines a process that predicts the impact on air quality from emissions as well as provides short term and long term (annual) guideline concentrations of individual compounds that the emissions must not exceed. To demonstrate effective compliance with the discharge requirements in DAR-1, the Contractor must demonstrate in their Work Plan that their air discharge system does not exceed the discharge limits set forth by DAR-1, established by utilizing model calculations. The implementing Contractor will be responsible for monitoring, calculating and meeting the limitations of the Annual Air Quality Impact and Short-Term Air Quality Impact for each contaminant. A table of these guidelines is provided in **Appendix G**.

2.9.2 Waste Water

During the in situ thermal treatment process, it is assumed that all versions of this technology would generate significant waste water from either steam or groundwater recovery, or both. It is assumed that the majority of this water (maximum estimated at 6 gallons per minute or gpm) cannot be recycled into the treatment area and would require disposal or discharge. Additional water may be generated if groundwater pumping is a component of the system construction. While off-site transportation to a private disposal facility would be an option, AECOM evaluated permitting and other technical requirements for the discharge of this waste water via either the local storm water system to nearby surface waters, or into the City of Poughkeepsie's sanitary sewer system. The site plan (**Figure 2-4**) shows both sanitary sewers (with manholes) and a storm water line (with catch basins) along Fulton Street.

An initial contact with the NYSDEC indicated that discharge to surface waters (Hudson River) via direct discharge to the intermittent stream adjacent to the MHBP area, or the storm water system, was an option to consider but not preferred. The City of Poughkeepsie's sanitary waste water treatment plant (WWTP) operator was contacted to discuss options to discharge to that system. This method appeared feasible from this discussion, which is documented in a call summary included in **Appendix H**. The WWTP operator requested that an IMP Groundwater Remediation Discharge Application be provided with preliminary information so that they could make a determination of daily flow, CVOC, and chloride discharge limits to the system through a local tie-in point, such as connection to the sewer or a discharge hose to a manhole. A Special Discharge Permit (No. 2013-SA01) was issued and will need to be updated by the thermal contractor and its substantial requirements met. A copy of the information provided to the city operator and the Permit is included in **Appendix H**.

2.9.3 Underground Injection Control

If the in situ thermal treatment system will include a component for injection of fluids or waste water into the ground, an Underground Injection Control (UIC) permit must be obtained from United States Environmental Protection Agency (US EPA) Region 2. In accordance with DER Internal Guidance Procedure (IGP) 22, EPA must be notified at least 30 days prior to the injection well installation. The notification was prepared by AECOM and e-mailed to EPA using the inventory spreadsheet which was created by EPA Region 2 for exclusive use by the NYSDEC. The inventory spreadsheet is provided in **Appendix H**. The UIC Notification was submitted to the EPA on June 3, 2013. A response from EPA to proceed with construction or application of water to the subsurface is not required.

The remedial Contractor will be responsible for finalizing their system details in their Work Plan, providing the information necessary to amend the UIC notification to EPA Region 2, if necessary, and any other related permits for waste waters. The state and local agencies may require pre-treatment of the injectate, should recycling of process waste water from the recovered steam and groundwater be used. Furthermore, the implementing Contractor will also be responsible for monitoring, calculating and meeting the limitations of their permit requirements. Wastewater being considered for injection will be required to meet both the NYSDEC's Department of Environmental Remediation (DER) Generic Effluent Criteria for Surface Water Discharges (updated 2013) and Generic Effluent Criteria for Groundwater Discharges (2013). These documents are provided in **Appendix H**. Additional details on specific requirements for waste water generation and possible related contaminant treatment equipment are provided in Section 3.0.

2.9.4 Other Local Permits

Additional permits, inspections and approvals that will need to be considered prior to the treatment system construction, depending on the design and operational specifics, will likely include the following, based on discussions with municipal officials.

2.9.4.1 Electrical Permit

An application form for an electrical permit should be completed and submitted to the Town of Poughkeepsie. An application form is included in **Appendix I**. The town requires a one-time $40 application fees and no electrical work should be performed until a permit is issued.

2.9.4.2 Commercial Gas and Electric Service

The Central Hudson Gas and Electric Company supplies gas and electricity to the MHBP neighborhood. Existing lines and services are nearby. Application forms have been included in **Appendix I**. The commercial electric form should be completed and submitted to Central Hudson to obtain a job number. Once submitted, Central Hudson's response time can range from a couple of weeks to a couple of months to supply a power drop. Sufficient advance notice will be required. If propane can be used in lieu of natural gas, a propane supplier (Star Gas) is available on the adjacent property, i.e., the Duso Site.

2.9.4.3 Plumbing Permit

Should the Contractor require a licensed plumber for work, a form should be submitted to the Town of Poughkeepsie. The form is included in **Appendix I** and should be directed to the Town Plumbing Inspector. If heating work is necessary, a heating permit may also be required for the site. A heating application form is also included in **Appendix I**.

2.9.4.4 Building Permit

A building permit may be required if the remedial treatment system requires a container, shed or separate treatment building to house the process equipment. Additional concrete pads may be required to be constructed for lay-down of transformers or other heavy equipment required for thermal remediation. The new commercial building or addition to commercial building permit is also included in **Appendix I**. The building should be built in accordance with the 2007 NYS building, fire, plumbing, mechanical and energy conservation codes. Further information can be obtained at:

http://www.townofpoughkeepsie.com/building/permits.html

2.9.4.5 Fire Alarm Permit

Due to the nature of thermal remediation being performed at the site, a fire alarm permit may also be required. A fire alarm permit application form for the Town of Poughkeepsie is also included in **Appendix I**.

2.9.4.6 Hot Work

Hot work, placement of gas tanks, and storage of flammable or hazardous materials may also require permits from the local Fire Department. That department should be consulted to determine whether the activity requires such a permit.

2.9.4.7 Conservation Commission

Given the potential for remedial activities in or near the intermittent stream on the NY Central Lines, LLC property, notification of the Conservation Commission may be required, as well as specific erosion and sediment control procedures. AECOM sent a request to the town on February 25, 2013 to determine the likelihood. Further communications with the Conservation Commission and Planning Department confirmed that no further approvals would be necessary by them. This is documented in an e-mail attached in **Appendix I**.

The Contractor shall submit a Surface Water Management Plan (SWPPP) to the Engineer, for approval, describing the systems to be implemented for erosion control/protection of water resources in complete detail pursuant to the requirements of the contract documents.

2.9.4.8 Noise

Poughkeepsie does have a noise ordinance identified as Chapter 139 of the town bylaws, which is included in **Appendix I**. In addition, New York State has noise regulations identified in policy DEP-00-1. These should be consulted since the area of the site is of mixed use, including some residences. The Contractor shall be responsible for meeting state and local noise ordinances during remedial construction and operation of the treatment system.

2.10 Green and Sustainable Remediation

New York State has a Green and Sustainable requirement for environmental projects which will require evaluation as part of the in situ thermal treatment project.

The largest environmental “footprint” associated with in situ thermal remediation techniques is often the energy use, direct and indirect. Current Site energy use estimated from in situ thermal vendors ranges from 791,500 kilowatt hours (kWhr) to 56,900,000,000 British Thermal Units (BTUs). Assuming a carbon dioxide (CO_2) emissions coefficient of 207.91 pounds of CO_2 per one million BTUs (MMBTUs) and 10,107 Btus per kWh (US EPA Unit Conversions, Emissions Factors, and Other Reference Data, November 2004), the estimated CO_2 emissions are projected to range from 166,300 pounds to 118,300 pounds.

Additional environmental “footprint” considerations include the procurement and installation of wells, transportation of oil/gas for ISTD units, site personnel transportation to/from the site, and transportation, construction, and operation of appropriate equipment and supplies. As this information becomes available at the 100% design, additional environmental “footprint” estimates will be completed, if necessary.

There are several Best Management Practices (BMPs) that have been identified below for use at the Site.

- Establish a baseline for expected weekly electricity and fuel use prior to remedial implementation. This data will be used to identify and measure potential remedy modifications or improvements in energy and fuel consumption.
- Ensure all equipment used onsite meets applicable energy star, clean fuel technologies, greenhouse gas emission reduction technologies, and water conservation and efficiency approaches. Examples include the use of energy star rated trailer appliances, Ultra Low Sulfur Diesel (ULSD), New York State Diesel Emission Reduction Act equipment, and the installation of local plantings that require minimal water maintenance.
- Maximize the recovery and reuse of heat associated with both the soil and water treatment operations.
- Co-locate electrodes and recovery wells in the same borehole, where applicable.
- Install equipment and lighting to minimize visual and noise disturbance to nearby residents.
- Consider the onsite installation of wind or solar energy power or the purchase of Renewable Energy Credits (approximately 1-3 cents/kwH of electricity).
- Install remote censoring equipment to reduce the site travel requirements, and
- Include an evaluation of energy consumption, material use, and community satisfaction into project reviews to identify opportunities for improvement.

2.11 Contract Type

Although normally the contract mechanism does not factor in as a basis of design element; however, certain design criteria and treatment system elements, as well as operational decisions may be significantly affected by the type of contract vehicle and other requirements. Different technical approaches to implementing in situ thermal treatment may be proposed depending on whether the contract is a fixed price, lump sum unit rate, time-and-materials, or performance-based project. In addition, contractual obligations such as bonding, liquidated damages, and severable tasks may also affect the nature of the work. The type of contract and requirements are discussed further in the contract documents.

3.0 Engineering Design

This section of the DAR describes the physical and chemical processes that control and influence the behavior of chemicals in the subsurface during in situ thermal treatment. Typical major equipment components (or equivalents) of various in situ thermal treatment systems are then identified as those that are anticipated to be provided in the individual bidder's approach. General performance specifications are described for the equipment identified. Detailed design criteria and parameters are then provided with associated backup assumptions, calculations, and references, where appropriate.

3.1 Thermal Remediation Process

Organic contaminants released to the subsurface can be found in four phases: the soil phase (adsorbed), the gas phase (soil gas), the liquid phase (aqueous dissolved), and a NAPL phase (soil pore spaces, ganglia, or free phase pools). Application of heat to the subsurface can mobilize NAPL phase contaminants from the soil matrix and cause phase changes, allowing them to be removed in the other three fluid phases by groundwater recovery, vapor phase collection, or by combination of both (UFC, 2006). Based on historical observations as well as analysis of soils and groundwater at the MHBP site, DNAPL has been detected and concentrations presumptively indicate that NAPL for several contaminants of concern (COCs) is likely present in other locations in the subsurface.

Volatilization of chemicals is controlled by their vapor pressure, which increases with temperature. Boiling of a compound in its pure state occurs when its vapor pressure is raised above atmospheric pressure. A temperature increase, even if it is below the boiling point of the compound, will increase its concentration in the vapor phase, and improve its mass transport. The boiling points of the pure compounds observed at the MHBP site are presented in **Table 3-1** below.

Volatilization or evaporation of a chemical can actually occur below its pure component boiling point. Certain mixtures of liquids, such as CVOCs and water, are miscible and produce the same composition in their vapor state as their liquid state even during distillation. They are called azeotrophic mixtures and are characterized by having boiling points for the mixture lower than any of the constituent boiling points; this is also known as its eutectic point. This phenomenon can be seen from **Table 3-1** and is known as co-distillation or steam distillation. The result is that even if DNAPL is present for some of these compounds at the MHBP site, vaporization and removal can occur at lower temperatures.

Table 3-1 Steam Co-Distillation Boiling Points

Components of NAPL Mixture	Component Boiling Points (°C at 1 atm)	Mixture Eutectic Point (°C)
1,1,1-TCA Water	74 100	65.3 [1]
1,1-DCA Water	57.2 100	53.2 [1]
1,2-DCA Water	83.5 100	72 / 71.3 [1]
Chloroethane Water	12.3 100	11.6 [1]
TCE Water	87.1 100	73.1 / 73.5 [1]
1,1-DCE Water	32 100	30.3 [1]
Methylene Chloride Water	40.1 100	<39.9
Vinyl Chloride Water	-13.4 100	-14 [1]

Source: Unified Facilities Criteria, 2006

[1] Eutectic points calculated, see **Appendix J**

As heat is introduced to the subsurface, other processes and reactions can also take place. Hydrolysis is decomposition while reacting with water. Contaminants can also be decomposed by oxygen or oxides in the subsurface. Both of these processes increase with increasing temperatures. Organic contaminants are also subject to pyrolysis or high temperature decomposition. Hydrolysis rates for chlorinated alkanes, such as those present in the MHBP area, tend to be very fast being destroyed as quickly as they dissolve at steam temperatures (UFC, 2006). This later process is expected to play a key role in remediation during in situ thermal treatment of the MHBP area.

3.1.1 Temperature

As thermal treatment is primarily focused on raising the subsurface temperature, the temperature of the site and even of specific zones of the site is a key design feature. Key design criteria that will function as performance criteria as well for in situ thermal treatment include subsurface target temperatures and an estimate of treatment duration at those temperatures.

The primary objective of the in situ thermal treatment is to facilitate the removal of CVOCs from the subsurface. As described in **Table 3-1** above, the minimum target temperature should be approximately 75°C to effectively address the eutectic point of mixtures of the COCs with water in the saturated zone. With in situ thermal technology, the most effective process is by removal following a phase change from the adsorbed, NAPL, or dissolved phase of the VOCs to the vapor phase, as discussed above. This minimum temperature would also correspond to the boiling point of the primary COC, 1,1,1-TCA, in its pure NAPL state.

In **Table 3-1**, the highest eutectic boiling temperature for the chlorinated alkanes is approximately 85°C. This is close to the 100°C boiling point of water. Therefore, to be conservative and to take these other compounds into account, the target temperature in the treatment area will be set at 100°C, with the minimum sustained temperature of 75°C across the treatment field to facilitate steam stripping and volatilization with extraction of dissolved and sorbed primary CVOCs.

However, boiling points for chemicals increase when the pressure increases with depth. The water pressure increases due to the overlying water table weight from approximately 5 ft bgs (average MHBP area water table) to 50 ft bgs (maximum treatment depth), or 45 ft of saturated water column.

Table 3-2 below presents the Performance Criteria boiling points for the minimum and target temperatures, at different depths in the treatment zone, that have been calculated for water and pure phase 1,1,1-TCA (**Appendix J**). 1,1,1-TCA has been used since it is one of the two primary COCs, and 1,1-DCA's boiling temperature (the other COC) is lower.

Table 3-2 Treatment Temperatures with Depth

Depth (ft bgs)	Water Boiling Temperature (°C)	1,1,1-TCA NAPL Boiling Temperature (°C)
5	100	74
10	104	78
20	111	86
30	116	92
40	121	97
50	125	102

3.1.2 Heating Duration

Duration of heating has been estimated based on vendor estimates and case studies, AECOM experience on other thermal remediation sites, and simple calculations. From AECOM and vendor case studies, in situ thermal remediation systems generally heat the subsurface at a rate of 2 to 2.5°C per day following start-up to sustained temperatures of 80 to 85°C. Based on a baseline temperature of approximately 10°C, this initial heating would occur over four to five weeks after start-up. Heating the subsurface to approximately 100° C from the 80 to 85°C mark is generally then observed to occur at a rate of 1 to 1.5°C per day, which would occur over an additional two to three weeks (six to eight weeks total after start-up). Peak temperatures are generally maintained for a minimum of at least 60 days at most in situ thermal remediation implementations for vapor extraction. The minimum total time of heating is estimated at 102 to 116 days. This estimate, which is based on assumed average rates of soil heating, corresponds to observations of a review of a number of in situ thermal projects, including several performed by AECOM, where the typical treatment duration for similar projects is approximately 90 to 120 days of heating.

For this specific project, a calculation was performed to estimate the time needed to boil off all of the pore water initially present using guidance from the Unified Facilities Criteria thermal remediation design guidance (Department of Defense, UFC 3-280-05, 2006])

$$t_b = \frac{A\left\{\left[\rho_R C_R(1-\phi) + \rho_w C_w \phi S_w\right](T_b - T_i) + \rho_w h_w \phi S_w\right\}}{\beta}$$

This calculation estimated a period of 222 days (slightly more than seven months) to boil off all of the pore water present. The calculation is presented in **Appendix J**. Completely boiling off all pore water is not a remediation objective to achieve significant VOC mass removal using in situ thermal remediation technologies; however, it would be a goal to attain very low soil treatment criteria. A review of thermal projects included 81 of 84 completed in less than six months (ESTCP, 2009).

For the off-site MHBP area project, a minimum heating duration of 110 days (inclusive of the time taken to reach the target temperature) will be the performance criteria for the thermal treatment remedy, given the estimated mass of CVOCs in the treatment area. Depending on the efficiency of heat up, and the proximity of the heater elements, a treatment period of 220 days should be considered as the more likely overall heating performance period.

3.2 Major Equipment Elements and Performance Specifications

In situ thermal remediation for the off-site MHBP area will address VOCs in the subsurface soil and groundwater by raising the temperature in the subsurface to a desired target level for a period of time. As the subsurface is heated, volatile COCs will be either decomposed in situ or recovered above- ground. The major equipment utilized during implementation of thermal remediation shall include the following components (or equivalents):

- **Heating elements** can take various forms based on the specific thermal remediation method implemented, and can include steam injection wells, heater wells for ISTD, electrodes for ERH, or directional antennae arrays for radio-frequency heating. The heater elements shall be oriented vertically in or towards the subsurface in a pattern throughout the thermal treatment area. The pattern spacing would depend on the form of in situ heating to achieve constant target temperatures throughout the treatment zone. **Figure 2-3** provides one conception of approximately 100 heating elements over the treatment area. Due to the indoor height or other space restrictions inside the abandoned building, installation equipment and heater element locations should be considered carefully.

- **Steam and vapor recovery system** components shall consist of a network of vapor recovery (VR) wells, conduits, or plenums used to effectively capture and control the steam and vapors generated during treatment such that re-condensation or migration of the contaminants does not occur. To efficiently control and remove these, a vacuum blower, or equivalent, shall be utilized and connected to conveyance piping, depending on the construction of the system.

  VR wells, if used, shall be constructed similar to soil vapor extraction wells and screened above the groundwater table to minimize extraction of water. The VR wells can be co-located with the heater elements and/or be stand-alone wells. VR well materials shall be constructed from materials consistent with the temperatures, pressures, and chemicals present in the treatment zone.

  Horizontal conveyance piping shall connect the VR collection points to the vacuum blower in order to route the extracted steam and vapors to process and control equipment above ground. The piping shall be sized and constructed to minimize resistance and allow efficient flow of collected steam and vapors, factoring in expansion. Considerations for sampling ports, valves, and monitoring points shall also be included in the final design. No impacts are anticipated over the construction and treatment period to the MHBP property owner. Therefore, vapor recovery conveyance piping will be placed above ground, where possible, assuming that the entire treatment area would be enclosed to pedestrian and vehicle traffic for protection.

Vacuum blower(s) shall be sized to achieve the required extraction rates at each VR well and to overcome friction losses in the conveyance piping. Blower extraction rates shall be chosen such that the total extraction rate is approximately double that of the expected vapor/steam flow rates to ensure more than adequate control of vapors and steam pressure during heating to minimize incomplete capture and migration.

- **Vapor processing and treatment system** components shall include a condenser, moisture separator with demister, or equivalent to condense steam vapor from the recovered soil gas and allow it to be separated and containerized. Condensate shall be separated in such a way that it can be measured, stored, separated from any pure phase organic compounds, sampled, recycled, and/or treated and disposed of, as appropriate.

  A cooling tower, if included in the Contractor’s construction Work Plan, shall be equipped to recover heat and cool the recovered vapor stream prior to subsequent treatment prior to discharge. The cooling tower shall have the capability of being monitored for emissions, if necessary.

  Based on a review of air permit requirements (see Section 2.0), air pollution treatment equipment will be required for the vapor stream after the condenser and blower(s) prior to discharge to the environment. There are a number of vapor treatment technologies available (US EPA, 2006), depending on system compatibility, required treatment efficiency, mass loading, flow rates, and operational considerations. These include, but are not limited to, vapor phase granular activated carbon (VGAC), thermal oxidation, catalytic oxidation, or compression and cryogenic condensation (C3). The Contractor shall choose the proper equipment for their approach to meet the performance requirements and substantive regulatory requirements, and provide details in their Work Plan, for approval by the Engineer.

  Vapor treatment equipment shall incorporate a back-up system such that thermal treatment on-site will not be affected by significant maintenance efforts or major air treatment equipment malfunctions. The vapor treatment system’s capacity or its operational down-time shall not impinge upon the effective heat up of the subsurface or vapor recovery rates.

  Vapor treatment equipment components may also include a scrubber with pH neutralization due to the production of hydrochloric acid during the oxidation treatment. Any ancillary chemicals associated with this process shall require proper on-site approval and storage, including spill containment. Off-gas stack equipment shall comply with local permits and approvals in terms of height, construction/stabilization, and noise. Vapor treatment equipment shall be outfitted with pressure and flow gauges and sampling ports at key locations to allow monitoring and sampling of influent and effluent vapor streams in order to show compliance with air permitting discharge requirements, as well as to allow calculations of mass removal efficiencies.

- **Condensate monitoring and treatment system** components shall collect the condensate water from the extracted steam (and any extracted or entrained groundwater), allow for temporary storage, and convey the water to an approved discharge point. Settling of significant sediment shall be incorporated into the condensate storage equipment process to allow removal without affecting the waste water discharge. The condensate system shall be equipped with gauges to allow monitoring of total volume discharged, flow rate, temperature, and sampling ports for monitoring to show compliance with discharge permit requirements.

The volume of condensate and any extracted groundwater generated will depend on specific aspects of the in situ thermal treatment system to be described fully in the Contractor's Work Plan. Estimates indicate that significant amounts of waste water may be generated during the treatment program. Discussions (see Section 2.0) indicate that waste water requiring disposal can be accepted by the Poughkeepsie POTW plant, under a sanitary sewer discharge permit. Discharge criteria are included in **Appendix H**. The Contractor shall be responsible for modifying the existing wastewater discharge permit in its own name and maintaining the discharge permit, or at least meeting the requirements of such a permit.

Should the thermal treatment process incorporate recycling of process water into the subsurface by injection, the Contractor shall be responsible for maintaining compliance with a UIC permit for this activity. Depending on the characteristics of the Contractor's process water, treatment of the condensate prior to injection recycling may be necessary. DER's discharge criteria (**Appendix H**) should be consulted. If this is required, treatment by liquid phase granular activated carbon (LGAC) or other means would be anticipated, with the final requirement determined by the specific discharge criteria. This equipment process shall include gauges and sampling ports in appropriate locations to allow monitoring and sampling to document compliance with applicable permits.

- **Computer controlled system for monitoring and controlling temperature and power** is a key element in thermal treatment system design. Input of energy and heat into the subsurface shall be controlled and monitored constantly and continuously during thermal treatment. Controls may incorporate gas metering, switch gears, electrical transformers, or other equivalent components. The PLC shall data log process parameters and events including system alarms. The PLC shall be set up for remote access (e.g., Ethernet communication via wireless modem). Interconnects for critical equipment such as high and low level switches, automated power shut-down, and other similar controls shall be included to allow for safe and efficient operation. The control system shall also include an auto dialer to dial out alarms through a dedicated analog phone line. Controls shall be designed to allow automatic and safe operation of the thermal system.
- **Utility feeds** are necessary for operation of the thermal remediation system, including electricity, water, communication lines, and/or natural gas, which are all available at or near the off-site MHBP area. The quantities and specifics for each utility feed will be determined based on the specific heating technology implemented. Additional electric poles and/or stubs for natural gas or water may be required to be constructed based on the above-ground equipment layout and requirements of the specific heating technology.

  Gas, electric, and sewer utility service information for the site are presented in **Appendix K** and **Figure 2-4**. In addition, the contact for Central Hudson Gas operations is Mr. James Keating (845-486-5491). The gas main trunk line along Fulton Avenue is a 4-inch diameter with 14.5 psig pressure. High voltage electric lines and transformers run along-side the off-site MHBP property. Available water lines and municipal hydrant lines are also located on the property.

- **Temperature (TMPs) and pressure monitoring points (PMPs)** include sensors to monitor temperature and pressure in the subsurface at multiple discrete depth intervals. These sensor points shall be installed at several locations and depths within the thermal treatment zone, as well as at key sensitive locations where migration concerns would be the greatest. These sensors shall be installed within temperature resistant conduits and shall be connected to data recorders to allow continuous and regular down-loading and review of the data.

  Specific procedures are not warranted to design a "hot floor" barrier to protect from downward migration of contaminants during the heating process. The only location that DNAPL was ever observed was in well MHC-29, which is screened from 15 to 20 ft bgs. Samples collected from the recently installed deep wells contain no more than 240 parts per billion (ppb) of CVOCs. Therefore, the majority of the mass is located in more shallow zones. Furthermore, the soil lithology indicates a silty clay layer beneath the upper sandy clayey silt where the majority of contaminant mass is, which would also inhibit downward migration. During the heating process, heat and steam/boiling water would move upward as well.

- **Site preparation** considerations consist not only of the layout of the system's equipment but also brush removal, grubbing, ground surface modifications, potential concrete pad installation, access/security preparations and building modification (heating, electricity, etc.). Depending on the nature and size of equipment mobilized to the MHBP area, options include outside installation, container or shed protection, or possible use of the abandoned building. Once the heating process is in progress, heat loss should be minimized. Given the shallow nature of the top of the treatment zone and proximity of the groundwater table to the ground surface, i.e., approximately five feet, a surface insulation cover shall be considered in the final Work Plan, with justification for its inclusion or deletion from the design.

  The completed heating and vapor recovery elements and treatment system equipment shall be secured within either locked structures or gated fenced areas to protect the equipment and the public safety.

A generalized Process Flow Diagram (PFD) for the overall system layout is provided as **Figure 3-1**. Detailed specifications for the heating process, vapor recovery, vapor treatment, waste water treatment, and building sub-slab depressurization (if necessary) are provided in the contract documents.

3.3 Thermal Treatment (Heating-related equipment)

3.3.1 Description

The thermal treatment or heating component of the remediation system is one in which energy is transferred as heat and applied to the subsurface. This can be accomplished by injecting steam, applying current between electrodes, creating heat and conducting it in the subsurface, or radiating energy via antennae (microwaves) into the ground. Forms of energy that can be used to accomplish these include electricity, propane, natural gas, and petroleum fuel. Depending on the temperatures reached, groundwater becomes steam and contaminants are volatilized.

The thermal heating system will include the following components at a minimum:

- Power Control and Monitoring
- Heating Elements
- Temperature Monitoring Points
- Computer Control and Data Acquisition

3.3.2 Design Criteria

The design criteria for the heating components of the treatment system include the following processes:

3.3.2.1 Power Source and Control

The main control unit of a system is able to meter energy from existing electrical services, petroleum fuel, or gas sources, and generate power and heat to apply it to the subsurface under control. Control in the system will allow an increase or decrease of energy applied to the full length of the heating elements in a consistent fashion. Power units provided with computer software provide additional control to be accessed remotely for starting, stopping, or adjusting settings. Controls should be equipped with automatic shut-off interlocks for safety, as well as a manual emergency shutoff switch. Remote telemetry and data acquisition capabilities that are compatible via internet or telephone connection are most valuable.

3.3.2.2 Heating Elements

Heating elements to deliver the heat should be equally spaced over the MHBP treatment area of 35,200 square feet to allow heat to be applied and reach the target temperatures at depths from 5 ft bgs to as much as 50 ft bgs (see **Figure 2-3**). Heating elements can be installed into the ground or stationed on the ground surface for the application of energy from grade level. Heating elements must apply energy/heat through soils and groundwater, through pavement and concrete (one foot thick) in the MHBP abandoned building. Heating elements should provide both consistent heating continuously along the full depth profile to be treated, as well as some flexibility to focus the energy/heat in specific zones.

3.3.2.3 Temperature Monitoring Points

Temperature Monitoring Points (TMPs) are inserted into the subsurface within the treatment zone to allow temperatures to be monitored at discrete depth intervals. Monitoring data is then acquired at various points in time, locations of the site, and different depths and recorded for comparison, display and presentation.

3.3.2.4 Surface Cover

Surface cover materials shall be considered to insulate the site from loss of shallow heat near ground surface, to reduce infiltration of precipitation which also contributes to cooling of the treatment area, and for protection and encapsulation of VOCs. Should any specific structure, such as roof drains, etc. require removal to reduce cooling or infiltration, this shall be performed by the Contractor prior to system construction. The Contractor shall include an evaluation of these conditions and include justifications for inclusion or exclusion of these procedures in their Work Plan.

3.3.2.5 Fencing Security

Areas of treatment and equipment staging that are not securable in the MHBP area will be fenced to prevent trespassers and as a safety precaution. Fencing will be signed and will be protected from stray voltage and heat. Automatic shut-off of the power control and heating systems shall be interlocked with security systems to ensure safe conditions should unauthorized individuals access the site.

3.3.3 Design Parameters

3.3.3.1 Power Source

The power control unit shall be capable of supplying sufficient power necessary to comply with the performance objectives of the heating project. The control unit will allow receipt of three phase medium voltage and step it down to apply 2,000 kW, 480 V of adjustable power to the subsurface under changing conditions. Control units may also distribute energy and heat to the subsurface by controlling fuel combustion (petroleum or gas) or microwave radiation to selected subsurface treatment zones.

Control unit shall be equipped with automatic shut-off and emergency stop functions. Control unit shall also be equipped with capabilities for a remote re-start after an equipment or power failure. Electric metering shall provide measurements of energy (KWh) and demand (average and peak KW). Other metering shall show BTU used and/or pounds fuel consumed for other alternative systems. System shall measure and record the distribution of rate of energy delivery to the heating elements.

3.3.3.2 Heating Element

Based on the treatment area, and an application of heat at points every 20 feet on center at approximately 105 “nodes”, heat input either from the surface or in the subsurface would be distributed over the 35,200 sq. ft area in three regions: Area A from 5 to 25 ft bgs, Area B from 5 to 35 ft bgs, and Area C from 5 to 50 ft bgs (see **Figure 2-3**). Equipment installed in the treatment area shall be heat resistant. Energy shall be applied such that the subsurface experiences a consistent target temperature horizontally and vertically in the treatment zone.

3.3.3.3 Temperature Monitoring Points (TMPS)

The total number of thermocouples specified for each TMP is identified in **Table 3-3** below. All TMPs shall have thermocouples installed at five foot vertical depth intervals starting at a depth of 10 ft from ground surface, assuming the water table is approximately six ft bgs. All TMPs will be used for Performance Monitoring; however, the two northernmost TMPs inside the building in Area B will also be utilized for heat migration monitoring as indications of potential impacts to receptors in adjacent commercial spaces. If heat, steam, etc. were expressed in unplanned areas or above tolerance levels for nearby structures, materials or receptors, as judged by the Engineer, Contractor would be required to reduce heat input, shut down heating elements, or mitigate heat/steam build-up in other ways. TMPs shall be completed below grade to allow temperatures to be monitored after treatment system decommissioning.

Table 3-3 TMP and Thermocouple Details

Location of TMPs	Maximum Depth of TMPs	Number of Thermocouples in Each TMP
One in the abandoned building in Area A	25 ft	4
Three outside in Area A	25 ft	4
Three in the abandoned building in Area B	35 ft	6
Two outside in Area B	35 ft	6
One in abandoned building in Area C	50 ft	9
Two outside in Area C	50 ft	9
Total of 12 TMPs		Minimum of 38 thermocouples

3.4 Vapor Recovery Equipment

3.4.1 Description

The vapor recovery component of the thermal treatment system consists of equipment to affect the active withdrawal of steam and contaminant vapors from the subsurface via collection points and the subsequent condensation of water vapor and processing of the condensate and contaminant vapor stream. Vapor recovery may differ significantly, depending on the final design and thermal process used during the remediation.

The vapor recovery system will consist of, but may not be limited to, the following components:

- Vapor Recovery Points
- Vacuum Blower

- Piping
- Condenser
- Cooling Tower
- Condensate Processing Equipment

3.4.2 Design Criteria

Design criteria for the vapor recovery system shall include the following processes:

3.4.2.1 Vapor Recovery Points

Vapor recovery points will be slotted screen wells or a collection shroud system above the water table to minimize extraction of groundwater during operation. As the water table in the MHBP area is approximately 5 ft bgs, very little “freeboard” is available to place vertical vapor recovery points. Horizontal well screens offer more flexibility. If a portion of the vapor recovery collection points are screened across the water table, the air velocity and construction of the recovery equipment and piping should be sized and prepared to avoid or minimize entrainment of water into the lines. Materials of construction shall be heat tolerant.

3.4.2.2 Vacuum/Pressure Monitoring Points

Narrow diameter vertical conduits placed into the subsurface to the depth of treatment with multiple vacuum/pressure sensors will allow detection of changes in pressure or vacuum. These will be most useful placed at the edge of the treatment zone to detect potential migration of steam or VOCs outside of the treatment area and within the abandoned building, and specific attention will be paid to the areas near the active retail location to the north (Staples) and in vicinity of subsurface utilities in Fulton Street. A minimum of six pressure monitoring points shall be installed at the most appropriate locations and include one near the building demarcation with Staples, as per the attached drawings.

3.4.2.3 Vacuum Blower

Extraction blowers will be required to remove volatilized contaminants and steam from the subsurface. Flexibility in blower design is necessary to allow increase or decrease in flow and vacuum to accommodate any added vapor recovery points or changed subsurface conditions. Vacuum blowers will be sized such that the combined vapor recovery network will operate to achieve a minimum of five unsaturated pore volume exchanges per day to collect vapors from the heating operations and prevent accumulation of VOCs in the unsaturated zone. The blower will be sized to achieve required extraction rates at each VR well and to overcome friction losses in the conveyance piping.

3.4.2.4 Condenser

The condenser is required to condense steam generated from the thermal system and removed by recovery points. Condenser function to remove moisture and heat from vapors recovered from subsurface as cooling water from a cooling tower loop recirculates through the condenser.

Condenser shall have a holding tank connected by pump with a liquid level switch control to the pump. The condenser shall be a plate and frame type heat exchanger, or equivalent. The condenser shall have temperature and pressure monitoring gauges and the materials of construction shall be resistant to CVOCs. Consideration for freeze protection shall be included in the design to comply with the operational up-time requirements.

3.4.2.5 Cooling Tower

The cooling tower helps to recirculate water through the condenser after steam transfers heat back to the tower. Equipment preferred includes a skid mounted cooling tower with a blower fan, thermostatic controls, a makeup tank, and a pump.

3.4.3 Design Parameters

3.4.3.1 Vapor Recovery Points

Based on the size of the treatment area (35,200 sq. ft), approximately 130 vapor recovery points, or one per 270 square feet have been estimated. If these are to be installed as vertical wells, construction material can range from 2 to 6 inch diameter steel casing wells with 0.02 inch slot size and may be co- located with heating elements. If they are to be installed as horizontal wells due to the shallow vadose zone depth, construction material can range from 2 to 4 inch diameter steel casings with 0.02 slot screen wrapped in geotextile and placed within a bed of crushed stone approximately 3 ft bgs laying in a trench. A combination of vertical and horizontal can be installed. Equivalent materials of construction are acceptable if tolerance to heat is maintained. Installation methods for recovery points will be determined by the Contractor as approved by the Engineer.

3.4.3.2 Vacuum/Pressure Monitoring point

Vacuum and pressure monitoring sensors installed into the treatment depth with sensors every 10 feet in vertical length, and casings located around the perimeter of the treatment area within the abandoned building would provide the most benefit.

3.4.3.3 Blower

A regenerative, rotary lobe, or positive displacement blower, or equivalent, shall be incorporated into the vapor recovery system. The blower size shall be approximately 40 HP capable of a flow of at least 800 scfm. The blower shall be rated for continuous long-duty and will be identified and proposed for use by the Contractor, for review and approval by the Engineer.

3.4.3.4 Piping

Piping shall consist of CPVC material or other heat resistant pipe of increasing size from the connection at the vapor recovery point or horizontal lateral, to larger manifolds and then headers at the condenser unit. Vapor recovery piping shall be installed above grade. Piping shall slope back towards vapor recovery points to avoid water/condensate collection limiting air flow. Piping shall be insulated against loss of heat and for safety heat protection. Piping and other equipment subject to freezing which may affect performance shall be heat traced and insulated to protect during winter months. Pipe routing will be determined by Contractor and approved by Engineer.

3.5 Vapor Treatment

3.5.1 Description

The vapor treatment component of the in situ thermal system consists of air emissions control technology that handles the influent vapor stream recovered from the heated subsurface (and possibly from vapor control and sub-slab depressurization points elsewhere on site) and then discharges to the environment. Depending on the thermal heating and vapor recovery process, different levels of treatment and equipment may be used, some of which may also generate other waste streams, such as pure phase NAPL or high concentration brine.

The vapor treatment portion of the in situ thermal system will consist of the following components:

- Blower
- Primary Air Pollution Control Equipment
- Back-up Vapor Treatment Equipment (if necessary)
- Monitoring Gauges and Sampling Ports

3.5.2 Design Criteria

The design criteria for the vapor treatment system processes include the following:

3.5.2.1 Control Technology

Contractor shall be responsible for selecting the vapor treatment process to meet the requirements identified in this DAR and provide the details of the design, construction, maintenance and monitoring of the treatment process in their Work Plan to confirm the substantive requirements of any related air permits will be met.

Options for available technologies include vapor phase granular activated carbon (VGAC), thermal oxidation (thermox), catalytic oxidation (catox), and C3 recovery. Evaluation of appropriate treatment methods shall consider the types of chemicals, estimate of the mass in the treatment area (**Appendix D**), the estimated average and peak mass removal rates, and compliance with NYSDEC air quality requirements (**Appendix G**) for technically appropriate and cost-effective controls. If significant free-phase DNAPL is present in the recovered vapor stream, the C3 technology can be quite cost effective as it would allow the extraction flow rates to be maintained while still having high Destructive Removal Efficiency (DRE) and recovering pure phase product for recycling. Operation of the C3 control technology can be complex however. Both thermox and catox are feasible control technologies, though each may have occasional difficulties with lower explosive limit (LEL) exceedance issues, requiring a decrease in extraction flow rates with dilution air, thereby extending the thermal treatment time and costs. Carbon may be effective at certain lower flow rates or influent concentrations, but may require frequent changing and may not be suited to all chemicals present, i.e. – vinyl chloride.

3.5.2.2 Effort to Permit and Maintain Compliance

Complex equipment that is difficult to operate or maintain compliance should be avoided. The control unit shall be compatible with other system components.

3.5.2.3 Fuel for the Equipment

Fuel for many of the control technologies consists of gas (natural or propane); however, some manufacturers also have electrically powered units. This is not a particularly limiting criterion as all of these are relatively available at the site.

3.5.2.4 Destructive Removal Efficiency (DRE)

Applicable DRE's for most of the vapor treatment control processes described above for the COCs at the MHBP site are minimally between 95 to 99%. A DRE of 99% Best Available Control Technology (BACT) will likely be required for air treatment prior to discharge for the MHBP area. DRE for vapor treatment will need to be sufficient to meet short term and long term (annual) emissions concentrations in accordance with the NYSDEC DAR-1.

3.5.2.5 Safety

Safety considerations are important. Vapor treatment units shall have the ability to shut down if power is lost, there are high or low temperature warnings, high or low pressure warnings, burner flame out, high moisture levels, or influent conditions above 25% LEL.

Information on each of the four control technologies reviewed and catalogue cuts of representative equipment is presented in **Appendix G**.

3.5.3 Design Parameters

Calculations to show compliance with NYSDEC air regulations and to support treatment effectiveness shall be performed by the Remedial Contractor in accordance with DAR-1, and reviewed and approved by the Engineer. These calculations shall take into consideration the following:

3.5.3.1 Toxicity of COCs

The CVOCs present in the MHBP area are of concern at the concentrations observed, particularly when the vapors are recovered from the subsurface over short treatment durations.

3.5.3.2 Proximity to Receptors

The control technology will not be close to many receptors as the treatment area is on the back side of a business park, adjacent to an abandoned building. Other receptors in the immediate area are light industrial and commercial businesses.

3.5.3.3 Dispersion in the Area

The area is relatively open with no high buildings immediately near the site.

3.5.3.4 Extracted Vapor Flow Rates

Estimated vapor flow rates may be in the range of 750 to 1000 scfm.

3.5.3.5 Average VOC Mass Removal Rate

Estimated average VOC mass rate may be approximately155 pounds/day.

3.5.3.6 Peak VOC Mass Removal Rate

Estimated peak VOC mass rate may be approximately 465 pounds/day.

3.6 Waste Water Treatment/Disposal Requirements

Waste water generated by the in situ thermal treatment system would also require discharge or disposal. The need for discharge/disposal, or perhaps prior treatment will depend heavily on the specifics presented in the Contractor’s Work Plan, in terms of volume and chemistry of waste water generated.

Collected waste streams could include condensate, cooling tower blow-down, contact and non-contact cooling water, scrubber brine, groundwater, drilling water, and other materials. In general, condensate, at as much as 5 to 10 gpm generation rate, is by far the largest component of these, although depending on the final construction of the system, groundwater removal may also contribute to this flow. The Contractor will be responsible for determining if their waste stream requires treatment, and how discharge would be accomplished. Compliance is also the responsibility of the Contractor. The Engineer will review and approve the design, construction, maintenance and monitoring details to be presented by the Contractor in their

Work Plan. See Section 2.9.2 of this DAR, **Appendix H**, and performance requirements in the applicable Specifications for further details.

4.0 Remediation Sequence Strategy

This section summarizes the primary field remediation activities and expected project process requirements associated with in situ thermal remediation at the MHBP site, and how performance and progress will be managed by the Engineer.

4.1 Period of Performance

The base work to be performed under this NYSDEC contract D009067 will be executed by the Contractor within a period of approximately 15 months of receiving the notice to proceed (NTP). For the purpose of organization and performance measurement, there shall be several stages described for the critical field work. These shall include a) Construction, b) Start-up and Shake Down, c) Routine Operation, and d) Post-Treatment Monitoring.

Construction Stage – The Contractor shall be responsible for planning, preparation, selection, procurement, installation, and integration of the system components. This stage is anticipated to require approximately five months.

Start-up and Shake Down Stage – The Contractor shall operate the components of the treatment system at the required operating parameter levels to meet the performance objectives and standards, as specified in the contract documents. The system shall have as its goal a ramp-up to continuous operation (7 days per week, 24 hours per day) of the entire system. The Contractor shall begin to perform Process Monitoring during this stage to attain this goal and ensure proper operation. This stage is anticipated to require a maximum of two weeks.

Routine Operation Stage – This Stage consists of the Initial Heating and Maintenance Heating aspects of the in situ thermal remediation. The Contractor shall operate the system at the prescribed operating parameters approved by the Engineer. The Contractor shall be responsible for operation and maintenance of the system for a period of 220 calendar days following satisfactory Start-up and Shake down. During this stage, the Contractor shall adhere to the operation and maintenance procedures described in the approved Work Plan and as specified in the contract documents.

Post-Treatment Monitoring – The Contractor shall be responsible for maintaining vapor recovery and performing monitoring of key progress parameters during this phase following shut-down of the heating system operation. This stage has a period of approximately 40 calendar days.

Figure 4-1 provides a layout of the schedule components to accommodate performance sampling (soils and groundwater) and potential supplemental heating, if necessary.

4.2 Pre-Construction Meeting and Plans

No later than twenty days after the Effective Date of Agreement, but before the Contractor starts work, a pre-Construction Conference will be held on a date and at a location set by the Department to discuss the contract clauses, project schedules, and other specifics. Contractor’s superintendent, quality control personnel, safety personnel, and any major subcontractor’s representative shall attend this meeting. Submittals, safety, payrolls, labor relations, environmental protection, project schedule, and procurement materials shall be discussed in this meeting.

After being notified of its apparent low bid, the Contractor shall submit two draft copies of the following plans to NYSDEC for review and approval by the Engineer:

- Construction Work Plan
- Sampling and Analysis Plan (SAP)
- Site Health and Safety Plan (SHSP)

4.2.1 Construction Work Plan-SAP-SHSP

The Contractor shall prepare for approval a Construction Work Plan, SAP, and SHSP. The Contractor shall submit responses to comments after NYSDEC and the Engineer have provided the Contractor with comments. The Contractor shall submit a final Work Plan, SAP, and SHSP incorporating the comments. The Work Plan shall provide a detailed description of the in situ thermal treatment technology and all associated field activities. At a minimum, the Work Plan shall include all items identified in **Figure 4-1** (Project Schedule), as well as items below. This Plan shall include, but is not limited to, the following:

- Detailed discussion of the utilization and implementation of the in situ thermal technology to achieve the remedial action objectives
- Detailed description of equipment, systems, and site layout
- Detailed layout of temporary facilities
- Detailed description of the field operations during construction, start-up, and operations; thermal Contractor shall provide oversight and maintain a presence on-site on a regular basis (full time during construction, and a minimum of three days per week, no less than 4 hrs per day during operation)
- Amount and type of energy and power (source) to be used
- Number of heating elements/wells, and plan to attain target temperature
- Heating element/well, TMP, PMP, and other design and locations
- Process information (flow, temperature, pressure, mass, etc.) for each stream, anticipated flow rate, total volume, and anticipated chemistry of condensate and pumped groundwater, and plans for treatment and discharge including integration into site treatment plant.
- Number, types, and locations of monitoring points, types of sampling data to be obtained, analytical methods, and rationale for process monitoring
- Methods for monitoring and minimizing mobilization of contaminants outside of the target treatment areas
- Organizational chart, including staff responsibilities
- Site preparation and mobilization details
- Necessary permitting
- Site security
- Erosion controls
- Well abandonment
- Site restoration

- Residuals management; Contractor shall be responsible for determining the most cost-effective firm and location for waste transportation and disposal.
- Site monitoring (operations and post-treatment)
- Project closeout

The Final Work Plan shall include key design components to include but not be limited to modeled estimates of energy needs for optimal temperature increase and duration necessary, equipment sizing, distribution of heater elements, process piping and instrumentation diagrams, electrical one- line diagrams, collection and treatment system layout plans, component process flow diagrams, and other information and references as required to describe the general intent of the system to execute the site remediation.

4.3 Field Work

4.3.1 Well Sealing and Abandonment

PVC well casings will become soft at target remediation temperatures, and PVC wells in the thermal remediation target area would likely be unusable during in situ thermal remediation. In addition, other non-essential open conduits to the groundwater table (wells, subsurface drainage conduits, etc.) may also provide unwanted cooling or exit routes for steam pressure and chlorinated volatile organic compounds (CVOC) vapors. These structures shall be properly decommissioned prior to system construction and start-up.

Therefore, existing PVC wells within the treatment area footprint will be abandoned prior to remediation activities according to NYSDEC well abandonment guidelines (i.e., NYSDEC Commissioner Policy CP-43). Abandonment will consist of removal of PVC riser and screen, to the best extent possible. **Table 4-1** provides information on the key known wells to be abandoned and/or replaced. Nine existing PVC wells in the thermal treatment area will require abandonment, as specified. Of these, four will require replacement in locations, depths, and construction as similar to the original wells as possible, to allow monitoring during and following treatment. Replacement wells shall be made of materials that are tolerant of the temperatures encountered during thermal treatment. Well abandonment and construction logs shall be prepared by the Contractor.

All heating elements/wells, temperature monitoring points, vapor recovery wells, and vacuum monitoring points shall be abandoned or removed at the completion of the accepted treatment period.

4.3.2 Subsurface Installation

Drilling rigs will be mobilized, if required, to support installation of heater elements, vapor recovery wells, and temperature and pressure monitoring points. For heating elements, specific locations and borehole diameters will be determined by the specific heating technology implemented. Borings to install heater units may have a large outer diameter and generate significant quantities of waste cuttings. Temperature and pressure monitoring points may be constructed using smaller diameter materials. Drilling will be required inside the abandoned building at the MHBP property, where the rafters are approximately 18 feet above the floor and the building ceiling is approximately 22 feet above the floor. Drill rigs and mast dimensions will be required to operate within these vertical restrictions.

4.3.3 Surface Preparation

In preparation for system construction, work will be required both outside and inside the abandoned building. This may include, but not be limited to, housekeeping, repair of lighting, protection of building for security and from the weather, removal of partitions, grubbing and removal of vegetation, preparation of support pads, and fence installation. A walk-through for asbestos-containing materials (ACM) was performed and no ACM were observed. Rubbish and other building materials that are present within the building that may affect the location of treatment equipment and the treatment area will be removed under separate contract by NYSDEC prior to remediation construction. A pre-treatment building survey shall be performed by the Contractor to document baseline conditions and integrity for comparison to post-treatment conditions, to ensure that no structural changes have occurred to the building due to subsidence or other effects related to the thermal process.

4.3.4 Above Ground Construction

Thermal remediation equipment will be mobilized and connected following construction of subsurface heater elements and vapor recovery wells. Vapor recovery wells will be manifolded together to convey extracted steam and vapors. Each heat unit will be connected with necessary utilities (electricity, natural gas, and/or water), as well as operation communications to control performance of each unit. Connections for necessary utilities will also be established, including natural gas, electricity, potable water, and waste water discharge to sanitary sewer or storm water connections. An insulating cover over the treatment area may also be required, depending on the Contractor's final plans.

4.3.5 Thermal Remediation Start-Up and Shake Down

When all subsurface and above ground equipment elements are in place and fuel/power/discharge processes are approved, the thermal remediation system will undergo initial start-up and shake down. During this time, all equipment will be turned on to confirm operation and connectivity to other elements. All system security and communications will be confirmed both on-site and remotely. Also, potential health and safety concerns will be evaluated and mitigated as required, including but not limited to include noise and stray voltage, radiation, heat, or other parameters.

4.3.6 Initial Heating and Heating to Target Temperatures

The initial heating period will consist of the time from system start-up through reaching boiling temperatures of primary VOCs (minimum temperature of 75°C for 1,1,1-TCA and 1,1-DCA), to the attainment of the target temperature of 100°C. Extraction of both water vapor and VOC vapors are anticipated to increase significantly as the subsurface continues to increase to the target temperature. The initial heating period is assumed to be approximately 50 operating days. Limited collection of water vapor /generation of condensate waste water are anticipated during the initial heating period.

4.3.7 Maintenance Heating

After the subsurface temperatures have risen to the target temperature spatially and vertically, as determined by the Performance Monitoring, the thermal remediation system shall be operated to maintain heat in the target treatment area and the CVOC extraction shall be continued until Performance Monitoring (see Section 4.4) results have reached their goals. The Engineer will determine when the treatment is complete (end of base treatment period or additional optional period) based on the results of Performance Monitoring. The total Heating Performance Period (Initial plus Maintenance) is 220 calendar days.

4.3.8 Data Recording, Storage, Telemetry, and Communication

The thermal remediation system shall be equipped with instrumentation to continuously (or some regular and frequent period identified in the Work Plan) measure, record, and communicate remotely (via cellular/internet technology) various operating parameters. At a minimum these parameters will include:

- operating time (i.e., blower hours),
- blower vacuum pressure,

- blower flow rate,
- heat exchanger inlet and outlet temperatures,
- condenser volume totalizer,
- waste water discharge totalizer,
- water volume injected at heater units,
- potable water usage,
- natural gas or propane usage,
- temperatures at TMPs, and
- various operating parameters for heater elements.

In addition, other parameters shall be measured and recorded at regular intervals identified in the Work Plan, including:

- photoionization detector readings from gas collected via Tedlar bags of vapor treatment equipment (influent, mid-fluent, if applicable), and effluent;
- photoionization detector readings of worker breathing zones outside and inside of the building and other structures associated with the thermal remediation equipment; and
- water quality readings of waste water discharge (pH, conductivity, salinity, temperature, contaminants, and chloride).

4.3.9 Shut-Down and Demobilization

At the completion of thermal remediation operations, when all performance objectives and treatment criteria have been attained, heating activities will be terminated in accordance with the General Conditions of the contract documents. Vapor recovery and off-gas treatment shall be operated, maintained, and monitored for four weeks further to allow for the continued removal of contaminant mass volatilized while subsurface temperatures remain elevated after heating is terminated. All aboveground equipment will be removed from the site, including all systems, equipment, and material related to the treatment program. MHBP building will be left in the condition present at the start of the project, or thereabouts.

4.4 Performance Criteria

Successful performance of in situ thermal remediation will be evaluated by the Engineer during all phases of work against the following applicable criteria.

4.4.1 Subsurface Contaminant Reduction

Performance monitoring will be performed and compared to criteria to determine whether the remediation program has achieved site closure or reduced risks. The main criteria are related to contaminant concentrations and will be documented by confirmation sampling and analysis.

Remedial goals established in the ROD and in discussions with NYSDEC were summarized in Section 2.3, including eliminating or reducing to the extent practicable

- Exposures of persons at or around the site to volatile organic compounds (VOCs) in soil and groundwater;

- The release of contaminants from the saturated soil into groundwater that may create an exceedance of groundwater quality standards; and
- The release of contaminants from groundwater into indoor air through soil vapor intrusion.

These remedial action objectives are intended to mitigate significant threats to public health and the environment at the site. This DAR also specified quantitative criteria to be used to evaluate performance and modify operations. The thermal treatment remedial criteria include the following:

- Reduce concentrations of individual VOCs in saturated soils to below NYSDEC Groundwater Protection SCOs, and
- Reduce concentrations of individual VOCs in groundwater to below NYSDEC Groundwater Standards.

Contaminant reductions will be used as one key performance and effectiveness criterion. Mass removal rate changes over time, as evaluated by concentrations (both corrected PID and actual compound concentrations) obtained from vapor streams sampled after the condenser but prior to air pollution treatment equipment, averaged over a one day period and reflected as pounds/day, would be used as an indicator over the treatment period. If the mass removal rate decreased or diminished significantly, an evaluation would then be made as to whether it was a limitation of the treatment, or due to asymptotic recovery because of low remaining contaminant concentrations. This parameter will not have a specific criterion but will be used holistically with other performance and effectiveness monitoring data. Any NAPL recovered from the subsurface shall be accounted for, as well as any significant COC concentrations in the condensate as part of this evaluation. Total mass removed for each compound of concern would also be used as a performance criterion and compared to the baseline mass estimate in the subsurface.

Bi-monthly groundwater monitoring and interim soil sampling analysis will be used for performance and effectiveness monitoring purposes. Monitoring wells within the treatment area will be monitored prior to thermal treatment start-up and then bi-monthly once maintenance heating has occurred. Sampling will continue one month following treatment shut down by the Contractor. Any additional groundwater sampling following treatment will be identified at a later date and performed by another contractor under a separate scope to address long-term monitoring. Groundwater will be sampled using hot water procedures implementing a cooling coil (UFC, 2006). Results will be compared to the groundwater cleanup criteria. The groundwater monitoring program is shown in **Table 4-2**.

Soil samples will be obtained by the Contractor with the thermal heating elements shut off, from discrete depths at previously sampled locations, within the thermal treatment zone, to be identified in the Work Plan. Soil samples will be obtained once late in the maintenance heating program, as approved by the Engineer. Any additional soil sampling following treatment will be identified at a later date and performed under a separate scope to address long-term monitoring. Samples will be obtained using a low profile drill rig employing hot sampling safety techniques and heat tolerant equipment and materials. Results will be compared to the groundwater protection soil criteria.

4.4.2 Temperature

A rise in subsurface temperatures and the attainment of the target temperature level in the saturated zone will also be a performance metric. The thermal remediation system shall produce and distribute heat in the treatment zone of the subsurface in a manner sufficient to effectively treat contamination. Horizontal and vertical temperature profiles within the treatment area shall be measured in all 3 Treatment Area (A, B, and C) at the 12 locations described in **Table 3-3** and at separate discrete depths. These temperatures shall be monitored and recorded a minimum of once daily. The target temperature is 100°C and the minimum temperature is 75°C. The equivalent temperature for these values at varying depths in the treatment zone is presented in **Table 3-2**. Each discrete thermocouple within each TMP will be evaluated separately (not averaged) and compared to the temperature criteria. The temperature criteria for all thermocouple depths is to reach 90% or greater of the target temperature with no thermocouple being below the minimum temperature during the Maintenance Heating period.

4.4.3 Heating Duration

Once the target temperature has been reached, the thermal remediation system shall maintain this temperature across the treatment area for the duration of at least 60 calendar days. This heating duration will continue if VOC mass extraction has not substantially decreased to required levels, up to the Heating Performance Period of 220 calendar days.

4.4.4 Operations

Periodic system shut down for maintenance and repair will be required during the period of active treatment, for both planned and unplanned actions. Following completion of initial start-up and shake down, the system operation requirement will be for active heating operations and vapor recovery and vapor treatment of greater than 90% up time. Typical thermal treatment system performance monitoring parameters and frequencies are presented in **Table 4-3**.

4.4.5 Hydraulic and Pneumatic Control

Control of the contaminated groundwater plume is a critical component of thermal treatment such that increased CVOC concentrations or NAPL do not migrate out from or beneath the treatment zone. Also, steam pressures should not increase significantly to move steam/vapors outside of the containment that vapor recovery affords. Results from area groundwater elevation monitoring before, during, and after thermal treatment will be evaluated for trends. Similarly, pressure monitoring point results will also be evaluated on a weekly and monthly basis.

4.4.6 Safety and Environmental Controls

The area surrounding the MHBP property is a well-used, mixed, residential/commercial/industrial area. The thermal remediation system shall be operated in a manner to ensure that no receptors are exposed to risk beyond baseline conditions. Vapor treatment effectiveness and compliance with NYS air guidance will be a performance metric. Similarly, waste water treatment and compliance will also be reviewed on an on-going basis.

Stray voltage and other radiation types appropriate for the thermal treatment design shall remain below 15 Volts (or related OSHA limits) and there shall be no surface expression of excessive heat or electrical current. Monitoring of these parameters will be at least weekly and described in the approved SAP. Noise levels shall remain below local and state acceptable guidelines for all octave bands.

4.4.7 Air Monitoring

Impacts to local and area air quality will be considered a performance criterion.

4.4.7.1 Community Air Monitoring Requirements

Air monitoring will be conducted by the Contractor throughout all phases of thermal remediation for protection of on-site workers and potential off-site receptors will be required by the contract documents. The New York State Department of Health (NYSDOH) Generic Community Air Monitoring Plan (CAMP) from DER-10 will be used as guidance (**Appendix L**).

4.4.7.2 Indoor Air

During thermal remediation, particular attention will be given to air quality inside the buildings adjacent to the off-site MHBP treatment area vacant building. Olfactory observations and PID measurements inside the buildings will be recorded each day the Contractor's staff are on-site.

During the peak of subsurface heating, and throughout the temperature maintenance phase, indoor air samples of key buildings and spaces shall be monitored using procedures described by NYSDOH on a monthly basis. In addition, field screening instruments shall also be used for daily indoor air monitoring, as compared to ambient VOC levels. Indoor air SUMMA canister samples in up to four locations will be collected prior to system start-up and once during the peak Maintenance Heating period and analyzed using EPA Method TO-15.

The need to install a temporary sub-slab depressurization system within the building(s) will be discussed with NYSDOH if VOCs are detected inside the building north of the treatment area, and/or inside the Staples location. The Contractor shall install sub-slab points during construction should this system require activation. In addition, pressure monitoring points inside the building will be monitored during heating operations. If static formation pressure increases due to thermal treatment, vapor/pressure relief measures will be required to be implemented. All air measurements will be logged either continuously by the sampling instrument(s) or recorded manually.

4.4.7.3 Vapor Extraction System Discharge

Extracted vapor removed from the subsurface shall be treated by an appropriate treatment technology, as identified in the Contractor's final Work Plan, to meet the discharge requirements specified in DAR-1 and in accordance with information in the Vapor Treatment Specification. Off-gas treatment efficiency to attain compliance with DAR-1 discharge criteria will be another Performance parameter. Screening of recovered vapors and effluent vapors will be performed using a hand-held vapor monitor (PID or equivalent). Confirmatory sampling will consist of VOC monitoring of off-gas treatment influent and effluent using EPA Method TO-15 methods. Samples will be collected weekly during the duration of active vapor extraction system operation, and more frequently during the Start-up/Shake down phase.

4.4.8 Waste Generation/Disposal

Several remediation waste streams will be generated and will require off-site disposal.

Soil cuttings will be generated from the installation of heater elements, vapor extraction wells, and temperature monitoring points. The soil will be temporarily and secured on-site, stored in DOT-approved containers (drums and/or roll-off). During drilling, the most contaminated soils, based on PID screening and visual/olfactory observations, may be segregated. Based on observed soil VOC concentrations, some portion of the soil cuttings may be characterized as a hazardous waste. All containerized soils will be disposed of off-site at a licensed disposal facility after profiling and approval by the Engineer.

Liquid waste will be generated from decontamination processes as well as groundwater sampling. Liquid wastes will be drummed and disposed of at an approved, off-site disposal facility, or treated on-site for approved discharge.

Liquid condensate will be generated from a portion of the collected steam vapor. As discussed earlier, this condensate will be collected and discharged under a specific waste water permit, or recycled under a UIC permit.

Solid materials generated during remediation activities, such as activated carbon, would be profiled and manifested for appropriate transport and disposal. Solid materials otherwise not impacted will be disposed of as municipal solid waste.

Contractor shall be responsible for determining the most cost-effective firm and location for waste transportation and disposal, which is to be provided in the initial Work Plan. Contractor and their subcontracted firms shall comply with all related state, local, and federal regulations regarding waste disposal. Wastes from the site will be documented by manifests and/or bills of lading profiled by the Contractor. The NYSDEC will be named as the generator and the Engineer will act as an agent for the NYSDEC to sign waste profile forms and manifests as such.

5.0 Operational Progress and Closeout

5.1 Required Submittals

5.1.1 Project Progress Meetings

The frequency, attendance, and purpose of progress meetings are provided in the contract documents.

The Contractor shall update the schedule for discussions at progress meetings, consistent with requirements in the contract documents and Specifications.

5.1.2 Process Monitoring Results

The Contractor shall submit an electronic version of the process monitoring result reports to the Engineer on a weekly basis during the Start-up and Shake down Phase, and on a monthly basis during the Routine Operations Phase to document monitoring of the treatment process. The process monitoring data to be included consist of the following parameters, tabulated when possible, with a short associated text description:

- Description of site preparation and construction/installation work performed,
- Power and energy input during period,
- Temperatures at each measurement point and depth,
- Pressures at each measurement point and depth,
- Vacuums and flow rates from each vapor recovery well and through the entire system,
- Vapor VOC measurements at each location monitored,
- Mass (discrete and cumulative) of total VOCs removed,
- Running mass (discrete points and cumulative total) of VOC emissions,
- Running indication of vapor treatment removal efficiency,
- Amount of waste water generated during the period,
- Description of any wastes generated during reporting period and their disposition,
- System down-time log with description of reasons and corrective actions, and
- Any other data (soil, groundwater, soil gas, etc.) obtained during the period.

5.1.3 Final Close-out Report

Upon completion of the project, the Contractor shall prepare a Final Close-out Report and submit it to the Engineer for approval within 45 days of the submittal of the post-treatment groundwater monitoring results.

5.1.4 Final Engineering Report

Upon completion of the thermal remediation and approval of the Contractor’s Final Close-out Report, the Engineer shall prepare and submit for approval a Final Engineering Report. The Engineering Report shall include, but not be limited to, the following:

Description of field operations including power and energy applied, duration of treatment, temperatures reached,

- A description of the project background, remedial contractors and remedial action,
- A report of the Pre-Construction Meeting and project submittals,
- Contract Modifications,
- A summary of the remedial construction work,
- Results of in situ thermal treatment,
- All sampling results, process monitoring results, and interim monitoring results,
- Any deviation from the approved Final Work Plan, QAPP, and HASP,
- Site restoration activities,
- Wastes generated and disposition (including characterization analysis of wastes), and
- Chemical data final report (if interim samples are collected).

5.2 Construction Milestones

- Notice to Proceed to thermal contractor
- Permitting, Final Design, Materials Procurement
- Subsurface Construction (heating elements, wells)
- PVC Well Abandonment
- Above Ground Equipment Mobilization and Construction
- Start-up/Shake down
- Initial Heating to Target Temperature
- Maintenance Heating
- Shut-Down and Demobilization
- Groundwater Performance Sampling (see section below)
- Soil Performance Sampling (see section below)
- Substantial Completion
- Final Completion

See **Figure 4-1**, Schedule for In Situ Thermal Remediation, for some of these sequence periods.

5.3 Performance Monitoring

Performance monitoring of the previously identified performance and effectiveness criteria shall be made in accordance with reasonable time periods associated with the thermal treatment system operation, permit requirements, client requests, as well as referring to **Tables 4-2 and 4-3** of this DAR, and **Table 11312-3** in the Bid Specifications. Progress as defined by desirable trends in the data, as well as meeting the criteria stated in Section 4.4, will be reported on a weekly and monthly basis in the reports discussed above.

5.4 Demobilization, Site Restoration and Project Closeout

Immediately upon determination of substantial completion by the Engineer and that no further treatment (heating or vapor recovery) will be required, the Contractor shall remove all the equipment, material, temporary facilities, and supplies from the site and clean the area. A post-treatment survey of the buildings potentially affected by heat, ground subsidence, etc. shall be performed to compare to the pre-treatment survey. The site shall be restored to the condition that existed before commencement of the thermal remediation, and/or as specified in the contract documents. Contractor shall prepare the Final Close-out Report and submit to the Engineer for approval. Contract close out is discussed in Section VIII, General Conditions, of the contract documents as per “Substantial and Final Completion”

6.0 References

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Tables

Table 2-1

Soil Analytical Results
Former Duso Chemical Company
Poughkeepsie, New York
NYSDEC Site No. 3-14-103

	Sample ID	Part 375 Restricted: Protection of		TW-1I 1718	TW-2D 1617	TW-2D 2425	TW-3D 1718	DUP-110512
	Date	Groundwater	Public Health - Commercial	11/12/2012	11/1/2012	11/1/2012	11/5/2012	11/5/2012
	Matrix			SOIL	SOIL	SOIL	SOIL	SOIL
CAS No.	***VOC (µg/Kg)***							
71-55-6	1,1,1-Trichloroethane	680	500,000	**480,000 D**	**24**	**22,000 D**	480 U	5.2 U
79-34-5	1,1,2,2-Tetrachloroethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
79-00-5	1,1,2-Trichloroethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
75-34-3	1,1-Dichloroethane	270	240,000	**320,000 D**	**38,000 D**	**53,000 D**	**93,000 D**	**42,000 D**
75-35-4	1,1-Dichloroethene	330	500,000	**100,000 D**	**14**	**1,200 E**	480 U	5.2 U
120-82-1	1,2,4-Trichlorobenzene	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
96-12-8	1,2-Dibromo-3-chloropropane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
106-93-4	1,2-Dibromoethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
95-50-1	1,2-Dichlorobenzene	1,100	500,000	270 U	5.1 U	6.7 U	480 U	5.2 U
107-06-2	1,2-Dichloroethane	20	30,000	**70,000 D**	**49**	**1,500 DJ**	**9,500**	**10,000 D**
78-87-5	1,2-Dichloropropane	NS	NS	**44 J**	5.1 U	**4.7 J**	480 U	5.2 U
541-73-1	1,3-Dichlorobenzene	2,400	280,000	270 U	5.1 U	6.7 U	480 U	5.2 U
106-46-7	1,4-Dichlorobenzene	1,800	130,000	270 U	5.1 U	6.7 U	480 U	5.2 U
78-93-3	2-Butanone (Methyl ethyl ketone)	120	500,000	**890 J**	25 U	**66**	2,400 U	**480**
591-78-6	2-Hexanone (Methyl butyl ketone)	NS	NS	1,400 U	25 U	34 U	2,400 U	26 U
108-10-1	4-Methyl-2-pentanone	NS	NS	**99 J**	25 U	**4.5 J**	2,400 U	**21 J**
67-64-1	Acetone	50	500,000	**3,700**	**12 J**	**220**	2,400 U	**440**
71-43-2	Benzene	60	44,000	**49 J**	5.1 U	**1.1 J**	480 U	5.2 U
75-27-4	Bromodichloromethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
75-25-2	Bromoform	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
74-83-9	Bromomethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
75-15-0	Carbon disulfide	NS	NS	270 U	5.1 U	**6.2 J**	480 U	5.2 U
56-23-5	Carbon tetrachloride	760	22,000	270 U	5.1 U	**660 E**	480 U	5.2 U
108-90-7	Chlorobenzene	1,100	500,000	270 U	5.1 U	6.7 U	480 U	5.2 U
75-00-3	Chloroethane	NS	NS	270 U	**7.9**	**13**	480 U	**170**
67-66-3	Chloroform	370	350,000	**2,000**	5.1 U	**8.4**	480 U	5.2 U
74-87-3	Chloromethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
156-59-2	cis-1,2-Dichloroethene	250	500,000	270 U	5.1 U	6.7 U	480 U	5.2 U
10061-01-5	cis-1,3-Dichloropropene	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
110-82-7	Cyclohexane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
124-48-1	Dibromochloromethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
75-71-8	Dichlorodifluoromethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
100-41-4	Ethylbenzene	1,000	390,000	270 U	5.1 U	6.7 U	480 U	5.2 U
98-82-8	Isopropylbenzene	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
79-20-9	Methyl acetate	NS	NS	**640**	5.1 U	6.7 U	480 U	5.2 U
1634-04-4	Methyl tert-butyl ether	930	500,000	270 U	5.1 U	**1.3 J**	480 U	5.2 U
108-87-2	Methylcyclohexane	NS	NS	270 U	**13**	6.7 U	480 U	5.2 U
75-09-2	Methylene chloride	50	500,000	**78 J**	5.1 U	**12**	**380 JB**	**120**
100-42-5	Styrene	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
127-18-4	Tetrachloroethene	1,300	150,000	270 U	**0.89 J**	6.7 U	480 U	5.2 U
108-88-3	Toluene	700	500,000	270 U	5.1 U	6.7 U	480 U	5.2 U
156-60-5	trans-1,2-Dichloroethene	190	500,000	270 U	5.1 U	6.7 U	480 U	5.2 U
10061-02-6	trans-1,3-Dichloropropene	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
79-01-6	Trichloroethene	470	200,000	270 U	5.1 U	6.7 U	480 U	5.2 U
75-69-4	Trichlorofluoromethane	NS	NS	270 U	5.1 U	6.7 U	480 U	5.2 U
75-01-4	Vinyl chloride	20	13,000	**4,200**	**6.1**	**17**	480 U	**49**
	Xylene (Total)	1,600	500,000	540 U	**1.7 J**	6.7 U	480 U	5.2 U
Total CVOCs		NA	NA	**976,322**	**38,102**	**78,415**	**102,880**	**52,339**
Total VOCs		NA	NA	**981,700**	**38,129**	**78,714**	**102,880**	**53,280**
CAS No.	***General Chemistry (mg/Kg)***							
NA	**Total Organic Carbon**	NA	NA	**39,200**	**7,610 H**	**2,000 H**	**3,070**	**4,120**

Notes:

NS - No objective established for the compound

NA - Not applicable

BOLD - The compound was detected at a concentration above the method detection limit (MDL).

U/ND - The compound was not detected at a concentration greater than or equal to the MDL.

J - The concentration given is an approximate value. Concentration is less than the reporting limit (RL) but greater than the MDL.

E - Results exceed calibration range.

D - The reported value is from a secondary dilution analysis factor.

B - The compound was also detected in the associated Method Blank.

H - Sample was prepped or analyzed beyond the specified holding time.

Table 2-1

Soil Analytical Results
Former Duso Chemical Company
Poughkeepsie, New York
NYSDEC Site No. 3-14-103

Sample ID		Part 375 Restricted: Protection of		TW-3D 2930	TW-4I 0709	TW-5S 1618	TW-6D 1718	TW-7D 1718
Date		Groundwater	Public Health - Commercial	11/5/2012	11/15/2012	11/9/2012	11/27/2012	11/19/2012
Matrix				SOIL	SOIL	SOIL	SOIL	SOIL
CAS No.	***VOC (µg/Kg)***							
71-55-6	1,1,1-Trichloroethane	680	500,000	3.9 U	68 U	**1,600 D**	**15**	**42,000 H**
79-34-5	1,1,2,2-Tetrachloroethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
79-00-5	1,1,2-Trichloroethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
75-34-3	1,1-Dichloroethane	270	240,000	3.9 U	**8,400 D**	**2,100 D**	**85,000 D**	**4,500 H**
75-35-4	1,1-Dichloroethene	330	500,000	3.9 U	68 U	**65**	**90**	**680 DJH**
120-82-1	1,2,4-Trichlorobenzene	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
96-12-8	1,2-Dibromo-3-chloropropane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
106-93-4	1,2-Dibromoethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
95-50-1	1,2-Dichlorobenzene	1,100	500,000	3.9 U	68 U	4.0 U	4.6 U	4.8 U
107-06-2	1,2-Dichloroethane	20	30,000	3.9 U	**3,800**	**610 D**	**4,600 D**	**34**
78-87-5	1,2-Dichloropropane	NS	NS	3.9 U	68 U	4.0 U	**2.5 J**	4.8 U
541-73-1	1,3-Dichlorobenzene	2,400	280,000	3.9 U	68 U	4.0 U	4.6 U	4.8 U
106-46-7	1,4-Dichlorobenzene	1,800	130,000	3.9 U	68 U	4.0 U	4.6 U	4.8 U
78-93-3	2-Butanone (Methyl ethyl ketone)	120	500,000	19 U	**310 J**	**7.2 J**	**98**	24 U
591-78-6	2-Hexanone (Methyl butyl ketone)	NS	NS	19 U	340 U	20 U	23 U	24 U
108-10-1	4-Methyl-2-pentanone	NS	NS	19 U	**56 J**	20 U	**6.1 J**	24 U
67-64-1	Acetone	50	500,000	19 U	340 U	**26**	**230**	**7.9 J**
71-43-2	Benzene	60	44,000	3.9 U	**33 J**	**0.96 J**	4.6 U	4.8 U
75-27-4	Bromodichloromethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
75-25-2	Bromoform	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
74-83-9	Bromomethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
75-15-0	Carbon disulfide	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
56-23-5	Carbon tetrachloride	760	22,000	3.9 U	68 U	4.0 U	4.6 U	4.8 U
108-90-7	Chlorobenzene	1,100	500,000	3.9 U	68 U	4.0 U	4.6 U	4.8 U
75-00-3	Chloroethane	NS	NS	3.9 U	**10,000 D**	4.0 U	**14**	4.8 U
67-66-3	Chloroform	370	350,000	3.9 U	68 U	**1.7 J**	**1.4 J**	4.8 U
74-87-3	Chloromethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
156-59-2	cis-1,2-Dichloroethene	250	500,000	3.9 U	**190**	4.0 U	4.6 U	4.8 U
10061-01-5	cis-1,3-Dichloropropene	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
110-82-7	Cyclohexane	NS	NS	3.9 U	**34 J**	4.0 U	4.6 U	4.8 U
124-48-1	Dibromochloromethane	NS	NS	3.9 U	**39 J**	4.0 U	4.6 U	4.8 U
75-71-8	Dichlorodifluoromethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
100-41-4	Ethylbenzene	1,000	390,000	3.9 U	68 U	**0.32 J**	4.6 U	**0.47 J**
98-82-8	Isopropylbenzene	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
79-20-9	Methyl acetate	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
1634-04-4	Methyl tert-butyl ether	930	500,000	3.9 U	68 U	4.0 U	4.6 U	**2.8 J**
108-87-2	Methylcyclohexane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
75-09-2	Methylene chloride	50	500,000	3.9 U	**130**	4.0 U	**84**	**19**
100-42-5	Styrene	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
127-18-4	Tetrachloroethene	1,300	150,000	3.9 U	**180**	**0.65 J**	4.6 U	**3.0 J**
108-88-3	Toluene	700	500,000	3.9 U	**71**	**1.2 J**	4.6 U	**4.1 J**
156-60-5	trans-1,2-Dichloroethene	190	500,000	3.9 U	68 U	4.0 U	4.6 U	4.8 U
10061-02-6	trans-1,3-Dichloropropene	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
79-01-6	Trichloroethene	470	200,000	3.9 U	**600**	**39**	4.6 U	**110**
75-69-4	Trichlorofluoromethane	NS	NS	3.9 U	68 U	4.0 U	4.6 U	4.8 U
75-01-4	Vinyl chloride	20	13,000	3.9 U	**360**	**5.7**	**38**	**3.6 J**
	Xylene (Total)	1,600	500,000	3.9 U	68 U	**0.80 J**	4.6 U	**3.8 J**
Total CVOCs		NA	NA	**ND**	**23,699**	**4,422**	**89,845**	**47,350**
Total VOCs		NA	NA	**ND**	**24,203**	**4,459**	**90,179**	**47,369**
CAS No.	***General Chemistry (mg/Kg)***							
NA	**Total Organic Carbon**	NA	NA	**2,200**	1,280 U	**2,270 H**	**2,300**	**1,580**

Notes:

NS - No objective established for the compound

NA - Not applicable

BOLD - The compound was detected at a concentration above the method detection limit (MDL).

U/ND - The compound was not detected at a concentration greater than or equal to the MDL.

J - The concentration given is an approximate value. Concentration is less than the reporting limit (RL) but greater than the MDL.

E - Results exceed calibration range.

D - The reported value is from a secondary dilution analysis factor.

B - The compound was also detected in the associated Method Blank.

H - Sample was prepped or analyzed beyond the specified holding time.

Table 2-2

Groundwater Analytical Results - MHBP Property
Former Duso Chemical Company
Poughkeepsie, New York
NYSDEC Site No. 3-14-103

Well ID Date		AWQS/GV	MHBP-8 2/24/2011	MHBP-10 12/11/2012	MHBP-11 2/24/2011	MHBP-12 2/24/2011	MHBP-13S 3/23/2011	MHBP-13D 3/23/2011	MHBP-16 3/21/2011	MHBP-19S 3/22/2011	MHBP-21 12/11/2012	MHC-29 2/24/2011	MHC-30 2/24/2011	OBG-1B 2/24/2011	OBG-1S 2/24/2011	OBG-7S 12/7/2012	OBG-7I 2/24/2011	OBG-7D 12/7/2012	OBG-70B 2/24/2011
CAS No.	***VOC (µg/l)***																		
71-55-6	**1,1,1-Trichloroethane**	5	**420**	**44,000 D**	**920,000 D**	**49,000 D**	**12**	1.0 U	1.0 U	1.0 U	1.0 U	**1,000,000 D**	**160**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
79-34-5	**1,1,2,2-Tetrachloroethane**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
79-00-5	**1,1,2-Trichloroethane**	1	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
76-13-1	**1,1,2-Trichloro-1,2,2-triflouroethane**	1	100 U	800 U	**400**	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-34-3	**1,1-Dichloroethane**	5	**68,000 D**	**17,000 D**	**120,000 D**	**370,000 D**	**69**	**21**	1.0 U	1.0 U	1.0 U	**190,000 D**	**2,200**	**0.74 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-35-4	**1,1-Dichloroethene**	5	**85 J**	**7,800 D**	**51,000 D**	**5,800**	**0.55 J**	**3.5**	1.0 U	1.0 U	1.0 U	**140,000 D**	**160**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
120-82-1	**1,2,4-Trichlorobenzene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
96-12-8	**1,2-Dibromo-3-chloropropane**	0.04	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
106-93-4	**1,2-Dibromoethane**	0.0006	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
95-50-1	**1,2-Dichlorobenzene**	3	100 U	800 U	100 U	100 U	**1.7**	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
107-06-2	**1,2-Dichloroethane**	0.6	**6,100**	**760 DJ**	**13,000 DJ**	**51,000 D**	**5.0**	**20**	1.0 U	1.0 U	1.0 U	**9,300**	**21 J**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
78-87-5	**1,2-Dichloropropane**	1	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
541-73-1	**1,3-Dichlorobenzene**	3	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
106-46-7	**1,4-Dichlorobenzene**	3	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
594-20-7	**2-Hexanone**	5	500 U	4,000 U	500 U	500 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	500 U	250 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U
78-93-3	**2-Butanone (Methyl ethyl ketone)**	50(GV)	1,000 U	8,000 U	1,000 U	**910 J**	10 U	10 U	10 U	10 U	10 U	**380 J**	500 U	10 U	10 U	10 U	10 U	10 U	10 U
108-10-1	**4-Methyl-2-pentanone**	NA	500 U	4,000 U	500 U	**570**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	500 U	250 U	5.0 U	5.0 U	5.0 U	5 U	5.0 U	5.0 U
67-64-1	**Acetone**	50 (GV)	1,000 U	8,000 U	**1,600**	**3,800**	10 U	10 U	10 U	10 U	10 U	**1,700**	500 U	10 U	10 U	10 U	10 U	10 U	10 U
71-43-2	**Benzene**	1	100 U	800 U	100 U	100 U	1.0 U	**2.4**	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-27-4	**Bromodichloromethane**	50(GV)	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-25-2	**Bromoform**	50(GV)	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
74-83-9	**Bromomethane**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-15-0	**Carbon disulfide**	60(GV)	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
56-23-5	**Carbon tetrachloride**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
108-90-7	**Chlorobenzene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-00-3	**Chloroethane**	5	**20,000 D**	800 U	100 U	**2,300**	**2,700 D**	**3.5**	1.0 U	1.0 U	1.0 U	**180**	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
67-66-3	**Chloroform**	7	100 U	800 U	**570**	**610**	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**400**	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
74-87-3	**Chloromethane**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
156-59-2	**cis-1,2-Dichloroethene**	5	100 U	800 U	100 U	100 U	1 U	**73**	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
10061-01-5	**cis-1,3-Dichloropropene**	0.4	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
110-82-7	**Cyclohexane**	50	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
124-48-1	**Dibromochloromethane**	50(GV)	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-71-8	**Dichlorodifluoromethane**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
100-41-4	**Ethylbenzene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
98-82-8	**Isopropylbenzene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
79-20-9	**Methyl acetate**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1634-04-4	**Methyl tert-butyl ether**	10(GV)	100 U	800 U	**85 J**	**170**	**0.73 J**	**2.6**	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	**2.7**
108-87-2	**Methylcyclohexane**	50	100 U	800 U	100 U	100 U	**1.2**	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-09-2	**Methylene chloride**	5	**110**	800 U	100 U	**270**	**1.1**	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
100-42-5	**Styrene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
127-18-4	**Tetrachloroethene**	5	100 U	800 U	100 U	100 U	1.0 U	**2.8**	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
108-88-3	**Toluene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
156-60-5	**trans-1,2-Dichloroethene**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
10061-02-6	**trans-1,3-Dichloropropene**	0.4	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
79-01-6	**Trichloroethene**	5	100 U	800 U	**520**	100 U	1 U	**30**	1.0 U	1.0 U	1.0 U	**1,500**	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-69-4	**Trichlorofluoromethane**	5	100 U	800 U	100 U	100 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	100 U	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
75-01-4	**Vinyl chloride**	2	**290**	800 U	**320**	**400**	1 U	**30**	1.0 U	1.0 U	1.0 U	**460**	50 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U	1.0 U
1330-20-7	**Xylenes, Total**	100	200 U	1,600 U	200 U	200 U	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	200 U	100 U	2.0 U	2.0 U	2.0 U	2 U	2.0 U	2.0 U
Total CVOCs		NA	**95,005**	**69,560**	**1,105,810**	**479,380**	**2,789**	**184**	**ND**	**ND**	**ND**	**1,341,840**	**2,541**	**0.74**	**ND**	**ND**	**ND**	**ND**	**ND**
Total VOCs		NA	**95,005**	**69,560**	**1,107,495**	**484,830**	**2,791**	**189**	**ND**	**ND**	**ND**	**1,343,920**	**2,541**	**0.74**	**ND**	**ND**	**ND**	**ND**	**2.7**
	General Chemistry (µg/l)																		
NA	**Total Organic Carbon**	NA	NS	**1.4**	NS	NS	NS	NS	NS	NS	**1.0 U**	NS	NS	NS	NS	**1.0 U**	NS	**1.0 U**	NS

Notes:

BOLD - The compound was detected at a concentration greater than or equal to the method detection limit (MDL).

BOLD/SHADED IN BLUE - The compound was detected at a concentration greater than New York State Ambient Water Quality Standards (AWQS) or Guidance Values (GV).

VOCs-Volatile Organic Compound
CVOCs-Chlorinated Volatile Organic Compound
µg/l - micrograms per liter
NA - Not applicable

U/ND - The compound was not detected at a concentration greater than or equal to the MDL.
J - The concentration given is an approximate value. The concentration is less than the reporting limit (RL) and greater than or equal to the MDL.
D - The reported value is from a secondary dilution analysis factor.
E - The compound concentration exceeded the calibration range.

Table 2-2

Groundwater Analytical Results - MHBP Property
Former Duso Chemical Company
Poughkeepsie, New York
NYSDEC Site No. 3-14-103

Well ID Date		AWQS/GV	TW-1S 12/5/2012	TW-1I 12/6/2012	TW-1D 12/5/2012	DUP 12/5/2012	TW-2S 12/10/2012	TW-2I 12/11/2012	TW-2D 12/10/2012	TW-3S 12/5/2012	TW-3I 12/6/2012	TW-3D 12/5/2012	TW-4S 12/5/2012	TW-4I 12/6/2012	TW-4D 12/5/2012	TW-5S 12/5/2012	TW-5D 12/5/2012
CAS No.	*VOC (µg/l)*																
71-55-6	1,1,1-Trichloroethane	5	**31,000** D	**270** D	**5.8**	**6.3**	**290,000** D	**680,000** D	**64**	2,000 U	1.0 U	1.0 U	250 U	**1.7**	1.0 U	**720** D	1.0 U
79-34-5	1,1,2,2-Tetrachloroethane	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
79-00-5	1,1,2-Trichloroethane	1	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
76-13-1	1,1,2-Trichloro-1,2,2-triflouroethane	1	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-34-3	1,1-Dichloroethane	5	**190,000** D	**8,600** D	**72**	**73**	**75,000** D	**71,000** D	**48**	**100,000** D	**18**	**34**	**12,000** D	**2,100** D	**26**	**2,800** D	**14**
75-35-4	1,1-Dichloroethene	5	**1,300** JD	200 U	**0.80** J	**0.85** J	**49,000** D	**110,000** D	**11**	2,000 U	1.0 U	1.0 U	250 U	**0.6** J	**0.6** J	**110** D	1.0 U
120-82-1	1,2,4-Trichlorobenzene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
106-93-4	1,2-Dibromoethane	0.0006	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
95-50-1	1,2-Dichlorobenzene	3	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
107-06-2	1,2-Dichloroethane	0.6	**24,000** D	**440** D	**4.9**	**5.0**	5,000 U	10,000 U	1.0 U	**2,700** D	**0.91** J	**1.7**	**2,000** D	**490** D	**8.3**	**400** D	1.0 U
78-87-5	1,2-Dichloropropane	1	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
541-73-1	1,3-Dichlorobenzene	3	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
106-46-7	1,4-Dichlorobenzene	3	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
594-20-7	2-Hexanone	5	20,000 U	1,000 U	5.0 U	5.0 U	25,000 U	50,000 U	5.0 U	2,000 U	1.0 U	1.0 U	250 U	5.0 U	5.0 U	200 U	5.0 U
78-93-3	2-Butanone (Methyl ethyl ketone)	50(GV)	40,000 U	2,000 U	10 U	10 U	50,000 U	100,000 U	10 U	10,000 U	5.0 U	5.0 U	1,300 U	**4.6** J	10 U	400 U	10 U
108-10-1	4-Methyl-2-pentanone	NA	20,000 U	1,000 U	5.0 U	5.0 U	25,000 U	50,000 U	5.0 U	20,000 U	10 U	10.0 U	2,500 U	**3.5** J	5.0 U	200 U	5.0 U
67-64-1	Acetone	50 (GV)	40,000 U	2,000 U	10 U	10 U	50,000 U	100,000 U	10.0 U	10,000 U	5.0 U	5.0 U	1,300 U	**17**	10 U	400 U	10 U
71-43-2	Benzene	1	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	20,000 U	10 U	10.0 U	2,500 U	1.0 U	**0.73** J	40 U	1.0 U
75-27-4	Bromodichloromethane	50(GV)	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-25-2	Bromoform	50(GV)	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
74-83-9	Bromomethane	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-15-0	Carbon disulfide	60(GV)	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
56-23-5	Carbon tetrachloride	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
108-90-7	Chlorobenzene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-00-3	Chloroethane	5	4,000 U	200 U	**22**	**23**	5,000 U	10,000 U	1.0 U	2,000 U	**4.8**	**41**	**13,000**	**2,500** D	**13**	40 U	1.0 U
67-66-3	Chloroform	7	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
74-87-3	Chloromethane	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	**0.66** J	1.0 U	40 U	1.0 U
156-59-2	cis-1,2-Dichloroethene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	**19**	40 U	1.0 U
10061-01-5	cis-1,3-Dichloropropene	0.4	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
110-82-7	Cyclohexane	50	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
124-48-1	Dibromochloromethane	50(GV)	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-71-8	Dichlorodifluoromethane	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
100-41-4	Ethylbenzene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
98-82-8	Isopropylbenzene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
79-20-9	Methyl acetate	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
1634-04-4	Methyl tert-butyl ether	10(GV)	4,000 U	200 U	**4.4**	**4.2**	5,000 U	10,000 U	**13**	2,000 U	**0.86** J	**8.8**	250 U	**0.50** J	**1.2**	40 U	**9.0**
108-87-2	Methylcyclohexane	50	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-09-2	Methylene chloride	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	**8.3**	1.0 U	40 U	1.0 U
100-42-5	Styrene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
127-18-4	Tetrachloroethene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
108-88-3	Toluene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
156-60-5	trans-1,2-Dichloroethene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
10061-02-6	trans-1,3-Dichloropropene	0.4	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
79-01-6	Trichloroethene	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	**2.2**	**650** D	1.0 U
75-69-4	Trichlorofluoromethane	5	4,000 U	200 U	1.0 U	1.0 U	5,000 U	10,000 U	1.0 U	2,000 U	1.0 U	1.0 U	250 U	1.0 U	1.0 U	40 U	1.0 U
75-01-4	Vinyl chloride	2	4,000 U	200 U	**1.9**	**2.0**	5,000 U	10,000 U	**1.5**	2,000 U	1.0 U	1.0 U	250 U	**1.9**	**17**	40 U	1.0 U
1330-20-7	Xylenes, Total	100	8,000 U	400 U	2.0 U	2.0 U	10,000 U	20,000 U	2.0 U	4,000 U	2.0 U	2.0 U	500 U	2.0 U	2.0 U	80 U	2.0 U
Total CVOCs		NA	**246,300**	**9,310**	**107**	**110**	**414,000**	**861,000**	**138**	**102,700**	**24**	**77**	**27,000**	**5,120**	**86.1**	**4,680**	**14**
Total VOCs		NA	**246,300**	**9,310**	**112**	**114**	**414,000**	**861,000**	**138**	**102,700**	**25**	**86**	**27,000**	**5,129**	**88**	**4,680**	**23**
	General Chemistry (µg/l)																
NA	Total Organic Carbon	NA	**115,000**	**7,700**	**480**	1.0 U	**7,500**	**4,500**	1.0 U	**62,300**	1.0 U	**590**	**13,800**	1.0 U	**1,400**	**2,200**	1.0 U

Notes:

BOLD - The compound was detected at a concentration greater than or equal to the method detection limit (MDL).

BOLD/SHADED IN BLUE - The compound was detected at a concentration greater than New York State Ambient Water Quality Standards (AWQS) or Guidance Values (GV).

VOCs-Volatile Organic Compound
CVOCs-Chlorinated Volatile Organic Compound
µg/l - micrograms per liter
NA - Not applicable

U/ND - The compound was not detected at a concentration greater than or equal to the MDL.
J - The concentration given is an approximate value. The concentration is less than the reporting limit (RL) and greater than or equal to the MDL.
D - The reported value is from a secondary dilution analysis factor.
E - The compound concentration exceeded the calibration range.

Table 2-2

Groundwater Analytical Results - MHBP Property
Former Duso Chemical Company
Poughkeepsie, New York
NYSDEC Site No. 3-14-103

Well ID Date		AWQS/GV	TW-6S 12/10/2012	TW-6I 12/10/2012	TW-6D 12/10/2012	TW-7S 12/7/2012	TW-7I 12/10/2012	TW-7D 12/7/2012	DUP 12/7/2012	X-PROP-MWS 12/6/2012	X-PROP-MWI 12/10/2012	X-PROP-MWD 12/6/2012	Y-PROP-MWS 12/7/2012	Y-PROP-MWI 12/17/2012	Y-PROP-MWD 12/7/2012	Z-PROP-MWS 12/6/2012	Z-PROP-MWI 12/10/2012	Z-PROP-MWD 12/6/2012
CAS No.	*VOC (µg/l)*																	
71-55-6	1,1,1-Trichloroethane	5	8,000 U	**11**	**1.0**	**100,000 D**	**400 D**	1.0 U	1.0 U	**750,000 D**	**2,100 D**	**39**	**550,000 D**	**33**	**44**	**910,000 D**	**130 D**	**49**
79-34-5	1,1,2,2-Tetrachloroethane	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
79-00-5	1,1,2-Trichloroethane	1	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
76-13-1	1,1,2-Trichloro-1,2,2-triflouroethane	1	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-34-3	1,1-Dichloroethane	5	**420,000 D**	**19**	**230 D**	**12,000 D**	**68**	**5.8**	**5.8**	**85,000 D**	**3,700 D**	**21.0**	**140,000 D**	**200 D**	**27**	**190,000 D**	**54**	**21**
75-35-4	1,1-Dichloroethene	5	8,000 U	**2.3**	1.0 U	**20,000 D**	**67**	1.0 U	1.0 U	**28,000 D**	**390 D**	**2.6**	**32,000 D**	**6.7**	**2.8**	**44,000 D**	**23**	**3.6**
120-82-1	1,2,4-Trichlorobenzene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
96-12-8	1,2-Dibromo-3-chloropropane	0.04	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
106-93-4	1,2-Dibromoethane	0.0006	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
95-50-1	1,2-Dichlorobenzene	3	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
107-06-2	1,2-Dichloroethane	0.6	**5,200 DJ**	1.0 U	**2.7**	2,000 U	**0.36 J**	1.0 U	1.0 U	20,000 U	**140 D**	**1.3**	10,000 U	**1.2**	**1.4**	20,000 U	**1.1**	**0.91 J**
78-87-5	1,2-Dichloropropane	1	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
541-73-1	1,3-Dichlorobenzene	3	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
106-46-7	1,4-Dichlorobenzene	3	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
594-20-7	2-Hexanone	5	40,000 U	5.0 U	1.0 U	10,000 U	5.0 U	5.0 U	5.0 U	100,000 U	250 U	5.0 U	50,000 U	5.0 U	5.0 U	100,000 U	5.0 U	5.0 U
78-93-3	2-Butanone (Methyl ethyl ketone)	50(GV)	80,000 U	10 U	1.0 U	20,000 U	10 U	10 U	10 U	200,000 U	500 U	10 U	100,000 U	10 U	10 U	200,000 U	10 U	10 U
108-10-1	4-Methyl-2-pentanone	NA	40,000 U	5.0 U	1.0 U	10,000 U	5.0 U	5.0 U	5.0 U	100,000 U	250 U	5.0 U	50,000 U	5.0 U	5.0 U	100,000 U	5.0 U	5.0 U
67-64-1	Acetone	50 (GV)	80,000 U	10 U	1.0 U	20,000 U	10 U	10 U	10 U	200,000 U	500 U	10 U	100,000 U	10 U	10 U	200,000 U	10 U	10 U
71-43-2	Benzene	1	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-27-4	Bromodichloromethane	50(GV)	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-25-2	Bromoform	50(GV)	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
74-83-9	Bromomethane	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-15-0	Carbon disulfide	60(GV)	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
56-23-5	Carbon tetrachloride	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
108-90-7	Chlorobenzene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-00-3	Chloroethane	5	8,000 U	1.0 U	**1.9**	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	**14**
67-66-3	Chloroform	7	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
74-87-3	Chloromethane	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
156-59-2	cis-1,2-Dichloroethene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
10061-01-5	cis-1,3-Dichloropropene	0.4	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
110-82-7	Cyclohexane	50	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
124-48-1	Dibromochloromethane	50(GV)	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-71-8	Dichlorodifluoromethane	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
100-41-4	Ethylbenzene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
98-82-8	Isopropylbenzene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
79-20-9	Methyl acetate	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
1634-04-4	Methyl tert-butyl ether	10(GV)	8,000 U	1.0 U	**3.7**	2,000 U	1.0 U	**8.2**	**8.4**	20,000 U	50 U	1.0 U	10,000 U	1.0 U	**14**	20,000 U	1.0 U	**7.0**
108-87-2	Methylcyclohexane	50	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-09-2	Methylene chloride	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
100-42-5	Styrene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
127-18-4	Tetrachloroethene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
108-88-3	Toluene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
156-60-5	trans-1,2-Dichloroethene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
10061-02-6	trans-1,3-Dichloropropene	0.4	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
79-01-6	Trichloroethene	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-69-4	Trichlorofluoromethane	5	8,000 U	1.0 U	1.0 U	2,000 U	1.0 U	1.0 U	1.0 U	20,000 U	50 U	1.0 U	10,000 U	1.0 U	1.0 U	20,000 U	1.0 U	1.0 U
75-01-4	Vinyl chloride	2	**11,000 D**	1.0 U	**6.3**	2,000 U	**1.6**	1.0 U	1.0 U	20,000 U	**91**	1.0 U	10,000 U	**4.9**	1.0 U	20,000 U	**1.6**	1.0 U
1330-20-7	Xylenes, Total	100	16,000 U	2.0 U	2.0 U	4,000 U	2.0 U	2.0 U	2.0 U	40,000 U	100 U	2.0 U	10,000 U	2.0 U	2.0 U	40,000 U	2.0 U	2.0 U
Total CVOCs		NA	**436,200**	**32**	**242**	**132,000**	**537**	**6**	**6**	**863,000**	**6,421**	**61**	**722,000**	**246**	**75**	**1,144,000**	**210**	**89**
Total VOCs		NA	**436,200**	**32**	**246**	**132,000**	**537**	**14**	**14**	**836,000**	**6,421**	**61**	**722,000**	**246**	**89**	**1,144,000**	**210**	**96**
	General Chemistry (µg/l)																	
NA	Total Organic Carbon	NA	**138,000**	**2,800**	**1,700**	**2,500**	**1,500**	**780**	**720**	**49.4 B**	**0.49 J**	**0.44 J**	**83.0**	**1.0 U**	**1.0 U**	**134**	**0.74 J**	**1.0 U**

Notes:

BOLD - The compound was detected at a concentration greater than or equal to the method detection limit (MDL).

BOLD/SHADED IN BLUE - The compound was detected at a concentration greater than New York State Ambient Water Quality Standards (AWQS) or Guidance Values (GV).
VOCs-Volatile Organic Compound
CVOCs-Chlorinated Volatile Organic Compound
µg/l - micrograms per liter
NA - Not applicable

U/ND - The compound was not detected at a concentration greater than or equal to the MDL.
J - The concentration given is an approximate value. The concentration is less than the reporting limit (RL) and greater than or equal to the MDL.
D - The reported value is from a secondary dilution analysis factor.
E - The compound concentration exceeded the calibration range.

Table 4-1
PVC Monitoring Wells to be Abandoned Prior to Thermal Remediation
Mid Hudson Business Park
Former Duso Chemical Company
Poughkeepsie, New York
NYSDEC Site No. 3-14-103

Well Identification	Disposition	Screened Material	Top of Casing Elevation (feet amsl)	Top of Screen		Bottom of Screen		Depth-to-Groundwater (feet bgs)	Total Well Depth (feet bgs)	Groundwater Elevation (feet amsl)
				feet bgs	feet amsl	feet bgs	feet amsl			
MHBP-8	Abandon	Silty Sand	110.57	5	105.57	15	95.57	3.41	12.70	107.16
MHBP-10	Abandon	Silty Sand	111.50	5	106.50	15	96.50	4.33	11.79	107.17
MHBP-11*	Replace on MHBP property	Silty Sand	112.06	10	102.06	20	92.06	NM	25.00	NA
MHBP-12*	Replace on MHBP property	Silty Sand	111.63	10	101.63	20	91.63	4.47	18.49	107.16
MHBP-13D	Abandon	Bedrock	110.58	38.5	72.08	43.5	67.08	4.09	43.44	106.49
MHBP-13S*	Replace on MHBP property	Silty Sand	110.29	10	100.29	20	90.29	3.95	16.00	106.34
MHC-29*	Replace	Silty Sand	112.51	10	102.51	20	92.51	4.46	18.93	108.05
MHC-30	Abandon	Silty Sand	112.57	9	103.57	19	93.57	4.53	16.45	108.04
OBG-8S	Abandon	Silty Sand	109.93	6.1	103.83	10.1	99.83	2.85	10.10	107.08

Notes:

Measurements collected on December 11, 2012

Top of casing and groundwater elevations based on USGS NAVD 1927

bgs - below ground surface

amsl - above mean sea level

NM - Not measured

NA - Not available

Screened material inferred, soil samples not recovered

* Requires replacement

Table 4-2
In Situ Thermal Remediation Groundwater Performance Monitoring
MHBP Area - Former Duso Chemical Site
Poughkeepsie, New York

Well	Screen Interval (ft bgs[3])		Months After System Start-Up[1]		After System Shutdown
	Top	Bottom	Pre-Start-Up	2, 4, 6	1 month
Thermal Treatment Area Wells (Stainless Steel)					
MHBP-11[2]	10	20	VOC[4]	CVOC[5]	VOC
MHBP-12[2]	10	20	VOC	CVOC	VOC
MHBP-13S[2]	10	20	VOC	CVOC	VOC
MHC-29[2]	10	20	VOC	CVOC	VOC
TW-1S	15	20	VOC	CVOC	VOC
TW-1I	25	35	VOC	CVOC	VOC
TW-1D	55	60	VOC	CVOC	VOC
TW-2S	15	20	VOC	CVOC	VOC
TW-2I	30	35	VOC	CVOC	VOC
TW-2D	60	65	VOC	CVOC	VOC
TW-3S	15	20	VOC	CVOC	VOC
TW-3I	25	35	VOC	CVOC	VOC
TW-3D	44	49	VOC	CVOC	VOC
TW-4S	5	10	VOC	CVOC	VOC
TW-4I	15	25	VOC	CVOC	VOC
TW-4D	35	40	VOC	CVOC	VOC
TW-5S	15	20	VOC	CVOC	VOC
TW-5D	25	35	VOC	CVOC	VOC
TW-6S	15	20	VOC	CVOC	VOC
TW-6I	30	35	VOC	CVOC	VOC
TW-6D	50	55	VOC	CVOC	VOC
TW-7S	15	20	VOC	CVOC	VOC
TW-7I	30	35	VOC	CVOC	VOC
TW-7D	52	57	VOC	CVOC	VOC
X-PROP-MWS	15	20	VOC	CVOC	VOC
X-PROP-MWI	25	30	VOC	CVOC	VOC
X-PROP-MWD	37.5	42.5	VOC	CVOC	VOC
Y-PROP-MWS	15	20	VOC	CVOC	VOC
Y-PROP-MWI	35	40	VOC	CVOC	VOC
Y-PROP-MWD	52.5	57.5	VOC	CVOC	VOC
Z-PROP-MWS	15	20	VOC	CVOC	VOC
Z-PROP-MWI	35	40	VOC	CVOC	VOC
Z-PROP-MWD	55	60	VOC	CVOC	VOC
Monitoring Wells Outside of Thermal Treatment Area					
MHBP-21	3	13	VOC	CVOC	VOC
OBG-7S	4.8	9.8	VOC	CVOC	VOC
OBG-7I	19.4	29.4	VOC	CVOC	VOC
OBG-7D	52	61.5	VOC	CVOC	VOC
OBG-8S	6.1	10.1	VOC	CVOC	VOC
MHBP-21D (new well)	15	25	VOC	CVOC	VOC
Number of samples			39	39	39

Notes:

[1] For samples collected during active heating, groundwater samples will be analyzed for a targeted CVOC analyte list that includes the following: 1,1,1-trichloroethane; 1,1-dichloroethane; 1,2-dichloroethane; 1,1-dichlorethene; chloroethane; trichloroethene; cis-1,2-dichloroethene; vinyl chloride; and methylene chloride.

[2] Replacement wells

[3] ft bgs - feet below ground surface

[4] VOC - Volatile Organic Compound by EPA Method 8260

[5] CVOC - Chlorinated Volatile Organic Compound

TABLE 4-3 THERMAL TREATMENT SYSTEM PERFORMANCE MONITORING

Location	Matrix	Number of Samples/ Locations per event	Parameters	Monitoring Frequency During Startup (2 weeks)	Laboratory Turnaround Time During Startup and Performance Testing	Frequency During Operation (4-8 months)	Laboratory Turnaround Time for Operation	Total Number of Analytical Samples
Vapor Recovery (points, trunk line or pre-condenser	Air	variable	Total VOCs (PID)	Daily	Field Measure	Weekly	Field Measure	variable
			Flow rate	Daily	Field Measure	Weekly	Field Measure	
			Vacuum Pressure	Daily	Field Measure	Weekly	Field Measure	
			Temperature	Daily	Field Measure	Weekly	Field Measure	
Blower Inlet	Air	3	Vacuum Pressure	Daily	Field Measure	Weekly	Field Measure	
Blower Outlet	Air	3	Flow rate	Daily	Field Measure	Weekly	Field Measure	
		3	Vacuum Pressure	Daily	Field Measure	Weekly	Field Measure	
		3	Temperature	Daily	Field Measure	Weekly	Field Measure	
Vapor Treatment Inlet	Air	1	TCL VOCs	Once/two weeks	5 days	Weekly	7 days	17-33
		1	Flow rate	Daily	Field Measure	Weekly	Field Measure	
		1	Pressure	Daily	Field Measure	Weekly	Field Measure	
		1	Temperature	Daily	Field Measure	Weekly	Field Measure	
		1	Total VOCs (PID)	Daily	Field Measure	Weekly	Field Measure	
Vapor Treatment Outlet	Air	1	TCL VOCs	Once/two weeks	7 days	Weekly	7 days	17-33
		1	Total VOCs (PID)	Daily	Field Measure	Weekly	Field Measure	
		1	Temperature	Daily	Field Measure	Weekly	Field Measure	

Figures

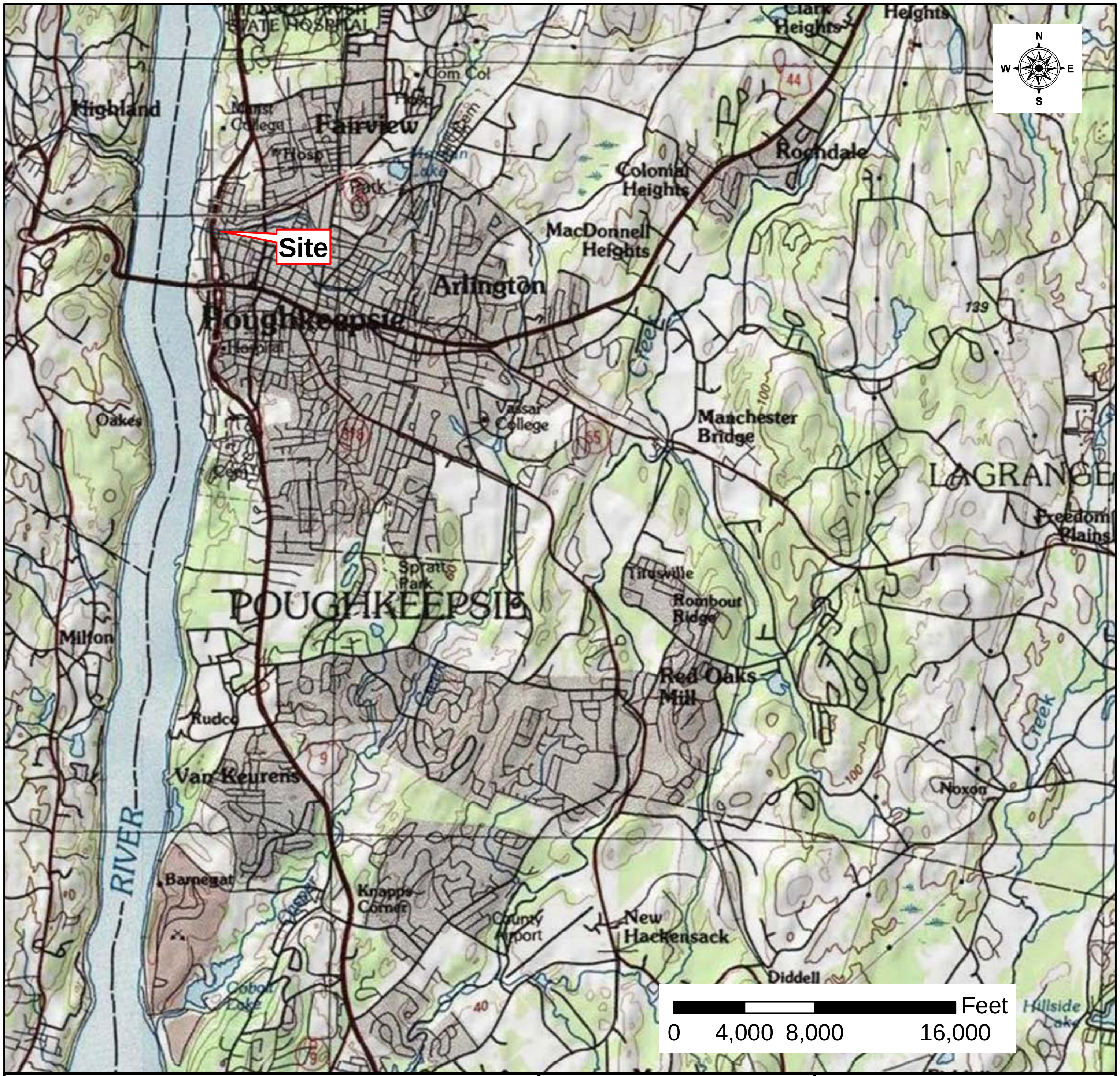

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FIGURE 1-1

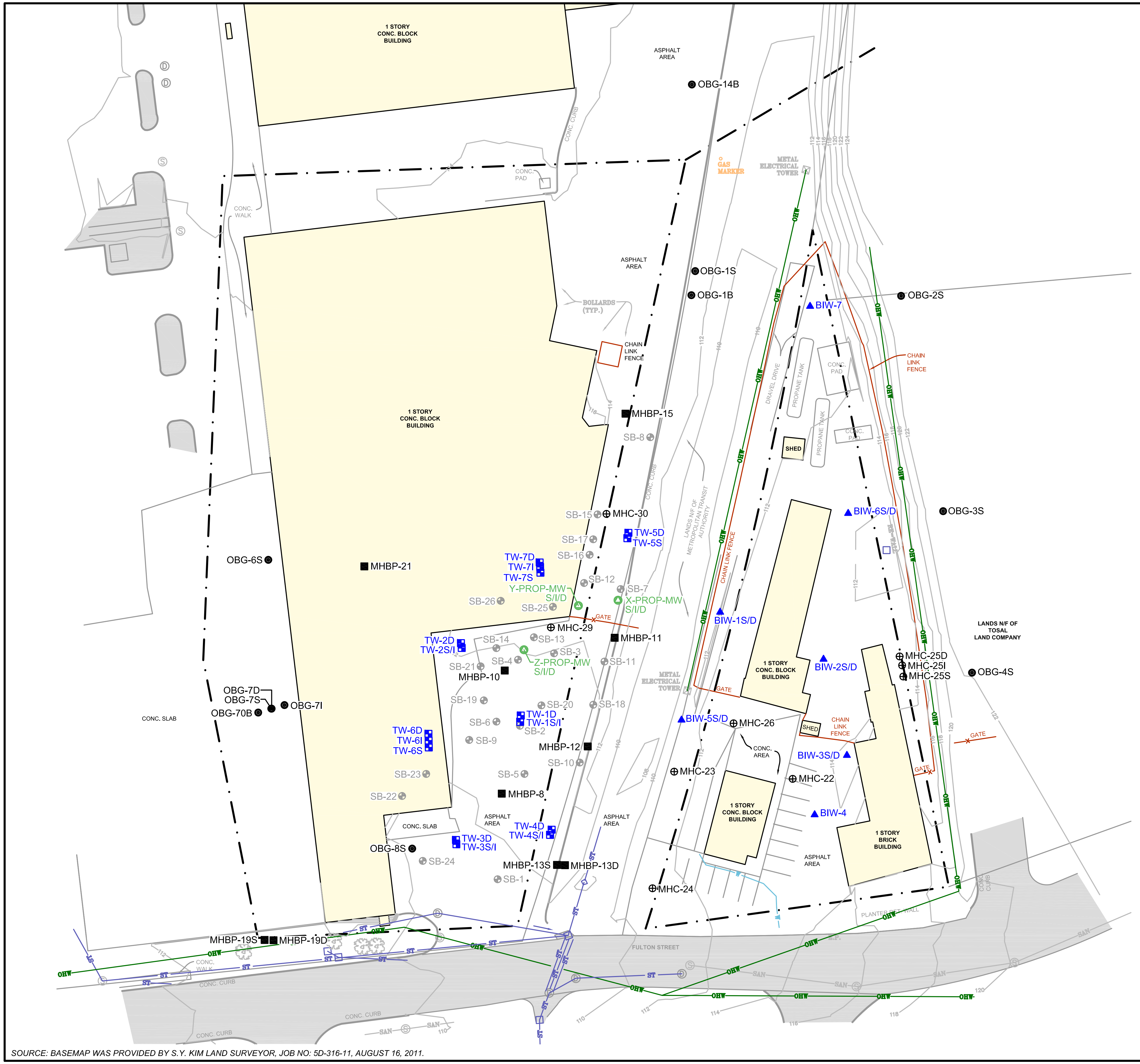
SITE LOCUS

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

Source: ArcGIS USA_Topo Maps

MARCH 2013

60279080



SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

N

LEGEND

BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▣	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D ●	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ●	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ●	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
☐	CATCH BASIN
Ⓓ	MANHOLES
✿	TREES
🟨	BUILDING
⬜	ROAD / PAVEMENT
—112—	TOPOGRAPHIC CONTOURS
— · —	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
——	PARCEL BOUNDARY
—OHW—	OVERHEAD WIRES
—W—	UNDERGROUND WATER
—SAN—	SANITARY SEWER LINE
—ST—	STORMWATER LINE
○	UNDERGROUND GAS

0 25 50 100
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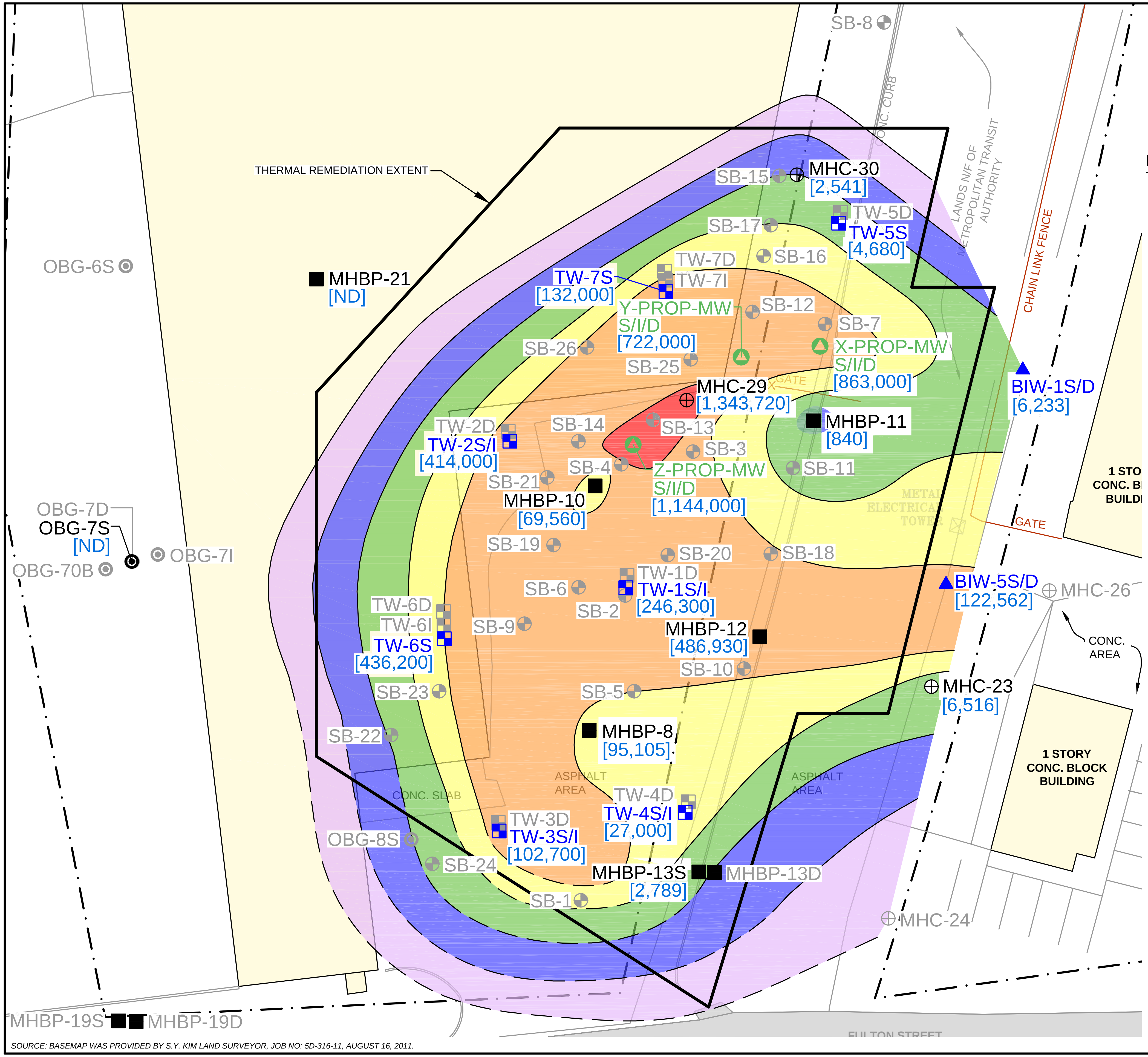
FIGURE 1-2
SITE PLAN

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013 60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_000 Site Plan.dwg, 3/5/2013 4:00:51 PM, Splawnm



SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

LEGEND

BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▣	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D △	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ◐	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ◉	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
[4,680]	CVOCs CONCENTRATION IN GROUNDWATER (µg/L)
[ND]	NON DETECT
───	CVOCs ISOCONCENTRATION CONTOUR LINE (DASHED WHERE INFERRED)
─ · ─	PROPERTY BOUNDARY (APPROXIMATE)
──x──	FENCE (APPROXIMATE)
───	PARCEL BOUNDARY
▭	BUILDING
▭	ROAD / PAVEMENT
▭	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER < 100 µg/L
▭	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 100 µg/L - 1,000 µg/L
🟩	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 1,000 µg/L - 10,000 µg/L
🟨	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 10,000 µg/L - 100,000 µg/L
🟧	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 100,000 µg/L - 1,000,000 µg/L
🟥	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER > 1,000,000 µg/L

0 15 30 60

SCALE IN FEET

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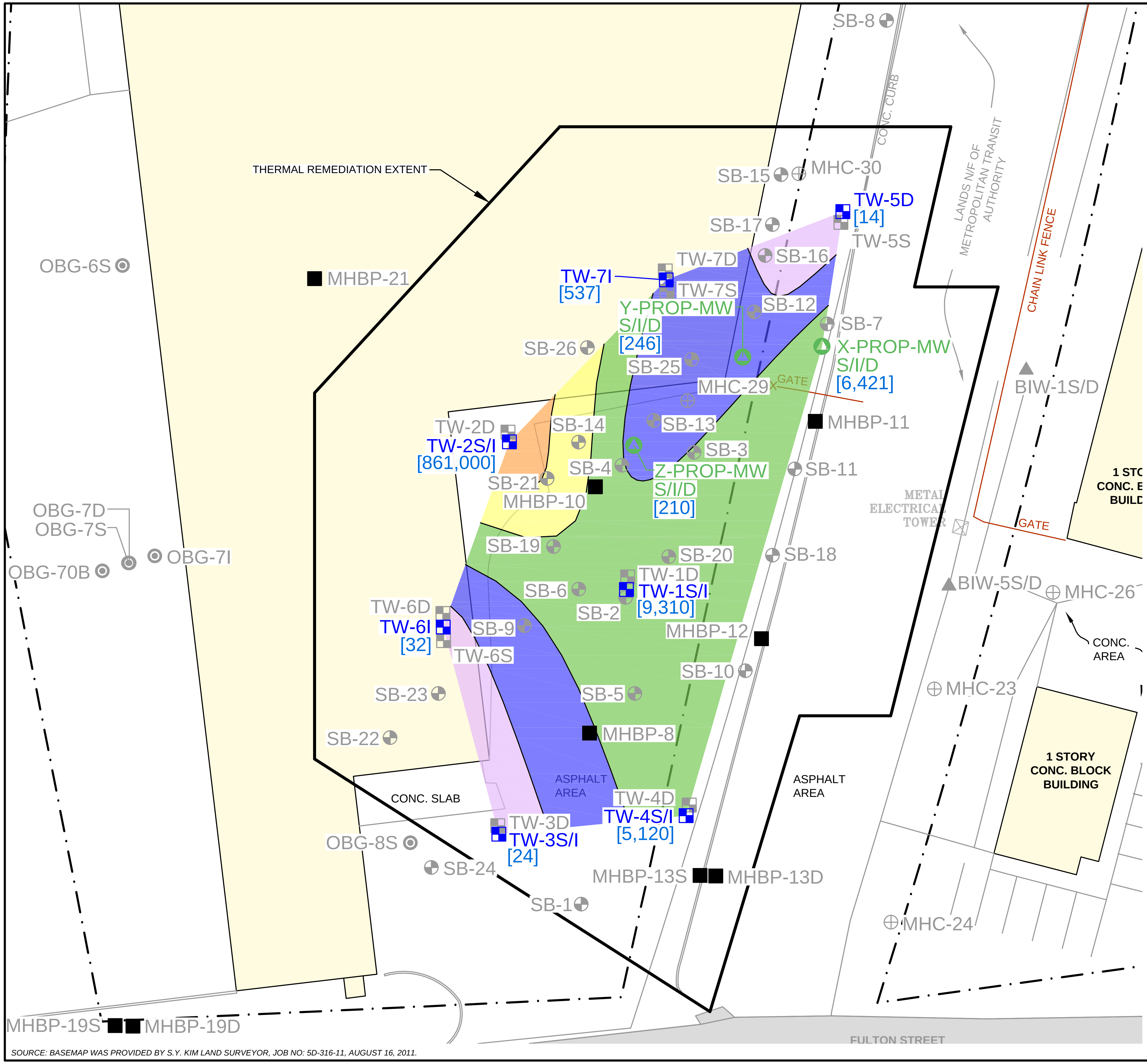
FIGURE 2-1
CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER - SHALLOW AQUIFER

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

FEBRUARY 2013

60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_014 CVOC in GW_Shallow.dwg, 2/28/2013 2:42:01 PM, Splawnm



SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

N

LEGEND

BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▚	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D ◬	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ◕	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ◉	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
[6,421]	CVOCs CONCENTRATION IN GROUNDWATER (µg/L)
———	CVOCs ISOCONCENTRATION CONTOUR LINE
— · —	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
———	PARCEL BOUNDARY
▭	BUILDING
▭	ROAD / PAVEMENT
🟪	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER < 100 µg/L
🟦	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 100 µg/L - 1,000 µg/L
🟩	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 1,000 µg/L - 10,000 µg/L
🟨	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 10,000 µg/L - 100,000 µg/L
🟧	CVOCs ISOCONCENTRATION CONTOUR IN GROUNDWATER 100,000 µg/L - 1,000,000 µg/L

0 15 30 60
SCALE IN FEET

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FIGURE 2-2
CVOCs ISOCONCENTRATION CONTOUR
IN GROUNDWATER - INTERMEDIATE AQUIFER

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

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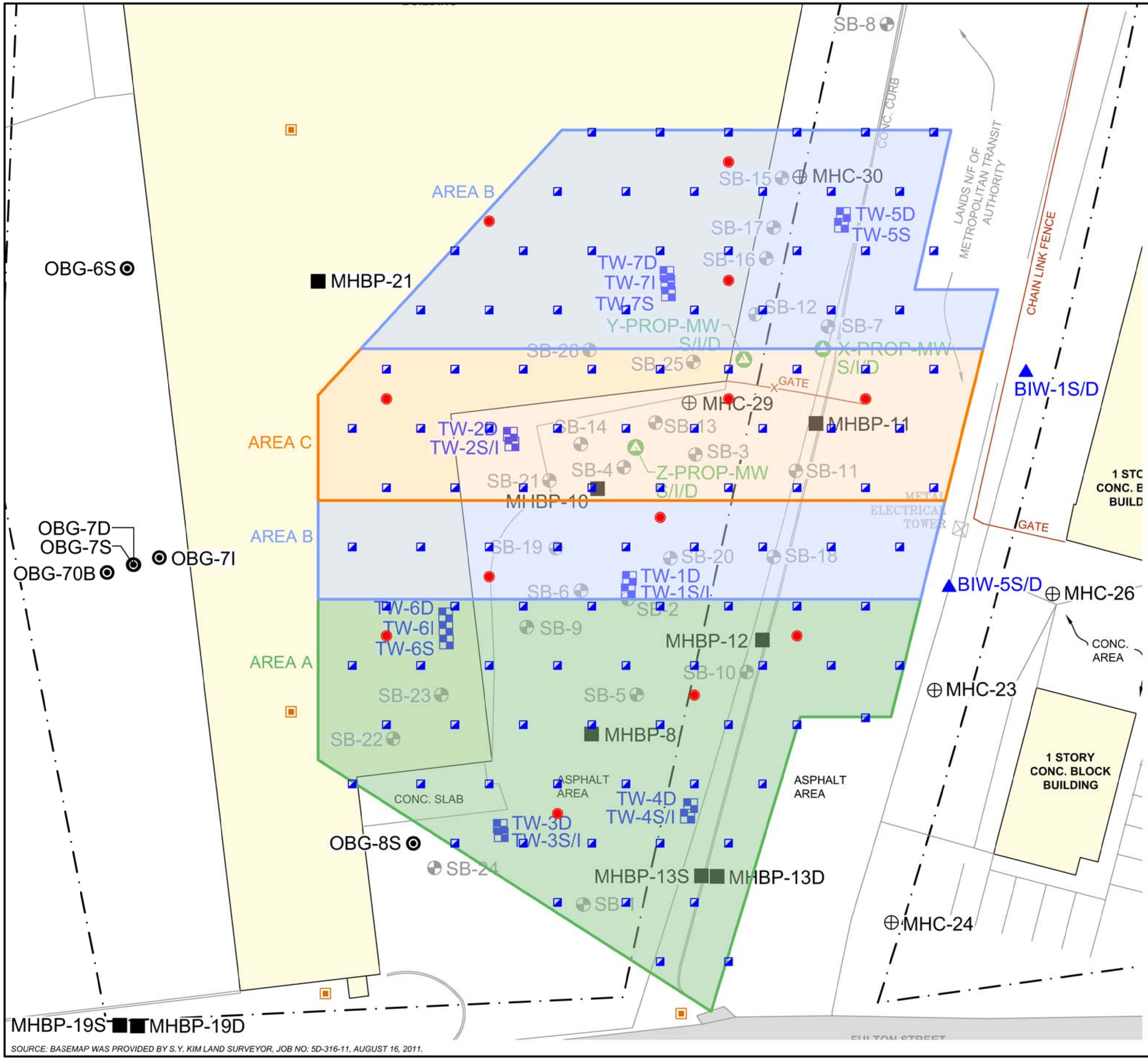

SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

N

LEGEND

◪	HEATER ELEMENTS (APPROXIMATE 20' ON CENTER)
●	TEMPERATURE MONITORING POINT (5' VERTICAL INTERVALS)
▣	SUBSURFACE PRESSURE MONITORING POINT
BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▚	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D △	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ◕	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ◉	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
▭	BUILDING
▬	ROAD / PAVEMENT
— · —	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
—	PARCEL BOUNDARY

NOTES

1. OBG-8S WAS "ND" FOR VOCs IN 2005 AND 2006.
2. IN SRI MHBP-21 IS "ND" FOR VOCs, BUT SCREEN IS ONLY 3-13'.

AREA	FOOTPRINT DEPTH (feet bgs)	FOOTPRINT AREA (sq. feet.)
A	5 - 25	12,688.39
B	5 - 35	14,269.81
C	5 - 50	8,288.18

0 15 30 60
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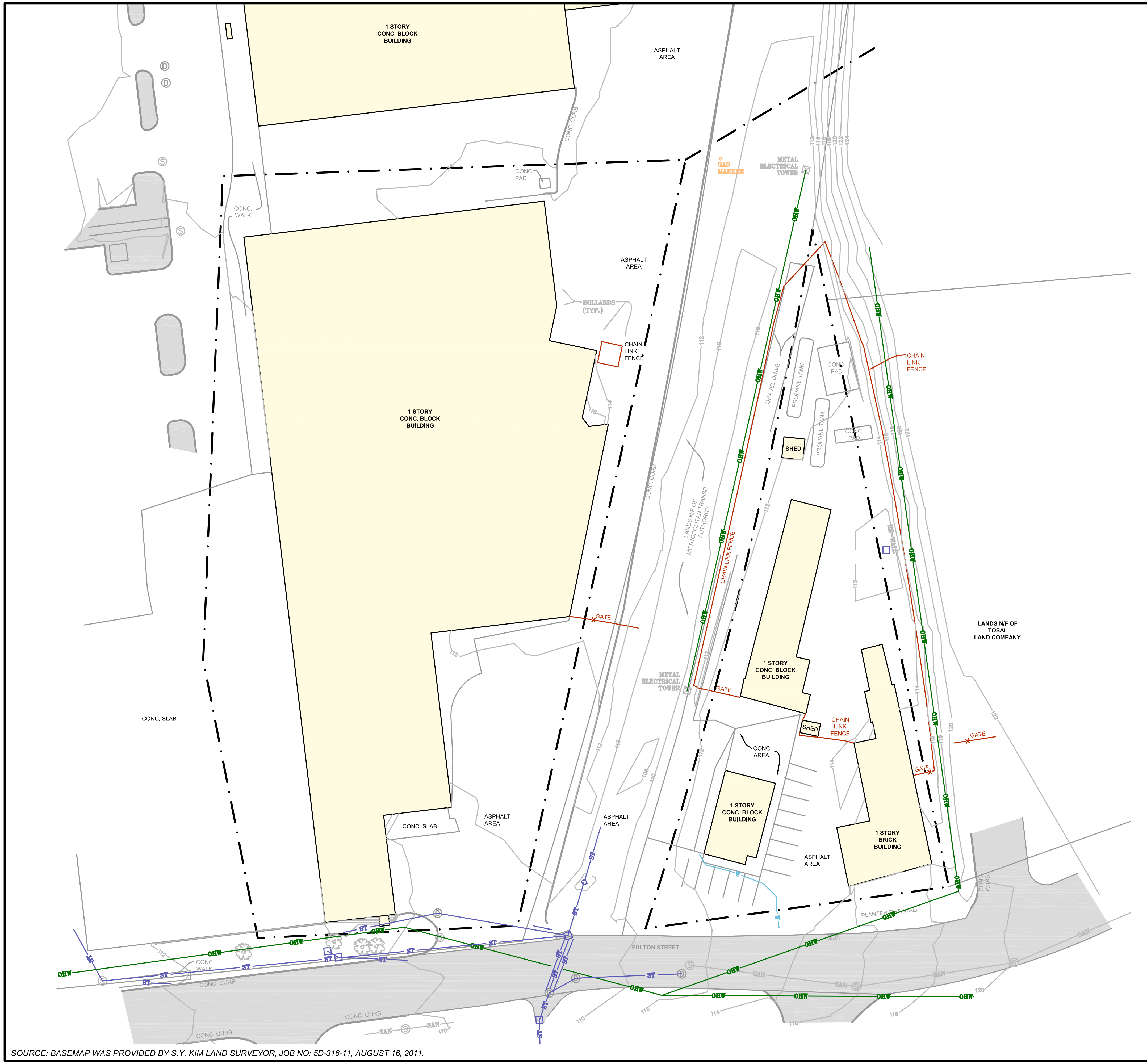
FIGURE 2-3
THERMAL REMEDIATION FOOTPRINT

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013 60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_013 Thermal Remediation Footprint.dwg, 3/5/2013 4:03:08 PM, Splawnm



SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

LEGEND

☐	CATCH BASIN
Ⓓ	MANHOLES
✲	TREES
🟨	BUILDING
▨	ROAD / PAVEMENT
—112—	TOPOGRAPHIC CONTOURS
— · —	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
——	PARCEL BOUNDARY
—OHW—	OVERHEAD WIRES
—W—	UNDERGROUND WATER
—SAN—	SANITARY SEWER LINE
—ST—	STORMWATER LINE
○	UNDERGROUND GAS

0 25 50 100
SCALE IN FEET

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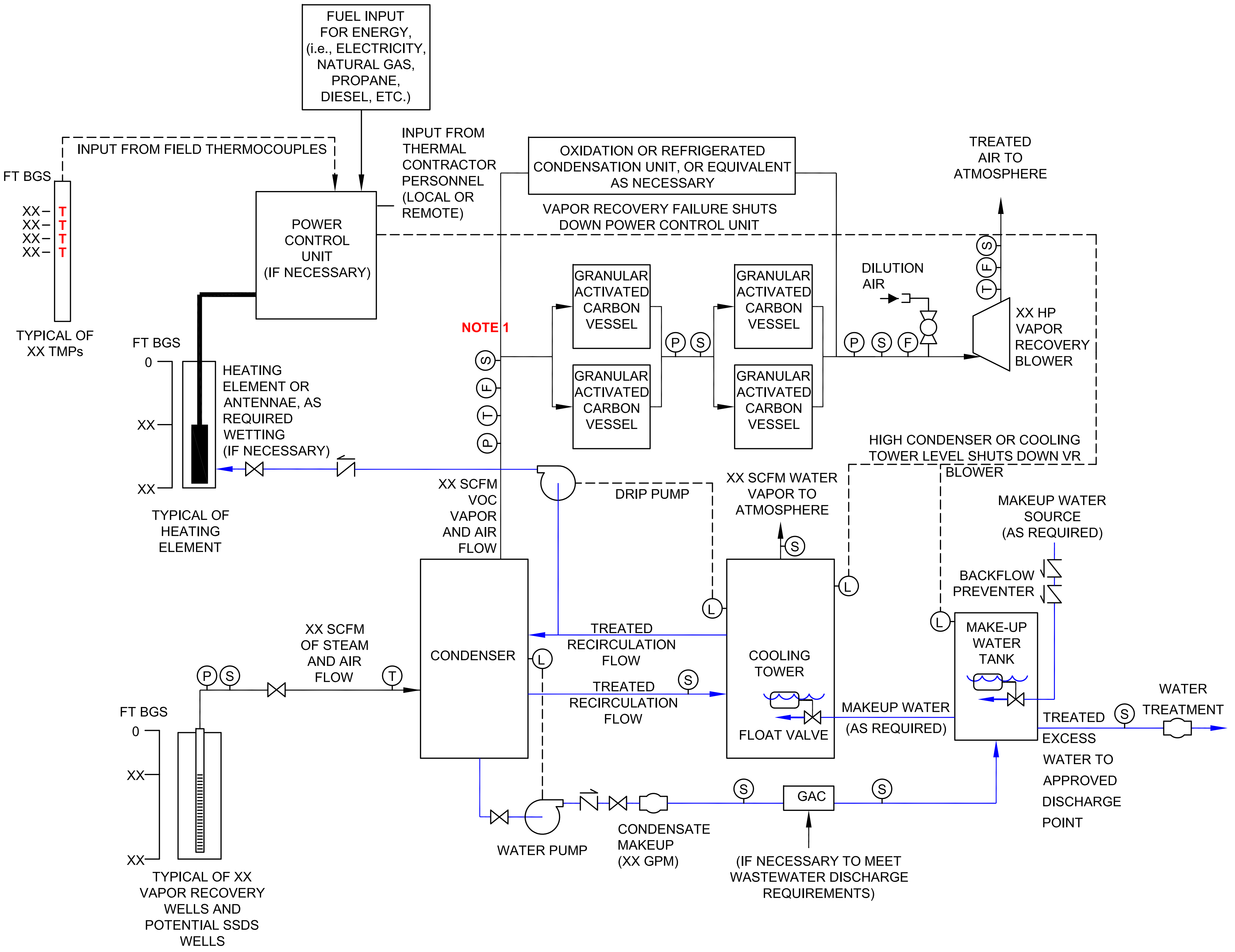
FIGURE 2-4
SITE PLAN WITH PHYSICAL FEATURES

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013
60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_017 Site Plan with Physical Features.dwg, 3/5/2013 5:05:06 PM, Splawnm



LEGEND:

Ⓟ	PRESSURE INDICATOR
Ⓣ	TEMPERATURE INDICATOR
Ⓢ	SAMPLE PORT
Ⓕ	FLOW RATE INDICATOR
T	THERMOCOUPLE
◯	WATER PUMP
⬭	TOTALIZING FLOW METER
⋈	BALL VALVE
⊳|	CHECK VALVE
Ⓛ	LIQUID LEVEL SENSOR
≋	MAKE-UP WATER TANK
– – –	CIRCUIT TO SHUTDOWN POWER HEATING CONTROL IF CONDENSED WATER EXCEEDS HANDLING CAPACITY

NOTES:

1. VAPOR TREATMENT EQUIPMENT WILL BE DETERMINED BY CONTRACTOR FOR APPROVAL BY DEPARTMENT ENGINEER BASED ON SPECIFIC EQUIPMENT PROPOSED AND APPROVED, AND MAY INCLUDE VAPOR GAC AND/OR OXIDATION UNIT.

2. QUANTIFYING PROCESS DESIGN FLOWS SHALL BE COMPLETED BY CONTRACTOR AS PART OF THE CONTRACTOR SUBMITTAL (WORK PLAN) BASED ON SPECIFIC EQUIPMENT PROPOSED AND APPROVED.

3. HEAT TRACING OF LINES MAY BE NECESSARY DURING COLD WEATHER MONTHS.

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FIGURE 3-1
PROCESS FLOW DIAGRAM

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2014
60279080

Figure 4-1
Schedule for In Situ Thermal Remediation
Former Duso Chemical Site - MHBP Property
Poughkeepsie, New York

	Month															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Contract Agreement (t=0)																
Notice to Proceed (20 d)	▨															
Permitting, Work Plan Approval, Materials Procurement (90 d)	▨	▨	▨	▨												
PVC Well Abandonment and Well Replacement (30 d)				▨												
Subsurface Construction (heating elements, wells, etc - 50 d)				▨	▨											
Above Ground Equipment Mobilization and Construction (30 d)					▨	▨										
Start-up and Shake-down (14 d)						▨										
Initial Heating to Target Temperature (50 d)							▨	▨								
Maintenance Heating (min 60 d; max period 170 d)								▨	▨	▨	▨	▨	▨	▨		
Shut-Down and Demobilization (60 d)														▨	▨	▨
Groundwater Performance Sampling						▨			▨		▨		▨		▨	
Soil Performance Sampling													▨			

Appendix A

Boring, Well Construction, and MIP Investigation Logs

AECOM, Inc.
40 British American Boulevard
Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **SB-A**

START DATE: **August 22, 2011**
END DATE: **August 22, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **West of the road**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **~45 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's, Sunny, No Rain, Breezy**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION		HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
	WEIGHT(S)						
	FALL			CASING	TUBE	CORE	RIG TYPE:
	TYPE						
	ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0 2.0		3.5'					0-0.8' Blacktop 0.8-2.8' coarse to fine(+) SAND, little Silt, trace fine Gravel 2.8-3.5' medium to fine SAND and SILT		
4.0 6.0		3.5					4-5.5' SILT, little fine Sand 5.5-6.5' coarse to fine(+) SAND and SILT 6.5-7.5' medium to fine(+) SAND		
8.0 10.0		3.8					8-8.5' SAA 8.5-8.9' coarse(+) to fine SAND 8.9-11.8' SILT and fine SAND, little Clay		
12.0 14.0	SB-A SS1-1516/DUP-1	4.0			VOCs 8260B		12-16' fine SAND, some Silt, trace Clay		
16.0 18.0		2.0					16-18' fine SAND, little Silt, trace Clay		
20.0									

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Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **SB-A**

START DATE: **August 22, 2011** END DATE: **August 22, 2011**

PROJECT NAME: **Former Duso Chemical Company** PROJECT NO.: **60165024** PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York** BORING LOCATION: **West of the road**
DRILLING CO.: **GeoLogic, Inc.** DRILLER: **John and Scott** DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch** DEPTH TO BEDROCK: TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **~45 fbgs** INSPECTOR: **Mark Howard** WEATHER CONDITIONS: **70's, Sunny, No Rain, Breezy**
LATITUDE: LONGITUDE: ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
20.0		4.0					20-219' transition from SILT to CLAYEY SILT to CLAY 21.9-24' CLAYEY SILT, little fine Sand		
22.0									
24.0	SB-A SSS2-2526/DUP-2	4.0			VOCs 8260B		24-28' SAA, Clay increasing		
26.0									
28.0		4.0					28-29' gray SILTY CLAY, trace fine Sand 29-32' gray CLAY, some Silt, trace fine Sand		
30.0									
32.0	SB-A SSS3-3535.5	3.5			VOCs 8260B		32-35.5' SAA		
34.0									
36.0		3.0					36-39' SAA, less Silt		
38.0									
40.0									

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BOREHOLE LOG

BORING ID #: **SB-A**

START DATE: **August 22, 2011**
END DATE: **August 22, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **West of the road**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **~45 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's, Sunny, No Rain, Breezy**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

ST. WATER LEVELS
DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

	HAMMER	SAMPLER	CASING	TUBE	CORE
WEIGHT(S)					
FALL					
TYPE					
ID/OD					

RIG TYPE:

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0	SB-A SSS4-4242.5	2.5			VOCs 8260B		40-42.5' SAA		
42.0									
44.0		1.0					44-45' gray coarse(+) to fine SAND, some medium to fine Gravel, rock fragments Probe Refusal @ ~45 fbgs		
46.0									
48.0									
50.0									
52.0									
54.0									
56.0									
58.0									
60.0									

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BOREHOLE LOG

BORING ID #: **SB-B**

START DATE: **August 23, 2011**
END DATE: **August 23, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Along the building**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **~50.5 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **60's, Cloudy, Sun @ times**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER
WEIGHT(S)		
FALL		
TYPE		
ID/OD		

ST. WATER LEVELS
DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

CASING	TUBE	CORE

RIG TYPE:

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0 2.0		3.0					0-0.4' Blacktop 0.4-2.2' coarse, medium(+), to fine SAND and SILT, trace Gravel, trace Clay 2.2-3' SILT		
4.0 6.0		2.7					4-6' transition from SILT and CLAY to CLAYEY SILT 6-6.7' coarse(+) to fine SAND and medium to fine GRAVEL, rock fragments		
8.0 10.0		4.0					8-9.5' SAA 9.5-11.8' varying amounts of CLAY and SILT 11.8-12' medium to fine(+) SAND		
12.0 14.0		3.5					12-14.5' SAA 14.5-15.5' CLAYEY SILT transitioning into SILTY and SAND		
16.0 18.0	SB-B SSS1-17.518	3.5			VOCs 8260B		16-17' gray CLAY, trace Silt 17-19.5 SAND and SILT		
20.0									

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BOREHOLE LOG

BORING ID #: **SB-B**

START DATE: **August 23, 2011**
END DATE: **August 23, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Along the building**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **~50.5 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **60's, Cloudy, Sun @ times**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

	HAMMER	SAMPLER	ST. WATER LEVELS			
WEIGHT(S)				DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
			CASING	TUBE	CORE	RIG TYPE:
FALL						
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
20.0 22.0		3.0					20-23' gray to dark gray CLAYEY SILT		
24.0 26.0	SB-B SSS2-2526	4.0			VOCs 8260B		24-28' SAA		
28.0 30.0		4.0					28-32' gray SILTY CLAY, trace fine Sand		
32.0 34.0	SB-B SSS3-3233	4.0			VOCs 8260B		32-36' gray CLAY, some SILT, trace fine Sand		
36.0 38.0	SB-B SSS4-3738	3.8			VOCs 8260B		36-39.8' SAA		
40.0									

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BOREHOLE LOG

BORING ID #: **SB-B**

START DATE: **August 23, 2011**
END DATE: **August 23, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Along the building**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **~50.5 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **60's, Cloudy, Sun @ times**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS			
WEIGHT(S)				DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL / REMARKS
40.0							40-43.8' SAA		
42.0		3.8							
44.0							44-46.5' SAA		
46.0	SB-B SSS5-4546	2.5			VOCs 8260B				
48.0							48-50' SAA 50-50.5' gray to dark gray coarse(+) to fine SAND and medium to fine GRAVEL, rock fragments, some Silt and Clay Probe Refusal @ ~50.5 fbgs		
50.0		2.5							
52.0									
54.0									
56.0									
58.0									
60.0									

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BOREHOLE LOG

BORING ID #: **SB-C**

START DATE: **August 23, 2011**
END DATE: **August 23, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Along southern edge of building, near MW-Z**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **60's, Cloudy, Sun @ times**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0 2.0		3.3					0-0.3' Blacktop 0.3-3.3' SAND and SILT transitioning into SILT		
4.0 6.0		4.0					4-4.4' SAA 4.4-5.6' CLAYEY SILT 5.6-6.1' coarse(+) to fine SAND and medium to fine GRAVEL, rock fragments 6.1-8' brown to light brown CLAYEY SILT, trace fine Sand		
8.0 10.0		4.0					8-9.5' SAA 9.5-12' gray fine SAND, some Silt, little Clay		
12.0 14.0		3.5					12-15.5' gray medium to fine(+) SAND and SILT, little Clay		
16.0 18.0	SB-C SSS1-1819	3.8			VOCs 8260B		16-19.8' SAA		
20.0									

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BOREHOLE LOG

BORING ID #: **SB-C**

START DATE: **August 23, 2011**
END DATE: **August 23, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Along southern edge of building, near MW-Z**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **60's, Cloudy, Sun @ times**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
20.0							20-23.1' gray medium to fine(+) SAND and SILT 23.1-23.8' gray CLAYEY SILT, some medium to fine(+) Sand		
22.0		3.8							
24.0							24-26' gray SILT, some Clay, trace fine Sand 26-27' gray CLAY, some Silt, trace fine Sand		
26.0		3.0							
28.0	SB-C SSS2-3031				VOCs 8260B		28-28.8' gray SILTY CLAY, trace fine Sand 28.8-31.5' gray CLAY, some Silt, trace fine Sand		
30.0		3.5							
32.0							32-36' SAA		
34.0		4.0							
36.0							36-39' SAA		
38.0		3.0							
40.0									

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BOREHOLE LOG

BORING ID #: **SB-C**

START DATE: **August 23, 2011**
END DATE: **August 23, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Along southern edge of building, near MW-Z**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **60's, Cloudy, Sun @ times**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
40.0 42.0	SB-C SSS3-4343.5	3.5			VOCs 8260B		40-42.4' SAA 42.4-43.5' gray CLAYEY SILT, some fine Sand		
44.0 46.0		4.0					44-48' gray CLAY, some Silt, trace fine Sand		
48.0 50.0	SB-C SSS4-5051	4.0			VOCs 8260B		48-52' SAA		
52.0 54.0		4.0					52-56' SAA		
56.0 58.0							No more drill rods.		
60.0									

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BOREHOLE LOG

BORING ID #: **SB-D**

START DATE: **August 24, 2011**
END DATE: **August 24, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **East of MW-Z**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's Breezy ,Very Sunny**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0 2.0		4.0					0-0.3' Blacktop 0.3-4' variation of SAND and SILT		
4.0 6.0		2.5					4-4.2' SAA 4.2-5.1' green to grayish green coarse(+) to fine SAND and medium to fine GRAVEL, some Silt, little Clay 5.1-5.6' green to grayish green CLAYEY SILT, yellow green mottling 5.6-6.5' gray SILT and fine SAND, trace Clay		
8.0 10.0		2.0					8-10' SAA		
12.0 14.0	SB-D SSS1-1213	3.0			VOCs 8260B		12-13.8' SAA 13.8-15' gray CLAYEY SILT, some fine Sand		
16.0 18.0		3.0					16-19' SAA, less Sand		
20.0									

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BOREHOLE LOG

BORING ID #: **SB-D**

START DATE: **August 24, 2011** END DATE: **August 24, 2011**

PROJECT NAME: **Former Duso Chemical Company**
SITE LOCATION: **Poughkeepsie, New York**
DRILLING CO.: **GeoLogic, Inc.**
BOREHOLE DIAMETER: **2.25 inch**
TOTAL DEPTH REACHED: **56 fbgs**
LATITUDE:

PROJECT NO.: **60165024**
BORING LOCATION: **East of MW-Z**
DRILLER: **John and Scott**
DEPTH TO BEDROCK:
INSPECTOR: **Mark Howard**
LONGITUDE:

PROJECT MANAGER: **Dan Servetas**
DRILLING METHOD: **Direct Push - Geoprobe**
TOTAL DEPTH DRILLED: **NA**
WEATHER CONDITIONS: **70's Breezy ,Very Sunny**
ELEVATION AND DATUM:

	HAMMER	SAMPLER	ST. WATER LEVELS			
WEIGHT(S)				DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL / REMARKS
20.0	SB-D SSS2-2021	4.0			VOCs 8260B		20-21.4' gray fine SAND and SILT, some Clay 21.4-23.6' gray CLAYEY SILT, little fine Sand 23.6-24' gray CLAY, some Silt, little fine Sand		
22.0									
24.0		2.0					24-26' SAA, less Silt		
26.0									
28.0		4.0					28-32' SAA, less Silt		
30.0									
32.0	SB-D SSS3-3536	3.0			VOCs 8260B		32-35' SAA		
34.0									
36.0		4.0					36-40' SAA		
38.0									
40.0									

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BOREHOLE LOG

BORING ID #: **SB-D**

START DATE: **August 24, 2011**
END DATE: **August 24, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **East of MW-Z**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's Breezy ,Very Sunny**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0 42.0		1.5					40-41.5' SAA		
44.0 46.0	SB-D SSS4-4546	3.5			VOCs 8260B		44-47.5' SAA		
48.0 50.0		4.0					48-52' SAA		
52.0 54.0		4.0					52-55.5' SAA 55.5-56' dark gray coarse(+) to fine SAND and medium(+) to fine GRAVEL, some Silt and Clay		
56.0 58.0							No more drill rods.		
60.0									

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BOREHOLE LOG

BORING ID #: **SB-E**

START DATE: **August 24, 2011**
END DATE: **August 24, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **South of SB-C, near MIP-21**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's Breezy ,Very Sunny**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)			LEVELS	DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0 2.0		3.8					0-0.3' Blacktop 0.3-3.8' variation of SILT and SAND		
4.0 6.0	SB-E SSS1-0708	4.0			VOCs 8260B		4-4.5' SAA 4.5-5.7' coarse(+) to fine SAND and medium(+) to fine GRAVEL, some Silt, trace Clay, rock fragments 5.7-6.2' CLAYEY SILT 6.2-8' medium to fine(+) SAND, Silt, little Clay		
8.0 10.0		3.0					8-11' variation of CLAYEY SILT and SILTY CLAY		
12.0 14.0	SB-E SSS2-13.514	4.0			VOCs 8260B		12-13' gray medium to fine(+) SAND, some Silt and Clay 13-13.5' gray SILTY CLAY, some medium to fine(+) Sand 13.5-15' gray medium to fine SAND, some Silt and Clay 15-16' gray SILTY CLAY, some medium to fine(+) Sand		
16.0 18.0		4.0					16-20' gray SANDY SILT, some Clay		
20.0									

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BOREHOLE LOG

BORING ID #: **SB-E**

START DATE: **August 24, 2011**
END DATE: **August 24, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **South of SB-C, near MIP-21**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's Breezy ,Very Sunny**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER
WEIGHT(S)		
FALL		
TYPE		
ID/OD		

ST. WATER LEVELS
DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

CASING	TUBE	CORE	RIG TYPE:

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
20.0 22.0	SB-E SSS3-2223	4.0			VOCs 8260B		20-24' SAA		
24.0 26.0		4.0					24-28' gray CLAYEY SILT, little fine Sand clay content increases with depth		
28.0 30.0		3.0					28-29' gray SILTY CLAY, little fine Sand 29-31' gray CLAY, some Silt, little fine Sand		
32.0 34.0	SB-E SSS4-3233	4.0			VOCs 8260B		32-36' SAA		
36.0 38.0		4.0					36-40' SAA		
40.0									

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40 British American Boulevard
Latham, New York 12110
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Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **SB-E**

START DATE: **August 24, 2011**
END DATE: **August 24, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **South of SB-C, near MIP-21**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **70's Breezy ,Very Sunny**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION		HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
	WEIGHT(S)						
	FALL			CASING	TUBE	CORE	RIG TYPE:
	TYPE						
	ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0	SB-E SSS5-4242.5	2.5			VOCs 8260B		40-42.5' SAA, less Silt		
42.0									
44.0		3.5					44-47.5' SAA, less Silt		
46.0									
48.0		3.5					48-51.5' SAA		
50.0									
52.0		4.0					52-55.5' SAA 55.5-56' gray medium to fine SAND and SILT, some Clay Shoe - gray CLAY, little Silt, trace fine Sand		
54.0									
56.0							No more drill rods.		
58.0									
60.0									

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40 British American Boulevard
Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **SB-F**

START DATE: **August 25, 2011**
END DATE: **August 25, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **West of SB-E, along building**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **Cloudy, 60's, Heavy Rain**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------- REMARKS
0.0		3.3					0-0.3' Blacktop 0.3-3.3' variation of SILT and SAND		
2.0									
4.0		3.8					4-4.3' SAA 4.3-4.5' brown to light brown SILT and fine SAND, some Clay 4.5-6.6' light brown to tan CLAYEY SILT, some fine Sand 6.6-7.8' gray SILT and fine SAND, some Clay		
6.0									
8.0		3.5					8-9' SAA 9-10' gray CLAYEY SILT, little fine Sand 10-11.5' gray SILTY CLAY, little fine Sand		
10.0									
12.0	SB-F SSS1-1516	4.0			VOCs 8260B		12-14.6' gray SANDY SILT, some Clay 14.6-15.2' gray CLAY, some Silt, little fine Sand 15.2-16' gray CLAYEY SILT, little Sand		
14.0									
16.0		3.5					16-16.2' gray CLAY, some Silt, little fine Sand 16.2-19.5' gray SILTY SAND, some Clay		
18.0									
20.0									

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BOREHOLE LOG

BORING ID #: **SB-F**

START DATE: **August 25, 2011**
END DATE: **August 25, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **West of SB-E, along building**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **Cloudy, 60's, Heavy Rain**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

	HAMMER	SAMPLER	ST. WATER LEVELS			
WEIGHT(S)				DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
20.0 22.0	SB-F SSS2-2122	3.8			VOCs 8260B		20-21.7' SAA 21.7-22.8' gray CLAY, some Silt, little fine Sand 22.8-23.8' gray SILTY CLAY, little fine Sand		
24.0 26.0		4.0					24-25.4' SAA 25.4-26.2' SAA 26.2-28' gray CLAY, some Silt, little fine Sand		
28.0 30.0		4.0					28-32' SAA		
32.0 34.0		4.0					32-36' SAA		
36.0 38.0		4.0					36-40' SAA		
40.0									

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BOREHOLE LOG

BORING ID #: **SB-F**

START DATE: **August 25, 2011**
END DATE: **August 25, 2011**

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60165024**
PROJECT MANAGER: **Dan Servetas**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **West of SB-E, along building**
DRILLING CO.: **GeoLogic, Inc.**
DRILLER: **John and Scott**
DRILLING METHOD: **Direct Push - Geoprobe**
BOREHOLE DIAMETER: **2.25 inch**
DEPTH TO BEDROCK:
TOTAL DEPTH DRILLED: **NA**
TOTAL DEPTH REACHED: **56 fbgs**
INSPECTOR: **Mark Howard**
WEATHER CONDITIONS: **Cloudy, 60's, Heavy Rain**
LATITUDE:
LONGITUDE:
ELEVATION AND DATUM:

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
			CASING	TUBE	CORE	RIG TYPE:
FALL						
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	SAMPLE ID	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0 42.0	SB-F SSS3-4243	3.0			VOCs 8260B		40-43' SAA, less Silt		
44.0 46.0		4.0					44-48' SAA		
48.0 50.0	SB-F SSS4-5051	4.0			VOCs 8260B		48-52' SAA		
52.0 54.0		3.0					52-54.7' SAA 54.7-55' dark gray coarse(+) to medium SAND and medium to fine GRAVEL, some Silt, trace Clay Rod Refusal @ ~55 fbgs		
56.0 58.0									
60.0									

AECOM

WELL CONSTRUCTION DETAILS

FIELD REPRESENTATIVE: Bryon Blaydes
DRILLING CONTRACTOR: Geologic

DRILLING TECHNIQUE: Hollow Stem Augers
SIZE AND TYPE: 4.25" I.D. Flighted

BOREHOLE IDENTIFICATION: **MW-X**
BOREHOLE DIAMETER: 4.25" HSA
WELL IDENTIFICATION: MW-xA, MW-xB, MW-xC

WELL CONSTRUCTION START DATE: 8/17/2011
WELL CONSTRUCTION COMPLETION DATE: 8/17/2011
SCREEN MATERIAL: Stainless Steel
SCREEN DIAMETER: 1" I.D.
SCREENED INTERVAL (ft.): 15-20 xA, 25-30 xB, 37.5-42.5 xC

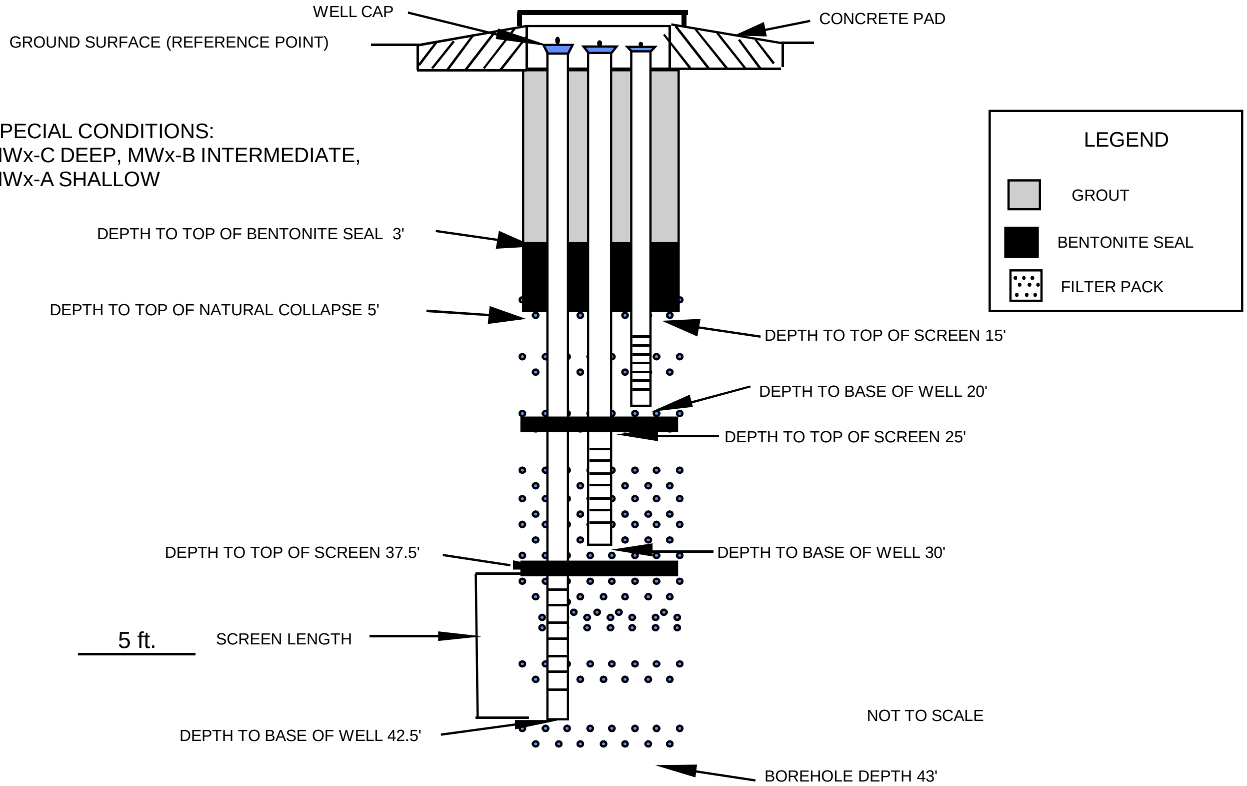
RISER MATERIAL: Stainless Steel
RISER DIAMETER: 1" I.D.

TYPE OF FILTER PACK: #1 Morie sand
GRADATION: N/A
AMOUNT OF FILTER PACK USED: N/A

TYPE OF BENTONITE: Pure Gold
AMOUNT OF BENTONITE: 1 Bag

TYPE OF CEMENT: Portland Type II
AMOUNT CEMENT USED: 75 Lbs.
GROUT MATERIALS USED: Bentonite Powder

DIMENSIONS OF SECURITY CASING: 8"
TYPE OF WELL CAP: Slip
TYPE OF END CAP: Flush Threaded
COMMENTS:



SPECIAL CONDITIONS:
MWx-C DEEP, MWx-B INTERMEDIATE,
MWx-A SHALLOW

WELL CONSTRUCTION DETAILS

FIELD REPRESENTATIVE: Mark Howard

DRILLING CONTRACTOR: Geologic

DRILLING TECHNIQUE: Hollow Stem Augers
SIZE AND TYPE: 4.25" I.D. Flighted

BOREHOLE IDENTIFICATION: **MW-Y**
BOREHOLE DIAMETER: 4.25" HSA
WELL IDENTIFICATION: MW-yA, MW-yB, MW-yC

WELL CONSTRUCTION START DATE: 8/29/2011
WELL CONSTRUCTION COMPLETION DATE: 8/31/2011
SCREEN MATERIAL: Stainless Steel
SCREEN DIAMETER: 1" I.D.
SCREENED INTERVAL (ft.): 15-20 yA, 35-40 xB, 52.5-57.5 xC

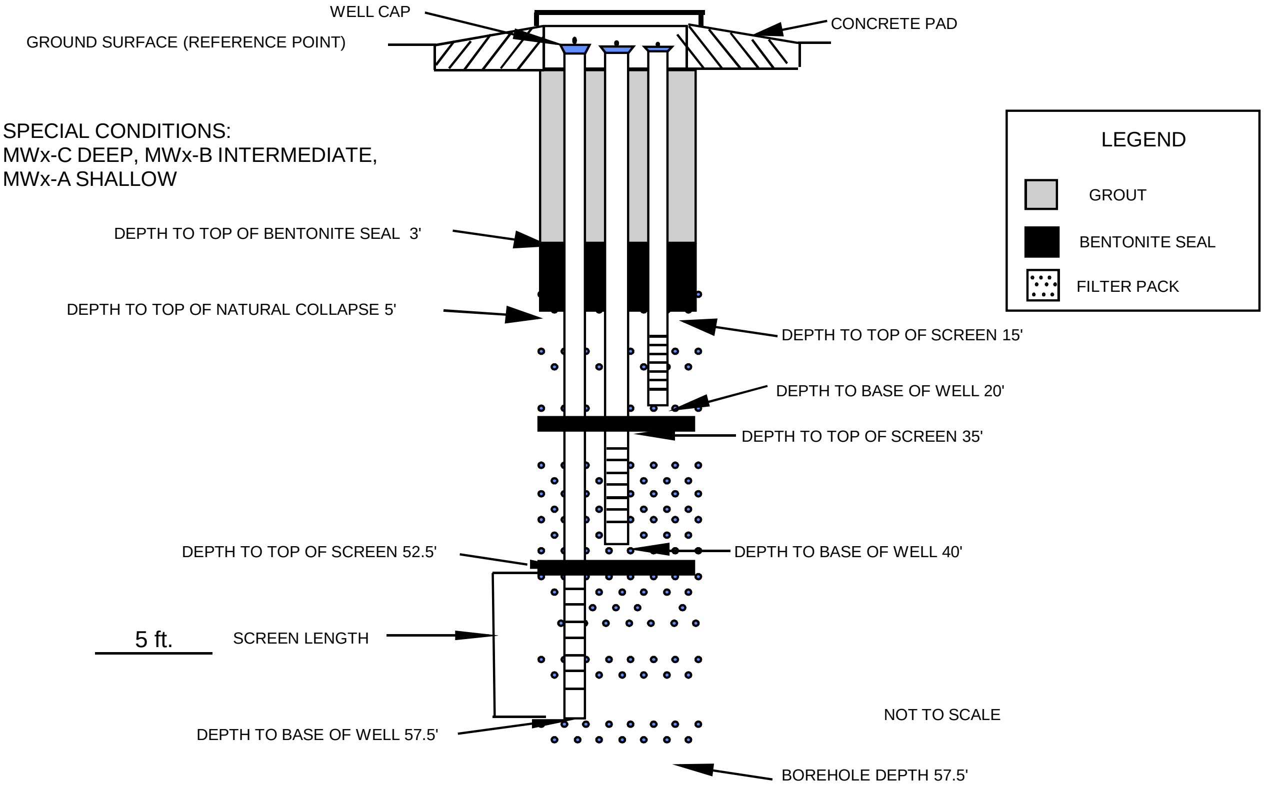
RISER MATERIAL: Stainless Steel
RISER DIAMETER: 1" I.D.

TYPE OF FILTER PACK: #1 Morie sand
GRADATION: N/A
AMOUNT OF FILTER PACK USED: N/A

TYPE OF BENTONITE: Pure Gold
AMOUNT OF BENTONITE: 1 Bag

TYPE OF CEMENT: Portland Type II
AMOUNT CEMENT USED: 75 Lbs.
GROUT MATERIALS USED: Bentonite Powder

DIMENSIONS OF SECURITY CASING: 8"
TYPE OF WELL CAP: Slip
TYPE OF END CAP: Flush Threaded
COMMENTS:



WELL CONSTRUCTION DETAILS

FIELD REPRESENTATIVE: Mark Howard
DRILLING CONTRACTOR: Geologic

DRILLING TECHNIQUE: Hollow Stem Augers
SIZE AND TYPE: 4.25" I.D. Flighted

BOREHOLE IDENTIFICATION: **MW-Z**
BOREHOLE DIAMETER: 4.25" HSA
WELL IDENTIFICATION: MW-zA, MW-zB, MW-zC

WELL CONSTRUCTION START DATE: 8/31/2011
WELL CONSTRUCTION COMPLETION DATE: 9/1/2011
SCREEN MATERIAL: Stainless Steel
SCREEN DIAMETER: 1" I.D.
SCREENED INTERVAL (ft.): 15-20 zA, 35-40 zB, 55-60 zC

RISER MATERIAL: Stainless Steel
RISER DIAMETER: 1" I.D.

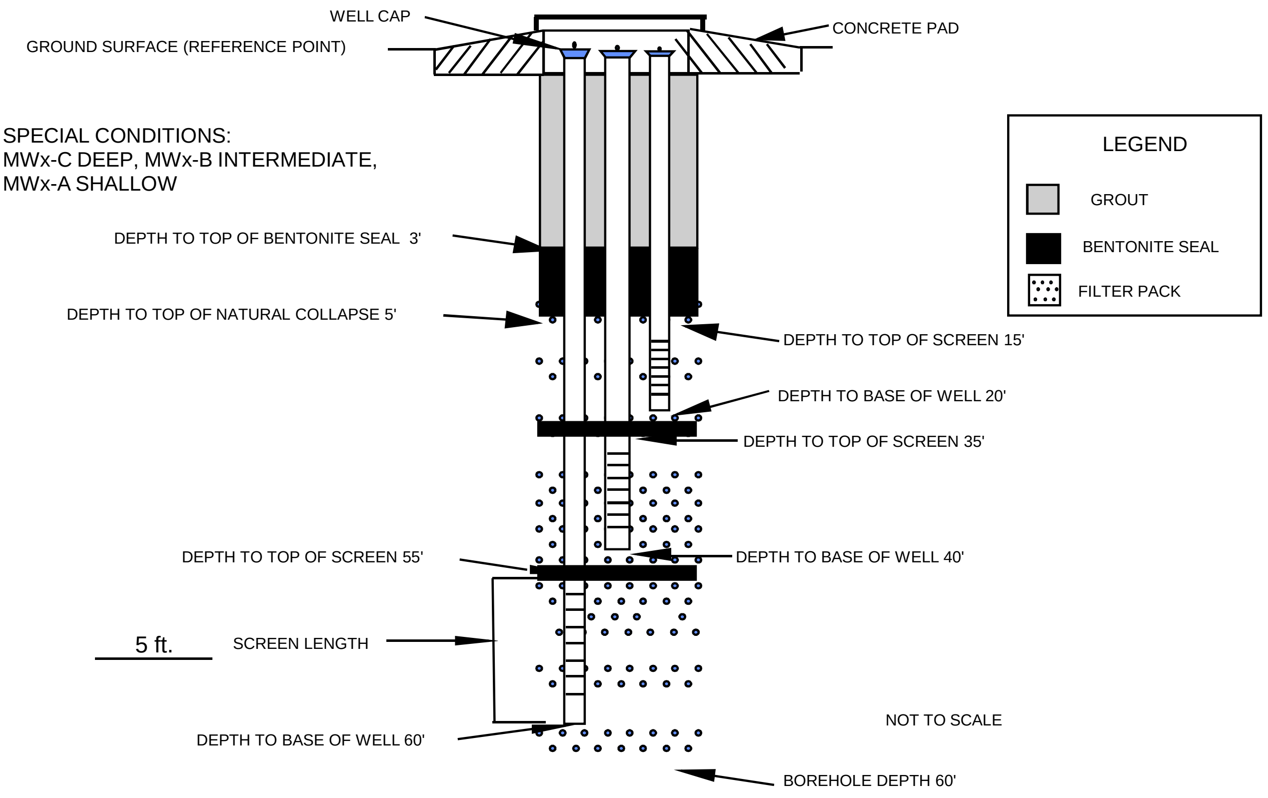
TYPE OF FILTER PACK: #1 Morie sand
GRADATION: N/A
AMOUNT OF FILTER PACK USED: N/A

TYPE OF BENTONITE: Pure Gold
AMOUNT OF BENTONITE: 1 Bag

TYPE OF CEMENT: Portland Type II
AMOUNT CEMENT USED: 75 Lbs.
GROUT MATERIALS USED: Bentonite Powder

DIMENSIONS OF SECURITY CASING: 8"
TYPE OF WELL CAP: Slip
TYPE OF END CAP: Flush Threaded
COMMENTS:

SPECIAL CONDITIONS:
MWx-C DEEP, MWx-B INTERMEDIATE,
MWx-A SHALLOW



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40 British American Boulevard
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BOREHOLE LOG

BORING ID #: **TW -1D**

START DATE: 10/23/12 END DATE: 10/25/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Middle of parking lot**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW STEM AUGER**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **62.2'**
TOTAL DEPTH DRILLED: **62.2'**
TOTAL DEPTH REACHED: **62.2'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~55 Mostly cloudy, breezy**
EASTING: **647985.7147**
NORTHING: **1053458.8648**
ELEVATION AND DATUM: **111.27/ UTM 18**

FIELD SAMPLE INFORMATION		HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
	WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
	FALL			CASING	TUBE	CORE	RIG TYPE:
	TYPE						
	ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0	NA 8 6 5	0.8	0.3 0.2 HS-2.1	N	NA	N	0-.2 blacktop; augered through 0.2 - 0.6 dark brown to gray fine SAND and SILT 0.6-0.8 black Cinders, Ash	dry/very loose dry/loose	
2.0	2 1 1 2	0.1	0.2 HS-2.1	N	NA	N	2-2.2 dark brown to black fine SAND and SILT	moist/very loose	
4.0	2 2 3 2	2.0	0.7 HS-3.0	N	NA	N	4-5 black SILT and fine SAND, Cinders, fine Ash 5-6 dark gray to green CLAYEY SAND to SILTY CLAY dark yellow to yellow mottling	moist/loose dry/med stiff	
6.0	5 4 6 8	1.2	1.1 HS-3.7	N	NA	N	6-6.2 SAA 6.2-7.2 brown SILT, some fine Sand lens of CLAYEY SILT @6.8-7.1	sat/soft wet/soft	
8.0	5 4 4 3	1.6	3.9 HS-2.0	N	NA	N	8-8.4 SAA 8.4-9.6 dark gray CLAYEY SILT and fine SAND, intermittent lens of dark gray fine Sand	sat/soft sat/soft	
10.0	4 3 4 3	2.0	4.5 HS-5.3	N	NA	N	SAA	same	
12.0	5 4 3 2	2.0	7.5 HS-23.8	N	NA	N	SAA	same	
14.0	4 3 3 2	1.5	4.9 HS-12.0	N	NA	N	SAA	same	
16.0	3 4 4 6	2.0	9.7 HS-10.6	Y	See Soil Analysis	N	SAA **Collected Sample TW-1I 1718 111212**	same	
18.0	3 4 4 4	1.0	7.1 HS-8.9	Y	NA	N	SAA	same	
20.0									

BOREHOLE LOG

BORING ID #: **TW -1D**

START DATE: 10/23/12 END DATE: 10/25/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Middle of parking lot**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW STEM AUGER**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **62.2'**
TOTAL DEPTH DRILLED: **62.2'**
TOTAL DEPTH REACHED: **62.2'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~55 Mostly cloudy, breezy**
EASTING: **647985.7147**
NORTHING: **1053458.8648**
ELEVATION AND DATUM: **111.27/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
20.0	4 2 3 3	1.0	3.2 HS-9.0	Y	NA	N	SAA	sat/ soft	
22.0	3 3 3 3	2.0	3.8 HS-5.0	Y	NA	N	22-23 SAA 23-24 dark gray CLAYEY SILT with some fine Sand to Clay	same wet tosat/med stiff	
24.0	2 2 2 2	1.0	1.5 HS-3.3	Y	NA	N	24-25 Same with intermittent fine Sands	same	
26.0	3 4 2 3	1.5	1.8 HS-2.3	N	NA	N	SAA	same	
28.0	2 1 1 3	1.5	1.1 HS-4.1	N	NA	N	28-29.5 dark gray Silty CLAY to CLAY, some fine Sand	wet/ med. stiff	
30.0	1 4 1 2	2.0	4.3 HS-2.3	N	NA	N	SAA	same	
32.0	3 4 3 6	2.0	1.7 HS-4.0	N	NA	N	SAA Clay increasing, varves	same	
34.0	1 1 3 4	2.0	1.2 HS-3.5	N	NA	N	SAA	wet/stiff	
36.0	3 4 4 3	2.0	1.4 HS-5.8	N	NA	N	SAA	same	
38.0	3 2 4 4	2.0	0.8 HS-4.6	N	NA	N	SAA	same	
40.0									

AECOM, Inc.
40 British American Boulevard
Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -1D**

START DATE: 10/23/12 END DATE: 10/25/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Middle of parking lot**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW STEM AUGER**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **62.2'**
TOTAL DEPTH DRILLED: **62.2'**
TOTAL DEPTH REACHED: **62.2'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~55 Mostly cloudy, breezy**
EASTING: **647985.7147**
NORTHING: **1053458.8648**
ELEVATION AND DATUM: **111.27/ UTM 18**

FIELD SAMPLE INFORMATION

ST. WATER LEVELS
DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

	HAMMER	SAMPLER	CASING	TUBE	CORE	RIG TYPE:
WEIGHT(S)						
FALL						
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0	2 4 4 3	1.5	0.3 HS-3.3	N	NA	N	SAA	same	
42.0	4 3 2 4	2.0	0.1 HS-.03	N	NA	N	SAA	same	
44.0	2 3 2 2	2.0	0.7 HS-0.2	N	NA	N	SAA	same	
46.0	3 3 3 4	2.0	0.1 HS-0.9	N	NA	N	SAA	same	
48.0	2 3 3 3	2.0	0.0 HS-0.1	N	NA	N	SAA	same	
50.0	3 3 3 3	1.5	0.0 HS-0.0	N	NA	N	SAA Clay increasing silt decreasing	same	
52.0	3 4 4 4	2.0	0.0 HS-0.0	N	NA	N	SAA	same	
54.0	3 3 4 7	2.0	0.0 HS-0.0	N	NA	N	54-55.5 SAA 55.5-56 dark gray SILTY CLAY, some coarse to medium fine Sand and medium to fine Gravel, rock fragments (WEATHERED TILL)	sat/stiff	
56.0	12 20 20 25	0.5	0.0 HS-0.2	N	NA	N	SAA	same	
58.0	17 17 20 25	0.5	0.0 HS-0.2	N	NA	N	SAA	same	
60.0									

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BOREHOLE LOG

BORING ID #: **TW -1D**

START DATE: 10/23/12 END DATE: 10/25/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Middle of parking lot**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW STEM AUGER**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **62.2'**
TOTAL DEPTH DRILLED: **62.2'**
TOTAL DEPTH REACHED: **62.2'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~55 Mostly cloudy, breezy**
EASTING: **647985.7147**
NORTHING: **1053458.8648**
ELEVATION AND DATUM: **111.27/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
60.0	12 17 15 10	1.5	0.0 HS-0.3	N	NA	N	SAA	same	
62.0	20 40 50/.2	0.5	0.0 HS-0.0	N	NA	N	SAA BEDROCK FRAGEMENTS (Silt Stone)	same	
64.0									
66.0									
68.0									
70.0									
72.0									
74.0									
76.0									
78.0									
80.0									

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40 British American Boulevard
Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -2D**

START DATE:10/25/12 END DATE: 11/02/12

PROJECT NAME: **Former Duso Chemical Company** PROJECT NO.: **60279080.1** PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York** BORING LOCATION: **Corner near man door**
DRILLING CO.: **Geologic** DRILLER: **Scott and John** DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"** DEPTH TO BEDROCK: **64.7'** TOTAL DEPTH DRILLED: **64.7'**
TOTAL DEPTH REACHED: **64.7'** INSPECTOR: **Matthew Dean** WEATHER CONDITIONS: **Low 50's, Overcast**
EASTING: **647950.9314** NORTHING: **1053500.9715** ELEVATION AND DATUM: **112.91/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION									
DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0	6 5 6 6	0.5	0.0 HS-12.2	N	NA	N	0-0.5 light brown to gray coarse to medium fine SAND and medium to fine Gravel, rock fragments	dry/ loose	
2.0	10 50/.2	0.3	2.1 HS-NA	N	NA	N	same with larger rock fragments	dry/ loose	
4.0	7 6 4 5	1.3	2.9 HS-4.9	N	NA	N	4-4.5 dark brown SILT and medium fine SAND, fine Gravel, rock fragments 4.5-4.9 dark brown to gray SILT and medium fine SAND 4.9-5.3 brown CLAYEY SILT and fine SAND, lens of SILTY CLAY	dry/ compact dry/stiff	
6.0	5 7 7 4	1.8	0.0 HS-7.9	N	NA	N	Same w/ occasional CLAY lens	dry/ stiff	
8.0	4 7 5 4	0.0	NA	NA	NA	NA	no recovery	NA	
10.0	2 2 1 2	1.0	0.0 HS-0.0	N	NA	N	dark gray fine SAND and CLAYEY SILT, occasional SILTY CLAY lens	wet/ stiff	
12.0	3 4 5 4	1.5	0.0 HS-0.0	N	NA	N	SAA	wet/ stiff	
14.0	3 2 3 2	1.0	3.3 HS-1.0	Y	NA	N	dark gray CLAYEY SILT, some fine Sand	sat/ medium	
16.0	3 4 5 3	1.5	3.2 HS-NA	Y	See Soil Analysis	N	SAA increasing Sand, decreasing Clay **Collected sample TW-2D 1617 110112**	same	
18.0	7 5 3 3	1.5	2.5 HS-6.8	N	NA	N	SAA	same	
20.0									

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BOREHOLE LOG

BORING ID #: **TW -2D**

START DATE:10/25/12 END DATE: 11/02/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Corner near man door**
DRILLING CO.: **Geologic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **64.7'**
TOTAL DEPTH DRILLED: **64.7'**
TOTAL DEPTH REACHED: **64.7'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 50's, Overcast**
EASTING: **647950.9314**
NORTHING: **1053500.9715**
ELEVATION AND DATUM: **112.91/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
20.0	2 3 2 3	1.5	1.0 HS-9.7	N	NA	N	dark gray fine SAND and CLAYEY SILT	wet/ medium	
22.0	5 3 3 4	2.0	0.2 HS-5.9	N	NA	N	dark gray fine SAND and CLAYEY SILT, occasional lens of Silty Clay	moist to wet/ stiff	
24.0	2 2 3 3	1.5	0.2 HS-2.4	N	See Soil Analysis	N	SAA **Collected sample TW-2D 2425 110112**	wet/stiff	
26.0	2 3 3 2	1.5	0.5 HS-1.0	N	NA	N	SAA	wet/stiff	
28.0	3 3 3 3	1.0	0.9 HS-1.7	N	NA	N	28-29.5 dark gray SILTY CLAY, some fine Sand	wet/ stiff	
30.0	3 3 2 2	1.5	0.0 HS-0.0	N	NA	N	same with occassional lenses of fine Sand and Silty Clay	wet/stiff	
32.0	1 3 4 4	1.5	0.0 HS-0.0	N	NA	N	SAA Clay increasing	moist/very stiff	
34.0	1 1 1 1	1.5	0.0 HS-0.0	N	NA	N	SAA	moist/very stiff	
36.0	3 4 4 3	2.0	NA HS-0.0	N	NA	N	SAA	moist/ hard	
38.0	2 3 2 3	0.0	NA	NA	NA	NA	No recovery All slough	same	
40.0									

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Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -2D**

START DATE:10/25/12 END DATE: 11/02/12

PROJECT NAME:	**Former Duso Chemical Company**	PROJECT NO.:	**60279080.1**	PROJECT MANAGER:	**Lindsay Mitchell**
SITE LOCATION:	**Poughkeepsie, New York**	BORING LOCATION:	**Corner near man door**		
DRILLING CO.:	**Geologic**	DRILLER:	**Scott and John**	DRILLING METHOD:	**HOLLOW Stem Auger**
BOREHOLE DIAMETER:	**8"**	DEPTH TO BEDROCK:	**64.7'**	TOTAL DEPTH DRILLED:	**64.7'**
TOTAL DEPTH REACHED:	**64.7'**	INSPECTOR:	**Matthew Dean**	WEATHER CONDITIONS:	**Low 50's, Overcast**
EASTING:	**647950.9314**	NORTHING:	**1053500.9715**	ELEVATION AND DATUM:	**112.91/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
			CASING	TUBE	CORE	RIG TYPE:
FALL						
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0	1 1 2 3	1.5	0.0 HS-0.0	N	NA	N	dark gray SILTY CLAY, fine Sand	moist to wet/stiff	
42.0	2 3 4 3	1.5	0.0 HS-0.0	N	NA	N	SAA	wet/stiff	
44.0	2 2 2 3	2.0	0.0 HS-0.0	N	NA	N	SAA	wet/stiff	
46.0	3 1 3 3	2.0	0.0 HS-0.0	N	NA	N	SAA increasing Clay, decreasing Silt	wet/med. stiff	
48.0	2 3 2 3	2.0	0.0 HS-0.0	N	NA	N	SAA	wet/very stiff	
50.0	4 3 4 4	0.0	NA	N	NA	N	no recovery	NA	
52.0	5 3 3 4	0.0	NA	N	NA	N	no recovery	NA	
54.0	2 2 2 2	2.0	0.0 HS-0.0	N	NA	N	54-55.5 SAA	wet/very stiff	
56.0	6 7 10 15	2.0	0.0 HS-0.0	N	NA	N	SAA w/ increasing Sand 57.6-58 dark gray CLAYEY SILT and course to medium SAND, some medium to fine Gravel (Weather Till)	same wet/medium compact	
58.0	9 10 12 12	0.5	0.0 HS-0.0	N	NA	N	SAA	same	
60.0									

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BOREHOLE LOG

BORING ID #: **TW -2D**

START DATE:10/25/12 END DATE: 11/02/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Corner near man door**
DRILLING CO.: **Geologic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **64.7'**
TOTAL DEPTH DRILLED: **64.7'**
TOTAL DEPTH REACHED: **64.7'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 50's, Overcast**
EASTING: **647950.9314**
NORTHING: **1053500.9715**
ELEVATION AND DATUM: **112.91/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
60.0	5 6 9 7	0.5	0.0 HS-0.0	N	NA	N	SAA	same	
62.0	15 19 30 50/.2	1.5	0.0 HS-0.0	N	NA	N	62-62.5 dark gray course medium fine SAND and medium fine GRAVEL 62.5-63.5 dark gray SILT and course medium fine SAND, some medium fine Gravel	sat/loose sat/medium compact to loose	
64.0	62 50/.2						Weathered Bedrock		
66.0									
68.0									
70.0									
72.0									
74.0									
76.0									
78.0									
80.0									

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BOREHOLE LOG

BORING ID #: **TW -3D**

START DATE:11/5/12 END DATE: 11/06/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Off corner of bay doors**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **48.4'**
TOTAL DEPTH DRILLED: **48.4'**
TOTAL DEPTH REACHED: **48.4'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~40's & Overcast**
EASTING: **647947.9943**
NORTHING: **1053386.4677**
ELEVATION AND DATUM: **109.97/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0	0 6 5 4	1.0	0.0 HS-1.9	Organic	NA	N	0-0.5 asphalt 0.5-1 dark brown fine to medium SAND, CLAYEY SILT 1-1.5 light brown fine SAND, some Clayey Silt	dry/medium compact	
2.0	6 5 4 5	1.5	0.0 HS-1.4	N	NA	N	2-2.3 SAA 2.3-3 grayish green coarse to fine SAND and CLAYEY SILT, little to fine Gravel 3-3.5 light brown fine SAND and CLAYEY SILT	dry/medium compact	
4.0	3 5 10 7	1.0	0.0 HS-2.3	N	NA	N	4-4.5 SAA w/ increasing Sand 4.5-5 same w/ CLAY lens @ 4.7 gray fine SAND, some Silt	dry/medium compact moist/stiff	
6.0	5 5 6 6	1.0	0.1 HS-2.1	N	NA	N	SAA	moist/ stiff	
8.0	3 4 3 4	1.5	0.0 HS-1.8	N	NA	N	gray fine SAND, some Silt, increasing Silt	moist/stif	
10.0	3 2 3 2	1.0	0.0 HS-2.2	N	NA	N	SAA	moist/stiff	
12.0	2 2 2 3	1.5	0.9 HS-3.5	N	NA	N	gray CLAYEY and fine SAND	wet/medium compact	
14.0	3 3 5 3	2.0	3.8 HS-5.7	N	NA	N	SAA	wet/medium compact	
16.0	6 6 5 4	2.0	1.7 HS-4.3	N	See Soil Analysis	N	SAA **Collected sample TW-3D 1718 110512** not enough soil for HS	wet/stiff	
18.0	2 1 3 5	2.0	8.3 HS-NA	N	NA	N	SAA	same	
20.0									

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40 British American Boulevard
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Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -3D**

START DATE:11/5/12 END DATE: 11/06/12

PROJECT NAME: **Former Duso Chemical Company** PROJECT NO.: **60279080.1** PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York** BORING LOCATION: **Off corner of bay doors**
DRILLING CO.: **GeoLogic** DRILLER: **Scott and John** DRILLING METHOD: **HOLLOW stem Auger**
BOREHOLE DIAMETER: **8"** DEPTH TO BEDROCK: **48.4'** TOTAL DEPTH DRILLED: **48.4'**
TOTAL DEPTH REACHED: **48.4'** INSPECTOR: **Matthew Dean** WEATHER CONDITIONS: **~40's & Overcast**
EASTING: **647947.9943** NORTHING: **1053386.4677** ELEVATION AND DATUM: **109.97/ UTM 18**

FIELD SAMPLE INFORMATION

ST. WATER LEVELS DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

RIG TYPE:

	HAMMER	SAMPLER	CASING	TUBE	CORE
WEIGHT(S)					
FALL					
TYPE					
ID/OD					

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------- REMARKS
20.0	1 2 2 2	1.5	0.2 HS-1.9	N	NA	N	SAA 20.5-21.5 gray SILTY CLAY	wet/stiff	
22.0	2 2 2 2	1.5	0.3 HS-2.5	N	NA	N	Gray CLAYEY SILT w/ some fine Sand	wet/stiff	
24.0	2 1 3 3	2.0	0.5 HS-2.2	N	NA	N	SAA w/ occasional lenses of SILTY CLAY	wet/stiff	
26.0	2 5 3 2	2.0	0.0 HS-1.8	N	NA	N	SAA	wet/stiff	
28.0	2 2 2 2	2.0	0.2 HS-1.3	N	See Soil Analysis	N	SAA **Collected sample TW-3D 2930 110512**	wet/ stiff	
30.0	1 1 1 1	2.0	0.1 HS-1.2	N	NA	N	SAA	wet/stiff	
32.0	1 2 1 2	2.0	0.0 HS-0.8	N	NA	N	SAA	wet/stiff	
34.0	1 1 1 1	2.0	0.2 HS-1.4	N	NA	N	SAA	wet/stiff	
36.0	3 3 3 2	2.0	0.0 HS-1.4	N	NA	N	SAA	wet/stiff	
38.0	1 2 1 2	2.0	0.0 HS-2.2	N	NA	N	SAA	wet/stiff	
40.0									

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Latham, New York 12110
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Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -3D**

START DATE:11/5/12 END DATE: 11/06/12

PROJECT NAME: **Former Duso Chemical Company** PROJECT NO.: **60279080.1** PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York** BORING LOCATION: **Off corner of bay doors**
DRILLING CO.: **GeoLogic** DRILLER: **Scott and John** DRILLING METHOD: **HOLLOW stem Auger**
BOREHOLE DIAMETER: **8"** DEPTH TO BEDROCK: **48.4'** TOTAL DEPTH DRILLED: **48.4'**
TOTAL DEPTH REACHED: **48.4'** INSPECTOR: **Matthew Dean** WEATHER CONDITIONS: **~40's & Overcast**
EASTING: **647947.9943** NORTHING: **1053386.4677** ELEVATION AND DATUM: **109.97/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER
WEIGHT(S)		
FALL		
TYPE		
ID/OD		

ST. WATER LEVELS
DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

	CASING	TUBE	CORE	RIG TYPE:
TYPE				
ID/OD				

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0	1 1 1 1	2.0	0.0 HS-1.3	N	NA	N	SAA	wet/stiff	
42.0	2 3 2 3	2.0	0.0 HS-2.2	N	NA	N	SAA	wet/stiff	
44.0	1 2 2 1	2.0	0.0 HS-1.9	N	NA	N	SAA	wet/stiff	
46.0	6 7 8 7	1.0	0.0 HS-2.0	N	NA	N	46-46.5 SAA 46.5 gray CLAYEY SILT, some coarse Sand, coarse to fine Gravel (WEATHERED TILL)	wet/stiff	
48.0	100/.4		0.0 HS-NA	N	NA	N	48-48.4 weathered rock		
50.0									
52.0									
54.0									
56.0									
58.0									
60.0									

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Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -4D**

START DATE:11/6/12 END DATE: 11/07/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Southern side of road toward STAR Gas**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **41.6'**
TOTAL DEPTH DRILLED: **41.6'**
TOTAL DEPTH REACHED: **41.6'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 40's & Overcast**
EASTING: **648003.6557**
LONGITUDE: **1053392.4961**
ELEVATION AND DATUM: **110.95/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
0.0	60 15 8 9	0.5	0.0 HS-NA	N	NA	N	0-0.5 asphalt	dry/very hard	
2.0	3 4 3 4	1.0	0.0 HS-2.1	Organic	NA	N	dark brown fine SAND, some Clayey Silt grayish green fine SAND and CLAYEY SILT	dry/loose	
4.0	2 3 3 3	0.5	0.9 HS-3.0	Y	NA	N	SAA organic odor-sanitary	dry/loose	
6.0	4 4 3 2	1.0	6.2 HS-10.1	Y	NA	N	gray to brown medium to fine SAND, some Silt petro/ propane additive odor	moist/ loose	
8.0	1 2 2 2	1.0	2.0 HS-6.3	Petro	See Soil Analysis	N	**Collected sample TW-4I 0709 111512** gray fine SANDY SILT, some varves decreasing petro odor	moist to wet/soft	
10.0	2 3 4 2	0.5	1.1 HS-7.2	Y	NA	N	SAA w/ increasing silt faint petro odor	wet/ medium	
12.0	4 3 2 3	1.5	2.8 HS-5.5	Y	NA	N	gray fine SAND and SILT w/ Clay lens @ 14'	same	
14.0	2 4 4 4	2.0	0.7 HS-3.3	Y	NA	N	gray CLAYEY SILT w/ some fine Sand	same	
16.0	4 5 4 4	1.5	0.4 HS-1.9	N	NA	N	SAA	same	
18.0	3 4 5 4	1.5	0.4 HS-1.4	N	NA	N	SAA	same	
20.0									

AECOM, Inc.
40 British American Boulevard
Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -4D**

START DATE:11/6/12 END DATE: 11/07/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Southern side of road toward STAR Gas**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **41.6'**
TOTAL DEPTH DRILLED: **41.6'**
TOTAL DEPTH REACHED: **41.6'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 40's & Overcast**
EASTING: **648003.6557**
LONGITUDE: **1053392.4961**
ELEVATION AND DATUM: **110.95/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ------------ REMARKS
20.0	3 2 2 1	1.2	0.1 HS-1.0	N	NA	N	gray SILTY CLAY w/ little to trace fine Sand	wet/stiff	
22.0	3 2 3 3	2.0	0.0 HS-0.5	N	NA	N	SAA w/ trace Sand	wet/stiff	
24.0	1 1 1 1	1.5	0.2 HS-0.7	N	NA	N	SAA	wet/stiff	
26.0	3 2 2 3	2.0	0.0 HS-0.4	N	NA	N	SAA	wet/stiff	
28.0	2 2 2 2	2.0	0.0 HS-0.6	N	NA	N	SAA	wet/ stiff	
30.0	1 1 1 1	1.5	0.2 HS-0.5	N	NA	N	SAA	wet/stiff	
32.0	2 3 2 3	1.0	0.2 HS-0.6	N	NA	N	SAA last 2" fine SILT, some fine to medium Gravel (WEATHERED TILL) Drilling got harder @ 33'	wet/stiff	
34.0	13 11 15 11	0.5	0.0 HS-NA	N	NA	N	SAA, large fractured rock	wet/hard	
36.0	15 14 12 17	1.0	0.0 HS-0.5	N	NA	N	gray SANDY SILT, some fine to medium Gravel(WEATHERED TILL)	moist/hard	
38.0	7 9 10 11	0.5	0.0 HS-NA	N	NA	N	SAA - WEATHERED BEDROCK?	moist/hard	
40.0									

AECOM, Inc.
40 British American Boulevard
Latham, New York 12110
Phone: (518) 951-2200
Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -4D**

START DATE:11/6/12 END DATE: 11/07/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Southern side of road toward STAR Gas**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **41.6'**
TOTAL DEPTH DRILLED: **41.6'**
TOTAL DEPTH REACHED: **41.6'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 40's & Overcast**
EASTING: **648003.6557**
LONGITUDE: **1053392.4961**
ELEVATION AND DATUM: **110.95/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
				DATE 2:	DEPTH 2:	TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
40.0	26 15 19 50/.1	1.0	0.4 HS-NA	N	NA	N	coarse to fine SANDY SILT and coarse to fine GRAVEL well graded WEATHERED TILL	wet/hard	
42.0									
44.0									
46.0									
48.0									
50.0									
52.0									
54.0									
56.0									
58.0									
60.0									

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Latham, New York 12110
Phone: (518) 951-2200
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BOREHOLE LOG

BORING ID #: **TW -5D**

START DATE:11/6/12 END DATE: 11/08/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Edge of road north**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **34.1'**
TOTAL DEPTH DRILLED: **34.1'**
TOTAL DEPTH REACHED: **34.1'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 40's, overcast, & snowy**
EASTING: **648048.2829**
NORTHING: **1053565.1237**
ELEVATION AND DATUM: **112.54/ UTM 18**

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
0.0	20 20 10	1.0	0.0 HS-NA	N	NA	N	0-0.3 asphalt 0.3-0.5 red brick fragments, Gravel 0.5-1 SAND and GRAVEL FILL	dry/loose	
2.0	10 5 3 3	0.5	0.0 HS-NA	N	NA	N	SAA (FILL)	dry/loose	
4.0	3 3 3 4	0.5	0.0 HS-NA	N	NA	N	4-4.3 SAA 4.3-4.5 brown to gray SANDY SILT, some Clay	dry/loose	
6.0	4 5 6 5	0.5	0.0 HS-NA	Organic	NA	N	6-6.5 brownish gray CLAYEY SILT, some fine Sand and Gravel	moist/medium stiff	
8.0	7 5 5 6	1.5	0.1 HS-0.4	N	NA	N	8-9 SAA 9-9.25 gray coarse SAND and GRAVE, layer of fine SAND 9.25-9.5 gray SANDY SILT w/ some Clay	wet/medium stiff	
10.0	7 6 7 7	1.0	0.1 HS-0.4	N	NA	N	SAA	same	
12.0	7 5 3 3	2.0	0.1 HS-0.3	N	NA	N	SAA	same	
14.0	3 1 2 3	2.0	0.2 HS-1.6	N	NA	N	gray CLAYEY SILT, some fine Sand and occasional lenses of Clay	same	
16.0	2 3 3 5	2.0	2.4 HS-7.4	N	See Soil Analysis	N	gray SANDY SILT, some Clay **Collected sample TW-5S 1618 110912**	same	
18.0	2 2 1 2	2.0	0.2 HS-1.7	N	NA	N	gray CLAYEY SILT, some fine Sand, occassional Clay lenses	same	
20.0									

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BOREHOLE LOG

BORING ID #: **TW -5D**

START DATE:11/6/12 END DATE: 11/08/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **Edge of road north**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **34.1'**
TOTAL DEPTH DRILLED: **34.1'**
TOTAL DEPTH REACHED: **34.1'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **Low 40's, overcast, & snowy**
EASTING: **648048.2829**
NORTHING: **1053565.1237**
ELEVATION AND DATUM: **112.54/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
20.0	1 2 1 1	1.0	0.1 HS-0.5	N	NA	N	SAA	wet/medium stiff	
22.0	2 3 2 2	2.0	0.1 HS-0.6	N	NA	N	gray CLAYEY SILT, trace Sand	same	
24.0	1 2 1 1	2.0	0.1 HS-0.6	N	NA	N	SAA	same	
26.0	2 2 2 2	1.5	0.1 HS-0.3	N	NA	N	SAA	same	
28.0	2 3 2 2	2.0	0.1 HS-0.7	N	NA	N	SAA	same	
30.0	1 1 1 1	1.5	0.1 HS-0.7	N	NA	N	SAA	wet/medium stiff	
32.0	1 4 9 55	2.0	0.2 HS-0.5	N	NA	N	32-33.5 SAA 33.5-34 coarse SAND and SILT, some fine to medium Gravel (WEATHERED BEDROCK)	wet/medium stiff wet/hard	
34.0	50/.1		NA HS-NA	N	NA	N	SAA (WEATHERED BEDROCK)	dry/hard	
36.0									
38.0									
40.0									

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BOREHOLE LOG

BORING ID #: **TW -6D**

START DATE:11/27/12 END DATE: 11/28/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **In building w/ bay doors in front of loading dock**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **55.2'**
TOTAL DEPTH DRILLED: **55.2'**
TOTAL DEPTH REACHED: **55.2'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~35 & Snowy**
EASTING: **647932.0077**
NORTHING **1053448.2195**
ELEVATION AND DATUM: **108.45/ UTM 18**

ST. WATER LEVELS
DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

	HAMMER	SAMPLER	CASING	TUBE	CORE	RIG TYPE:
WEIGHT(S)						
FALL						
TYPE						
ID/OD						

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
1.0	3 4 4 4	1.5	0.0 HS-0.0	N	NA	N	0-.9 concrete 1-2 SAND and GRAVEL (FILL) 2-2.5 brown SILTY CLAY, some fine Sand	moist/medium stiff	
3.0	4 7 7 9	1.0	0.0 HS-0.0	N	NA	N	gray SILTY CLAY, some fine Sand	moist/medium stiff	
5.0	5 4 5 5	2.0	0.0 HS-0.0	N	NA	N	SAA	wet/medium stiff	
7.0	4 5 4 4	1.0	0.0 HS-0.0	N	NA	N	gray CLAYEY SILT, some fine Sand	same	
9.0	3 5 5 3	1.5	0.0 HS-0.0	N	NA	N	intermittent gray SILTY CLAY and CLAYEY SILT, little fine Sand	same	
11.0	4 5 4 5	1.5	0.0 HS-0.0	N	NA	N	SAA	same	
13.0	4 6 5 4	1.0	0.3 HS-0.0	N	NA	N	SAA	same	
15.0	3 4 6 5	1.0	0.9 HS-2.4	N	NA	N	SAA	same	
17.0	5 4 6 4	2.0	2.5 HS-NA	Y	See Soil Analysis	N	SAA, increased Sand **Collected sample TW-6D 1718 112712** slight petro odor	same	
19.0	4 3 4 3	1.5	2.2 HS-3.0	Y	NA	N	SAA slight petro odor	same	
21.0									

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BOREHOLE LOG

BORING ID #: **TW -6D**

START DATE:11/27/12 END DATE: 11/28/12

PROJECT NAME: **Former Duso Chemical Company** PROJECT NO.: **60279080.1** PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York** BORING LOCATION: **In building w/ bay doors**
DRILLING CO.: **GeoLogic** DRILLER: **Scott and John** DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"** DEPTH TO BEDROCK: **55.2'** TOTAL DEPTH DRILLED: **55.2'**
TOTAL DEPTH REACHED: **55.2'** INSPECTOR: **Matthew Dean** WEATHER CONDITIONS: **~35 & Snowy**
EASTING: **647932.0077** NORTHING **1053448.2195** ELEVATION AND DATUM: **108.45/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
21.0	2 3 2 2	2.0	0.0 HS-3.0	N	NA	N	gray CLAYEY SILT, intermittent lenses of Clay and Silty Clay	wet/medium stiff	
23.0	2 1 3 2	1.5	0.0 HS-0.0	N	NA	N	gray SILTY CLAY, varves, increased Clay	same	
25.0	1 3 2 3	2.0	0.3 HS-0.0	N	NA	N	SAA	same	
27.0	2 2 2 2	1.5	0.0 HS-0.0	N	NA	N	SAA	same	
29.0	1 1 2 3	2.0	0.0 HS-0.3	N	NA	N	SAA	same	
31.0	1 1 2 3	2.0	0.0 HS-0.2	N	NA	N	SAA	same	
33.0	1 1 2 2	1.0	0.0 HS-0.5	N	NA	N	SAA	same	
35.0	2 2 2 3	2.0	0.0 HS-2.4	N	NA	N	SAA	same	
37.0	2 2 2 2	2.0	0.0 HS-1.0	N	NA	N	SAA	same	
39.0	2 3 3 3	2.0	0.0 HS-0.8	N	NA	N	SAA	same	
41.0									

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BOREHOLE LOG

BORING ID #: **TW -6D**

START DATE:11/27/12 END DATE: 11/28/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **In building w/ bay doors**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **HOLLOW Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **55.2'**
TOTAL DEPTH DRILLED: **55.2'**
TOTAL DEPTH REACHED: **55.2'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~35 & Snowy**
EASTING: **647932.0077**
NORTHING **1053448.2195**
ELEVATION AND DATUM: **108.45/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------- REMARKS
41.0	4 4 4 4	2.0	0.0 HS-0.6	N	NA	N	SAA	wet/medium	
43.0	4 4 3 3	2.0	0.0 HS-0.4	N	NA	N	SAA	same	
45.0	2 3 2 3	1.5	0.0 HS-0.9	N	NA	N	SAA	same	
47.0	4 6 4 4	2.0	0.0 HS-0.1	N	NA	N	SAA	wet/stiff	
49.0	4 5 4 4	1.5	0.0 HS-0.0	N	NA	N	SAA	same	
51.0	6 5 4 6	2.0	0.0 HS-0.3	N	NA	N	SAA less SILT	same	
53.0	6 8 7 8	2.0	0.0 HS-0.0	N	NA	N	SAA	same	
55.0	50/.2	0.0	NA HS-NA	N	NA	N	Spoon refusal @ 55.2 black to gray WEATHERED BEDROCK. SHALE or MUDSTONE w/ low fissility	dry/hard	
57.0									
59.0									
61.0									

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BOREHOLE LOG

BORING ID #: **TW -7D**

START DATE:11/19/12 END DATE: 11/20/12

PROJECT NAME: **Former Duso Chemical Company**
PROJECT NO.: **60279080.1**
PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York**
BORING LOCATION: **In corner of northern building w/ man door**
DRILLING CO.: **GeoLogic**
DRILLER: **Scott and John**
DRILLING METHOD: **Hollow Stem Auger**
BOREHOLE DIAMETER: **8"**
DEPTH TO BEDROCK: **56.1'**
TOTAL DEPTH DRILLED: **56.1'**
TOTAL DEPTH REACHED: **56.1'**
INSPECTOR: **Matthew Dean**
WEATHER CONDITIONS: **~35 & clear**
EASTING: **647996.6730**
NORTHING: **1053547.9076**
ELEVATION AND DATUM: **112.79/ UTM 18**

ST. WATER LEVELS DATE 1: DEPTH 1: TIME 1:
DATE 2: DEPTH 2: TIME 2:

	HAMMER	SAMPLER	CASING	TUBE	CORE
WEIGHT(S)					
FALL					
TYPE					
ID/OD					

RIG TYPE:

FIELD SAMPLE INFORMATION

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL REMARKS
1.0	22 20 30 15	0.5	0.0 HS-0.9	N	NA	N	0-.9 concrete fine to coarse SAND and GRAVEL (FILL)	dry/loose	
3.0	4 5 4 4	1.5	0.0 HS-0.6	Y	NA	N	2-2.5 black PEAT 2.5-3 wood, highly organic odor 3-3.5 grayish fine SAND and SILT, organic smell	moist/medium stiff	
5.0	1 2 1 1	1.0	0.1 HS-0.8	Y	NA	N	gray to brown SANDY SILT, some organics and Clay	moist/soft	
7.0	11 9 6 9	1.5	0.0 HS-NA	N	NA	N	7-8 gray SILTY SAND, some subrounded Gravel 8-8.5 brown medium to coarse SAND and GRAVEL	moist/loose	
9.0	8 17 10 10	1.5	0.1 HS-1.1	Y	NA	N	9-9.5 SAA 9.5-10 gray SAND and SILT, some Clay and Gravel 10-10.5 lens of brown to red SAND and SILT, organic odor. Last 2" gray SILTY SAND	moist/stiff	
11.0	6 5 4 5	2.0	0.0 HS-1.1	N	NA	N	gray SANDY SILT w/ increasing Silt	wet/medium stiff	
13.0	6 4 6 4	1.5	0.1 HS-1.3	N	NA	N	SAA	same	
15.0	4 4 2 4	1.5	0.1 HS-2.5	N	NA	N	SAA w/ occasional CLAY lenses	same	
17.0	2 2 2 2	2.0	27.3 HS-NA	Y	See Soil Analysis	N	SAA Collected sample TW-7D 1718 111812 Petro odor	same	
19.0	3 5 4 5	2.0	0.2 HS-NA	N	NA	N	SAA	same	
21.0									

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40 British American Boulevard
Latham, New York 12110
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Fax: (518) 951-2300

BOREHOLE LOG

BORING ID #: **TW -7D**

START DATE:11/19/12 END DATE: 11/20/12

PROJECT NAME: **Former Duso Chemical Company**
SITE LOCATION: **Poughkeepsie, New York**
DRILLING CO.: **GeoLogic**
BOREHOLE DIAMETER: **8"**
TOTAL DEPTH REACHED: **56.1'**
EASTING: **647996.6730**

PROJECT NO.: **60279080.1**
BORING LOCATION: **In corner of northern building w/ man door**
DRILLER: **Scott and John**
DEPTH TO BEDROCK: **56.1'**
INSPECTOR: **Matthew Dean**
NORTHING: **1053547.9076**

PROJECT MANAGER: **Lindsay Mitchell**
DRILLING METHOD: **Hollow Stem Auger**
TOTAL DEPTH DRILLED: **56.1'**
WEATHER CONDITIONS: **~35 & clear**
ELEVATION AND DATUM: **112.79/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1:	DEPTH 1:	TIME 1:
WEIGHT(S)				DATE 2:	DEPTH 2:	TIME 2:
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
21.0	2 3 2 3	2.0	0.0 HS-2.3	N	NA	N	SAA increasing CLAY towards bottom	wet/medium stiff	
23.0	3 4 6 4	2.0	0.1 HS-4.6	N	NA	N	intermittent gray SILTY CLAY and gray CLAYEY SILT w/ occasional lenses of Clay	wet/stiff	
25.0	4 3 3 4	0.0	NA HS-NA	N	NA	N	No Recovery	NA	
27.0	5 5 4 5	2.0	0.1 HS-1.5	N	NA	N	SAA	wet/ soft	
29.0	3 2 2 3	2.0	0.0 HS-2.3	N	NA	N	SAA	wet/medium stiff	
31.0	3 3 3 3	1.0	0.0 HS-1.0	N	NA	N	SAA	same	
33.0	2 3 2 3	1.5	0.0 HS-1.2	N	NA	N	SAA	same	
35.0	1 2 1 2	1.5	0.0 HS-1.1	N	NA	N	SAA	same	
37.0	3 4 3 4	1.5	0.1 HS-0.9	N	NA	N	gray SILTY CLAY	wet/stiff	
39.0	2 2 3 3	2.0	0.1 HS-3.6	N	NA	N	SAA	same	
41.0									

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BOREHOLE LOG

BORING ID #: **TW -7D**

START DATE:11/19/12 END DATE: 11/20/12

PROJECT NAME: **Former Duso Chemical Company** PROJECT NO.: **60279080.1** PROJECT MANAGER: **Lindsay Mitchell**
SITE LOCATION: **Poughkeepsie, New York** BORING LOCATION: **In corner of northern building w/ man door**
DRILLING CO.: **GeoLogic** DRILLER: **Scott and John** DRILLING METHOD: **Hollow Stem Auger**
BOREHOLE DIAMETER: **8"** DEPTH TO BEDROCK: **56.1'** TOTAL DEPTH DRILLED: **56.1'**
TOTAL DEPTH REACHED: **56.1'** INSPECTOR: **Matthew Dean** WEATHER CONDITIONS: **~35 & clear**
EASTING: **647996.6730** NORTHING: **1053547.9076** ELEVATION AND DATUM: **112.79/ UTM 18**

FIELD SAMPLE INFORMATION

	HAMMER	SAMPLER	ST. WATER LEVELS	DATE 1: DATE 2:	DEPTH 1: DEPTH 2:	TIME 1: TIME 2:
WEIGHT(S)						
FALL			CASING	TUBE	CORE	RIG TYPE:
TYPE						
ID/OD						

DEPTH (feet bgs)	Blow Counts	RECOVERY	PID (ppm)	ODOR OBSERVED	LAB ANALYSIS	VISIBLE PRODUCT	GEOLOGIC DESCRIPTION	LITHOLOGY/ SOIL TYPE	WATER LEVEL ---------------------- REMARKS
41.0	3 4 4 4	2.0	0.1 HS-3.5	N	NA	N	SAA	wet/stiff	
43.0	1 2 2 4	1.5	0.0 HS-1.4	N	NA	N	SAA	same	
45.0	2 2 2 2	2.0	0.5 HS-1.6	N	NA	N	SAA	same	
47.0	12 15 14 60	2.0	0.0 HS-1.3	N	NA	N	47-47.75 SAA 47.75-49 gray coarse SAND and GRAVEL (WEATHERED TILL)	wet/dense	
49.0	42 15 15 12	0.5	0.0 HS-1.4	N	NA	N	SAA	same	
51.0	7 5 7 10	1.5	0.0 HS-1.5	N	NA	N	SAA	same	
53.0	18 50 50/.1	1.5	0.0 HS-0.7	N	NA	N	gray SILT, some fine Sand and little subrounded Gravel. last 0.2' medium size Cobbles spoon refusal @ 54.1', augered to 55'	same	
55.0	34 30 50/.1		NA HS-1.6	N	NA	N	SAA spoon refusal @ 56.1'	same	
57.0									
59.0									
61.0									

NESTED MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

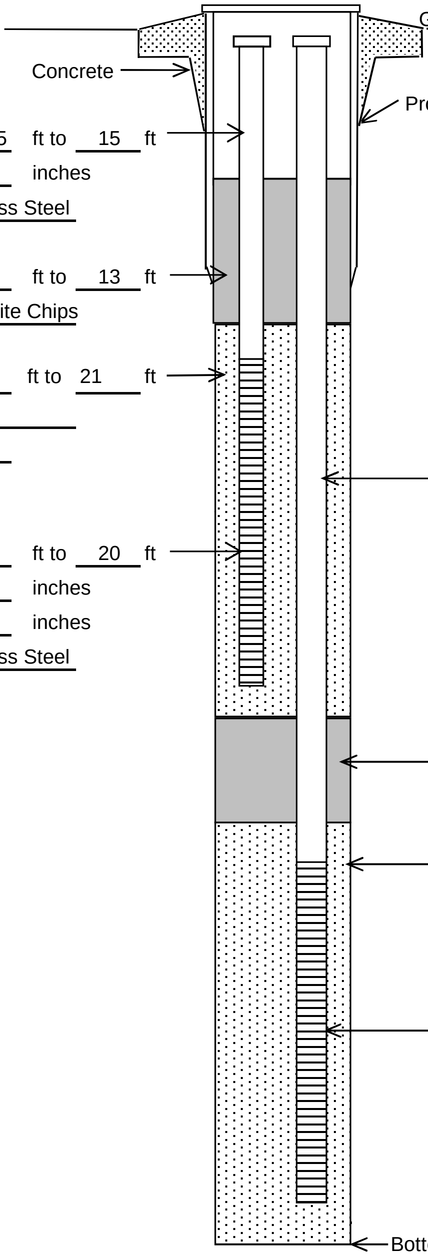
Well No. TW 1 S/I

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/13/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matthew Dean	
Drilling Method: 6.25" Hollow Stem Augers	Development Method and Date: Whale Pump	

Shallow Well:
TW-1S

Deep Well:
TW-1I

Protective Flushmount with Concrete Pad



Protective Casing:
Diameter: 12 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite Chips

Filter Pack: 13 ft to 21 ft
Type: Sand
Size: 0

Well Screen: 15 ft to 20 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 25 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 21 ft to 23 ft
Type: Bentonite Pellets

Filter Pack: 23 ft to 35 ft
Type: Sand
Size: 0

Well Screen: 25 ft to 35 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 35 ft

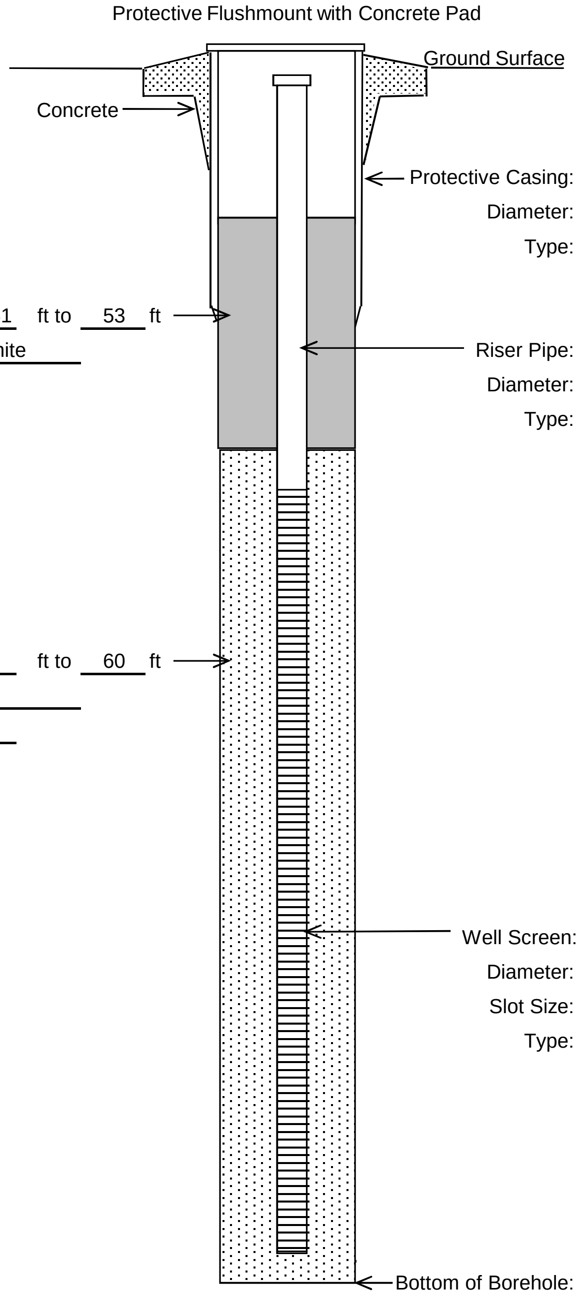
Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

AECOM

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-1D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 10/25/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 51 ft to 53 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 55 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 53 ft to 60 ft
Type: Sand
Size: 1

Well Screen: 55 ft to 60 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 62 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

NESTED MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW 2 S/I

Project: Former DUSO Chemical Company

Location: W of 33 Fulton St Poughkeepsie, NY

Date of Completion: 11/17/12

AECOM Project Number: 60279080

Subcontractor: GeoLogic NY, Inc.

Surface Elevation:

Drillers: Scott and John

Water Level ____ ft. On __/__/__

Top of PVC Casing Elevation:

Geologist: Matthew Dean

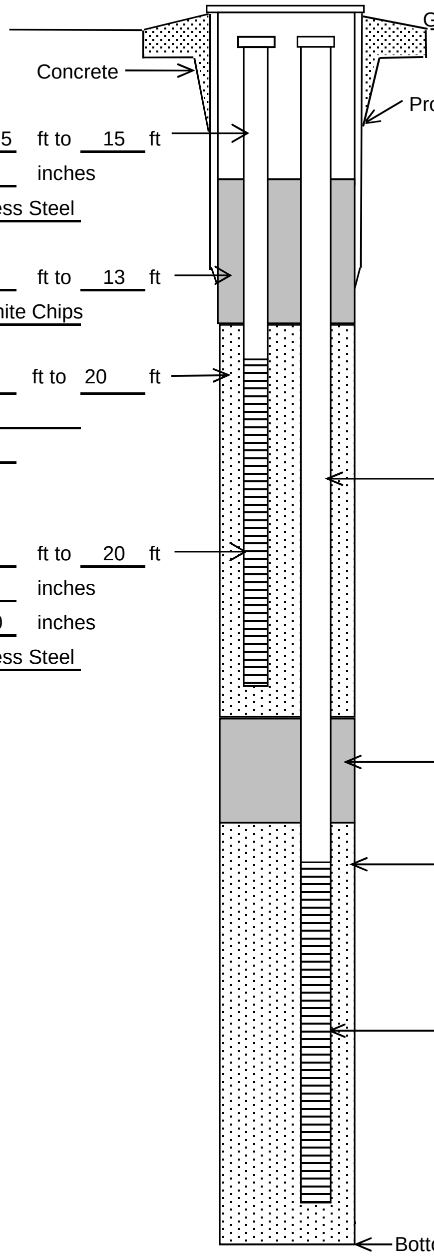
Drilling Method: 6.25" Hollow Stem Augers

Development Method and Date: Whale Pump

Shallow Well: TW-2S

Deep Well: TW-2I

Protective Flushmount with Concrete Pad



Protective Casing:
Diameter: 12 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite Chips

Filter Pack: 13 ft to 20 ft
Type: Sand
Size: 0

Well Screen: 15 ft to 20 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 30 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 26 ft to 28 ft
Type: Bentonite Pellets

Filter Pack: 28 ft to 35.5 ft
Type: Sand
Size: 0

Well Screen: 30 ft to 35 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 35.5 ft

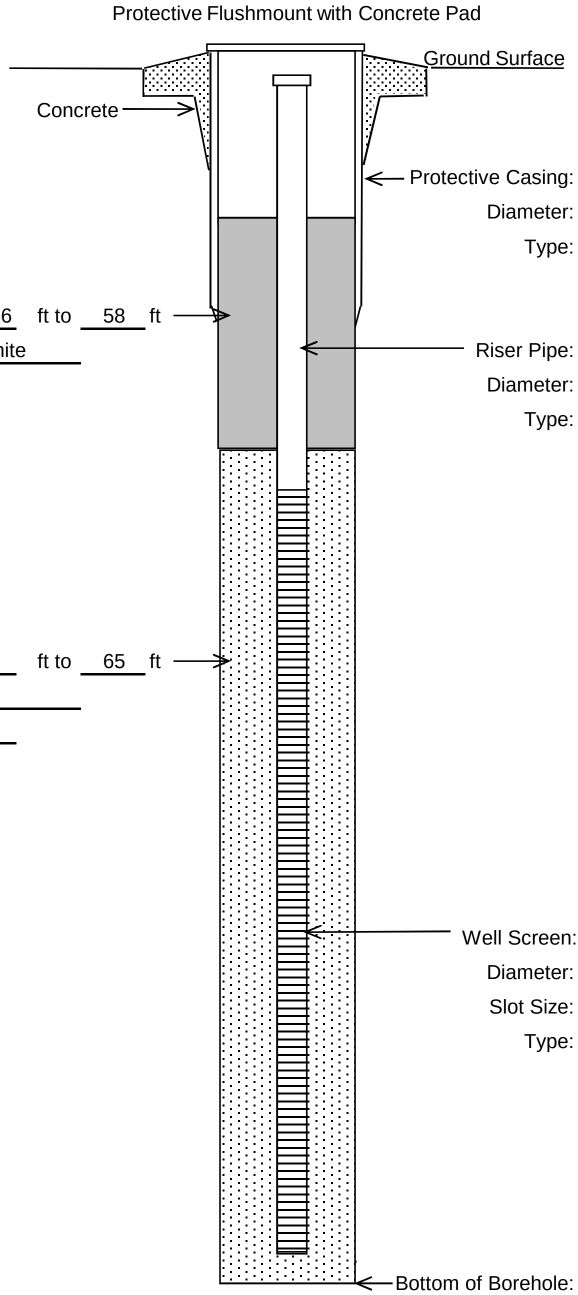
Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

AECOM

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-2D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/2/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 56 ft to 58 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 60 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 58 ft to 65 ft
Type: Sand
Size: 1

Well Screen: 60 ft to 65 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 65 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

AECOM

NESTED MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

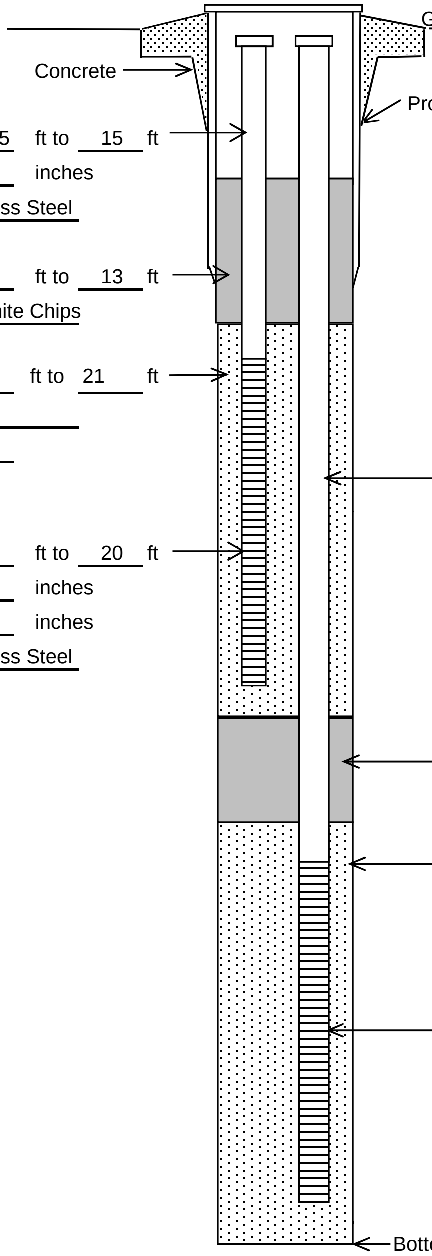
Well No. TW 3 S/I

Project: Former DUSO Chemical Company
Location: W of 33 Fulton St Poughkeepsie, NY
Date of Completion: 11/-/12
AECOM Project Number: 60279080
Subcontractor: GeoLogic NY, Inc.
Surface Elevation:
Drillers: Scott and John
Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:
Geologist: Matthew Dean
Drilling Method: 6.25" Hollow Stem Augers
Development Method and Date: Whale Pump

Shallow Well: TW-3S

Deep Well: TW-3I

Protective Flushmount with Concrete Pad



Protective Casing:
Diameter: 12 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite Chips

Filter Pack: 13 ft to 21 ft
Type: Sand
Size: 0

Riser Pipe: 0.5 ft to 25 ft
Diameter: 2 inches
Type: Stainless Steel

Well Screen: 15 ft to 20 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Annular Seal: 21 ft to 23 ft
Type: Bentonite Pellets

Filter Pack: 23 ft to 35 ft
Type: Sand
Size: 0

Well Screen: 25 ft to 35 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 35 ft

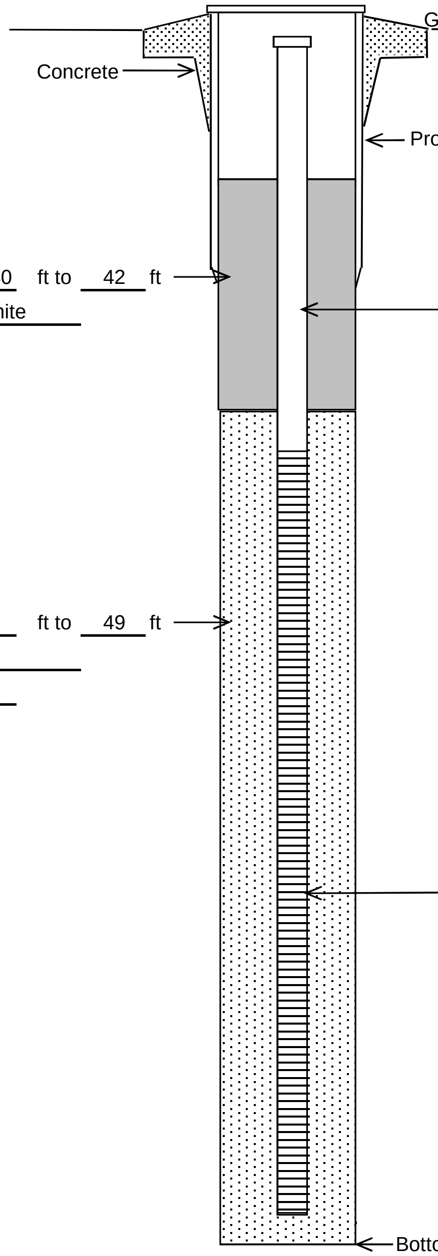
Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

AECOM

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-3D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/6/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 40 ft to 42 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 44 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 42 ft to 49 ft
Type: Sand
Size: 1

Well Screen: 44 ft to 49 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 49 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

NESTED MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

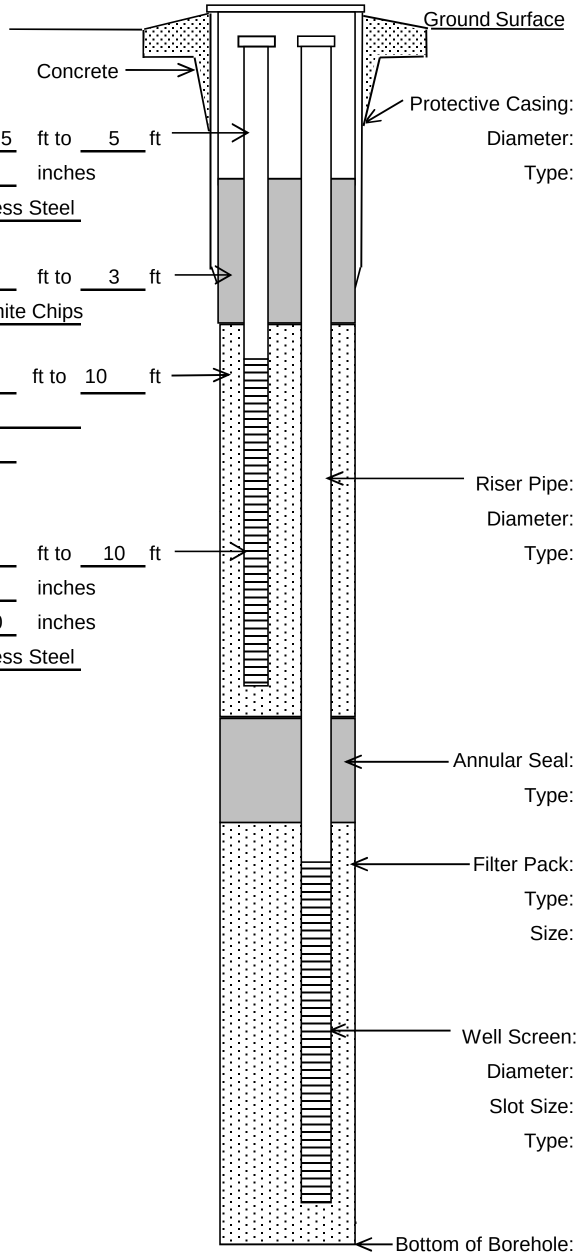
Well No. TW 4 S/I

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/15/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matthew Dean	
Drilling Method: 6.25" Hollow Stem Augers	Development Method and Date: Whale Pump	

Shallow Well: TW-4S

Deep Well: TW-4I

Protective Flushmount with Concrete Pad



Protective Casing:
Diameter: 12 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 5 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 1 ft to 3 ft
Type: Bentonite Chips

Filter Pack: 3 ft to 10 ft
Type: Sand
Size: 0

Well Screen: 5 ft to 10 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite Pellets

Filter Pack: 13 ft to 25 ft
Type: Sand
Size: 0

Well Screen: 15 ft to 25 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

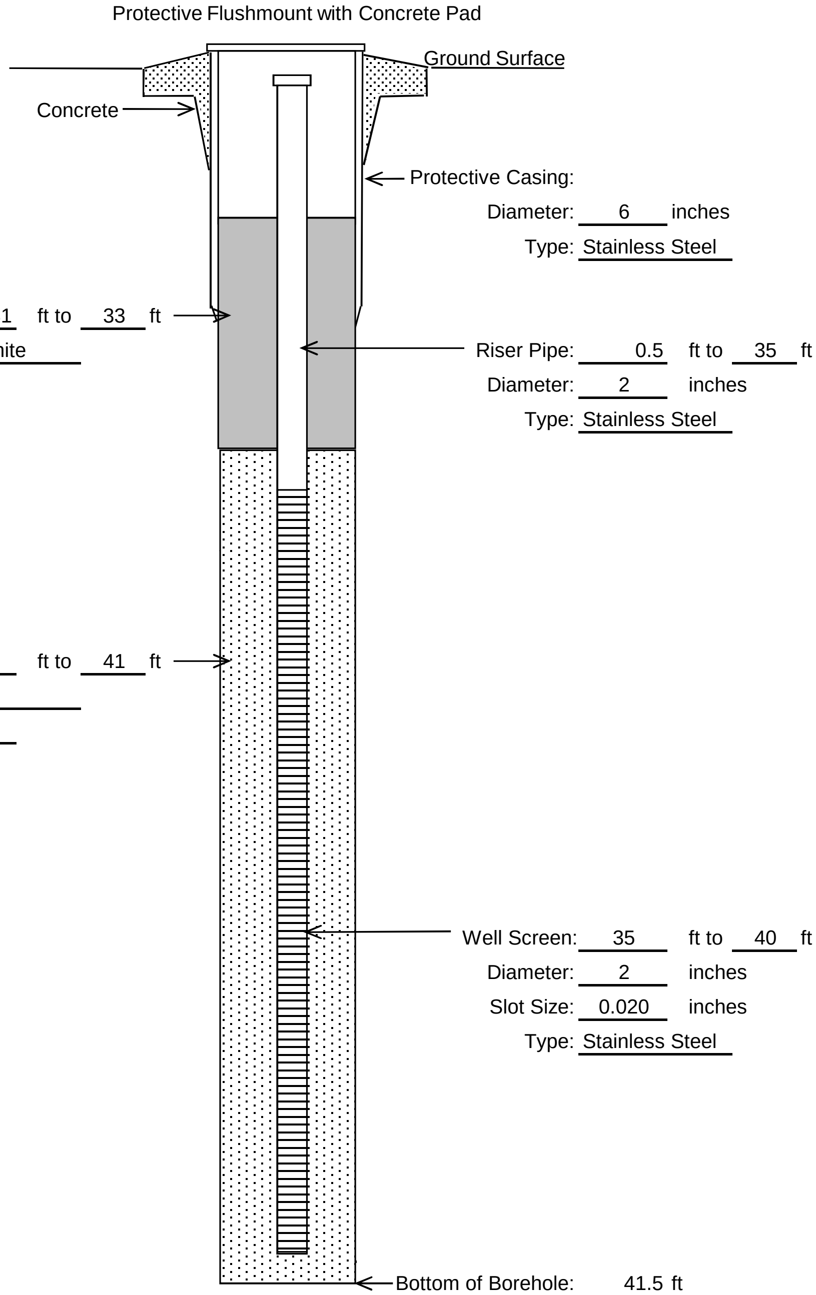
Bottom of Borehole: 25 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-4D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/7/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	

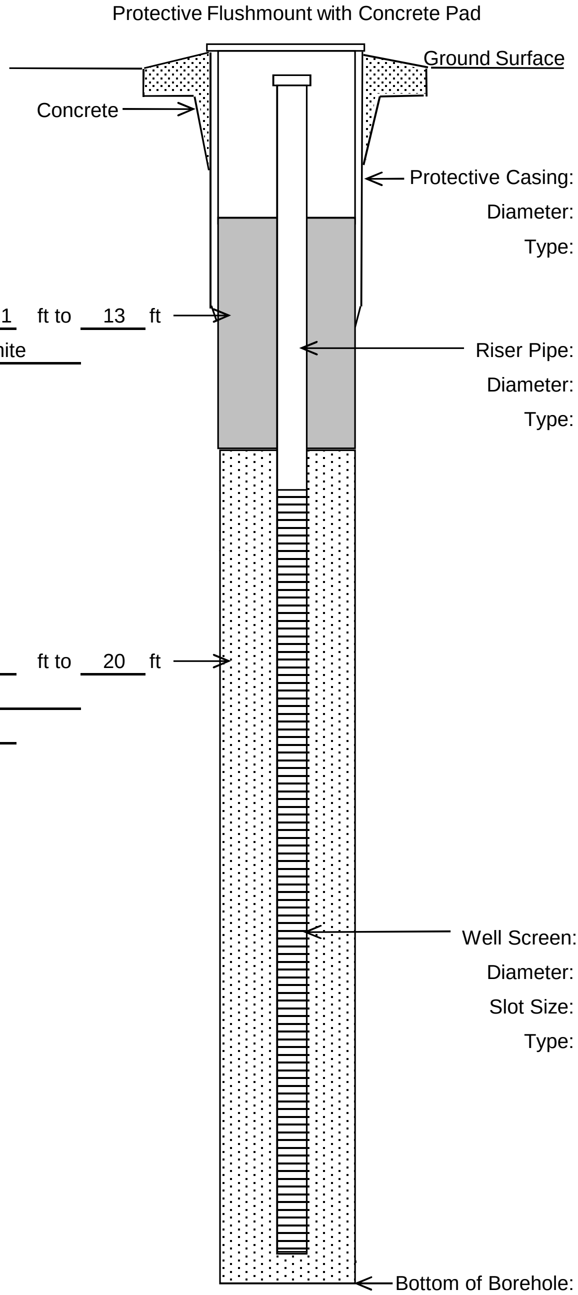


Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-5S

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/9/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 13 ft to 20 ft
Type: Sand
Size: 0

Well Screen: 15 ft to 20 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

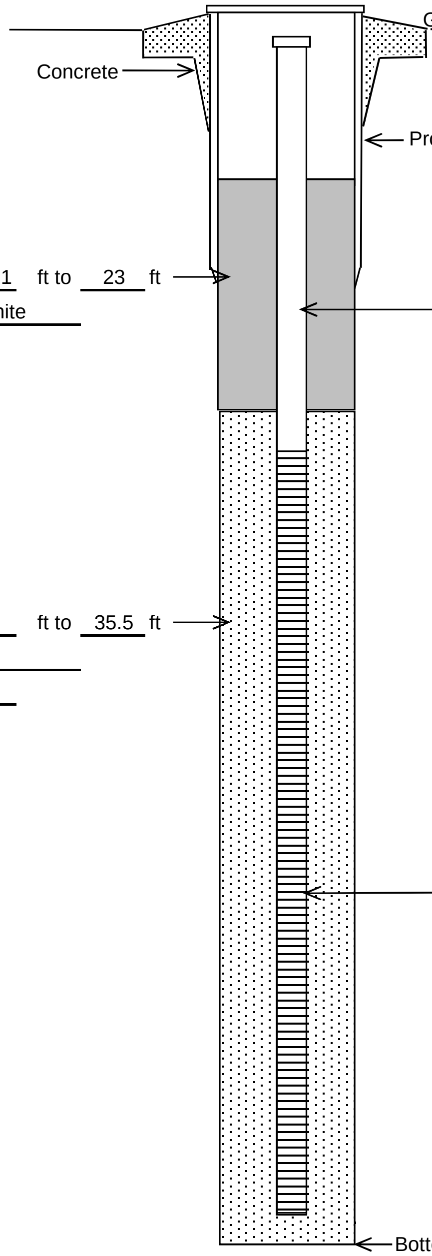
Bottom of Borehole: 20 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-5D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/9/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Flushmount with Concrete Pad

Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 21 ft to 23 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 25 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 23 ft to 35.5 ft
Type: Sand
Size: 0

Well Screen: 25 ft to 35 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

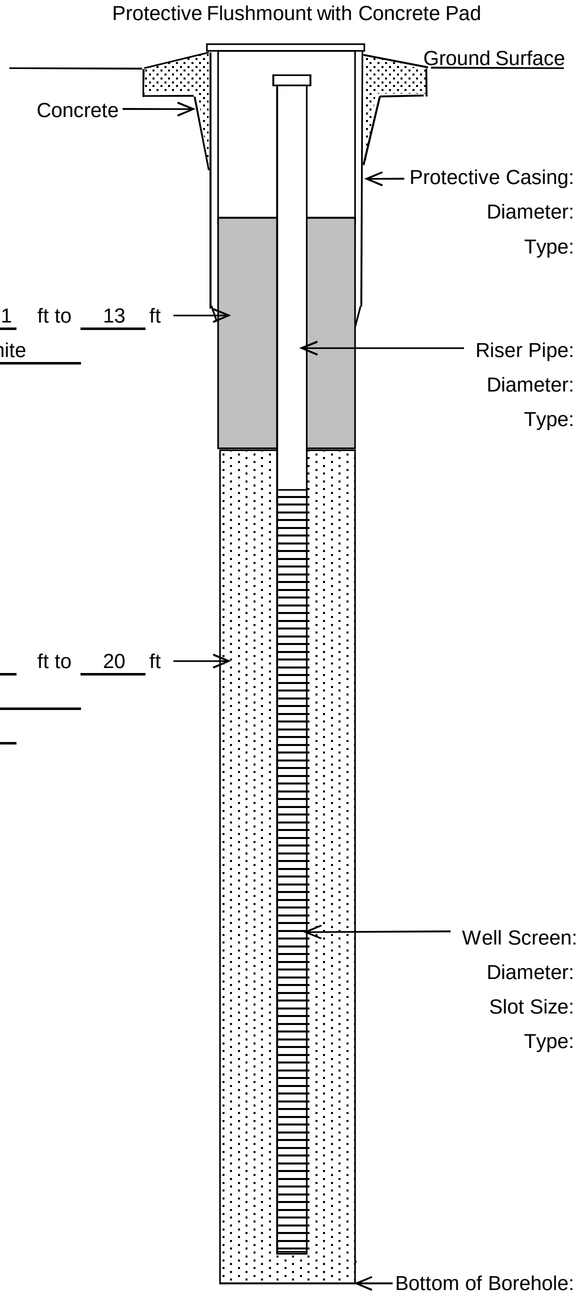
Bottom of Borehole: 35.5 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-6S

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/--/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 13 ft to 20 ft
Type: Sand
Size: 0

Well Screen: 15 ft to 20 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 20 ft

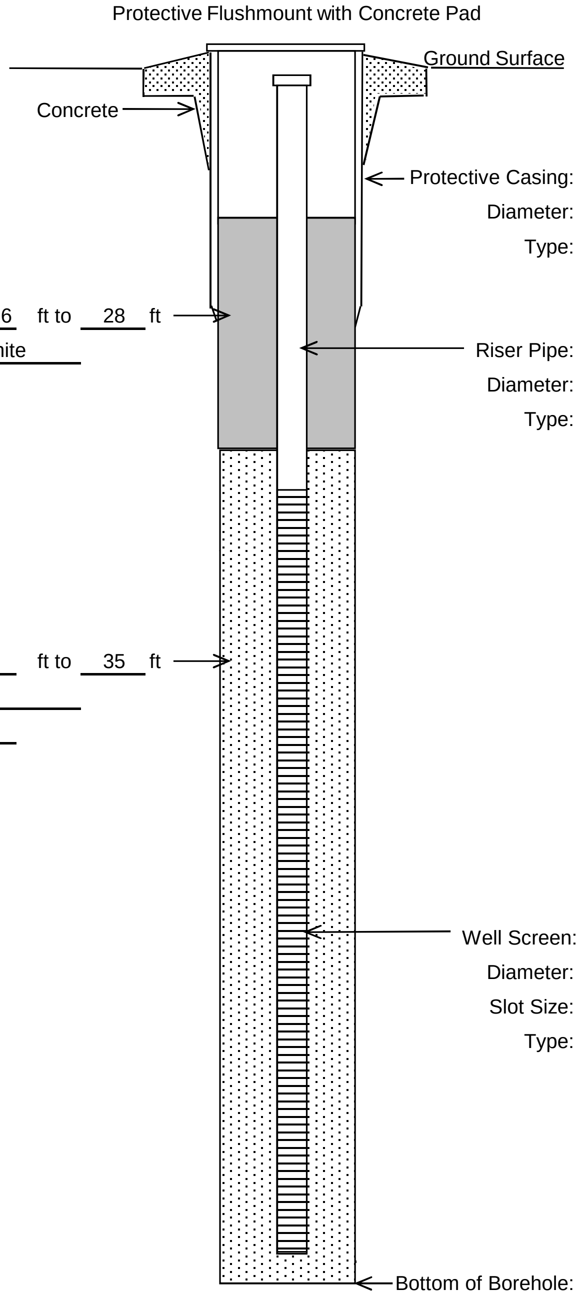
Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

AECOM

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-6I

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/--/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 26 ft to 28 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 30 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 28 ft to 35 ft
Type: Sand
Size: 0

Well Screen: 30 ft to 35 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 35 ft

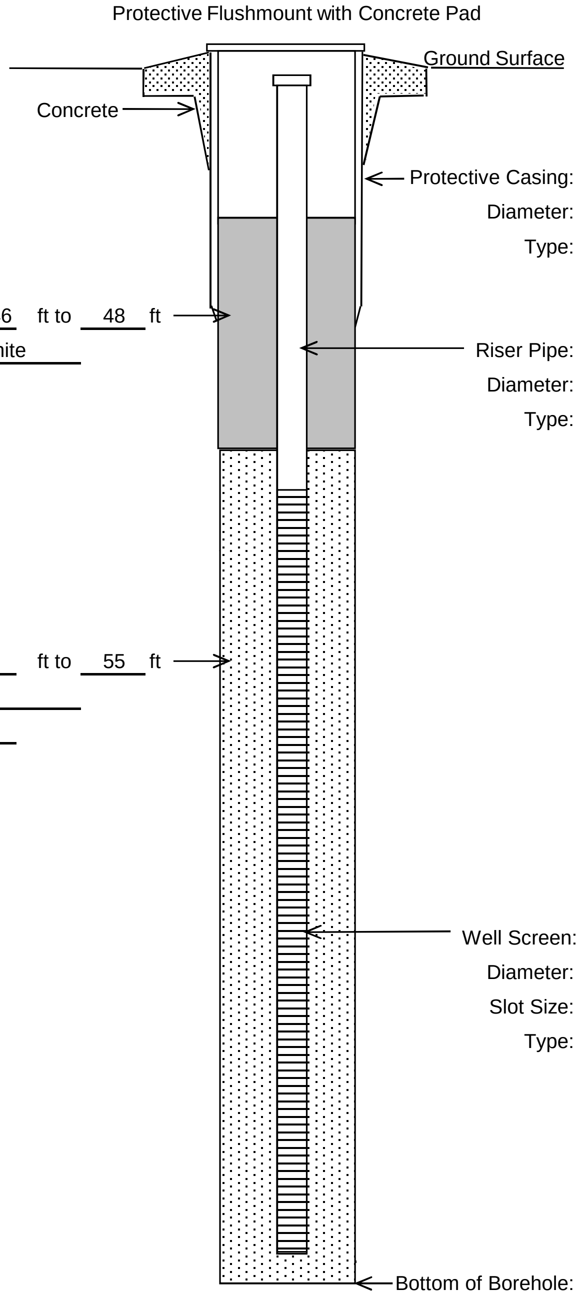
Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

AECOM

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-6D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/28/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 46 ft to 48 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 50 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 48 ft to 55 ft
Type: Sand
Size: 0

Well Screen: 50 ft to 55 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

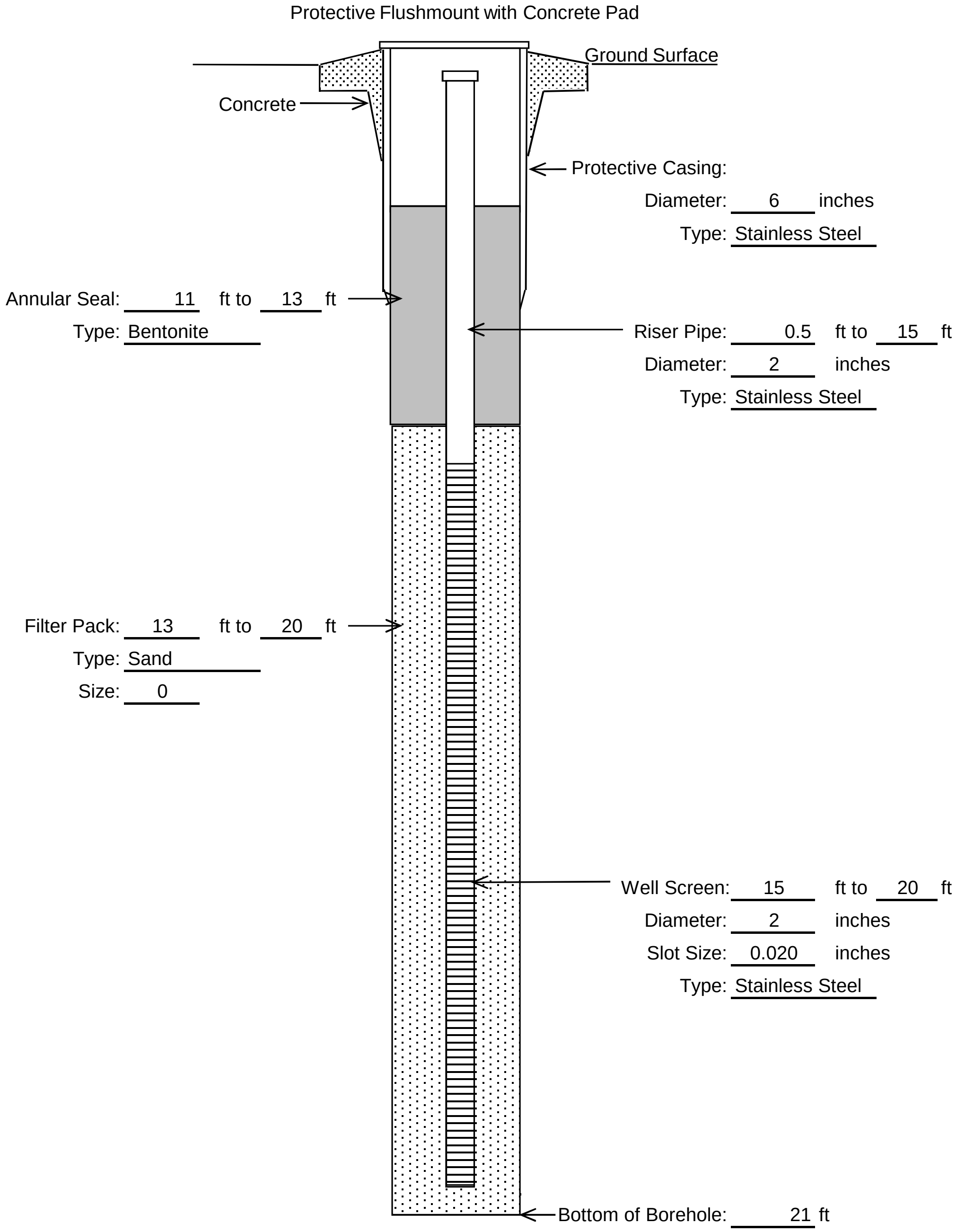
Bottom of Borehole: 55.2 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-7S

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/21/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 11 ft to 13 ft
Type: Bentonite

Riser Pipe: 0.5 ft to 15 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 13 ft to 20 ft
Type: Sand
Size: 0

Well Screen: 15 ft to 20 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

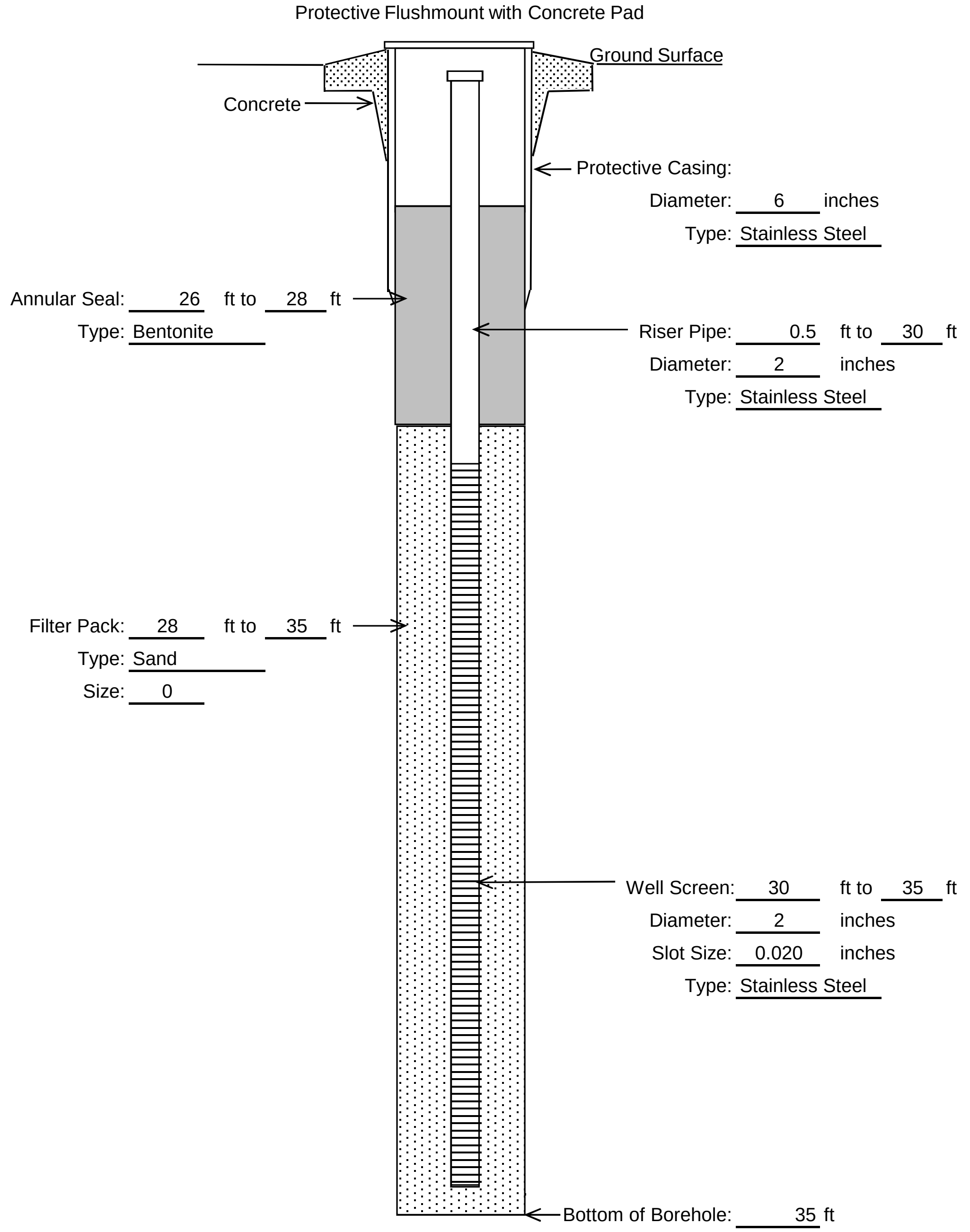
Bottom of Borehole: 21 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-7I

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/26/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	

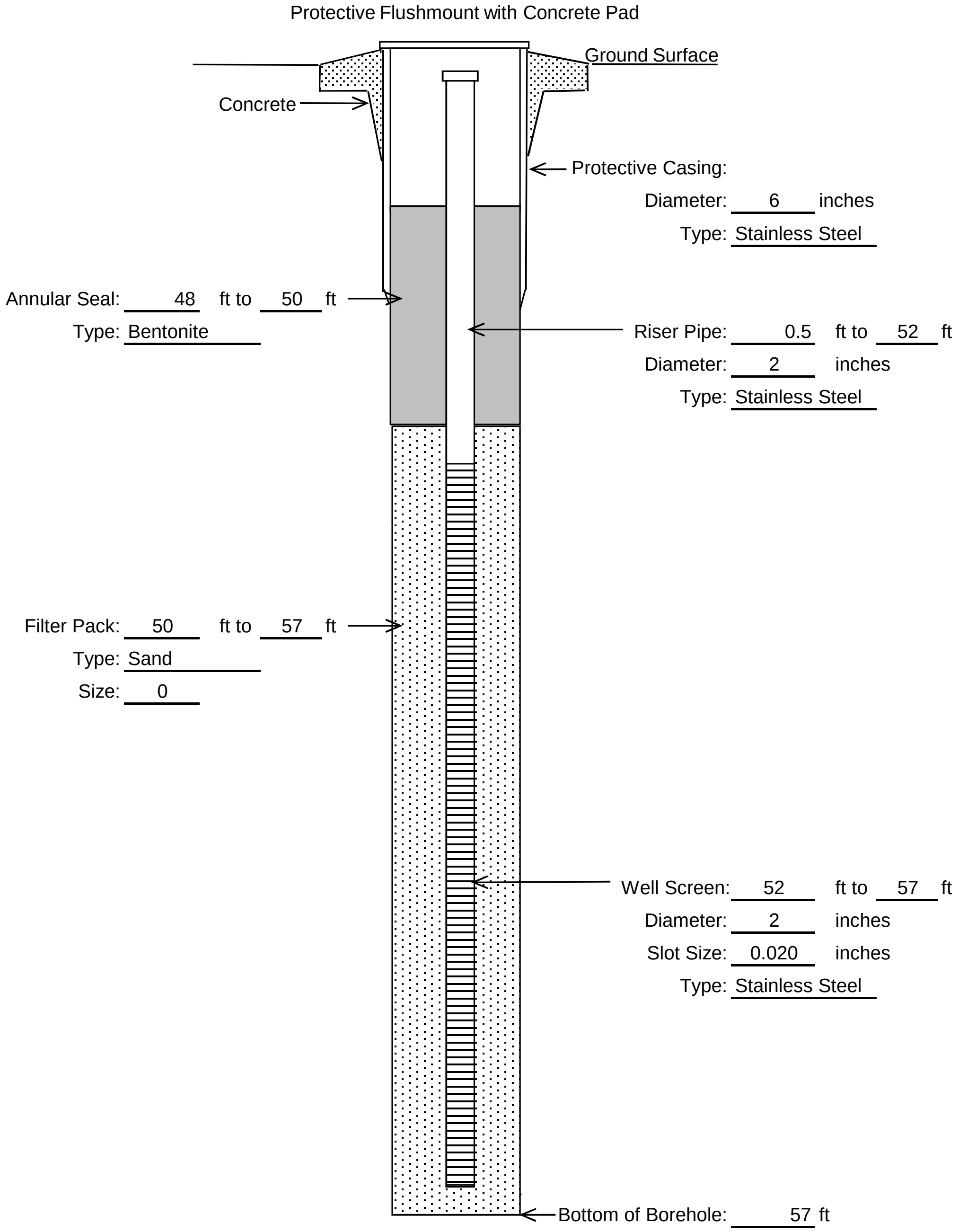


Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.

MONITORING WELL DIAGRAM
SINGLE-CASED
FLUSH-MOUNT COMPLETION

Well No. TW-7D

Project: Former DUSO Chemical Company	Location: W of 33 Fulton St Poughkeepsie, NY	Date of Completion: 11/20/12
AECOM Project Number: 60279080	Subcontractor: GeoLogic NY, Inc.	
Surface Elevation:	Drillers: Scott and John	Water Level ____ ft. On __/__/__
Top of PVC Casing Elevation:	Geologist: Matt Dean	
Drilling Method: 4.25" Hollow Stem Augers	Development Method and Date: Whale Pump on	



Protective Casing:
Diameter: 6 inches
Type: Stainless Steel

Annular Seal: 48 ft to 50 ft
Type: Bentonite

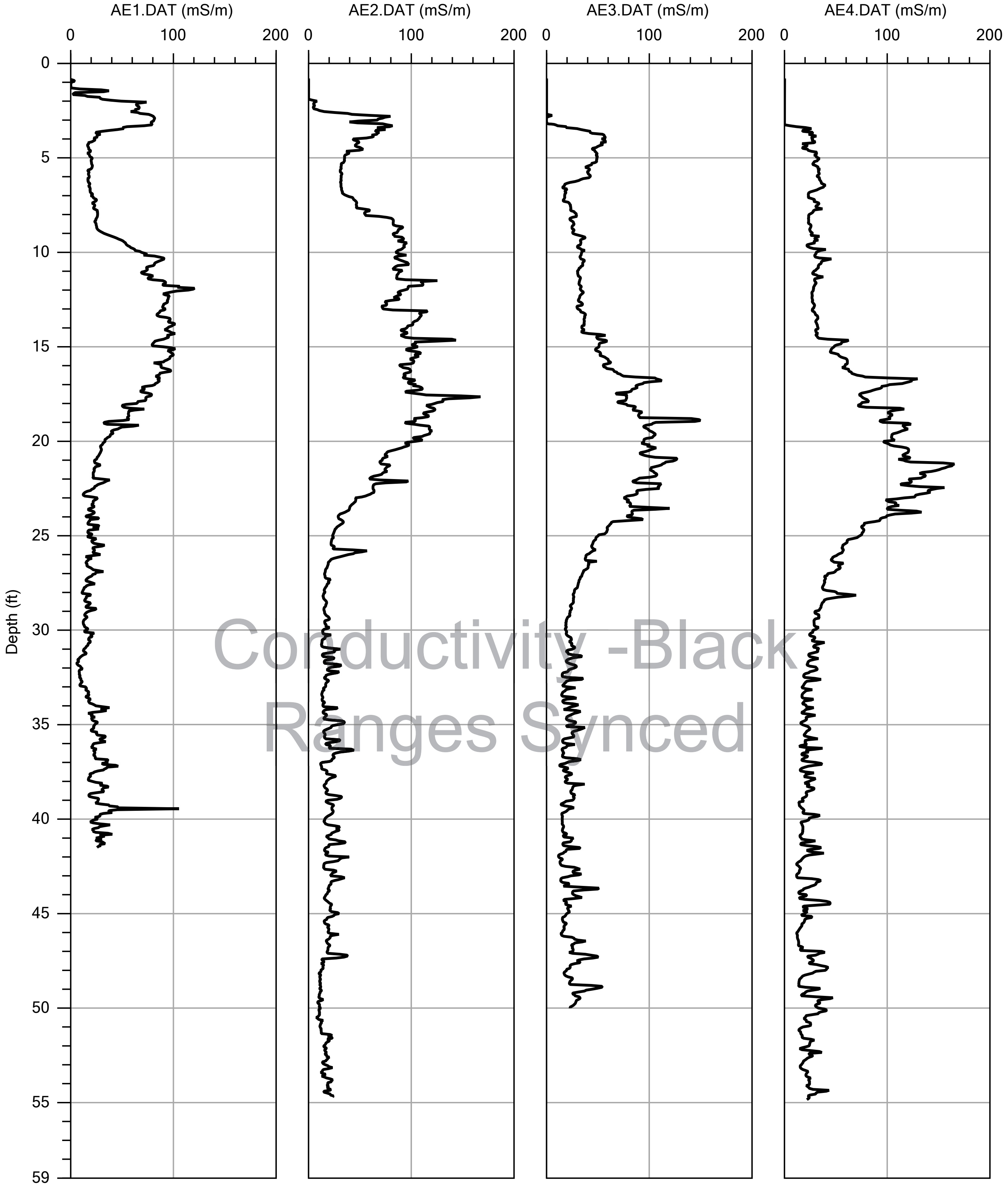
Riser Pipe: 0.5 ft to 52 ft
Diameter: 2 inches
Type: Stainless Steel

Filter Pack: 50 ft to 57 ft
Type: Sand
Size: 0

Well Screen: 52 ft to 57 ft
Diameter: 2 inches
Slot Size: 0.020 inches
Type: Stainless Steel

Bottom of Borehole: 57 ft

Note: All measurements are based on ground surface at 0.0 feet. Measurements are given in feet below grade. Diagram not to scale.



EC

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

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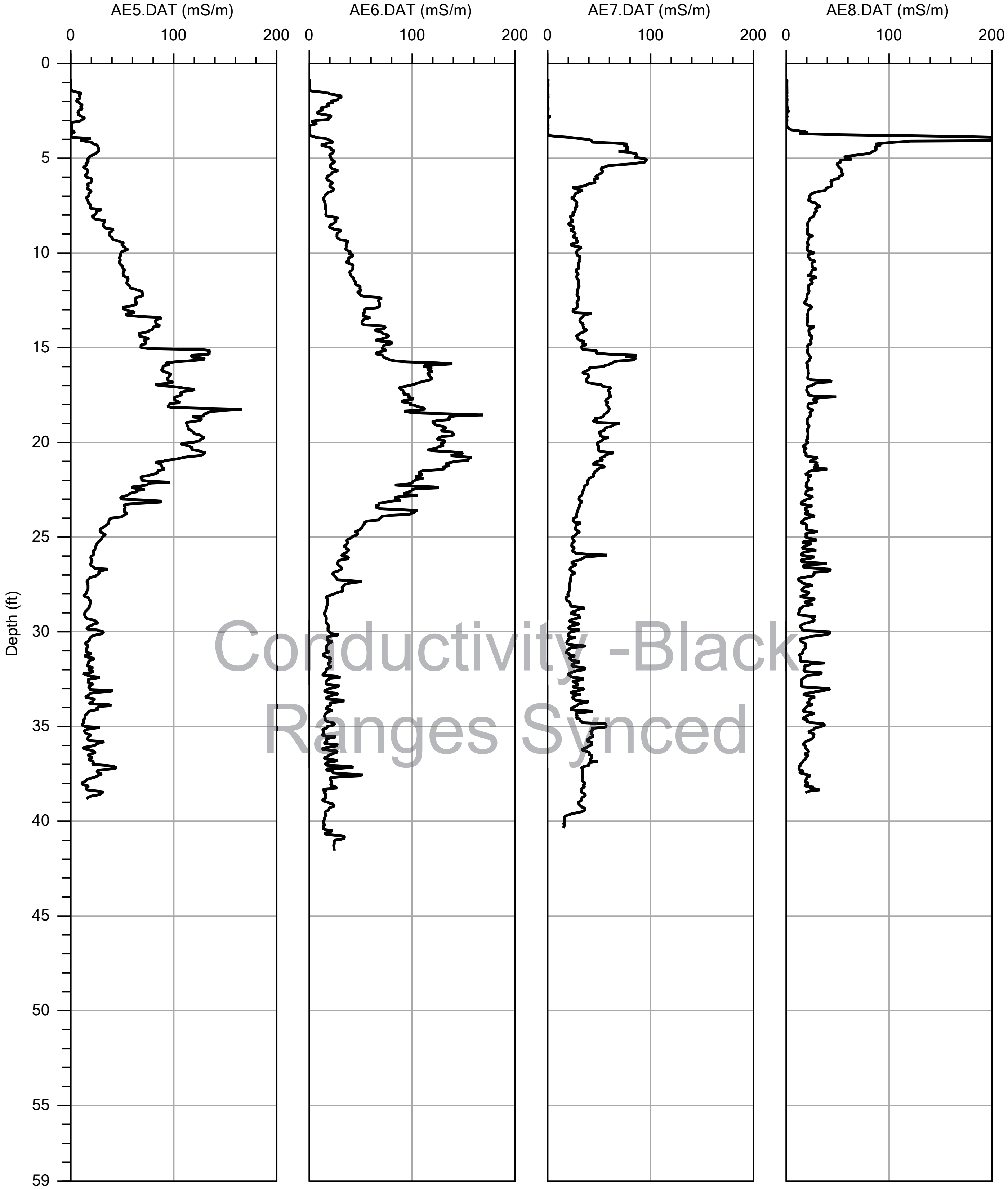
AE2.DAT	3/21/2011
AE3.DAT	3/21/2011
AE4.DAT	3/22/2011

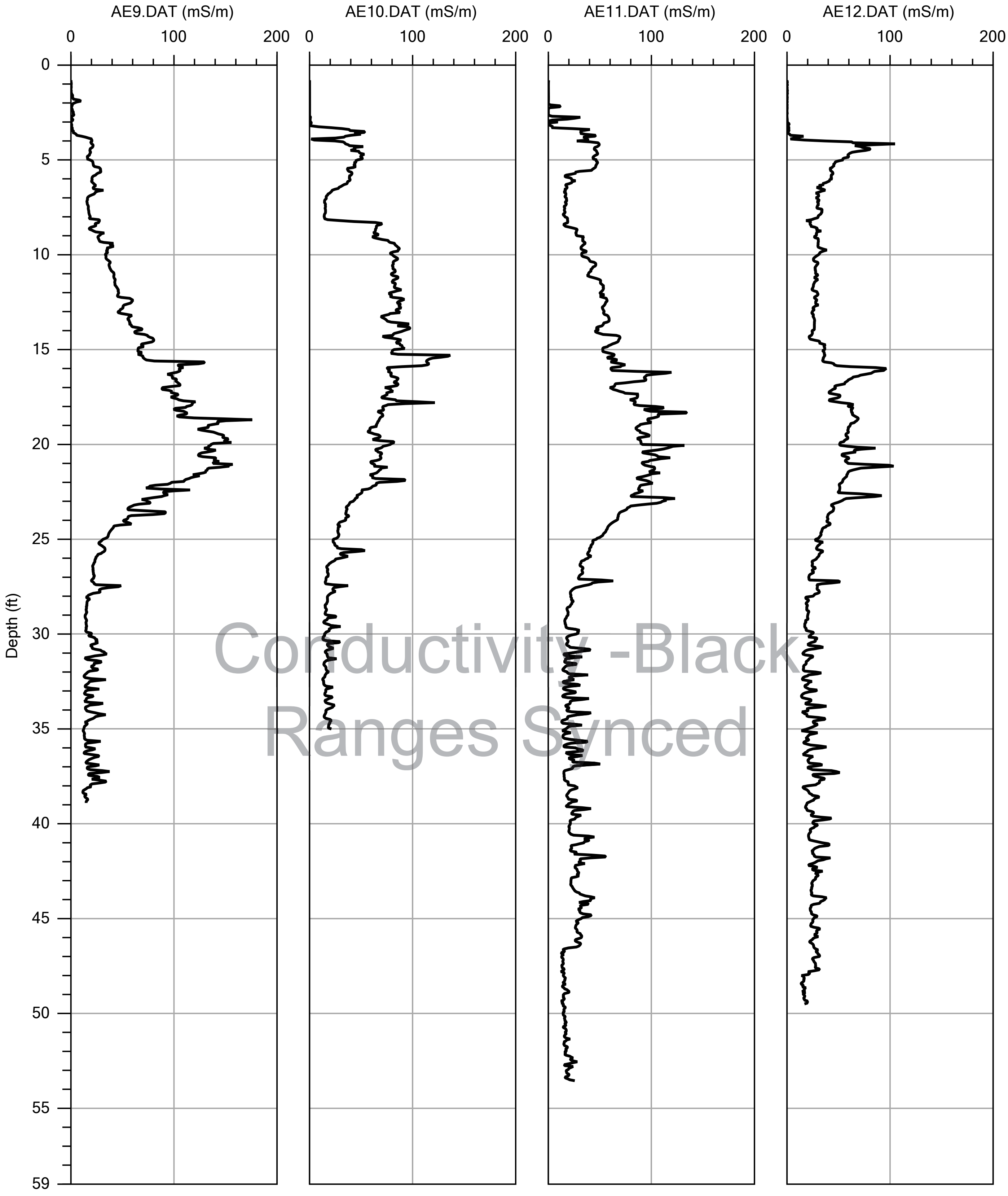


AE5.DAT	3/22/2011
AE6.DAT	3/22/2011
AE7.DAT	3/22/2011
AE8.DAT	3/22/2011

41° 43′ 26″ N, 73° 55′ 45″ W

EC

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM



AE9.DAT 3/23/2011

AE10.DAT 3/23/2011
41° 43′ 26″ N, 73° 55′ 44″ W

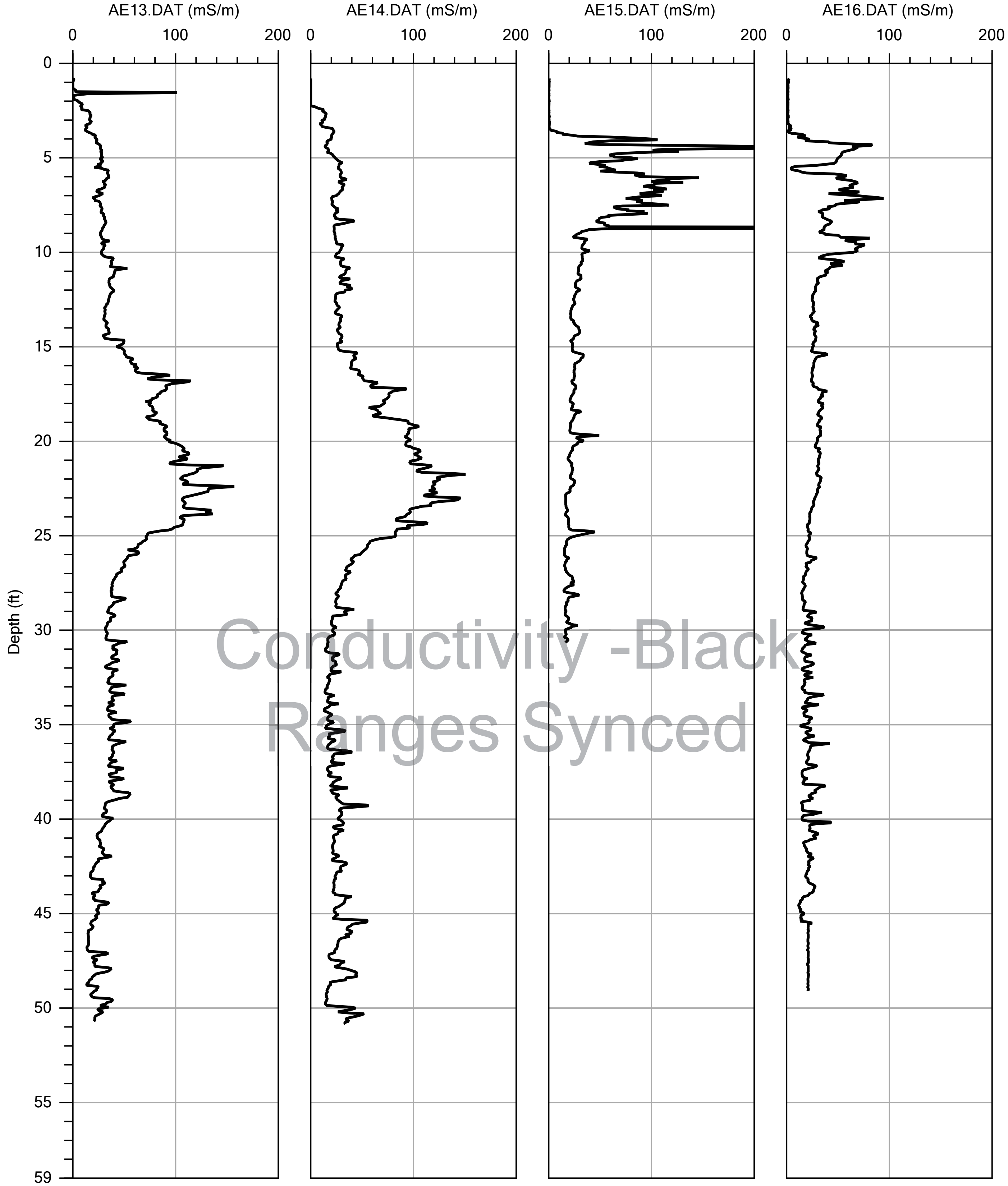
AE11.DAT 3/23/2011
41° 43′ 27″ N, 73° 55′ 43″ W

AE12.DAT 3/23/2011

EC

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

ZEBRA Environmental Subsurface Sampling, Injections and Data Collection for Environmental Professionals Since 1992.



AE13.DAT 3/24/2011
41° 43′ 26″ N, 73° 55′ 44″ W

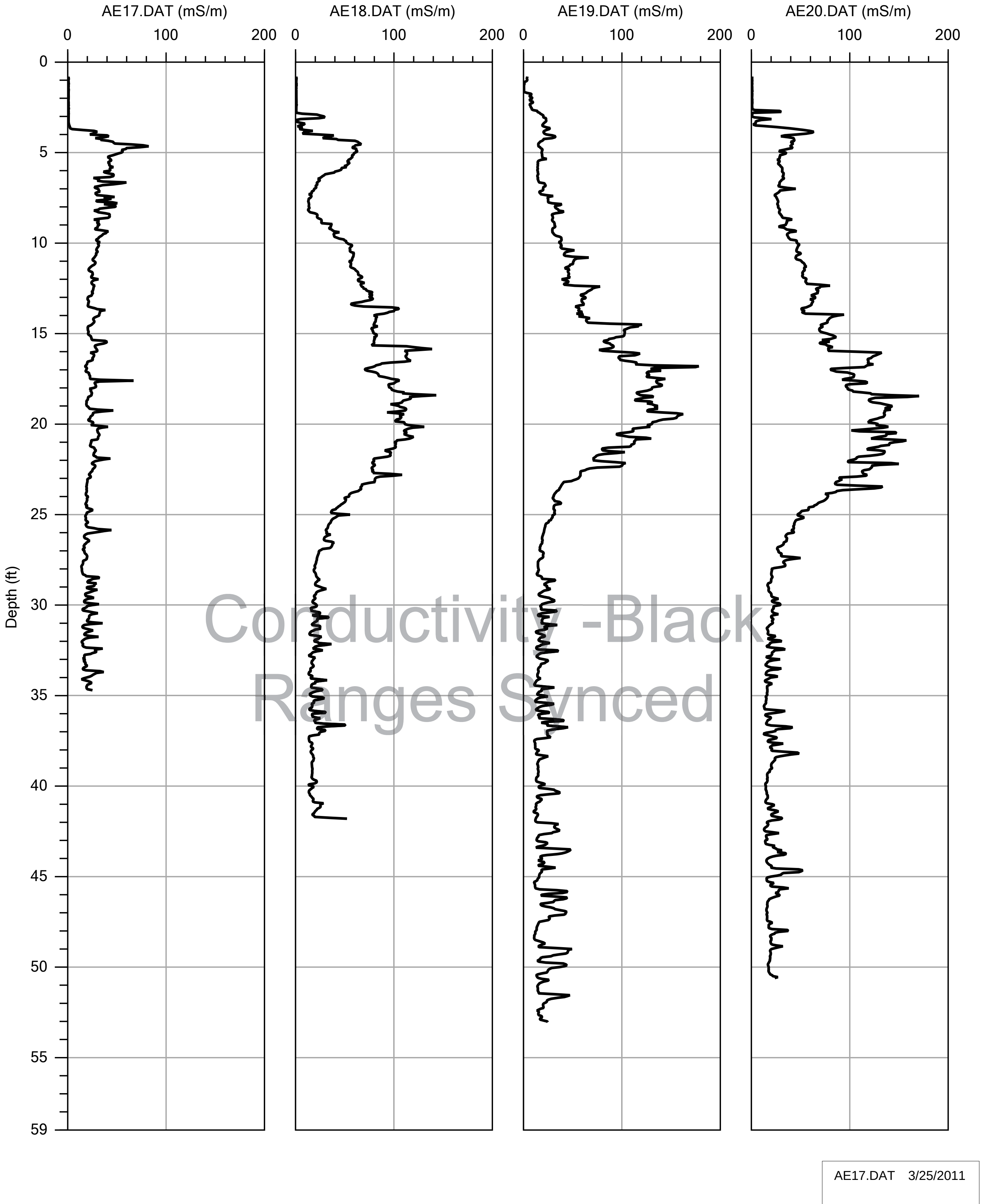
AE14.DAT 3/24/2011
41° 43′ 27″ N, 73° 55′ 45″ W

AE15.DAT 3/24/2011

AE16.DAT 3/25/2011
41° 43′ 27″ N, 73° 55′ 44″ W

EC

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM



AE17.DAT 3/25/2011

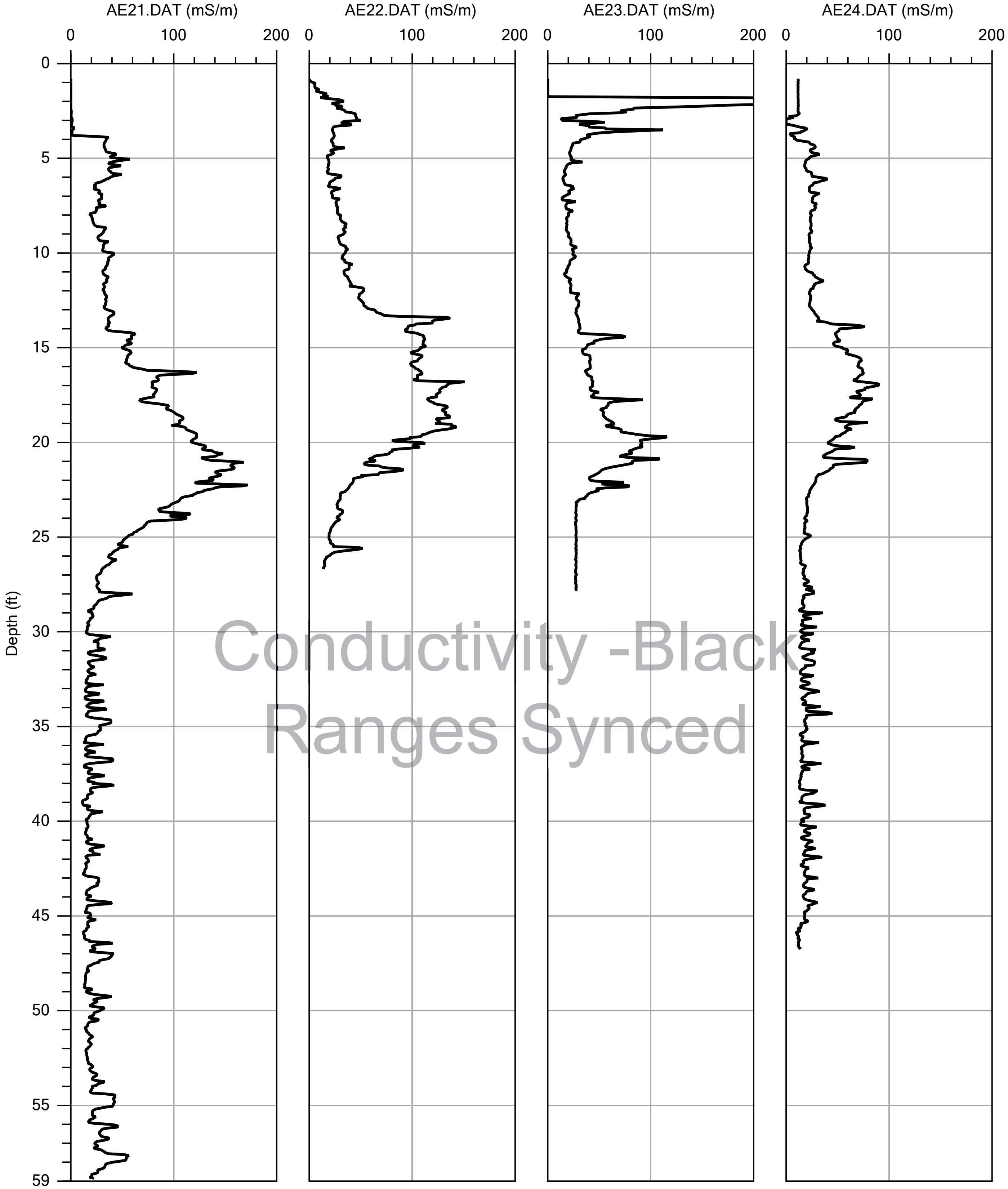
AE18.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 44″ W

AE19.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 45″ W

AE20.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 44″ W

EC

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM



EC

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

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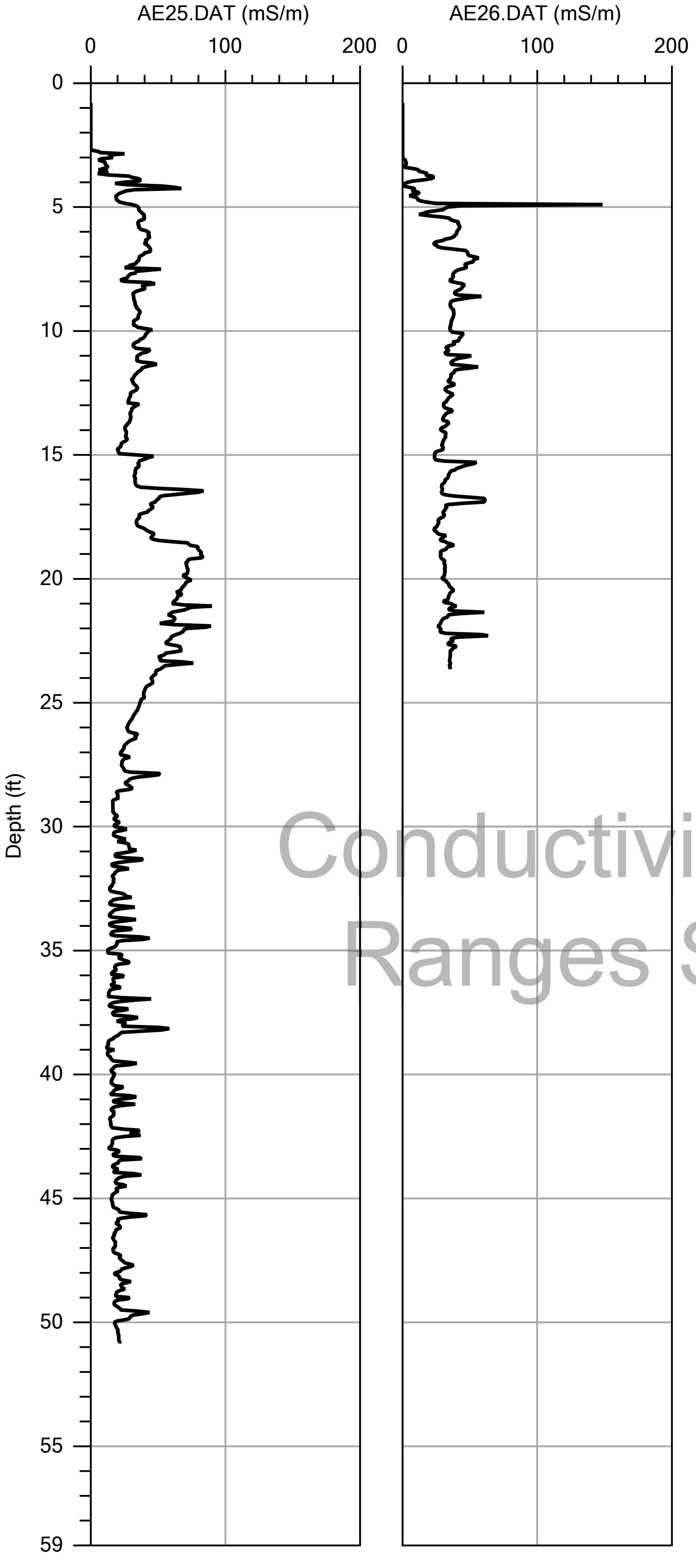
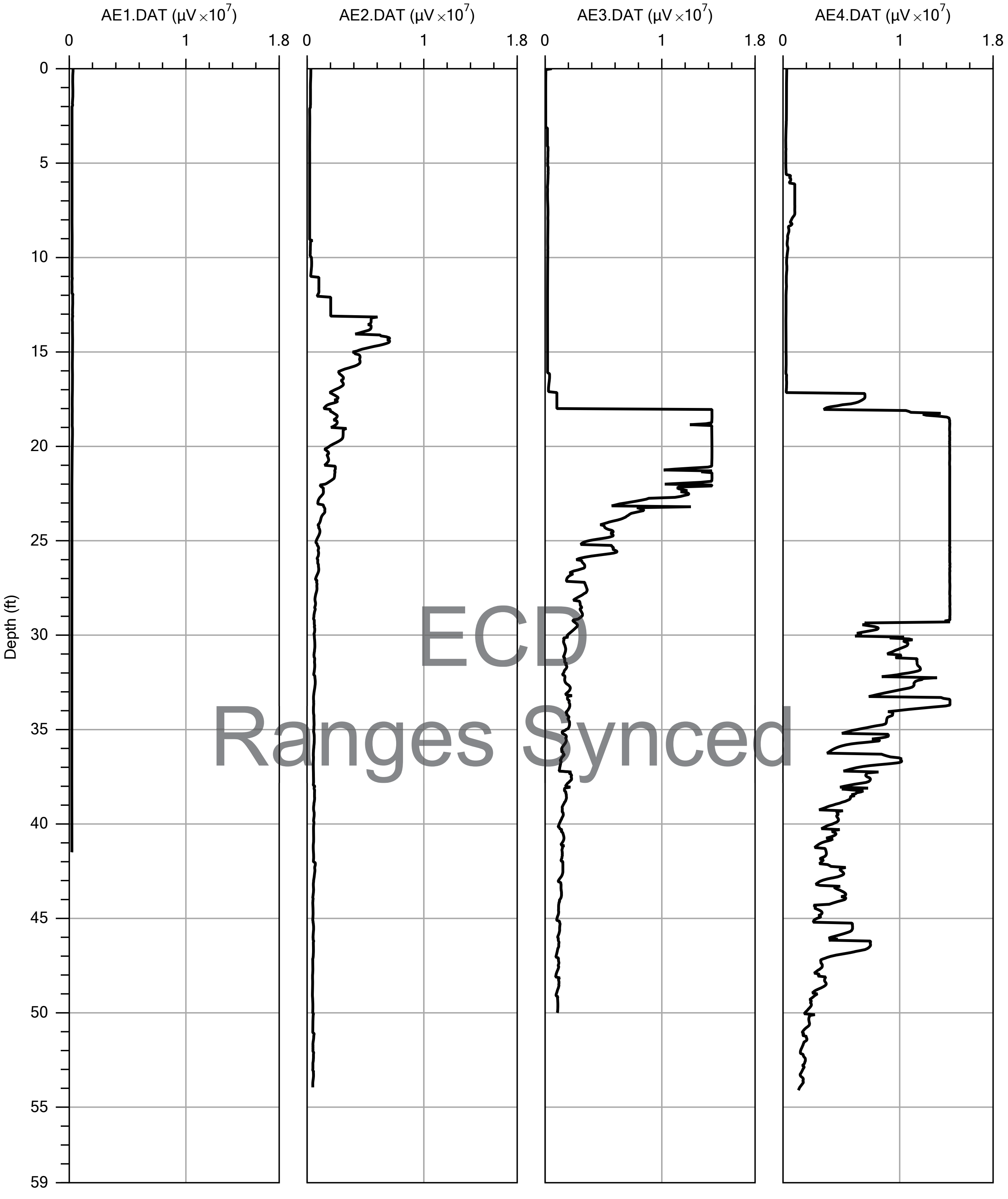
AE22.DAT	7/5/2011
AE23.DAT	7/5/2011
AE24.DAT	7/5/2011



EC

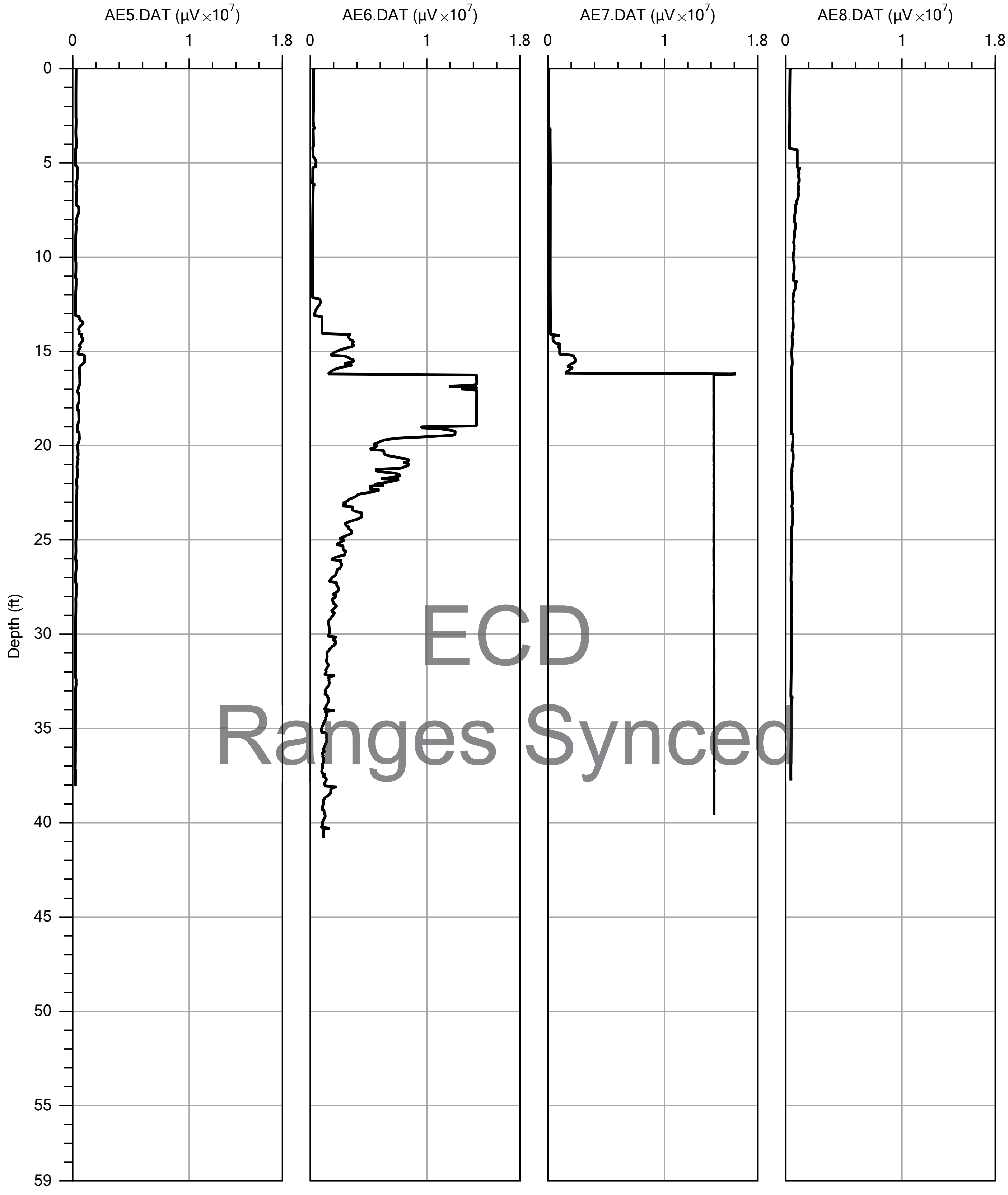
Company: ZEBRA ENVIRONMENTAL	Operator: Brian R	AE25.DAT 7/6/2011
Project ID: NY	Client: AECOM	AE26.DAT 7/6/2011



ECD Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

AE1.DAT	3/21/2011
AE2.DAT	3/21/2011
AE3.DAT	3/21/2011
AE4.DAT	3/22/2011



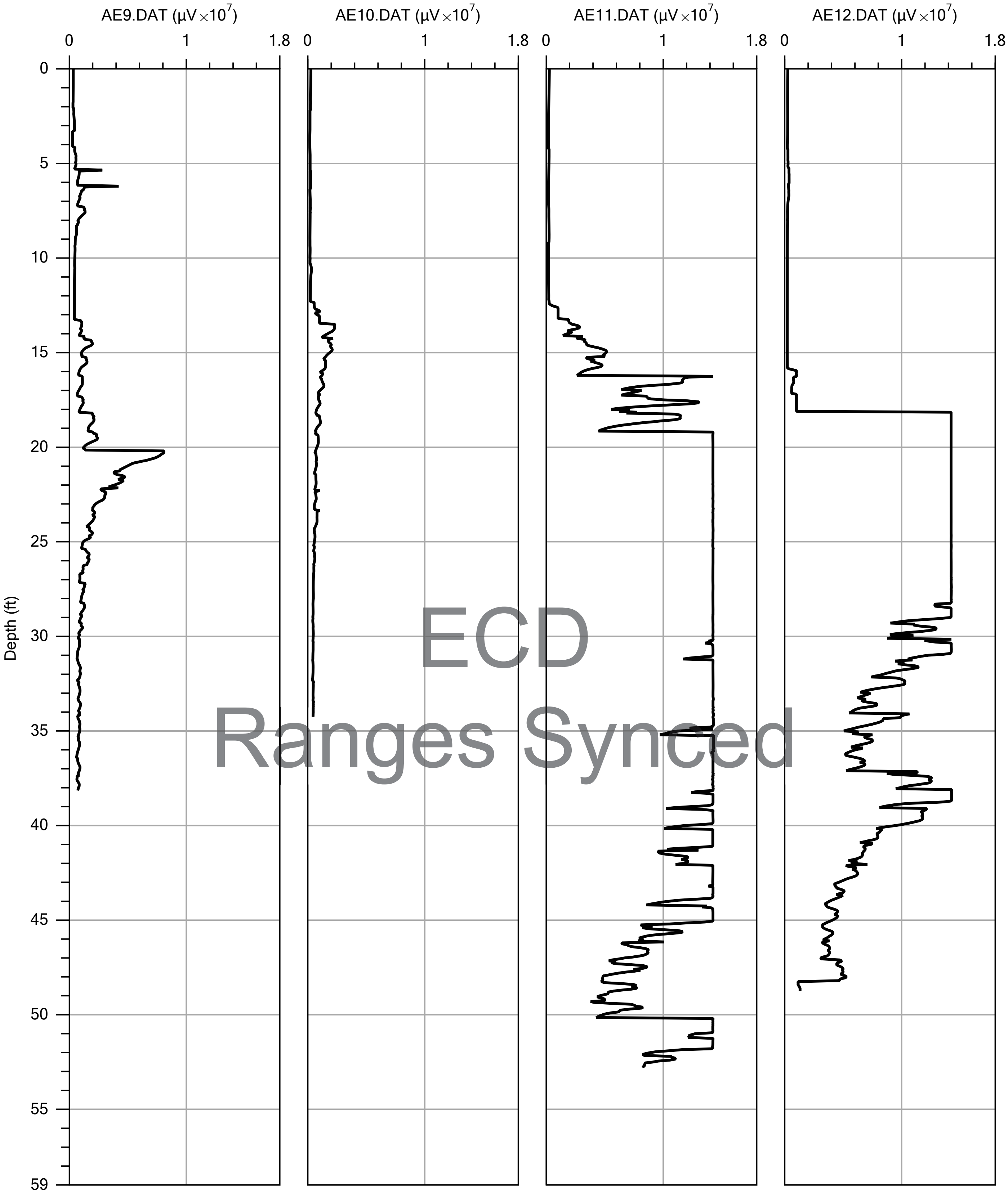
ECD Max

Company: ZEBRA ENVIRONMENTAL
Operator: Brian R
Project ID: NY
Client: AECOM

AE5.DAT	3/22/2011
AE6.DAT	3/22/2011

41° 43′ 26″ N, 73° 55′ 45″ W

AE7.DAT	3/22/2011
AE8.DAT	3/22/2011



AE9.DAT	3/23/2011
AE10.DAT	3/23/2011
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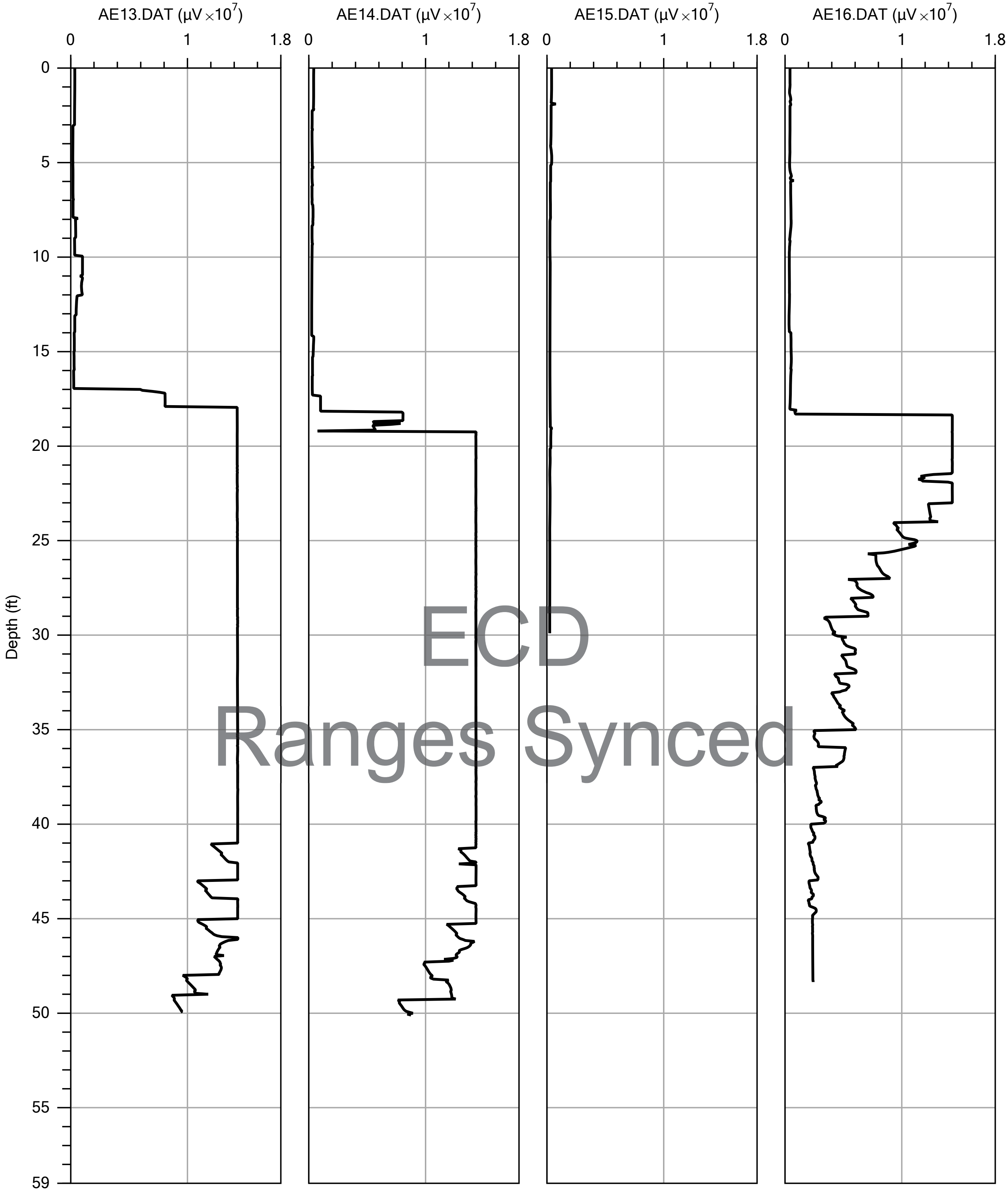
AE11.DAT	3/23/2011
41° 43′ 27″ N, 73° 55′ 43″ W	
AE12.DAT	3/23/2011

ECD Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

ZEBRA Environmental Subsurface Sampling, Injections and Data Collection for Environmental Professionals Since 1992.



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AE14.DAT 3/24/2011
41° 43′ 27″ N, 73° 55′ 45″ W

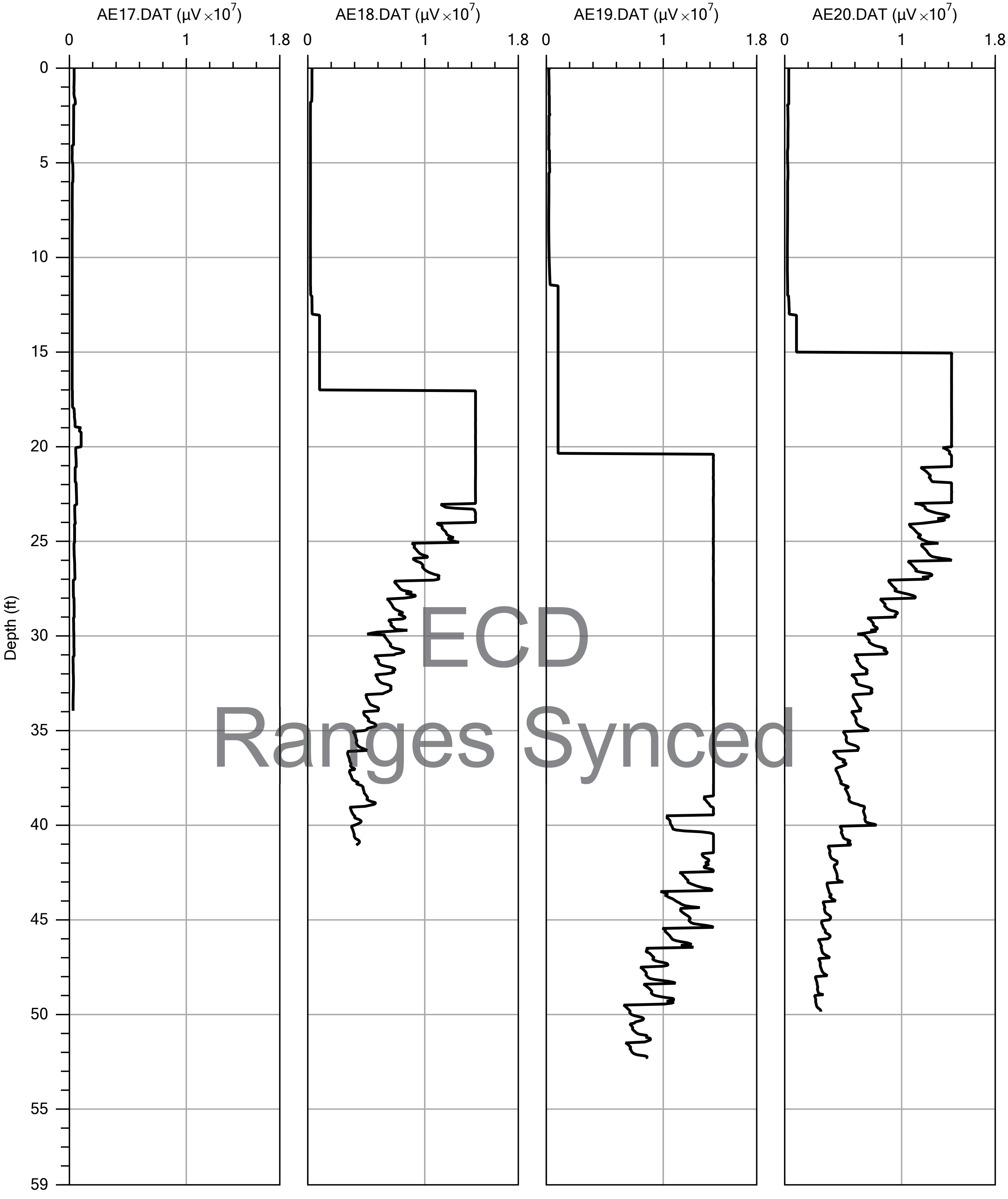
AE15.DAT 3/24/2011

AE16.DAT 3/25/2011
41° 43′ 27″ N, 73° 55′ 44″ W

ECD Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

ZEBRA



AE17.DAT 3/25/2011

AE18.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 44″ W

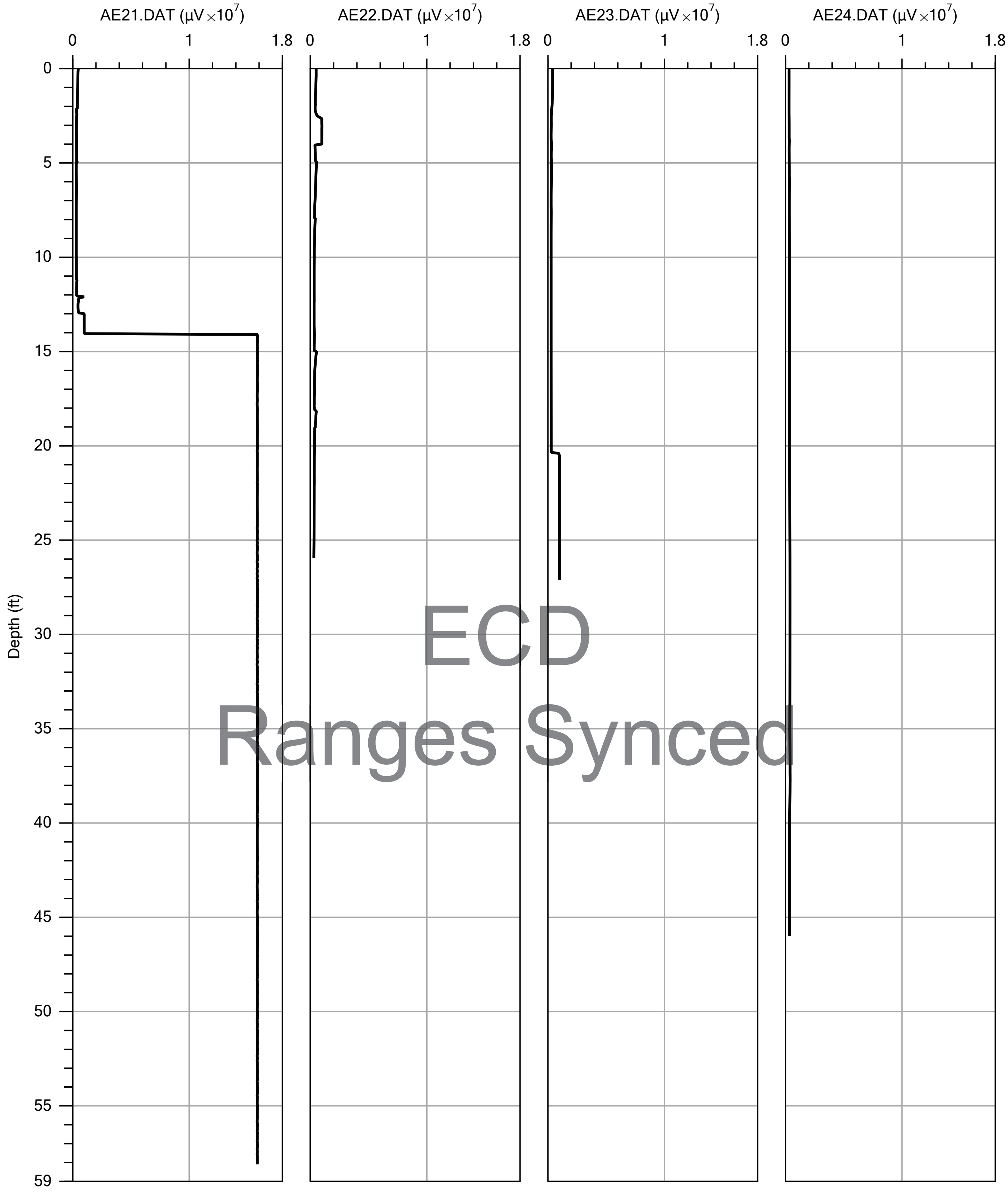
AE19.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 45″ W

AE20.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 44″ W

ECD Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

ZEBRA



ECD Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

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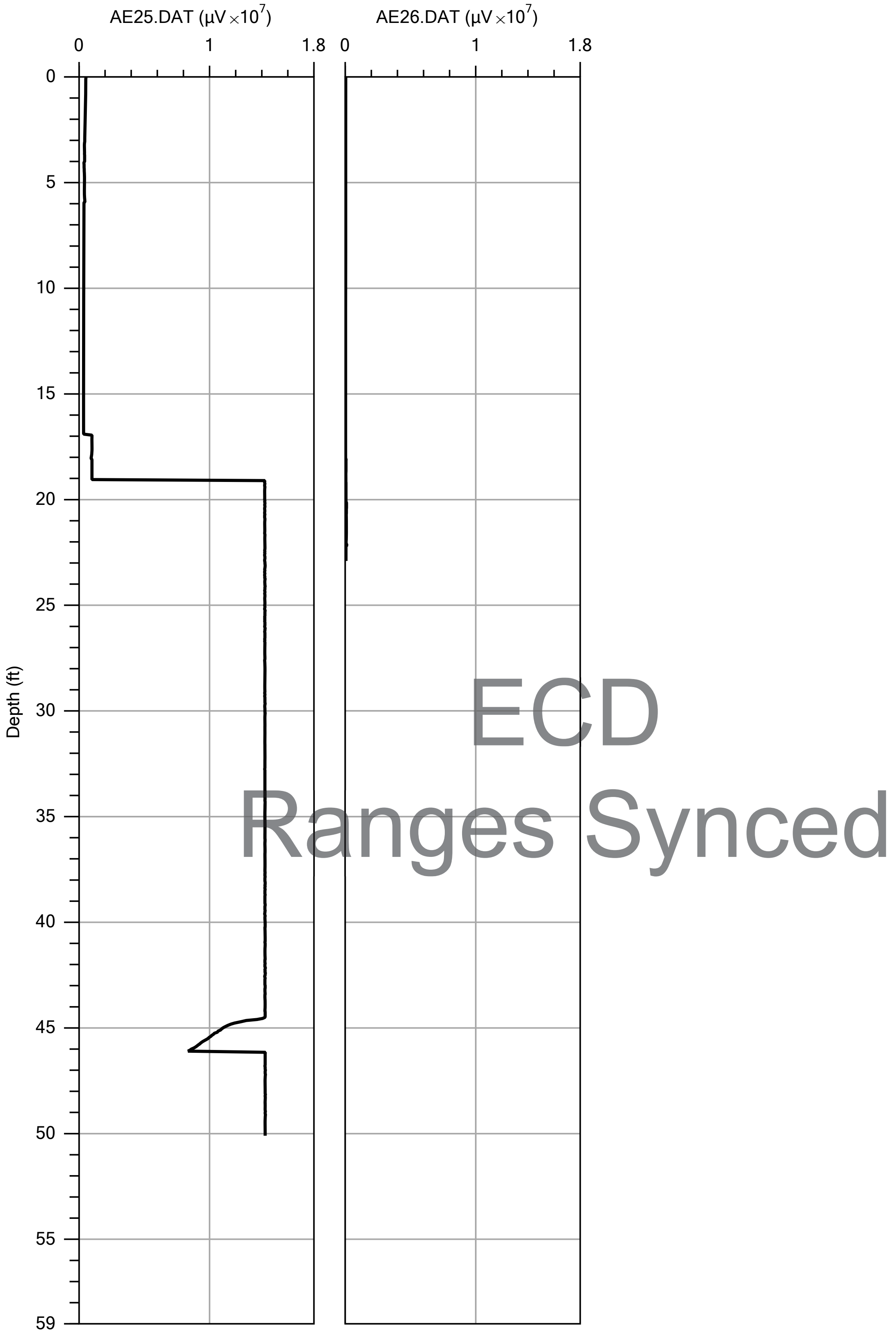
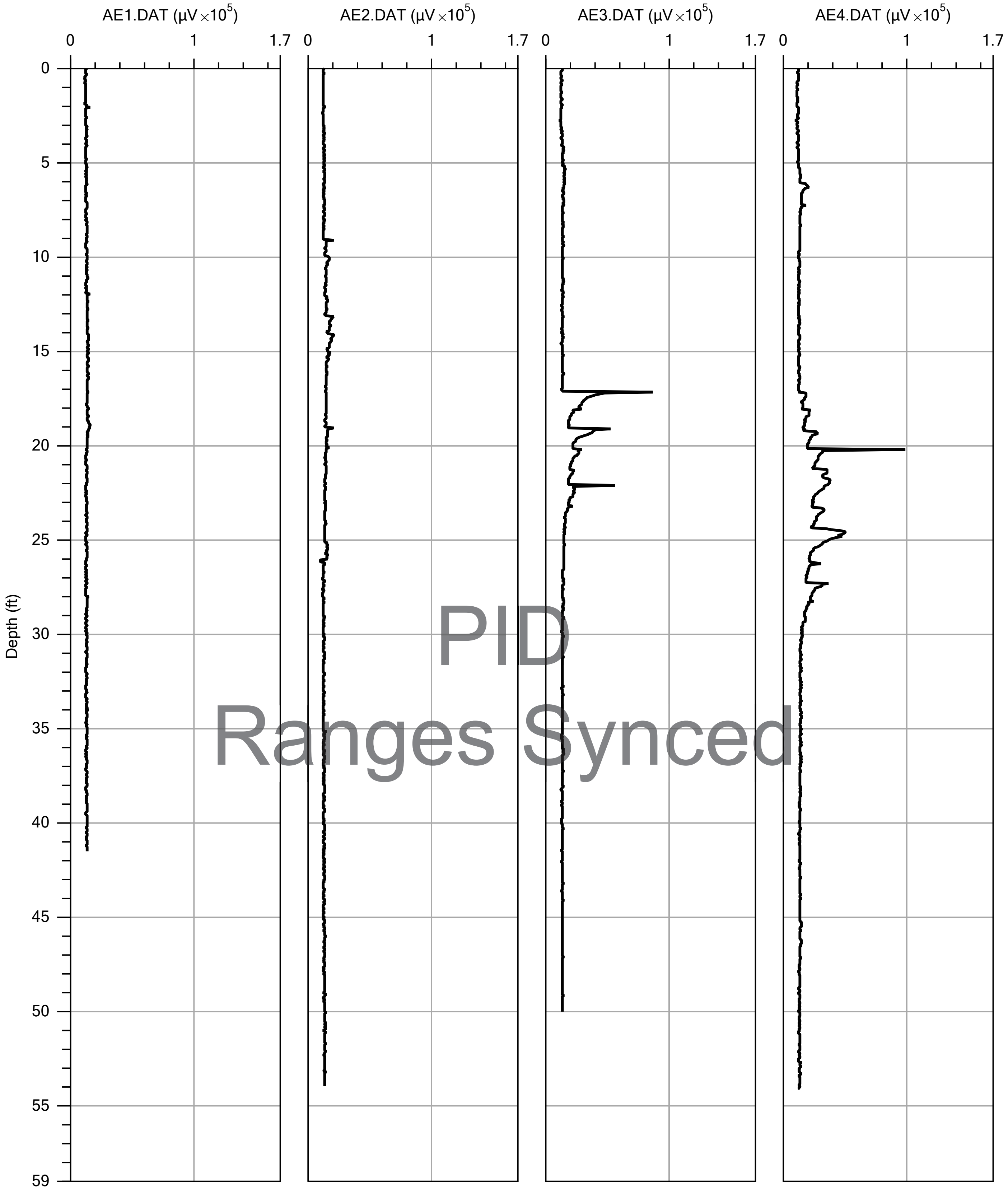
AE22.DAT	7/5/2011
AE23.DAT	7/5/2011
AE24.DAT	7/5/2011



ECD Max

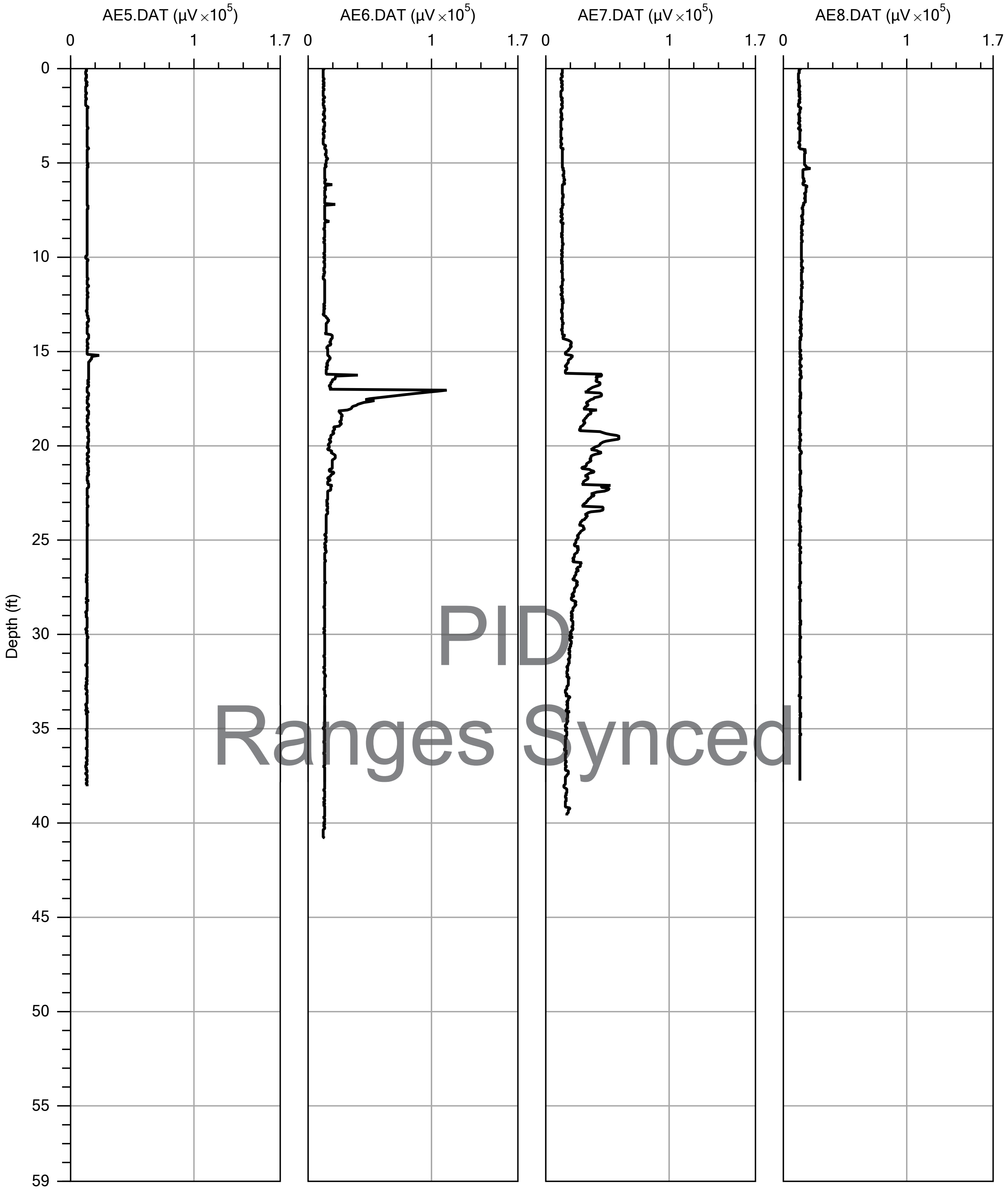
Company: ZEBRA ENVIRONMENTAL	Operator: Brian R	AE25.DAT 7/6/2011
Project ID: NY	Client: AECOM	AE26.DAT 7/6/2011



PID Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

AE1.DAT	3/21/2011
AE2.DAT	3/21/2011
AE3.DAT	3/21/2011
AE4.DAT	3/22/2011



PID Max

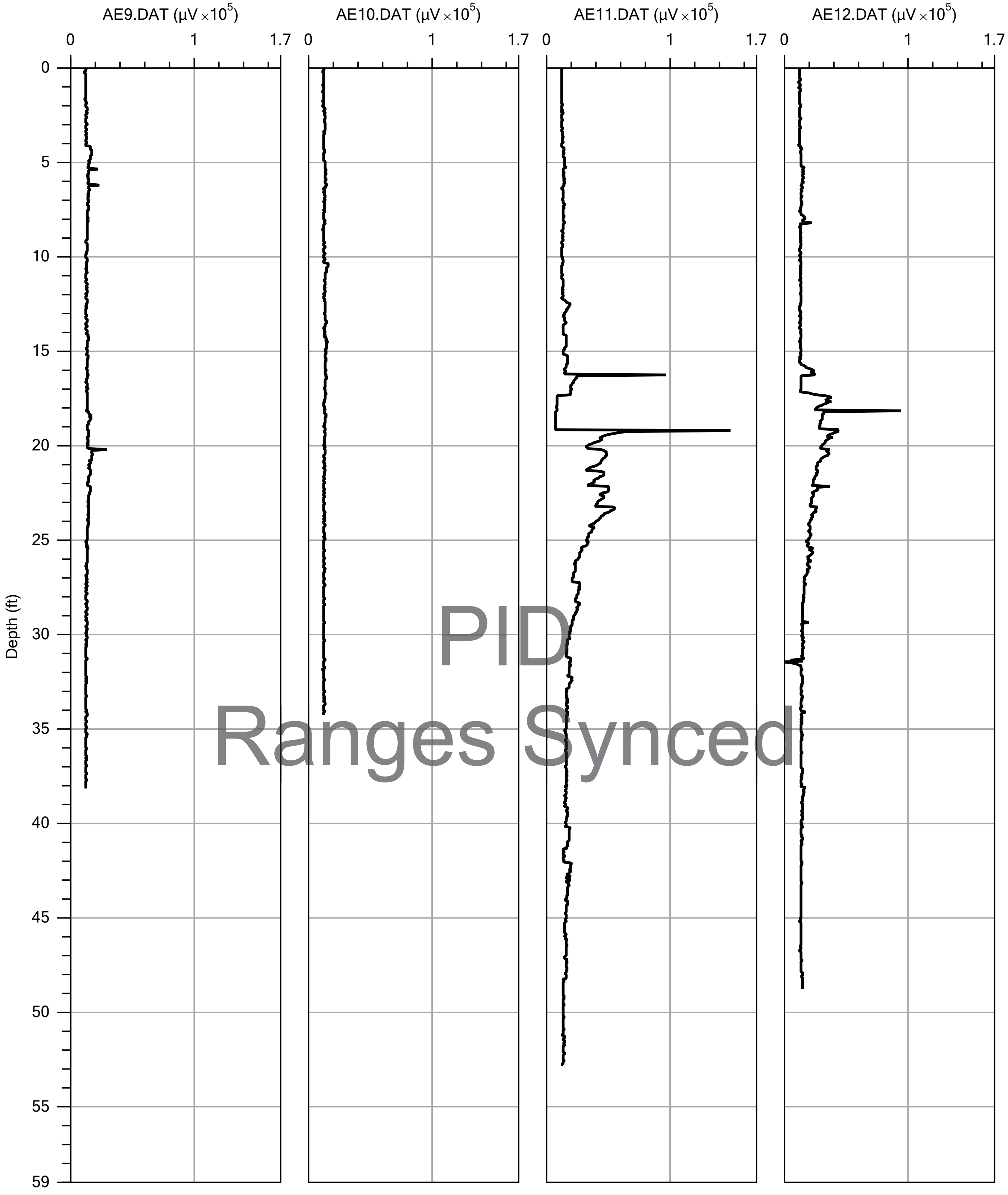
Company: ZEBRA ENVIRONMENTAL
Operator: Brian R
Project ID: NY
Client: AECOM

AE5.DAT 3/22/2011

AE6.DAT 3/22/2011
41° 43′ 26″ N, 73° 55′ 45″ W

AE7.DAT 3/22/2011

AE8.DAT 3/22/2011



AE9.DAT 3/23/2011

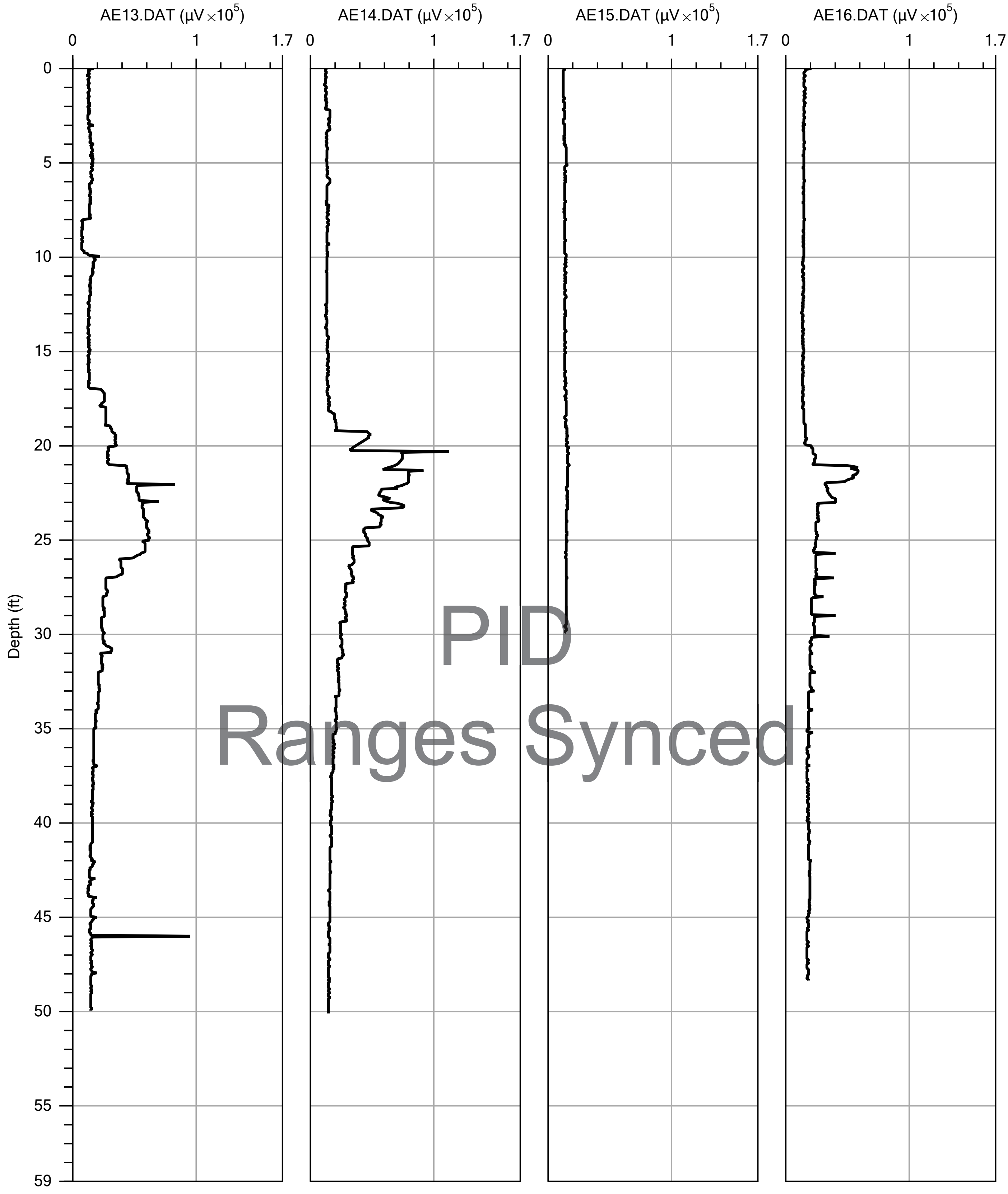
AE10.DAT 3/23/2011
41° 43′ 26″ N, 73° 55′ 44″ W

AE11.DAT 3/23/2011
41° 43′ 27″ N, 73° 55′ 43″ W

AE12.DAT 3/23/2011

PID Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM



AE13.DAT 3/24/2011
41° 43′ 26″ N, 73° 55′ 44″ W

AE14.DAT 3/24/2011
41° 43′ 27″ N, 73° 55′ 45″ W

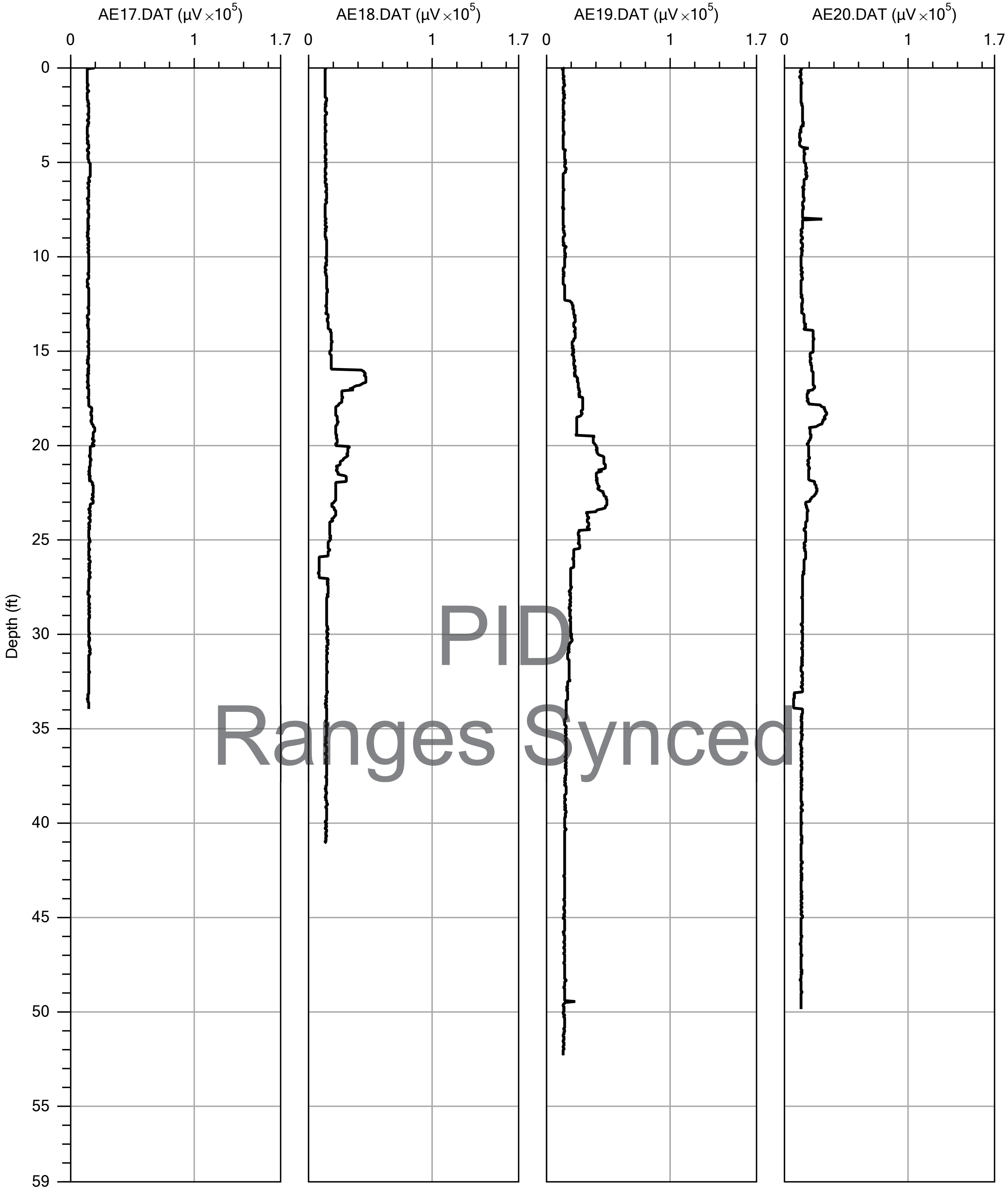
AE15.DAT 3/24/2011

AE16.DAT 3/25/2011
41° 43′ 27″ N, 73° 55′ 44″ W

PID Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

ZEBRA Environmental Subsurface Sampling, Injections and Data Collection for Environmental Professionals Since 1992.



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AE18.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 44″ W

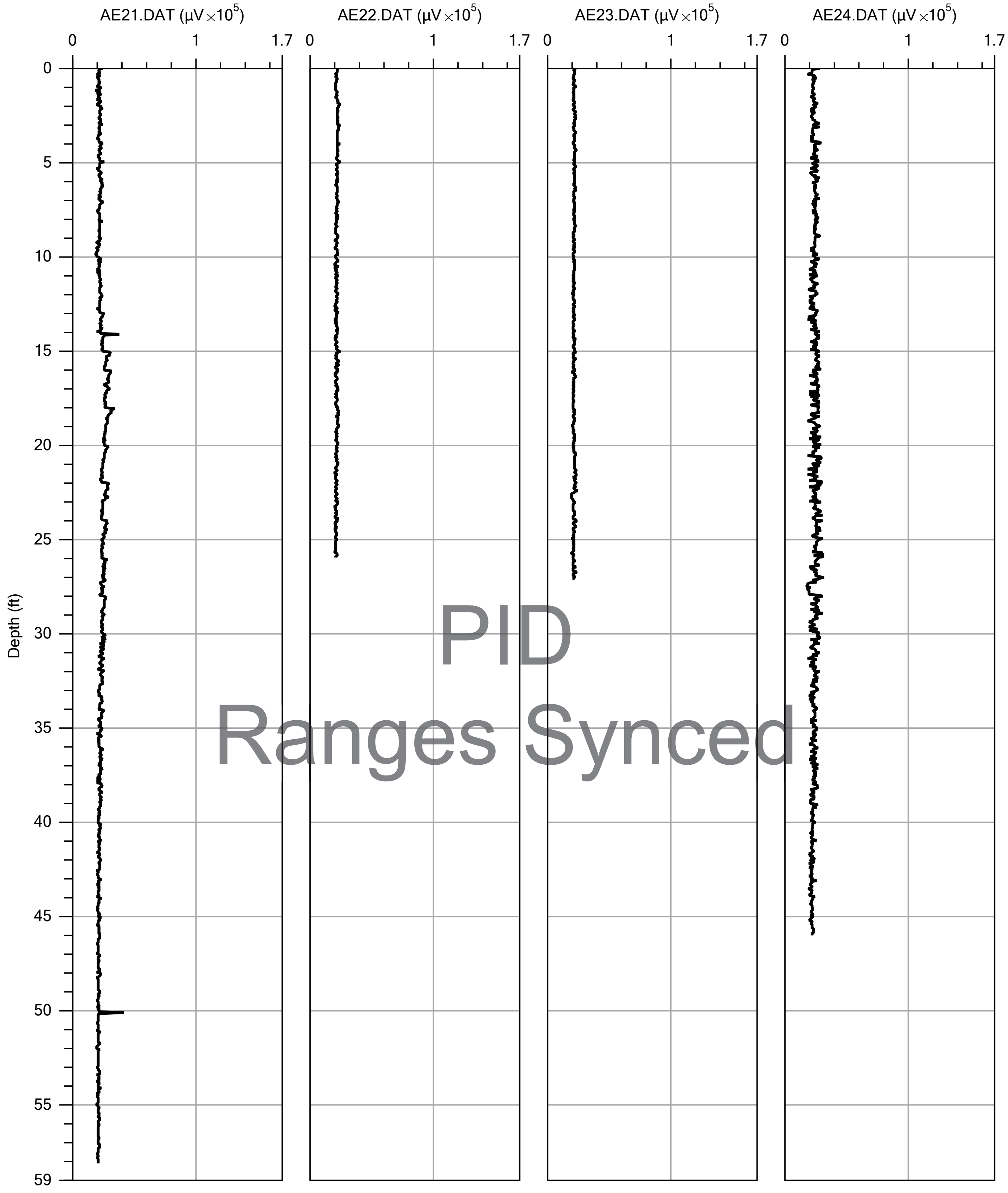
AE19.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 45″ W

AE20.DAT 3/25/2011
41° 43′ 26″ N, 73° 55′ 44″ W

PID Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

ZEBRA Environmental Subsurface Sampling, Injections and Data Collection for Environmental Professionals Since 1992.

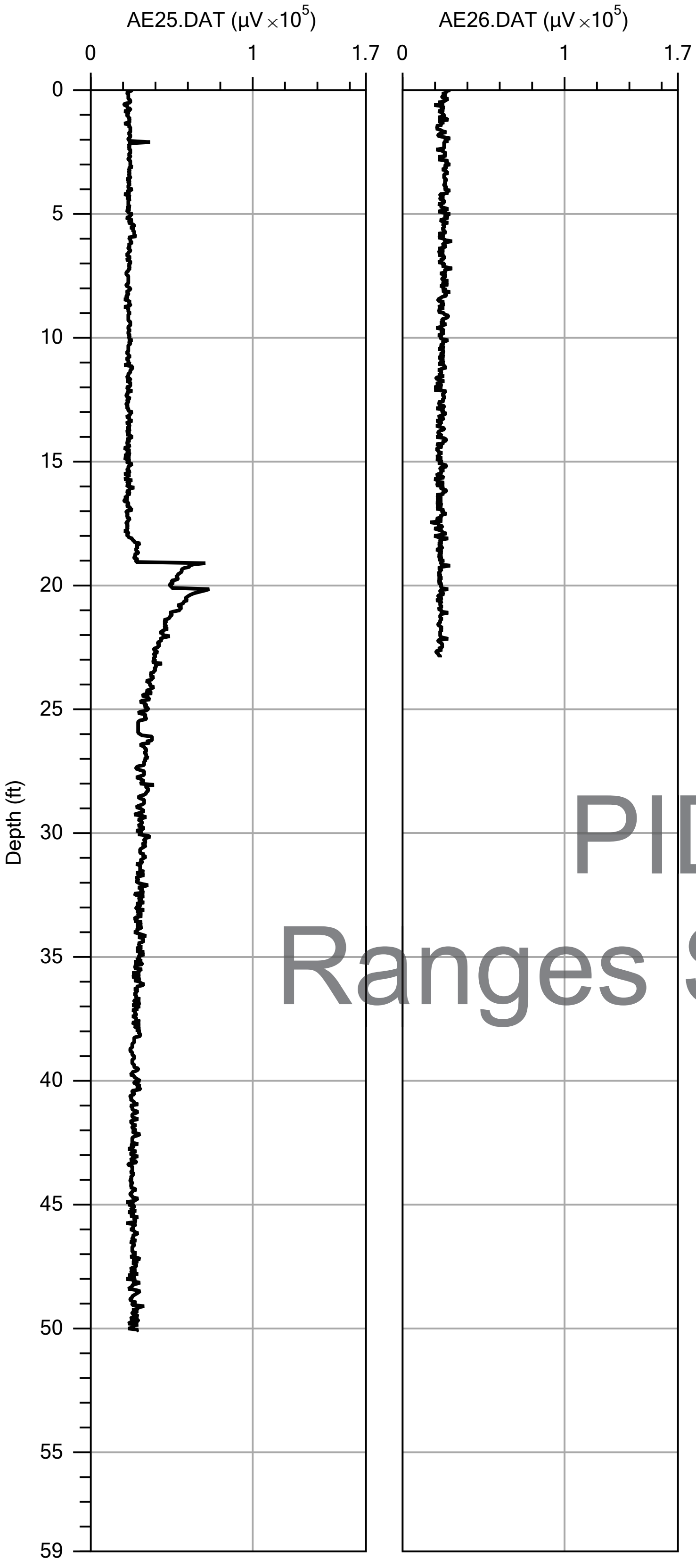


PID Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R
Project ID: NY	Client: AECOM

AE21.DAT	7/5/2011
AE22.DAT	7/5/2011
AE23.DAT	7/5/2011
AE24.DAT	7/5/2011

ZEBRA Environmental Subsurface Sampling, Injections and Data Collection for Environmental Professionals Since 1992.

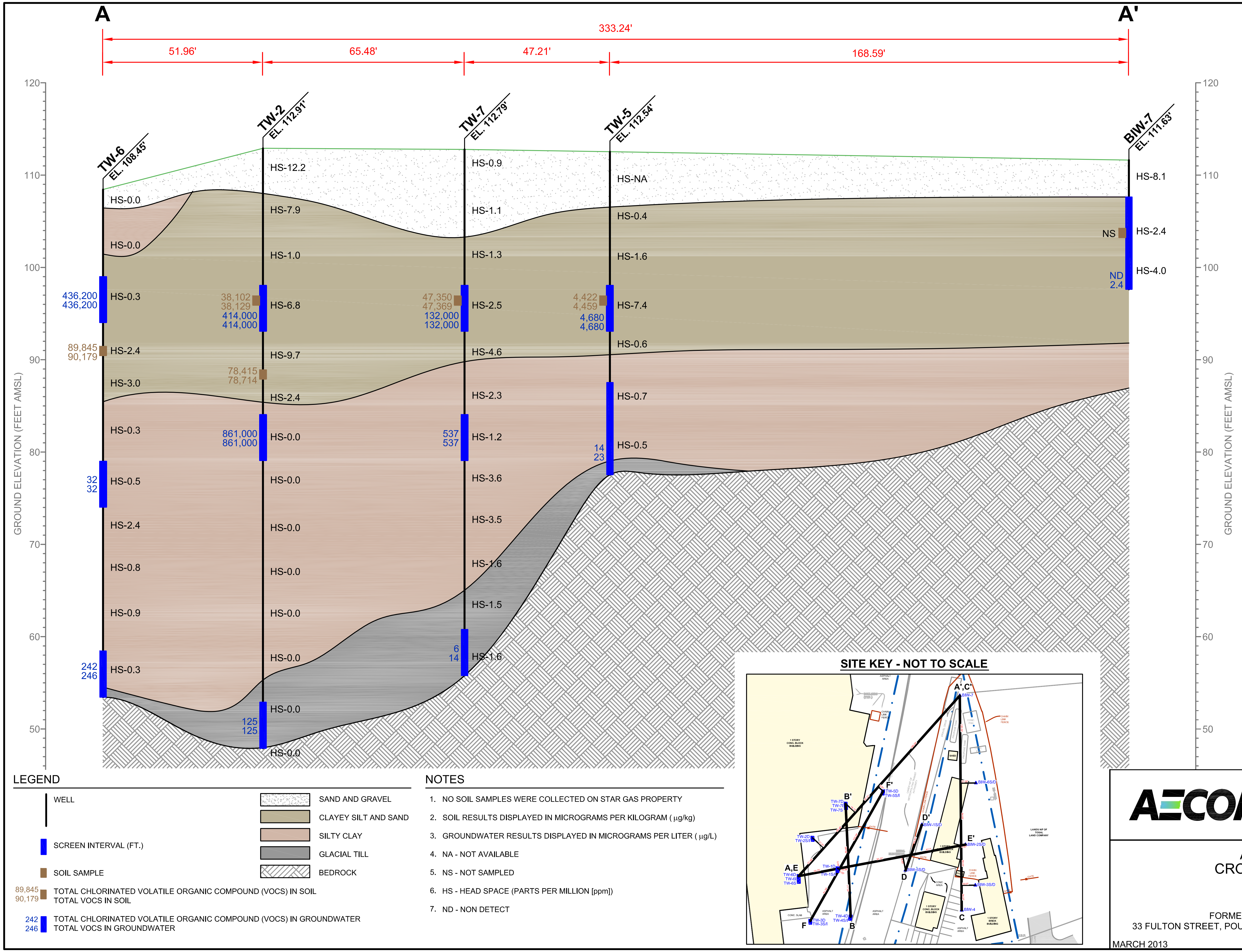


PID Max

Company: ZEBRA ENVIRONMENTAL	Operator: Brian R	AE25.DAT 7/6/2011
Project ID: NY	Client: AECOM	AE26.DAT 7/6/2011

Appendix B

Cross-Sections



LEGEND

|	WELL
▮	SCREEN INTERVAL (FT.)
■	SOIL SAMPLE
89,845 90,179 ■	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN SOIL TOTAL VOCS IN SOIL
242 246 ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN GROUNDWATER TOTAL VOCS IN GROUNDWATER
░	SAND AND GRAVEL
▤	CLAYEY SILT AND SAND
▤	SILTY CLAY
▦	GLACIAL TILL
▨	BEDROCK

NOTES

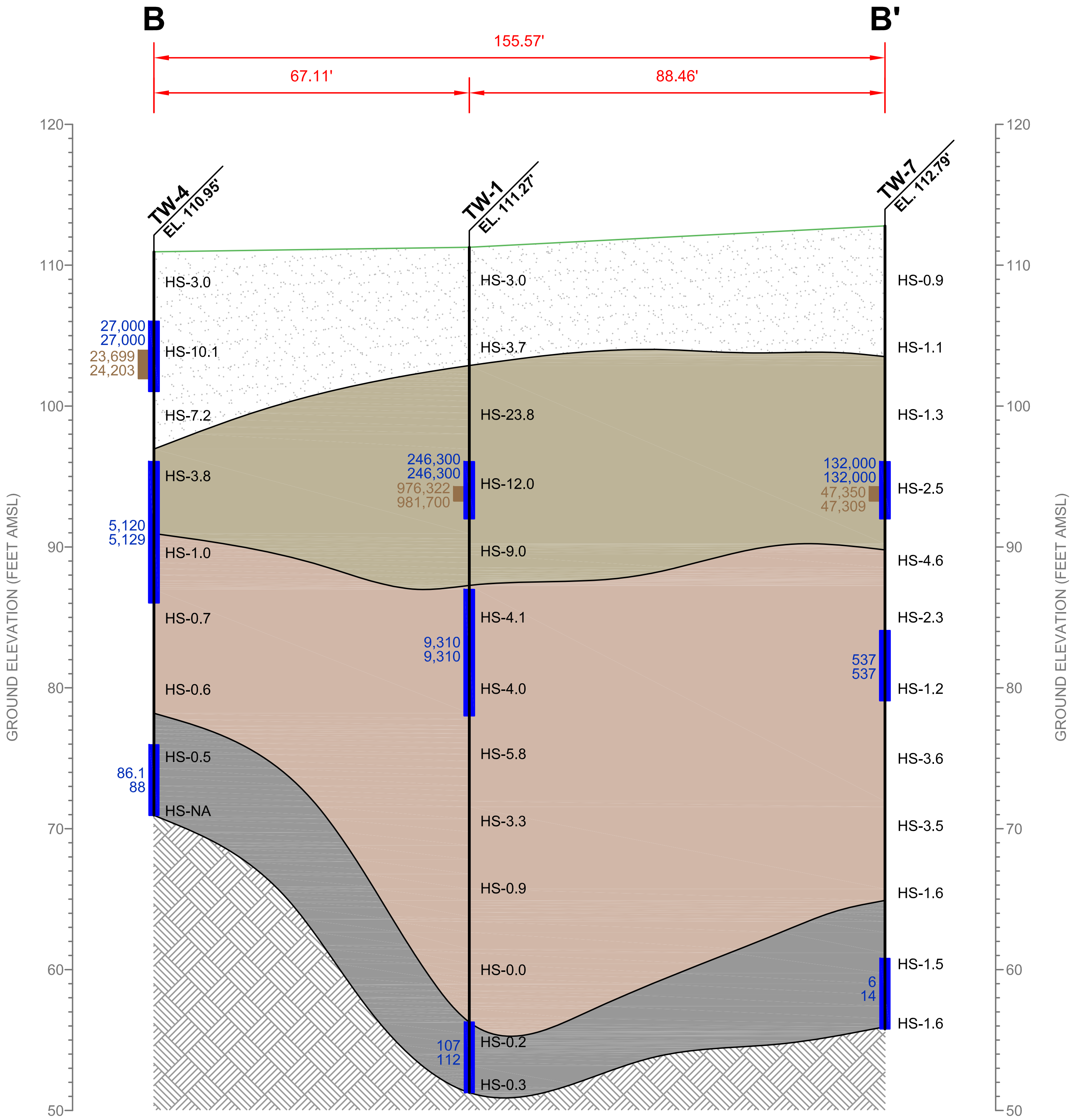
1. NO SOIL SAMPLES WERE COLLECTED ON STAR GAS PROPERTY
2. SOIL RESULTS DISPLAYED IN MICROGRAMS PER KILOGRAM (µg/kg)
3. GROUNDWATER RESULTS DISPLAYED IN MICROGRAMS PER LITER (µg/L)
4. NA - NOT AVAILABLE
5. NS - NOT SAMPLED
6. HS - HEAD SPACE (PARTS PER MILLION [ppm])
7. ND - NON DETECT

40 British American Blvd.
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

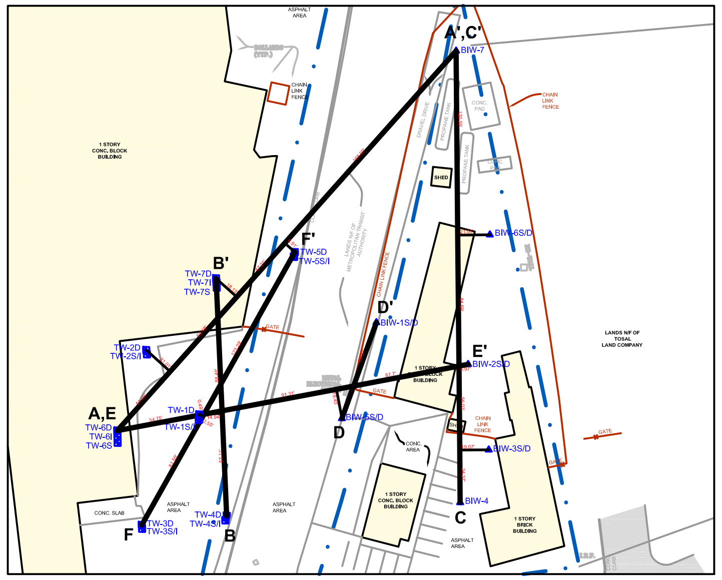
APPENDIX B-1
CROSS-SECTION A-A'

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013
60279080



SITE KEY - NOT TO SCALE



0 15 30 60
SCALE IN FEET
HORIZONTAL SCALE

0 5 10 20
SCALE IN FEET
VERTICAL SCALE
3x EXAGGERATION

LEGEND

│	WELL
▮	SCREEN INTERVAL (FT.)
▮	SOIL SAMPLE
23,699 24,203 ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN SOIL TOTAL VOCS IN SOIL
86.1 88 ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN GROUNDWATER TOTAL VOCS IN GROUNDWATER
▨	SAND AND GRAVEL
▨	CLAYEY SILT AND SAND
▨	SILTY CLAY
▨	GLACIAL TILL
▨	BEDROCK

NOTES

1. NO SOIL SAMPLES WERE COLLECTED ON STAR GAS PROPERTY
2. SOIL RESULTS DISPLAYED IN MICROGRAMS PER KILOGRAM (µg/kg)
3. GROUNDWATER RESULTS DISPLAYED IN MICROGRAMS PER LITER (µg/L)
4. NA - NOT AVAILABLE
5. NS - NOT SAMPLED
6. HS - HEAD SPACE (PARTS PER MILLION [ppm])
7. ND - NON DETECT

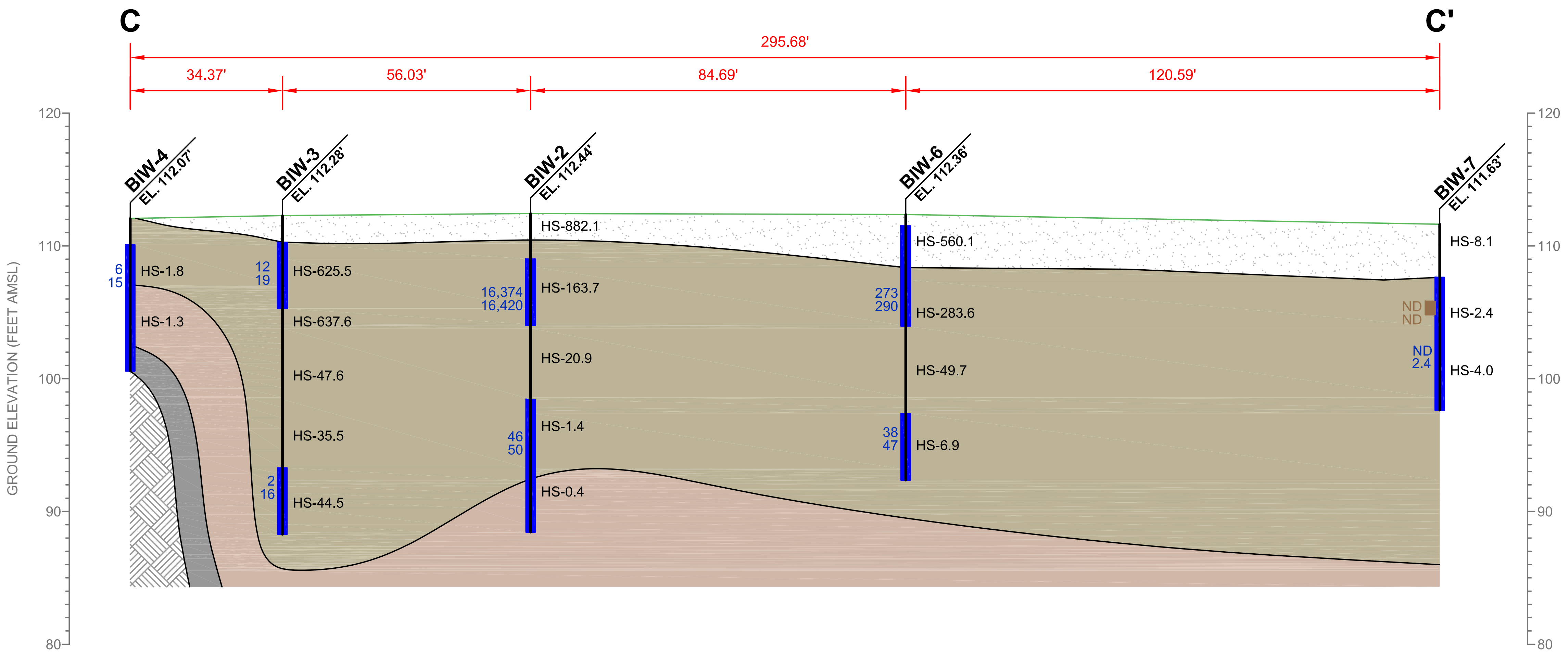
AECOM

40 British American Blvd.
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

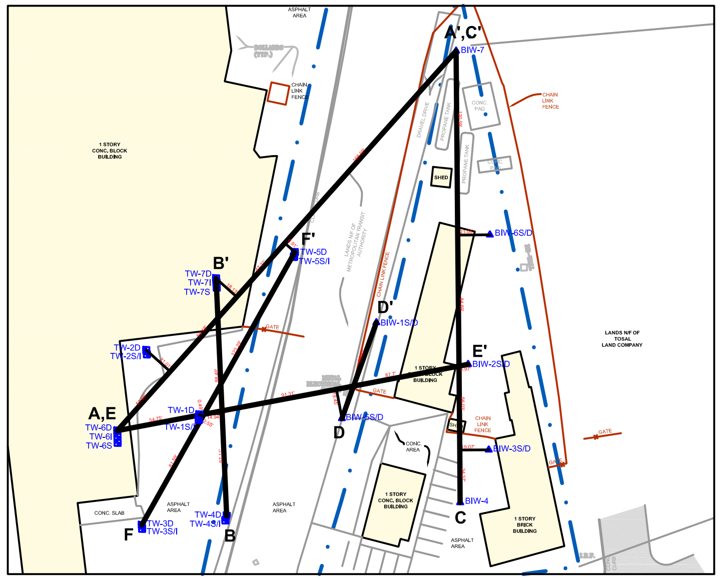
APPENDIX B-2
CROSS-SECTION B-B'

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013
60279080



SITE KEY - NOT TO SCALE



0 15 30 60

SCALE IN FEET
HORIZONTAL SCALE

0 5 10 20

SCALE IN FEET
VERTICAL SCALE
3x EXAGGERATION

LEGEND

WELL	▨ SAND AND GRAVEL
SCREEN INTERVAL (FT.)	▨ CLAYEY SILT AND SAND
SOIL SAMPLE	▨ SILTY CLAY
ND ND TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN SOIL TOTAL VOCS IN SOIL	▨ GLACIAL TILL
2 16 TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN GROUNDWATER TOTAL VOCS IN GROUNDWATER	▨ BEDROCK

NOTES

1. NO SOIL SAMPLES WERE COLLECTED ON STAR GAS PROPERTY
2. SOIL RESULTS DISPLAYED IN MICROGRAMS PER KILOGRAM (μg/kg)
3. GROUNDWATER RESULTS DISPLAYED IN MICROGRAMS PER LITER (μg/L)
4. NA - NOT AVAILABLE
5. NS - NOT SAMPLED
6. HS - HEAD SPACE (PARTS PER MILLION [ppm])
7. ND - NON DETECT

AECOM

40 British American Blvd.
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

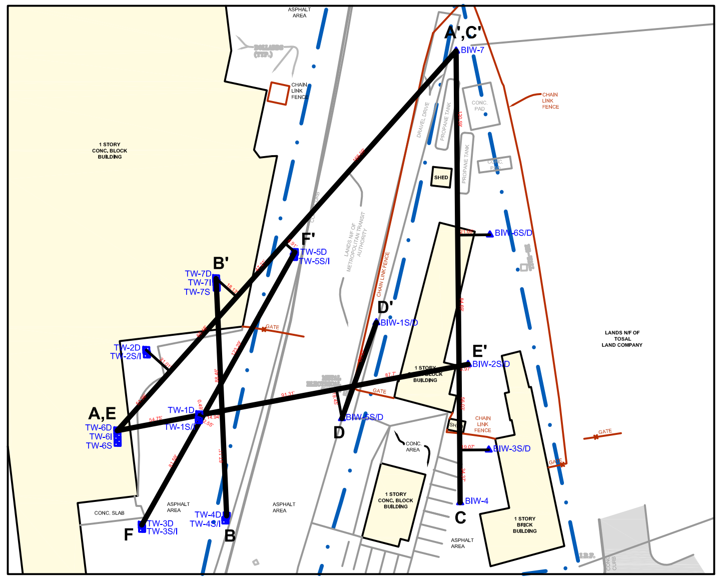
APPENDIX B-3
CROSS-SECTION C-C'

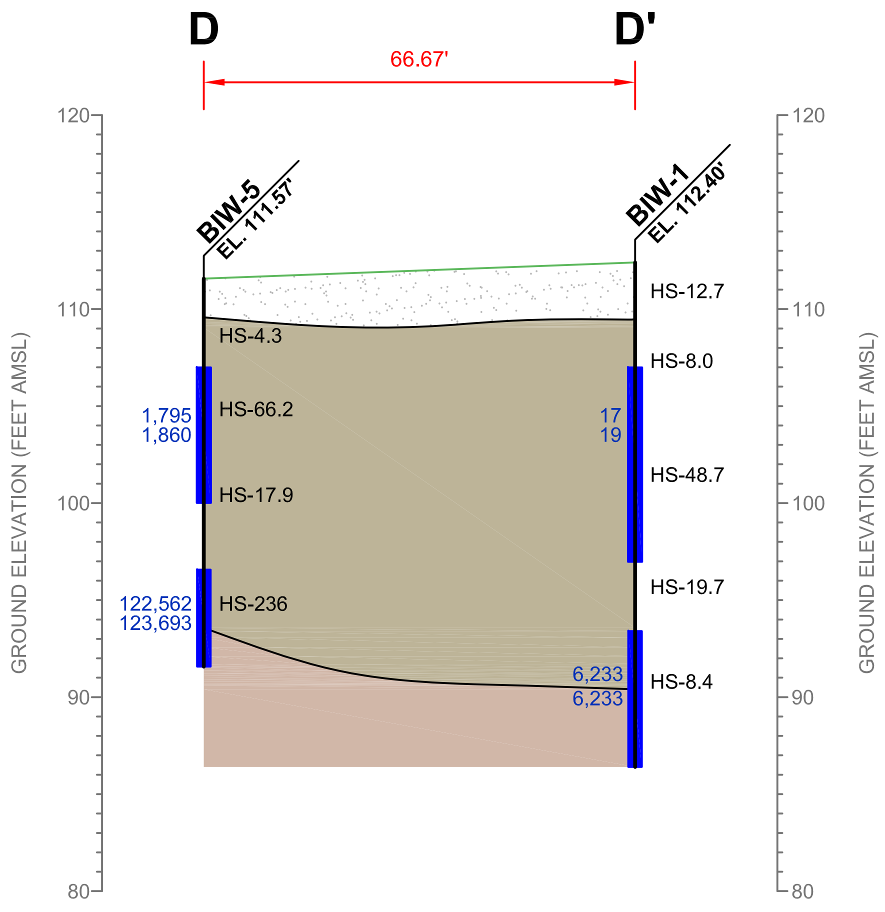
FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

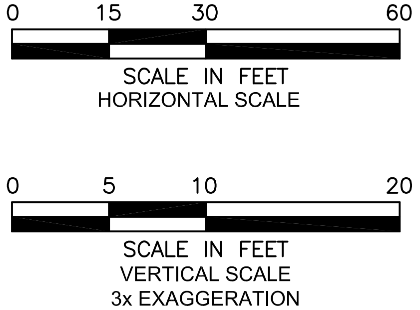
MARCH 2013
60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_009 Cross-section C-C'.dwg, 6/6/2013 11:52:43 AM, Splawnm

SITE KEY - NOT TO SCALE







LEGEND

│	WELL
▮	SCREEN INTERVAL (FT.)
▮	SOIL SAMPLE
# # ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN SOIL TOTAL VOCS IN SOIL
6,233 6,233 ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN GROUNDWATER TOTAL VOCS IN GROUNDWATER
▨	SAND AND GRAVEL
▨	CLAYEY SILT AND SAND
▨	SILTY CLAY
▨	GLACIAL TILL
▨	BEDROCK

NOTES

1. NO SOIL SAMPLES WERE COLLECTED ON STAR GAS PROPERTY
2. SOIL RESULTS DISPLAYED IN MICROGRAMS PER KILOGRAM (µg/kg)
3. GROUNDWATER RESULTS DISPLAYED IN MICROGRAMS PER LITER (µg/L)
4. NA - NOT AVAILABLE
5. NS - NOT SAMPLED
6. HS - HEAD SPACE (PARTS PER MILLION [ppm])
7. ND - NON DETECT

AECOM

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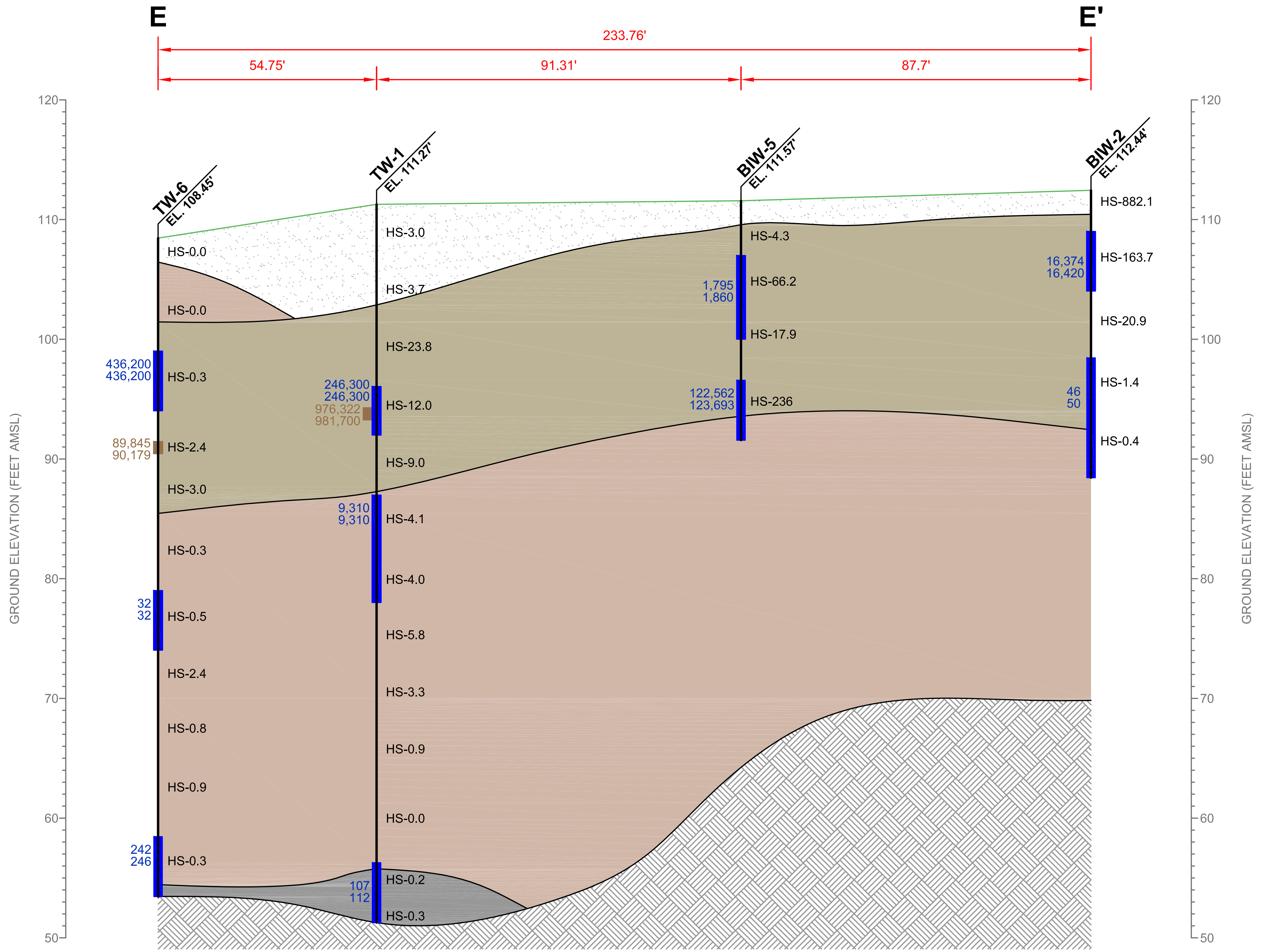
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

APPENDIX B-4
CROSS-SECTION D-D'

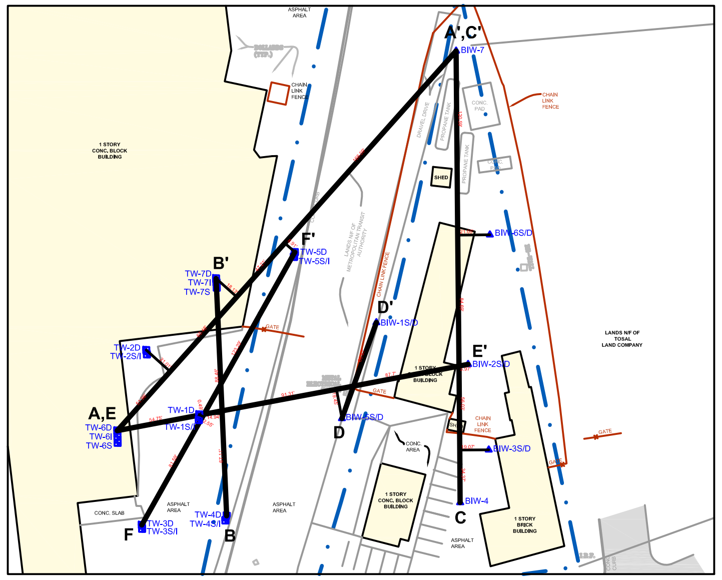
FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

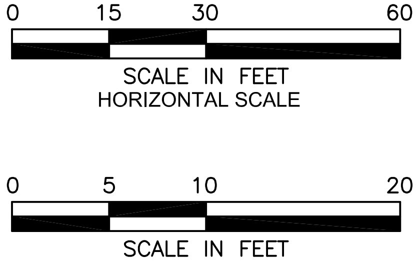
MARCH 2013
60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_010 Cross-section D-D'.dwg, 6/6/2013 11:55:33 AM, Splawnm



SITE KEY - NOT TO SCALE





VERTICAL SCALE
3x EXAGGERATION

LEGEND

WELL		
▮	SCREEN INTERVAL (FT.)	
■	SOIL SAMPLE	
89,845 90,179 ■	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN SOIL TOTAL VOCS IN SOIL	
242 246 ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN GROUNDWATER TOTAL VOCS IN GROUNDWATER	

░	SAND AND GRAVEL
▒	CLAYEY SILT AND SAND
▒	SILTY CLAY
▓	GLACIAL TILL
▨	BEDROCK

NOTES

1. NO SOIL SAMPLES WERE COLLECTED ON STAR GAS PROPERTY
2. SOIL RESULTS DISPLAYED IN MICROGRAMS PER KILOGRAM (μg/kg)
3. GROUNDWATER RESULTS DISPLAYED IN MICROGRAMS PER LITER (μg/L)
4. NA - NOT AVAILABLE
5. NS - NOT SAMPLED
6. HS - HEAD SPACE (PARTS PER MILLION [ppm])
7. ND - NON DETECT

AECOM

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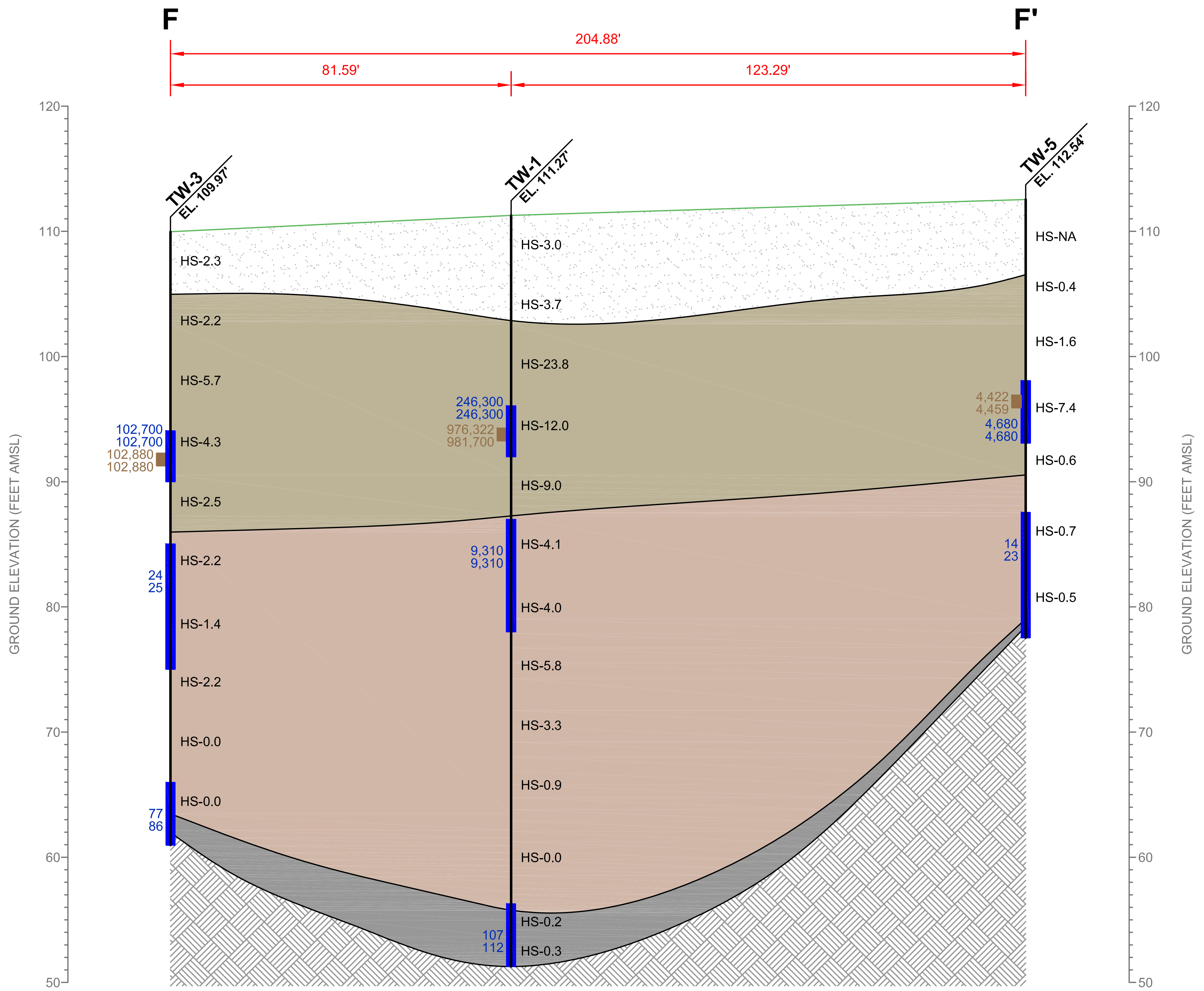
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

APPENDIX B-5
CROSS-SECTION E-E'

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013
60279080



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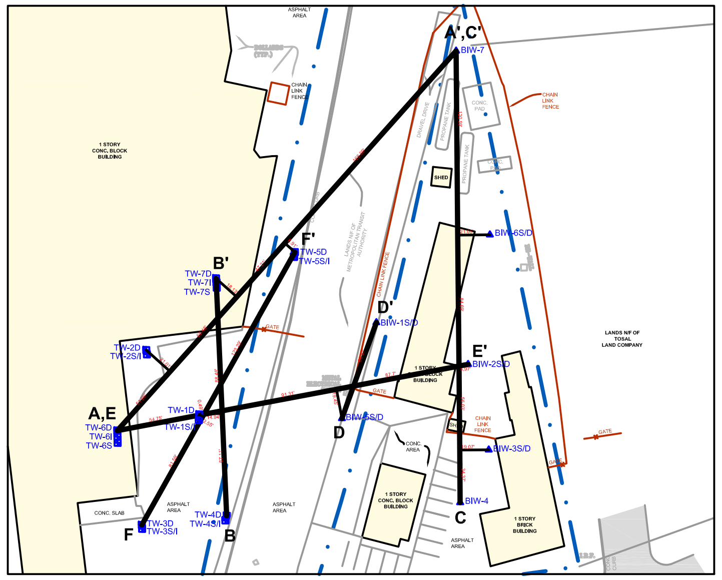
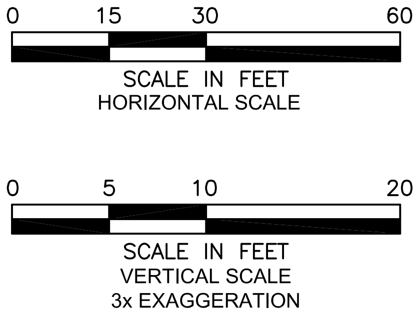




LEGEND

|	WELL
▮	SCREEN INTERVAL (FT.)
■	SOIL SAMPLE
102,880 102,880 ■	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN SOIL TOTAL VOCS IN SOIL
77 86 ▮	TOTAL CHLORINATED VOLATILE ORGANIC COMPOUND (VOCS) IN GROUNDWATER TOTAL VOCS IN GROUNDWATER
░	SAND AND GRAVEL
▒	CLAYEY SILT AND SAND
▒	SILTY CLAY
▓	GLACIAL TILL
▨	BEDROCK

NOTES

1. NO SOIL SAMPLES WERE COLLECTED ON STAR GAS PROPERTY
2. SOIL RESULTS DISPLAYED IN MICROGRAMS PER KILOGRAM (µg/kg)
3. GROUNDWATER RESULTS DISPLAYED IN MICROGRAMS PER LITER (µg/L)
4. NA - NOT AVAILABLE
5. NS - NOT SAMPLED
6. HS - HEAD SPACE (PARTS PER MILLION [ppm])
7. ND - NON DETECT

AECOM

40 British American Blvd.
Latham, NY 12110
T: (518) 951-2200
F: (518) 951-2300

APPENDIX B-6
CROSS-SECTION F-F'

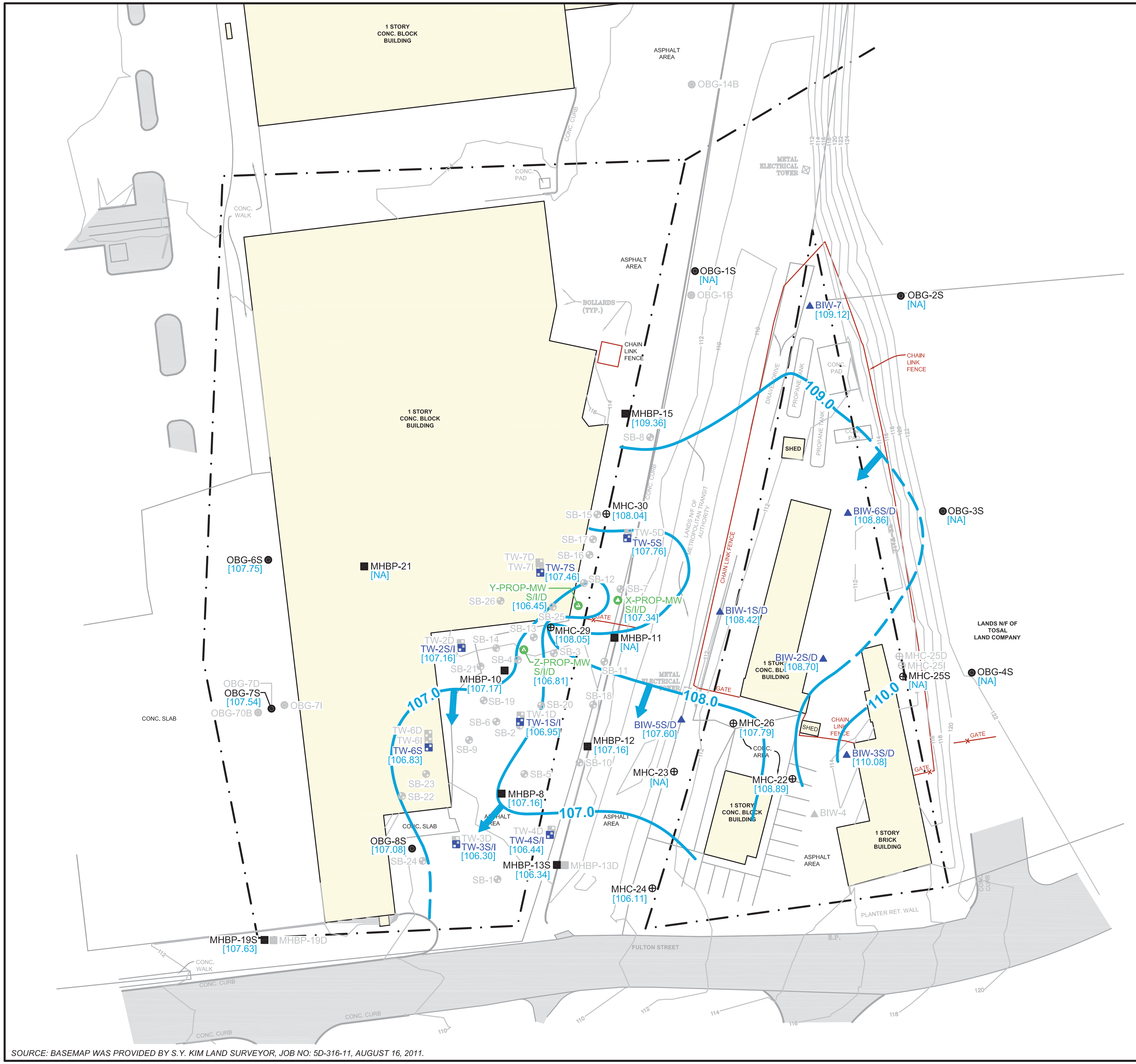
FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013
60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_012 Cross-section F-F'.dwg, 6/6/2013 12:05:35 PM, Splawnm

Appendix C

Groundwater Elevation Contour Maps - December 11, 2012



SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

LEGEND

BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▦	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D ◬	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ◉	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ◉	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
[109.12]	GROUNDWATER ELEVATION (ft amsl)
[NA]	NOT ANALYZED
⬅	GROUNDWATER FLOW DIRECTION (APPROXIMATE)
▭	BUILDING
▭	ROAD / PAVEMENT
—112—	TOPOGRAPHIC CONTOURS
——	GROUNDWATER ISOELEVATION CONTOUR (ft amsl) (DASHED WHERE INFERRED)
— · —	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
——	PARCEL BOUNDARY

NOTES

1. amsl - ABOVE MEAN SEA LEVEL
2. GROUNDWATER CONTOURS WERE CONSTRUCTED USING SHALLOW WELLS (CLAYEY SILT AND SAND) AND DEEP WELLS (SILTY CLAY).

0 25 50 100
SCALE IN FEET

AECOM

10 British American Blvd.
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

APPENDIX C-1
GROUNDWATER CONTOUR MAP
SHALLOW WELLS

DECEMBER 11, 2012

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

JANUARY 2013
60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_005 GW Contour Map Shallow Wells.dwg, 2/13/2013 3:30:15 PM, Splawnm

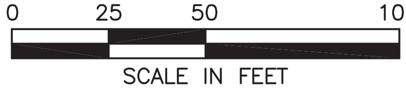
SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

LEGEND

BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▣	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D ▲	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ⊘	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ◎	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
[109.12]	GROUNDWATER ELEVATION (ft amsl)
[NA]	NOT ANALYZED
⬅	GROUNDWATER FLOW DIRECTION (APPROXIMATE)
▭	BUILDING
▭	ROAD / PAVEMENT
—112—	TOPOGRAPHIC CONTOURS
——	GROUNDWATER ISOELEVATION CONTOUR (ft amsl) (DASHED WHERE INFERRED)
—·—	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
——	PARCEL BOUNDARY

NOTES

1. amsl - ABOVE MEAN SEA LEVEL
2. GROUNDWATER CONTOURS WERE CONSTRUCTED USING SHALLOW WELLS (CLAYEY SILT AND SAND) AND DEEP WELLS (SILTY CLAY).



AECOM

10 British American Blvd.
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

APPENDIX C-2
GROUNDWATER CONTOUR MAP
DEEP WELLS
DECEMBER 11, 2012

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

JANUARY 2013 60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_006 GW Contour Map Deep Wells.dwg, 1/31/2013 1:39:58 PM, Splawnm

Appendix D

Contaminant Mass Estimate Calculations

MHBP Property (Former Duso Chemical Site), Poughkeepsie, NY
Subject: Estimated Aqueous Phase CVOC Mass (2012 Data)

Performed by Paul M. Dombrowski	Date	2/22/2013
Checked by Shamim Wright	Date	2/24/2013

Summary: This calculation estimates the aqueous mass of CVOCs in groundwater beneath the thermal treatment area. The plan view area of the thermal treatment area was divided into regular geometric shapes, and monitoring well data from 2012 was applied (2011 data applied where 2012 data was not collected).

Assumptions:
-Calculation does not include any CVOCs present in the railroad right of way in between the Star Gas and MHBP properties
-Shallow depth/groundwater table assumed to be 6 feet below ground surface.
-Assume >90% of CVOCs are 1,1,1-TCA and 1,1-DCA in vertical interval to be treated (shallow and intermediate)
-Assume ~50% of CVOCs are 1,1,1-TCA and 50% are 1,1-DCA based on groundwater concentration speciation; Site Koc weighted accordingly
-Assume unit volume of soils is 30% pore space and 70% solids
-Koc values from La Grega, et. al, 2001, Hazardous Waste Management (2nd Ed.)
-Geometric mean of soil total organic carbon concentration applied for sorbed mass estimate (range 1580 - 39200 mg/kg, median 2300 mg/kg)
-Solubility of 1,1,1-TCA = 4.4 g/L (44 mg/L = 1%)
NAPL multiplier of 2 applied to sorbed mass where aqueous concentrations of 1,1,1-TCA exceed 1% aqueous solubility and where NAPL observed historically

Assume soil bulk density	105	lb/ft3		
Koc values	152	(1,1,1-TCA)	30	(1,1-DCA)
Site Koc	91			
Geometric Mean foc	0.00381223			

Area	Area (sq ft)	Interval	Thickness	GW Volume (L)	Total CVOC Conc (ug/L)	Aqueous CVOC (kg)	Aqueous CVOC (lb)	Representative Well for Concentration	Mass Solid Soil (kg)	CVOC Conc sorbed mg/kg	NAPL Multiplier	Mass CVOCs Sorbed (kg)	Mass CVOCs Sorbed (lb)
MHC-30	1953	6-20	14	232284	2541	0.6	1.3	MHC-30	913419	0.88	1	0.8	1.8
	1953	20-35	15	248876	14	0.0	0.0	TW-5D	978664	0.00	1	0.0	0.0
										0.00	1	0.0	0.0
TW-5	1343	6-20	14	159696	4680	0.7	1.6	TW-5S	627976	1.62	1	1.0	2.2
	1343	20-35	15	171102	14	0.0	0.0	TW-5D	672831	0.00	1	0.0	0.0
										0.00	1	0.0	0.0
Downgradient	2514	6-20	14	299010.348	3611	1.1	2.4	average MW-30 and TW-5	1175808	1.25	1	1.5	3.2
TW-5 + MW-30	2514	20-35	15	320368.23	14	0.0	0.0		1259794	0.00	1	0.0	0.0
										0.00	1	0.0	0.0
X-PROP-MW	1268	6-20	14	150762	863000	130.1	286.2	X-PROP-MWS	592844	299.39	2	355.0	781.0
	1268	20-35	15	161530	6421	1.0	2.3	X-PROP-MWI	635190	2.23	1	1.4	3.1
	1268	35-45	10	107687	61	0.0	0.0	X-PROP-MWD	423460	0.02	1	0.0	0.0
Y-PROP-MW	349	6-20	14	41459	722000	29.9	65.9	Y-PROP-MWS	163032	250.47	2	81.7	179.7
	349	20-40	20	59228	246	0.0	0.0	Y-PROP-MWI	232903	0.09	1	0.0	0.0
	349	40-57	17	50344	75	0.0	0.0	Y-PROP-MWD	197968	0.03	1	0.0	0.0
	246	6-20	14	29315	722000	21.2	46.6	Y-PROP-MWS	115275	250.47	2	57.7	127.0
	246	20-40	20	41878	246	0.0	0.0	Y-PROP-MWI	164679	0.09	1	0.0	0.0
	246	40-57	17	35596.47	75	0.0	0.0	Y-PROP-MWD	139977	0.03	1	0.0	0.0
TW-7	282	6-25	19	45468	132000	6.0	13.2	TW-7S	178794	45.79	2	16.4	36.0
	282	25-40	15	35896	537	0.0	0.0	TW-7I	141153	0.19	1	0.0	0.1
	282	40-57	17	40682	6	0.0	0.0	TW-7D	159974	0.00	1	0.0	0.0
	317	6-25	19	51151	132000	6.8	14.9	TW-7S	201144	45.79	2	18.4	40.5
	317	25-40	15	40383	537	0.0	0.0	TW-7I	158798	0.19	1	0.0	0.1
	317	40-57	17	45767	6	0.0	0.0	TW-7D	179971	0.00	1	0.0	0.0
	822	6-25	19	132614	132000	17.5	38.5	TW-7S	521483	45.79	1	23.9	52.5
	822	25-40	15	104696	537	0.1	0.1	TW-7I	411697	0.19	1	0.1	0.2
	822	40-57	17	118654.9	6	0.0	0.0	TW-7D	466590	0.00	1	0.0	0.0

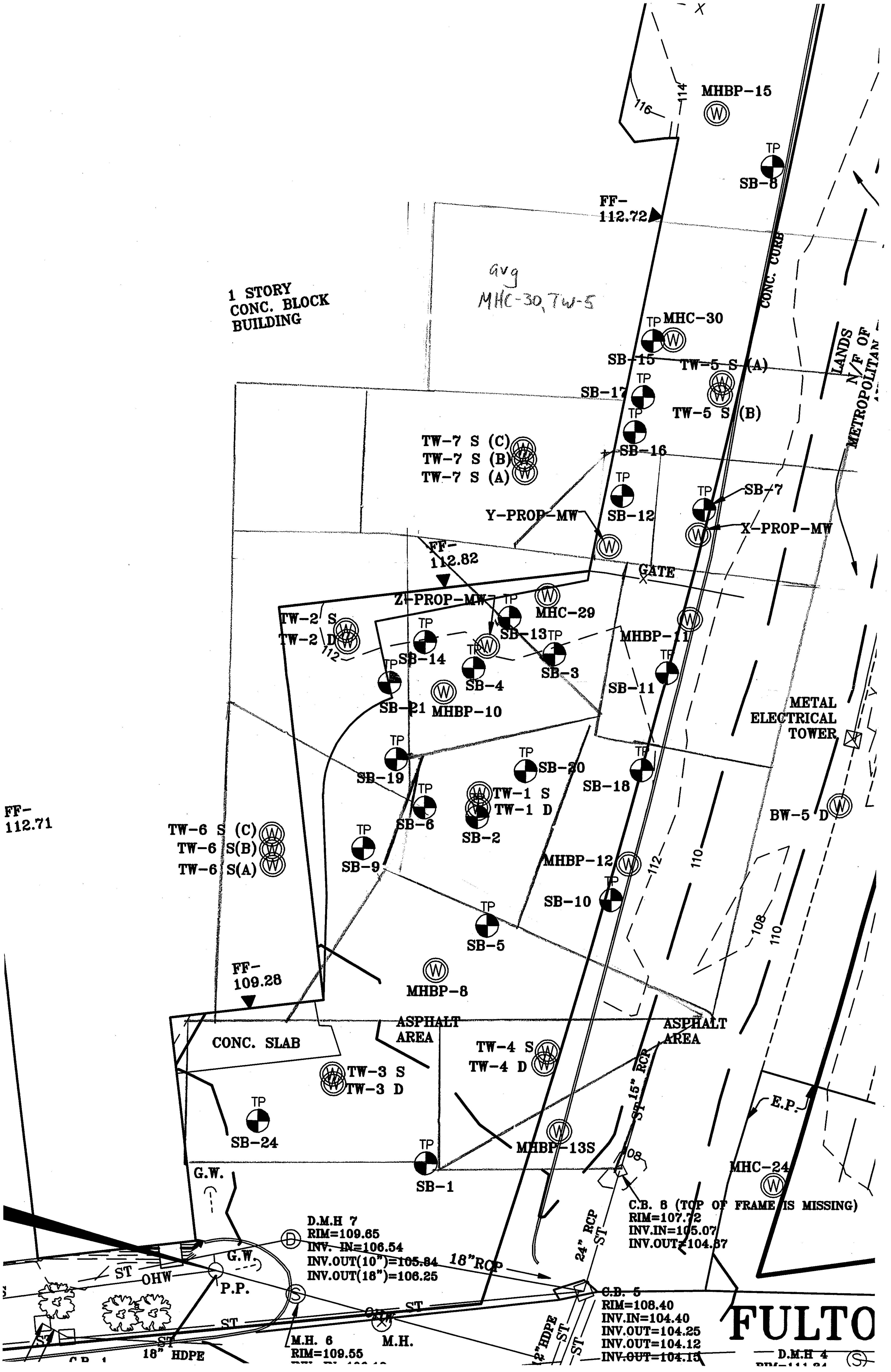
Area	Area (sq ft)	Interval	Thickness	GW Volume (L)	Total CVOC Conc (ug/L)	Aqueous CVOC (kg)	Aqueous CVOC (lb)	Representative Well for Concentration	Mass Solid Soil (kg)	CVOC Conc sorbed mg/kg	NAPL Multiplier	Mass CVOCs Sorbed (kg)	Mass CVOCs Sorbed (lb)
downgradient TW-7	1197	6-25	19	193238	66000	12.8	28.1	average TW-7 and MHBP-21	759876	22.90	1	17.4	38.3
	1197	25-40	15	152556	269	0.0	0.1		599902	0.09	1	0.1	0.1
	1197	40-57	17	172897	3	0.0	0.0		679889	0.00	1	0.0	0.0
MHBP-11	1878	6-20	14	223350	1105810	247.0	543.4	MHBP-11 (2011)	878288	383.62	2	673.9	1482.5
	1878	20-40	20	319072	9310	3.0	6.5	TW-1I	1254697	3.23	1	4.1	8.9
	1878	40-45	5	79768	112	0.0	0.0	TW-1D	313674	0.04	1	0.0	0.0
MHBP-12	2711	6-20	14	322462	479380	154.6	340.1	MHBP-12 (2011)	1268028	166.30	1	210.9	463.9
	2711	20-40	20	460660	9310	4.3	9.4	TW-1I	1811469	3.23	1	5.9	12.9
	2711	40-45	5	115165	112	0.0	0.0	TW-1D	452867	0.04	1	0.0	0.0
MHC-29	1268	6-20	14	150762	1341840	202.3	445.1	MHC-29 (2011)	592844	465.50	2	551.9	1214.3
	1268	20-40	20	215374	246	0.1	0.1	Y-PROP-MWI	846920	0.09	1	0.1	0.2
	1268	40-50	10	107687	75	0.0	0.0	Y-PROP-MWD	423460	0.03	1	0.0	0.0
Z-PROP-MW	1479	6-20	14	175888	1144000	201.2	442.7	Z-PROP-MWS	691652	396.87	2	549.0	1207.8
	1479	20-40	20	251269	210	0.1	0.1	Z-PROP-MWI	988074	0.07	1	0.1	0.2
	1479	40-45	5	62817	89	0.0	0.0	Z-PROP-MWD	247018	0.03	1	0.0	0.0
TW-2	2070	6-20	14	246244	414000	101.9	224.3	TW-2S	968312	143.62	2	278.1	611.9
	2070	20-40	20	351777	861000	302.9	666.3	TW-2I	1383303	298.69	2	826.4	1818.0
	2070	40-50	10	175888	138	0.0	0.1	TW-2D	691652	0.05	1	0.0	0.1
	518	6-20	14	61561	414000	25.5	56.1	TW-2S	242078	143.62	2	69.5	153.0
	518	20-40	20	87944	861000	75.7	166.6	TW-2I	345826	298.69	2	206.6	454.5
	518	40-50	10	43972.11	138	0.0	0.0	TW-2D	172913	0.05	1	0.0	0.0
TW-1	299	6-20	14	35596	246300	8.8	19.3	TW-1S	139977	85.44	1	12.0	26.3
	299	20-40	20	50852	9310	0.5	1.0	TW-1I	199967	3.23	1	0.6	1.4
	299	40-50	10	25426	112	0.0	0.0	TW-1D	99984	0.04	1	0.0	0.0
	599	6-20	14	71193	246300	17.5	38.6	TW-1S	279954	85.44	1	23.9	52.6
	599	20-40	20	101704	9310	0.9	2.1	TW-1I	399935	3.23	1	1.3	2.8
	599	40-50	10	50852.1	112	0.0	0.0	TW-1D	199967	0.04	1	0.0	0.0
TW-6	616	6-20	14	73287	436200	32.0	70.3	TW-6S	288188	151.32	1	43.6	95.9
	616	20-40	20	104696	32	0.0	0.0	TW-6I	411697	0.01	1	0.0	0.0
	616	40-50	10	52348	242	0.0	0.0	TW-6D	205849	0.08	1	0.0	0.0
	998	6-20	14	118655	436200	51.8	113.9	TW-6S	466590	151.32	1	70.6	155.3
	998	20-40	20	169507	32	0.0	0.0	TW-6I	666558	0.01	1	0.0	0.0
	998	40-50	10	84754	242	0.0	0.0	TW-6D	333279	0.08	1	0.0	0.1
	1057	6-20	14	125774	436200	54.9	120.7	TW-6S	494586	151.32	1	74.8	164.7
	1057	20-40	20	179677	32	0.0	0.0	TW-6I	706551	0.01	1	0.0	0.0
	1057	40-50	10	89838.71	242	0.0	0.0	TW-6D	353276	0.08	1	0.0	0.1
TW-4	1335	6-15	9	102078	27000	2.8	6.1	TW-4S	401405	9.37	1	3.8	8.3
	1335	15-30	15	170130	5120	0.9	1.9	TW-4I	669008	1.78	1	1.2	2.6
	1335	30-40	10	113420	86.1	0.0	0.0	TW-4D	446006	0.03	1	0.0	0.0
TW-3	2300	6-20	14	273604	102700	28.1	61.8	TW-3S	1075903	35.63	1	38.3	84.3
	2300	20-35	15	293147	24	0.0	0.0	TW-3I	1152753	0.01	1	0.0	0.0
	2300	35-45	10	195432	74	0.0	0.0	TW-3D	768502	0.03	1	0.0	0.0
MHBP-8	1951	6-20	14	232075	95005	22.0	48.5	MHBP-8	912596	32.96	1	30.1	66.2
	1951	20-40	20	331536	7215	2.4	5.3	verage TW-1I and TW-	1303709	2.50	1	3.3	7.2
	1951	40-45	5	82884	99.05	0.0	0.0	erage TW-1D and TW-	325927	0.03	1	0.0	0.0
MHBP-13	1299	6-20	14	154531	2789	0.4	0.9	MHBP-13S	607665	0.97	1	0.6	1.3
	1299	20-35	10	110379	1487	0.2	0.4	average MHBP-13S and MHBP-13D	434047	0.52	1	0.2	0.5
	1299	35-45	10	110379	184	0.0	0.0	MHBP-13D	434047	0.06	1	0.0	0.1
	30666			**10198553**		**1769.6**	**3893.1**					**4256.4**	**9364.0**

TOTAL MASS **13,257** lbs

Total Shallow Mass in LBS (GWT to 20-25' bgs) 9869

TOTAL MASS **6,026** kg

MASS/VOLUME **590,866** ug/L (CVOC mass divided by GW volume)



avg
MHC-30, TW-5

Appendix E

Site Photos and Building Condition Inspection

Client Name: NYSDEC	**Site Location:** Former Duso Chemical Site, City of Poughkeepsie, Dutchess County, New York	**Project No.** 60279080

Photo No. **1**

Date: Jan-2011

Direction Photo Taken:

Northwest

Description:

Garage doors leading into the one story concrete block building at the Mid-Hudson Business Park; near location of TW-3.

Photo No. **2**

Date: Jan-2011

Direction Photo Taken:

North

Description:

Service road to the east of the one story concrete block building. Currently, services Staples and Home Depot. Approximate location of TW-4. Location of TW-1 in the background.

Client Name: NYSDEC	**Site Location:** Former Duso Chemical Site, City of Poughkeepsie, Dutchess County, New York	**Project No.** 60279080

Photo No. 3

Date: Oct-17-2012

Direction Photo Taken:

Northwest

Description:

Wooden door used to access the one story concrete block building. Area shows location of TW-2.

Photo No. 4

Date: Oct-17-2012

Direction Photo Taken:

West

Description:

Southernmost section of the one story concrete block building at the Mid-Hudson Business Park.

Photo No.	**Date:**
5	Oct-17-2012

Direction Photo Taken:

Northwest

Description:

Interior of the one story concrete block building. Area past the two garage doors.

Photo No.	**Date:**
6	Oct-17-2012

Direction Photo Taken:

North

Description:

Area past the two garage doors. Shows the general location of TW-6.

AECOM Technical Services Northeast, Inc. PHOTOGRAPHIC LOG

Client Name: NYSDEC	**Site Location:** Former Duso Chemical Site, City of Poughkeepsie, Dutchess County, New York	**Project No.** 60279080

Photo No. **7**	**Date:** Oct-17-2012

Direction Photo Taken:

Northeast

Description:

Interior of the one story concrete block building. South of Staples. Shows the general location of TW-7.

Photo No. **8**	**Date:** Oct-17-2012

Direction Photo Taken:

South

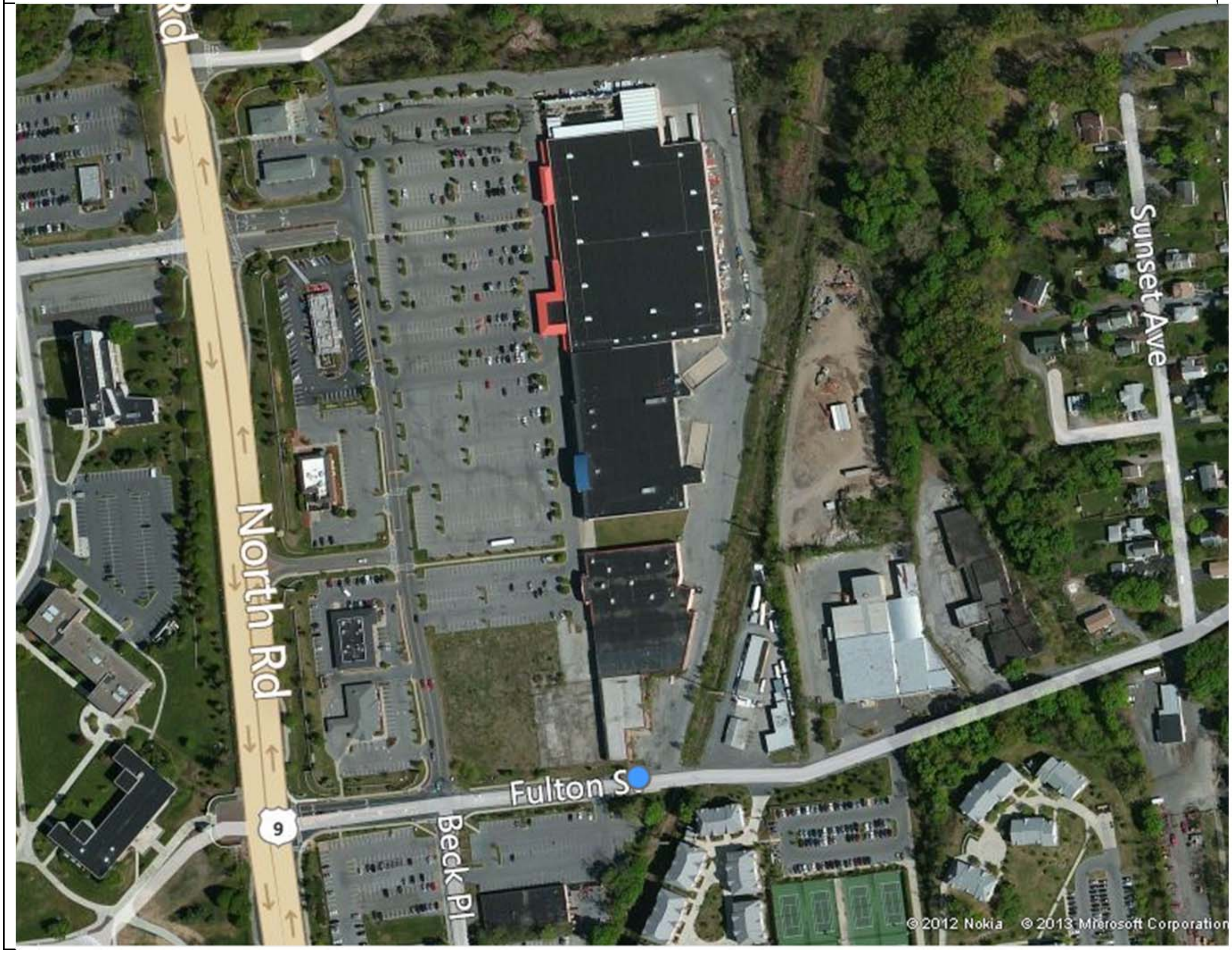
Description:

Service road to the east of the one story concrete block building. Approximate location of TW-5.

AECOM Technical Services Northeast, Inc. **PHOTOGRAPHIC LOG**

Client Name: NYSDEC	**Site Location:** Former Duso Chemical Site, City of Poughkeepsie, Dutchess County, New York	**Project No.** 60279080

Site Aerial Photograph



AECOM
40 British American Boulevard
Latham, NY 12110

518.951.2373 tel
518.951.2300 fax

Memorandum

To	Project Files
Subject	Review of materials of construction within Mid Hudson Business Park warehouse building West of Former Duso Chemical Facility, 33 Fulton Street, Poughkeepsie, New York
From	Lindsay Mitchell
Date	February 21, 2014

Attached please find:

- A photographic log of the interior of the Mid Hudson Business Park (MHBP) warehouse building on October 17, 2012 and October 4, 2013 (pictures taken by Lindsay Mitchell and Matt Dean of AECOM, respectively); and
- AECOM's "Thermal Remediation Footprint" figure from the *In Situ Thermal Treatment 90% Design Analysis Report, Former Duso Chemical Site* dated July 2013, overlain with the approximate interior building layout and photograph locations.

The MHBP warehouse building is located to the west of the Star Gas Propane property at 33 Fulton Street, Poughkeepsie, Dutchess County, New York. The interior of the MHBP building consists mainly of concrete foundation floors and concrete block, drywall, siding and brick walls. The ceiling mainly appears to be constructed of metal.

A qualified asbestos inspector did not perform a site visit to this property. However, based on the photographs AECOM has collected, asbestos-containing materials (ACM) do not appear to be present within the thermal treatment area shown on the attached figure. Please note that neither the apparent masonite/fiberboard ceiling in the northeastern area of the building nor the roof were examined.

The debris indicated in the photographic log shall be assumed to be removed by the Department under a separate contract, not as part of this construction contract.

Lindsay Mitchell

Lindsay Mitchell, P.E.
AECOM Project Manager
lindsay.mitchell@aecom.com

AECOM Technical Services Northeast, Inc. PHOTOGRAPHIC LOG

Client Name: NYSDEC	**Site Location:** Western Publishing property portion of Mid Hudson Business Park, Town of Poughkeepsie, Dutchess County, New York	**Project No.** 60279080

Photo No. 1

Date: 10-17-12

Direction Photo Taken:

North

Description:

Garage area of the Mid Hudson Business Park (MHBP) warehouse building consists of a concrete floor, concrete block/brick walls and a metal ceiling.

Photo No. 2

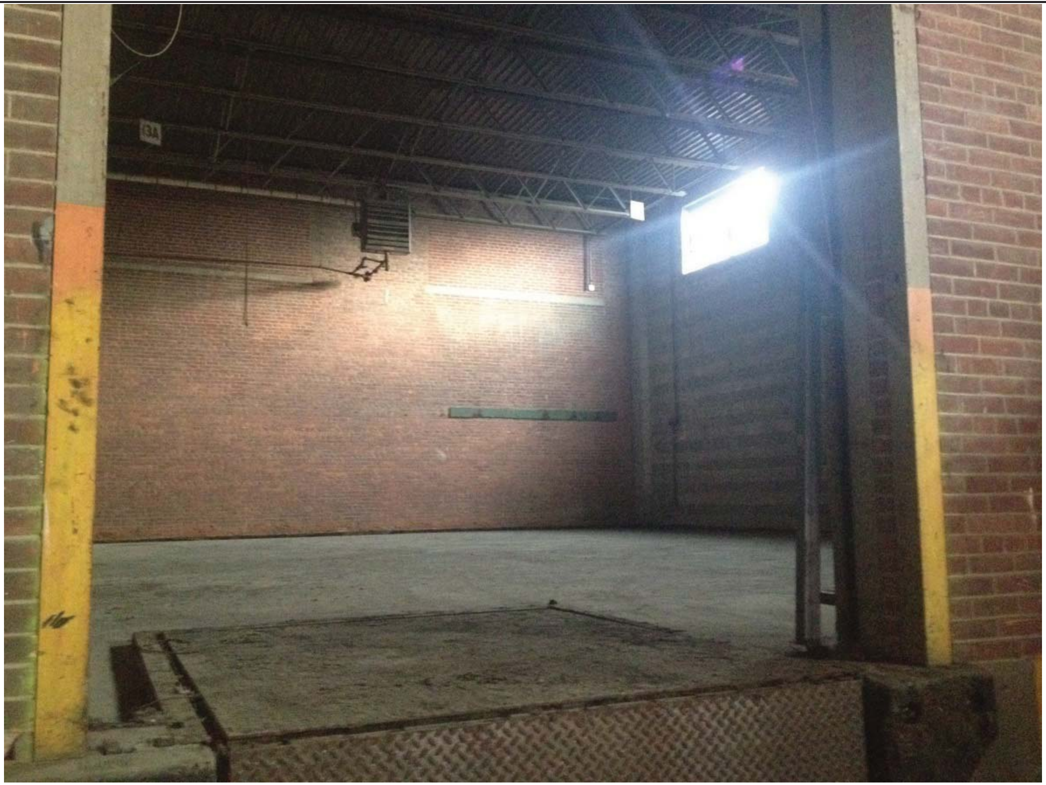
Date: 10-04-13

Direction Photo Taken:

Northeast

Description:

Loading dock area of the MHBP warehouse building consists of a concrete floor, concrete block/brick walls and a metal ceiling.



Client Name: NYSDEC	**Site Location:** Western Publishing property portion of Mid Hudson Business Park, Town of Poughkeepsie, Dutchess County, New York	**Project No.** 60279080

Photo No. 3

Date: 10-17-12

Direction Photo Taken:

Northeast

Description:

Northeast room of the MHBP warehouse building consists of a concrete floor and concrete block/drywall walls. Ceiling is partially constructed of metal and partially of a masonite or fiberboard-type material.

Photo No. 4

Date: 10-04-13

Direction Photo Taken:

Southwest

Description:

Northwest room of the MHBP warehouse building consists of a concrete floor and drywall, siding and concrete block walls. Ceiling construction is likely metal.

Photo No. 5

Date: 10-04-13

Direction Photo Taken:

Northeast

Description:

Southwest room of the MHBP warehouse building contains a small drywall office structure. Outer walls consist of concrete blocks and siding. Floors are constructed of concrete, and ceiling construction is likely metal.

Photo No. 6

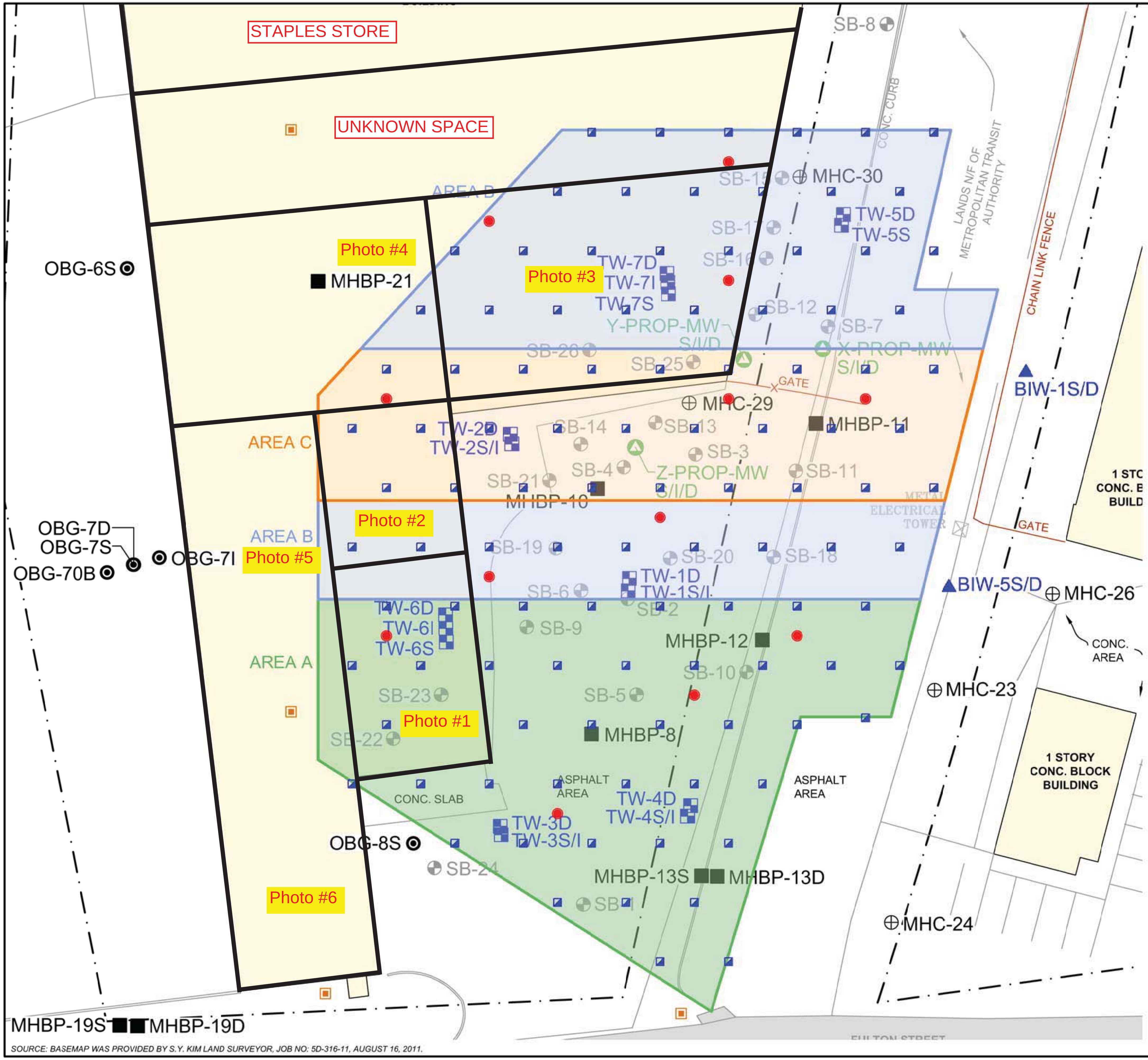
Date: 10-04-13

Direction Photo Taken:

North

Description:

Southwest room of the MHBP warehouse building is constructed of concrete block and siding walls and a concrete floor. Ceiling construction is likely metal.



SOURCE: BASEMAP WAS PROVIDED BY S.Y. KIM LAND SURVEYOR, JOB NO: 5D-316-11, AUGUST 16, 2011.

Photo #1	Photographic Log location
▬	Approximate room/building wall location

N

LEGEND

◩	HEATER ELEMENTS (APPROXIMATE 20' ON CENTER)
●	TEMPERATURE MONITORING POINT (5' VERTICAL INTERVALS)
▣	SUBSURFACE PRESSURE MONITORING POINT
BIW-1S/D ▲	NESTED BIOREMEDIATION INJECTION WELL LOCATION (2012)
TW-1S/I ▦	NESTED THERMAL WELL LOCATION (2012)
X-PROP-MW S/I/D ○	TRI-LEVEL STAINLESS STEEL WELL LOCATION (2011)
SB-15 ◍	AECOM MEMBRANE INTERFACE PROBE BORING LOCATION (2011)
OBG-2S ◉	O'BRIEN & GERE WELL LOCATION (2005 & 2007)
MHBP-11 ■	MID HUDSON BUSINESS PARK WELL LOCATION (1993-1994)
MHC-30 ⊕	WELL LOCATION (1990s)
🟨	BUILDING
⬜	ROAD / PAVEMENT
— · —	PROPERTY BOUNDARY (APPROXIMATE)
—x—	FENCE (APPROXIMATE)
—	PARCEL BOUNDARY

NOTES

1. OBG-8S WAS "ND" FOR VOCs IN 2005 AND 2006.
2. IN SRI MHBP-21 IS "ND" FOR VOCs, BUT SCREEN IS ONLY 3-13'.

AREA	FOOTPRINT DEPTH (feet bgs)	FOOTPRINT AREA (sq. feet.)
A	5 - 25	12,688.39
B	5 - 35	14,269.81
C	5 - 50	8,288.18

0 15 30 60
SCALE IN FEET

AECOM

40 British American Blvd.
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

FIGURE 2-3
THERMAL REMEDIATION FOOTPRINT

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013 60279080

Appendix F

Property Access Information

Appendix F

Property Information
Former Duso Chemical Company
Poughkeepsie, Dutchess County, New York
NYSDEC Site No. 3-14-103

Property Owner			Parcel Location	Tax Map ID	Access Purpose
Name	**Address (1)**	**Status**			
Midhudson Center LLC	PO Box 9273, Oak Brook, IL 60522	Primary Owner	3440-3444 North Rd, Poughkeepsie NY 12601	134689-6162-05-005836-0000	
Star Gas Properties Inc	33 Fulton St, Poughkeepsie, NY 12601	Primary Owner	33 Fulton St, Poughkeepsie NY 12601	134689-6162-05-042826-0000	
New York Central Lines LLC	500 Water St, Jacksonville, FL 32202	Primary Owner	Spur N & E Of City, Poughkeepsie NY 12601	134689-6162-05-011773-0000	
Inland Westn Pok Mid Hud LLC	PO Box 9273, Oak Brook, IL 60522	Primary Owner	3432-3434 North Rd, Poughkeepsie NY 12601	134689-6062-02-990867-0000	
R Freedman & Son Inc	25 Tibbits Ave, Green Island, NY 12183	Primary Owner	51 Fulton St, Poughkeepsie NY 12601	134689-6162-05-059876-0000	

Notes:

(1) Dutchess County Parcel Access Website http://geoaccess.co.dutchess.ny.us/parcelaccess/


990867
9.71 Ac.(s)
2
059876
2.91 Ac.
90.7
083848
1.607 Ac.
FM 5638 - 1
POUGHKEEPSIE
FM 10650
005836
5.81 Ac.(s)
042826
178
FULTON ST
336.5
341.1
767 R
234
240
385(s)
005805
225
BECK PL

● **HELP**

Area of Interest

Entire Dutchess County

Navigation Toolbar | Identify | Backgrounds | Parcel Address Lists (Primary Owner)

Buffer(ft): 100

Coordinates

N: Lat:

E: Long:

Parcel **Owner** **Address**

LOT NUMBER: 990867

130000 swis *0000 section* *00 block* *000000 lot* *0000 suffix*

This search is within:
Entire Dutchess County

GO

PARCEL IDENTITY

Parcel Number:
134689-6162-05-005836-0000

Parcel Address -
3440-3444 North Rd
Poughkeepsie 126010000

Owner Name on March 1:
Midhudson Center LLC , *(Primary)*

Primary *(P)* Owner Mailing Address

PO Box 9273
Oak Brook IL 605229273

Lot Size | Land Use (Land Use Code):
5.81 Ac (S) | Nbh shop ctr (452)

Assessment Information:
Land = $1074800 | Total = $4450000

Market Value:
$4450000

School District:
Hyde Park CSD

Agricultural District:

Roll Section:
1
(Taxable)

Tax Code:
N (Non-Homestead)

The following detailed information is available for this parcel:

- Photo
- Full property card
- Print Lot Dimensions
- Print Dimensions (No Aerial)
- GeoAccess Link

A filed map registered with the County Clerk is available. This link will direct you to a

ParcelAccess

Parcel Grid Identification #:
134689-6162-05-005836-0000
Municipality: Poughkeepsie

Parcel Location
3440-3444 North Rd

Owner Name on March 1
Midhudson Center LLC , *(P)*

Primary *(P)* Owner Mail Address

PO Box 9273
Oak Brook IL 605229273

Parcel Details

Size (acres): 5.81 Ac (S)
Land Use Class: (452) Commercial: Retail Services: Area or Neighborhood Shopping Centers
File Map: 10650
Agri. Dist.: (0)
File Lot #: 3
School District: (133201) Hyde Park Central School District
Split Town

Assessment Information (Current)

*** 2013 assessments not yet established ***

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	1957	0612	( )	0

Site Information:

Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(3) Comm/public	(3) Comm/public	(3) Superior	FC	(D03) Local center

Commercial/Industrial/Utility Building Information:

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 1

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
2000	1	54700	(0325) Shopping ctr/strip load sup	(2) Average +

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	0

Number Identical:	Condition Code:
1	3

Commercial Rental Information:

Site Number: 1

Use Number: 1
Used As: (D03) Local center

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(01) Square feet	24700	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
1	0	0	0

Site Number: 1
Use Number: 2
Used As: (Z98) Non-contrib

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
( )	31600	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
0	0	0	0

Site Number: 1
Use Number: 3
Used As: (F03) Dstr wrhouse

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
( )	6900	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
0	0	0	0

Special District Information:

Special District: 999Y2

Primary Units:	Advalorem Value	Spec. Dist. Name:
20800	0	Townwide Drain Imp

Special District: CL057

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	4450000	Consolidated Light

Special District: FF025

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	4450000	Fairview Fire Pok

Special District: GL000

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	4450000	Pok Lib District

Special District: TW0K3

Primary Units:	Advalorem Value	Spec. Dist. Name:
35900	0	Town Wide Wat Imp

Special District: WS0P4

Primary Units:	Advalorem Value	Spec. Dist. Name:
28900	0	4th Ward Swr Imp Cap

This report was produced with ParcelAccess Intranet on 2/18/2013. Developed and maintained by OCIS - Dutchess County, NY.

ParcelAccess

Parcel Grid Identification #:
134689-6162-05-011773-0000
Municipality: Poughkeepsie

Parcel Location
Spur N & E Of City

Owner Name on March 1
New York Central Lines LLC , *(P)*

Primary *(P)* Owner Mail Address
500 Water St
Jacksonville FL 322020000

Parcel Details

Size (acres):	11.5 Ac (C)	Land Use Class:	(340) Vacant Land Located in Industrial Areas
File Map:		Agri. Dist.:	(0)
File Lot #:		School District:	(133201) Hyde Park Central School District
Split Town			

Assessment Information (Current)
*** 2013 assessments not yet established ***

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	21999	05513	( )	0

Site Information:

Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(1) None	(1) None	(1) Inferior	FC	( )

.

Special District Information:

Special District: 999Y2

Primary Units:	Advalorem Value	Spec. Dist. Name:
9300	0	Townwide Drain Imp

.

Special District: CL057

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	466000	Consolidated Light

.

Special District: FF025

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	466000	Fairview Fire Pok

.

Special District: GL000

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	466000	Pok Lib District

Special District: TW0K3

Primary Units:	Advalorem Value	Spec. Dist. Name:
4800	0	Town Wide Wat Imp

This report was produced with ParcelAccess Intranet on 2/18/2013. Developed and maintained by OCIS - Dutchess County, NY.

ParcelAccess

Parcel Grid Identification #:
134689-6162-05-042826-0000
Municipality: Poughkeepsie

Parcel Location
33 Fulton St

Owner Name on March 1
Star Gas Properties Inc , *(P)*

Primary *(P)* Owner Mail Address
33 Fulton St
Poughkeepsie NY 126010000

Parcel Details

Size (acres):	.7 Ac	Land Use Class:	(441) Commercial: Storage, Warehouse and Distribution Facilities: Gasoline, Fuel, Oil, Liquid Petroleum Storage and or Distribution
File Map:		Agri. Dist.:	(0)
File Lot #:		School District:	(133201) Hyde Park Central School District
Split Town			

Assessment Information (Current)
*** 2013 assessments not yet established ***

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	1984	0657	( )	0

Site Information:

Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(3) Comm/public	(3) Comm/public	(3) Superior	FC	(F06) Nat gas dstr

Commercial/Industrial/Utility Building Information:

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 1

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
0	0	7400	(0832) 1 sty warehouse wood mill	(3) Above Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	3200

Number Identical:	Condition Code:
1	3

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 2

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
1965	1	1470	(0312) 1 sty store load sup	(2) Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
100	0	0	0	0

Number Identical:	Condition Code:
1	3

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 3

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
1965	1	3240	(0832) 1 sty warehouse wood mill	(2) Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	0

Number Identical:	Condition Code:
1	3

Commercial Rental Information:

Site Number: 1
Use Number: 1
Used As: (F06) Nat gas dstr

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(01) Square feet	7910	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
0	0	0	0

Site Number: 1
Use Number: 2
Used As: (Z98) Non-contrib

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(01) Square feet	7400	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
0	0	0	0

Improvements:

Site Number: 1

Improvement Number: 1

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(RG4) Gar-1.0 det	0	0	1	1950

Condition:	Grade	Sq. Ft.
(3) Normal	C	150

Site Number: 1

Improvement Number: 2

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(FC3) Shed-galvnzd	0	0	1	1950

Condition:	Grade	Sq. Ft.
(3) Normal	C	285

Site Number: 1

Improvement Number: 3

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built

(FC3) Shed-galvnzd	0	0	1	1950

•

Condition:	Grade	Sq. Ft.
(3) Normal	C	240

•

Site Number: 1

Improvement Number: 4

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(FC3) Shed-galvnzd	0	0	1	1950

•

Condition:	Grade	Sq. Ft.
(3) Normal	C	144

•

Site Number: 1

Improvement Number: 5

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(TK6) Tank-hz bulk	0	0	1	1962

•

Condition:	Grade	Sq. Ft.
(3) Normal	C	30000

•

Site Number: 1

Improvement Number: 6

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(TK6) Tank-hz bulk	0	0	1	1950

•

Condition:	Grade	Sq. Ft.
(3) Normal	C	15000

•

Site Number: 1

Improvement Number: 7

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(LP4) Pavng-asphlt	0	0	1	1985

•

Condition:	Grade	Sq. Ft.
(3) Normal	C	10000

•

Special District Information:

Special District: 999Y2

Primary Units:	Advalorem Value	Spec. Dist. Name:
2300	0	Townwide Drain Imp

•

Special District: CL057

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	451500	Consolidated Light

•

Special District: FF025

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	451500	Fairview Fire Pok

•

Special District: GL000

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	451500	Pok Lib District

•

Special District: TW0K3

Primary Units:	Advalorem Value	Spec. Dist. Name:
3900	0	Town Wide Wat Imp

Special District: WS0P4

Primary Units:	Advalorem Value	Spec. Dist. Name:
3100	0	4th Ward Swr Imp Cap

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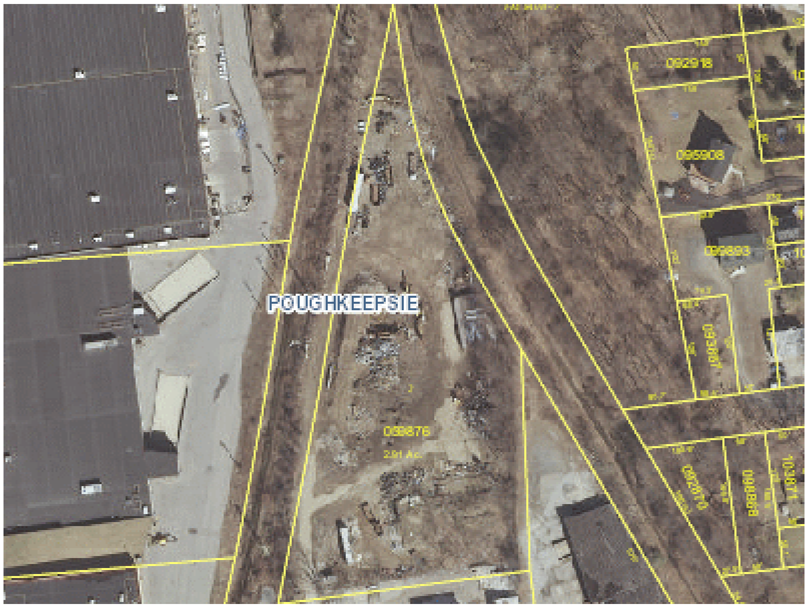
ParcelAccess



Parcel Grid Identification #:
134689-6162-05-059876-0000
Municipality: Poughkeepsie

Parcel Location
51 Fulton St

Owner Name on March 1
R Freedman & Son Inc , *(P)*

Primary *(P)* Owner Mail Address
25 Tibbits Ave
Green Island NY 121830000

Parcel Details

Size (acres):	2.91 ac	Land Use Class:	(449) Commercial: Storage, Warehouse and Distribution Facilities: Other Storage, Warehouse and Distribution Facilities
File Map:	5638	Agri. Dist.:	(0)
File Lot #:	2	School District:	(133201) Hyde Park Central School District
Split Town			

Assessment Information (Current)

*** 2013 assessments not yet established ***

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$330500	3/17/2011 2:07:14 PM	22011	1726	(J)	1

Site Information:

Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(3) Comm/public	(3) Comm/public	(1) Inferior	FC	(F03) Dstr wrhouse

Commercial/Industrial/Utility Building Information:

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 1

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
0	1	1200	(0833) 1 sty warehouse steel 10% wood OHD	(3) Above Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	0

Number Identical:	Condition Code:
1	3

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 2

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
1983	1	1200	(0832) 1 sty warehouse wood mill	(2) Average
Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	0
Number Identical:	Condition Code:			
1	4			

Commercial Rental Information:

Site Number: 1
Use Number: 1
Used As: (F03) Dstr wrhouse

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
( )	2400	0	0	0
Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts	
0	0	0	0	

Improvements:

Site Number: 1

Improvement Number: 1

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(LP4) Pavng-asphlt	0	0	1	1985
Condition:	Grade	Sq. Ft.		
(3) Normal	C	30000		

Special District Information:

Special District: 999Y2

Primary Units:	Advalorem Value	Spec. Dist. Name:
1500	0	Townwide Drain Imp

Special District: CL057

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	325000	Consolidated Light

Special District: FF025

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	325000	Fairview Fire Pok

Special District: GL000

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	325000	Pok Lib District

Special District: TW0K3

Primary Units:	Advalorem Value	Spec. Dist. Name:
2600	0	Town Wide Wat Imp

Special District: WS0P4

Primary Units:	Advalorem Value	Spec. Dist. Name:
2100	0	4th Ward Swr Imp Cap

ABSOLUTELY NO ACCURACY OR COMPLETENESS GUARANTEE IS IMPLIED OR INTENDED. ALL INFORMATION ON THIS MAP IS SUBJECT TO CHANGE BASED ON A COMPLETE TITLE SEARCH OR FIELD SURVEY.

ParcelAccess

Parcel Grid Identification #:
134689-6062-02-990867-0000
Municipality: Poughkeepsie

Parcel Location
3432-3434 North Rd

Owner Name on March 1
Inland Westn Pok Mid Hud LLC , *(P)*

Primary *(P)* Owner Mail Address

PO Box 9273
Oak Brook IL 605229273

Parcel Details

Size (acres):	9.71 Ac (S)	Land Use Class:	(452) Commercial: Retail Services: Area or Neighborhood Shopping Centers
File Map:	10650	Agri. Dist.:	(0)
File Lot #:	2	School District:	(133201) Hyde Park Central School District
Split Town			

Assessment Information (Current)

*** 2013 assessments not yet established ***

Last Sale/Transfer

Sales Price:	Sale Date:	Deed Book:	Deed Page:	Sale Condition:	No. Parcels:
$0	0	22005	7213	( )	0

Site Information:

Site Number: 1

Water Supply:	Sewer Type:	Desirability:	Zoning Code:	Used As:
(3) Comm/public	(3) Comm/public	(3) Superior	FC	(E06) Branch bank

Commercial/Industrial/Utility Building Information:

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 1

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
2000	1	64520	(0351) Supermarket 1 sty load sup	(3) Above Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	0

Number Identical:	Condition Code:
1	3

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 2

Year Built: No. Stories: Gross Floor Area:

2000	1	5292	Boeck Model (0511) 1 sty bank load sup	Const. Qual.: (2) Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
100	100	100	0	0

Number Identical:	Condition Code:
1	4

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 3

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
2000	1	4959	(0426) Dine/lounge 1 sty wood	(2) Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	100	0	0	0

Number Identical:	Condition Code:
1	4

Site Number: 1

Bldg Sec.: 1 Bldg. Number: 4

Year Built:	No. Stories:	Gross Floor Area:	Boeck Model	Const. Qual.:
2001	1	7219	(0312) 1 sty store load sup	(2) Average

Air Cond. %:	Sprinkler %:	Alarm %:	No. Elevator:	Basement sf.:
0	0	0	0	0

Number Identical:	Condition Code:
1	4

Commercial Rental Information:

Site Number: 1
Use Number: 1
Used As: (D06) Supermarket

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(01) Square feet	59720	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
1	0	0	0

Site Number: 1
Use Number: 2
Used As: (E06) Branch bank

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(01) Square feet	5292	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
1	0	0	0

Site Number: 1
Use Number: 3
Used As: (C01) Restaurant

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(04) Seats	4959	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
250	0	0	0

Site Number: 1
Use Number: 4

Used As: (D08) Small retail

Unit Code:	Total Rent Area:	Area 1 Bdrms Apts	Area 2 Bdrms Apts	Area 3 Bdrms Apts
(01) Square feet	7219	0	0	0

Total Units:	No. 1 Bdrms Apts	No. 2 Bdrms Apts	No. 3 Bdrms Apts
1	0	0	0

Improvements:

Site Number: 1

Improvement Number: 1

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(LD2) Ld dock-st/c	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	1084

Site Number: 1

Improvement Number: 2

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(LD2) Ld dock-st/c	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	1064

Site Number: 1

Improvement Number: 3

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(CP8) Canpy-com st	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	3200

Site Number: 1

Improvement Number: 4

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(BE4) Rectdoor-mon	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	12

Site Number: 1

Improvement Number: 5

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(BE1) Vault-money	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	204

Site Number: 1

Improvement Number: 6

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(BE8) Bnk-sr windw	1	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	0

Site Number: 1

Improvement Number: 7

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built

(BE6) Nite deposit	1	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	0

Site Number: 1

Improvement Number: 8

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(CP9) Canpy-com wd	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	1092

Site Number: 1

Improvement Number: 9

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(CP9) Canpy-com wd	0	0	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	208

Site Number: 1

Improvement Number: 10

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(BF1) 24hr wu tllr	2	0	2	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	0

Site Number: 1

Improvement Number: 11

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(BF2) Pneu sa tllr	2	0	2	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	0

Site Number: 1

Improvement Number: 12

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(RN2) Cold stor rm	176	1	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	0

Site Number: 1

Improvement Number: 13

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(RN2) Cold stor rm	96	3	1	2000

Condition:	Grade	Sq. Ft.
(3) Normal	C	0

Site Number: 1

Improvement Number: 14

Structure Code:	Dim 1:	Dim 2	Quantity	Year Built
(RN2) Cold stor rm	80	1	1	2000

Condition:	Grade	Sq. Ft.

(3) Normal	C	0

Special District Information:

Special District: 999Y2

Primary Units:	Advalorem Value	Spec. Dist. Name:
47500	0	Townwide Drain Imp

Special District: CL057

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	10145000	Consolidated Light

Special District: FF025

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	10145000	Fairview Fire Pok

Special District: GL000

Primary Units:	Advalorem Value	Spec. Dist. Name:
0	10145000	Pok Lib District

Special District: TW0K3

Primary Units:	Advalorem Value	Spec. Dist. Name:
81900	0	Town Wide Wat Imp

Special District: WS0P4

Primary Units:	Advalorem Value	Spec. Dist. Name:
65900	0	4th Ward Swr Imp Cap

This report was produced with ParcelAccess Intranet on 2/18/2013. Developed and maintained by OCIS - Dutchess County, NY.

New York State Department of Environmental Conservation
Division of Environmental Remediation
Office of the Director, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **Fax:** (518) 402-9020
Website: www.dec.ny.gov

Joe Martens
Commissioner

OCT 02 2013

Certified Mail, Return Receipt Requested

Midhudson Center LLC
c/o Arthur H. Bienenstock
2 E 61st Street
New York, New York 10022-1943

RE: Remedial Action Site Access
Site Name: Former Duso Chemical Site
Inactive Hazardous Waste Disposal Site
Registry Site No. 314103
(T) Poughkeepsie, Dutchess County

Dear Mr. Bienenstock:

The New York State Department of Environmental Conservation (DEC) is preparing to implement the selected remedy for the Former Duso Chemical Site located at 33 Fulton Street, in the Town of Poughkeepsie, Dutchess County, New York (the "Site"). DEC selected a remedy for the Site in a Record of Decision dated March 2008, comprising enhanced in-situ biological treatment ("EISB') for both on-site and off-site treatment and in-situ thermal desorption for off-site treatment. DEC's records indicate that Midhudson Center LLC ("Midhudson") is the owner of the property located near the Site at 3440-3444 North Road and identified on the County of Dutchess Tax Map as Parcel Number 134689-6162-05-005836-0000.

Environmental Conservation Law (ECL) Article 27 §§ 1309(3)-(4) and ECL Article 27 §1313(8) authorize DEC or its authorized agents to enter upon any site, areas near such site, or area on which it has reason to believe that contaminants were disposed or discharged for purposes of inspection, sampling and testing, implementing a remedial program, long-term operation and maintenance, and temporary occupancy. DEC is remediating hazardous waste contamination that has occurred on or near your real property. Pursuant to ECL Article 27 §§ 1309(3)-(4) and ECL Article 27 §1313(8), DEC and its contractors are authorized to enter onto property for these purposes.

DEC, acting through its officers, employees, agents, consultant and contractors, requires access to Midhudson's real property, above specified for the purpose of implementing the selected remedy for the Site. In order to implement the selected remedy for the Site, activities proposed for Midhudson's real property, include, but are not limited to, implementation of thermal treatment of contaminated soil and groundwater followed by groundwater monitoring and sampling of monitoring wells as described in the Proposed Scope and Schedule of Work attached to this Agreement as Appendix "A," and restoration of disturbed areas (see enclosed figure).

The DEC engineering consultant who will manage the work is AECOM. A DEC representative will follow up with you and provide an updated schedule for remedial activities once the thermal treatment remedial contract is awarded by the DEC and a contractor is identified.

Currently, it is anticipated that the contract for thermal treatment will be publically bid in Fall 2013. DEC expects the thermal treatment work to begin in the first or second quarter of 2014 and to be completed in 2015.

DEC prefers to act in cooperation with private parties. Therefore, it is requested that the duly authorized individual sign, on behalf of Midhudson, the duplicate copies of the enclosed form acknowledging and consenting to DEC's Right of Entry onto Midhudson's property. Two copies of the property owner access acknowledgement form are enclosed (one copy for your records and one signed copy to be returned to DEC). Please return the completed form to the attention of David Chiusano, the DEC Project Manager for the Site, in the enclosed self-addressed stamped envelope within two weeks from the receipt of this letter.

DEC will make every effort to cooperate with Midhudson so that any adverse impact of its entry on and occupancy of Midhudson's property will be minimized. Prior to entering Midhudson's property, to conduct any activities associated with the development and implementation of the selected remedy for the Site, DEC will make every attempt to provide Midhudson at least two (2) business days advance notice. DEC's contractor has comprehensive general liability insurance for the activities conducted on Midhudson's property. DEC will cooperate with the owner in pursuing with the insurer any claim that may arise. DEC will pay the cost of the work to be conducted on Midhudson's property and will return the ground surface of the property to its condition before it entered the property, unless you otherwise agree.

Any questions or concerns regarding DEC's activities on your property should be directed to David J. Chiusano, DEC Project Manager, at (518) 402-9814, djchiusa@gw.dec.state.ny.us or at the above address. Any questions regarding DEC's legal authority should be directed to the DEC case attorney, Ms. Alali Tamuno, Senior Attorney, Office of General Counsel, at (914) 428-2505 extension 320.

Nothing contained herein constitutes a waiver by DEC or the State of New York of any rights held pursuant to any applicable state and/or federal law or a release for any party from any obligations held under those same laws.

Sincerely,

Robert W. Schick, P.E.
Director
Division of Environmental Remediation

Enclosures

ec: Lindsay Mitchell, AECOM (lindsay.mitchell@aecom.com)
Scott Underhill, AECOM (scott.underhill@aecom.com)
Paul Dombrowski, AECOM (paul.dombrowski2@aecom.com)
Arthur Taddeo, AECOM (Arthur.Taddeo@aecom.com)
Michael Cruden, DEC
Gerard Burke, DEC
David Chiusano, DEC
Edward Moore, DEC
Alali Tamuno, DEC

Appendix "A"
Proposed Scope and Schedule of Work

Project Description:

Thermal Treatment is for the Former Duso Chemical site (Site), a Class 2 inactive hazardous waste disposal site, NYS Site 10 3-14-103, located in Poughkeepsie, NY. The site is near property owned by Midhudson Center LLC (Midhudson).

The New York State Department of Environmental Conservation (DEC) prepared the ROD in March 2008 that included thermal treatment (off-site). The major source of VOC contamination was the surficial release of VOCs that occurred as a result of a warehouse fire in 1963 at the Site. The VOC release impacted the shallow groundwater table, and migrated west and downward over time under the property owned by CSX Railroad and the MHBP site.

Thermal treatment will target depths from groundwater to 50 ft bgs. Heating elements can take various forms based on the thermal remediation method implemented and may include steam injection wells, heater wells, electrodes, or directional antennae arrays. This will be unknown until a contractor is selected and a contract is awarded by the State of New York following the bid process. Approximately 77 heating elements have been assumed to be required on Midhudson's property.

Scope of Work Details:

1. Abandonment of a select number of existing groundwater monitoring wells;

2. Routine groundwater sampling from existing groundwater monitoring wells;

3. Installation/operation of 77 +/- heater elements to thermally desorb chlorinated hydrocarbons which will be recovered through vapor recovery wells that will be installed at locations yet to be finalized; and

4. On completion of remediation, removal of heater elements, vapor recovery wells, monitoring wells, and all associated piping and control systems. Any waste materials, including without limitation purge waters or other investigation- or remediation-derived waste, generated during performance of the Work shall be handled in accordance with federal, state and local laws and regulations.

Schedule to perform work and notifications:

The construction contract associated with thermal treatment is expected to be publically bid by the end of 2013. Contract award and initiation of remedial activities are expected to occur in Spring 2014. Remedial work is expected to continue thru 2014 into 2015. Long term groundwater monitoring to follow.

> DEC will notify Midhudson at least ten (10) days before proceeding with any phase of the Work on Midhudson Property, and at least forty-eight (48) hours prior to the actual commencement of the Work so that Midhudson may arrange for the Railroad's own consultants to be present during the Work.

EXHIBIT B

SOURCE: AERIAL PROVIDED BY GOOGLE EARTH 2013

AECOM

40 British American Blvd
Latham, New York 12110
T: (518) 951-2200
F: (518) 951-2300

FIGURE 1
SITE BOUNDARY LOCATION MAP

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013

60279080

L:\Group\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279080_018 Site Boundary Location Map.dwg, 3/29/2013 8:43:28 AM, Splawnm

Property Owner Access Acknowledgment

Target Property Address: 3440-3444 North Road
Poughkeepsie, New York

Target Parcel Grid ID: 134689-6162-05-005836-0000

Printed Name of Property Owner: Midhudson Center LLC
c/o Arthur H. Bienenstock

Signature of Property Owner: ____________________

Date: ____________________

Day Time Phone Number: ____________________

(ECL)§ 27-1309 (3)-(4) and § 27-1313 (8) authorizes the DEC and its contractors (or the duly authorized Responsible Person, its employees, agents, consultants, contractors and subcontractors acting at the direction of DEC, so authorized by DEC in writing) to enter any inactive hazardous waste disposal site and properties near such site to inspect and collect samples, and to implement an inactive hazardous waste disposal site remedial program for such site. This is not a notice that DEC intends to acquire the above-specified property nor is it an offer to acquire it.

Keep This Copy for Your Records

Property Owner Access Acknowledgment

Target Property Address: 3440-3444 North Road
Poughkeepsie, New York

Target Parcel Grid ID: 134689-6162-05-005836-0000

Printed Name of Property Owner: Midhudson Center LLC
c/o Arthur H. Bienenstock

Signature of Property Owner: ______________________________

Date: ____________________

Day Time Phone Number: ______________________________

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Return This Copy to DEC in the Postage-Paid Envelope Provided

New York State Department of Environmental Conservation
Division of Environmental Remediation
Office of the Director, 12th Floor
625 Broadway, Albany, New York 12233-7011
Phone: (518) 402-9706 • **Fax:** (518) 402-9020
Website: www.dec.ny.gov

Joe Martens
Commissioner

AUG 08 2013

Certified Mail, Return Receipt Requested

Kevin Boland, PG (kevin_boland@csx.com)
CSX Transportation, Inc.
6737 Southpoint Drive South, J-180
Jacksonville, Florida 32216

RE: Former Duso Chemical Site
Site No. 314103
Inactive Hazardous Waste Site
Town of Poughkeepsie, Dutchess County

Dear Mr. Boland:

As you may know, the New York State Department of Environmental Conservation (DEC) is preparing to implement the selected remedy for the Former Duso Chemical Site located at 33 Fulton Street, in the Town of Poughkeepsie, Dutchess County, New York (the "Site"). The Site is listed in the New York State Registry of Inactive Hazardous Waste Disposal Sites as Site No. 314103 with a classification "2" pursuant to Environmental Conservation Law §27-1305. DEC selected a remedy for the Site in a Record of Decision (ROD) for the Site dated March 2008. The remedy selected is Enhanced In-Situ Biological Treatment (EISB) for both on-site and off-site treatment and In-Situ Thermal Desorption (ISTD) for off-site treatment. Our records indicate that New York Central Line LLC c/o CSX Transportation (CSX) is the owner of property located near the Site identified on the County of Dutchess Tax Map as Parcel Number 134689-6162-05-011773.

Environmental Conservation Law (ECL) Article 27 §§1309(3)-(4) and ECL Article 27 §1313(8) authorizes DEC or its authorized agents to enter upon any site, areas near such site, or area on which it has reason to believe that contaminants were disposed or discharged for purposes of inspection, sampling and testing, implementing a remedial program, long-term operation and maintenance, and temporary occupancy. DEC is remediating hazardous waste contamination that has occurred on or near your real property. Pursuant to ECL Article 27 §§1309(3)-(4) and ECL Article 27 §1313(8), DEC and its contractors are authorized to enter onto property for these purposes.

DEC, acting through its officers, employees, agents, consultant and contractors, requires access to your real property, above specified for the purpose of implementing the selected remedy for the Site. In order to implement the selected remedy for the Site, activities proposed for your real property, include, but are not limited to, implementation of EISB and thermal treatment of contaminated soil and groundwater followed by groundwater monitoring and sampling of monitoring wells, and restoration of completed disturbed areas (see enclosed figure).

The name of the remedial contractor who will conduct the EISB work is SPEC Environmental, Inc. The consultant who will manage the work is AECOM. DEC is projecting that the application of EISB treatment on CSX's property will begin on September 16, 2013.

The work is expected to last approximately one month from the date of mobilization. A DEC representative will follow up with you and provide an updated schedule for remedial activities once the thermal treatment remedial contract is awarded and a contractor is identified. DEC will provide you with the name of the contractor who will conduct the thermal treatment work once the information becomes available. Currently, it is anticipated that the contract for thermal treatment will be publically bid in Fall 2013.

DEC would prefer to act in cooperation with private parties. Therefore, it is requested that you sign the duplicate copies of the enclosed form acknowledging and consenting to the DEC's Right of Entry onto CSX's property. Two copies of the property owner access acknowledgement form are enclosed (one copy for your records and one signed copy to be returned to DEC). Please return the completed form to the attention of David Chiusano, the Project Manager for this site, in the enclosed self-addressed stamped envelope within two weeks from the receipt of this letter.

DEC will make every effort to cooperate with CSX so that any adverse impact of its entry on and occupancy of CSX's property will be minimized. Accordingly, DEC will pay the cost of the work to be conducted on CSX property and will return the ground surface of the property to its condition before it entered your property, unless you otherwise agree. Any questions or concerns regarding DEC's activities on your property should be directed to David J. Chiusano, Project Manager, at (518) 402-9814, djchiusa@gw.dec.state.ny.us or at the above address. Any questions regarding DEC's legal authority should be directed to the assigned case attorney, Mrs. Alali Tamuno, Senior Attorney, Office of General Counsel, at (914) 428-2505 extension 320.

Nothing contained herein constitutes a waiver by DEC or the State of New York of any rights held pursuant to any applicable state and/or federal law or a release for any party from any obligations held under those same laws.

Sincerely,

Robert W. Schick, P.E.
Director
Division of Environmental Remediation

Enclosures

ec: Lindsay Mitchell, AECOM (lindsay.mitchell@aecom.com
Scott Underhill, AECOM (scott.underhill@aecom.com)
Mike Cruden, DEC
Gerard Burke, DEC
David Chiusano, DEC
Alali Tamuno, DEC
Ed Moore, DEC

EXHIBIT B

SOURCE: AERIAL PROVIDED BY GOOGLE EARTH 2013

AECOM

40 British American Blvd
Latham, New York 12110
T (518) 951-2200
F (518) 951-2300

FIGURE 1
SITE BOUNDARY LOCATION MAP

FORMER DUSO CHEMICAL FACILITY
33 FULTON STREET, POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

MARCH 2013

60279060

L:\Groups\earth\Latham NY Work\NYSDEC Former Duso Chem Site\60279060_018 Site Boundary Location Map.dwg, 3/29/2013 8:43:26 AM, Spaeem

Property Owner Access Acknowledgment

Target Property Address: Spur North and East of City along Fulton St.
Poughkeepsie, New York

Target Parcel Grid ID: 134689-6162-05-011773-0000

Printed Name of Property Owner: New York Central Line LLC c/o
CSX Transportation, Inc.

Signature of Property Owner: ______________________________

Date: ____

Day Time Phone Number: ________________________________

Environmental Conservation Law (ECL) § 27-1309 (3)-(4) and § 27-1313 (8) authorizes DEC and its contractors (or the duly authorized Responsible Person, its employees, agents, consultants, contractors and subcontractors acting at the direction of DEC, so authorized by DEC in writing) to enter any inactive hazardous waste disposal site and properties near such site to inspect and collect samples, and to implement an inactive hazardous waste disposal site remedial program for such site. This is not a notice that DEC intends to acquire the above specified property nor is it an offer to acquire it.

Keep This Copy for Your Records

Property Owner Access Acknowledgment

Target Property Address: Spur North and East of City along Fulton St.
Poughkeepsie, New York

Target Parcel Grid ID: 134689-6162-05-011773-0000

Printed Name of Property Owner: New York Central Line LLC c/o
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Signature of Property Owner: ______________________________

Date: ____

Day Time Phone Number: ________________________________

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Return This Copy to DEC in the Postage-Paid Envelope Provided

Appendix G

Air Permitting and Off-Gas Treatment Information

New York State Department of Environmental Conservation
Division of Environmental Remediation, 12th Floor
625 Broadway, Albany, New York 12233-7011
(518) 402-9706 • **FAX:** (518) 402-9020
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

MEMORANDUM

TO: Bureau Directors, Section Chiefs, Regional Hazardous Waste Remediation Engineers, Regional Spill Engineers

FROM: Dale A. Desnoyers, Director, Division of Environmental Remediation

Dale A. Desnoyers

SUBJECT: Substantive Compliance with Air Requirements

DATE: February 28, 2003

Remediation that is being conducted under Division of Environmental Remediation (DER) oversight under any of our remedial programs are exempt from obtaining air discharge permits either through a program exemption (e.g. Part 375) or a regulatory exemption (e.g. Part 201). However, all remedial projects must demonstrate that they comply with the substantiative regulations. This means that the appropriate air pollution control equipment has to be installed and that the remediation activity must not cause air pollution.

The requirements for air pollution control equipment are contained in Part 212. Part 212 contains a table that specifies the minimum degree of air cleaning required which is based on emission rate potential and environmental rating. In most instances, emissions from the remedial projects that DER staff oversee fall into the category of "Degree of Control to be Determined by the Commissioner." The position that DER has taken is that any installation with an emission rate potential exceeding 0.5 lb/hr. of total volatile organic compounds require air pollution controls. This generally encompasses all soil vapor extraction systems and thermal desorption units. Air strippers generally do not require controls.

The demonstration that an air emission source will not cause air pollution is accomplished by performing an air quality impact analysis. The Division of Air Resources (DAR) has guidance for this analysis. It is called "Guidelines for the Control of Toxic Ambient Air Contaminants" (formerly Air Guide 1) and is identified as DAR-1. This guidance outlines a process that predicts the impact on air quality from the emissions. DAR-1 contains both short term (24 hr.) and long term (annual) ambient guideline concentrations that the impact must not exceed. Specific information regarding DAR-1 is available from the Division of Air Resources web page (http://www.dec.state.ny.us/website/dar/boss/toxics.html).

Project Managers should require adequate information to demonstrate compliance with both of these requirements. The application for a permit to construct a process, exhaust or ventilation system (formerly AIR 100 or 79-19-3) has been used to submit the emissions information in a format in which reviewers were familiar with and to insure all of the needed information was included. This form is no longer available. However, attached are relevant portions of that form which may be used for the same purpose. This format does not have to be used, but it makes review much easier (potentially expediting review) and ensures all of the needed information is submitted the first time. In addition to the emissions information, a DAR-1 analysis must be submitted. If required, the information should include a description of the monitoring schedule, a stack testing protocol and a procedure to maintain the air pollution control equipment (e.g. carbon cannister change out procedure).

If further information is required, please contact Jim Harrington at 402-9755

Attachment

Information for Determination of Compliance with Substantive Air Requirements

Site Name:

Site Address:

Name and affiliation
of person submitting information:

Description of Process:

Description of Control Equipment:

Description of Continuous Air Monitors:

Attach a copy of a site plan showing property lines, prevailing wind direction and distance to nearest offsite receptors

Stack Information

Ground Elevation (ft.)	
Stack Height (ft.)	
Height above Structures (ft.)	
Inside Dimensions (in.)	
Exit Temperature (^{0}F)	
Exit Velocity (ft./sec.)	
Exit Flow (acfm)	

Emissions Information:

Contaminant	CAS Number	Hourly Emissions (lbs/hr.)	Annual Emissions (tons/year)

AECOM
701 Edgewater Drive
Wakefield, MA 01880

Memorandum

Date: February 20, 2013

Job #:

To: Former Duso Chemical Site – Thermal Remediation Project File

From: Paul M. Dombrowski, P.E.

Subject: NYSDEC Air Permit Requirements for Thermal Remediation

Distribution:

AECOM contacted NYSDEC Division of Air Resources to evaluate the air permit requirements for operation of an in-situ thermal remediation system at the MHBP property of the Former Duso Chemical Site in Poughkeepsie, NY.

Shamim Wright spoke with Tom Miller of NYSDEC Region 3 Air Quality department. Paul Dombrowski spoke with Mike Cronin of NYSDEC Air Quality department in Albany. Both NYSDEC representatives stated that a short-term remediation action on a State Superfund Site where NYSDEC is performing the work would constitute a **Trivial Activity**, and therefore would not require a permit for air discharge operations.

> §201-3.3 Trivial activities
> (c) The category headings used in the following listing of trivial activities are strictly for organizational purposes and are not intended to be definitive. The following activities are trivial and are exempt from permitting requirements and do not need to be listed in the title V facility permit application:
>> (29) Air strippers and soil vents required under the provisions of an order on consent or stipulation agreement, or in operation at a superfund site.
>>> (i) required by the provisions of an order on consent; or
>>> (ii) operated under an agreement with, and under the supervision of, the department; or
>>> (iii) operated at a Superfund site.

Specific emission requirements were discussed with the NYSDEC representatives AECOM quoted the emission caps under the federal Clean Air Act, which NYS Subpart 201-7 uses as a criterion for a stationary source to avoid requirements to obtain Title V facility permit or other applicable requirements. Neither Mr. Miler or Mr. Cronin were aware of any additional emission limitations (stack concentrations or pound per hour or day). Paul Dombrowski indicated to Mr. Cronin that initial estimates approximated 10,000 to 15,000 lbs of chlorinated VOCs (primarily two specific VOCs), which would be below the federal emission caps.

> § 201-7: Federally Enforceable Emission Caps
> §201-7.1 General
> A source owner or operator may elect to accept federally enforceable permit terms and conditions which restrict or cap emissions from a stationary source or emission unit in order to avoid being subject to one or more applicable requirements that the source or unit would otherwise be subject to, or where needed to establish an emission reduction credit as defined under Part 231 of this Title. Source owners or operator may also be eligible to cap their emissions by accepting limitations and provisions established under section 201-7.3 of this Subpart in order to avoid the requirement to obtain a title V facility permit or other applicable requirement.
>> (e) Emission limitations. Stationary sources subject to and operating pursuant to this section must not emit more than the following quantities of emissions in every 12-month period:
>>> (2) five tons of a single hazardous air pollutant;
>>> (3) 12.5 tons of any combination of hazardous air pollutants;

With respect to air treatment equipment and removal efficiencies, Mr. Cronin suggested contacting the Division of Remediation (DER), and inquire about what treatment efficiencies would be required if DER remediation was being implemented by a responsible party with DEC Remediation overseeing.

Note, the references to federal emission caps listed above were removed from the NYSDEC website in February 2013 as a result of an adoption filed on January 23, 2013.

http://www.dec.ny.gov/regs/4299.html
[Filed 6/7/96. Effective 30 days after filing. Adoption filed 1/23/13. Effective 30 days after filing.]

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DEPARTMENT OF ENVIRONMENTAL CONSERVATION

Printer-friendly || A-Z Subject Index || Enter search words Search DEC

Home » Regulations and Enforcement » Regulations » Chapter III- Air Resources » Part 212: General Process Emission Sources

Outdoor Activities
Animals, Plants, Aquatic Life
Chemical and Pollution Control
Energy and Climate
Lands and Waters
Education
Permits and Licenses
Public Involvement and News
Regulations and Enforcement
Regulations
Chapter III- Air Resources
Part 212: General Process Emission Sources
Publications, Forms, Maps
About DEC

Part 212: General Process Emission Sources

(Statutory authority: Environmental Conservation Law, §§ 1-0101, 1-0303, 3-0301, 19-0103, 19-0105, 19-0107, 19-0301, 19-0303, 19-0305, 19-0311, 71-2103, 71-2105)

[Filed 8/31/10. Effective 30 days after filing.]

[page 1 of 1]

For administrative information about this posting, contact: Division of Air Resources. The Bureau of Stationary Sources at (518) 402-8403 is the contact for technical questions pertaining to this rule.

Contents:

Sec.

§212.1 Definitions

(a) For the purpose of this Part, the general definitions in Part 200 of this Title apply.

(b) For the purpose of this Part, the following definitions also apply:

(1) *Aggregate*. Any hard, inert material used for mixing in graduated particles or fragments. Includes sand, gravel, crushed stone, slag, rock dust or powder.

(2) *Hot mix asphalt*. Paving material that is produced by mixing hot dried aggregate with heated asphalt cement.

(3) *Low NO_x burner*. A burner designed to reduce flame turbulence by the mixing of fuel and air and by establishing fuel-rich zones for initial combustion, thereby reducing the formation of nitrogen oxides.

(4) *Overall removal efficiency*. The total reduction of volatile organic compound emissions considering the efficiency of both the capture system and of the subsequent destruction and/or removal of these air contaminants by the control equipment prior to their release into the atmosphere.

(5) *Process*. Any industrial, commercial, agricultural or other activity, operation, manufacture or treatment in which chemical, biological and/or physical properties of the material or materials are changed, or in which the material(s) is conveyed or stored without changing the material(s) (where such conveyance or storage system is equipped with a vent(s) and is non-mobile), and which emits air contaminants to the outdoor atmosphere. A process does not include an open fire, operation of a combustion installation, or incineration of refuse other than by-products or wastes from processes.

(6) *Tune-up*. Adjustments made to a burner in accordance with procedures supplied by the manufacturer (or an approved specialist) to optimize the combustion efficiency.

§212.2 Determination of environmental rating

When an application is made for a permit to construct or for a certificate to operate for a process emission source, the commissioner will issue an environmental rating for each air contaminant from each emission point in accordance with Table 1 of this Part.

§212.3 Emissions from existing emission sources

Emissions of air contaminants to the outdoor atmosphere from any process emission source are restricted as follows:

(a) No person will cause or allow emissions that violate the requirement specified in Table 2, Table 3 or Table 4 of this Part for the environmental rating issued by the commissioner; or

(b) In instances where determination of permissible emission rate using process weight is not applicable (see Table 5) and for an environmental rating of B or C, no person will cause or allow emissions of solid particulates that exceed 0.15 grains of particulates per cubic foot of exhaust gas, corrected for dilution air and expressed at standard conditions on a dry gas basis.

§212.4 Emissions from new emission sources and/or modifications

Emissions from any process emission source for which an application for a permit to construct is received by the department after July 1, 1973, are restricted as follows:

(a) except as required under section 201.8 of this Title, no person shall cause or allow emissions that exceed the applicable permissible emission rate as determined from Table 2, Table 3 or Table 4 of this Part for the environmental rating issued by the commissioner; or

(b) for gases and liquid particulates with an environmental rating of A, B, or C and for solid particulates with an environmental rating of A, where the emission rate potential is not shown in Table 2 the permissible emission rate shall be specified by the commissioner; or

(c) in instances where determination of permissible emission rate using process weight is not applicable (see Table 5) and for an environmental rating of B or C, no person will cause or allow emissions of solid particulates that exceed 0.050 grains of particulates per cubic foot of exhaust gas, expressed at standard conditions on a dry gas basis, except as provided in section 201.6 of this Title.

§212.5 Determining applicable emission standards

(a) Where air contaminants from two or more devices or contrivances are emitted to the outdoor atmosphere through a single emission point, the permissible emission rate or degree of air cleaning required is determined by using the sum of the process weights or emission rate potentials for all such devices or contrivances.

(b) Where air contaminants from a single device or contrivance are emitted to the outdoor atmosphere through more than one emission point, the sum of the emissions from all such emission points shall not exceed the quantity that would be permitted if said emissions were through a single emission point.

(c) Where air contaminants from two or more devices or contrivances are emitted to the outdoor atmosphere through a single emission point and the applicable emission standard for one or more of such devices or contrivances if vented separately to the outdoor atmosphere is a concentration standard (grains per standard cubic foot), the permissible emission rate through such emission point shall not exceed the quantity that would be allowed if said emissions were through separate emission points.

(d) Where a source owner can demonstrate to the satisfaction of the commissioner that he will apply best available control technology, the commissioner may specify a less restrictive permissible emission rate, emission standard or degree of air cleaning for such source than required under this Part provided that the less restrictive requirement is equivalent to that which can be achieved through the application of best available control technology.

(e) A process emission source, subject to the Federal new source performance standards in 40 CFR part 60, the national emission standards for hazardous air pollutants in 40 CFR part 61, or to the polychlorinated biphenyl disposal criteria in 40 CFR part 761 satisfies the requirements of this Part for the contaminant regulated by the Federal standard if the source owner can demonstrate that the source is in compliance with the respective Federal regulation.

(f) Owners and/or operators of facilities which have limited the facility's annual potential to emit nitrogen oxides or volatile organic compounds below applicability levels through federally and state enforceable special conditions in permits to construct and/or certificates to operate under the provisions of section 212.10(d) of this Part must maintain annual actual emissions below these limitations. Nitrogen oxide and volatile organic compound emission points at these facilities are not subject to the control requirements in section 212.9(b) if the emissions are not given an A rating.

§212.6 Opacity of emissions limited

(a) No person will cause or allow emissions having an average opacity during any six consecutive minutes of 20 percent or greater from any process emission source, except only the emission of uncombined water.

(b) Upon written application by a source owner or operator, the commissioner, at his discretion may accept for an emission source an equivalent opacity standard exceeding the opacity standard of subdivision (a) of this section, if the source owner can demonstrate through acceptable tests for such source that he is in compliance with all applicable emission requirements other than the opacity standard and that the source and any associated emission control equipment is being operated and maintained in a manner acceptable to the commissioner. An equivalent opacity standard for an emission source will only be granted where reasonably available control technology, as determined by the commissioner, has been utilized. In such cases, the source owner or operator will not cause or allow emissions to exceed the equivalent opacity.

§212.7 Exceptions

The following process emission sources are not subject to the provisions of this Part:

(a) process emission sources which are exempt under section 201.6 of this Title;

(b) kilns and clinker coolers in portland cement plants subject to Part 220 of this Title with respect to emissions which are not given an A rating;

(c) ferrous jobbing foundry melting furnaces in operation on or prior to February 6, 1968 with respect to particulate emissions only;

(d) by-product coke oven batteries subject to Part 214 of this Title with respect to emissions which are not given an A rating;

(e) gasoline, petroleum, and volatile organic liquid storage and transfer facilities subject to Part 229 or Part 230 of this Title, with respect to volatile organic compound emissions which are not given an A rating;

(f) process emission sources other than kilns and clinker coolers in a portland cement plant with respect to opacity of emissions only;

(g) process emission sources in a sulfuric or nitric acid plant which are regulated by Part 224 of this Title with respect to emissions of nitrogen oxides, oxides of sulfur, sulfuric acid mist and smoke;

(h) process emission sources in a petroleum refinery subject to Part 223 of this Title with respect to sulfur compound emissions and emissions of volatile organic compounds which are not given an A rating;

(i) process emission sources from which emissions of oxides of sulfur are attributable only to sulfur in fuel with respect to emissions of oxides of sulfur;

(j) solvent metal cleaning processes subject to Part 226 of this Title with respect to emissions of volatile organic compounds which are not given an A rating;

(k) iron and/or steel processes subject to Part 216 of this Title;

(l) surface coating operations subject to Part 228 of this Title or coatings exempt from Part 228 pursuant to section 228.1(h) of this Title with respect to emissions of volatile organic compounds which are not given an A rating;

(m) process emission sources with respect to emissions of carbon monoxide and volatile organic compounds produced solely by incomplete combustion of any fuel, except where material is heated, burned, combusted or otherwise chemically changed under oxygen deficient conditions by design;

(n) perchloroethylene dry cleaning facilities subject to Part 232 of this Title;

(o) pharmaceutical and cosmetic manufacturing processes subject to Part 233 of this Title or processes exempt from Part 233 pursuant to section 233.1(g) of this Title with respect to emissions of volatile organic compounds which are not given an A rating;

(p) graphic arts processes subject to Part 234 of this Title or inks exempt from Part 234 pursuant to section 234.1(h) of this Title with respect to emissions of volatile organic compounds which are not given an A rating;

(q) primary aluminum reduction plant processes subject to Part 209 of this Title with respect to opacity and emissions of total fluorides; and

(r) process emission sources with respect to emissions of nitrogen oxides produced by catalytic oxidizers used as air pollution control equipment.

§212.8 Compliance schedules

(a) Process emission sources which commence construction before November 16, 1985 in the New York City metropolitan area which are subject to Table 3 of this section are required to comply with the applicable standard within six months after the expiration date of the last certificate to operate issued prior to November 15, 1985. Process emission sources which commence construction after November 15, 1985 in the New York City metropolitan area which are subject to Table 3 (section 212.9[c]) of this Part must comply with the applicable standard upon start-up.

(b) An application for a certificate to operate for process emission sources at bakeries subject to this Part must be submitted to the department by October 20, 1994.

§212.9 Tables

(a) *Table 1.*

ENVIRONMENTAL RATING

Rating	*Criteria*
A	An air contaminant whose discharge results, or may result, in serious adverse effects on receptors or the environment. These effects may be of a health, economic or aesthetic nature or any combination of these.

B	An air contaminant whose discharge results, or may result in only moderate and essentially localized effects; or where the multiplicity of sources of the contaminant in any given area require an overall reduction of the atmospheric burden of that contaminant.
C	An air contaminant whose discharge may result in localized adverse effects of an aesthetic or nuisance nature.
D	An air contaminant whose discharge will not result in measurable or observable effects on receptors, nor add to an existing or predictable atmospheric burden of that contaminant which may cause adverse effects, considering properties and concentrations of the emissions, isolated conditions, stack height and other factors.

The following items will be considered in making a determination of the environmental rating to be applied to an air contaminant:

a. toxic and other properties and emission rate potential of the air contaminant;
b. location of the source with respect to residences or other sensitive environmental receptors, including a consideration of the area's anticipated growth;
c. emission dispersion characteristics at or near the source, taking into account the physical location of the source relative to surrounding buildings and terrain; and
d. the projected maximum cumulative impact of taking into account emissions from all sources in the facility under review and the pre-existing ambient concentration of the air contaminant under review.

(b) *Table 2.*

Degree of Air Cleaning Required
for
Gases and Liquid Particulate Emissions (Environmental Rating A,B,C or D)
and
Solid Particulate Emissions (Environmental Rating A or D)
but excluding
Volatile Organic Compound Emissions in the New York City Metropolitan Area*

Environmental Rating	*EMISSION RATE POTENTIAL (LB/HR)*									
	Less than 1.0	*1 to 10*	*10 to 20*	*20 to 100*	*100 to 500*	*500 to 1,000*	*1,000 to 1,500*	*1,500 to 4,000*	*4,000 to 10,000*	*10,000 and greater*
A	**	99% OR GREATER OR BEST AVAILABLE CONTROL TECHNOLOGY								
B	**		90%	91%	94%	96%		97%	98%	99% or greater
C	**		70%	75%	85%	90%		93%	95%	98% or greater
D	NO AIR CLEANING REQUIRED									

* See Table 3 of this Part for degree of air cleaning required for volatile organic compound emissions in the New York City Metropolitan Area.

** Degree of air cleaning required shall be specified by the commissioner.

(c) *Table 3.*

Degree of Air Cleaning Required for Process Emission Sources Emitting Volatile Organic Compounds in the New York City Metropolitan Area

Environmental rating	*EMISSION RATE POTENTIAL (LB/HR)*		
	Less than 1.0	*1.0 to 3.5*	*Greater than 3.5*
A	*	99% OR GREATER OR BEST AVAILABLE CONTROL TECHNOLOGY	
B or C	*		REASONABLY AVAILABLE CONTROL TECHNOLOGY
D	NO AIR CLEANING REQUIRED		REASONABLY AVAILABLE CONTROL TECHNOLOGY

* Degree of air cleaning required will be specified by the commissioner.

(d) *Table 4*.

Permissible Emission Rates Based on Process Weight for Solid Particulate Emissions (Environmental Rating B or C)

Process weight per hour (lb/hr)	*Existing Source*	*Permissible emission rate (lb/hr) New source or modification*
100	0.51	0.51
500	1.5	1.5
1,000	2.4	2.4
5,000	6.8	6.8
10,000	11	11
25,000	20	20
50,000	32	32
75,000	42	42
100,000	51	51
250,000	58	0.030 grain per standard cubic foot of undiluted exhaust gas on a dry basis.
500,000	64	
750,000	68	
1,000,000	71	
2,000,000	78	
5,000,000	88	

To determine values of permissible emission rate not shown in table:

for all process weight sources up to 100,000 lb/hr, use $E = 0.024P^{0.67}$;

for existing process weight sources in excess of 100,000 lb/hr, use $E = (39P^{0.082}) - 50$, where E = permissible emission rate; P = process weight in lb/hr.

(e) *Table 5.*

Processes for which Permissible Emission Rate is Based on Process Weight

a. Stone dryers (asphalt concrete plants)
b. Expanded aggregate kilns (lightweight aggregate plants)
c. Continuous process material dryers emitting solid particulates and water only
d. Brass and bronze melting furnaces
e. Ferro alloy production furnaces
f. Lime kilns
g. Glass production furnaces
h. Graphitizing and silicon carbide furnaces
i. Gypsum dryers
j. Primary aluminum reduction furnaces

§212.10 Reasonably available control technology for major facilities

(a) (1) Owners and/or operators of facilities located in the lower Orange County or New York City metropolitan areas with an annual potential to emit of 25 tons or more of nitrogen oxides or 25 tons or more of volatile organic compounds must comply with the requirements of this section.

(2) Owners and/or operators of facilities located outside of the lower Orange County and New York City metropolitan areas with an annual potential to emit of 100 tons or more of nitrogen oxides or 50 tons or more of volatile organic compounds must comply with the requirements of this section.

(3) Owners and/or operators of facilities located in the lower Orange County or New York City metropolitan areas with an annual potential to emit of 25 tons or more of nitrogen oxides or facilities located outside of the lower Orange County or New York City metropolitan areas with an annual potential to emit 100 tons or more of nitrogen oxides may petition the Environmental Protection Agency (EPA) for an exemption from the reasonably available control technology requirements for nitrogen oxide emission points in this section. The facility is eligible for the exemption if the owner and/or operator demonstrates that net ozone air quality benefits are greater in the absence of reductions of nitrogen oxides from the facility. Nothing in this paragraph shall exempt owners and/or operators of facilities which petition the Environmental Protection Agency for an exemption from complying with the applicable requirements of this section by the May 31, 1995 deadline absent approval of the exemption.

(b) Owners and/or operators of emission points subject to this Part which emit nitrogen oxides or volatile organic compounds located at facilities described in subdivision (a) of this section must submit a compliance plan to the Department by October 20, 1994. The compliance plan must either include the reasonably available control technology (RACT) analysis required by subdivision (c) of this section or a plan to limit the annual potential to emit below the applicability levels pursuant to subdivision (d) of this section.

(c) (1) The compliance plan must identify reasonably available control technology (RACT) for each emission point which emits nitrogen oxides for major nitrogen oxide facilities or volatile organic compounds for major volatile organic compound facilities. The compliance plan must identify the emission points which do not employ reasonably available control technology (RACT), and a schedule for implementation of RACT must be included in the plan. A RACT analysis is not required for emission points with nitrogen oxide and volatile organic compound emission rate potentials less than 3.0 pounds per hour and actual emissions in the absence of control equipment less than 15.0 pounds per day at facilities located in the lower Orange County and New York City metropolitan areas. A RACT analysis is not required for emission points with nitrogen oxide and volatile organic compound emission rate potentials less than 3.0 pounds per hour at facilities located outside of the lower Orange County and New York City metropolitan areas. Reasonably available control technology as approved by the department must be implemented on each emission point subject to this section by May 31, 1995.

(2) Compliance plans which include construction of emission control equipment must include a milestone date no later than December 20, 1994 for submission of permit to construct applications to the department for emission control equipment. The compliance plans must include milestone dates for commencement of construction, completion of construction, and completion of emissions testing of emission control equipment.

(3) Reasonably available control technology compliance plans for nitrogen oxide emission points must include technically feasible control strategies to minimize nitrogen oxide formation and emission control equipment alternatives. These process specific RACT demonstrations which are acceptable to the department will be submitted to the United States Environmental Protection Agency for approval as a revision to the State Implementation Plan by the department.

(4) (i) Volatile organic compound emission points which are equipped with a capture system and a control device with an overall removal efficiency of at least 81 percent are equipped with reasonably available control technology.

(ii) Surface coating processes which are not subject to Part 228 of this Title which use a surface coating with a maximum volatile organic compound content of 3.5 pounds VOC per gallon as applied (minus water and excluded VOC) as calculated according to the formula in section 228.2(b)(11) of this Title are equipped with reasonably available control technology.

(iii) Where the facility owner or operator can show to the satisfaction of the department that an emission point cannot achieve an overall removal efficiency of 81 percent or use coatings not exceeding 3.5 pounds VOC per gallon as applied (minus water and excluded VOC) for reasons of technological or economic feasibility, the department may accept a lesser degree of control upon submission of satisfactory evidence that the facility owner or operator will apply reasonably available control technology. These process specific RACT demonstrations which are acceptable to the department will be submitted to the United States Environmental Protection Agency for approval as a revision to the State Implementation Plan by the department.

(d) The owner or operator of any facility with federally and state enforceable conditions in certificates to operate which limit its annual potential to emit nitrogen oxides and volatile organic compounds below the applicability levels of subdivision (a) of this section by May 31, 1995 is exempt from the RACT analysis and implementation requirements of this section. Records must be maintained by the owner or operator at the facility on a monthly basis which verify the facility's annual actual emissions. Upon reasonable request, these records must be submitted to the department in a format acceptable to the department. An exceedance of the annual potential to emit conditions for any calendar year must be reported by the owner or operator to the department within thirty days of the end of that calendar year.

(e) Any facility that is subject to this section after May 31, 1995 will remain subject to these provisions even if the annual potential to emit nitrogen oxides or volatile organic compounds later fall below the applicability threshold.

(f) Owners and/or operators of emission points located at facilities described in subdivision (a) of this section which commence construction after August 15, 1994 must submit a RACT demonstration for nitrogen oxides and volatile organic compound emissions with each application for a permit to construct. Reasonably available control technology must be implemented on these emission points when operation commences. A RACT analysis is not required for new emission points with nitrogen oxide and volatile organic compound emission rate potentials less than 3.0 pounds per hour and actual emissions in the absence of control equipment less than 15.0 pounds per day at facilities located outside of the lower Orange County and New York City metropolitan areas.

§212.11 Sampling and monitoring

(a) Owners and/or operators of any source which is required by the department to demonstrate compliance with this Part must comply with the notification requirements and must conduct capture efficiency and/or stack emissions testing using acceptable procedures pursuant to Part 202 of this Title.

(b) Owners and/or operators of any source equipped with the following emissions control equipment must install continuous monitors and data recorders for the required parameter by June 1, 1995. Continuous monitors must be operated at all times when the associated process equipment is operating except during any quality assurance and routine maintenance activities. Each monitor must be operated according to a quality assurance program approved by the department. Alternative monitoring methods may be employed subject to department approval.

(1) The exhaust gas temperature must be monitored from thermal or catalytic incinerators.

(2) The temperature rise across catalytic incinerator beds must be monitored.

(3) The volatile organic compound outlet concentrations must be monitored from fixed-bed carbon adsorption units.

(4) The outlet gas temperature must be monitored from refrigerated condensers.

(5) Other parameters must be monitored if required by conditions on the permit to construct or certificate to operate for the source.

(c) For the purpose of ascertaining compliance with this Part, the department may obtain or require the owner or operator of a process emission source to provide a sample of any type 5 or 6 refuse (see Table 1 of Appendix 2 of Part 219 for classifications of refuse) where such refuse is an input material of the process.

§212.12 Hot mix asphalt production plants

(a) The owner or operator of a hot mix asphalt production plant must comply with the following requirements:

(1) Beginning in calendar year 2011, a tune-up must be performed on the dryer burner on an annual basis at any hot mix asphalt production plant that is in operation during that calendar year.

(2) A plan must be submitted to the department by March 1, 2011 which details the introduction or continuation of methods by which to reduce the moisture content of the aggregate stockpile(s). Such methods must be implemented that year, or the first subsequent year the plant is in operation.

(b) (1) Beginning January 1, 2012, the owner or operator of a hot mix asphalt production plant must analyze the economic feasibility of installing a low NO_x burner when it comes time for their current burner to be replaced. This economic analysis must follow an approach acceptable to the department.

(2) By January 1, 2020, all owners or operators of active plants must have submitted the economic feasibility analysis for the installation of a low NO_x burner. A low NO_x burner must be installed for that operating year in all instances in which it proves feasible.

(3) Hot mix asphalt production plants which are in a state of inactivity on January 1, 2020 and have not otherwise complied with the requirements of this subdivision by that date must do so prior to continued operation.

(4) A similar analysis must be submitted for subsequent burner replacements.

(5) A low NO_x burner will be required at any new hot mix asphalt production plant.

(c) For major stationary sources, approved RACT determinations will be submitted by the department to the United States Environmental Protection Agency for approval as separate State Implementation Plan revisions.

New York State Department of Environmental Conservation

DAR-1

AGC/SGC Tables

includes TLVs & STELs for the Year 2007

Division of Air Resources
Air Toxics Section
September 10, 2007

New York State Department of Environmental Conservation
Division of Air Resources
Bureau of Air Quality Analysis and Research
625 Broadway, 2nd Floor, Albany, New York 12233-3259
Phone: (518) 402-8402 • **FAX:** (518) 402-9035
Website: www.dec.state.ny.us

Alexander B. Grannis
Commissioner

September 10, 2007

MEMORANDUM

TO: Regional Air Pollution Control Engineers, Bureau Directors & Section Chiefs
FROM: David Shaw, Division of Air Resources, Director
SUBJECT: **DAR-1 AGC/SGC Tables**

Attached to this memo are the official DAR-1 AGC/SGC tables. One sorted alphabetically by contaminant name and the other numerically by Chemical Abstract Service (CAS) registry number. These tables were last revised on December 22, 2003 and originally included in Appendix C of the 1991 draft Edition of Air Guide-1, now DAR-1.

The AGC/SGC tables list all the (I) Short-term (one-hour) and Annual Guideline Concentrations (AGCs & SGCs), (II) Federal and State one-hour and annual air quality standards and (III) DAR-1 "equivalent" one-hour and annual air quality standards. The DAR-1 "equivalent" standards are Federal and State Air Quality Standards that have been adjusted to a one-hour or annual averaging period. These "equivalent" standards serve only as screening surrogates for determining environmental ratings and initially assessing compliance with the Federal and State Air Quality Standards that are based upon 3-hour, 8-hour, 24-hour, 1-month or 3-month averaging periods. Whenever a facility's screening impact is predicted to exceed a DAR-1 "equivalent" standard, compliance should be reassessed with the applicable Federal or State Air Quality Standard and for the correct averaging time using the modeling procedures for air quality impact analysis outlined in DAR-10, previously Air Guide 26, issued on May 9, 2006 and available at http://www.dec.state.ny.us/website/dar/ood/dar10.html.

DAR-10 clarifies the use of DAR-1 modeling software as an initial screening step in analyzing source impacts and emphasizes that the DAR-1 procedures will not be considered the final determination of emission point impacts. For most situations, due to the conservative modeling assumptions incorporated in the screening procedures, the DAR-1 screen provides conservative (overestimated) long-term (annual) average and short-term (1-hr) impacts in relation to corresponding AGCs and SGCs. However, the Industrial Source Complex Long Term (ISCLT2) model is bundled with the screen model of the DAR-1 software. The ISCLT2 model is not appropriate for evaluating predicted ambient impacts for criteria pollutants because in December of 2005, EPA revised their guidance on air quality models to incorporate the use of AERMOD. Source analyses which must undergo both NYSDEC and EPA review for criteria pollutants should adhere strictly to the requirements and preferred modeling procedures described in the EPA Guidelines, with the added requirements of NYSDEC on the application of

AERMOD as described in DAR-10. Therefore, the application of DAR-1 procedures should be limited to a preliminary screening of toxic pollutants and should not be used for criteria pollutant impact analysis.

The AGC/SGC values, standards and "equivalent" standards shall be used for determining the appropriate Environmental Rating and degree of air cleaning required for a source regulated under 6 NYCRR Part 212 as outlined in the DAR-1 guidance document. Any questions about the application or interpretation of these values should be directed to the Air Toxics Section of the Division of Air Resources (518-402-8402).

I. SHORT-TERM AND ANNUAL GUIDELINE CONCENTRATIONS (SGCs & AGCs).

Many organizations and agencies derive short-term or annual exposure limits to protect workers or the general public from adverse exposure to toxic air contaminants. Each one of these exposure limits requires extensive research and development time. As such, the New York State Department of Environmental Conservation (NYSDEC) often uses the limits published by other agencies or organizations to derive Short-term or Annual Guideline Concentrations.

When short-term or annual exposure limits are derived by NYSDEC, the United States Environmental Protection Agency (USEPA) or the New York State Department of Health (NYSDOH), the most conservative (lowest) of these preliminary values will be adopted as the AGC or SGC value. If there are no exposure limits derived by NYSDEC, USEPA or NYSDOH, the AGC/SGC values will be derived from Threshold Limit Values (TLVs), TLV Ceiling Limits or Short-Term Exposure Limits (STELs) published by the American Conference of Governmental Industrial Hygienists (ACGIH). When no exposure limits or ACGIH values are available, NYSDEC will often derive AGC/SGC values based on an analogy to a compound with similar toxicological properties. Lastly, when no exposure limits or ACGIH values are available and no analogies can be made, NYSDEC will assign a conservative *de minimus* limit as the AGC.

SGCs are chosen to protect the general population from adverse acute one-hour exposures. Whereas, AGCs are chosen to protect against adverse chronic exposure and based upon the most conservative carcinogenic or noncarcinogenic annual exposure limit. When an AGC is based upon carcinogenic effects, the concentration is "equivalent" to an excess, lifetime cancer risk of one-in-one-million. These carcinogenic-based AGCs can be identified in the AGC/SGC Tables by a "U" under column "1" of the codes heading.

AGC/SGC values in the attached tables are derived from the following sources. The source of each AGC/SGC assignment can be identified under the "W" (Who derived?) column heading in the attached tables.

(A) New York State Department of Environmental Conservation - NYSDEC, (D).

NYSDEC derives short-term (one hour) and annual exposure limits to protect the general population from adverse acute and chronic inhalation exposure. Some of these limits are derived independently by NYSDEC and others are based upon the exposure data published by other agencies like the California Environmental Protection Agency (CalEPA). CalEPA derives many acute and chronic Reference Exposure Limits (RELs) and cancer Unit Risk Estimate values to protect the general population from adverse inhalation exposure. These values are available at www.oehha.org/air/html. All exposure limits derived by NYSDEC are adopted as AGC or SGC values unless there is a more conservative exposure limit derived by NYSDOH or USEPA.

(B) United States Environmental Protection Agency - USEPA, (E).

The USEPA derives both carcinogenic and noncarcinogenic annual exposure limits for use in assessing the impact from chronic exposure. Reference Concentrations (RfCs) are exposure limits designed to protect against adverse chronic noncarcinogenic effects. RfCs are "an estimate of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious noncancer effects during a lifetime." Whereas the exposure limits derived from Unit Risk Estimate values are used to protect the public from the additional "one-in-one-million" risk of contracting cancer over a lifetime of continuous exposure. For air contaminants classified by USEPA as "possible" carcinogens, NYSDEC will review the Unit Risk estimated values on a case-by-case basis because of the scientific uncertainty surrounding their validity. RfCs and Unit Risk Estimate values are published on the Integrated Risk Information System (IRIS) website (www.epa.gov/iris/).

NYSDEC will adopt an AGC based upon a USEPA limit when it's less than the most conservative exposure limit derived by NYSDEC or NYSDOH. When a contaminant has both an RfC and Unit Risk Estimate value published on the IRIS website, NYSDEC will choose the more conservative of both limits as the AGC.

(C) New York State Department of Health - NYSDOH, (H).

NYSDEC will adopt NYSDOH one-hour and annual exposure limits as AGC and SGC values when they are more conservative than any limits derived by NYSDEC or USEPA.

(D) 2007 American Conference of Governmental Industrial Hygienists (ACGIH) TLVs, (T).

A significant number of the AGCs in the DAR-1 AGC/SGC Tables are based on the ACGIH TLV-TWA limits published in the *2007 Guide to Occupational Exposure Values* handbook. These limits are published annually and "represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects." This repeated exposure is based on an 8-hour workday and 40-hour workweek. AGCs will be based on TLVs when no annual exposure limits have been derived by the NYSDEC, NYSDOH or USEPA.

For *low toxicity air contaminants* (DAR-1, Appendix C, Section II.C), AGCs are derived by dividing TLVs by a factor of 42. This represents a dosimetric adjustment of 4.2 (40 hour workweek adjusted to 168 hours per week) with an additional safety/uncertainty factor adjustment of ten (10) to protect the general population including sensitive individuals, children and the elderly. All other AGCs are derived by dividing TLVs by a factor of 420. This includes the dosimetric adjustment of 4.2 and a factor of one-hundred (100) to account for additional data uncertainties for moderate toxicity contaminants.

(E) 20076 ACGIH TLVs Ceiling Limit, (Y).

The ACGIH publishes short-term exposure limits for many contaminants. Each short-term limit is denoted as a TLV Ceiling limit <u>or</u> Short-Term Exposure Limit (STEL). A TLV Ceiling Limit represents a maximum exposure concentration that should never be exceeded at any time during a workday. TLV Ceiling Limits are used to derive SGCs when no one-hour exposure limits have been derived by NYSDEC, NYSDOH or USEPA.

NYSDEC derives SGCs from ACGIH TLV Ceiling Limits by dividing the TLV Ceiling Limits by an additional safety factor of ten (10). This additional safety factor is applied because the Ceiling Limits are applicable to a healthy working population rather than a potentially sensitive general population.

(F) 2007 ACGIH STELs, (Z).

The ACGIH publishes short-term exposure limits for many contaminants. Each short-term limit is denoted as a TLV Ceiling limit <u>or</u> Short-Term Exposure Limit (STEL). A STEL is defined as a 15-minute time-weighted average exposure which should never be exceeded at any time during the workday. STELs are used to derive SGCs when no one-hour exposure limits have been derived by NYSDEC, NYSDOH or USEPA.

NYSDEC divides ACGIH STELs by an additional safety factor of ten (10) to derive SGCs. This additional safety factor is applied because the STELs are applicable to a healthy working population rather than a potentially sensitive general population.

(G) Analogy by the NYSDEC, (A).

When limited or no toxicological data is available from the above cited agency sources (A through F), NYSDEC will sometimes derive an AGC or SGC value based on an analogy to a similar compound. Analogies are made when compounds have similar toxicological properties or similar metabolic pathways. When an analogy is made, both compounds are assumed to cause similar toxic or deleterious effects. However, this may not always be true as even subtle changes in structure (e.g., stereo-chemical differences) can alter a substance's bioactivity.

(H) High Toxicity *de minimus* Limit by NYSDEC, (*).

When a *high toxicity air contaminant* (DAR-1, Appendix C, Section II.A) has no AGC or SGC value, NYSDEC will assign the high toxicity de minimus limit (2.0×10^{-5} μg/m^3) as the AGC. This limit represents a concentration for which 95% of the carcinogenic AGCs have higher values.

II. FEDERAL AND STATE AIR QUALITY STANDARDS, (S).

Most Federal and State air quality standards are based upon one-hour or annual averaging periods. All of these standards, except ozone and the one-hour carbon monoxide standard, are listed in the AGC/SGC Tables. Each can be identified by a capital letter "S" under the “W” (Who derived?) heading. These standards are not AGC or SGC values and are only included in the tables to facilitate the DAR-1 source screening procedures under 6 NYCRR Part 212.

In previous editions, when a specific compound was classified as a particulate and the PM-10 standard was less than the preliminary AGC value, the annual PM-10 standard would be listed in place of the AGC value in the attached tables. Effective December 17, 2006, the EPA no longer recognizes the annual PM_{10} standard. Therefore, when compounds are classified as particulate, the Department will now use the total suspended particulate standard (NY075-00-0) of 45 $\mu g/m^3$, per 6 NYCRR Part 257-3, for any air contaminant whose is preliminary AGC is greater than 45 $\mu g/m^3$.

The Federal one-hour standard for carbon monoxide is not listed in the AGC/SGC tables. In its place is the more conservative DAR-1 “equivalent” one-hour standard. This “equivalent” standard was derived from the more stringent Federal eight-hour carbon monoxide standard. If sources at a facility can demonstrate compliance with the “equivalent” one-hour carbon monoxide standard it is assumed they meet both the one-hour and eight-hour Federal Standards. “Equivalent” standards are discussed in Section III and are derived for the sole purpose of determining the appropriate Environmental Ratings under Part 212.

No air contaminant emission source may cause an exceedance of a Federal or State Air Quality Standard. Most of these contaminants are present in the environment at relatively high concentrations. As such, all modeling analyses for contaminants with air quality standards must include an estimated background concentration.

Whenever a facility regulated by 6 NYCRR Part 212 is predicted to cause an ambient impact that exceeds a standard using the DAR-1 screening procedures, the source owner should perform a more refined modeling analysis following the procedures specified in DAR-10, previously Air Guide-26 (http://www.dec.state.ny.us/website/dar/ood/dar10.html) . If this analysis still shows an exceedance, a higher Environmental Rating must be assigned to the source contaminant. If this higher Environmental Rating does not require the necessary degree of control to meet the standard, the required air cleaning must be based on compliance with Section 200.6 of Part 200 and not Part 212. Section 200.6 states: *“no person shall allow or permit any air contamination source to emit air contaminants in quantities which alone or in combination with emissions from other air contamination sources would contravene any applicable ambient air quality standard and/or cause air pollution. In such cases where contravention occurs or may occur, the commissioner shall specify the degree and/or method of emission control required.”*

In most circumstances, emission points of particulate emissions are given "B" or "C" Environmental Ratings and regulated by the grain loading standards of Part 212. In some instances, these grain loading standards may not be sufficient to maintain compliance with the standards. When this occurs, the source should be assigned an "A" Environmental Rating for which a higher degree of air cleaning is required. If this higher degree of air cleaning (99% or greater or BACT) is not sufficient to meet the standard, the required degree of air cleaning must be based on compliance with Section 200.6 of Part 200 and not Part 212. *NOTE: In some instances (e.g., minor or major source modification), the PSD increment may require a higher level of control than does compliance with the National Ambient Air Quality Standard (NAAQS).*

The following one-hour and annual standards are listed in the AGC/SGC Tables:

(A) Federal Annual PM-2.5 Particulate Standard.

The Federal annual PM-2.5 particulate standard is 15 μg/m^3 for fine particulate. It has been assigned solely to the New York CAS number for PM-2.5 particulate (NY075-02-5). Unlike the total suspended particulate standard, the more stringent PM-2.5 standard was not assigned to particulate contaminants with less stringent, preliminary AGC values. In addition to the specific particulate AGC and SGC values listed in these tables, the PM-2.5 standard still pertains to all particulate compounds with diameters less than 2.5 microns. Although the annual PM-2.5 standard is listed in the AGC/SGC tables, it is a standard and not a guideline value.

(B) Federal & State Annual Sulfur Dioxide Standard.

The Federal & State annual sulfur dioxide standard is 80 μg/m^3. This standard has been assigned to the CAS number for sulfur dioxide (07446-09-5). Although the annual sulfur dioxide standard is listed in the AGC/SGC tables, it is a standard and not a guideline value.

(C) Federal & State Annual Nitrogen Dioxide Standard.

The Federal & State annual nitrogen dioxide standard is 100 μg/m^3. This standard has been assigned to the CAS number for nitrogen dioxide (10102-44-0). Although the annual nitrogen dioxide standard is listed in the AGC/SGC tables, it is a standard and not a guideline value.

(D) Federal One-hour Ozone Standard.

On June 15, 2005, the EPA revoked the one hour ozone standard for all areas except the 8-hour ozone nonattainment Early Action Compact Areas (EAC) areas (those do not yet have an effective date for their 8-hour designations). The one-hour ozone standard is no longer listed in the AGC/SGC tables.

Ozone is generally considered an unstable secondary pollutant formed in the atmosphere by the photochemical reaction of nitrogen oxides and reactive hydrocarbons in the presence of high temperatures and ultraviolet light. As such, USEPA and NYSDEC do not have an appropriate model to calculate ozone impacts from a single source.

(E) State One-hour Hydrogen Sulfide Standard.

The New York State one-hour standard for hydrogen sulfide is 14 μg/m^3. This standard has been assigned to the CAS number for hydrogen sulfide (07783-06-4). Although the one-hour hydrogen sulfide standard is listed in the AGC/SGC Tables, it is a standard and not a guideline value.

III. DAR-1 “EQUIVALENT” AIR QUALITY STANDARDS, (s).

Many Federal and State air quality standards are not based upon one-hour or annual averaging periods. For these standards, it is more difficult to assess compliance using the DAR-1 screening procedures. As such, DAR-1 “equivalent” one-hour and annual standards have been derived using averaging time conversion factors. These “equivalent” standards only act as screening surrogates for assessing compliance with the applicable Federal or State Air Quality Standard.

A DAR-1 “equivalent” standard will be listed in the AGC/SGC tables when it is more conservative (less) than a preliminary AGC or SGC value (Section I). These “equivalent” standards are not air quality standards. They can be identified by a lowercase letter "s" under the “W” (Who derived?) heading. DAR-1 “equivalent” standards should only be used for determining compliance with Part 212. When a source screening impact exceeds an “equivalent” standard, compliance should be reassessed for the applicable Federal or State air quality standard using a more refined model and for the correct averaging time.

DAR-1 “equivalent” standards were not derived from the State’s three-hour nonmethane hydrocarbon standard, one-hour photochemical oxidants standard, one-month beryllium standard or Federal eight-hour ozone standard. The hydrocarbon and oxidants standard are no longer considered technically valid and the latest USEPA health risk assessment data shows that the beryllium standard is not sufficiently protective against adverse public health impacts.

The following DAR-1 “equivalent” standards have been assigned in the AGC/SGC tables. Each is based on the USEPA or NYSDEC averaging time conversion factors stated below in Table 1. Those derived by USEPA are documented in *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019)*. Those derived by NYSDEC represent worst case adjustment factors.

Table 1

Averaging Time Conversion Factors

Source	Federal or State Standard (Convert From:)	Averaging Time Conversion Factor (Divisor)	DAR-1 "Equivalent" Standard (Convert To:)
USEPA	Maximum 3 hour	0.9	Maximum one-hour
USEPA	Maximum 8 hour	0.7	Maximum one-hour
NYSDEC	Maximum 12 hour	0.7	Maximum one-hour
USEPA	Maximum 24 hour	0.4	Maximum one-hour
NYSDEC	Maximum month	12	Maximum Annual
NYSDEC	Maximum 3 month	4	Maximum Annual

Example: DAR-1 Equiv. one-hour PM std. = (Federal 24-hour PM std.) / (0.4)

(A) DAR-1 "Equivalent" One-hour PM_{10} Standard.

The Federal 24 hour PM_{10} standard for particulate is 150 μg/m^3. This standard can be converted into a DAR-1 "equivalent" one-hour standard to make it easier to determine environmental ratings. The DAR-1 "equivalent" standard has been assigned to the New York CAS number for particulate (NY075-00-0), and other specific particulate compounds for which the DAR-1 "equivalent" standard is more conservative (less) than any preliminary SGC value. Where a specific compound is classified as a particulate, the DAR-1 "equivalent" one-hour PM standard (380 μg/m^3) will be listed as the contaminant specific "SGC" when it's less than the preliminary SGC value for the contaminant specific particulate compound.

As a guideline for assessing compliance with the Federal 24 hour PM standard, the following DAR-1 "equivalent" one-hour standard was derived from the 24 hour PM standard:

- DAR-1 "equivalent" one-hour PM-10 Standard = 150 / 0.4 = 380 μg/m^3.

(B) DAR-1 "Equivalent" One-hour PM-2.5 Standard.

The Federal 24 hour PM-2.5 standard for fine particulate is 35 μg/m^3. It can be converted into a DAR-1 "equivalent" one-hour standard to make it easier to for determining environmental ratings or assessing an initial compliance analysis. This DAR-1 "equivalent" standard has been assigned solely to the New York CAS number for PM-2.5 particulate (NY075-02-5). Unlike the PM standard, the more stringent PM-2.5 standard was not assigned to particulate contaminants with less stringent, preliminary SGC values.

In addition to the specific particulate AGC and SGC values listed in these tables, the PM-2.5 standard still pertains to all particulate compounds with diameters less than 2.5 microns.

As a guideline for determining environmental ratings or assessing an initial compliance analysis with the Federal 24 hour PM-2.5 standard, the following DAR-1 “equivalent” one-hour standard was derived from the 24 hour PM-2.5 standard:

- DAR-1 “Equivalent” one-hour PM-2.5 Standard = 35 / 0.4 = 88 μg/m^3.

(C) DAR-1 “Equivalent” One-hour Sulfur Dioxide Standard.

There are two sulfur dioxide standards for relatively short-term averaging periods: a 3 hour State standard of 1300 μg/m^3 and a 24 hour Federal & State standard of 365 μg/m^3. For both of these standards, DAR-1 “equivalent” one-hour standards can be derived. The 3 hour State standard can be converted into a DAR-1 “equivalent” one-hour standard of 1400 μg/m^3 (1300/0.9 = 1400 μg/m^3) and the 24 hour Federal & State standard can be converted into a DAR-1 “equivalent” one-hour standard of 910 μg/m^3 (365/0.4 = 910 μg/m^3). A comparison of the two values shows that the 24 hour Federal & State standard has the more conservative (lower) DAR-1 “equivalent” one-hour standard.

As a guideline for determining environmental ratings or assessing an initial compliance analysis with both the 3 hour State and 24 hour Federal & State standards, the following DAR-1 “equivalent” one-hour standard was derived for the short-term sulfur dioxide standards (CAS: 07446-09-5):

- DAR-1 “Equivalent” one-hour Sulfur Dioxide Standard = 910 μg/m^3.

(D) DAR-1 “Equivalent” One-hour Carbon Monoxide Standard.

There are two carbon monoxide standards for relatively short-term averaging times: a one-hour Federal & State standard of 40,000 μg/m^3 and a 8 hour Federal & State standard of 10,000 μg/m^3. Of these two standards, it’s often more difficult to demonstrate compliance with the 8 hour standard. This can be seen from a comparison of the actual and DAR-1 “equivalent” one-hour standards. The DAR-1 “equivalent” one-hour carbon monoxide standard can be derived by dividing the 8 hour standard by the 0.7 factor presented in Table 1. Thus, the DAR-1 “equivalent” one-hour standard (10,000/0.7 = 14,000 μg/m^3) is less than the actual one-hour standard (40,000 μg/m^3) for carbon monoxide.

As a guideline for determining environmental ratings or assessing an initial compliance analysis with the Federal and State one-hour and 8 hour standards, the following DAR-1 “equivalent” one-hour standard was derived for the short-term Carbon Monoxide standards (CAS: 00630-08-0):

- DAR-1 “equivalent” one-hour Carbon Monoxide standard = 14,000 μg/m^3.

(E) DAR-1 “Equivalent” Annual Lead Standard.

The Federal 3 month standard for lead is 1.5 μg/m^3. This standard can be converted into a DAR-1 “equivalent” annual standard to make it easier to assess compliance. This DAR-1 “equivalent” standard has been assigned to lead (CAS: 07439-92-1) and lead compounds for which the DAR-1 “equivalent” lead standard is less than any preliminary AGC value.

As a guideline for determining environmental ratings or assessing an initial compliance analysis with the Federal 3 month standard, the following DAR-1 “equivalent” annual standard was derived for lead:

- DAR-1 “equivalent” annual Lead Standard = 1.5/4 = 0.38 (Pb) μg/m^3.

(F) DAR-1 “Equivalent” One-hour and Annual Fluoride Standards.

New York State has several air quality standards for gaseous fluorides. Fluorides are defined as any compound that tests as fluoride by the appropriate method. Therefore, the regulation (Subpart 257-8) applies to all **inorganic** gaseous compounds which contain the element fluoride (F).

There are 4 separate gaseous fluoride standards with different averaging times: one-month (0.8 μg/m^3), one-week (1.65 μg/m^3), 24 hour (2.85 μg/m^3) and 12 hour (3.7 μg/m^3). None of these standards have one-hour or annual averaging periods.

A DAR-1 “equivalent” annual standard was derived for fluoride compounds as a guideline for determining environmental ratings or assessing an initial compliance analysis with the New York State fluoride standards. This “equivalent” annual standard was assigned to fluorine (CAS: 07782-41-4) and other inorganic gaseous fluoride compounds for which the DAR-1 “equivalent” standard was less than any preliminary AGC value. The DAR-1 “equivalent” annual standard was based solely on the one month standard for gaseous fluoride as it is reasonably protective of both the one month and one week standards.

A DAR-1 “equivalent” one-hour standard was also derived for fluoride compounds as a guideline for assessing compliance with the short-term State Fluoride standards. This “equivalent” standard was assigned to fluorine (CAS: 07782-41-4) and other inorganic contaminants for which the DAR-1 “equivalent” fluoride standard was less than any preliminary SGC value. The DAR-1 “equivalent” one hour standard was based on the 12 hour standard for gaseous fluoride and is protective of both the 24 hour and 12 hour standards.

- DAR-1 “Equivalent” annual Fluoride Standard = 0.8/12 = 0.067 (F) µg/m^3.
- DAR-1 “Equivalent” one-hour Fluoride Standard = 3.7/0.7 = 5.3 (F) µg/m^3.

Attachments:

1. DAR-1 AGC/SGC table (ALPHABETICALLY by Contaminant Name)
2. DAR-1 AGC/SGC table (NUMERICALLY by CAS Number)

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
ACETALDEHYDE	00075-07-0			4500.0	Y	4.5E-01	E	M	U		H	C	I										
ACETAMIDE	00060-35-5			---		5.0E-02	D	M	U		H												
ACETIC ACID	00064-19-7			3700.0	Z	60.0	T																
ACETIC ACID,COBALT	00071-48-7	Co	07440-48-4	---		3.0E-03	D				H							R		Q			
ACETIC ACID,LEAD	00301-04-2	Pb	07439-92-1	---		6.0E-01	s	H			H							R		Q			
ACETIC ANHYDRIDE	00108-24-7			---		50.0	T	M															
ACETOIN	00513-86-0		00078-93-3	13000.0	A	5000.0	A	M										R	R				
ACETONE	00067-64-1			180000.0	Z	28000.0	T	L				I											
ACETONE CYANOHYDRIN	00075-86-5			500.0	Y	---	X	H				C											
ACETONITRILE	00075-05-8			---		60.0	E	M			H	I											
ACETONITRILE,CHLOR0	00107-14-2		00075-05-8	---		60.0	A				H							R					
ACETOPHENONE	00098-86-2			---		120.0	T				H												
ACETYL CHLORIDE	00075-36-5		07647-01-0	2100.0	A	20.0	A	M										R	R				
ACETYLENE TETRABROM	00079-27-6			---		3.3	T																
ACRIDINE	00260-94-6		13049829-2	---		2.0E-02	A		U		H							R					
ACROLEIN	00107-02-8			1.9E-01	D	2.0E-02	E	H			H	C	I										
ACRYLAMIDE	00079-06-1			---		7.7E-04	E	H	U		H	I											
ACRYLIC ACID	00079-10-7			6000.0	D	1.0	E	M			H	I											
ACRYLIC MONOMERS	09081-82-7		00080-62-6	41000.0	A	700.0	A	M										R	R				
ACRYLONITRILE	00107-13-1			---		1.5E-02	E	H	U		H	I											
ACTINOLITE	77536-66-4		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
ADIPIC ACID	00124-04-9			---		12.0	T																
ADIPONITRILE	00111-69-3			---		21.0	T																
ALACHLOR	15972-60-8			---		2.4	T	M				I											
ALDRIN	00309-00-2			---		2.0E-04	E	H	U			I											
ALLYL ALCOHOL	00107-18-6			---		2.8	T	H				I											
ALLYL CHLORIDE	00107-05-1			600.0	Z	1.0	E	M			H	I											
ALLYL GLYCIDYL ETHER	00106-92-3			---		11.0	T					I											
ALLYL PROPYL DISULFI	02179-59-1			---		7.1	T																
ALPHAMETHRIN	67375-30-8		08003-34-7	---		12.0	A	M										R					
ALUMINUM	07429-90-5	Al	Al*SALTALK	---		4.8	A					K						R					
ALUMINUM OXIDE	01344-28-1	Al2		---		45.0	T					I								Q			
ALUMINUM, TRIETHYL	00097-93-8	Al	Al*SALTALK	---		20.0	T	H										R		Q			
AMINODIPHENYL, P-	00092-67-1			---		2.0E-05	*	H			H	A											
AMINOPROPYLTRIETSI,g	00919-30-2		07803-62-5	---		160.0	A	L										R					
AMINOPYRIDINE, 2-	00504-29-0			---		4.8	T																
AMITROLE	00061-82-5			---		4.8E-01	T					I											
AMMONIA	07664-41-7			2400.0	Z	100.0	E	L															
AMMONIUM BISULFATE	07803-63-6			120.0	D	---	X																
AMMONIUM BROMIDE	12124-97-9		12125-02-9	380.0	s	24.0	A	M										R	R				
AMMONIUM CHLORIDE	12125-02-9			380.0	s	24.0	T	M															
AMMONIUM PERFLUOROOC	03825-26-1			---		2.4E-02	T					I											
AMMONIUM PERSULFATE	07727-54-0	S2O8		---		2.8E-01	T													Q			
AMMONIUM SULFAMATE	07773-06-0			---		240.0	T	L															
AMMONIUM SULFATE	07783-20-2			120.0	D	---	X	L															
AMOSITE	12172-73-5		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
AMYL ACETATE, N-	00628-63-7			53000.0	Z	630.0	T																
AMYL ACETATE, SEC-	00626-38-0			53000.0	Z	630.0	T																
AMYL ACETATE, tert-	00625-16-1			53000.0	Z	630.0	T																
AMYL ACETATE,3-	00620-11-1			53000.0	Z	630.0	T																
AMYLMETHYLETHER,tert	00994-05-8			---		200.0	T																
ANILINE	00062-53-3			---		6.0E-01	D	H	U		H	I											
ANISIDINE	29191-52-4			---		1.2	T	M															

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                                                                                                -----codes-----
                                   TOXIC   REFERENCED         SGC                AGC                     111111
    CHEMICAL NAME     CAS NUMBER  ELEMENT   COMPOUND         ug/m3     W        ug/m3       W T 123456789012345

ANISIDINE, O-         00090-04-0                               ---              1.2         T M   HI
ANISIDINE, P-         00104-94-9                               ---              1.2         T M    I
ANTHOPHYLLITE         77536-67-5           01332-21-4          ---              1.6E-05     A H U HAI    R
ANTHRACENE            00120-12-7           13049829-2          ---              2.0E-02     A H U H      R
ANTIMONATE,HEXAFL,Na  16925-25-0   Sb      07440-36-0          ---              2.5         T     H      R Q
ANTIMONY              07440-36-0   Sb                          ---              1.2         T M   H
ANTIMONY OXIDE        01314-60-9   Sb      07440-36-0          ---              1.3         T     H      R Q
ANTIMONY TRICHLORIDE  10025-91-9   Sb      07440-36-0          ---              2.2         T     H      R Q
ANTIMONY TRIOXIDE     01309-64-4   Sb2                         ---              2.4E-01     E M   HB       Q
ANTIMONY TRISULFIDE   01345-04-6   Sb2     07440-36-0          ---              1.7         T     H      R Q
ANTU                  00086-88-4                               ---              7.1E-01     T      I
AQUA AMMONIA          01336-21-6           07664-41-7       2400.0     A      100.0         A L          RR
ARAMITE               00140-57-8                               ---              1.4E-01     E   U
ARSENIC               07440-38-2   As                          ---              2.3E-04     E H U HA
ARSENIC ACID          01327-52-2   As      07440-38-2          ---              4.4E-04     E H U H      R Q
ARSENIC ACID          07778-39-4   As      07440-38-2          ---              4.4E-04     E H U HA     R Q
ARSENIC PENTOXIDE     01303-28-2   As2     07440-38-2          ---              3.6E-04     E H U HA     R Q
ARSENIC TRIOXIDE      01327-53-3   As4     07440-38-2          ---              3.1E-04     E H U HA     R Q
ARSENOUS ACID         13464-58-9   As                          ---              4.7E-02     T H   HA       Q
ARSENOUS ACID,TRIMET  03141-12-6   As      07440-38-2          ---              6.5E-04     E   U H      R Q
ARSENOUS TRICHLORIDE  07784-34-1   As      07440-38-2          ---              5.6E-04     E H U H      R Q
ARSENOUS TRIFLUORIDE  07784-35-2   As      07440-38-2          ---              4.1E-04     E H U H      R Q
ARSENOZO III          01668-00-4   As2     As*ORGANIC          ---              1.2E-03     E H U H      R Q
ARSINE                07784-42-1                             160.0     D        5.0E-02     E H   H
ASBESTOS              01332-21-4                               ---              1.6E-05     D H U HAI
ASPHALT               08052-42-4                               ---              1.2         T      I
ATRAZINE              01912-24-9                               ---             12.0         T      I
AURAMINE              02465-27-2                               ---              2.0E-05     * H
AZINPHOS-METHYL       00086-50-0                               ---              4.8E-01     T      I
AZOBENZENE            00103-33-3                               ---              3.2E-02     E   U
B A P                 00050-32-8                               ---              9.1E-04     D H U HBI
BARIUM                07440-39-3   Ba                          ---              1.2         T M    I
BARIUM CHROMATE       10294-40-3   Cr      18540-29-9          ---              9.8E-05     H H U H      R Q
BARIUM CYANIDE        00542-62-1   C2N2    00057-12-5        380.0     s       45.0         S H   H      RRQQ
BARIUM LEAD SULFATE   42579-89-5   Pb      07439-92-1          ---              8.1E-01     s H   H      R Q
BARIUM SULFATE        07727-43-7                               ---             24.0         T M
BE ETHYL DIAM CL      13497-34-2   Be      07440-41-7         22.0     Z        9.3E-03     E H U H      RRQQ
BENOMYL               17804-35-2                               ---             24.0         T      I
BENZ METHBIS ISOCYAN  26447-40-5           00101-68-8         14.0     A        6.0E-01     A H          RR
BENZENE               00071-43-2                            1300.0     D        1.3E-01     E H U HA
BENZENEARSONIC ACID   00098-05-5   As      07440-38-2          ---              6.3E-04     E H U H      R Q
BENZIDINE             00092-87-5                               ---              1.5E-05     E H U HAI
BENZO(A)ANTHRACENE    00056-55-3           13049829-2          ---              2.0E-02     A H U HBI    R
BENZOTRICHLORIDE      00098-07-7                              80.0     Y        ---         X     HCB
BENZOYL CHLORIDE      00098-88-4                             280.0     Y        ---         X      CI
BENZOYL PEROXIDE      00094-36-0                               ---             12.0         T      I
BENZYL ACETATE        00140-11-4                               ---            150.0         T      I
BENZYL ALCOHOL        00100-51-6                            1300.0     D      350.0         D M
BENZYL CHLORIDE       00100-44-7                             240.0     D        2.0E-02     D H U HI
BERULLIUM ZINC SILIC  39413-47-3   Be      07440-41-7         18.0     Z        7.7E-03     E H U HB     RRQQ
BERYLLIUM             07440-41-7   Be                          1.0     Z        4.2E-04     E H U HA
BERYLLIUM FLUORIDE    07787-49-7   Be      07440-41-7          5.2     Z        2.2E-03     E H U H      RRQQ
BERYLLIUM OXIDE       01304-56-9   Be      07440-41-7          2.8     Z        1.2E-03     E H U H      RRQQ
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									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
BERYLLIUM SULFATE	13510-49-1	Be	07440-41-7	12.0	Z	4.9E-03	E	H	U		H							R	R	Q	Q		
BIFENTHRIN	82657-04-3		08003-34-7	---		12.0	A	M										R					
BIPHENYL	00092-52-4			---		3.1	T	M			H												
BISMUTH TELLURIDE	01304-82-1		Bi2Te3*und	---		24.0	A					K						R					
BORATE	10043-35-3			---		4.8	T																
BORATES,ANHYDROUS	01330-43-4			---		4.8	T																
BORATES,DECAHYDRATE	01303-96-4			---		4.8	T																
BORATES,PENTAHYDRATE	12179-04-3			---		4.8	T																
BORON OXIDE	01303-86-2			---		24.0	T																
BORON TRIBROMIDE	10294-33-4			380.0	s	---	X					C											
BORON TRIFLUORIDE	07637-07-2	F3	*FLUORIDE*	6.3	s	8.0E-02	s					C						R	R	Q	Q		
BROMACIL	00314-40-9			---		24.0	T					I											
BROMADIOLONE	28772-56-7			---		2.0E-05	*	H															
BROMINE	07726-95-6			130.0	Z	1.6	T	M															
BROMINE PENTAFLUORID	07789-30-2	F5	*FLUORIDE*	9.8	s	1.2E-01	s											R	R	Q	Q		
BROMODICHLOROMETHANE	00075-27-4			---		2.0E-02	D	H	U														
BROMOFORM	00075-25-2			---		9.1E-01	E	M	U		H	I											
BROMOPROPANE, 1-	00106-94-5			---		35.0	D	M															
BUTADIENE POLYMER	69102-90-5		00106-99-0	---		3.3E-02	A	H	U									R					
BUTADIENE, 1,3	00106-99-0			---		3.3E-02	E	H	U		H	B											
BUTANE	00106-97-8			---		57000.0	T	L															
BUTANOL	35296-72-1		00071-36-3	---		1500.0	A	L										R					
BUTANOL,SEC	00078-92-2			---		710.0	T																
BUTOXYETHANOL, 2-	00111-76-2			14000.0	D	13000.0	E	M			H	I											
BUTOXYETHYL ACETATE	00112-07-2			---		310.0	T	M			H	I											
BUTYL ACETATE	00123-86-4			95000.0	Z	17000.0	T	L															
BUTYL ACETATE, SEC-	00105-46-4			---		2300.0	T																
BUTYL ACETATE, TERT-	00540-88-5			---		2300.0	T																
BUTYL ACRYLATE, N-	00141-32-2			---		26.0	T					I											
BUTYL ALCOHOL, N-	00071-36-3			---		1500.0	T	L															
BUTYL ALCOHOL, TERT	00075-65-0			---		720.0	T					I											
BUTYL BENZYL PHTHALA	00085-68-7		00084-66-2	---		12.0	A	M										R					
BUTYL CARBITOL	00112-34-5		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
BUTYL CARBITOL ACETA	00124-17-4		00110-80-5	840.0	A	450.0	A	M			H							R	R			M	M
BUTYL CHROMATE, TERT	01189-85-1	Cr	18540-29-9	23.0	Y	8.9E-05	H	H	U		H	C						R		Q	Q		
BUTYL GLYCIDYL ETHER	02426-08-6			---		38.0	T																
BUTYL LACTATE, N-	00138-22-7			---		71.0	T																
BUTYL MERCAPTAN	00109-79-5			---		4.3	T	M															
BUTYL PHTHALATE GLYC	00085-70-1		00084-66-2	---		12.0	A	M										R					
BUTYLAMINE, N-	00109-73-9			1500.0	Y	---	X	M				C											
BUTYLPHENOL,O-SEC	00089-72-5			---		74.0	T																
BUTYLTOLUENE,P-TERT	00098-51-1			---		15.0	T																
BUTYROLACTONE,gamma-	00096-48-0		00057-57-8	---		3.6	A	M										R					
CADMIUM	07440-43-9	Cd		---		2.4E-04	D	H	U		H	B											
CADMIUM CHLORIDE	10108-64-2	Cd	07440-43-9	---		3.9E-04	D	H	U		H							R		Q			
CADMIUM CHLORIDE HYD	07790-78-5	Cd	07440-43-9	---		3.9E-04	D	H	U		H							R		Q			
CADMIUM CYANIDE	00542-83-6	C2N2	00057-12-5	380.0	s	3.5E-04	D	H	U		H							R	R	Q	Q		
CADMIUM IODIDE	07790-80-9	Cd	07440-43-9	---		7.8E-04	D	H	U		H							R		Q			
CADMIUM NITRATE	10325-94-7	Cd	07440-43-9	---		5.1E-04	D	H	U		H							R		Q			
CADMIUM NITRATE TET	10022-68-1	Cd	07440-43-9	---		5.9E-04	D		U		H							R		Q			
CADMIUM OXIDE	01306-19-0	Cd	07440-43-9	---		2.7E-04	D	H	U		H							R		Q			
CADMIUM SELENIDE	01306-24-7	Cd	07440-43-9	---		4.1E-04	D	H	U		H							R		Q			
CADMIUM STEARATE	02223-93-0	Cd2	07440-43-9	---		8.5E-04	D	H	U		H							R		Q			

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
CADMIUM SULFATE	10124-36-4	Cd	07440-43-9	---		4.5E-04	D	H	U		H							R		Q			
CADMIUM SULFIDE	01306-23-6	Cd	07440-43-9	---		3.1E-04	D	H	U		H							R		Q			
CADMIUM ZINC SULFATE	12442-27-2	Cd	07440-43-9	---		4.5E-04	D	H	U		H							R		Q			
CADMIUMMERCURYSULFID	01345-09-1	Cd	07440-43-9	---		7.4E-04	D	H	U		H							R		Q			
CALCIUM ARSENATE	07778-44-1	As2	07440-38-2	---		6.3E-04	E	H	U		H							R		Q			
CALCIUM CHROMATE	13765-19-0	Cr	18540-29-9	---		6.1E-05	H	H	U		H	B						R		Q			
CALCIUM CYANAMIDE	00156-62-7			---		1.2	T				H	I											
CALCIUM CYANIDE	00592-01-8	C2N2		380.0	s	---	X	H			H	C									Q		
CALCIUM DIHYDROXIDE	01305-62-0			---		12.0	T																
CALCIUM OXIDE	01305-78-8			---		4.8	T																
CALCIUM SILICATE	01344-95-2			---		24.0	T					I											
CALCIUM SULFATE	07778-18-9			---		24.0	T																
CAMPHOR	00076-22-2			1900.0	Z	29.0	T					I											
CAPROLACTAM	00105-60-2			---		12.0	T					I											
CAPTAFOL	02425-06-1			---		2.4E-01	T					I											
CAPTAN	00133-06-2			---		12.0	T				H	I											
CARBARYL	00063-25-2			---		12.0	T				H	I											
CARBENDAZIM	10605-21-7		01563-66-2	---		2.4E-01	A	M										R					
CARBITOL CELLOSOLVE	00111-90-0		00110-80-5	550.0	A	300.0	A	M			H							R	R			M	M
CARBOFURAN	01563-66-2			---		2.4E-01	T	M				I											
CARBON BLACK	01333-86-4			---		8.3	T	M				I											
CARBON DIOXIDE	00124-38-9			5400000.0	Z	21000.0	T																
CARBON DISULFIDE	00075-15-0			6200.0	D	700.0	E	M			H	I											
CARBON MONOXIDE	00630-08-0			14000.0	s	---	X																
CARBON TETRABROMIDE	00558-13-4			410.0	Z	3.3	T																
CARBON TETRACHLORIDE	00056-23-5			1900.0	D	6.7E-02	E	H	U		H	B											
CARBONIC ACID Ni SLT	03333-67-3	Ni	07440-02-0	11.0	D	7.5E-03	E	H	U		H							R	R	Q	Q		
CARBONIC ACID,MnSALT	00598-62-9		07439-96-5	---		5.0E-02	A				H							R					
CARBONYL FLUORIDE	00353-50-4	F2	*FLUORIDE*	9.2	s	1.2E-01	s											R	R	Q	Q		
CARBONYL SULFIDE	00463-58-1			250.0	D	28.0	D	M			H												
CARENE, 3-	13466-78-9			---		270.0	T					I											
CATECHOL	00120-80-9		00108-95-2	5800.0	A	55.0	T				H	I							R				
CD DIETHDITHIOCARB	14239-68-0	Cd	07440-43-9	---		8.7E-04	D	H	U		H							R		Q			
CELLULOSE	09004-34-6			---		24.0	T																
CESIUM HYDROXIDE	21351-79-1			---		4.8	T																
CHLORBENZMALONONIT,O	02698-41-1			39.0	Y	---	X					C	I										
CHLORDANE	00057-74-9			---		1.2	T	H			H	I											
CHLORDANE, TECHNICAL	12789-03-6			---		1.0E-02	E	H	U														
CHLORDECONE	00143-50-0			---		2.0E-05	*	H															
CHLORINATED DIPH OX	31242-93-0			---		1.2	T																
CHLORINE	07782-50-5			290.0	Z	2.0E-01	D	M			H	I											
CHLORINE DIOXIDE	10049-04-4			83.0	Z	2.0E-01	E	M															
CHLORINE TRIFLUORIDE	07790-91-2	F3	*FLUORIDE*	8.6	s	1.1E-01	s					C						R	R	Q	Q		
CHLORO DIFLUOROETHAN	00075-68-3			---		50000.0	E	L															
CHLORO NITROANILINE	00121-87-9		00100-01-6	---		7.1	A	M										R					
CHLORO NITROPROPANE	00600-25-9			---		24.0	T																
CHLORO-1-PROPANOL,2-	00078-89-7			---		9.5	T					I											
CHLORO-2-PROPANOL,1-	00127-00-4			---		9.5	T					I											
CHLOROACETALDEHYDE	00107-20-0			320.0	Y	---	X					C											
CHLOROACETIC ACID	00079-11-8			30.0	D	7.0	D	H			H	I											
CHLOROACETONE	00078-95-5			380.0	Y	---	X					C											
CHLOROACETOPHENONE,2	00532-27-4			---		3.0E-02	E	M			H	I											
CHLOROACETYLCHLORIDE	00079-04-9			69.0	Z	5.5E-01	T																

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CHLOROANILINE, P-	00106-47-8		00062-53-3	---		8.2E-01	A	M	U									R				M	
CHLOROBROMOMETHAN	00074-97-5			---		2500.0	T																
CHLORODIFLUOROMETHAN	00075-45-6			---		50000.0	E					I											
CHLOROFORM	00067-66-3			150.0	D	4.3E-02	E	M	U		H	I											
CHLOROMETHANE	00074-87-3			22000.0	D	90.0	E	M			H	I											
CHLOROMETHYL ETH,BIS	00542-88-1			---		1.6E-05	E	H	U		H	A											
CHLORONITROBENZENE,P	00100-00-5			---		1.5	T	M				I											
CHLOROPENTAFLUOROETH	00076-15-3			---		15000.0	T																
CHLOROPICRIN	00076-06-2			29.0	D	4.0E-01	D					I											
CHLOROPRENE, B-	00126-99-8			---		86.0	T				H												
CHLOROPROPIONICACI,2	00598-78-7			---		1.0	T																
CHLOROSTYRENE, O-	02039-87-4			43000.0	Z	670.0	T																
CHLOROTOLUENE,ORTHO	00095-49-8			---		620.0	T																
CHLORPYRIFOS	02921-88-2			---		2.4E-01	T					I											
CHROMATE	13907-45-4	Cr	18540-29-9	---		4.5E-05	H	H	U		H							R		Q			
CHROME TANNED COWHID	68131-98-6		18540-29-9	---		2.0E-05	A	H	U		H							R					
CHROMIC (VI) ACID	07738-94-5	Cr	18540-29-9	---		4.5E-05	H	H	U		H	A						R		Q			
CHROMIC ACID	11115-74-5	Cr	18540-29-9	---		4.5E-05	H	H	U		H							R		Q			
CHROMIC ACID	13530-68-2	Cr2	18540-29-9	---		4.2E-05	H	H	U		H							R		Q			
CHROMIC ACID, DIAMMO	07789-09-5	Cr2	18540-29-9	---		4.8E-05	H	H	U		H							R		Q			
CHROMIC ACID, DILITH	14307-35-8	Cr	18540-29-9	---		5.1E-05	H	H	U		H							R		Q			
CHROMIC ACID, DISODI	07789-12-0	Cr2	18540-29-9	---		5.2E-05	H	H	U		H							R		Q			
CHROMIC ACID,Na SALT	07775-11-3	Cr	18540-29-9	---		6.3E-05	H	H	U		H							R		Q			
CHROMIUM	07440-47-3	Cr	16065-83-1	---		1.2	T	H			H	I											
CHROMIUM CHLORIDE	10025-73-7	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM CHLORIDE	10060-12-5	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM DIOXIDE	12018-01-8	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM HYDROXIDE	01308-14-1	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM III	16065-83-1	Cr		---		45.0	S	M			H	I											
CHROMIUM K SULFATE	10141-00-1	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM OXIDE	01308-38-9	Cr2	16065-83-1	---		45.0	S	M			H							R		Q			
CHROMIUM OXIDE	01333-82-0	Cr	18540-29-9	---		3.8E-05	H	H	U		H							R		Q			
CHROMIUM OXIDE PYRID	20492-50-6	Cr	18540-29-9	---		9.9E-05	H		U		H							R		Q			
CHROMIUM OXYCHLORIDE	14977-61-8	Cr	18540-29-9	---		6.0E-05	H	H	U		H							R		Q			
CHROMIUM SULFATE	10101-53-8	Cr2	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM ZINC OXIDE	12018-19-8	Cr	18540-29-9	---		9.0E-05	H		U		H							R		Q			
CHROMIUM ZINC OXIDE	50922-29-7	Cr2	18540-29-9	---		4.5E-05	H	H	U		H							R		Q			
CHROMIUM(VI)	18540-29-9	Cr		---		2.0E-05	H	H	U		H	A	K										
CHROMYL FLUORIDE	07788-96-7	Cr	18540-29-9	---		4.7E-05	H	H	U		H							R		Q			
CHRYSENE	00218-01-9		13049829-2	---		2.0E-02	A	H	U		H	I						R					
CHRYSOTILE	12001-29-5		01332-21-4	---		1.6E-05	A	H	U		H							R					
CHRYSOTILE	13220732-0		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
CLOPIDOL	02971-90-6			---		24.0	T					I											
COAL TAR PITCH VOLAT	65996-93-2			---		4.8E-01	T					A											
COBALT	07440-48-4	Co		---		1.0E-03	D	M			H	I											
COBALT ALUMINATE	01345-16-0	Co	07440-48-4	---		3.0E-03	D				H							R		Q			
COBALT CARBONATE	00513-79-1	Co	07440-48-4	---		2.1E-03	D				H							R		Q			
COBALT CARBONYL	10210-68-1	Co2	07440-48-4	---		2.9E-03	D				H							R		Q			
COBALT CHLORINE	07646-79-9	Co	07440-48-4	---		2.2E-03	D				H							R		Q			
COBALT COMPLEX	53108-50-2	Co	07440-48-4	---		4.2E-03	D	M			H							R		Q			
COBALT HYDROCARBONYL	16842-03-8	Co	07440-48-4	---		2.9E-03	D				H							R		Q			
COBALT NAPTHA	61789-51-3		07440-48-4	---		1.0E-03	A	M			H							R					
COBALT OXIDE	01307-96-6	Co	07440-48-4	---		1.3E-03	D	M			H							R		Q			

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
COBALT SULFATE	10124-43-3	Co	07440-48-4	---		2.7E-03	D				H							R		Q			
COBALT SULFIDE	01317-42-6	Co	07440-48-4	---		1.5E-03	D	M			H							R		Q			
COBALT TRIFLUORIDE	10026-18-3	Co	07440-48-4	---		2.0E-03	D				H							R		Q			
COKE	65996-77-2		08007-45-2	---		1.6E-03	A		U		H							R					
COKE OVEN EMISSIONS	08007-45-2			---		1.6E-03	E	H	U		H												
COKE(PETROLEUM)	64741-79-3		08007-45-2	---		1.6E-03	A		U		H							R					
COPPER	07440-50-8	Cu	Cu*FUME***	100.0	D	2.0E-02	D	M				K											
COPPER CYANIDE	00544-92-3	CN	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
COUMAPHOS	00056-72-4			---		1.2E-01	T					I											
CRESOL	01319-77-3			---		52.0	T	M			H												
CRESOL, M-	00108-39-4			---		52.0	T	M			H												
CRESOL, O-	00095-48-7			---		52.0	T	M			H												
CRESOL, P-	00106-44-5			---		52.0	T	M			H												
CROCIDOLITE	12001-28-4		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
CROTONALDEHYDE	04170-30-3			86.0	Y	---	X					C	I										
CROTONALDEHYDE,trans	00123-73-9		04170-30-3	86.0	A	---	X												R				
CRUFORMATE	00299-86-5			---		12.0	T					I											
CUMENE	00098-82-8			---		400.0	E				H												
CYANAMIDE	00420-04-2			---		4.8	T	M															
CYANIC ACID	00420-05-3	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
CYANIDE	00057-12-5	CN		380.0	s	45.0	S	H			H	C											
CYANOGEN	00460-19-5		00074-90-8	520.0	A	3.0	D	M											R				
CYANOGEN BROMIDE	00506-68-3		00074-90-8	75.0	D	3.0	A	M			H							R					
CYANOGEN CHLORIDE	00506-77-4		00074-90-8	75.0	Y	3.0	A	M			H	C						R					
CYCLIC DEXADIENE	00080-56-8			---		270.0	T																
CYCLOHEXANE	00110-82-7			---		6000.0	E	L															
CYCLOHEXANOL	00108-93-0			---		490.0	T																
CYCLOHEXANONE	00108-94-1			20000.0	Z	190.0	T	M				I											
CYCLOHEXENE MIXTURE	00110-83-8			---		2400.0	T																
CYCLOHEXYLAMINE	00108-91-8			---		98.0	T					I											
CYCLONITE	00121-82-4			---		1.2	T					I											
CYCLOPENTADIENE, 1,3	00542-92-7			---		480.0	T	M															
CYCLOPENTANE	00287-92-3			---		4100.0	T																
CYHEXATIN	13121-70-5			---		12.0	T					I											
CYPERMETHRIN	52315-07-8		08003-34-7	---		12.0	A	M										R					
Cd CYCLOHEXANE BUTY	55700-14-6	Cd	07440-43-9	---		6.0E-04	D	H	U		H							R		Q			
DDE	00072-55-9		00050-29-3	---		1.0E-02	A		U		H							R					
DDT	00050-29-3			---		1.0E-02	E	H	U			I											
DECABORANE	17702-41-9			75.0	Z	6.0E-01	T																
DECAMETHYLCYCLOPENTA	00541-02-6		00556-67-2	---		360.0	A	L										R					
DECANE	00124-18-5		00110-54-3	---		700.0	A	M										R					
DEMETON	08065-48-3			---		1.2E-01	T					I											
DEMETON-S-METHYL	00919-86-8			---		1.2E-01	T					I											
DEUTERIUM SULFATE	13813-19-9		07664-93-9	120.0	A	1.0	A	M										R	R				
DI(ME)TETRA(MEO)DISI	18186-97-5		00681-84-5	---		14.0	A	M										R					
DIACETONE ALCOHOL	00123-42-2			---		570.0	T	M															
DIALKYL PHTHALATES	39393-37-8		00084-66-2	---		12.0	A	M										R					
DIALLYLAMALEATE	00999-21-3		00108-31-6	---		7.0E-01	A	M										R					
DIAZINON	00333-41-5			---		2.4E-02	T					I											
DIAZOMETHANE	00334-88-3			---		8.1E-01	T	M			H	B											
DIBENZ(a,h)ANTHRACEN	00053-70-3		13049829-2	---		2.0E-02	A		U									R					
DIBENZOFURANS	00132-64-9		13049829-2	---		2.0E-02	A		U		H							R					
DIBORANE	19287-45-7			---		2.6E-01	T																

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CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DIBROMOCHLOROPROPANE	00096-12-8			---		2.0E-01	E				H												
DIBROMOETHANE, 1,2-	00106-93-4			---		1.7E-03	E	H	U		H	I											
DIBUTYL CARBITOL	00112-73-2		00110-80-5	900.0	A	480.0	A	M			H							R	R			M	M
DIBUTYL PHENYL PHOSP	02528-36-1			---		8.3	T																
DIBUTYL PHOSPHATE	00107-66-4			1700.0	Z	20.0	T																
DIBUTYL PHTHALATE	00084-74-2			---		12.0	T				H												
DIBUTYLAMINOETOL,2-N	00102-81-8			---		8.3	T																
DICHLORDIMEHYDANTOIN	00118-52-5			40.0	Z	4.8E-01	T																
DICHLORO-2-BUTENE,14	00764-41-0			---		6.0E-02	T					B											
DICHLOROACETIC ACID	00079-43-6			---		6.3	T					I											
DICHLOROACETYLENE	07572-29-4			39.0	Y	---	X					C	I										
DICHLOROANILINE,2,5-	00095-82-9		00062-53-3	---		6.0E-01	A	M	U									R					
DICHLOROBENZENE, O-	00095-50-1			30000.0	Z	360.0	T	M				I											
DICHLOROBENZENE, m-	00541-73-1		00095-50-1	30000.0	A	360.0	A	M										R	R				
DICHLOROBENZENE,P-	00106-46-7			---		9.0E-02	D	M	U		H	I											
DICHLOROBENZIDINE33'	00091-94-1			---		3.0E-03	D	H			H												
DICHLORODIFLUOROMETH	00075-71-8			---		12000.0	T					I											
DICHLOROETHANE,1,1	00075-34-3			---		6.3E-01	D	L	U		H	I											
DICHLOROETHANE,1,2	00107-06-2			---		3.8E-02	E	M	U		H	I											
DICHLOROETHYL ETHER	00111-44-4			5800.0	Z	3.0E-03	E		U		H	I											
DICHLOROETHYLENE, 12	00540-59-0			---		63.0	D	M															
DICHLOROETHYLENE,cis	00156-59-2			---		63.0	D	M															
DICHLOROETHYLENEtran	00156-60-5			---		63.0	D	M															
DICHLOROFLUOROMETHAN	00075-43-4			---		100.0	T																
DICHLOROMETHANE	00075-09-2			14000.0	D	2.1	E	M	U		H	I											
DICHLORONITROETHANE	00594-72-9			---		29.0	T																
DICHLOROPROPANOL,1,3	00096-23-1		00056-23-5	1900.0	A	6.7E-02	A		U									R	R				
DICHLOROPROPENE, 1,3	00542-75-6			---		2.5E-01	E		U		H	I											
DICHLOROPROPIONICACI	00075-99-0			---		12.0	T					I											
DICHLORPHENOXY,2,4	00094-75-7			---		24.0	T				H	I											
DICHLORTETRAFLUORETH	00076-14-2			---		17000.0	T					I											
DICHLORVOS	00062-73-7			---		5.0E-01	E	M			H	I											
DICROTOPHOS	00141-66-2			---		1.2E-01	T					I											
DICYCLOPENTADIENE	00077-73-6			---		64.0	T																
DICYCPENTDIENYL IRON	00102-54-5			---		24.0	T																
DIELDRIN	00060-57-1			---		2.2E-04	E	H	U			I											
DIETHANOLAMINE	00111-42-2			---		3.0	D				H												
DIETHYL CARBITOL	00112-36-7		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
DIETHYL KETONE	00096-22-0			110000.0	Z	1700.0	T																
DIETHYL PHTHALATE	00084-66-2			---		12.0	T	M				I											
DIETHYL SULFATE	00064-67-5		00077-78-1	---		1.2	A	H			H							R					
DIETHYLAMINE	00109-89-7			4500.0	Z	36.0	T					I											
DIETHYLAMINOETHANOL	00100-37-8			---		23.0	T																
DIETHYLEN GLYCOL ADP	58984-19-3		00110-80-5	370.0	A	200.0	A				H							R	R				
DIETHYLENE GLY DIETH	00111-96-6		00109-86-4	160.0	A	35.0	A	M			H							R	R			M	M
DIETHYLENE GLY MET	00629-38-9		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
DIETHYLENE TRIAMINE	00111-40-0			---		10.0	T	M															
DIFLUORDIBROMOMETHAN	00075-61-6			---		2000.0	T																
DIFLUOROETHANE	00075-37-6			---		40000.0	E	L															
DIGLYCID AMINO...	05026-74-4		00122-60-1	---		1.4	A	M										R					
DIGLYCIDYL ETHER	02238-07-5			---		1.2E-01	T					I											
DIISOBUTYL KETONE	00108-83-8			---		350.0	T																
DIISODECYL PHTHALATE	26761-40-0		00084-66-2	---		12.0	A	M										R					

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	codes 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DIISOOCTYLPHTHALATE	27554-26-3		00084-66-2	---		12.0	A	M										R					
DIISOPROPYLAMINE	00108-18-9			---		50.0	T																
DIMETHYL AMINE	00124-40-3			2800.0	Z	22.0	T					I											
DIMETHYL DISULFIDE	00624-92-0		07783-06-4	14.0	A	4.8	T	M											R				
DIMETHYL ETHER	00115-10-6		00060-29-7	150000.0	A	29000.0	A	L										R	R				
DIMETHYL HYDRAZINE	00057-14-7			---		6.0E-02	T	M			H	I											
DIMETHYL PHTHALATE	00131-11-3			---		12.0	T				H												
DIMETHYL SULFATE	00077-78-1			---		1.2	T	H			H	I											
DIMETHYL SULFIDE	00075-18-3		07783-06-4	14.0	A	60.0	T	M											R				
DIMETHYLACETAMIDE	00127-19-5			---		86.0	T	M				I											
DIMETHYLAMINO ETH,2-	00108-01-0			---		26.0	D	M															
DIMETHYLAMINOAZOBENZ	00060-11-7			---		8.0E-04	D	M	U		H												
DIMETHYLANILINE	00121-69-7			5000.0	Z	60.0	T	M			H	I											
DIMETHYLBUTANE, 2,2-	00075-83-2			350000.0	Z	4200.0	T	M															
DIMETHYLBUTANE, 2,3-	00079-29-8			350000.0	Z	4200.0	T																
DIMETHYLCARBMYLCHLOR	00079-44-7			---		4.8E-02	T	M			H	B											
DIMETHYLDICHLOROSILA	00075-78-5		07803-62-5	---		16.0	A	M										R					
DIMETHYLFORMAMIDE	00068-12-2			---		30.0	E	M			H	I											
DIMETHYLFURAN,2,5-	00625-86-5		00098-00-0	6000.0	A	95.0	A	M										R	R				
DIMETHYLPROPANE	00463-82-1			---		4200.0	T																
DIMTHYLETHOXYSILANE	14857-34-2			380.0	s	5.0	T																
DINITRO-O-CRESOL	00534-52-1			---		4.8E-01	T				H												
DINITRO-O-TOLUAMIDE	00148-01-6			---		2.4	T					I											
DINITROBENZENE	00100-25-4			---		2.4	T																
DINITROBENZENE	00528-29-0			---		2.4	T																
DINITROBENZENE, M-	00099-65-0			---		2.4	T	M															
DINITROPHENOL, 2,4-	00051-28-5			---		2.0E-05	*	H			H												
DINITROTOLUENE	25321-14-6			---		1.1E-02	D	H	U		H	I											
DINITROTOLUENE,2,4-	00121-14-2			---		1.1E-02	D	H	U		H												
DIOCTYL ADIPATE	00103-23-1		00084-66-2	---		12.0	A	M										R					
DIOCTYL PHTHALATE	00117-81-7			---		4.2E-01	D	M	U		H	I											
DIOXANE,1,4	00123-91-1			3000.0	D	1.3E-01	D	M	U		H	I											
DIOXATHION	00078-34-2			---		2.4E-01	T					I											
DIOXOLANE	00646-06-0			---		1500.0	T	L															
DIPHENYL HYDRAZINE	00122-66-7		00057-14-7	---		4.5E-03	E	H	U		H												
DIPHENYL MERCURY	00587-85-9	Hg	Hg*ALKYL**	---		4.2E-02	T	H			H							R		Q			
DIPHENYLAMINE	00122-39-4			---		24.0	T					I											
DIPROPGLYCOLMETHETHR	34590-94-8			91000.0	Z	1400.0	T																
DIPROPYL KETONE	00123-19-3			---		550.0	T																
DIQUAT	02764-72-9		DIQUAT*RES	---		2.4E-01	A					K	I					R					
DIQUAT DIBROMIDE	00085-00-7		DIQUAT*RES	---		2.4E-01	A					K						R					
DIQUATDIBROMIDEMONOH	06385-62-2		DIQUAT*RES	---		2.4E-01	A					K						R					
DISTILL.HYDR0 LIGHT	64742-47-8			---		480.0	T					I											
DISULFIRAM	00097-77-8			---		4.8	T					I											
DISULFOTON	00298-04-4			---		1.2E-01	T					I											
DITERT BUTLY-P-CRES	00128-37-0			---		48.0	T	L				I											
DITERTBUTYPHENOL,2,6	00128-39-2		00108-95-2	5800.0	A	45.0	A											R	R				
DIURON	00330-54-1			---		24.0	T					I											
DIVINYL BENZENE, MIX	01321-74-0			---		130.0	T																
DIVINYL BENZENE,1,3	00108-57-6		01321-74-0	---		130.0	A											R					
DMAEE	03033-62-3			98.0	Z	7.9E-01	T																
DODECYL MERCAPTAN	00112-55-0			---		1.9	T																
EMERY	01302-74-5			---		24.0	T																

		TOXIC	REFERENCED	SGC		AGC			-----codes-----														
																		1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
ENDOSULFAN	00115-29-7			---		2.4E-01	T					I											
ENDRIN	00072-20-8			---		2.4E-01	T					I											
ENFLURANE	13838-16-9			---		1300.0	T					I											
EPICHLOROHYDRIN	00106-89-8			1300.0	D	8.3E-01	E	M	U		H	I											
EPN	02104-64-5			---		2.4E-01	T					I											
EPOXYBUTANE, 1,2	00106-88-7			3000.0	D	20.0	E	M			H												
ET HEXYLMETHACRYLATE	00688-84-6		00096-33-3	---		17.0	A	M										R					
ETBE	00637-92-3			---		45.0	S																
ETHANE	00074-84-0			---		2900.0	T					G											
ETHANOL	00064-17-5			---		45000.0	T	L				I											
ETHANOL,2-(PHENYLMET	00622-08-2		00110-80-5	620.0	A	340.0	A				H							R	R			M	M
ETHANOL,2-PHENOXY-	00122-99-6		00110-80-5	570.0	A	310.0	A	M			H							R	R			M	M
ETHANOLAMINE	00141-43-5			1500.0	Z	18.0	T	M															
ETHION	00563-12-2			---		1.2E-01	T					I											
ETHOXYETHYL ACETATE2	00111-15-9			140.0	D	64.0	T	M			H												
ETHOXYLATED ALCOHOLS	09002-92-0		00110-80-5	1500.0	A	800.0	A	M										R	R			M	M
ETHOXYLATED ALCOHOLS	74432-13-6		00110-80-5	1500.0	A	800.0	A	M										R	R			M	M
ETHOXYPROPANOL,3-	00111-35-3		00107-98-2	55000.0	A	2000.0	A	M										R	R				
ETHYL 4-OXAHEXANOATE	00763-69-9		00111-15-9	140.0	A	64.0	A	M										R	R				
ETHYL ACETATE	00141-78-6			---		3400.0	T	M															
ETHYL ACRYLATE	00140-88-5			6100.0	Z	48.0	T				H	I											
ETHYL AMINE	00075-04-7			2800.0	Z	22.0	T																
ETHYL AMYL KETONE	00106-68-3		00541-85-5	---		120.0	A											R					
ETHYL AMYL KETONE	00541-85-5			---		120.0	T																
ETHYL BENZENE	00100-41-4			54000.0	Z	1000.0	E	M			H	I											
ETHYL BROMIDE	00074-96-4			---		52.0	T					I											
ETHYL BUTYL KETONE	00106-35-4			35000.0	Z	560.0	T																
ETHYL CHLORIDE	00075-00-3			---		10000.0	E	L			H	I											
ETHYL CYANOACRYLATE	07085-85-0			---		2.4	T																
ETHYL ETHER	00060-29-7			150000.0	Z	29000.0	T	L															
ETHYL FORMATE	00109-94-4			---		720.0	T																
ETHYL HEXANOIC	00149-57-5			---		12.0	T					I											
ETHYL MERCAPTAN	00075-08-1			---		3.1	T	M															
ETHYL MERCURIC PHOSP	02235-25-8	Hg	Hg*ALKYL**	---		3.9E-02	T	H			H							R		Q			
ETHYL SILICATE	00078-10-4			---		200.0	T																
ETHYLENE	00074-85-1			---		550.0	T					G	I										
ETHYLENE CHLOROHYDRN	00107-07-3			330.0	Y	---	X					C	I										
ETHYLENE DIAMINE	00107-15-3			---		60.0	T	M				I											
ETHYLENE GLY DIBUT	00112-48-1		00110-80-5	720.0	A	390.0	A	M			H							R	R			M	M
ETHYLENE GLY DIMET	00629-14-1		00109-86-4	140.0	A	31.0	A	M			H							R	R			M	M
ETHYLENE GLYCOL	00107-21-1			10000.0	Y	400.0	D				H	C	I										
ETHYLENE GYLCOL MONO	00111-45-5		00110-80-5	420.0	A	230.0	A	M			H							R	R			M	M
ETHYLENE OXIDE	00075-21-8			18.0	D	1.9E-02	D	H	U		H	B											
ETHYLENE THIOUREA	00096-45-7			---		7.7E-02	D	H	U		H												
ETHYLENEGLY MONOPR E	02807-30-9		00110-80-5	430.0	A	230.0	A	M			H							R	R			M	M
ETHYLENEGLYCOLDINITR	00628-96-6			---		7.4E-01	T																
ETHYLENEIMINE	00151-56-4			---		2.1	T	H			H	I											
ETHYLHEXYL ACRYLATE	00103-11-7		00096-33-3	---		17.0	A	M										R					
ETHYLIDENENORBORNENE	16219-75-3			2500.0	Y	---	X					C											
ETHYLMORPHOLINE,N-	00100-74-3			---		57.0	T																
FENAMIPHOS	22224-92-6			---		1.2E-01	T					I											
FENSULFOTHION	00115-90-2			---		2.4E-02	T					I											
FENTHION	00055-38-9			---		1.2E-01	T					I											

DAR-1 AGC/SGC Table (ALPHABETICALLY by Contaminant Name)

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
FERBAM	14484-64-1			---		24.0	T					I											
FERRIC SULFATE	10028-22-5		07664-93-9	120.0	A	1.0	A	L										R	R				
FERROVANADIUM DUST	12604-58-9			300.0	Z	2.4	T																
FLUORIDE NY STANDARD	*FLUORIDE*	F		5.3	s	6.7E-02	s					I											
FLUORINE	07782-41-4			5.3	s	6.7E-02	s	M															
FONOFOS	00944-22-9			---		2.4E-01	T					I											
FORMALDEHYDE	00050-00-0			30.0	H	6.0E-02	H	H	U		H	B	C										
FORMAMIDE	00075-12-7			---		43.0	T	M															
FORMIC ACID	00064-18-6			1900.0	Z	22.0	T	M															
FREON 13	00075-72-9		00071-55-6	68000.0	A	1000.0	A	L										R	R				
FURFURAL	00098-01-1			---		19.0	T	M				I											
FURFURYL ALCOHOL	00098-00-0			6000.0	Z	95.0	T	M															
GALLIUM ARSENIDE	01303-00-0	As	07440-38-2	---		4.5E-04	E	H	U		H							R		Q			
GASOLINE	08006-61-9		86290-81-5	150000.0	A	2100.0	A											R	R				
GASOLINE	86290-81-5			150000.0	Z	2100.0	T					I											
GERMANIUMTETRAHYDRID	07782-65-2			---		1.5	T																
GLUTARALDEHYDE	00111-30-8			20.0	Y	8.0E-02	D					C	I										
GLYCERIN	00056-81-5			---		240.0	T	L															
GLYCIDOL	00556-52-5			---		15.0	T					I											
GLYCOL ETHER	00111-46-6		00110-80-5	440.0	A	240.0	A				H							R	R			M	M
GLYCOL MONOETHYLETHR	00110-80-5			370.0	D	200.0	E	M			H												
GLYCOLONITRILE	00107-16-4		00075-05-8	---		60.0	A											R					
GLYOXAL	00107-22-2			---		2.4E-01	T					I											
GOLD CYANIDE	00506-65-0	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
GOLD CYANIDE	37187-64-7	CN	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
GOLD POTASSIUM CYAN	00554-07-4	C2N2	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
GRAPHITE	07782-42-5			---		4.8	T																
GYPSUM	13397-24-5			---		24.0	T					I											
HAFNIUM HF	07440-58-6	Hf		---		1.2	T																
HALOTHANE	00151-67-7			---		960.0	T					I											
HDI POLYMER	28182-81-2			75.0	D	6.0E-01	D	M															
HDI-BIURET POLYMER	04035-89-6			75.0	D	6.0E-01	D	M															
HDI-CYANURATE POLYME	03779-63-3			75.0	D	6.0E-01	D	M															
HEPTACHLOR	00076-44-8			---		7.7E-04	E	H	U		H	I											
HEPTACHLOR EPOXIDE	01024-57-3			---		3.8E-04	E	H	U			I											
HEPTANE, N-	00142-82-5			210000.0	Z	3900.0	T	M															
HEPTYL ACETATE	00112-06-1		00108-84-9	---		7000.0	A	L										R					
HEXA-CDD	19408-74-3			---		7.7E-07	E		U														
HEXA-CDD	57653-85-7			---		7.7E-07	E		U														
HEXACHLOROBENZENE	00118-74-1			---		2.2E-03	E	H	U		H	I											
HEXACHLOROBUTADIENE	00087-68-3			---		4.5E-02	E	M	U		H	I											
HEXACHLOROETHANE	00067-72-1			---		23.0	T	H			H	I											
HEXACHLORONAPTHALENE	01335-87-1			---		4.8E-01	T	M															
HEXACHLOROPHENE	00070-30-4			---		1.0	D	H															
HEXAFLUOROACETONE	00684-16-2			---		1.6	T																
HEXAFLUOROPROPYLENE	00116-15-4			---		1.4	T																
HEXAHYDROPHTHA.ANHYD	00085-42-7			5.0E-01	Y	---	X					C	I										
HEXAMETHYLDISILOXANE	00107-46-0		07803-62-5	---		16.0	A	M										R					
HEXAMETHYLENE DIISOC	00822-06-0		26471-62-5	14.0	A	1.0E-02	E	H			H								R				
HEXANE	00110-54-3			---		700.0	E	M			H												
HEXANEDIAMINE, 1,6-	00124-09-4			---		5.5	T	M															
HEXANOIC ACID,COBALT	00136-52-7	Co	07440-48-4	---		5.9E-03	D				H							R		Q			
HEXCHLORCYCPENTDIENE	00077-47-4			---		2.0E-01	E	M			H	I											

							-----codes-----																
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
HEXENE,-1	00592-41-6			---		410.0	T																
HEXYL ACETATE, SEC-	00108-84-9			---		7000.0	T	L															
HEXYL CARBITOL	00112-59-4		00110-80-5	780.0	A	420.0	A	M			H							R	R			M	M
HEXYLENE GLYCOL	00107-41-5			12000.0	Y	---	X	L				C											
HYDRAZINE	00302-01-2			---		2.0E-04	E	H	U		H	I											
HYDROGEN BROMIDE	10035-10-6			680.0	Y	---	X	L				C											
HYDROGEN CHLORIDE	07647-01-0			2100.0	D	20.0	E	L			H	C	I										
HYDROGEN CYANIDE	00074-90-8			520.0	Y	3.0	E	H			H	C											
HYDROGEN FLUORIDE	07664-39-3	F	*FLUORIDE*	5.6	s	7.1E-02	s	M			H	C						R	R	Q	Q		
HYDROGEN PEROXIDE	07722-84-1			---		3.3	T					I											
HYDROGEN SELENIDE	07783-07-5			5.0	D	8.0E-02	D				H												
HYDROGEN SULFIDE	07783-06-4			14.0	S	2.0	E	M															
HYDROGENATED TERPHEN	61788-32-7			---		12.0	T																
HYDROQUINONE	00123-31-9			---		4.8	T	M			H	I											
HYDROXYPROPYLACRYLAT	00999-61-1			---		6.7	T																
INDENE	00095-13-6			---		110.0	T																
INDIUM IN	07440-74-6	In		---		2.4E-01	T	H															
INDIUM, TRIETHYL	00923-34-2	In	07440-74-6	---		4.2E-01	T	H										R		Q			
IODINE	07553-56-2			100.0	Y	---	X	L				C											
IODOFORM	00075-47-8			---		24.0	T																
IRON OXIDE	01309-37-1			---		12.0	T					I											
IRON PENTACARBONYL	13463-40-6			160.0	Z	1.9	T																
ISO-OCTANE	00540-84-1			---		3300.0	T	M			H												
ISO-PENTANE	00078-78-4			---		42000.0	T	L															
ISOAMYL ACETATE	00123-92-2			53000.0	Z	6300.0	T	L															
ISOAMYL ALCOHOL	00123-51-3			45000.0	Z	8600.0	T	L															
ISOBUTANE	00075-28-5		00106-97-8	---		57000.0	A	L										R					
ISOBUTANOLAMINE	00124-68-5		00141-43-5	1500.0	A	18.0	A	M										R	R				
ISOBUTYL ACETATE	00110-19-0			---		17000.0	T	L															
ISOBUTYL ALCOHOL	00078-83-1			---		360.0	T																
ISOBUTYL NITRITE	00542-56-3			380.0	s	---	X					C	I										
ISOBUTYRALDEHYDE	00078-84-2		04170-30-3	86.0	A	---	X	M											R				
ISOOCTYL ALCOHOL	26952-21-6			---		630.0	T																
ISOPHORONE	00078-59-1			2800.0	Y	---	X	M			H	C	I										
ISOPHORONE DIISOCYAN	04098-71-9		26471-62-5	14.0	A	1.1E-01	T												R				
ISOPROPOXYETHANOL,2-	00109-59-1			---		250.0	T																
ISOPROPYL ACETATE	00108-21-4			84000.0	Z	1000.0	T																
ISOPROPYL ALCOHOL	00067-63-0			98000.0	Z	7000.0	D	M															
ISOPROPYL ETHER	00108-20-3			130000.0	Z	2500.0	T																
ISOPROPYLAMINE	00075-31-0			2400.0	Z	29.0	T	M															
ISOPROPYLANILINE, N-	00768-52-5			---		26.0	T																
ISOPROPYLGLYCIDYLETH	04016-14-2			36000.0	Z	570.0	T																
KAOLIN (CLAY)	01332-58-7			---		4.8	T					I											
KEROSENE	08008-20-6			---		480.0	T					I											
KEROSENE	64742-81-0			---		480.0	T					I											
KETENE	00463-51-4			260.0	Z	2.0	T	M															
LEAD	07439-92-1	Pb		---	X	3.8E-01	s	H			H	I											
LEAD ACETATE	01335-32-6	Pb3	07439-92-1	---		4.9E-01	s	H			H							R		Q			
LEAD ACETATE	51404-69-4	Pb3	07439-92-1	---		4.9E-01	s	H			H							R		Q			
LEAD ALLOY,SN ,DROSS	69011-60-5	Pb	07439-92-1	---		6.0E-01	s	H			H							R		Q			
LEAD ARSENATE	03687-31-8	As2	07440-38-2	---		1.4E-03	E	H	U		H							R		Q			
LEAD ARSENATE	07645-25-2	As	07440-38-2	---		1.1E-03	E	H	U		H							R		Q			
LEAD ARSENATE	07784-40-9	As	07440-38-2	---		1.1E-03	E	H	U		H							R		Q			

									-----codes-----														
CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
LEAD CARBONATE	00598-63-0	Pb	07439-92-1	---		4.9E-01	s	H			H							R		Q			
LEAD CARBONATE	01319-46-6	Pb3	07439-92-1	---		4.7E-01	s	H			H							R		Q			
LEAD CARBONATE	25510-11-6	Pb	07439-92-1	---		4.9E-01	s	H			H							R		Q			
LEAD CHLORIDE	07758-95-4	Pb	07439-92-1	---		5.1E-01	s	H			H							R		Q			
LEAD CHROMATE	07758-97-6	Cr	18540-29-9	---		1.2E-04	H	H	U		H	B						R		Q			
LEAD CHROMATE OXIDE	18454-12-1	Cr	18540-29-9	---		2.1E-04	H	H	U		H							R		Q			
LEAD FLUOROBORATE	13814-96-5	Pb	07439-92-1	---		5.4E-01	s	H			H							R		Q			
LEAD MOLYBDATE	10190-55-3	Pb	07439-92-1	---		6.7E-01	s	H			H							R		Q			
LEAD NAPHTHENATE	61790-14-5	Pb	07439-92-1	---		6.2E-01	s	H			H							R		Q			
LEAD OXIDE	01309-60-0	Pb	07439-92-1	---		4.4E-01	s	H			H							R		Q			
LEAD OXIDE	01317-36-8	Pb	07439-92-1	---		4.1E-01	s	H			H							R		Q			
LEAD OXIDE	01335-25-7	Pb	07439-92-1	---		4.1E-01	s	H			H							R		Q			
LEAD OXIDE SULFATE	12202-17-4	Pb	07439-92-1	---		6.4E-01	s	H			H							R		Q			
LEAD PHOSPHATE SALT	07446-27-7	Pb2	07439-92-1	---		5.3E-01	s	H			H	I						R		Q			
LEAD SILICATE	11120-22-2	Pb3	07439-92-1	---		4.8E-01	s	H			H							R		Q			
LEAD STEARATE SALT	07428-48-0	Pb	07439-92-1	---		9.0E-01	s	H			H							R		Q			
LEAD SULFATE	07446-14-2	Pb	07439-92-1	---		5.6E-01	s	H			H							R		Q			
LEAD SULFOCHROMATE	01344-37-2	Cr	18540-29-9	---		2.0E-05	A	H	U		H							R					
LEAD TETROXIDE	01314-41-6	Pb3	07439-92-1	---		4.2E-01	s	H			H							R		Q			
LEAD TITANATE ZIRCON	12626-81-2	Pb	07439-92-1	---		7.2E-01	s	H			H							R		Q			
LEAD TITANIUM OXIDE	12060-00-3	Pb	07439-92-1	---		5.6E-01	s	H			H							R		Q			
LEAD ZIRCONIUM OXIDE	12060-01-4	Pb	07439-92-1	---		6.4E-01	s	H			H							R		Q			
LEAD,BENZENEDICARBOX	69011-06-9	Pb3	07439-92-1	---		5.0E-01	s	H			H							R		Q			
LEADSTEARATE	56189-09-4	Pb2	07439-92-1	---		9.3E-01	s	H			H							R		Q			
LINDANE, ALPHA-	00319-84-6			---		5.6E-04	E	M	U		H												
LINDANE, BETA-	00319-85-7			---		1.9E-03	E	M	U		H												
LINDANE, GAMMA-	00058-89-9			---		1.2	T	M			H	I											
LINDANE-TECHNICAL	00608-73-1			---		2.0E-03	E		U														
LIQUIFIED GAS	68476-85-7			---		2400.0	T																
LITHIUM HYDRIDE LIH	07580-67-8			---		6.0E-02	T																
MAGNESIUM OXIDE	01309-48-4			---		24.0	T					I											
MALATHION	00121-75-5			---		2.4	T	M				I											
MALEIC ANHYDRIDE	00108-31-6			---		7.0E-01	D	M			H	I											
MALONONITRILE	00109-77-3		00075-05-8	---		60.0	A											R					
MANGANESE	07439-96-5	Mn		---		5.0E-02	E	M			H												
MANGANESE NAPTHENAT	01336-93-2		07439-96-5	---		5.0E-02	A				H							R					
MANGANESE NITRATE	10377-66-9	Mn	07439-96-5	---		1.1E-01	E				H							R		Q			
MANGANESE OXIDE	01313-13-9	Mn	07439-96-5	---		3.8E-01	E				H							R		Q			
MANGANESE OXIDE	01317-34-6	Mn2	07439-96-5	---		7.2E-02	E				H							R		Q			
MANGANESE OXIDE	01344-43-0	Mn	07439-96-5	---		6.5E-02	E				H							R		Q			
MANGANESE PHOSPHATE	10124-54-6	Mn	07439-96-5	---		1.4E-01	E				H							R		Q			
MANGANESE ROSINATE	09008-34-8		07439-96-5	---		5.0E-02	A				H							R					
MANGANESE SULFATE	07785-87-7	Mn	07439-96-5	---		1.4E-01	E				H							R		Q			
MANGANESE TETROXIDE	01317-35-7	Mn3	07439-96-5	---		6.9E-02	E				H							R		Q			
MANGANESECYCLOPENTAD	12079-65-1	Mn		---		8.8E-01	T				H									Q			
MAPP	59355-75-8			210000.0	Z	3900.0	T																
MEK PEROXIDE	01338-23-4			150.0	Y	---	X					C											
MELAMINEFORMALDEHYDE	68891-01-0		00050-00-0	30.0	A	6.0E-02	A	M	U									R	R				
MERCURIC OXIDE	21908-53-2	Hg	07439-97-6	1.9	D	3.2E-01	E	H			H							R	R	Q	Q		
MERCURIC SULFATE	07783-35-9	Hg	07439-97-6	2.7	D	4.4E-01	E	H			H							R	R	Q	Q		
MERCUROUS NITRATE	10415-75-5	Hg	07439-97-6	2.4	D	3.9E-01	E	H			H							R	R	Q	Q		
MERCUROUS OXIDE	15829-53-5	Hg2	07439-97-6	1.9	D	3.1E-01	E	H			H							R	R	Q	Q		
MERCURY	07439-97-6	Hg		1.8	D	3.0E-01	E	H			H	K	I										

		TOXIC	REFERENCED	SGC		AGC			-----codes-----														
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
MERCURY "NUCLEATE"	12002-19-6			1.8	D	---	X				H												
MERCURY CHLORIDE	07487-94-7	Hg	07439-97-6	2.4	D	4.1E-01	E	H			H							R	R	Q	Q		
MERCURY IODINE	07774-29-0	Hg	07439-97-6	4.1	D	6.8E-01	E	H			H							R	R	Q	Q		
MERCURY NITRATE	10045-94-0	Hg	07439-97-6	2.9	D	4.9E-01	E	H			H							R	R	Q	Q		
MERCURY SULFIDE	01344-48-5	Hg	07439-97-6	2.1	D	3.5E-01	E	H			H							R	R	Q	Q		
MERCURY,NEODEC.,PHEN	26545-49-3	Hg	Hg*ALKYL**	---		5.3E-02	T	H			H							R		Q			
MESITYENE	00108-67-8		25551-13-7	---		290.0	A	M										R					
MESITYL OXIDE	00141-79-7			10000.0	Z	140.0	T																
METH ACRY AC METH ES	00080-62-6			41000.0	Z	700.0	E	M			H	I											
METH BIS-O-CHLORANIL	00101-14-4			---		2.3E-03	D		U		H	B											
METHACRYLIC ACID	00079-41-4			---		170.0	T																
METHANE	00074-82-8			---		1600.0	T					G											
METHANESULFONIC ACID	00075-75-2		07664-93-9	120.0	A	1.0	A	L										R	R				
METHANOL	00067-56-1			33000.0	Z	4000.0	D	M			H												
METHOMYL	16752-77-5			---		6.0	T					I											
METHOXYCHLOR	00072-43-5			---		24.0	T				H	I											
METHOXYETHYL ACET,2-	00110-49-6			---		1.2	T																
METHOXYPHENOL, 4-	00150-76-5			---		12.0	T																
METHOXYPROPYLACETATE	00108-65-6		00107-98-2	55000.0	A	2000.0	A	L										R	R				
METHYL ACETATE	00079-20-9			76000.0	Z	1400.0	T																
METHYL ACETYLENE	00074-99-7			---		3900.0	T	M															
METHYL ACRYLATE	00096-33-3			---		17.0	T	M				I											
METHYL AMYL KETONE	00110-43-0			---		550.0	T																
METHYL ANILINE	00100-61-8			---		5.2	T	M															
METHYL BROMIDE	00074-83-9			3900.0	D	5.0	E	M			H	I											
METHYL BUTYL KETONE	00591-78-6			4000.0	Z	48.0	T																
METHYL CARBITOL	00111-77-3		00109-86-4	150.0	A	32.0	A	M			H							R	R			M	M
METHYL CELLOSOLVE	00109-86-4			93.0	D	20.0	E	M			H												
METHYL CHLOROFORM	00071-55-6			68000.0	D	1000.0	D	L			H	I											
METHYL CHLOROMETHETH	00107-30-2		00542-88-1	---		1.6E-05	A	M	U		H	B	I					R					
METHYL CYANOACRYLATE	00137-05-3			---		2.4	T				H												
METHYL DEMETON	08022-00-2			---		1.2E-01	T																
METHYL ETHYL KETONE	00078-93-3			13000.0	D	5000.0	E	M			H												
METHYL FORMATE	00107-31-3			37000.0	Z	590.0	T	M															
METHYL IODIDE	00074-88-4			---		29.0	T				H												
METHYL ISOBUTYL KETO	00108-10-1			31000.0	Z	3000.0	E	M			H												
METHYL ISOCYANATE	00624-83-9			---		1.1E-01	T	H			H												
METHYL MERCAPTAN	00074-93-1		07783-06-4	14.0	A	2.3	T	M											R				
METHYL PARATHION	00298-00-0			---		4.8E-01	T					I											
METHYL PENTANE, 2-	00107-83-5			350000.0	Z	4200.0	T	M															
METHYL PROPYL KETONE	00107-87-9			53000.0	Z	---	X																
METHYL PYRROLIDONE	00872-50-4			---		100.0	D	M															
METHYL SILICATE	00681-84-5			---		14.0	T	M															
METHYL STYRENE	00098-83-9			48000.0	Z	580.0	T																
METHYL TETRAMER	00556-67-2			---		360.0	D	M															
METHYL VINYL KETONE	00078-94-4			60.0	Y	---	X					C											
METHYLACRYLONITRILE	00126-98-7			---		6.4	T																
METHYLAL	00109-87-5			---		7400.0	T																
METHYLAMINE	00074-89-5			1900.0	Z	15.0	T	M															
METHYLBUTYLACETATE,2	00624-41-9			53000.0	Z	630.0	T																
METHYLCYCLOHEXANE	00108-87-2			---		3800.0	T	M															
METHYLCYCLOHEXANOL	25639-42-3			---		560.0	T																
METHYLCYCLOHEXANON,O	00583-60-8			34000.0	Z	550.0	T																

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
METHYLCYCLOPENTADIEN	12108-13-3	Mn		---		1.5	T				H									Q			
METHYLCYCLOPENTADIEN	26519-91-5		00542-92-7	---		480.0	A	M										R					
METHYLCYCLOPENTANE	00096-37-7		00110-54-3	---		700.0	A	L										R					
METHYLENE BISPH ISCY	00101-68-8			14.0	D	6.0E-01	E	H			H												
METHYLENEBIS4CYCLOHE	05124-30-1			---		1.3E-01	T	H															
METHYLENEDIANILINE44	00101-77-9			---		2.0E-03	D	M	U		H	I											
METHYLFURAN,2-	00534-22-5		00098-00-0	6000.0	A	95.0	A	M										R	R				
METHYLISOAMYLKETONE	00110-12-3			---		560.0	T																
METHYLISOBUTYLCARBIN	00108-11-2			17000.0	Z	250.0	T																
METHYLISOPROPYLKETON	00563-80-4			---		1700.0	T																
METHYLMERCURY	22967-92-6	Hg	Hg*ALKYL**	3.0	Z	2.4E-02	T	H			H												
METHYLNAPHTHALENE,1-	00090-12-0			---		7.1	T					I											
METHYLNAPHTHALENE,2-	00091-57-6			---		7.1	T					I											
METHYLPENTANE,3-	00096-14-0			350000.0	Z	4200.0	T																
METHYLTERTBUTYLETHER	01634-04-4			---		3000.0	E	M			H	I											
METHYLTRIMETHOXYSILA	01185-55-3		07803-62-5	---		160.0	A	L										R					
METHYLVINYLTETRAMER	02554-06-5		07803-62-5	---		16.0	A	M										R					
METRIBUZIN	21087-64-9			---		12.0	T					I											
MEVINPHOS	07786-34-7			---		2.4E-02	T					I											
MICA	12001-26-2			---		7.1	T																
MIREX	02385-85-5			---		2.0E-05	*	H															
MOLYBDENUM	07439-98-7	Mo	Mo*SOLUBLE	---		1.2	A					K						R					
MONOCHLOROBENZENE	00108-90-7			---		110.0	T	M			H	I											
MONOCROTOPHOS	06923-22-4			---		1.2E-01	T					I											
MONOMETHYL HYDRAZINE	00060-34-4			---		4.5E-02	T	M			H	I											
MONOSODIUM PHOSPHATE	07558-80-7		07664-38-2	300.0	A	10.0	A	L										R	R				
MORPHOLINE	00110-91-8			---		170.0	T					I											
N,N-DIETHYL ANILINE	00091-66-7		00100-61-8	---		5.2	A	M										R					
N-ETHYLANILINE	00103-69-5		00100-61-8	---		5.2	A	M										R					
N-PROPYLBENZENE	00103-65-1		00100-41-4	54000.0	A	1000.0	A	M										R	R				
NALED (DIBROM)	00300-76-5			---		2.4E-01	T					I											
NAPHTHA (COAL TAR)	08030-30-6			---		3800.0	T																
NAPHTHA HEAVY	64742-94-5		08030-30-6	---		3800.0	A	M										R					
NAPHTHA LIGHT	64742-95-6		08030-30-6	---		3800.0	A	M										R					
NAPHTHALELEDIISOCYAN	03173-72-6		26471-62-5	14.0	A	7.0E-02	A											R	R				
NAPHTHALENE	00091-20-3			7900.0	Z	3.0	E	M			H	I											
NAPHTHYLAMINE, 2-	00091-59-8			---		2.0E-05	*	H				A											
NATURAL GAS	08006-14-2			---		1600.0	T																
NICKEL	07440-02-0	Ni		6.0	D	4.2E-03	E	H	U		H	K	I										
NICKEL (+2) SULFATE	07786-81-4	Ni	Ni*INORG**	16.0	D	1.1E-02	E	H	U		H	I						R		Q	Q		
NICKEL ACETATE	00373-02-4	Ni	07440-02-0	18.0	D	1.3E-02	E	H	U		H							R	R	Q	Q		
NICKEL AZO YELLOW	51931-46-5	Ni	07440-02-0	67.0	D	4.7E-02	E	H	U		H							R	R	Q	Q		
NICKEL BORIDE	12007-02-2	Ni3	Ni*INORG**	---		4.4E-03	E	H	U		H							R		Q			
NICKEL BROMIDE	13462-88-9	Ni	Ni*INORG**	---		1.6E-02	E	H	U		H							R		Q			
NICKEL CARBIDE	12710-36-0	Ni	Ni*INORG**	---		5.9E-03	E	H	U		H							R		Q			
NICKEL CARBONYL	13463-39-3	Ni	Ni*INORG**	---		1.2E-02	E	H	U		H							R		Q			
NICKEL CHLORIDE	07718-54-9	Ni	Ni*INORG**	13.0	D	9.2E-03	E	H	U		H	I						R		Q	Q		
NICKEL CYANIDE	00557-19-7	C2N2	00057-12-5	380.0	s	7.9E-03	E	H	U		H							R	R	Q	Q		
NICKEL DIACETATE TET	06018-89-9	Ni	07440-02-0	26.0	D	1.8E-02	E	H	U		H							R	R	Q	Q		
NICKEL HYDROXIDE	12054-48-7	Ni	Ni*INORG**	---		6.6E-03	E	H	U		H							R		Q			
NICKEL NITRATE	13138-45-9	Ni	Ni*INORG**	---		1.3E-02	E	H	U		H							R		Q			
NICKEL OXIDE	01313-99-1	Ni	Ni*INORG**	7.6	D	5.3E-03	E	H	U		H	A	I					R		Q	Q		
NICKEL OXIDE	01314-06-3	Ni2	Ni*INORG**	---		5.9E-03	E	H	U		H	I						R		Q			

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
									-----codes-----														
NICKEL PHOSPHATE	10381-36-9	Ni3	Ni*INORG**	---		8.8E-03	E	H	U		H							R		Q			
NICKEL SUBSULFIDE	12035-72-2	Ni3	Ni*INORG**	8.2	D	2.8E-03	E	H	U		H	A	I							Q	Q		
NICKEL SULFAMIDE	13770-89-3	Ni	Ni*INORG**	---		1.1E-02	E	H	U		H							R		Q			
NICKEL SULFATE	10101-97-0	Ni	Ni*INORG**	---		1.9E-02	E	H	U		H							R		Q			
NICKEL TITANATE	12653-76-8	Ni	Ni*INORG**	---		1.1E-02	E	H	U		H							R		Q			
NICKEL,BIS(1-(4-DIME	38465-55-3	Ni	07440-02-0	64.0	D	4.5E-02	E	H	U		H							R	R	Q	Q		
NITRAPYRIN	01929-82-4			2000.0	Z	24.0	T					I											
NITRIC ACID	07697-37-2			86.0	D	12.0	T	M															
NITRIC ACID,LEADSALT	10099-74-8	Pb	07439-92-1	---		5.0E-01	s	H			H							R		Q			
NITRO-O-TOLUIDINE,5	00099-55-8			---		2.4	T					I											
NITROANILINE, P-	00100-01-6			---		7.1	T	M				I											
NITROBENZENE	00098-95-3			---		9.0	D	M			H	I											
NITRODIPHENYL, 4-	00092-93-3			---		2.0E-05	*	H			H	B											
NITROETHANE	00079-24-3			---		730.0	T																
NITROGEN DIOXIDE	10102-44-0			---	X	100.0	S					I											
NITROGEN MUSTARD	00051-75-2			---		2.0E-05	*	H															
NITROGEN OXIDE	10102-43-9			---		74.0	T																
NITROGEN TRIFLUORIDE	07783-54-2	F3	*FLUORIDE*	6.6	s	8.3E-02	s											R	R	Q	Q		
NITROGLYCERINE	00055-63-0			---		1.1	T	M															
NITROMETHANE	00075-52-5			---		120.0	T					I											
NITROPROPANE, 1-	00108-03-2			---		220.0	T	M				I											
NITROPROPANE, 2-	00079-46-9			---		20.0	E	H			H	I											
NITROSO-N-BUTYLAMINE	00924-16-3			---		6.3E-04	E		U														
NITROSODIETHYLAMINE	00055-18-5			---		2.3E-05	E		U														
NITROSODIMETHYLAMINE	00062-75-9			---		7.1E-05	E	H	U		H	I											
NITROSOMORPHOLINE,N	00059-89-2			---		5.0E-04	D	M	U		H												
NITROSOPYRROLIDINE	00930-55-2			---		1.6E-03	E		U														
NITROTOLUENE, M-	00099-08-1			---		26.0	T																
NITROTOLUENE, O-	00088-72-2			---		26.0	T																
NITROTOLUENE, P-	00099-99-0			---		26.0	T	M															
NITROUS OXIDE	10024-97-2			---		210.0	T					I											
NONANE	00111-84-2			---		25000.0	T	L															
NONPINNE	00127-91-3			---		270.0	T																
OCTACHLORONAPHTHALEN	02234-13-1			30.0	Z	2.4E-01	T	M															
OCTANE	00111-65-9			---		3300.0	T																
OIL MIST (MINERAL)	08012-95-1			380.0	s	12.0	T	M															
OSMIUM TETROXIDE	20816-12-0	Os		6.3E-01	Z	5.1E-03	T													Q	Q		
OSYBIS(BENZ.SULF.HYD	00080-51-3			---		2.4E-01	T					I											
OXALIC ACID	00144-62-7			200.0	Z	2.4	T	M															
OXOPHENYL ARSINE	00637-03-6	As	07440-38-2	---		5.2E-04	E	H	U		H							R		Q			
OXYGEN DIFLUORIDE	07783-41-7	F2	*FLUORIDE*	7.5	s	9.5E-02	s					C						R	R	Q	Q		
PAH(s)	13049829-2			---		2.0E-02	H	H	U		H	I											
PARAFFIN WAX	08002-74-2			---		4.8	T																
PARAQUAT	04685-14-7		PARAQUAT*R	---		2.4E-01	A	M				K						R					
PARAQUAT DICHLORIDE	01910-42-5		PARAQUAT*R	---		2.4E-01	A	M										R					
PARAQUAT DIMETHYLSUL	02074-50-2		PARAQUAT*R	---		2.4E-01	A											R					
PARATHION	00056-38-2			---		1.2E-01	T	H			H	I											
PARTICULATE	NY075-00-0			380.0	s	45.0	S					K											
PARTICULATE (PM-10)	NY075-00-5			380.0	s	---	X					K											
PARTICULATE (PM-2.5)	NY075-02-5			160.0	s	15.0	S					K											
PCB	01336-36-3		11096-82-5	---		2.0E-03	A	H	U		H							R					
PCB AROCLOR 1016	12674-11-2			---		1.0E-02	E	H	U		H												
PCB AROCLOR 1221	11104-28-2			---		1.0E-02	E	H	U		H												

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
PCB AROCLOR 1232	11141-16-5			---		1.0E-02	E	H	U		H												
PCB AROCLOR 1242	53469-21-9			---		1.0E-02	E	H	U		H												
PCB AROCLOR 1248	12672-29-6			---		2.0E-03	E	H	U		H												
PCB AROCLOR 1254	11097-69-1			---		2.0E-03	E	H	U		H	I											
PCB AROCLOR 1260	11096-82-5			---		2.0E-03	E	H	U		H												
PCB AROCLOR 1262	37324-23-5			---		2.0E-03	E	H	U		H												
PCB AROCLOR 1268	11100-14-4			---		2.0E-03	E	H	U		H												
PENTABORANE	19624-22-7			3.9	Z	3.1E-02	T																
PENTACHLORONAPHTHALE	01321-64-8			---		1.2	T																
PENTACHLORONITROBENZ	00082-68-8			---		1.2	T				H	I											
PENTACHLOROPHENOL	00087-86-5			---		2.0E-01	D	M	U		H	I											
PENTAERYTHRITOL	00115-77-5			---		24.0	T																
PENTAFLUORO-ARSORANE	07784-36-3	As	07440-38-2	---		5.3E-04	E	H	U		H							R		Q			
PENTANE	00109-66-0			---		4200.0	T																
PENTANOL	00071-41-0		00071-36-3	---		1500.0	A	L										R					
PENTEN-2-OL,4-	00625-31-0		00107-18-6	---		2.8	A	H										R					
PENTENE,1-	00109-67-1		00110-54-3	---		700.0	A	M										R					
PERACETIC ACID	00079-21-0		07722-84-1	---		3.3	A											R					
PERCHLORMETHMERCAPTN	00594-42-3			---		1.8	T																
PERCHLORYL FLUORIDE	07616-94-6	F	*FLUORIDE*	29.0	s	3.6E-01	s											R	R	Q	Q		
PERFLUOROBUTYL ETHY.	19430-93-4			---		2400.0	T																
PERFLUOROISOBUTYLENE	00382-21-8			8.2	Y	---	X					C											
PERMETHRIN	52645-53-1		08003-34-7	---		12.0	A	M										R					
PETROLEUM SULFONATE	68425-94-5		00110-54-3	---		700.0	A	L										R					
PHENANTHRENE	00085-01-8		13049829-2	---		2.0E-02	A	H	U		H							R					
PHENARSINE OXIDE	00058-36-6	As2	07440-38-2	---		7.8E-04	E	H	U		H							R		Q			
PHENOL	00108-95-2			5800.0	D	45.0	T	M			H	I											
PHENOTHIAZINE	00092-84-2			---		12.0	T																
PHENY GLYCIDYL ETHER	00122-60-1			---		1.4	T	M				I											
PHENYL DICHLOROARSIN	00696-28-6	As	07440-38-2	---		6.9E-04	E	H	U		H							R		Q			
PHENYL ETHER	00101-84-8			1400.0	Z	17.0	T																
PHENYL MERCAPTAN	00108-98-5			---		1.1	T																
PHENYLENEDIAMINE, M-	00108-45-2			---		2.4E-01	T	M				I											
PHENYLENEDIAMINE, O-	00095-54-5			---		2.4E-01	T					I											
PHENYLENEDIAMINE, P-	00106-50-3			---		2.4E-01	T	M			H	I											
PHENYLHYDRAZINE	00100-63-0			---		1.0	T	M				I											
PHENYLMERCURICACETAT	00062-38-4	Hg	Hg*ALKYL**	---		3.7E-02	T	H			H							R		Q			
PHENYLPHOSPHINE	00638-21-1		07803-51-2	23.0	Y	3.0E-01	A					C						R					
PHORATE	00298-02-2			---		1.2E-01	T																
PHOSGENE	00075-44-5			4.0	D	4.0E-01	E	M			H												
PHOSPH OXYCHLORIDE	10025-87-3			---		1.5	T																
PHOSPH PENTACHLORIDE	10026-13-8			---		2.0	T																
PHOSPH PENTASULFIDE	01314-80-3			300.0	Z	2.4	T																
PHOSPHINE	07803-51-2			140.0	Z	3.0E-01	E	M			H												
PHOSPHORIC ACID	07664-38-2			300.0	Z	10.0	E	M															
PHOSPHORIC ACID, REA	92203-02-6		07664-38-2	300.0	A	10.0	A				H							R	R				
PHOSPHOROUS TRICHLOR	07719-12-2			280.0	Z	2.6	T																
PHOSPHORUS (YELLOW)	07723-14-0			---		7.0E-02	D	M			H												
PHOSPHORUS (YELLOW)	12185-10-3			---		7.0E-02	D	M			H												
PHTHALIC ANHY.,trans	14166-21-3			5.0E-01	Y	---	X					C	I										
PHTHALIC ANHYD.,cis-	13149-00-3			5.0E-01	Y	---	X					C	I										
PHTHALIC ANHYDRIDE	00085-44-9			---		20.0	D				H	I											
PHTHALODINITRILE, M-	00626-17-5			---		12.0	T																

DAR-1 AGC/SGC Table (ALPHABETICALLY by Contaminant Name)

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PICLORAM	01918-02-1			---		24.0	T					I											
PICRIC ACID	00088-89-1			---		2.4E-01	T	M															
PIGMENT RED	35355-77-2		07439-96-5	---		5.0E-02	A				H							R					
PINDONE	00083-26-1			---		2.4E-01	T																
PIPERAZINE DIHYDROCH	00142-64-3			---		12.0	T																
PLATINUM	07440-06-4	Pt	Pt*SOLSALT	---		4.8E-03	A					K						R					
POLYACRYLIC ACID	09003-01-4		00079-10-7	6000.0	A	1.0	A	M										R	R				
POLYETHYLENEGLYCOLDI	24991-55-7		00110-80-5	370.0	A	200.0	A	M										R	R			M	M
POLYMERIC MDI	09016-87-9			75.0	D	6.0E-01	E	H															
POLYOXYPROPYLENE	25791-96-2		00110-80-5	1100.0	A	590.0	A	M										R	R			M	M
POLYPROPYLENE	09003-07-0		NY075-00-5	380.0	s	---	X	L											R				
POLYSTYRENE DUST	09003-53-6		00100-42-5	380.0	s	45.0	S	M										R	R				
PORTLAND CEMENT	65997-15-1			---		24.0	T																
POTASSIUM ARSENITE	10124-50-2	As	07440-38-2	---		5.1E-04	E	H	U		H							R		Q			
POTASSIUM CHROMATE	07789-00-6	Cr	18540-29-9	---		7.5E-05	H	H	U		H							R		Q			
POTASSIUM CYANATE	00590-28-3	CN	00057-12-5	380.0	s	45.0	S	M										R	R	Q	Q		
POTASSIUM CYANIDE	00151-50-8	CN	00057-12-5	380.0	s	45.0	S	H			H	C						R	R	Q	Q		
POTASSIUM DICHROMAT	07778-50-9	Cr2	18540-29-9	---		5.7E-05	H	H	U		H							R		Q			
POTASSIUM FERRICYANI	13746-66-2	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
POTASSIUM FERROCYANI	13943-58-3	CN	00057-12-5	380.0	s	45.0	S				H							R	R				
POTASSIUM GOLD CYANI	13967-50-5	C2N2	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
POTASSIUM HYDROXIDE	01310-58-3			200.0	Y	---	X					C											
POTASSIUM NICKELCYN	14220-17-8	Ni	Ni*INORG**	---		1.7E-02	E	H	U		H							R		Q			
POTASSIUM PERMANGANA	07722-64-7	Mn	07439-96-5	---		1.4E-01	E	M			H							R		Q			
POTASSIUM PERSULFATE	07727-21-1	S2O8		---		3.4E-01	T													Q			
POTASSIUMGOLDCYANIDE	14263-59-3	C4N4	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
PRIMIDONE	00125-33-7			---		3.6	D	M															
PROPANE	00074-98-6			---		43000.0	T	L															
PROPANE SULTONE	01120-71-4			---		1.4E-03	D	M	U		H	I											
PROPANEDIAMINE,1,3-	00109-76-2		00107-15-3	---		60.0	A	M										R					
PROPANEDIOL-1,2	00057-55-6		00107-98-2	55000.0	A	2000.0	A	L										R	R				
PROPANOIC ACID	00079-09-4			---		71.0	T																
PROPANOL	00071-23-8			---		590.0	T																
PROPANOL, BUTOXYMET-	55934-93-5		00110-80-5	1000.0	A	550.0	A				H							R	R			M	M
PROPANOL, OXYBIS	25265-71-8		00110-80-5	550.0	A	300.0	A	L			H							R	R			M	M
PROPANOL-2,PROPOXY-1	01569-01-3		00107-98-2	55000.0	A	2000.0	A	M										R	R				
PROPARGYL ALCOHOL	00107-19-7			---		5.5	T																
PROPIOLACTONE,BETA-	00057-57-8			---		3.6	T	M			H	I											
PROPIONALDEHYDE	00123-38-6			---		110.0	T				H												
PROPIONITRILE	00107-12-0		00075-05-8	---		60.0	A											R					
PROPOXUR (BAYGON)	00114-26-1			---		1.2	T				H	I											
PROPYL ACETATE	00109-60-4			100000.0	Z	20000.0	T	L															
PROPYL NITRATE, N-	00627-13-4			17000.0	Z	250.0	T																
PROPYLENE	00115-07-1			---		3000.0	D					G	I										
PROPYLENE DICHLORIDE	00078-87-5			---		4.0	E	M			H												
PROPYLENE GLYCOL DIN	06423-43-4			---		8.1E-01	T				H												
PROPYLENE GLYCOL MON	00107-98-2			55000.0	Z	2000.0	E	M															
PROPYLENE IMINE	00075-55-8			---		11.0	T				H	I											
PROPYLENE OXIDE, 1,2	00075-56-9			3100.0	D	2.7E-01	E	M	U		H	I											
PTFE (DECOMPOSITION)	** PTFE **			---		2.0E-05	*	H															
PYRENE	00129-00-0		13049829-2	---		2.0E-02	A	H	U		H							R					
PYRETHRIN	00121-29-9		08003-34-7	---		12.0	A	M										R					
PYRETHRUM	08003-34-7			---		12.0	T	M				I											

									-----codes-----														
CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PYRIDINE	00110-86-1			---		74.0	T	L															
QUINONE	00106-51-4			---		1.0	T	M			H												
RESORCINOL	00108-46-3			9000.0	Z	1100.0	T	L				I											
RHODIUM RH	07440-16-6	Rh	Rh*SOLCOMP	---		2.4E-02	A					K	I					R					
RONNEL	00299-84-3			---		12.0	T																
ROTENONE	00083-79-4			---		12.0	T	M				I											
RUBBER DUST	09006-04-6			---		2.4E-03	T					I											
SELENIC ACID DISOD	13410-01-0	Se	07782-49-2	---		45.0	S											R		Q			
SELENIOUS ACID	07783-00-8	Se	07782-49-2	---		33.0	D				H							R		Q			
SELENIUM	07782-49-2	Se		---		20.0	D	M			H												
SELENIUM CHLORIDE	10026-03-6	Se	07782-49-2	---		45.0	S				H							R		Q			
SELENIUM DIOXIDE	07446-08-4	Se	07782-49-2	---		28.0	D											R		Q			
SELENIUM DISULFIDE	07488-56-4	Se	07782-49-2	---		36.0	D	M			H							R		Q			
SELENIUM HEXAFLUORID	07783-79-1	F6	*FLUORIDE*	9.0	s	1.1E-01	s				H							R	R	Q	Q		
SELENIUM SULFIDE	07446-34-6	Se	07782-49-2	---		28.0	D				H							R		Q			
SELENOUREA	00630-10-4	Se	07782-49-2	---		31.0	D				H							R		Q			
SESONE	00136-78-7			---		24.0	T					I											
SILANE, CHLORETHENYL	01719-58-0		07803-62-5	---		16.0	A	M										R					
SILICA - CRYSTALLINE	14464-46-1			---		6.0E-02	T					B	I										
SILICA - QUARTZ	14808-60-7			---		6.0E-02	T				H	B	I										
SILICON CARBIDE	00409-21-2			---		7.1	T					K	I										
SILICON TETRAHYDRIDE	07803-62-5			---		16.0	T	M															
SILOXANESSILICONDIME	63148-62-9		07803-62-5	---		16.0	A	M										R					
SILVER	07440-22-4	Ag	Ag*SOLCOMP	---		2.4E-02	A					K						R					
SILVER CYANIDE	00506-64-9	CN	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
SODIUM ARSENATE	07631-89-2	As	07440-38-2	---		5.1E-04	E	H	U		H							R		Q			
SODIUM ARSENITE	07784-46-5	As	07440-38-2	---		4.0E-04	E	H	U		H	A						R		Q			
SODIUM AZIDE	26628-22-8			29.0	Y	---	X					C	I										
SODIUM BISULFITE	07631-90-5			---		12.0	T					I											
SODIUM CARBONATE	00497-19-8		01310-73-2	200.0	A	---	X	L											R				
SODIUM CHROMATE(VI)	10034-82-9	Cr	18540-29-9	---		9.1E-05	H	H	U		H							R		Q			
SODIUM CUPRICCYANIDE	13715-19-0	C2N2	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
SODIUM CYANATE	00917-61-3	CN	00057-12-5	380.0	s	45.0	S	M										R	R	Q	Q		
SODIUM CYANIDE	00143-33-9	CN	00057-12-5	380.0	s	45.0	S	H			H	C						R	R	Q	Q		
SODIUM DICHROMATE	10588-01-9	Cr2	18540-29-9	---		5.1E-05	H	H	U		H							R		Q			
SODIUM FERRICYANIDE	14217-21-1	C6N6	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
SODIUM FERROCYANIDE	13601-19-9	C6N6	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
SODIUM FLUOROACETATE	00062-74-8			---		1.2E-01	T																
SODIUM HYDROXIDE	01310-73-2			200.0	Y	---	X					C											
SODIUM METABISULFITE	07681-57-4			---		12.0	T					I											
SODIUM MONOXIDE	12401-86-4			---		5.0	D																
SODIUM NITRITE	07632-00-0			---		2.0E-05	*	H															
SODIUM NITROBENZSULF	00127-68-4		00098-95-3	---		9.0	A	M										R					
SODIUM PERSULFATE	07775-27-1	S2O8		---		3.0	T	L												Q			
SODIUM SULFATE	07757-82-6			120.0	D	---	X																
SODIUM XYLENESULFNTE	01300-72-7		01330-20-7	4300.0	A	100.0	A	L										R	R				
SODIUM ZINC CYANIDE	15333-24-1	C4N4	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
SODIUMACODYLATE	00124-65-2	As	07440-38-2	---		5.0E-04	E	H	U		H							R		Q			
STARCH	09005-25-8			---		24.0	T					I											
STIBINE	07803-52-3			---		1.2	T				H												
STODDARD SOLVENT	08052-41-3			---		1300.0	T																
STONNOUS OXIDE	21651-19-4	Sn		---		5.4	T													Q			
STRONTIUM CHROMATE	07789-06-2	Cr	18540-29-9	---		7.9E-05	H	H	U		H	B						R		Q			

DAR-1 AGC/SGC Table (ALPHABETICALLY by Contaminant Name)

									-----codes-----														
CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
STRYCHNINE	00057-24-9			---		3.6E-01	T																
STYRENE	00100-42-5			17000.0	Z	1000.0	E	M			H	I											
STYRENE OXIDE	00096-09-3			---		2.0E-05	*	H			H												
SUBTILISINS	01395-21-7			6.0E-03	Y	---	X	H				C											
SUBTILISINS	09014-01-1			6.0E-03	Y	---	X	H				C											
SUCCINONITRILE	00110-61-2		00075-05-8	---		60.0	A											R					
SULFOMETURON METHYL	74222-97-2			---		12.0	T					I											
SULFOMIC ACID, Co	14017-41-5	Co2	07440-48-4	---		1.8E-03	D				H							R		Q			
SULFOTEP	03689-24-5			---		2.4E-01	T					I											
SULFUR DIOXIDE	07446-09-5			910.0	s	80.0	S					I											
SULFUR HEXAFLUORIDE	02551-62-4	F6	*FLUORIDE*	6.8	s	8.6E-02	s											R	R	Q	Q		
SULFUR MONOCHLORIDE	10025-67-9			380.0	s	---	X					C											
SULFUR PENTAFLUORIDE	05714-22-7	F10	*FLUORIDE*	7.1	s	9.0E-02	s					C						R	R	Q	Q		
SULFUR TETRAFLUORIDE	07783-60-0	F4	*FLUORIDE*	7.5	s	9.5E-02	s					C						R	R	Q	Q		
SULFURIC ACI,CADMIUM	07790-84-3	Cd	07440-43-9	---		4.5E-04	D	H	U		H							R		Q			
SULFURIC ACID	07664-93-9			120.0	D	1.0	D	M				B											
SULFURYL FLUORIDE	02699-79-8	F2	*FLUORIDE*	14.0	s	1.8E-01	s											R	R	Q	Q		
SULPROFOS	35400-43-2			---		2.4	T					I											
SYNTHETIC SILICA	11294552-5		14464-46-1	---		6.0E-02	A				H							R					
TALC	14807-96-6			---		4.8	T					I											
TANTALUM TA	07440-25-7			---		12.0	T																
TANTALUM OXIDE	01314-61-0	Ta2		---		15.0	T													Q			
TCDDIOXIN, 2,3,7,8-	01746-01-6			---		3.0E-08	D	H	U		H												
TCDFURAN, 2,3,7,8-	51207-31-9		01746-01-6	---		3.0E-08	A	H	U		H							R					
TELLURIUM	13494-80-9	Te		---		2.4E-01	T																
TELLURIUM HEXAFLUORI	07783-80-4	F6	*FLUORIDE*	11.0	s	1.4E-01	s											R	R	Q	Q		
TEMEPHOS (ABATE)	03383-96-8			---		2.4	T																
TEPP	00107-49-3			---		2.4E-02	T																
TERBUFOS	13071-79-9			---		2.4E-02	T					I											
TEREPHTHALIC ACID	00100-21-0			---		24.0	T																
TERPHENYLS	26140-60-3			500.0	Y	---	X					C											
TERPINEOL-ALPHA	00098-55-5		08006-64-2	---		2700.0	A	L										R					
TETRACHL22DIFLUORETH	00076-11-9			---		9900.0	T																
TETRACHLOROETHAN1122	00079-34-5			---		16.0	T	M			H	I											
TETRACHLOROETHYLENE	00127-18-4			1000.0	H	1.0	H	M	U		H	I											
TETRACHLORONAPHTHALE	01335-88-2			---		4.8	T																
TETRADECENE,1-	01120-36-1		00110-54-3	---		700.0	A	L										R					
TETRAETHYL LEAD	00078-00-2	Pb	07439-92-1	---		5.9E-01	s	H			H	I						R		Q			
TETRAFLUOROETHANE	00811-97-2			---		80000.0	E	L															
TETRAFLUOROETHYLENE	00116-14-3			---		20.0	T					I											
TETRAHYDROFURAN	00109-99-9			30000.0	Z	350.0	T	M															
TETRAKIS PHOSPH.SULF	55566-30-8			---		4.8	T					I											
TETRAMETHYL LEAD	00075-74-1	Pb	07439-92-1	---		4.9E-01	s	H			H							R		Q			
TETRAMETHYL SUCCINON	03333-52-6			---		6.7	T																
TETRANITROMETHANE	00509-14-8			---		9.5E-02	T					I											
TETROCHL12DIFLUORETH	00076-12-0			---		9900.0	T																
TETRYL	00479-45-8			---		3.6	T																
THALLIUM	07440-28-0	Tl		---		2.4E-01	T	M															
THALLIUM ACETATE	00563-68-8	Tl	07440-28-0	---		3.1E-01	T											R		Q			
THALLIUM CARBONATE	06533-73-9	Tl2	07440-28-0	---		2.7E-01	T											R		Q			
THALLIUM CHLORIDE	07791-12-0	Tl	07440-28-0	---		2.8E-01	T											R		Q			
THALLIUM NITRATE	10102-45-1	Tl	07440-28-0	---		3.1E-01	T											R		Q			
THALLIUM OXIDE	01314-32-5	Tl2	07440-28-0	---		2.7E-01	T	M										R		Q			

									-----codes-----														
CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
THALLIUM SELENITE	12039-52-0	Se	07782-49-2	---		45.0	S	M			H							R		Q			
THALLIUM SULFATE	07446-18-6	Tl2	07440-28-0	---		3.0E-01	T	M										R		Q			
THIOBISTERTBUTYLCRES	00096-69-5			---		24.0	T					I											
THIOCYANIC ACID, K	00333-20-0	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
THIOGLYCOLIC ACID	00068-11-1			---		9.0	T																
THIONYL CHLORIDE	07719-09-7		07647-01-0	380.0	s	20.0	A					C						R	R				
THIRAM	00137-26-8			---		2.4	T	M				I											
TIN	07440-31-5	Sn	Sn*ORGANIC	20.0	A	2.4E-01	A					K						R	R				
TIN DIOXIDE	18282-10-5	Sn		---		6.0	T													Q			
TITANIUM DIOXIDE	13463-67-7			---		24.0	T					I											
TITANIUM TETRACHLOR.	07550-45-0			---		2.0E-05	*	H			H												
TOLIDINE, O-	00119-93-7		00062-53-3	---		6.0E-01	A	M	U		H	I						R					
TOLUENE	00108-88-3			37000.0	D	5000.0	E	L			H	I											
TOLUENE 2,4-DIAMINE	00095-80-7		26471-62-5	14.0	A	9.0E-04	D	H	U		H								R				
TOLUENE 2,6-DIISOCYA	00091-08-7		26471-62-5	14.0	A	7.0E-02	E	H											R				
TOLUENE DIISOCYANATE	26471-62-5			14.0	Z	7.0E-02	E	H				I											
TOLUENE24DIISOCYANAT	00584-84-9		26471-62-5	14.0	A	7.0E-02	E	H			H	I							R				
TOLUIDINE, M-	00108-44-1			---		21.0	T					I											
TOLUIDINE, O-	00095-53-4			---		21.0	T	H			H	I											
TOLUIDINE, P-	00106-49-0			---		21.0	T					I											
TOXAPHENE	08001-35-2			100.0	Z	3.1E-03	E	H	U		H	I											
TREMOLITE	77536-68-6		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
TRIBUTYL PHOSPHATE	00126-73-8			---		5.2	T																
TRICH112 (FREON 113)	00076-13-1			960000.0	Z	180000.0	T	L				I											
TRICHLOPHENOXY,2,4,5	00093-76-5			---		24.0	T					I											
TRICHLORO BENZENE	00120-82-1			3700.0	Y	---	X				H	C											
TRICHLOROACETIC ACID	00076-03-9			---		16.0	T					I											
TRICHLOROETHANE,112	00079-00-5			---		1.4	D	M			H	I											
TRICHLOROETHYLENE	00079-01-6			14000.0	Z	5.0E-01	D	M	U		H	B											
TRICHLOROFLUOROMETHA	00075-69-4		00071-55-6	68000.0	A	1000.0	A	L										R	R				
TRICHLORONAPHTHALENE	01321-65-9			---		12.0	T																
TRICHLOROPHENOL,246	00088-06-2			---		3.2E-01	E		U		H												
TRICHLOROPHON	00052-68-6			---		2.4	T					I											
TRICHLORPROPAN,123	00096-18-4			---		140.0	T					I											
TRIDECANE	00629-50-5		00110-54-3	---		700.0	A	L										R					
TRIETHANOLAMINE	00102-71-6			---		12.0	T																
TRIETHYLAMINE	00121-44-8			2800.0	D	7.0	E				H	I											
TRIETHYLENE GLY MET	00112-35-6		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
TRIETHYLENE GLYCOL	00112-27-6		00110-80-5	620.0	A	330.0	A	M			H							R	R			M	M
TRIETHYLENETETRAMINE	00112-24-3		00111-40-0	---		10.0	A	M										R					
TRIFLUOROBROMOMETHAN	00075-63-8			---		15000.0	T																
TRIGLYCIDYL-S-TRIAZI	02451-62-9			---		1.2E-01	T																
TRIMELLITIC ANHYDRID	00552-30-7			4.0	Y	---	X					C											
TRIMETHOXYSILANE	02487-90-3		07803-62-5	---		16.0	A	M										R					
TRIMETHYL BENZENE	25551-13-7			---		290.0	T	M															
TRIMETHYL BENZENE 1,	00095-63-6		25551-13-7	---		290.0	A											R					
TRIMETHYL PHOSPHITE	00121-45-9			---		24.0	T																
TRIMETHYLAMINE	00075-50-3			3600.0	Z	29.0	T																
TRIMETHYLBENZENE,123	00526-73-8		25551-13-7	---		290.0	A											R					
TRINITROTOLUENE	00118-96-7			---		2.4E-01	T																
TRIORTHOCRESYL PHOSP	00078-30-8			---		2.4E-01	T					I											
TRIPHENYL AMINE	00603-34-9			---		12.0	T																
TRIPHENYL ARSINE	00603-32-7	As	07440-38-2	---		9.5E-04	E	H	U		H							R		Q			

									-----codes-----														
CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TRIPHENYL As OXIDE	01153-05-5	As	07440-38-2	---		1.0E-03	E	H	U		H							R		Q			
TRIPHENYL PHOSPHATE	00115-86-6			---		7.1	T					I											
TUNGSTEN	07440-33-7	W	W*SOLUBLE*	300.0	A	2.4	A					K						R	R				
TURPENTINE	08006-64-2			---		2700.0	T	L															
ULTEM	61128-46-9		NY075-00-5	380.0	s	---	X	M											R				
URANIUM	07440-61-1	U		60.0	Z	4.8E-01	T					A											
URETHANE	00051-79-6			---		3.4E-03	D	M	U		H												
VALERALDEHYDE	00110-62-3			---		420.0	T																
VANADIUM	07440-62-2			---		2.0E-01	H	H															
VANADIUM OXIDE	01314-62-1			30.0	D	1.2E-01	T					I											
VINYL ACETATE	00108-05-4			5300.0	Z	200.0	E	M			H	I											
VINYL BROMIDE	00593-60-2			---		3.0	E	H			H	B											
VINYL CHLORIDE	00075-01-4			180000.0	D	1.1E-01	E	H	U		H	A											
VINYL CYCLOHEXENE	00100-40-3			---		380.0	D	M				I											
VINYL CYCLOHEXENE DI	00106-87-6			---		1.4	T					I											
VINYL FLUORIDE	00075-02-5			---		4.5	T	M				B											
VINYL PYRROLIDINONE	00088-12-0			---		7.0	D	M				I											
VINYL TOLUENE	25013-15-4			48000.0	Z	580.0	T					I											
VINYLIDENE CHLORIDE	00075-35-4			---		70.0	D	M			H	I											
VINYLIDENE FLOURIDE	00075-38-7			---		3100.0	T					I											
VM&P NAPHTHA	08032-32-4			---		33000.0	T	L				I											
WARFARIN	00081-81-2			---		2.4E-01	T																
XYLENE @,@-DIAMINE:M	01477-55-0			10.0	Y	---	X					C											
XYLENE,M,O&P MIXT.	01330-20-7			4300.0	D	100.0	E	M			H	I											
XYLENE,M-	00108-38-3			4300.0	D	100.0	E	M			H	I											
XYLENE,O-	00095-47-6			4300.0	D	100.0	E	M			H	I											
XYLENE,P-	00106-42-3			4300.0	D	100.0	E	M			H	I											
XYLIDINE	01300-73-8			---		6.0	T	M				I											
YTTRIUM	07440-65-5	Y		---		2.4	T																
ZINC	07440-66-6			---		45.0	S	L															
ZINC BROMIDE	07699-45-8		07646-85-7	200.0	A	2.4	A	M										R	R				
ZINC CHLORIDE	07646-85-7			200.0	Z	2.4	T	M															
ZINC CHROMATE	11103-86-9	Cr2	18540-29-9	---		8.1E-05	H	H	U		H	A						R		Q			
ZINC CHROMATE	13530-65-9	Cr	18540-29-9	---		7.1E-05	H	H	U		H	A						R		Q			
ZINC CHROMATE	37300-23-5	Cr4	18540-29-9	---		8.4E-05	H	H	U		H	A						R		Q			
ZINC CHROMATES	01308-13-0	Cr	18540-29-9	---		7.1E-05	H	H	U		H							R		Q			
ZINC CHROMITE	01328-67-2	Cr	18540-29-9	---		7.1E-05	H	H	U		H							R		Q			
ZINC CYANIDE	00557-21-1	C2N2	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
ZINC OXIDE	01314-13-2			380.0	s	45.0	S	M															
ZINC PHOSPHIDE	01314-84-7		07803-51-2	140.0	A	3.0E-01	A	M										R	R				
ZINC STEARATE	00557-05-1			---		24.0	T																
ZIRCONIUM ZR	07440-67-7	Zr		380.0	s	12.0	T					I											

TOXICITY (T):

- (H) HIGH Toxicity Contaminant.
- (M) MODERATE Toxicity Contaminant.
- (L) LOW Toxicity Contaminant.

WHO (W), Source of AGC/SGC Assignment:

- (A) AGC/SGC based upon NYSDEC "Analogy".
- (D) NYSDEC derived AGC/SGC.
- (E) AGC based upon EPA IRIS data (RFC or Unit Risk).
- (H) NYSDOH derived AGC/SGC.
- (S) AGC/SGC listed is FEDERAL or NYS Standard.
- (T) AGC based upon ACGIH TLV.
- (Y) SGC is based on ACGIH TLV Ceiling limit.
- (Z) SGC is based on ACGIH STEL.
- (*) AGC assigned High Toxicity "de minimis" limit.
- ( ) There is no SGC for this compound.

WHO (W), Source of special AGC/SGC Interim Assignment:

- (s) AGC/SGC based upon Equivalent FEDERAL or NYS Standard.
- (X) There is no AGC/SGC value for this contaminant.

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-----codes-----
         111111
123456789012345:

codes, (Position 1):
     (U) AGC equivalent to "one in a million risk".
codes, (Position 3):
     (H) FEDERAL HAP identified by 1990 CAAA.
codes, (Positions 4 & 5):
     (A) ACGIH Human Carcinogen.
     (B) ACGIH Suspected Human Carcinogen.
     (C) ACGIH Ceiling Limit.
     (G) ACGIH Simple Asphxiant.
     (I) Refer to ACGIH Handbook: (Code A3,A4,A5 or particulate fraction).
     (K) Multiple TLVs assigned in ACGIH Handbook.
codes, (Position 8):
     (Q) REFERENCED AGC adjusted for elemental assignment.
codes, (Position 9):
     (Q) REFERENCED SGC adjusted for elemental assignment.
codes, (Position 10):
     (R) AGC ASSIGNED TO REFERENCED COMPOUND.
codes, (Position 11):
     (R) SGC ASSIGNED TO REFERENCED COMPOUND.
codes, (Position 12):
     (Q) AGC ASSIGNED AS DIFFERENT ELEMENT(s) & ADJUSTED.
codes, (Position 13):
     (Q) SGC ASSIGNED AS DIFFERENT ELEMENT(s) & ADJUSTED.
codes, (Position 14):
     (M) REFERENCED AGC adjusted for MOLECULAR WEIGHTS.
codes, (Position 15):
     (M) REFERENCED SGC adjusted for MOLECULAR WEIGHTS.
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DAR-1 AGC/SGC Table (NUMERICALLY by CAS Number)

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	-----codes----- 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PTFE (DECOMPOSITION)	** PTFE **			---		2.0E-05	*	H															
FLUORIDE NY STANDARD	*FLUORIDE*	F		5.3	s	6.7E-02	s					I											
FORMALDEHYDE	00050-00-0			30.0	H	6.0E-02	H	H	U		H	B	C										
DDT	00050-29-3			---		1.0E-02	E	H	U			I											
B A P	00050-32-8			---		9.1E-04	D	H	U		H	B	I										
DINITROPHENOL, 2,4-	00051-28-5			---		2.0E-05	*	H			H												
NITROGEN MUSTARD	00051-75-2			---		2.0E-05	*	H															
URETHANE	00051-79-6			---		3.4E-03	D	M	U		H												
TRICHLOROPHON	00052-68-6			---		2.4	T					I											
DIBENZ(a,h)ANTHRACEN	00053-70-3		13049829-2	---		2.0E-02	A		U									R					
NITROSODIETHYLAMINE	00055-18-5			---		2.3E-05	E		U														
FENTHION	00055-38-9			---		1.2E-01	T					I											
NITROGLYCERINE	00055-63-0			---		1.1	T	M															
CARBON TETRACHLORIDE	00056-23-5			1900.0	D	6.7E-02	E	H	U		H	B											
PARATHION	00056-38-2			---		1.2E-01	T	H			H	I											
BENZO(A)ANTHRACENE	00056-55-3		13049829-2	---		2.0E-02	A	H	U		H	B	I					R					
COUMAPHOS	00056-72-4			---		1.2E-01	T					I											
GLYCERIN	00056-81-5			---		240.0	T	L															
CYANIDE	00057-12-5	CN		380.0	s	45.0	S	H			H	C											
DIMETHYL HYDRAZINE	00057-14-7			---		6.0E-02	T	M			H	I											
STRYCHNINE	00057-24-9			---		3.6E-01	T																
PROPANEDIOL-1,2	00057-55-6		00107-98-2	55000.0	A	2000.0	A	L										R	R				
PROPIOLACTONE,BETA-	00057-57-8			---		3.6	T	M			H	I											
CHLORDANE	00057-74-9			---		1.2	T	H			H	I											
PHENARSINE OXIDE	00058-36-6	As2	07440-38-2	---		7.8E-04	E	H	U		H							R		Q			
LINDANE, GAMMA-	00058-89-9			---		1.2	T	M			H	I											
NITROSOMORPHOLINE,N	00059-89-2			---		5.0E-04	D	M	U		H												
DIMETHYLAMINOAZOBENZ	00060-11-7			---		8.0E-04	D	M	U		H												
ETHYL ETHER	00060-29-7			150000.0	Z	29000.0	T	L															
MONOMETHYL HYDRAZINE	00060-34-4			---		4.5E-02	T	M			H	I											
ACETAMIDE	00060-35-5			---		5.0E-02	D	M	U		H												
DIELDRIN	00060-57-1			---		2.2E-04	E	H	U			I											
AMITROLE	00061-82-5			---		4.8E-01	T					I											
PHENYLMERCURICACETAT	00062-38-4	Hg	Hg*ALKYL**	---		3.7E-02	T	H			H							R		Q			
ANILINE	00062-53-3			---		6.0E-01	D	H	U		H	I											
DICHLORVOS	00062-73-7			---		5.0E-01	E	M			H	I											
SODIUM FLUOROACETATE	00062-74-8			---		1.2E-01	T																
NITROSODIMETHYLAMINE	00062-75-9			---		7.1E-05	E	H	U		H	I											
CARBARYL	00063-25-2			---		12.0	T				H	I											
ETHANOL	00064-17-5			---		45000.0	T	L				I											
FORMIC ACID	00064-18-6			1900.0	Z	22.0	T	M															
ACETIC ACID	00064-19-7			3700.0	Z	60.0	T																
DIETHYL SULFATE	00064-67-5		00077-78-1	---		1.2	A	H			H							R					
METHANOL	00067-56-1			33000.0	Z	4000.0	D	M			H												
ISOPROPYL ALCOHOL	00067-63-0			98000.0	Z	7000.0	D	M															
ACETONE	00067-64-1			180000.0	Z	28000.0	T	L				I											
CHLOROFORM	00067-66-3			150.0	D	4.3E-02	E	M	U		H	I											
HEXACHLOROETHANE	00067-72-1			---		23.0	T	H			H	I											
THIOGLYCOLIC ACID	00068-11-1			---		9.0	T																
DIMETHYLFORMAMIDE	00068-12-2			---		30.0	E	M			H	I											
HEXACHLOROPHENE	00070-30-4			---		1.0	D	H															
PROPANOL	00071-23-8			---		590.0	T																
BUTYL ALCOHOL, N-	00071-36-3			---		1500.0	T	L															

		TOXIC	REFERENCED	SGC		AGC			-----codes-----									1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
PENTANOL	00071-41-0		00071-36-3	---		1500.0	A	L										R					
BENZENE	00071-43-2			1300.0	D	1.3E-01	E	H	U		H	A											
ACETIC ACID,COBALT	00071-48-7	Co	07440-48-4	---		3.0E-03	D				H							R		Q			
METHYL CHLOROFORM	00071-55-6			68000.0	D	1000.0	D	L			H	I											
ENDRIN	00072-20-8			---		2.4E-01	T					I											
METHOXYCHLOR	00072-43-5			---		24.0	T				H	I											
DDE	00072-55-9		00050-29-3	---		1.0E-02	A		U		H							R					
METHANE	00074-82-8			---		1600.0	T					G											
METHYL BROMIDE	00074-83-9			3900.0	D	5.0	E	M			H	I											
ETHANE	00074-84-0			---		2900.0	T					G											
ETHYLENE	00074-85-1			---		550.0	T					G	I										
CHLOROMETHANE	00074-87-3			22000.0	D	90.0	E	M			H	I											
METHYL IODIDE	00074-88-4			---		29.0	T				H												
METHYLAMINE	00074-89-5			1900.0	Z	15.0	T	M															
HYDROGEN CYANIDE	00074-90-8			520.0	Y	3.0	E	H			H	C											
METHYL MERCAPTAN	00074-93-1		07783-06-4	14.0	A	2.3	T	M											R				
ETHYL BROMIDE	00074-96-4			---		52.0	T					I											
CHLOROBROMOMETHAN	00074-97-5			---		2500.0	T																
PROPANE	00074-98-6			---		43000.0	T	L															
METHYL ACETYLENE	00074-99-7			---		3900.0	T	M															
ETHYL CHLORIDE	00075-00-3			---		10000.0	E	L			H	I											
VINYL CHLORIDE	00075-01-4			180000.0	D	1.1E-01	E	H	U		H	A											
VINYL FLUORIDE	00075-02-5			---		4.5	T	M				B											
ETHYL AMINE	00075-04-7			2800.0	Z	22.0	T																
ACETONITRILE	00075-05-8			---		60.0	E	M			H	I											
ACETALDEHYDE	00075-07-0			4500.0	Y	4.5E-01	E	M	U		H	C	I										
ETHYL MERCAPTAN	00075-08-1			---		3.1	T	M															
DICHLOROMETHANE	00075-09-2			14000.0	D	2.1	E	M	U		H	I											
FORMAMIDE	00075-12-7			---		43.0	T	M															
CARBON DISULFIDE	00075-15-0			6200.0	D	700.0	E	M			H	I											
DIMETHYL SULFIDE	00075-18-3		07783-06-4	14.0	A	60.0	T	M											R				
ETHYLENE OXIDE	00075-21-8			18.0	D	1.9E-02	D	H	U		H	B											
BROMOFORM	00075-25-2			---		9.1E-01	E	M	U		H	I											
BROMODICHLOROMETHANE	00075-27-4			---		2.0E-02	D	H	U														
ISOBUTANE	00075-28-5		00106-97-8	---		57000.0	A	L										R					
ISOPROPYLAMINE	00075-31-0			2400.0	Z	29.0	T	M															
DICHLOROETHANE,1,1	00075-34-3			---		6.3E-01	D	L	U		H	I											
VINYLIDENE CHLORIDE	00075-35-4			---		70.0	D	M			H	I											
ACETYL CHLORIDE	00075-36-5		07647-01-0	2100.0	A	20.0	A	M										R	R				
DIFLUOROETHANE	00075-37-6			---		40000.0	E	L															
VINYLIDENE FLOURIDE	00075-38-7			---		3100.0	T					I											
DICHLOROFLUOROMETHAN	00075-43-4			---		100.0	T																
PHOSGENE	00075-44-5			4.0	D	4.0E-01	E	M			H												
CHLORODIFLUOROMETHAN	00075-45-6			---		50000.0	E					I											
IODOFORM	00075-47-8			---		24.0	T																
TRIMETHYLAMINE	00075-50-3			3600.0	Z	29.0	T																
NITROMETHANE	00075-52-5			---		120.0	T					I											
PROPYLENE IMINE	00075-55-8			---		11.0	T				H	I											
PROPYLENE OXIDE, 1,2	00075-56-9			3100.0	D	2.7E-01	E	M	U		H	I											
DIFLUORDIBROMOMETHAN	00075-61-6			---		2000.0	T																
TRIFLUOROBROMOMETHAN	00075-63-8			---		15000.0	T																
BUTYL ALCOHOL, TERT	00075-65-0			---		720.0	T					I											
CHLORO DIFLUOROETHAN	00075-68-3			---		50000.0	E	L															

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
TRICHLOROFLUOROMETHA	00075-69-4		00071-55-6	68000.0	A	1000.0	A	L										R	R				
DICHLORODIFLUOROMETH	00075-71-8			---		12000.0	T					I											
FREON 13	00075-72-9		00071-55-6	68000.0	A	1000.0	A	L										R	R				
TETRAMETHYL LEAD	00075-74-1	Pb	07439-92-1	---		4.9E-01	s	H			H							R		Q			
METHANESULFONIC ACID	00075-75-2		07664-93-9	120.0	A	1.0	A	L										R	R				
DIMETHYLDICHLOROSILA	00075-78-5		07803-62-5	---		16.0	A	M										R					
DIMETHYLBUTANE, 2,2-	00075-83-2			350000.0	Z	4200.0	T	M															
ACETONE CYANOHYDRIN	00075-86-5			500.0	Y	---	X	H				C											
DICHLOROPROPIONICACI	00075-99-0			---		12.0	T					I											
TRICHLOROACETIC ACID	00076-03-9			---		16.0	T					I											
CHLOROPICRIN	00076-06-2			29.0	D	4.0E-01	D					I											
TETRACHL22DIFLUORETH	00076-11-9			---		9900.0	T																
TETROCHL12DIFLUORETH	00076-12-0			---		9900.0	T																
TRICH112 (FREON 113)	00076-13-1			960000.0	Z	180000.0	T	L				I											
DICHLORTETRAFLUORETH	00076-14-2			---		17000.0	T					I											
CHLOROPENTAFLUOROETH	00076-15-3			---		15000.0	T																
CAMPHOR	00076-22-2			1900.0	Z	29.0	T					I											
HEPTACHLOR	00076-44-8			---		7.7E-04	E	H	U		H	I											
HEXCHLORCYCPENTDIENE	00077-47-4			---		2.0E-01	E	M			H	I											
DICYCLOPENTADIENE	00077-73-6			---		64.0	T																
DIMETHYL SULFATE	00077-78-1			---		1.2	T	H			H	I											
TETRAETHYL LEAD	00078-00-2	Pb	07439-92-1	---		5.9E-01	s	H			H	I						R		Q			
ETHYL SILICATE	00078-10-4			---		200.0	T																
TRIORTHOCRESYL PHOSP	00078-30-8			---		2.4E-01	T					I											
DIOXATHION	00078-34-2			---		2.4E-01	T					I											
ISOPHORONE	00078-59-1			2800.0	Y	---	X	M			H	C	I										
ISO-PENTANE	00078-78-4			---		42000.0	T	L															
ISOBUTYL ALCOHOL	00078-83-1			---		360.0	T																
ISOBUTYRALDEHYDE	00078-84-2		04170-30-3	86.0	A	---	X	M											R				
PROPYLENE DICHLORIDE	00078-87-5			---		4.0	E	M			H												
CHLORO-1-PROPANOL,2-	00078-89-7			---		9.5	T					I											
BUTANOL,SEC	00078-92-2			---		710.0	T																
METHYL ETHYL KETONE	00078-93-3			13000.0	D	5000.0	E	M			H												
METHYL VINYL KETONE	00078-94-4			60.0	Y	---	X					C											
CHLOROACETONE	00078-95-5			380.0	Y	---	X					C											
TRICHLOROETHANE,112	00079-00-5			---		1.4	D	M			H	I											
TRICHLOROETHYLENE	00079-01-6			14000.0	Z	5.0E-01	D	M	U		H	B											
CHLOROACETYLCHLORIDE	00079-04-9			69.0	Z	5.5E-01	T																
ACRYLAMIDE	00079-06-1			---		7.7E-04	E	H	U		H	I											
PROPANOIC ACID	00079-09-4			---		71.0	T																
ACRYLIC ACID	00079-10-7			6000.0	D	1.0	E	M			H	I											
CHLOROACETIC ACID	00079-11-8			30.0	D	7.0	D	H			H	I											
METHYL ACETATE	00079-20-9			76000.0	Z	1400.0	T																
PERACETIC ACID	00079-21-0		07722-84-1	---		3.3	A											R					
NITROETHANE	00079-24-3			---		730.0	T																
ACETYLENE TETRABROM	00079-27-6			---		3.3	T																
DIMETHYLBUTANE, 2,3-	00079-29-8			350000.0	Z	4200.0	T																
TETRACHLOROETHAN1122	00079-34-5			---		16.0	T	M			H	I											
METHACRYLIC ACID	00079-41-4			---		170.0	T																
DICHLOROACETIC ACID	00079-43-6			---		6.3	T					I											
DIMETHYLCARBMYLCHLOR	00079-44-7			---		4.8E-02	T	M			H	B											
NITROPROPANE, 2-	00079-46-9			---		20.0	E	H			H	I											
OSYBIS(BENZ.SULF.HYD	00080-51-3			---		2.4E-01	T					I											

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CYCLIC DEXADIENE	00080-56-8			---		270.0	T																
METH ACRY AC METH ES	00080-62-6			41000.0	Z	700.0	E	M			H	I											
WARFARIN	00081-81-2			---		2.4E-01	T																
PENTACHLORONITROBENZ	00082-68-8			---		1.2	T				H	I											
PINDONE	00083-26-1			---		2.4E-01	T																
ROTENONE	00083-79-4			---		12.0	T	M				I											
DIETHYL PHTHALATE	00084-66-2			---		12.0	T	M				I											
DIBUTYL PHTHALATE	00084-74-2			---		12.0	T				H												
DIQUAT DIBROMIDE	00085-00-7		DIQUAT*RES	---		2.4E-01	A					K						R					
PHENANTHRENE	00085-01-8		13049829-2	---		2.0E-02	A	H	U		H							R					
HEXAHYDROPHTHA.ANHYD	00085-42-7			5.0E-01	Y	---	X					C	I										
PHTHALIC ANHYDRIDE	00085-44-9			---		20.0	D				H	I											
BUTYL BENZYL PHTHALA	00085-68-7		00084-66-2	---		12.0	A	M										R					
BUTYL PHTHALATE GLYC	00085-70-1		00084-66-2	---		12.0	A	M										R					
AZINPHOS-METHYL	00086-50-0			---		4.8E-01	T					I											
ANTU	00086-88-4			---		7.1E-01	T					I											
HEXACHLOROBUTADIENE	00087-68-3			---		4.5E-02	E	M	U		H	I											
PENTACHLOROPHENOL	00087-86-5			---		2.0E-01	D	M	U		H	I											
TRICHLOROPHENOL,246	00088-06-2			---		3.2E-01	E		U		H												
VINYL PYRROLIDINONE	00088-12-0			---		7.0	D	M				I											
NITROTOLUENE, O-	00088-72-2			---		26.0	T																
PICRIC ACID	00088-89-1			---		2.4E-01	T	M															
BUTYLPHENOL,O-SEC	00089-72-5			---		74.0	T																
ANISIDINE, O-	00090-04-0			---		1.2	T	M			H	I											
METHYLNAPHTHALENE,1-	00090-12-0			---		7.1	T					I											
TOLUENE 2,6-DIISOCYA	00091-08-7		26471-62-5	14.0	A	7.0E-02	E	H											R				
NAPHTHALENE	00091-20-3			7900.0	Z	3.0	E	M			H	I											
METHYLNAPHTHALENE,2-	00091-57-6			---		7.1	T					I											
NAPHTHYLAMINE, 2-	00091-59-8			---		2.0E-05	*	H				A											
N,N-DIETHYL ANILINE	00091-66-7		00100-61-8	---		5.2	A	M										R					
DICHLOROBENZIDINE33'	00091-94-1			---		3.0E-03	D	H			H												
BIPHENYL	00092-52-4			---		3.1	T	M			H												
AMINODIPHENYL, P-	00092-67-1			---		2.0E-05	*	H			H	A											
PHENOTHIAZINE	00092-84-2			---		12.0	T																
BENZIDINE	00092-87-5			---		1.5E-05	E	H	U		H	A	I										
NITRODIPHENYL, 4-	00092-93-3			---		2.0E-05	*	H			H	B											
TRICHLOPHENOXY,2,4,5	00093-76-5			---		24.0	T					I											
BENZOYL PEROXIDE	00094-36-0			---		12.0	T					I											
DICHLORPHENOXY,2,4	00094-75-7			---		24.0	T				H	I											
INDENE	00095-13-6			---		110.0	T																
XYLENE,O-	00095-47-6			4300.0	D	100.0	E	M			H	I											
CRESOL, O-	00095-48-7			---		52.0	T	M			H												
CHLOROTOLUENE,ORTHO	00095-49-8			---		620.0	T																
DICHLOROBENZENE, O-	00095-50-1			30000.0	Z	360.0	T	M				I											
TOLUIDINE, O-	00095-53-4			---		21.0	T	H			H	I											
PHENYLENEDIAMINE, O-	00095-54-5			---		2.4E-01	T					I											
TRIMETHYL BENZENE 1,	00095-63-6		25551-13-7	---		290.0	A											R					
TOLUENE 2,4-DIAMINE	00095-80-7		26471-62-5	14.0	A	9.0E-04	D	H	U		H								R				
DICHLOROANILINE,2,5-	00095-82-9		00062-53-3	---		6.0E-01	A	M	U									R					
STYRENE OXIDE	00096-09-3			---		2.0E-05	*	H			H												
DIBROMOCHLOROPROPANE	00096-12-8			---		2.0E-01	E				H												
METHYLPENTANE,3-	00096-14-0			350000.0	Z	4200.0	T																
TRICHLORPROPAN,123	00096-18-4			---		140.0	T					I											

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
DIETHYL KETONE	00096-22-0			110000.0	Z	1700.0	T																
DICHLOROPROPANOL,1,3	00096-23-1		00056-23-5	1900.0	A	6.7E-02	A		U									R	R				
METHYL ACRYLATE	00096-33-3			---		17.0	T	M				I											
METHYLCYCLOPENTANE	00096-37-7		00110-54-3	---		700.0	A	L										R					
ETHYLENE THIOUREA	00096-45-7			---		7.7E-02	D	H	U		H												
BUTYROLACTONE,gamma-	00096-48-0		00057-57-8	---		3.6	A	M										R					
THIOBISTERTBUTYLCRES	00096-69-5			---		24.0	T					I											
DISULFIRAM	00097-77-8			---		4.8	T					I											
ALUMINUM, TRIETHYL	00097-93-8	Al	Al*SALTALK	---		20.0	T	H										R		Q			
FURFURYL ALCOHOL	00098-00-0			6000.0	Z	95.0	T	M															
FURFURAL	00098-01-1			---		19.0	T	M				I											
BENZENEARSONIC ACID	00098-05-5	As	07440-38-2	---		6.3E-04	E	H	U		H							R		Q			
BENZOTRICHLORIDE	00098-07-7			80.0	Y	---	X				H	C	B										
BUTYLTOLUENE,P-TERT	00098-51-1			---		15.0	T																
TERPINEOL-ALPHA	00098-55-5		08006-64-2	---		2700.0	A	L										R					
CUMENE	00098-82-8			---		400.0	E				H												
METHYL STYRENE	00098-83-9			48000.0	Z	580.0	T																
ACETOPHENONE	00098-86-2			---		120.0	T				H												
BENZOYL CHLORIDE	00098-88-4			280.0	Y	---	X					C	I										
NITROBENZENE	00098-95-3			---		9.0	D	M			H	I											
NITROTOLUENE, M-	00099-08-1			---		26.0	T																
NITRO-O-TOLUIDINE,5	00099-55-8			---		2.4	T					I											
DINITROBENZENE, M-	00099-65-0			---		2.4	T	M															
NITROTOLUENE, P-	00099-99-0			---		26.0	T	M															
CHLORONITROBENZENE,P	00100-00-5			---		1.5	T	M				I											
NITROANILINE, P-	00100-01-6			---		7.1	T	M				I											
TEREPHTHALIC ACID	00100-21-0			---		24.0	T																
DINITROBENZENE	00100-25-4			---		2.4	T																
DIETHYLAMINOETHANOL	00100-37-8			---		23.0	T																
VINYL CYCLOHEXENE	00100-40-3			---		380.0	D	M				I											
ETHYL BENZENE	00100-41-4			54000.0	Z	1000.0	E	M			H	I											
STYRENE	00100-42-5			17000.0	Z	1000.0	E	M			H	I											
BENZYL CHLORIDE	00100-44-7			240.0	D	2.0E-02	D	H	U		H	I											
BENZYL ALCOHOL	00100-51-6			1300.0	D	350.0	D	M															
METHYL ANILINE	00100-61-8			---		5.2	T	M															
PHENYLHYDRAZINE	00100-63-0			---		1.0	T	M				I											
ETHYLMORPHOLINE,N-	00100-74-3			---		57.0	T																
METH BIS-O-CHLORANIL	00101-14-4			---		2.3E-03	D		U		H	B											
METHYLENE BISPH ISCY	00101-68-8			14.0	D	6.0E-01	E	H			H												
METHYLENEDIANILINE44	00101-77-9			---		2.0E-03	D	M	U		H	I											
PHENYL ETHER	00101-84-8			1400.0	Z	17.0	T																
DICYCPENTDIENYL IRON	00102-54-5			---		24.0	T																
TRIETHANOLAMINE	00102-71-6			---		12.0	T																
DIBUTYLAMINOETOL,2-N	00102-81-8			---		8.3	T																
ETHYLHEXYL ACRYLATE	00103-11-7		00096-33-3	---		17.0	A	M										R					
DIOCTYL ADIPATE	00103-23-1		00084-66-2	---		12.0	A	M										R					
AZOBENZENE	00103-33-3			---		3.2E-02	E		U														
N-PROPYLBENZENE	00103-65-1		00100-41-4	54000.0	A	1000.0	A	M										R	R				
N-ETHYLANILINE	00103-69-5		00100-61-8	---		5.2	A	M										R					
ANISIDINE, P-	00104-94-9			---		1.2	T	M				I											
BUTYL ACETATE, SEC-	00105-46-4			---		2300.0	T																
CAPROLACTAM	00105-60-2			---		12.0	T					I											
ETHYL BUTYL KETONE	00106-35-4			35000.0	Z	560.0	T																

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	-----codes----- 111111 123456789012345
XYLENE,P-	00106-42-3			4300.0	D	100.0	E	M	HI
CRESOL, P-	00106-44-5			---		52.0	T	M	H
DICHLOROBENZENE,P-	00106-46-7			---		9.0E-02	D	M	U HI
CHLOROANILINE, P-	00106-47-8		00062-53-3	---		8.2E-01	A	M	U R M
TOLUIDINE, P-	00106-49-0			---		21.0	T		I
PHENYLENEDIAMINE, P-	00106-50-3			---		2.4E-01	T	M	HI
QUINONE	00106-51-4			---		1.0	T	M	H
ETHYL AMYL KETONE	00106-68-3		00541-85-5	---		120.0	A		R
VINYL CYCLOHEXENE DI	00106-87-6			---		1.4	T		I
EPOXYBUTANE, 1,2	00106-88-7			3000.0	D	20.0	E	M	H
EPICHLOROHYDRIN	00106-89-8			1300.0	D	8.3E-01	E	M	U HI
ALLYL GLYCIDYL ETHER	00106-92-3			---		11.0	T		I
DIBROMOETHANE, 1,2-	00106-93-4			---		1.7E-03	E	H	U HI
BROMOPROPANE, 1-	00106-94-5			---		35.0	D	M	
BUTANE	00106-97-8			---		57000.0	T	L	
BUTADIENE, 1,3	00106-99-0			---		3.3E-02	E	H	U HB
ACROLEIN	00107-02-8			1.9E-01	D	2.0E-02	E	H	HCI
ALLYL CHLORIDE	00107-05-1			600.0	Z	1.0	E	M	HI
DICHLOROETHANE,1,2	00107-06-2			---		3.8E-02	E	M	U HI
ETHYLENE CHLOROHYDRN	00107-07-3			330.0	Y	---	X		CI
PROPIONITRILE	00107-12-0		00075-05-8	---		60.0	A		R
ACRYLONITRILE	00107-13-1			---		1.5E-02	E	H	U HI
ACETONITRILE,CHLOR0	00107-14-2		00075-05-8	---		60.0	A		H R
ETHYLENE DIAMINE	00107-15-3			---		60.0	T	M	I
GLYCOLONITRILE	00107-16-4		00075-05-8	---		60.0	A		R
ALLYL ALCOHOL	00107-18-6			---		2.8	T	H	I
PROPARGYL ALCOHOL	00107-19-7			---		5.5	T		
CHLOROACETALDEHYDE	00107-20-0			320.0	Y	---	X		C
ETHYLENE GLYCOL	00107-21-1			10000.0	Y	400.0	D		HCI
GLYOXAL	00107-22-2			---		2.4E-01	T		I
METHYL CHLOROMETHETH	00107-30-2		00542-88-1	---		1.6E-05	A	M	U HBI R
METHYL FORMATE	00107-31-3			37000.0	Z	590.0	T	M	
HEXYLENE GLYCOL	00107-41-5			12000.0	Y	---	X	L	C
HEXAMETHYLDISILOXANE	00107-46-0		07803-62-5	---		16.0	A	M	R
TEPP	00107-49-3			---		2.4E-02	T		
DIBUTYL PHOSPHATE	00107-66-4			1700.0	Z	20.0	T		
METHYL PENTANE, 2-	00107-83-5			350000.0	Z	4200.0	T	M	
METHYL PROPYL KETONE	00107-87-9			53000.0	Z	---	X		
PROPYLENE GLYCOL MON	00107-98-2			55000.0	Z	2000.0	E	M	
DIMETHYLAMINO ETH,2-	00108-01-0			---		26.0	D	M	
NITROPROPANE, 1-	00108-03-2			---		220.0	T	M	I
VINYL ACETATE	00108-05-4			5300.0	Z	200.0	E	M	HI
METHYL ISOBUTYL KETO	00108-10-1			31000.0	Z	3000.0	E	M	H
METHYLISOBUTYLCARBIN	00108-11-2			17000.0	Z	250.0	T		
DIISOPROPYLAMINE	00108-18-9			---		50.0	T		
ISOPROPYL ETHER	00108-20-3			130000.0	Z	2500.0	T		
ISOPROPYL ACETATE	00108-21-4			84000.0	Z	1000.0	T		
ACETIC ANHYDRIDE	00108-24-7			---		50.0	T	M	
MALEIC ANHYDRIDE	00108-31-6			---		7.0E-01	D	M	HI
XYLENE,M-	00108-38-3			4300.0	D	100.0	E	M	HI
CRESOL, M-	00108-39-4			---		52.0	T	M	H
TOLUIDINE, M-	00108-44-1			---		21.0	T		I
PHENYLENEDIAMINE, M-	00108-45-2			---		2.4E-01	T	M	I

		TOXIC	REFERENCED	SGC		AGC			-----codes-----														
																		1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
RESORCINOL	00108-46-3			9000.0	Z	1100.0	T	L				I											
DIVINYL BENZENE,1,3	00108-57-6		01321-74-0	---		130.0	A											R					
METHOXYPROPYLACETATE	00108-65-6		00107-98-2	55000.0	A	2000.0	A	L										R	R				
MESITYENE	00108-67-8		25551-13-7	---		290.0	A	M										R					
DIISOBUTYL KETONE	00108-83-8			---		350.0	T																
HEXYL ACETATE, SEC-	00108-84-9			---		7000.0	T	L															
METHYLCYCLOHEXANE	00108-87-2			---		3800.0	T	M															
TOLUENE	00108-88-3			37000.0	D	5000.0	E	L			H	I											
MONOCHLOROBENZENE	00108-90-7			---		110.0	T	M			H	I											
CYCLOHEXYLAMINE	00108-91-8			---		98.0	T					I											
CYCLOHEXANOL	00108-93-0			---		490.0	T																
CYCLOHEXANONE	00108-94-1			20000.0	Z	190.0	T	M				I											
PHENOL	00108-95-2			5800.0	D	45.0	T	M			H	I											
PHENYL MERCAPTAN	00108-98-5			---		1.1	T																
ISOPROPOXYETHANOL,2-	00109-59-1			---		250.0	T																
PROPYL ACETATE	00109-60-4			100000.0	Z	20000.0	T	L															
PENTANE	00109-66-0			---		4200.0	T																
PENTENE,1-	00109-67-1		00110-54-3	---		700.0	A	M										R					
BUTYLAMINE, N-	00109-73-9			1500.0	Y	---	X	M				C											
PROPANEDIAMINE,1,3-	00109-76-2		00107-15-3	---		60.0	A	M										R					
MALONONITRILE	00109-77-3		00075-05-8	---		60.0	A											R					
BUTYL MERCAPTAN	00109-79-5			---		4.3	T	M															
METHYL CELLOSOLVE	00109-86-4			93.0	D	20.0	E	M			H												
METHYLAL	00109-87-5			---		7400.0	T																
DIETHYLAMINE	00109-89-7			4500.0	Z	36.0	T					I											
ETHYL FORMATE	00109-94-4			---		720.0	T																
TETRAHYDROFURAN	00109-99-9			30000.0	Z	350.0	T	M															
METHYLISOAMYLKETONE	00110-12-3			---		560.0	T																
ISOBUTYL ACETATE	00110-19-0			---		17000.0	T	L															
METHYL AMYL KETONE	00110-43-0			---		550.0	T																
METHOXYETHYL ACET,2-	00110-49-6			---		1.2	T																
HEXANE	00110-54-3			---		700.0	E	M			H												
SUCCINONITRILE	00110-61-2		00075-05-8	---		60.0	A											R					
VALERALDEHYDE	00110-62-3			---		420.0	T																
GLYCOL MONOETHYLETHR	00110-80-5			370.0	D	200.0	E	M			H												
CYCLOHEXANE	00110-82-7			---		6000.0	E	L															
CYCLOHEXENE MIXTURE	00110-83-8			---		2400.0	T																
PYRIDINE	00110-86-1			---		74.0	T	L															
MORPHOLINE	00110-91-8			---		170.0	T					I											
ETHOXYETHYL ACETATE2	00111-15-9			140.0	D	64.0	T	M			H												
GLUTARALDEHYDE	00111-30-8			20.0	Y	8.0E-02	D					C	I										
ETHOXYPROPANOL,3-	00111-35-3		00107-98-2	55000.0	A	2000.0	A	M										R	R				
DIETHYLENE TRIAMINE	00111-40-0			---		10.0	T	M															
DIETHANOLAMINE	00111-42-2			---		3.0	D				H												
DICHLOROETHYL ETHER	00111-44-4			5800.0	Z	3.0E-03	E		U		H	I											
ETHYLENE GYLCOL MONO	00111-45-5		00110-80-5	420.0	A	230.0	A	M			H							R	R			M	M
GLYCOL ETHER	00111-46-6		00110-80-5	440.0	A	240.0	A				H							R	R			M	M
OCTANE	00111-65-9			---		3300.0	T																
ADIPONITRILE	00111-69-3			---		21.0	T																
BUTOXYETHANOL, 2-	00111-76-2			14000.0	D	13000.0	E	M			H	I											
METHYL CARBITOL	00111-77-3		00109-86-4	150.0	A	32.0	A	M			H							R	R			M	M
NONANE	00111-84-2			---		25000.0	T	L															
CARBITOL CELLOSOLVE	00111-90-0		00110-80-5	550.0	A	300.0	A	M			H							R	R			M	M

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
DIETHYLENE GLY DIETH	00111-96-6		00109-86-4	160.0	A	35.0	A	M			H							R	R			M	M
HEPTYL ACETATE	00112-06-1		00108-84-9	---		7000.0	A	L										R					
BUTOXYETHYL ACETATE	00112-07-2			---		310.0	T	M			H	I											
TRIETHYLENETETRAMINE	00112-24-3		00111-40-0	---		10.0	A	M										R					
TRIETHYLENE GLYCOL	00112-27-6		00110-80-5	620.0	A	330.0	A	M			H							R	R			M	M
BUTYL CARBITOL	00112-34-5		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
TRIETHYLENE GLY MET	00112-35-6		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
DIETHYL CARBITOL	00112-36-7		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
ETHYLENE GLY DIBUT	00112-48-1		00110-80-5	720.0	A	390.0	A	M			H							R	R			M	M
DODECYL MERCAPTAN	00112-55-0			---		1.9	T																
HEXYL CARBITOL	00112-59-4		00110-80-5	780.0	A	420.0	A	M			H							R	R			M	M
DIBUTYL CARBITOL	00112-73-2		00110-80-5	900.0	A	480.0	A	M			H							R	R			M	M
PROPOXUR (BAYGON)	00114-26-1			---		1.2	T				H	I											
PROPYLENE	00115-07-1			---		3000.0	D					G	I										
DIMETHYL ETHER	00115-10-6		00060-29-7	150000.0	A	29000.0	A	L										R	R				
ENDOSULFAN	00115-29-7			---		2.4E-01	T					I											
PENTAERYTHRITOL	00115-77-5			---		24.0	T																
TRIPHENYL PHOSPHATE	00115-86-6			---		7.1	T					I											
FENSULFOTHION	00115-90-2			---		2.4E-02	T					I											
TETRAFLUOROETHYLENE	00116-14-3			---		20.0	T					I											
HEXAFLUOROPROPYLENE	00116-15-4			---		1.4	T																
DIOCTYL PHTHALATE	00117-81-7			---		4.2E-01	D	M	U		H	I											
DICHLORDIMEHYDANTOIN	00118-52-5			40.0	Z	4.8E-01	T																
HEXACHLOROBENZENE	00118-74-1			---		2.2E-03	E	H	U		H	I											
TRINITROTOLUENE	00118-96-7			---		2.4E-01	T																
TOLIDINE, O-	00119-93-7		00062-53-3	---		6.0E-01	A	M	U		H	I						R					
ANTHRACENE	00120-12-7		13049829-2	---		2.0E-02	A	H	U		H							R					
CATECHOL	00120-80-9		00108-95-2	5800.0	A	55.0	T				H	I							R				
TRICHLORO BENZENE	00120-82-1			3700.0	Y	---	X				H	C											
DINITROTOLUENE,2,4-	00121-14-2			---		1.1E-02	D	H	U		H												
PYRETHRIN	00121-29-9		08003-34-7	---		12.0	A	M										R					
TRIETHYLAMINE	00121-44-8			2800.0	D	7.0	E				H	I											
TRIMETHYL PHOSPHITE	00121-45-9			---		24.0	T																
DIMETHYLANILINE	00121-69-7			5000.0	Z	60.0	T	M			H	I											
MALATHION	00121-75-5			---		2.4	T	M				I											
CYCLONITE	00121-82-4			---		1.2	T					I											
CHLORO NITROANILINE	00121-87-9		00100-01-6	---		7.1	A	M										R					
DIPHENYLAMINE	00122-39-4			---		24.0	T					I											
PHENY GLYCIDYL ETHER	00122-60-1			---		1.4	T	M				I											
DIPHENYL HYDRAZINE	00122-66-7		00057-14-7	---		4.5E-03	E	H	U		H												
ETHANOL,2-PHENOXY-	00122-99-6		00110-80-5	570.0	A	310.0	A	M			H							R	R			M	M
DIPROPYL KETONE	00123-19-3			---		550.0	T																
HYDROQUINONE	00123-31-9			---		4.8	T	M			H	I											
PROPIONALDEHYDE	00123-38-6			---		110.0	T				H												
DIACETONE ALCOHOL	00123-42-2			---		570.0	T	M															
ISOAMYL ALCOHOL	00123-51-3			45000.0	Z	8600.0	T	L															
CROTONALDEHYDE,trans	00123-73-9		04170-30-3	86.0	A	---	X												R				
BUTYL ACETATE	00123-86-4			95000.0	Z	17000.0	T	L															
DIOXANE,1,4	00123-91-1			3000.0	D	1.3E-01	D	M	U		H	I											
ISOAMYL ACETATE	00123-92-2			53000.0	Z	6300.0	T	L															
ADIPIC ACID	00124-04-9			---		12.0	T																
HEXANEDIAMINE, 1,6-	00124-09-4			---		5.5	T	M															
BUTYL CARBITOL ACETA	00124-17-4		00110-80-5	840.0	A	450.0	A	M			H							R	R			M	M

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
DECANE	00124-18-5		00110-54-3	---		700.0	A	M										R					
CARBON DIOXIDE	00124-38-9			5400000.0	Z	21000.0	T																
DIMETHYL AMINE	00124-40-3			2800.0	Z	22.0	T					I											
SODIUMACODYLATE	00124-65-2	As	07440-38-2	---		5.0E-04	E	H	U		H							R		Q			
ISOBUTANOLAMINE	00124-68-5		00141-43-5	1500.0	A	18.0	A	M										R	R				
PRIMIDONE	00125-33-7			---		3.6	D	M															
TRIBUTYL PHOSPHATE	00126-73-8			---		5.2	T																
METHYLACRYLONITRILE	00126-98-7			---		6.4	T																
CHLOROPRENE, B-	00126-99-8			---		86.0	T				H												
CHLORO-2-PROPANOL,1-	00127-00-4			---		9.5	T					I											
TETRACHLOROETHYLENE	00127-18-4			1000.0	H	1.0	H	M	U		H	I											
DIMETHYLACETAMIDE	00127-19-5			---		86.0	T	M				I											
SODIUM NITROBENZSULF	00127-68-4		00098-95-3	---		9.0	A	M										R					
NONPINNE	00127-91-3			---		270.0	T																
DITERT BUTLY-P-CRES	00128-37-0			---		48.0	T	L				I											
DITERTBUTYPHENOL,2,6	00128-39-2		00108-95-2	5800.0	A	45.0	A											R	R				
PYRENE	00129-00-0		13049829-2	---		2.0E-02	A	H	U		H							R					
DIMETHYL PHTHALATE	00131-11-3			---		12.0	T				H												
DIBENZOFURANS	00132-64-9		13049829-2	---		2.0E-02	A		U		H							R					
CAPTAN	00133-06-2			---		12.0	T				H	I											
HEXANOIC ACID,COBALT	00136-52-7	Co	07440-48-4	---		5.9E-03	D				H							R		Q			
SESONE	00136-78-7			---		24.0	T					I											
METHYL CYANOACRYLATE	00137-05-3			---		2.4	T				H												
THIRAM	00137-26-8			---		2.4	T	M				I											
BUTYL LACTATE, N-	00138-22-7			---		71.0	T																
BENZYL ACETATE	00140-11-4			---		150.0	T					I											
ARAMITE	00140-57-8			---		1.4E-01	E		U														
ETHYL ACRYLATE	00140-88-5			6100.0	Z	48.0	T				H	I											
BUTYL ACRYLATE, N-	00141-32-2			---		26.0	T					I											
ETHANOLAMINE	00141-43-5			1500.0	Z	18.0	T	M															
DICROTOPHOS	00141-66-2			---		1.2E-01	T					I											
ETHYL ACETATE	00141-78-6			---		3400.0	T	M															
MESITYL OXIDE	00141-79-7			10000.0	Z	140.0	T																
PIPERAZINE DIHYDROCH	00142-64-3			---		12.0	T																
HEPTANE, N-	00142-82-5			210000.0	Z	3900.0	T	M															
SODIUM CYANIDE	00143-33-9	CN	00057-12-5	380.0	s	45.0	S	H			H	C						R	R	Q	Q		
CHLORDECONE	00143-50-0			---		2.0E-05	*	H															
OXALIC ACID	00144-62-7			200.0	Z	2.4	T	M															
DINITRO-O-TOLUAMIDE	00148-01-6			---		2.4	T					I											
ETHYL HEXANOIC	00149-57-5			---		12.0	T					I											
METHOXYPHENOL, 4-	00150-76-5			---		12.0	T																
POTASSIUM CYANIDE	00151-50-8	CN	00057-12-5	380.0	s	45.0	S	H			H	C						R	R	Q	Q		
ETHYLENEIMINE	00151-56-4			---		2.1	T	H			H	I											
HALOTHANE	00151-67-7			---		960.0	T					I											
DICHLOROETHYLENE,cis	00156-59-2			---		63.0	D	M															
DICHLOROETHYLENEtran	00156-60-5			---		63.0	D	M															
CALCIUM CYANAMIDE	00156-62-7			---		1.2	T				H	I											
CHRYSENE	00218-01-9		13049829-2	---		2.0E-02	A	H	U		H	I						R					
ACRIDINE	00260-94-6		13049829-2	---		2.0E-02	A		U		H							R					
CYCLOPENTANE	00287-92-3			---		4100.0	T																
METHYL PARATHION	00298-00-0			---		4.8E-01	T					I											
PHORATE	00298-02-2			---		1.2E-01	T																
DISULFOTON	00298-04-4			---		1.2E-01	T					I											

									-----codes-----														
CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
RONNEL	00299-84-3			---		12.0	T																
CRUFORMATE	00299-86-5			---		12.0	T					I											
NALED (DIBROM)	00300-76-5			---		2.4E-01	T					I											
ACETIC ACID,LEAD	00301-04-2	Pb	07439-92-1	---		6.0E-01	s	H			H							R		Q			
HYDRAZINE	00302-01-2			---		2.0E-04	E	H	U		H	I											
ALDRIN	00309-00-2			---		2.0E-04	E	H	U			I											
BROMACIL	00314-40-9			---		24.0	T					I											
LINDANE, ALPHA-	00319-84-6			---		5.6E-04	E	M	U		H												
LINDANE, BETA-	00319-85-7			---		1.9E-03	E	M	U		H												
DIURON	00330-54-1			---		24.0	T					I											
THIOCYANIC ACID, K	00333-20-0	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
DIAZINON	00333-41-5			---		2.4E-02	T					I											
DIAZOMETHANE	00334-88-3			---		8.1E-01	T	M			H	B											
CARBONYL FLUORIDE	00353-50-4	F2	*FLUORIDE*	9.2	s	1.2E-01	s											R	R	Q	Q		
NICKEL ACETATE	00373-02-4	Ni	07440-02-0	18.0	D	1.3E-02	E	H	U		H							R	R	Q	Q		
PERFLUOROISOBUTYLENE	00382-21-8			8.2	Y	---	X					C											
SILICON CARBIDE	00409-21-2			---		7.1	T					K	I										
CYANAMIDE	00420-04-2			---		4.8	T	M															
CYANIC ACID	00420-05-3	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
CYANOGEN	00460-19-5		00074-90-8	520.0	A	3.0	D	M											R				
KETENE	00463-51-4			260.0	Z	2.0	T	M															
CARBONYL SULFIDE	00463-58-1			250.0	D	28.0	D	M			H												
DIMETHYLPROPANE	00463-82-1			---		4200.0	T																
TETRYL	00479-45-8			---		3.6	T																
SODIUM CARBONATE	00497-19-8		01310-73-2	200.0	A	---	X	L											R				
AMINOPYRIDINE, 2-	00504-29-0			---		4.8	T																
SILVER CYANIDE	00506-64-9	CN	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
GOLD CYANIDE	00506-65-0	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
CYANOGEN BROMIDE	00506-68-3		00074-90-8	75.0	D	3.0	A	M			H							R					
CYANOGEN CHLORIDE	00506-77-4		00074-90-8	75.0	Y	3.0	A	M			H	C						R					
TETRANITROMETHANE	00509-14-8			---		9.5E-02	T					I											
COBALT CARBONATE	00513-79-1	Co	07440-48-4	---		2.1E-03	D				H							R		Q			
ACETOIN	00513-86-0		00078-93-3	13000.0	A	5000.0	A	M										R	R				
TRIMETHYLBENZENE,123	00526-73-8		25551-13-7	---		290.0	A											R					
DINITROBENZENE	00528-29-0			---		2.4	T																
CHLOROACETOPHENONE,2	00532-27-4			---		3.0E-02	E	M			H	I											
METHYLFURAN,2-	00534-22-5		00098-00-0	6000.0	A	95.0	A	M										R	R				
DINITRO-O-CRESOL	00534-52-1			---		4.8E-01	T				H												
DICHLOROETHYLENE, 12	00540-59-0			---		63.0	D	M															
ISO-OCTANE	00540-84-1			---		3300.0	T	M			H												
BUTYL ACETATE, TERT-	00540-88-5			---		2300.0	T																
DECAMETHYLCYCLOPENTA	00541-02-6		00556-67-2	---		360.0	A	L										R					
DICHLOROBENZENE, m-	00541-73-1		00095-50-1	30000.0	A	360.0	A	M										R	R				
ETHYL AMYL KETONE	00541-85-5			---		120.0	T																
ISOBUTYL NITRITE	00542-56-3			380.0	s	---	X					C	I										
BARIUM CYANIDE	00542-62-1	C2N2	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
DICHLOROPROPENE, 1,3	00542-75-6			---		2.5E-01	E		U		H	I											
CADMIUM CYANIDE	00542-83-6	C2N2	00057-12-5	380.0	s	3.5E-04	D	H	U		H							R	R	Q	Q		
CHLOROMETHYL ETH,BIS	00542-88-1			---		1.6E-05	E	H	U		H	A											
CYCLOPENTADIENE, 1,3	00542-92-7			---		480.0	T	M															
COPPER CYANIDE	00544-92-3	CN	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
TRIMELLITIC ANHYDRID	00552-30-7			4.0	Y	---	X					C											
GOLD POTASSIUM CYAN	00554-07-4	C2N2	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		

		TOXIC	REFERENCED	SGC		AGC	-----codes-----																	
																		1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
GLYCIDOL	00556-52-5			---		15.0	T					I											
METHYL TETRAMER	00556-67-2			---		360.0	D	M															
ZINC STEARATE	00557-05-1			---		24.0	T																
NICKEL CYANIDE	00557-19-7	C2N2	00057-12-5	380.0	s	7.9E-03	E	H	U		H							R	R	Q	Q		
ZINC CYANIDE	00557-21-1	C2N2	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
CARBON TETRABROMIDE	00558-13-4			410.0	Z	3.3	T																
ETHION	00563-12-2			---		1.2E-01	T					I											
THALLIUM ACETATE	00563-68-8	Tl	07440-28-0	---		3.1E-01	T											R		Q			
METHYLISOPROPYLKETON	00563-80-4			---		1700.0	T																
METHYLCYCLOHEXANON,O	00583-60-8			34000.0	Z	550.0	T																
TOLUENE24DIISOCYANAT	00584-84-9		26471-62-5	14.0	A	7.0E-02	E	H			H	I							R				
DIPHENYL MERCURY	00587-85-9	Hg	Hg*ALKYL**	---		4.2E-02	T	H			H							R		Q			
POTASSIUM CYANATE	00590-28-3	CN	00057-12-5	380.0	s	45.0	S	M										R	R	Q	Q		
METHYL BUTYL KETONE	00591-78-6			4000.0	Z	48.0	T																
CALCIUM CYANIDE	00592-01-8	C2N2		380.0	s	---	X	H			H	C									Q		
HEXENE,-1	00592-41-6			---		410.0	T																
VINYL BROMIDE	00593-60-2			---		3.0	E	H			H	B											
PERCHLORMETHMERCAPTN	00594-42-3			---		1.8	T																
DICHLORONITROETHANE	00594-72-9			---		29.0	T																
CARBONIC ACID,MnSALT	00598-62-9		07439-96-5	---		5.0E-02	A				H							R					
LEAD CARBONATE	00598-63-0	Pb	07439-92-1	---		4.9E-01	s	H			H							R		Q			
CHLOROPROPIONICACI,2	00598-78-7			---		1.0	T																
CHLORO NITROPROPANE	00600-25-9			---		24.0	T																
TRIPHENYL ARSINE	00603-32-7	As	07440-38-2	---		9.5E-04	E	H	U		H							R		Q			
TRIPHENYL AMINE	00603-34-9			---		12.0	T																
LINDANE-TECHNICAL	00608-73-1			---		2.0E-03	E		U														
AMYL ACETATE,3-	00620-11-1			53000.0	Z	630.0	T																
ETHANOL,2-(PHENYLMET	00622-08-2		00110-80-5	620.0	A	340.0	A				H							R	R			M	M
METHYLBUTYLACETATE,2	00624-41-9			53000.0	Z	630.0	T																
METHYL ISOCYANATE	00624-83-9			---		1.1E-01	T	H			H												
DIMETHYL DISULFIDE	00624-92-0		07783-06-4	14.0	A	4.8	T	M											R				
AMYL ACETATE, tert-	00625-16-1			53000.0	Z	630.0	T																
PENTEN-2-OL,4-	00625-31-0		00107-18-6	---		2.8	A	H										R					
DIMETHYLFURAN,2,5-	00625-86-5		00098-00-0	6000.0	A	95.0	A	M										R	R				
PHTHALODINITRILE, M-	00626-17-5			---		12.0	T																
AMYL ACETATE, SEC-	00626-38-0			53000.0	Z	630.0	T																
PROPYL NITRATE, N-	00627-13-4			17000.0	Z	250.0	T																
AMYL ACETATE, N-	00628-63-7			53000.0	Z	630.0	T																
ETHYLENEGLYCOLDINITR	00628-96-6			---		7.4E-01	T																
ETHYLENE GLY DIMET	00629-14-1		00109-86-4	140.0	A	31.0	A	M			H							R	R			M	M
DIETHYLENE GLY MET	00629-38-9		00110-80-5	670.0	A	360.0	A	M			H							R	R			M	M
TRIDECANE	00629-50-5		00110-54-3	---		700.0	A	L										R					
CARBON MONOXIDE	00630-08-0			14000.0	s	---	X																
SELENOUREA	00630-10-4	Se	07782-49-2	---		31.0	D				H							R		Q			
OXOPHENYL ARSINE	00637-03-6	As	07440-38-2	---		5.2E-04	E	H	U		H							R		Q			
ETBE	00637-92-3			---		45.0	S																
PHENYLPHOSPHINE	00638-21-1		07803-51-2	23.0	Y	3.0E-01	A					C						R					
DIOXOLANE	00646-06-0			---		1500.0	T	L															
METHYL SILICATE	00681-84-5			---		14.0	T	M															
HEXAFLUOROACETONE	00684-16-2			---		1.6	T																
ET HEXYLMETHACRYLATE	00688-84-6		00096-33-3	---		17.0	A	M										R					
PHENYL DICHLOROARSIN	00696-28-6	As	07440-38-2	---		6.9E-04	E	H	U		H							R		Q			
ETHYL 4-OXAHEXANOATE	00763-69-9		00111-15-9	140.0	A	64.0	A	M										R	R				

		TOXIC	REFERENCED	SGC		AGC			-----codes-----														
																		1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
DICHLORO-2-BUTENE,14	00764-41-0			---		6.0E-02	T					B											
ISOPROPYLANILINE, N-	00768-52-5			---		26.0	T																
TETRAFLUOROETHANE	00811-97-2			---		80000.0	E	L															
HEXAMETHYLENE DIISOC	00822-06-0		26471-62-5	14.0	A	1.0E-02	E	H			H								R				
METHYL PYRROLIDONE	00872-50-4			---		100.0	D	M															
SODIUM CYANATE	00917-61-3	CN	00057-12-5	380.0	s	45.0	S	M										R	R	Q	Q		
AMINOPROPYLTRIETSI,g	00919-30-2		07803-62-5	---		160.0	A	L										R					
DEMETON-S-METHYL	00919-86-8			---		1.2E-01	T					I											
INDIUM, TRIETHYL	00923-34-2	In	07440-74-6	---		4.2E-01	T	H										R		Q			
NITROSO-N-BUTYLAMINE	00924-16-3			---		6.3E-04	E		U														
NITROSOPYRROLIDINE	00930-55-2			---		1.6E-03	E		U														
FONOFOS	00944-22-9			---		2.4E-01	T					I											
AMYLMETHYLETHER,tert	00994-05-8			---		200.0	T																
DIALLYLAMALEATE	00999-21-3		00108-31-6	---		7.0E-01	A	M										R					
HYDROXYPROPYLACRYLAT	00999-61-1			---		6.7	T																
HEPTACHLOR EPOXIDE	01024-57-3			---		3.8E-04	E	H	U			I											
TETRADECENE,1-	01120-36-1		00110-54-3	---		700.0	A	L										R					
PROPANE SULTONE	01120-71-4			---		1.4E-03	D	M	U		H	I											
TRIPHENYL As OXIDE	01153-05-5	As	07440-38-2	---		1.0E-03	E	H	U		H							R		Q			
METHYLTRIMETHOXYSILA	01185-55-3		07803-62-5	---		160.0	A	L										R					
BUTYL CHROMATE, TERT	01189-85-1	Cr	18540-29-9	23.0	Y	8.9E-05	H	H	U		H	C						R		Q	Q		
SODIUM XYLENESULFNTE	01300-72-7		01330-20-7	4300.0	A	100.0	A	L										R	R				
XYLIDINE	01300-73-8			---		6.0	T	M				I											
EMERY	01302-74-5			---		24.0	T																
GALLIUM ARSENIDE	01303-00-0	As	07440-38-2	---		4.5E-04	E	H	U		H							R		Q			
ARSENIC PENTOXIDE	01303-28-2	As2	07440-38-2	---		3.6E-04	E	H	U		H	A						R		Q			
BORON OXIDE	01303-86-2			---		24.0	T																
BORATES,DECAHYDRATE	01303-96-4			---		4.8	T																
BERYLLIUM OXIDE	01304-56-9	Be	07440-41-7	2.8	Z	1.2E-03	E	H	U		H							R	R	Q	Q		
BISMUTH TELLURIDE	01304-82-1		Bi2Te3*und	---		24.0	A					K						R					
CALCIUM DIHYDROXIDE	01305-62-0			---		12.0	T																
CALCIUM OXIDE	01305-78-8			---		4.8	T																
CADMIUM OXIDE	01306-19-0	Cd	07440-43-9	---		2.7E-04	D	H	U		H							R		Q			
CADMIUM SULFIDE	01306-23-6	Cd	07440-43-9	---		3.1E-04	D	H	U		H							R		Q			
CADMIUM SELENIDE	01306-24-7	Cd	07440-43-9	---		4.1E-04	D	H	U		H							R		Q			
COBALT OXIDE	01307-96-6	Co	07440-48-4	---		1.3E-03	D	M			H							R		Q			
ZINC CHROMATES	01308-13-0	Cr	18540-29-9	---		7.1E-05	H	H	U		H							R		Q			
CHROMIUM HYDROXIDE	01308-14-1	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM OXIDE	01308-38-9	Cr2	16065-83-1	---		45.0	S	M			H							R		Q			
IRON OXIDE	01309-37-1			---		12.0	T					I											
MAGNESIUM OXIDE	01309-48-4			---		24.0	T					I											
LEAD OXIDE	01309-60-0	Pb	07439-92-1	---		4.4E-01	s	H			H							R		Q			
ANTIMONY TRIOXIDE	01309-64-4	Sb2		---		2.4E-01	E	M			H	B								Q			
POTASSIUM HYDROXIDE	01310-58-3			200.0	Y	---	X					C											
SODIUM HYDROXIDE	01310-73-2			200.0	Y	---	X					C											
MANGANESE OXIDE	01313-13-9	Mn	07439-96-5	---		3.8E-01	E				H							R		Q			
NICKEL OXIDE	01313-99-1	Ni	Ni*INORG**	7.6	D	5.3E-03	E	H	U		H	A	I					R		Q	Q		
NICKEL OXIDE	01314-06-3	Ni2	Ni*INORG**	---		5.9E-03	E	H	U		H	I						R		Q			
ZINC OXIDE	01314-13-2			380.0	s	45.0	S	M															
THALLIUM OXIDE	01314-32-5	Tl2	07440-28-0	---		2.7E-01	T	M										R		Q			
LEAD TETROXIDE	01314-41-6	Pb3	07439-92-1	---		4.2E-01	s	H			H							R		Q			
ANTIMONY OXIDE	01314-60-9	Sb	07440-36-0	---		1.3	T				H							R		Q			
TANTALUM OXIDE	01314-61-0	Ta2		---		15.0	T													Q			

DAR-1 AGC/SGC Table (NUMERICALLY by CAS Number)

							-----codes-----															
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
VANADIUM OXIDE	01314-62-1			30.0	D	1.2E-01	T					I											
PHOSPH PENTASULFIDE	01314-80-3			300.0	Z	2.4	T																
ZINC PHOSPHIDE	01314-84-7		07803-51-2	140.0	A	3.0E-01	A	M										R	R				
MANGANESE OXIDE	01317-34-6	Mn2	07439-96-5	---		7.2E-02	E				H							R		Q			
MANGANESE TETROXIDE	01317-35-7	Mn3	07439-96-5	---		6.9E-02	E				H							R		Q			
LEAD OXIDE	01317-36-8	Pb	07439-92-1	---		4.1E-01	s	H			H							R		Q			
COBALT SULFIDE	01317-42-6	Co	07440-48-4	---		1.5E-03	D	M			H							R		Q			
LEAD CARBONATE	01319-46-6	Pb3	07439-92-1	---		4.7E-01	s	H			H							R		Q			
CRESOL	01319-77-3			---		52.0	T	M			H												
PENTACHLORONAPHTHALE	01321-64-8			---		1.2	T																
TRICHLORONAPHTHALENE	01321-65-9			---		12.0	T																
DIVINYL BENZENE, MIX	01321-74-0			---		130.0	T																
ARSENIC ACID	01327-52-2	As	07440-38-2	---		4.4E-04	E	H	U		H							R		Q			
ARSENIC TRIOXIDE	01327-53-3	As4	07440-38-2	---		3.1E-04	E	H	U		H	A						R		Q			
ZINC CHROMITE	01328-67-2	Cr	18540-29-9	---		7.1E-05	H	H	U		H							R		Q			
XYLENE,M,O&P MIXT.	01330-20-7			4300.0	D	100.0	E	M			H	I											
BORATES,ANHYDROUS	01330-43-4			---		4.8	T																
ASBESTOS	01332-21-4			---		1.6E-05	D	H	U		H	A	I										
KAOLIN (CLAY)	01332-58-7			---		4.8	T					I											
CHROMIUM OXIDE	01333-82-0	Cr	18540-29-9	---		3.8E-05	H	H	U		H							R		Q			
CARBON BLACK	01333-86-4			---		8.3	T	M				I											
LEAD OXIDE	01335-25-7	Pb	07439-92-1	---		4.1E-01	s	H			H							R		Q			
LEAD ACETATE	01335-32-6	Pb3	07439-92-1	---		4.9E-01	s	H			H							R		Q			
HEXACHLORONAPTHALENE	01335-87-1			---		4.8E-01	T	M															
TETRACHLORONAPHTHALE	01335-88-2			---		4.8	T																
AQUA AMMONIA	01336-21-6		07664-41-7	2400.0	A	100.0	A	L										R	R				
PCB	01336-36-3		11096-82-5	---		2.0E-03	A	H	U		H							R					
MANGANESE NAPTHENAT	01336-93-2		07439-96-5	---		5.0E-02	A				H							R					
MEK PEROXIDE	01338-23-4			150.0	Y	---	X					C											
ALUMINUM OXIDE	01344-28-1	Al2		---		45.0	T					I								Q			
LEAD SULFOCHROMATE	01344-37-2	Cr	18540-29-9	---		2.0E-05	A	H	U		H							R					
MANGANESE OXIDE	01344-43-0	Mn	07439-96-5	---		6.5E-02	E				H							R		Q			
MERCURY SULFIDE	01344-48-5	Hg	07439-97-6	2.1	D	3.5E-01	E	H			H							R	R	Q	Q		
CALCIUM SILICATE	01344-95-2			---		24.0	T					I											
ANTIMONY TRISULFIDE	01345-04-6	Sb2	07440-36-0	---		1.7	T				H							R		Q			
CADMIUMMERCURYSULFID	01345-09-1	Cd	07440-43-9	---		7.4E-04	D	H	U		H							R		Q			
COBALT ALUMINATE	01345-16-0	Co	07440-48-4	---		3.0E-03	D				H							R		Q			
SUBTILISINS	01395-21-7			6.0E-03	Y	---	X	H				C											
XYLENE @,@-DIAMINE:M	01477-55-0			10.0	Y	---	X					C											
CARBOFURAN	01563-66-2			---		2.4E-01	T	M				I											
PROPANOL-2,PROPOXY-1	01569-01-3		00107-98-2	55000.0	A	2000.0	A	M										R	R				
METHYLTERTBUTYLETHER	01634-04-4			---		3000.0	E	M			H	I											
ARSENOZO III	01668-00-4	As2	As*ORGANIC	---		1.2E-03	E	H	U		H							R		Q			
SILANE, CHLORETHENYL	01719-58-0		07803-62-5	---		16.0	A	M										R					
TCDDIOXIN, 2,3,7,8-	01746-01-6			---		3.0E-08	D	H	U		H												
PARAQUAT DICHLORIDE	01910-42-5		PARAQUAT*R	---		2.4E-01	A	M										R					
ATRAZINE	01912-24-9			---		12.0	T					I											
PICLORAM	01918-02-1			---		24.0	T					I											
NITRAPYRIN	01929-82-4			2000.0	Z	24.0	T					I											
CHLOROSTYRENE, O-	02039-87-4			43000.0	Z	670.0	T																
PARAQUAT DIMETHYLSUL	02074-50-2		PARAQUAT*R	---		2.4E-01	A											R					
EPN	02104-64-5			---		2.4E-01	T					I											
ALLYL PROPYL DISULFI	02179-59-1			---		7.1	T																

DAR-1 AGC/SGC Table (NUMERICALLY by CAS Number)

							-----codes-----															
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
CADMIUM STEARATE	02223-93-0	Cd2	07440-43-9	---		8.5E-04	D	H	U		H							R		Q			
OCTACHLORONAPHTHALEN	02234-13-1			30.0	Z	2.4E-01	T	M															
ETHYL MERCURIC PHOSP	02235-25-8	Hg	Hg*ALKYL**	---		3.9E-02	T	H			H							R		Q			
DIGLYCIDYL ETHER	02238-07-5			---		1.2E-01	T					I											
MIREX	02385-85-5			---		2.0E-05	*	H															
CAPTAFOL	02425-06-1			---		2.4E-01	T					I											
BUTYL GLYCIDYL ETHER	02426-08-6			---		38.0	T																
TRIGLYCIDYL-S-TRIAZI	02451-62-9			---		1.2E-01	T																
AURAMINE	02465-27-2			---		2.0E-05	*	H															
TRIMETHOXYSILANE	02487-90-3		07803-62-5	---		16.0	A	M										R					
DIBUTYL PHENYL PHOSP	02528-36-1			---		8.3	T																
SULFUR HEXAFLUORIDE	02551-62-4	F6	*FLUORIDE*	6.8	s	8.6E-02	s											R	R	Q	Q		
METHYLVINYLTETRAMER	02554-06-5		07803-62-5	---		16.0	A	M										R					
CHLORBENZMALONONIT,O	02698-41-1			39.0	Y	---	X					C	I										
SULFURYL FLUORIDE	02699-79-8	F2	*FLUORIDE*	14.0	s	1.8E-01	s											R	R	Q	Q		
DIQUAT	02764-72-9		DIQUAT*RES	---		2.4E-01	A					K	I					R					
ETHYLENEGLY MONOPR E	02807-30-9		00110-80-5	430.0	A	230.0	A	M			H							R	R			M	M
CHLORPYRIFOS	02921-88-2			---		2.4E-01	T					I											
CLOPIDOL	02971-90-6			---		24.0	T					I											
DMAEE	03033-62-3			98.0	Z	7.9E-01	T																
ARSENOUS ACID,TRIMET	03141-12-6	As	07440-38-2	---		6.5E-04	E		U		H							R		Q			
NAPHTHALELEDIISOCYAN	03173-72-6		26471-62-5	14.0	A	7.0E-02	A											R	R				
TETRAMETHYL SUCCINON	03333-52-6			---		6.7	T																
CARBONIC ACID Ni SLT	03333-67-3	Ni	07440-02-0	11.0	D	7.5E-03	E	H	U		H							R	R	Q	Q		
TEMEPHOS (ABATE)	03383-96-8			---		2.4	T																
LEAD ARSENATE	03687-31-8	As2	07440-38-2	---		1.4E-03	E	H	U		H							R		Q			
SULFOTEP	03689-24-5			---		2.4E-01	T					I											
HDI-CYANURATE POLYME	03779-63-3			75.0	D	6.0E-01	D	M															
AMMONIUM PERFLUOROOC	03825-26-1			---		2.4E-02	T					I											
ISOPROPYLGLYCIDYLETH	04016-14-2			36000.0	Z	570.0	T																
HDI-BIURET POLYMER	04035-89-6			75.0	D	6.0E-01	D	M															
ISOPHORONE DIISOCYAN	04098-71-9		26471-62-5	14.0	A	1.1E-01	T												R				
CROTONALDEHYDE	04170-30-3			86.0	Y	---	X					C	I										
PARAQUAT	04685-14-7		PARAQUAT*R	---		2.4E-01	A	M				K						R					
DIGLYCID AMINO...	05026-74-4		00122-60-1	---		1.4	A	M										R					
METHYLENEBIS4CYCLOHE	05124-30-1			---		1.3E-01	T	H															
SULFUR PENTAFLUORIDE	05714-22-7	F10	*FLUORIDE*	7.1	s	9.0E-02	s					C						R	R	Q	Q		
NICKEL DIACETATE TET	06018-89-9	Ni	07440-02-0	26.0	D	1.8E-02	E	H	U		H							R	R	Q	Q		
DIQUATDIBROMIDEMONOH	06385-62-2		DIQUAT*RES	---		2.4E-01	A					K						R					
PROPYLENE GLYCOL DIN	06423-43-4			---		8.1E-01	T				H												
THALLIUM CARBONATE	06533-73-9	Tl2	07440-28-0	---		2.7E-01	T											R		Q			
MONOCROTOPHOS	06923-22-4			---		1.2E-01	T					I											
ETHYL CYANOACRYLATE	07085-85-0			---		2.4	T																
LEAD STEARATE SALT	07428-48-0	Pb	07439-92-1	---		9.0E-01	s	H			H							R		Q			
ALUMINUM	07429-90-5	Al	Al*SALTALK	---		4.8	A					K						R					
LEAD	07439-92-1	Pb		---	X	3.8E-01	s	H			H	I											
MANGANESE	07439-96-5	Mn		---		5.0E-02	E	M			H												
MERCURY	07439-97-6	Hg		1.8	D	3.0E-01	E	H			H	K	I										
MOLYBDENUM	07439-98-7	Mo	Mo*SOLUBLE	---		1.2	A					K						R					
NICKEL	07440-02-0	Ni		6.0	D	4.2E-03	E	H	U		H	K	I										
PLATINUM	07440-06-4	Pt	Pt*SOLSALT	---		4.8E-03	A					K						R					
RHODIUM RH	07440-16-6	Rh	Rh*SOLCOMP	---		2.4E-02	A					K	I					R					
SILVER	07440-22-4	Ag	Ag*SOLCOMP	---		2.4E-02	A					K						R					

DAR-1 AGC/SGC Table (NUMERICALLY by CAS Number)

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
TANTALUM TA	07440-25-7			---		12.0	T																
THALLIUM	07440-28-0	Tl		---		2.4E-01	T	M															
TIN	07440-31-5	Sn	Sn*ORGANIC	20.0	A	2.4E-01	A					K						R	R				
TUNGSTEN	07440-33-7	W	W*SOLUBLE*	300.0	A	2.4	A					K						R	R				
ANTIMONY	07440-36-0	Sb		---		1.2	T	M			H												
ARSENIC	07440-38-2	As		---		2.3E-04	E	H	U		H	A											
BARIUM	07440-39-3	Ba		---		1.2	T	M				I											
BERYLLIUM	07440-41-7	Be		1.0	Z	4.2E-04	E	H	U		H	A											
CADMIUM	07440-43-9	Cd		---		2.4E-04	D	H	U		H	B											
CHROMIUM	07440-47-3	Cr	16065-83-1	---		1.2	T	H			H	I											
COBALT	07440-48-4	Co		---		1.0E-03	D	M			H	I											
COPPER	07440-50-8	Cu	Cu*FUME***	100.0	D	2.0E-02	D	M				K											
HAFNIUM HF	07440-58-6	Hf		---		1.2	T																
URANIUM	07440-61-1	U		60.0	Z	4.8E-01	T					A											
VANADIUM	07440-62-2			---		2.0E-01	H	H															
YTTRIUM	07440-65-5	Y		---		2.4	T																
ZINC	07440-66-6			---		45.0	S	L															
ZIRCONIUM ZR	07440-67-7	Zr		380.0	s	12.0	T					I											
INDIUM IN	07440-74-6	In		---		2.4E-01	T	H															
SELENIUM DIOXIDE	07446-08-4	Se	07782-49-2	---		28.0	D											R		Q			
SULFUR DIOXIDE	07446-09-5			910.0	s	80.0	S					I											
LEAD SULFATE	07446-14-2	Pb	07439-92-1	---		5.6E-01	s	H			H							R		Q			
THALLIUM SULFATE	07446-18-6	Tl2	07440-28-0	---		3.0E-01	T	M										R		Q			
LEAD PHOSPHATE SALT	07446-27-7	Pb2	07439-92-1	---		5.3E-01	s	H			H	I						R		Q			
SELENIUM SULFIDE	07446-34-6	Se	07782-49-2	---		28.0	D				H							R		Q			
MERCURY CHLORIDE	07487-94-7	Hg	07439-97-6	2.4	D	4.1E-01	E	H			H							R	R	Q	Q		
SELENIUM DISULFIDE	07488-56-4	Se	07782-49-2	---		36.0	D	M			H							R		Q			
TITANIUM TETRACHLOR.	07550-45-0			---		2.0E-05	*	H			H												
IODINE	07553-56-2			100.0	Y	---	X	L				C											
MONOSODIUM PHOSPHATE	07558-80-7		07664-38-2	300.0	A	10.0	A	L										R	R				
DICHLOROACETYLENE	07572-29-4			39.0	Y	---	X					C	I										
LITHIUM HYDRIDE LIH	07580-67-8			---		6.0E-02	T																
PERCHLORYL FLUORIDE	07616-94-6	F	*FLUORIDE*	29.0	s	3.6E-01	s											R	R	Q	Q		
SODIUM ARSENATE	07631-89-2	As	07440-38-2	---		5.1E-04	E	H	U		H							R		Q			
SODIUM BISULFITE	07631-90-5			---		12.0	T					I											
SODIUM NITRITE	07632-00-0			---		2.0E-05	*	H															
BORON TRIFLUORIDE	07637-07-2	F3	*FLUORIDE*	6.3	s	8.0E-02	s					C						R	R	Q	Q		
LEAD ARSENATE	07645-25-2	As	07440-38-2	---		1.1E-03	E	H	U		H							R		Q			
COBALT CHLORINE	07646-79-9	Co	07440-48-4	---		2.2E-03	D				H							R		Q			
ZINC CHLORIDE	07646-85-7			200.0	Z	2.4	T	M															
HYDROGEN CHLORIDE	07647-01-0			2100.0	D	20.0	E	L			H	C	I										
PHOSPHORIC ACID	07664-38-2			300.0	Z	10.0	E	M															
HYDROGEN FLUORIDE	07664-39-3	F	*FLUORIDE*	5.6	s	7.1E-02	s	M			H	C						R	R	Q	Q		
AMMONIA	07664-41-7			2400.0	Z	100.0	E	L															
SULFURIC ACID	07664-93-9			120.0	D	1.0	D	M				B											
SODIUM METABISULFITE	07681-57-4			---		12.0	T					I											
NITRIC ACID	07697-37-2			86.0	D	12.0	T	M															
ZINC BROMIDE	07699-45-8		07646-85-7	200.0	A	2.4	A	M										R	R				
NICKEL CHLORIDE	07718-54-9	Ni	Ni*INORG**	13.0	D	9.2E-03	E	H	U		H	I						R		Q	Q		
THIONYL CHLORIDE	07719-09-7		07647-01-0	380.0	s	20.0	A					C						R	R				
PHOSPHOROUS TRICHLOR	07719-12-2			280.0	Z	2.6	T																
POTASSIUM PERMANGANA	07722-64-7	Mn	07439-96-5	---		1.4E-01	E	M			H							R		Q			
HYDROGEN PEROXIDE	07722-84-1			---		3.3	T					I											

DAR-1 AGC/SGC Table (NUMERICALLY by CAS Number)

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
PHOSPHORUS (YELLOW)	07723-14-0			---		7.0E-02	D	M			H												
BROMINE	07726-95-6			130.0	Z	1.6	T	M															
POTASSIUM PERSULFATE	07727-21-1	S2O8		---		3.4E-01	T													Q			
BARIUM SULFATE	07727-43-7			---		24.0	T	M															
AMMONIUM PERSULFATE	07727-54-0	S2O8		---		2.8E-01	T													Q			
CHROMIC (VI) ACID	07738-94-5	Cr	18540-29-9	---		4.5E-05	H	H	U		H	A						R		Q			
SODIUM SULFATE	07757-82-6			120.0	D	---	X																
LEAD CHLORIDE	07758-95-4	Pb	07439-92-1	---		5.1E-01	s	H			H							R		Q			
LEAD CHROMATE	07758-97-6	Cr	18540-29-9	---		1.2E-04	H	H	U		H	B						R		Q			
AMMONIUM SULFAMATE	07773-06-0			---		240.0	T	L															
MERCURY IODINE	07774-29-0	Hg	07439-97-6	4.1	D	6.8E-01	E	H			H							R	R	Q	Q		
CHROMIC ACID,Na SALT	07775-11-3	Cr	18540-29-9	---		6.3E-05	H	H	U		H							R		Q			
SODIUM PERSULFATE	07775-27-1	S2O8		---		3.0	T	L												Q			
CALCIUM SULFATE	07778-18-9			---		24.0	T																
ARSENIC ACID	07778-39-4	As	07440-38-2	---		4.4E-04	E	H	U		H	A						R		Q			
CALCIUM ARSENATE	07778-44-1	As2	07440-38-2	---		6.3E-04	E	H	U		H							R		Q			
POTASSIUM DICHROMAT	07778-50-9	Cr2	18540-29-9	---		5.7E-05	H	H	U		H							R		Q			
FLUORINE	07782-41-4			5.3	s	6.7E-02	s	M															
GRAPHITE	07782-42-5			---		4.8	T																
SELENIUM	07782-49-2	Se		---		20.0	D	M			H												
CHLORINE	07782-50-5			290.0	Z	2.0E-01	D	M			H	I											
GERMANIUMTETRAHYDRID	07782-65-2			---		1.5	T																
SELENIOUS ACID	07783-00-8	Se	07782-49-2	---		33.0	D				H							R		Q			
HYDROGEN SULFIDE	07783-06-4			14.0	S	2.0	E	M															
HYDROGEN SELENIDE	07783-07-5			5.0	D	8.0E-02	D				H												
AMMONIUM SULFATE	07783-20-2			120.0	D	---	X	L															
MERCURIC SULFATE	07783-35-9	Hg	07439-97-6	2.7	D	4.4E-01	E	H			H							R	R	Q	Q		
OXYGEN DIFLUORIDE	07783-41-7	F2	*FLUORIDE*	7.5	s	9.5E-02	s					C						R	R	Q	Q		
NITROGEN TRIFLUORIDE	07783-54-2	F3	*FLUORIDE*	6.6	s	8.3E-02	s											R	R	Q	Q		
SULFUR TETRAFLUORIDE	07783-60-0	F4	*FLUORIDE*	7.5	s	9.5E-02	s					C						R	R	Q	Q		
SELENIUM HEXAFLUORID	07783-79-1	F6	*FLUORIDE*	9.0	s	1.1E-01	s				H							R	R	Q	Q		
TELLURIUM HEXAFLUORI	07783-80-4	F6	*FLUORIDE*	11.0	s	1.4E-01	s											R	R	Q	Q		
ARSENOUS TRICHLORIDE	07784-34-1	As	07440-38-2	---		5.6E-04	E	H	U		H							R		Q			
ARSENOUS TRIFLUORIDE	07784-35-2	As	07440-38-2	---		4.1E-04	E	H	U		H							R		Q			
PENTAFLUORO-ARSORANE	07784-36-3	As	07440-38-2	---		5.3E-04	E	H	U		H							R		Q			
LEAD ARSENATE	07784-40-9	As	07440-38-2	---		1.1E-03	E	H	U		H							R		Q			
ARSINE	07784-42-1			160.0	D	5.0E-02	E	H			H												
SODIUM ARSENITE	07784-46-5	As	07440-38-2	---		4.0E-04	E	H	U		H	A						R		Q			
MANGANESE SULFATE	07785-87-7	Mn	07439-96-5	---		1.4E-01	E				H							R		Q			
MEVINPHOS	07786-34-7			---		2.4E-02	T					I											
NICKEL (+2) SULFATE	07786-81-4	Ni	Ni*INORG**	16.0	D	1.1E-02	E	H	U		H	I						R		Q	Q		
BERYLLIUM FLUORIDE	07787-49-7	Be	07440-41-7	5.2	Z	2.2E-03	E	H	U		H							R	R	Q	Q		
CHROMYL FLUORIDE	07788-96-7	Cr	18540-29-9	---		4.7E-05	H	H	U		H							R		Q			
POTASSIUM CHROMATE	07789-00-6	Cr	18540-29-9	---		7.5E-05	H	H	U		H							R		Q			
STRONTIUM CHROMATE	07789-06-2	Cr	18540-29-9	---		7.9E-05	H	H	U		H	B						R		Q			
CHROMIC ACID, DIAMMO	07789-09-5	Cr2	18540-29-9	---		4.8E-05	H	H	U		H							R		Q			
CHROMIC ACID, DISODI	07789-12-0	Cr2	18540-29-9	---		5.2E-05	H	H	U		H							R		Q			
BROMINE PENTAFLUORID	07789-30-2	F5	*FLUORIDE*	9.8	s	1.2E-01	s											R	R	Q	Q		
CADMIUM CHLORIDE HYD	07790-78-5	Cd	07440-43-9	---		3.9E-04	D	H	U		H							R		Q			
CADMIUM IODIDE	07790-80-9	Cd	07440-43-9	---		7.8E-04	D	H	U		H							R		Q			
SULFURIC ACI,CADMIUM	07790-84-3	Cd	07440-43-9	---		4.5E-04	D	H	U		H							R		Q			
CHLORINE TRIFLUORIDE	07790-91-2	F3	*FLUORIDE*	8.6	s	1.1E-01	s					C						R	R	Q	Q		
THALLIUM CHLORIDE	07791-12-0	Tl	07440-28-0	---		2.8E-01	T											R		Q			

									-----codes-----														
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
PHOSPHINE	07803-51-2			140.0	Z	3.0E-01	E	M			H												
STIBINE	07803-52-3			---		1.2	T				H												
SILICON TETRAHYDRIDE	07803-62-5			---		16.0	T	M															
AMMONIUM BISULFATE	07803-63-6			120.0	D	---	X																
TOXAPHENE	08001-35-2			100.0	Z	3.1E-03	E	H	U		H	I											
PARAFFIN WAX	08002-74-2			---		4.8	T																
PYRETHRUM	08003-34-7			---		12.0	T	M				I											
NATURAL GAS	08006-14-2			---		1600.0	T																
GASOLINE	08006-61-9		86290-81-5	150000.0	A	2100.0	A											R	R				
TURPENTINE	08006-64-2			---		2700.0	T	L															
COKE OVEN EMISSIONS	08007-45-2			---		1.6E-03	E	H	U		H												
KEROSENE	08008-20-6			---		480.0	T					I											
OIL MIST (MINERAL)	08012-95-1			380.0	s	12.0	T	M															
METHYL DEMETON	08022-00-2			---		1.2E-01	T																
NAPHTHA (COAL TAR)	08030-30-6			---		3800.0	T																
VM&P NAPHTHA	08032-32-4			---		33000.0	T	L				I											
STODDARD SOLVENT	08052-41-3			---		1300.0	T																
ASPHALT	08052-42-4			---		1.2	T					I											
DEMETON	08065-48-3			---		1.2E-01	T					I											
ETHOXYLATED ALCOHOLS	09002-92-0		00110-80-5	1500.0	A	800.0	A	M										R	R			M	M
POLYACRYLIC ACID	09003-01-4		00079-10-7	6000.0	A	1.0	A	M										R	R				
POLYPROPYLENE	09003-07-0		NY075-00-5	380.0	s	---	X	L											R				
POLYSTYRENE DUST	09003-53-6		00100-42-5	380.0	s	45.0	S	M										R	R				
CELLULOSE	09004-34-6			---		24.0	T																
STARCH	09005-25-8			---		24.0	T					I											
RUBBER DUST	09006-04-6			---		2.4E-03	T					I											
MANGANESE ROSINATE	09008-34-8		07439-96-5	---		5.0E-02	A				H							R					
SUBTILISINS	09014-01-1			6.0E-03	Y	---	X	H				C											
POLYMERIC MDI	09016-87-9			75.0	D	6.0E-01	E	H															
ACRYLIC MONOMERS	09081-82-7		00080-62-6	41000.0	A	700.0	A	M										R	R				
CADMIUM NITRATE TET	10022-68-1	Cd	07440-43-9	---		5.9E-04	D		U		H							R		Q			
NITROUS OXIDE	10024-97-2			---		210.0	T					I											
SULFUR MONOCHLORIDE	10025-67-9			380.0	s	---	X					C											
CHROMIUM CHLORIDE	10025-73-7	Cr	16065-83-1	---		45.0	S				H							R		Q			
PHOSPH OXYCHLORIDE	10025-87-3			---		1.5	T																
ANTIMONY TRICHLORIDE	10025-91-9	Sb	07440-36-0	---		2.2	T				H							R		Q			
SELENIUM CHLORIDE	10026-03-6	Se	07782-49-2	---		45.0	S				H							R		Q			
PHOSPH PENTACHLORIDE	10026-13-8			---		2.0	T																
COBALT TRIFLUORIDE	10026-18-3	Co	07440-48-4	---		2.0E-03	D				H							R		Q			
FERRIC SULFATE	10028-22-5		07664-93-9	120.0	A	1.0	A	L										R	R				
SODIUM CHROMATE(VI)	10034-82-9	Cr	18540-29-9	---		9.1E-05	H	H	U		H							R		Q			
HYDROGEN BROMIDE	10035-10-6			680.0	Y	---	X	L				C											
BORATE	10043-35-3			---		4.8	T																
MERCURY NITRATE	10045-94-0	Hg	07439-97-6	2.9	D	4.9E-01	E	H			H							R	R	Q	Q		
CHLORINE DIOXIDE	10049-04-4			83.0	Z	2.0E-01	E	M															
CHROMIUM CHLORIDE	10060-12-5	Cr	16065-83-1	---		45.0	S				H							R		Q			
NITRIC ACID,LEADSALT	10099-74-8	Pb	07439-92-1	---		5.0E-01	s	H			H							R		Q			
CHROMIUM SULFATE	10101-53-8	Cr2	16065-83-1	---		45.0	S				H							R		Q			
NICKEL SULFATE	10101-97-0	Ni	Ni*INORG**	---		1.9E-02	E	H	U		H							R		Q			
NITROGEN OXIDE	10102-43-9			---		74.0	T																
NITROGEN DIOXIDE	10102-44-0			---	X	100.0	S					I											
THALLIUM NITRATE	10102-45-1	Tl	07440-28-0	---		3.1E-01	T											R		Q			
CADMIUM CHLORIDE	10108-64-2	Cd	07440-43-9	---		3.9E-04	D	H	U		H							R		Q			

DAR-1 AGC/SGC Table (NUMERICALLY by CAS Number)

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	-----codes-----														
									1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CADMIUM SULFATE	10124-36-4	Cd	07440-43-9	---		4.5E-04	D	H	U		H							R		Q			
COBALT SULFATE	10124-43-3	Co	07440-48-4	---		2.7E-03	D				H							R		Q			
POTASSIUM ARSENITE	10124-50-2	As	07440-38-2	---		5.1E-04	E	H	U		H							R		Q			
MANGANESE PHOSPHATE	10124-54-6	Mn	07439-96-5	---		1.4E-01	E				H							R		Q			
CHROMIUM K SULFATE	10141-00-1	Cr	16065-83-1	---		45.0	S				H							R		Q			
LEAD MOLYBDATE	10190-55-3	Pb	07439-92-1	---		6.7E-01	s	H			H							R		Q			
COBALT CARBONYL	10210-68-1	Co2	07440-48-4	---		2.9E-03	D				H							R		Q			
BORON TRIBROMIDE	10294-33-4			380.0	s	---	X					C											
BARIUM CHROMATE	10294-40-3	Cr	18540-29-9	---		9.8E-05	H	H	U		H							R		Q			
CADMIUM NITRATE	10325-94-7	Cd	07440-43-9	---		5.1E-04	D	H	U		H							R		Q			
MANGANESE NITRATE	10377-66-9	Mn	07439-96-5	---		1.1E-01	E				H							R		Q			
NICKEL PHOSPHATE	10381-36-9	Ni3	Ni*INORG**	---		8.8E-03	E	H	U		H							R		Q			
MERCUROUS NITRATE	10415-75-5	Hg	07439-97-6	2.4	D	3.9E-01	E	H			H							R	R	Q	Q		
SODIUM DICHROMATE	10588-01-9	Cr2	18540-29-9	---		5.1E-05	H	H	U		H							R		Q			
CARBENDAZIM	10605-21-7		01563-66-2	---		2.4E-01	A	M										R					
PCB AROCLOR 1260	11096-82-5			---		2.0E-03	E	H	U		H												
PCB AROCLOR 1254	11097-69-1			---		2.0E-03	E	H	U		H	I											
PCB AROCLOR 1268	11100-14-4			---		2.0E-03	E	H	U		H												
ZINC CHROMATE	11103-86-9	Cr2	18540-29-9	---		8.1E-05	H	H	U		H	A						R		Q			
PCB AROCLOR 1221	11104-28-2			---		1.0E-02	E	H	U		H												
CHROMIC ACID	11115-74-5	Cr	18540-29-9	---		4.5E-05	H	H	U		H							R		Q			
LEAD SILICATE	11120-22-2	Pb3	07439-92-1	---		4.8E-01	s	H			H							R		Q			
PCB AROCLOR 1232	11141-16-5			---		1.0E-02	E	H	U		H												
SYNTHETIC SILICA	11294552-5		14464-46-1	---		6.0E-02	A				H							R					
MICA	12001-26-2			---		7.1	T																
CROCIDOLITE	12001-28-4		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
CHRYSOTILE	12001-29-5		01332-21-4	---		1.6E-05	A	H	U		H							R					
MERCURY "NUCLEATE"	12002-19-6			1.8	D	---	X				H												
NICKEL BORIDE	12007-02-2	Ni3	Ni*INORG**	---		4.4E-03	E	H	U		H							R		Q			
CHROMIUM DIOXIDE	12018-01-8	Cr	16065-83-1	---		45.0	S				H							R		Q			
CHROMIUM ZINC OXIDE	12018-19-8	Cr	18540-29-9	---		9.0E-05	H		U		H							R		Q			
NICKEL SUBSULFIDE	12035-72-2	Ni3	Ni*INORG**	8.2	D	2.8E-03	E	H	U		H	A	I							Q	Q		
THALLIUM SELENITE	12039-52-0	Se	07782-49-2	---		45.0	S	M			H							R		Q			
NICKEL HYDROXIDE	12054-48-7	Ni	Ni*INORG**	---		6.6E-03	E	H	U		H							R		Q			
LEAD TITANIUM OXIDE	12060-00-3	Pb	07439-92-1	---		5.6E-01	s	H			H							R		Q			
LEAD ZIRCONIUM OXIDE	12060-01-4	Pb	07439-92-1	---		6.4E-01	s	H			H							R		Q			
MANGANESECYCLOPENTAD	12079-65-1	Mn		---		8.8E-01	T				H									Q			
METHYLCYCLOPENTADIEN	12108-13-3	Mn		---		1.5	T				H									Q			
AMMONIUM BROMIDE	12124-97-9		12125-02-9	380.0	s	24.0	A	M										R	R				
AMMONIUM CHLORIDE	12125-02-9			380.0	s	24.0	T	M															
AMOSITE	12172-73-5		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
BORATES,PENTAHYDRATE	12179-04-3			---		4.8	T																
PHOSPHORUS (YELLOW)	12185-10-3			---		7.0E-02	D	M			H												
LEAD OXIDE SULFATE	12202-17-4	Pb	07439-92-1	---		6.4E-01	s	H			H							R		Q			
SODIUM MONOXIDE	12401-86-4			---		5.0	D																
CADMIUM ZINC SULFATE	12442-27-2	Cd	07440-43-9	---		4.5E-04	D	H	U		H							R		Q			
FERROVANADIUM DUST	12604-58-9			300.0	Z	2.4	T																
LEAD TITANATE ZIRCON	12626-81-2	Pb	07439-92-1	---		7.2E-01	s	H			H							R		Q			
NICKEL TITANATE	12653-76-8	Ni	Ni*INORG**	---		1.1E-02	E	H	U		H							R		Q			
PCB AROCLOR 1248	12672-29-6			---		2.0E-03	E	H	U		H												
PCB AROCLOR 1016	12674-11-2			---		1.0E-02	E	H	U		H												
NICKEL CARBIDE	12710-36-0	Ni	Ni*INORG**	---		5.9E-03	E	H	U		H							R		Q			
CHLORDANE, TECHNICAL	12789-03-6			---		1.0E-02	E	H	U														

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	-----codes----- 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PAH(s)	13049829-2			---		2.0E-02	H	H	U		H	I											
TERBUFOS	13071-79-9			---		2.4E-02	T					I											
CYHEXATIN	13121-70-5			---		12.0	T					I											
NICKEL NITRATE	13138-45-9	Ni	Ni*INORG**	---		1.3E-02	E	H	U		H							R		Q			
PHTHALIC ANHYD.,cis-	13149-00-3			5.0E-01	Y	---	X					C	I										
CHRYSOTILE	13220732-0		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
GYPSUM	13397-24-5			---		24.0	T					I											
SELENIC ACID DISOD	13410-01-0	Se	07782-49-2	---		45.0	S											R		Q			
NICKEL BROMIDE	13462-88-9	Ni	Ni*INORG**	---		1.6E-02	E	H	U		H							R		Q			
NICKEL CARBONYL	13463-39-3	Ni	Ni*INORG**	---		1.2E-02	E	H	U		H							R		Q			
IRON PENTACARBONYL	13463-40-6			160.0	Z	1.9	T																
TITANIUM DIOXIDE	13463-67-7			---		24.0	T					I											
ARSENOUS ACID	13464-58-9	As		---		4.7E-02	T	H			H	A								Q			
CARENE, 3-	13466-78-9			---		270.0	T					I											
TELLURIUM	13494-80-9	Te		---		2.4E-01	T																
BE ETHYL DIAM CL	13497-34-2	Be	07440-41-7	22.0	Z	9.3E-03	E	H	U		H							R	R	Q	Q		
BERYLLIUM SULFATE	13510-49-1	Be	07440-41-7	12.0	Z	4.9E-03	E	H	U		H							R	R	Q	Q		
ZINC CHROMATE	13530-65-9	Cr	18540-29-9	---		7.1E-05	H	H	U		H	A						R		Q			
CHROMIC ACID	13530-68-2	Cr2	18540-29-9	---		4.2E-05	H	H	U		H							R		Q			
SODIUM FERROCYANIDE	13601-19-9	C6N6	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
SODIUM CUPRICCYANIDE	13715-19-0	C2N2	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
POTASSIUM FERRICYANI	13746-66-2	CN	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
CALCIUM CHROMATE	13765-19-0	Cr	18540-29-9	---		6.1E-05	H	H	U		H	B						R		Q			
NICKEL SULFAMIDE	13770-89-3	Ni	Ni*INORG**	---		1.1E-02	E	H	U		H							R		Q			
DEUTERIUM SULFATE	13813-19-9		07664-93-9	120.0	A	1.0	A	M										R	R				
LEAD FLUOROBORATE	13814-96-5	Pb	07439-92-1	---		5.4E-01	s	H			H							R		Q			
ENFLURANE	13838-16-9			---		1300.0	T					I											
CHROMATE	13907-45-4	Cr	18540-29-9	---		4.5E-05	H	H	U		H							R		Q			
POTASSIUM FERROCYANI	13943-58-3	CN	00057-12-5	380.0	s	45.0	S				H							R	R				
POTASSIUM GOLD CYANI	13967-50-5	C2N2	00057-12-5	380.0	s	45.0	S				H							R	R	Q	Q		
SULFOMIC ACID, Co	14017-41-5	Co2	07440-48-4	---		1.8E-03	D				H							R		Q			
PHTHALIC ANHY.,trans	14166-21-3			5.0E-01	Y	---	X					C	I										
SODIUM FERRICYANIDE	14217-21-1	C6N6	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
POTASSIUM NICKELCYN	14220-17-8	Ni	Ni*INORG**	---		1.7E-02	E	H	U		H							R		Q			
CD DIETHDITHIOCARB	14239-68-0	Cd	07440-43-9	---		8.7E-04	D	H	U		H							R		Q			
POTASSIUMGOLDCYANIDE	14263-59-3	C4N4	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
CHROMIC ACID, DILITH	14307-35-8	Cr	18540-29-9	---		5.1E-05	H	H	U		H							R		Q			
SILICA - CRYSTALLINE	14464-46-1			---		6.0E-02	T					B	I										
FERBAM	14484-64-1			---		24.0	T					I											
TALC	14807-96-6			---		4.8	T					I											
SILICA - QUARTZ	14808-60-7			---		6.0E-02	T				H	B	I										
DIMTHYLETHOXYSILANE	14857-34-2			380.0	s	5.0	T																
CHROMIUM OXYCHLORIDE	14977-61-8	Cr	18540-29-9	---		6.0E-05	H	H	U		H							R		Q			
SODIUM ZINC CYANIDE	15333-24-1	C4N4	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
MERCUROUS OXIDE	15829-53-5	Hg2	07439-97-6	1.9	D	3.1E-01	E	H			H							R	R	Q	Q		
ALACHLOR	15972-60-8			---		2.4	T	M				I											
CHROMIUM III	16065-83-1	Cr		---		45.0	S	M			H	I											
ETHYLIDENENORBORNENE	16219-75-3			2500.0	Y	---	X					C											
METHOMYL	16752-77-5			---		6.0	T					I											
COBALT HYDROCARBONYL	16842-03-8	Co	07440-48-4	---		2.9E-03	D				H							R		Q			
ANTIMONATE,HEXAFL,Na	16925-25-0	Sb	07440-36-0	---		2.5	T				H							R		Q			
DECABORANE	17702-41-9			75.0	Z	6.0E-01	T																
BENOMYL	17804-35-2			---		24.0	T					I											

							-----codes-----																
		TOXIC	REFERENCED	SGC		AGC												1	1	1	1	1	1
CHEMICAL NAME	CAS NUMBER	ELEMENT	COMPOUND	ug/m3	W	ug/m3	W	T	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
DI(ME)TETRA(MEO)DISI	18186-97-5		00681-84-5	---		14.0	A	M										R					
TIN DIOXIDE	18282-10-5	Sn		---		6.0	T													Q			
LEAD CHROMATE OXIDE	18454-12-1	Cr	18540-29-9	---		2.1E-04	H	H	U		H							R		Q			
CHROMIUM(VI)	18540-29-9	Cr		---		2.0E-05	H	H	U		H	A	K										
DIBORANE	19287-45-7			---		2.6E-01	T																
HEXA-CDD	19408-74-3			---		7.7E-07	E		U														
PERFLUOROBUTYL ETHY.	19430-93-4			---		2400.0	T																
PENTABORANE	19624-22-7			3.9	Z	3.1E-02	T																
CHROMIUM OXIDE PYRID	20492-50-6	Cr	18540-29-9	---		9.9E-05	H		U		H							R		Q			
OSMIUM TETROXIDE	20816-12-0	Os		6.3E-01	Z	5.1E-03	T													Q	Q		
METRIBUZIN	21087-64-9			---		12.0	T					I											
CESIUM HYDROXIDE	21351-79-1			---		4.8	T																
STONNOUS OXIDE	21651-19-4	Sn		---		5.4	T													Q			
MERCURIC OXIDE	21908-53-2	Hg	07439-97-6	1.9	D	3.2E-01	E	H			H							R	R	Q	Q		
FENAMIPHOS	22224-92-6			---		1.2E-01	T					I											
METHYLMERCURY	22967-92-6	Hg	Hg*ALKYL**	3.0	Z	2.4E-02	T	H			H												
POLYETHYLENEGLYCOLDI	24991-55-7		00110-80-5	370.0	A	200.0	A	M										R	R			M	M
VINYL TOLUENE	25013-15-4			48000.0	Z	580.0	T					I											
PROPANOL, OXYBIS	25265-71-8		00110-80-5	550.0	A	300.0	A	L			H							R	R			M	M
DINITROTOLUENE	25321-14-6			---		1.1E-02	D	H	U		H	I											
LEAD CARBONATE	25510-11-6	Pb	07439-92-1	---		4.9E-01	s	H			H							R		Q			
TRIMETHYL BENZENE	25551-13-7			---		290.0	T	M															
METHYLCYCLOHEXANOL	25639-42-3			---		560.0	T																
POLYOXYPROPYLENE	25791-96-2		00110-80-5	1100.0	A	590.0	A	M										R	R			M	M
TERPHENYLS	26140-60-3			500.0	Y	---	X					C											
BENZ METHBIS ISOCYAN	26447-40-5		00101-68-8	14.0	A	6.0E-01	A	H										R	R				
TOLUENE DIISOCYANATE	26471-62-5			14.0	Z	7.0E-02	E	H				I											
METHYLCYCLOPENTADIEN	26519-91-5		00542-92-7	---		480.0	A	M										R					
MERCURY,NEODEC.,PHEN	26545-49-3	Hg	Hg*ALKYL**	---		5.3E-02	T	H			H							R		Q			
SODIUM AZIDE	26628-22-8			29.0	Y	---	X					C	I										
DIISODECYL PHTHALATE	26761-40-0		00084-66-2	---		12.0	A	M										R					
ISOOCTYL ALCOHOL	26952-21-6			---		630.0	T																
DIISOOCTYLPHTHALATE	27554-26-3		00084-66-2	---		12.0	A	M										R					
HDI POLYMER	28182-81-2			75.0	D	6.0E-01	D	M															
BROMADIOLONE	28772-56-7			---		2.0E-05	*	H															
ANISIDINE	29191-52-4			---		1.2	T	M															
CHLORINATED DIPH OX	31242-93-0			---		1.2	T																
DIPROPGLYCOLMETHETHR	34590-94-8			91000.0	Z	1400.0	T																
BUTANOL	35296-72-1		00071-36-3	---		1500.0	A	L										R					
PIGMENT RED	35355-77-2		07439-96-5	---		5.0E-02	A				H							R					
SULPROFOS	35400-43-2			---		2.4	T					I											
GOLD CYANIDE	37187-64-7	CN	00057-12-5	380.0	s	45.0	S	H			H							R	R	Q	Q		
ZINC CHROMATE	37300-23-5	Cr4	18540-29-9	---		8.4E-05	H	H	U		H	A						R		Q			
PCB AROCLOR 1262	37324-23-5			---		2.0E-03	E	H	U		H												
NICKEL,BIS(1-(4-DIME	38465-55-3	Ni	07440-02-0	64.0	D	4.5E-02	E	H	U		H							R	R	Q	Q		
DIALKYL PHTHALATES	39393-37-8		00084-66-2	---		12.0	A	M										R					
BERULLIUM ZINC SILIC	39413-47-3	Be	07440-41-7	18.0	Z	7.7E-03	E	H	U		H	B						R	R	Q	Q		
BARIUM LEAD SULFATE	42579-89-5	Pb	07439-92-1	---		8.1E-01	s	H			H							R		Q			
CHROMIUM ZINC OXIDE	50922-29-7	Cr2	18540-29-9	---		4.5E-05	H	H	U		H							R		Q			
TCDFURAN, 2,3,7,8-	51207-31-9		01746-01-6	---		3.0E-08	A	H	U		H							R					
LEAD ACETATE	51404-69-4	Pb3	07439-92-1	---		4.9E-01	s	H			H							R		Q			
NICKEL AZO YELLOW	51931-46-5	Ni	07440-02-0	67.0	D	4.7E-02	E	H	U		H							R	R	Q	Q		
CYPERMETHRIN	52315-07-8		08003-34-7	---		12.0	A	M										R					

-----codes-----

CHEMICAL NAME	CAS NUMBER	TOXIC ELEMENT	REFERENCED COMPOUND	SGC ug/m3	W	AGC ug/m3	W	T	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
PERMETHRIN	52645-53-1		08003-34-7	---		12.0	A	M										R					
COBALT COMPLEX	53108-50-2	Co	07440-48-4	---		4.2E-03	D	M			H							R		Q			
PCB AROCLOR 1242	53469-21-9			---		1.0E-02	E	H	U		H												
TETRAKIS PHOSPH.SULF	55566-30-8			---		4.8	T					I											
Cd CYCLOHEXANE BUTY	55700-14-6	Cd	07440-43-9	---		6.0E-04	D	H	U		H							R		Q			
PROPANOL, BUTOXYMET-	55934-93-5		00110-80-5	1000.0	A	550.0	A				H							R	R			M	M
LEADSTEARATE	56189-09-4	Pb2	07439-92-1	---		9.3E-01	s	H			H							R		Q			
HEXA-CDD	57653-85-7			---		7.7E-07	E		U														
DIETHYLEN GLYCOL ADP	58984-19-3		00110-80-5	370.0	A	200.0	A				H							R	R				
MAPP	59355-75-8			210000.0	Z	3900.0	T																
ULTEM	61128-46-9		NY075-00-5	380.0	s	---	X	M											R				
HYDROGENATED TERPHEN	61788-32-7			---		12.0	T																
COBALT NAPTHA	61789-51-3		07440-48-4	---		1.0E-03	A	M			H							R					
LEAD NAPHTHENATE	61790-14-5	Pb	07439-92-1	---		6.2E-01	s	H			H							R		Q			
SILOXANESSILICONDIME	63148-62-9		07803-62-5	---		16.0	A	M										R					
COKE(PETROLEUM)	64741-79-3		08007-45-2	---		1.6E-03	A		U		H							R					
DISTILL.HYDR0 LIGHT	64742-47-8			---		480.0	T					I											
KEROSENE	64742-81-0			---		480.0	T					I											
NAPHTHA HEAVY	64742-94-5		08030-30-6	---		3800.0	A	M										R					
NAPHTHA LIGHT	64742-95-6		08030-30-6	---		3800.0	A	M										R					
COKE	65996-77-2		08007-45-2	---		1.6E-03	A		U		H							R					
COAL TAR PITCH VOLAT	65996-93-2			---		4.8E-01	T					A											
PORTLAND CEMENT	65997-15-1			---		24.0	T																
ALPHAMETHRIN	67375-30-8		08003-34-7	---		12.0	A	M										R					
CHROME TANNED COWHID	68131-98-6		18540-29-9	---		2.0E-05	A	H	U		H							R					
PETROLEUM SULFONATE	68425-94-5		00110-54-3	---		700.0	A	L										R					
LIQUIFIED GAS	68476-85-7			---		2400.0	T																
MELAMINEFORMALDEHYDE	68891-01-0		00050-00-0	30.0	A	6.0E-02	A	M	U									R	R				
LEAD,BENZENEDICARBOX	69011-06-9	Pb3	07439-92-1	---		5.0E-01	s	H			H							R		Q			
LEAD ALLOY,SN ,DROSS	69011-60-5	Pb	07439-92-1	---		6.0E-01	s	H			H							R		Q			
BUTADIENE POLYMER	69102-90-5		00106-99-0	---		3.3E-02	A	H	U									R					
SULFOMETURON METHYL	74222-97-2			---		12.0	T					I											
ETHOXYLATED ALCOHOLS	74432-13-6		00110-80-5	1500.0	A	800.0	A	M										R	R			M	M
ACTINOLITE	77536-66-4		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
ANTHOPHYLLITE	77536-67-5		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
TREMOLITE	77536-68-6		01332-21-4	---		1.6E-05	A	H	U		H	A	I					R					
BIFENTHRIN	82657-04-3		08003-34-7	---		12.0	A	M										R					
GASOLINE	86290-81-5			150000.0	Z	2100.0	T					I											
PHOSPHORIC ACID, REA	92203-02-6		07664-38-2	300.0	A	10.0	A				H							R	R				
PARTICULATE	NY075-00-0			380.0	s	45.0	S					K											
PARTICULATE (PM-10)	NY075-00-5			380.0	s	---	X					K											
PARTICULATE (PM-2.5)	NY075-02-5			160.0	s	15.0	S					K											

TOXICITY (T):

- (H) HIGH Toxicity Contaminant.
- (M) MODERATE Toxicity Contaminant.
- (L) LOW Toxicity Contaminant.

WHO (W), Source of AGC/SGC Assignment:

- (A) AGC/SGC based upon NYSDEC "Analogy".
- (D) NYSDEC derived AGC/SGC.
- (E) AGC based upon EPA IRIS data (RFC or Unit Risk).
- (H) NYSDOH derived AGC/SGC.
- (S) AGC/SGC listed is FEDERAL or NYS Standard.
- (T) AGC based upon ACGIH TLV.
- (Y) SGC is based on ACGIH TLV Ceiling limit.
- (Z) SGC is based on ACGIH STEL.
- (*) AGC assigned High Toxicity "de minimis" limit.
- ( ) There is no SGC for this compound.

WHO (W), Source of special AGC/SGC Interim Assignment:

- (s) AGC/SGC based upon Equivalent FEDERAL or NYS Standard.
- (X) There is no AGC/SGC value for this contaminant.

```
-----codes-----
         111111
123456789012345:
```

codes, (Position 1):
- (U) AGC equivalent to "one in a million risk".

codes, (Position 3):
- (H) FEDERAL HAP identified by 1990 CAAA.

codes, (Positions 4 & 5):
- (A) ACGIH Human Carcinogen.
- (B) ACGIH Suspected Human Carcinogen.
- (C) ACGIH Ceiling Limit.
- (G) ACGIH Simple Asphxiant.
- (I) Refer to ACGIH Handbook: (Code A3,A4,A5 or particulate fraction).
- (K) Multiple TLVs assigned in ACGIH Handbook.

codes, (Position 8):
- (Q) REFERENCED AGC adjusted for elemental assignment.

codes, (Position 9):
- (Q) REFERENCED SGC adjusted for elemental assignment.

codes, (Position 10):
- (R) AGC ASSIGNED TO REFERENCED COMPOUND.

codes, (Position 11):
- (R) SGC ASSIGNED TO REFERENCED COMPOUND.

codes, (Position 12):
- (Q) AGC ASSIGNED AS DIFFERENT ELEMENT(s) & ADJUSTED.

codes, (Position 13):
- (Q) SGC ASSIGNED AS DIFFERENT ELEMENT(s) & ADJUSTED.

codes, (Position 14):
- (M) REFERENCED AGC adjusted for MOLECULAR WEIGHTS.

codes, (Position 15):
- (M) REFERENCED SGC adjusted for MOLECULAR WEIGHTS.

3-in-1 Flame-Ox

Multimode Oxidation System

Accelerate Site Clean-up

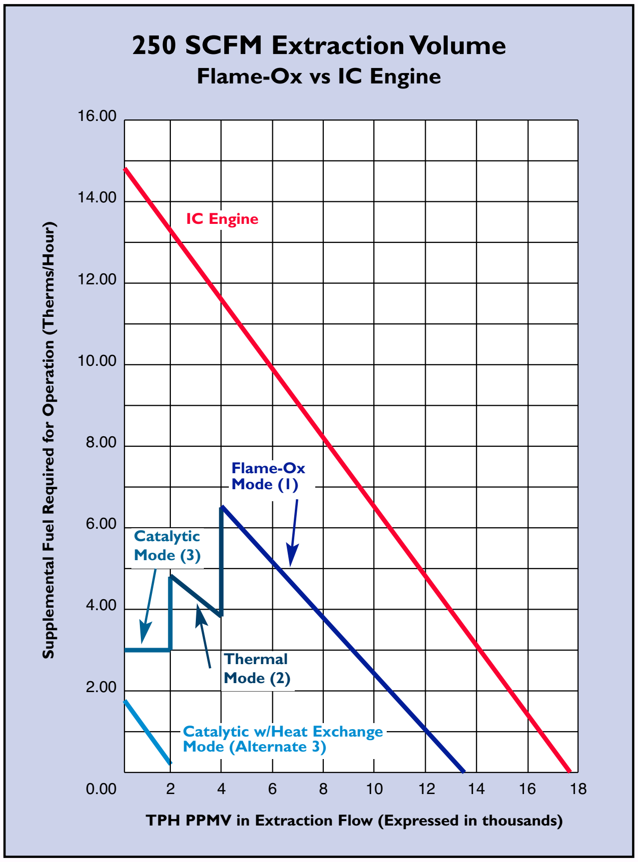
The Flame-Ox is ideally suited to treat off-gas from soil vapor extraction systems (SVE) or multi/dual-phase extraction systems (MPE or DPE) in the presence of free phase gasoline.

The Flame-Ox was specifically designed to treat 100% of the process air stream, without having to bleed in ambient air prior to the extraction blower to lower the LEL to a point where traditional technology can safely operate.

Three Modes — One Oxidation System

The Flame-Ox oxidation system was specifically engineered for remediation sites with free phase product and/or heavily contaminated soil vapors. The Flame-Ox is designed to provide three individual modes of operation, with each maximizing hydrocarbon throughput while minimizing supplemental energy requirements, as charted below.

The three individual modes allow the site operator to change the Flame-Ox operation as site conditions change, utilizing one system for the entire life cycle of the remediation project.



CATALYTIC COMBUSTION

709 21st Avenue, Bloomer, WI 54724
Phone: 715.568.2882 Fax: 715.568.2884
E-mail: sales@catalyticcombustion.com
www.catalyticcombustion.com

FIFTY YEARS OF ENVIRONMENTAL SERVICES 50

More Reliable Than an IC Engine

As represented in the chart at right, the Flame-Ox is more reliable than an internal combustion engine and operating costs are a fraction of a conventional oxidation system.

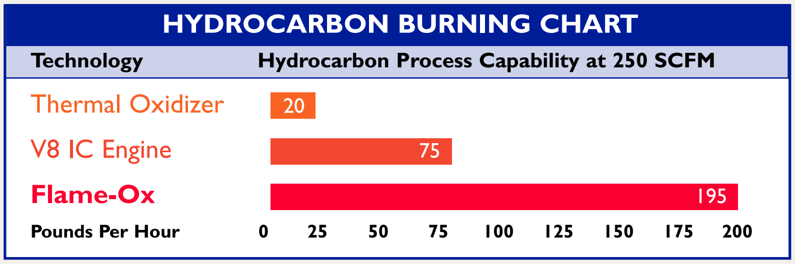
Three Modes — One System

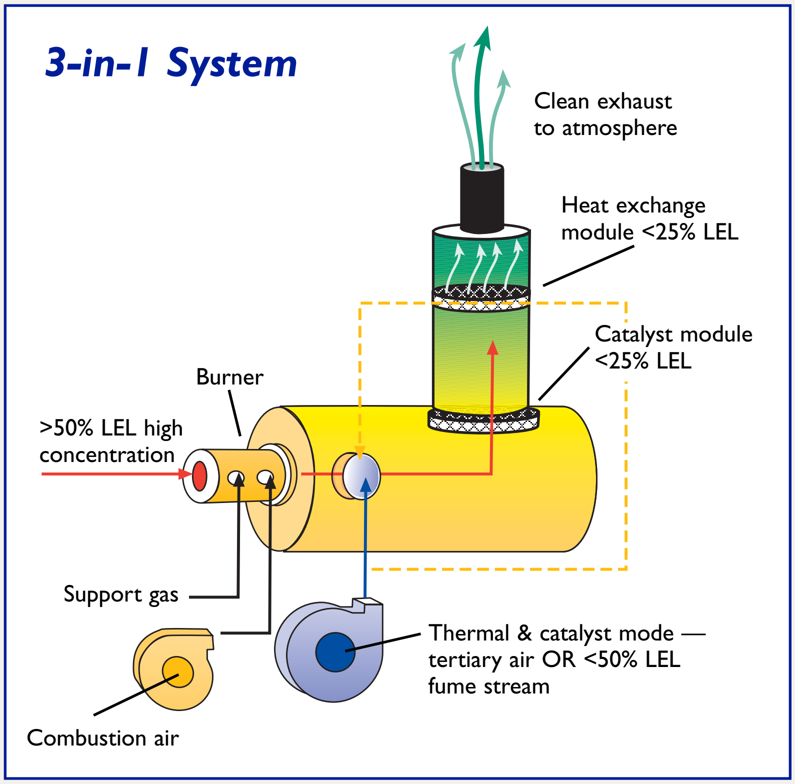
Here's how it works

(1) Flame Mode: The heavily contaminated air stream, which is highly saturated with hydrocarbon vapors, is directed into the specially designed Flame-Ox burner. Prior to combustion, a select amount of air is introduced to ensure complete combustion. In the absence of a sufficient hydrocarbon concentration in the air stream, additional auxiliary fuel is automatically added to maintain a proper mixture.

(2) Thermal Mode: Once the concentration levels decline to <50% LEL, the temperature and air flow adjustments are made and the system operates in a standard thermal mode.

(3) Catalytic Mode: When concentration levels decline to <25% LEL, the catalyst module is inserted, air flow and temperature settings are adjusted and the system operates in a standard catalytic mode. During extended periods of low concentration operation a heat exchanger can be utilized in conjunction with the catalytic mode. During flame and thermal modes, the heat exchanger is by-passed.





Benefits of the Flame-Ox

- One piece of equipment for the entire site clean-up
- Maximum hydrocarbon throughput, accelerating site remediation
- Reliability is maximized, providing superior uptime performance
- Superior destruction efficiency in all operational modes
- Operational flexibility minimizes supplemental energy use
- Safely processes hydrocarbons and eliminates flame propogation potential to source
- Eliminates LEL alarm shut-downs due to high concentrations
- Lowest life cycle cost for off-gas treatment for heavily contaminated sites
- Hazwopper compliant

CATALYTIC
COMBUSTION

709 21st Avenue, Bloomer, WI 54724
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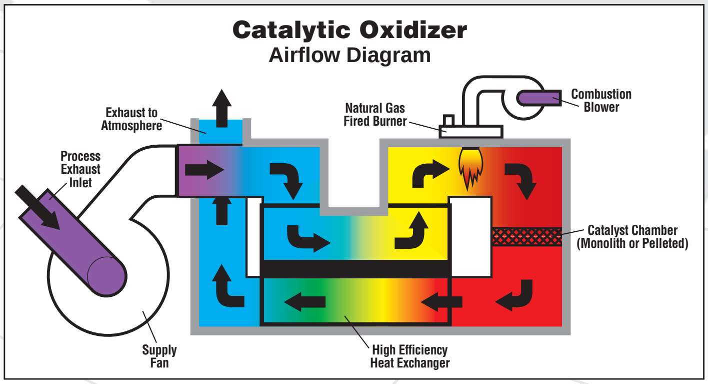
With sales and service offices in North, South and Central America, Europe and Asia

Bulletin 1105

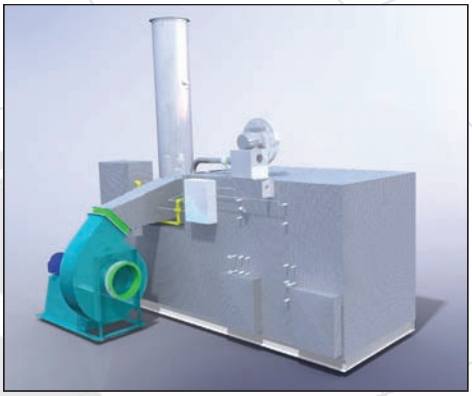
Catalytic Oxidizer

Catalytic Oxidizers from The CMM Group, LLC are designed to destroy air pollutants emitted from process exhaust streams at temperatures ranging from 260°C (500°F) to 345°C (650°F). Catalytic oxidizers utilize a high-efficiency counter-flow plate type heat exchanger. Oxidation is achieved as pollutants pass through a heated bed of precious metal catalyst.

The basic design concept of catalytic oxidation is to utilize an industrial grade catalyst to promote the chemical reaction at lower temperatures as compared to thermal oxidation. The air pollutant is mixed with oxygen, heated to an elevated temperature and passed through a catalyst, thus destroying the pollutant in the air stream by converting it to CO2, H2O and heat. The rate of reaction is controlled by the temperature of the catalyst chamber and the amount of time that the pollutant spends within the catalyst itself. Catalytic oxidation commonly requires less energy to operate due to lower operating temperatures.



During operation, the process exhaust fumes are forced into the catalytic oxidizer inlet plenum (using a high pressure supply fan) and directed through the "cold" side of a high-efficiency, counter-flow plate type heat exchanger. The VOC/HAP laden air then enters into the combustion chamber (typically at a temperature very close to that required for oxidation) where it is thoroughly mixed for temperature uniformity. To maintain set point temperature, auxiliary fuel is introduced if necessary. The preheated stream then passes through a fixed bed of industrial grade catalyst where air pollutant destruction takes place.



After passing through the catalyst chamber, the clean (hot) air is routed back through the "hot" side of the heat exchanger where it continuously preheats the incoming process air. Upon exiting the heat exchanger, the clean (cooled) air is routed to the atmosphere through an exhaust chamber and ultimately through the exhaust stack. Heat exchangers in standard catalytic units are typically fabricated of heavy-duty stainless steel. Thermal recovery efficiencies (TRE) range from 50% to 80%. Internal chambers of a catalytic oxidizer are manufactured entirely of heavy gauge stainless steel. Thermal expansion joints are incorporated where necessary. To maintain low external shell temperatures and minimize radiant heat loss, the internal chambers are covered with blanket insulation and then clad, typically with embossed aluminum. Air pollutant destruction efficiencies of 99% can typically be guaranteed.

Standard Features by CMM

(Many custom options available)

- High air pollutant destruction efficiencies are guaranteed
- Lowest operating costs available with energy efficient design
- Designed to meet your specific project requirements
- Proven high quality components are used throughout
- Control scheme is designed to automatically react to your manufacturing process
- Modern PLC based controls with color touch-screen interface
- Data-logger is included for recordkeeping
- Meets or exceeds all regulations

Typical Applications

(Varies based on specifications)

4,250 to 102,000+ NCMH
(2,500 to 60,000+ SCFM)

Suited for air streams with low to moderate levels of air pollutant

Common uses include:

- Coffee roasting
- Converting web dryers
- Chemical processing
- Food & baking
- Flexographic printing
- Heat-set printing
- Many others…

Typical Advantages & Disadvantages

Advantages:

- Low operating costs with low air pollutant concentrations
- Low maintenance costs
- Ease of operation
- Ease of install

Disadvantages:

- High capital cost with stainless steel parts
- Potential for catalyst poisons
- Limited to moderate air pollutant concentrations

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Air Pollution Control Systems • Production Machinery

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Website: www.thecmmgroup.com

FALCO 600 SPECIFICATIONS

The FALCO 600 electric catalytic oxidizer treats air streams contaminated with volatile organic compounds. Startup is fully automatic. Controllers accurately regulate input loading and temperatures. The controls adjust a FALCO Vapor Control Valve (VCV) to maintain safe maximum input concentrations. Automatic shutdown results if temperatures exceed limits.

The FALCO 600 has an efficient heat exchanger. A bypass valve allows for adjustment of heat recovery. Low heat recovery enables operation at high vapor concentration. High heat recovery minimizes energy use during operation at low concentration.
At 850 ppmv (gasoline) and 600 scfm, sufficient heat is recovered to preheat the inflow without supplementary electric energy.

The FALCO 600 has a massive catalyst volume for its rated capacity, providing longer life and poison resistance than monolith type catalysts. The heat exchanger, heaters, and catalyst are integrated into a compact system which is easily installed and operated.

FM
C US
APPROVED

CAPACITY	250-700 CFM
MAXIMUM INPUT LOADING	430 lb/day petroleum hydrocarbons @ 700 CFM
DESTRUCTION EFFICIENCY	Up to 99.5%
CATALYST TEMPERATURE RANGE	330-620ºC (626-1148ºF)
CATALYST	Packed bed 4.9 cubic feet. Precious metal on 1/8” ceramic beads is standard. Other catalysts are available
HEAT EXCHANGER	304 stainless steel spiral plate. 73% efficient at 600 scfm.
HEATER (Electric)	75 amp @ 208 volts (27 kW) or, 86.7 amp @ 240 volts (36 kW) or, 43 amps @ 480 volts (36 kW)
WEIGHT	1,400 lb. with flame arrestor.
CONSTRUCTION	304 stainless steel heat exchanger and vessel. Powder coated steel frame.
DIMENSIONS	87” high (excluding 5’ stack) X 78” long X 40” wide Fits in the back of a pick-up truck.
POWER REQUIREMENTS	Heater- 3 phase 208-240 Volt, Optional 480 Volts Controls-120 Volts
APPROVALS	System is FM Approved for use in Hazardous Locations.

FALMOUTH PRODUCTS P.O. BOX 541 FALMOUTH, MA 02541 PHONE 508 548 6686 FAX 508 548 8144
Rev 12-19-12

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ENVIRONMENTAL

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Regenerative Thermal Oxidizers

Regenerative Thermal Oxidizer (RTO)

ONLINE INQUIRY FORM (Budgetary quotes back in 24 hours)

Gulf Coast Environmental designs, builds and installs various types of thermal oxidizers. Matching the right technology with our customers process needs is paramount to any successful abatement project.

Why Consider an RTO?

RTO technology delivers low operating costs for high air flow, low volatile organic compound (VOC) fume streams. Rather than allowing the clean hot air to exhaust to atmosphere, the RTO unit captures up to 95% of the heat prior to exhausting it to atmosphere.

Confirm e-mail:

Phone #:

Comments:

Send All Fields Required

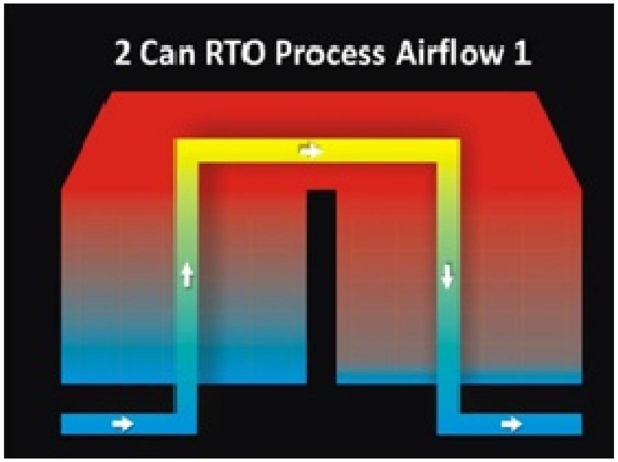
How Does the RTO Process Work?

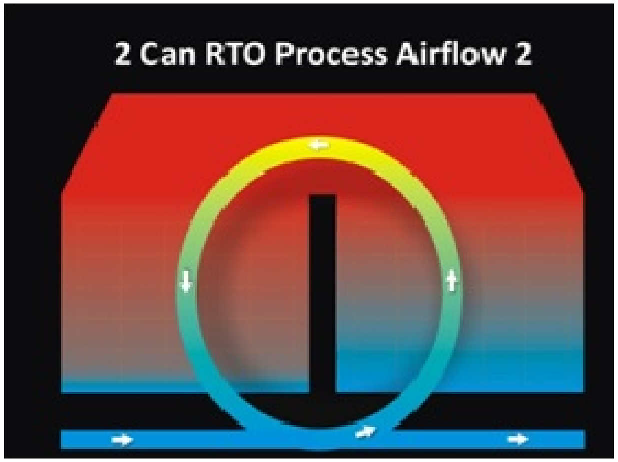
Step 1: The RTO unit is brought up to combustion temperature using supplemental fuel such as natural gas, propane, diesel or bio-fuel. During this start up period, the RTO unit initially purges itself with fresh air and continues to process fresh air until it reaches combustion temperature equilibrium. The RTO unit is now ready to switch over to process air and begin the thermal oxidation of VOC with destruction efficiency up to 99%.

Step 2: The RTO switches from start-up mode running on clean air to operating on VOC process air from the source. To maximize heat recovery, the RTO will automatically cycle or alternate the inlet and outlet (see diagrams below) via a series of pneumatic valves.

Because the RTO is so efficient at reclaiming effluent heat, the units often times are capable of sustaining combustion temperatures without any supplemental fuel, utilizing the VOC as the only source of fuel.

Flow Diagrams of a 2-Canister RTO:





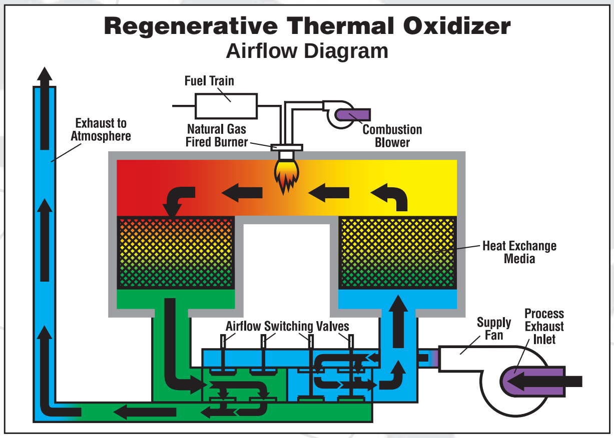
Fill out the **Data Inquiry Sheet** so we can help you out with your next Oxidizer.

Shipping of a 2-Canister Regenerative Thermal Oxidizer

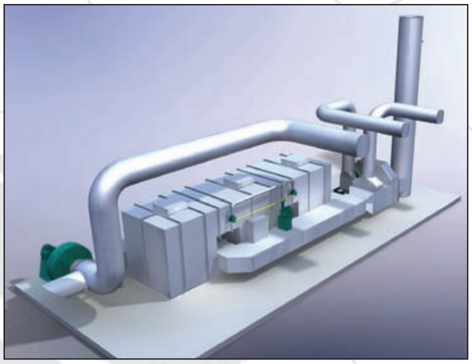
Regenerative Thermal Oxidizer (RTO)

Regenerative Thermal Oxidizers (RTO's) from The CMM Group, LLC are designed to destroy air pollutants emitted from process exhaust streams at temperatures ranging from 815°C (1,500°F) to 980°C (1,800°F). RTO's utilize ceramic media packed into vertical canisters as a high-efficiency heat exchanger. Oxidation is achieved as pollutants pass through the ceramic media, are mixed, and held at elevated temperatures in the combustion chamber.

The basic design concept of thermal oxidation is to promote a chemical reaction of the air pollutant with oxygen at elevated temperatures. This reaction destroys the pollutant in the air stream by converting it to CO_2, H_2O and heat. The rate of reaction is controlled by three-(3) interdependent and critical factors; time, temperature and turbulence.


Regenerative Thermal Oxidizer
Airflow Diagram

In operation, the process exhaust fumes are forced into the RTO inlet manifold (with a high pressure supply fan) and directed into one of the energy recovery canisters by use of inlet (switch) valves. The pollutant laden air passes from the valve assembly vertically upward through the first of the heat exchanger canisters where it adsorbs heat from the ceramic media (thus eventually cooling the media). This preheated air then enters the combustion chamber (typically at a temperature very close to that required for oxidation), is thoroughly mixed for temperature uniformity (turbulence) and held in the combustion chamber at the elevated set-point temperature (temperature) for a residence time of ~0.5 seconds (time). Air pollutant destruction takes place within the combustion chamber where auxiliary fuel is introduced if necessary.



After passing through the combustion chamber, the clean (hot) air is routed vertically downward through a second energy recovery canister where the heat generated during thermal oxidation is adsorbed by the ceramic media (thus preheating the media for the next cycle). The clean (cooled) air is routed to atmosphere through outlet (switch) valves, the exhaust manifold and ultimately through the exhaust stack. To maximize the heat exchange, the switching valves alternate the airflow path between canisters to continuously regenerate the heat stored within the ceramic media. Thermal energy efficiencies (TER) range from 85% to 97%. To maintain low external shell temperatures and minimize radiant heat loss, the combustion chamber is insulated with long-life ceramic fiber modules. The external shell is typically fabricated of carbon steel. Air pollutant destruction efficiencies of 99% can typically be guaranteed.

Standard Features by CMM

(Many custom options available)

- High air pollutant destruction efficiencies are guaranteed
- Lowest operating costs available with energy efficient design
- Designed to meet your specific project requirements
- Proven high quality components are used throughout
- Control scheme is designed to automatically react to your manufacturing process
- Modern PLC based controls with color touch-screen interface
- Data-logger is included for recordkeeping
- Meets or exceeds all regulations

Typical Applications

(Varies based on specifications)

4,250 to 170,000+ NCMH
(2,500 to 100,000+ SCFM)

Suited for air streams with low to high levels of air pollutant

Common uses include:
- Chemical processing
- Converting web dryers
- Flexographic printing
- FRP manufacturing
- Heat-set printing
- Paint & coatings manufacturing
- Surface coating
- Wood finishing & manufacturing
- Many others…

Typical Advantages & Disadvantages

Advantages:
- Moderate capital cost
- Low operating costs with low air pollutant concentrations
- Very high thermal heat recovery
- Capable of high inlet temperatures

Disadvantages:
- Simple two chamber design limited to 98% air pollutant destruction
- More moving parts, more maintenance

THE CMM GROUP, LLC
CMM™
Custom Machine Manufacturing

Single Source Solutions For:
Ovens & Dryers • Energy Recovery Systems
Air Pollution Control Systems • Production Machinery

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Website: www.thecmmgroup.com

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A CECO Environmental Company

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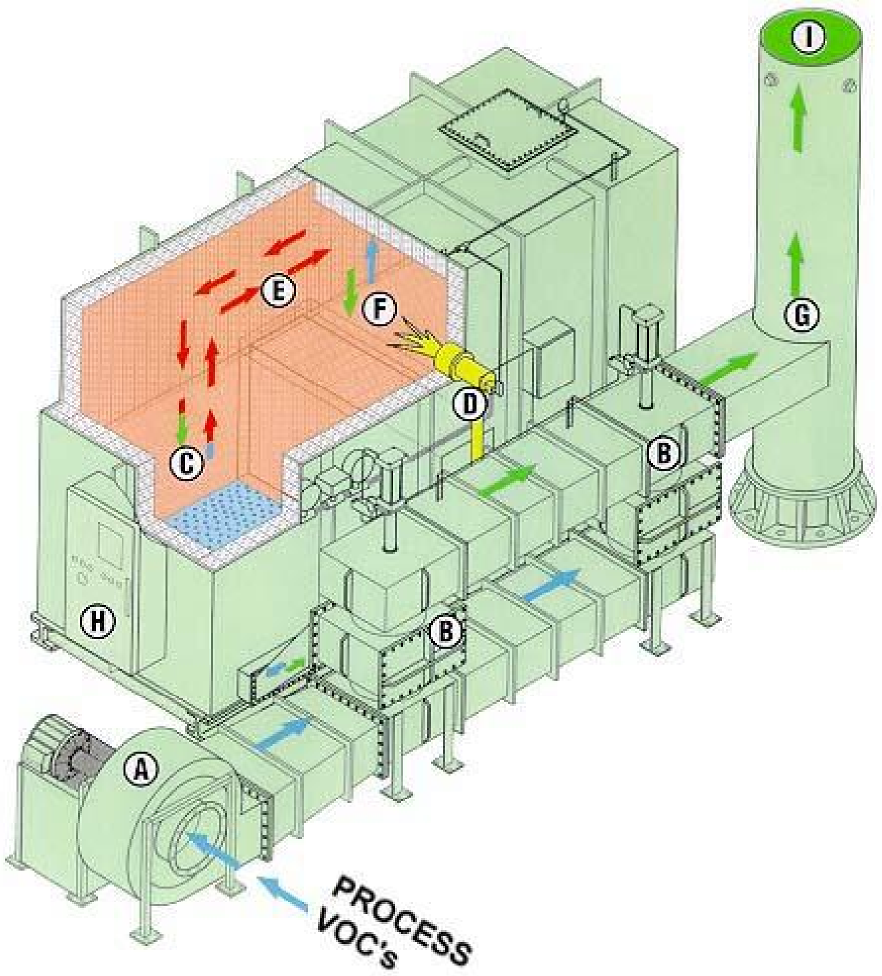
FLAMELESS RETOX REGENERATIVE THERMAL OXIDIZER VOC ABATEMENT SYSTEMS

At Adwest Technologies, Inc., we’re proud to bring you RETOX RTO Dual Chamber Regenerative Thermal Oxidizers. As the focus of our business, we dedicate time, experience, and knowledge into ensure we provide you with cost-effective, custom designed and fabricated RTO Thermal Oxidizer systems ranging from 1,000 scfm to 80,000 scfm with single shop assembled modules. Our RTO systems boast several unique features, including our "large Flow Capacity" (LFC) series described below that provides a compact, low profile alternative to traditional large flow abatement equipment. RETOX RTO systems are also available custom designed with special metallurgy for acid gas and corrosive process applications. We also have extensive experience with acid gas scrubber systems and prefiltration solutions if your process parameters require these components.

We’re confident that you can count on Adwest Technologies, Inc.’s 640+ combined man hours of dedicated RETOX Thermal Oxidizer design, technology, fabrication, quality control, and customer service experience to provide exceptional service to all past, current, and future clients. Experience the benefits of choosing Adwest – reliable, energy efficient VOC Compliance advantage - the ADWEST RTO Advantage!

RETOX REGENERATIVE THERMAL OXIDIZER (RTO) SYSTEM OPERATION



MAJOR RETOX DUAL CHAMBER RTO OXIDIZER COMPONENTS

A-VOCs Enter RTO Forced Draft Fan (Optional ID Fan for Phenolics,etc)
B-Pneumatic Poppet Valves Control VOC Flow to RTO
C-Low Pressure Drop RETOX Ceramic Heat Exchange Bed # 1
D-RTO Burner (cold & warm startups only) with FM/IRI/CGA Designed Piping
E RTO Combustion Chamber with Internal Shop Installed Insulation
F-Purified VOCs enter Low Pressure Drop Ceramic

RETOX 6,000 RTO-WOOD FINISHING

HX Bed #2
G-Outlet poppet valve directs flow to Exhaust Stack & Test Ports
H-Automatic PLC Controls with Operator Screen Diagnostics & Telemetry
I-Purified Exhaust (H2O Vapor) Exits RETOX RTO to Atmosphere

Note: The RETOX RTO Poppet Valve Flow Control System Typically Switches Direction every 4-5 minutes to maintain a stable profile

HALOGENATED VOC RETOX RTOs for ACID GAS PROCESSES

AL6XN 8,000 SCFM RETOX RTO-REACTOR VENTS

STAINLESS STEEL RETOX RTO With SCRUBBER

RETOX 4,000 RTO for AMINE GAS STRIPPING

TITANIUM RETOX RTO for ORGANIC CHEMICALS

RETOX RTO LFC (LARGE FLOW CAPACITY) RTO OXIDIZER SYSTEMS

For larger flow capacity processes the RETOX LFC (Large Flow Capacity) Design provides cost effective VOC Control from 60,000 scfm to 80,000 scfm with single shop assembled modules. For flowrates larger than 80,000 scfm we can provide multiple module systems with common stacks for up to 320,000 scfm and greater sized systems. Our RETOX LFC RTO Oxidizers have a compact minimal footprint with a low profile design like all RETOX RTOs for ease of access and maintenance from ground level. The following photographs illustrate a few of our RETOX LFC-large flow capacity RTO systems.

RETOX 62,000 SCFM LFC RTO-WEB CONVERTING & PRINTING-REPLACED CARBON SOLVENT RECOVERY UNIT

80,000 SCFM RETOX RTO-PRINTING

RETOX 70,000 LFC RTO-GRAVURE & FLEXO PRINTING

2 MODULE RETOX LFC RTO SYSTEM-120,000 SCFM TOTAL FOR PAINT FINISHING SPRAY BOOTHS

For a custom RETOX RTO Thermal Oxidizer System Proposal or for a custom Control Panel that we design and fabricate in our in house UL Approved panel shop for regular or classified duty please contact our Anaheim, CA headquarters at #714/632-9801

Richard Whitford-VP Operations rwhitford@adwest.cc

Bruce Plano-Custom Control Panel Mgr bplano@adwest.cc

Industrial Facility with Chlorinated Solvents

Project in Los Angeles California

Project Description

The project site is an Industrial facility located in the foothills of northern Los Angeles, California. The facility utilized chlorinated solvents in operations.

Site Geology

Based on soil borings site geology consisted of unconsolidated gravely sands, sand, silty sand, sandy silt, and silt from ground surface to more than 200 feet below ground surface (bgs). Groundwater was encountered at the site at approximately 65 ft bgs.

Contaminants of Concern

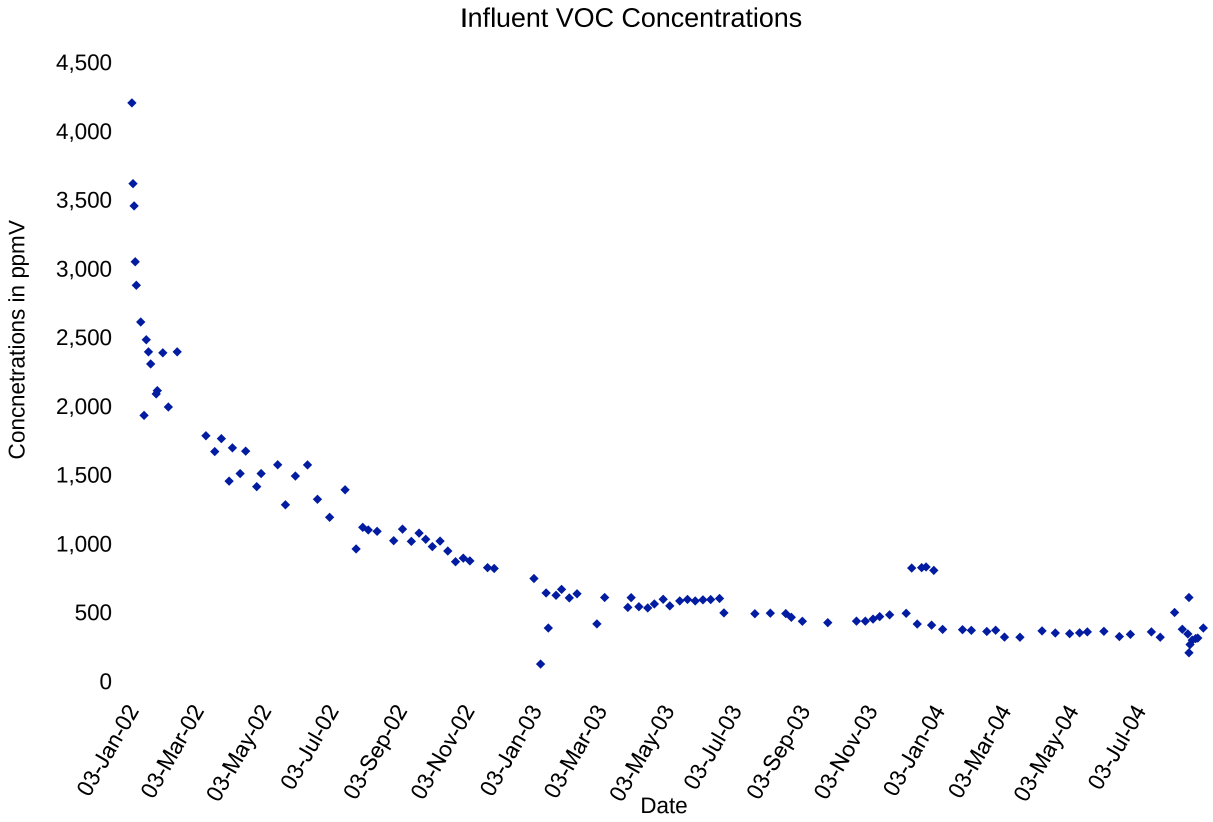
Primary constituents of concern included tetrachloroethylene, trichloroethylene, 1,1 dichloroethylene and carbon tetrachloride.

System Performance and Results

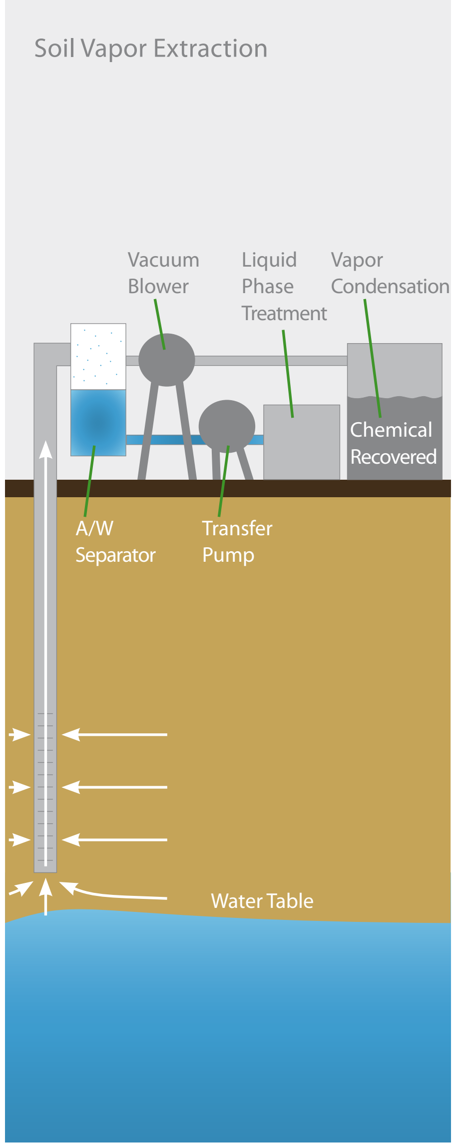
The soil vapor extraction system operated at the site for approximately two years. The maximum influent concentrations of 4,196 parts per million by volume (ppmV) was achieved at startup. More than 4,500 gallons of chlorinated solvents had been condensed from the vapor within the first two years of operation. The uptime performance was greater than 90% with average flow rate of 178 SCFM. Provided below is the influent vapor concentration vs time during the first two years of operation.

Vapor Treatment System Design

- 200 SCFM system capacity
- Fifteen vapor extraction wells were operated in cycles
- GAC redundant filtration utilized to satisfy SCAQMD requirements


Influent VOC Concentrations
Concnetrations in ppmV
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
03-Jan-02
03-Mar-02
03-May-02
03-Jul-02
03-Sep-02
03-Nov-02
03-Jan-03
03-Mar-03
03-May-03
03-Jul-03
03-Sep-03
03-Nov-03
03-Jan-04
03-Mar-04
03-May-04
03-Jul-04
Date

GREEN SOIL REMEDIATION THROUGH SVE OFF-GAS CHEMICAL RECOVERY



Experience

International engineering firms and Fortune 500 companies are among G.E.O. Inc.'s satisfied clients. G.E.O. Inc. has performed successfully for more than 20 years on a variety of sites across the United States and growing internationally.

G.E.O. Inc. also provides mobile units specifically designed for vapor extraction site qualification and testing (SQT). The SQT units (pilot test systems) generate the data essential for design and implementation of the full-scale system. Various location permits are available for up to one year in selected regions.

G.E.O. Inc. technical staff training utilizes both in-house programs and equipment supplier training schools to achieve and maintain requisite operation certification and credentials on a variety of approved environmental remedial and monitoring systems.

Qualifications

•Woman owned business - 8A certification in process •Successful operation and perfect safety record since 1989 • G.E.O. Inc. team has over 100 years of collective manufacturing and environmental industry experience •registered professionals on staff •Professional Service Management Team and Technical Support Staff •OSHA 40-hour Safety trained Staff •100% client satisfaction is job #1

G.E.O. Inc.
1612 Jenks Drive
Corona · CA 92880
Ph 877 800 9324
www.geoinc.org
info@geoinc.org

G.E.O. Inc.

GOOD EARTHKEEPING ORGANIZATION

SOIL VAPOR EXTRACTION AND CHEMICAL RECOVERY UTILIZING VAPOR CONDENSATION

C3 TECHNOLOGY

Compression & Cryogenic-Condensation combined with Regenerative Adsorption Technology

C3 Technology (Patent Pending) is a combination of cryogenic-cooling and compression processes that efficiently recovers volatile organic compounds (VOCs) and hydrocarbons from the off-gas vapor stream of soil vapor extraction (SVE) or dual phase extraction (DPE) systems. Condensed chemical is recovered as a non-aqueous phase liquid (NAPL) that is temporarily containerized in appropriate vessels for recycling or proper disposal. Generally, greater than 99.9% of the VOCs are recovered from the vapor stream.

Environmentally Friendly and Sustainable Characteristics

- No incineration of organics on-site
- No CO2 generation
- Low carbon footprint
- No effluent gases to cause concern
- VOCs containerized for recycling, reuse or incineration

Using C3 Technology for off-gas treatment during soil vapor extraction has been shown to result in reduced cost, reduced time of remediation (i.e. no dilution), and provides opportunity for recycling or reuse of recovered solvent or fuel.

PERFORMANCE

G.E.O.'s C3 Technology is a cost effective and sustainable solution when highly contaminated soil conditions are present and when Dense Non-Aqueous Phase Liquids (DNAPLs) or Light Non-Aqueous Phase Liquids (LNAPLs) are present.

Being the original equipment manufacturer enables quick and customized design for specific site requirements. G.E.O. systems are designed to meet your most critical applications.

G.E.O. has successfully recovered chlorinated and stoddard solvents, freon and jet fuel from the subsurface soil and groundwater at commercial, industrial and federally owned sites under the oversight of RWQCB, DTSC, EPA, and other local agencies in many states across the U.S.

SYSTEM BENEFITS

- Environmentally friendly
- All electric systems
- Remotely monitored
- System operation and maintenance is included
- Zero influent air dilution equals faster results
- 99.8% VOC removal efficiency (most compounds)
- Guaranteed 90% operation up-time
- Single or Dual Phase
- In-house engineering and manufacturing
- Competitive lease rates
- Pilot testing available
- No off-gas byproduct concerns

COMPATIBLE WITH THE MOST CHALLENGING VOCS

- Methylene Chloride
- Vinyl Chloride
- MEK
- CFCs/Freon
- Stoddard Solvents
- Petroleum/Jet Fuels

COMPATIBLE WITH OTHER TECHNOLOGIES

- SVE/DPE/MPE
- Air Sparging
- In-Situ Thermal Heating

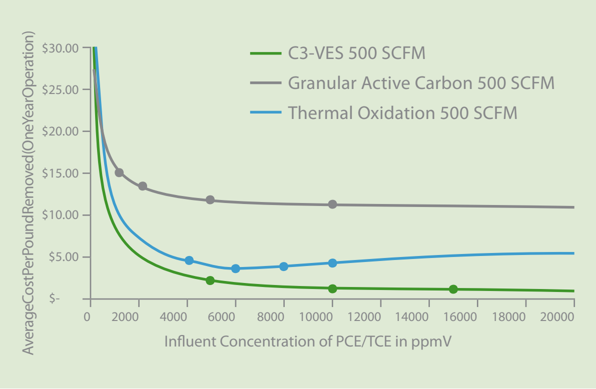
COST COMPETITIVE

Guaranteed Fixed Pricing available

Reduced Remediation Time as a result of zero dilution

Find out if you can sell carbon credits

Lower cost than alternatives *(see graph below)*



Fully Loaded Cost Per Year vs Influent Concentration
GAC adsorption = 10%

Tetrachloroethylene Multiphase Extraction (MPE) Remediation

Case Study 2007

Los Angeles, California

Project Description

An active industrial facility in the San Fernando Valley north of Los Angeles was impacted by tetrachloroethylene (PCE) degreasing operations. A phased approach to multiphase extraction (MPE) remediation was employed; Phase I implemented high contaminant mass removal rates with very high VOC vapor concentrations, typically observed in the steep decay portion of influent concentration curve, while Phase II realized mass removal rates typical of lower concentrations observed in the asymptotic component of the influent concentration decay curve.

Site Geology

The site geology consists of intercalated sand, silty sand and silt lenses to approximately 80 feet below ground surface (bgs) where a perched low transmissivity groundwater zone exists, beneath which is a silty clay aquitard followed by a gravelly sand aquifer that is used by local municipalities as a water supply. At the time of the investigation, the lower groundwater zone beneath the confining layer had not been impacted by the contaminated perched groundwater.

Contaminant of Concern

PCE was the primary contaminant of concern. Maximum concentrations of approximately 2,000 parts per million by volume (ppmV) were observed during the initial months of operation.

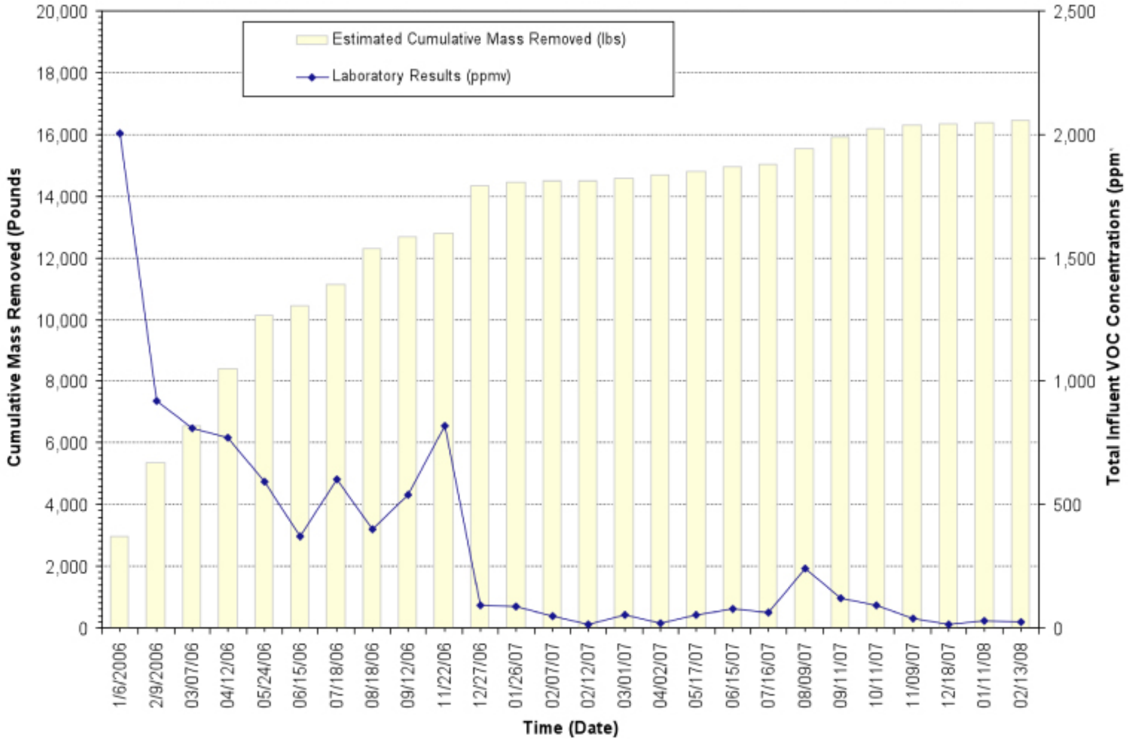
Vapor Treatment System Design

- 200 SCFM system
- Sixteen dual phase extraction wells were operated in cycles
- Drop pipes of approximately 1.5 inch diameter and 80 feet in length

Performance and Results

Over 14,000 pounds of PCE were recovered in 11 months.

When influent vapor concentrations declined below 500 ppmV, a granular activated carbon system replaced the refrigerated condensation system for long term venting operations.



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CANSORB® RX - Polyethylene Lined Liquid Phase - Activated Carbon Adsorbers

Remediation equipment for liquid phase activated carbon adsorption systems for environmental remediation applications

The CANSORB RX series of activated carbon adsorbers is fabricated of carbon steel and have a bonded nominal 200 mil lining of seamless polyethylene which can withstand the rigors of environmental remediation applications. ***Activated carbon*** discharge and drain lines can be provided with ball valves.

The liquid collection system is designed to promote even flow distribution and thus efficient utilization of the activated carbon. The liquid outlet is designed to maintain a liquid level above the activated carbon bed. Manways are 18" in diameter for easy access and for removal and replacement of activated carbon and other media. The activated carbon vessels are provided with lifting lugs and fork channels. Specifications and properties are subject to change without notice.

TIGG's CANSORB RX has a polyethylene lining and is ideal for adsorption using activated carbon as media.

*Specifications and properties are subject to change without notice.

Liquid Phase Carbon Adsorbers - Steel Drums Overview

MODEL PDF FILES*	Nominal FLOW (GPM)	MAX PRESS (PSIG)	MAX TEMP (deg F)	FNPT INLET / OUTLET (IN)	MAXIMUM ADSORBENT FILL (LBS)	SHIPPING WT. STANDARD FILL (LBS)
C-35 RX	60	30	130	2 / 2	875	1380
C-50 RX	90	30	130	3 / 3	1600	2040
C-75 RX	40	30	130	3 / 4	2500	3420
C-100 RX	200	30	130	3/4	3600	4790

* INDICATES PDF FILE FOR DOWNLOAD

NOTES:

- Nominal flow may be conservative. Desired contact time may allow higher or lower flow rates.
- Dry virgin activated or reactivated carbon provided as standard adsorbent.
- Maximum adsorbent fill is based on a bed density of 27 lb/ft3.
- Maximum adsorbent fill can differ based on variable bed density and alternate adsorbents.
- Vessels are available in higher pressure ratings in accordance with ASME Section VIII.
- Pressure drops are based on a dense packed bed of activated carbon.

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Ancillary Equipment
■ Bag Filtration Units
■ Piping Modules & Hoses
■ Liquid-Phase Water Pumps
■ Oil Water Separators
■ Adsorber Skid System

Activated Carbon
Filter Media

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CANSORB® P - Activated Carbon Adsorber High Pressure Carbon Steel Adsorber

The CANSORB P Series of **Modular Activated Carbon Adsorbers** are capable of operations where full backwash is required, including applications for backwashing activated carbon and for use as a multi-media filter. These activated carbon adsorber units are fabricated of PVQ (pressure vessel quality) carbon steel and come equiped with a high solids epoxy lining.

Where process conditions dictate, the vessels can be fabricated from other materials such as stainless steel. In addition, a different lining can be substituted for the high solids epoxy. The liquid collection system is designed to promote even flow distribution and thus, efficient adsorbent utilization. Manways are 18" x 14" elliptical located on top of tank for easy access.

Legs and fork channels are provided on the CP5000 and smaller vessels. larger activated carbon adsorber vessels have legs only.

Specifications and properties are subject to change without notice.

Liquid Phase Carbon Adsorbers - CANSORB P Overview

MODEL PDF	MAX FLOW (GPM)	MAX PRESS	MAX TEMP (deg F)	FNPT INLET / OUTLET	MAXIMUM ADSORBENT FILL (LBS)	SHIPPING WEIGHT STD FILL (LBS)
CP-500	78	75	130	2/2	850	1400
CP-1000	115	75	130	3/3	1500	2200
CP-2000	145	75	130	3/3	2200	3600
CP-3000	235	75	130	4/4	3300	5000
CP-5000	400	75	130	6/6	6200	8200
CP-8000	500	125	130	6/6	10000	13400
CP-20K-10	750	125	150	8/8	20000	11783
CP-20K-12	750	125	150	8/8	20000	17000

NOTES:

- Desired contact time may allow higher or lower flow rates.
- Dry virgin activated or reactivated carbon provided as standard adsorbent.
- Maximum adsorbent fill is based on a bed density of 27 lb/ft3.
- Maximum adsorbent fill can differ based on variable bed density and alternate adsorbents.
- The CP 8000 and CP20K Vessels are ASME Section VIII code stamped. Our other vessels can be manufactured acording to these specifications upon request.

TIGG's Steel Tank & Pressure Vessel Web Site

Ancillary Equipment
■ Bag Filtration Units
■ Piping Modules & Hoses
■ Liquid-Phase Water Pumps
■ Oil Water Separators
■ Adsorber Skid System

Activated Carbon Filter Media

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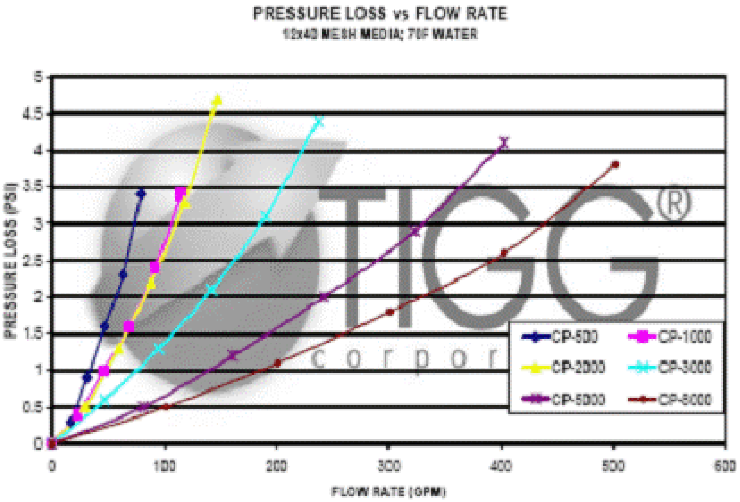
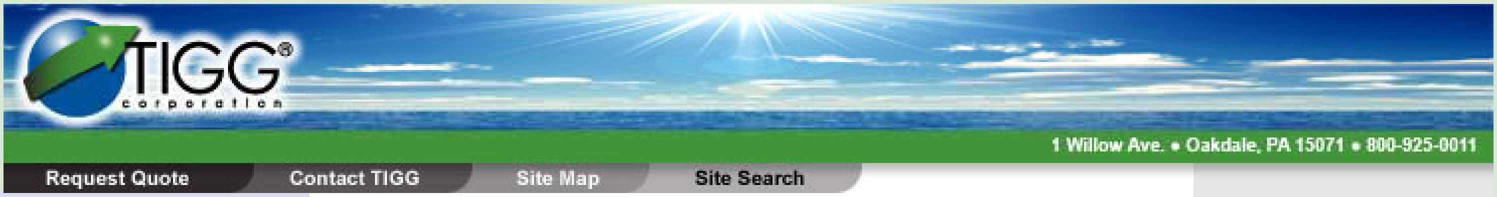
- Pressure drops are based on a dense packed bed of activated carbon.

- Inlet/outlets are flanged.

Download A PDF | Cansorb P - High Pressure Carbon Steel Adsorber





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Production Plant

Activated Carbon Adsorption Equipment - Liquid Phase

TIGG manufactures & rents a variety of Liquid Phase Activated Carbon Adsorbers

The environmental remediation market requires liquid phase activated carbon adsorption equipment from low flow rates to thousands of GPM. TIGG's standard liquid phase activated carbon adsorption equipment can treat flows ranging from one to 500 GPM. Units in parallel or custom designed liquid phase equipment have treated thousands of GPM. This liquid phase carbon adsorption equipment is used to treat wastewater, groundwater, storm water, oily water separation and PCB removal applications.

TIGG's CANSORB line of liquid phase activated carbon adsorption equipment for liquid phase remediation applications includes ECONOSORB Drum Adsorbers with epoxy-lined steel vessels to polyethylene-lined steel adsorbers. The equipment has been designed to have a low pressure drop, excellent flow distribution and resistance to corrosive conditions.

TIGG's large, in-stock liquid-phase activated carbon adsorbers and filtration systems are available for sale or ready to RENT.

Liquid Phase | Activated Carbon Adsorption Equipment Overview:

INTEGRATED - Activated Carbon Systems

Liquid Phase Adsorption Systems	Max Flow (GPM)	Max Pressure (PSIG)	Max Temp Degrees (F)	Standard Fill
 INTEGRATED SYSTEMS	400-750	75-125	130	10000-80000

CANSORB - Activated Carbon Adsorbers

Liquid Phase Adsorption Model	Max Flow (GPM)	Max Pressure (PSIG)	Max Temp Degrees (F)	Standard Fill
 CANSORB P HIGH PRESSURE STEEL VESSEL	78-750	125	130	500-20000

TIGG's Steel Tank & Pressure Vessel Web Site

Ancillary Equipment
- Bag Filtration Units
- Piping Modules & Hoses
- Liquid-Phase Water Pumps
- Oil Water Separators
- Adsorber Skid System

Activated Carbon Filter Media

Questions or comments?

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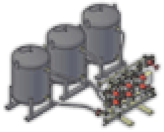
 CANSORB L HIGH PRESSURE STEEL VESSEL	40-225	75	130	500-5000
 CANSORB RX POLYETHYLENE LINED STEEL VESSEL	60-200	30	130	660-4000
 CANSORB STEEL VESSEL	500-700	50-75	140-150	8000-20000
 CANSORB STEEL DRUM	5-20	6-15	130	95-300
 CANSORB XP POLYETHYLENE DRUM	5	6	130	95

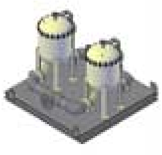
ECONOSORB - TIGG's Economy Adsorbers

Liquid Phase Adsorption Systems	Max Flow (GPM)	Max Pressure (PSIG)	Max Temp Degrees (F)	Standard Fill
 ECONOSORB LP STEEL VESSEL	35-100	12	130	1000-2000
 ECONOSORB LS STEEL DRUM	15	6	130	150-200
 ECONOSORB L LIQUID DRUM	15	6	130	150-200

Filtration Systems - Multi-Media & Bag Filters

Multi-Media Filters	Backwashing

 MULTI-MEDIA FILTRATION UNITS	Automatic or Manual	Visit Multi-Media Page For More Details

Multi-Bag Filters	Cavities	Flow Rate	Filter Area	Diameter/Height
 MULTI-BAG FILTRATION UNITS	6, 8 & 12	1050 - 2100	26.4 - 44	26" x 68" 36" x 79"

Liquid Phase Bag Filters	Max Flow	Max Pressure	Max Temp	Filter Area
 BAG FILTRATION UNITS	180 gpm	150 psig	250 F	5.0 ft2

If you have questions about liquid phase activated carbon adsorption and filtration equipment for water purification, call a TIGG Technical Sales Rep at 800-925-0011 or complete a RFQ form.

Vapor-Phase

Activated Carbon Adsorbers

For Vapor Phase Environmental & Industrial Solutions

TIGG manufactures, sells and rents a wide range of activated carbon adsorption equipment and integrated systems for use in vapor phase applications such as:

Air stripper off-gas, SVE, **tank vents**, contaminated air from remediation of contaminated soil, odor control, manufactured gas plant (MGP) contaminated vapor generated during remediation, process vents and gases released after fumigation of various products.

TIGG Engineers specialize in designing integrated systems such as this NIXTOX PDB **tank vent**. TIGG's system designs provide users with the ability to continue operations in one unit while servicing another.

Model	Max Flow (CFM)	Max Press	Max Temp (F)	Standard Fill
NIXTOX Box Adsorbers	8,000 - 20,000	1	140	6,000 - 16,000
NIXTOX Steel Vessel	750 - 5,000	15	180	650 - 7,400
NIXTOX Radial Flow	500 - 3,000	Open	150	200 - 1,600
NIXTOX XP Drum	50 - 500	3	130	95 - 400
NIXTOX Steel Drum	50 - 250	6	200	110 - 400
EconosorbV	600 - 3,800	1	140	1,000 - 5,000
Econosorb EVP	350 - 600	1	140	1,000
Econosorb Drum	100	6	200	175

Call a TIGG Representative Today at 800-925-0011

TIGG® corporation

800-925-0011
www.TIGGtanks.com
www.TIGG.com

TIGG Corporation
1 Willow Avenue
Oakdale, PA 15071

GSA

Multiple Contract Holder
GS-07F-0494W & GS-07F-0495W

12/11

Appendix H

Waste Water Permitting Information

AECOM
250 Apollo Drive
Chelmsford, MA

[Phone] 978-905-2100
[Fax] fax

Telephone Call Summary

By:	Shamim Wright	Date:	2/22/13
Talked with:	Edward Steeprock	Project number:	
From (company):	City of Poughkeepsie WWTP Manager	Project name:	Former Duso Chemical Site
Phone number:	845-471-8165	Subject:	Treated water discharge requirements to the City of Poughkeepsie WWTP

Distribution:

On Friday 2/22/13, I spoke with Edward Steeprock regarding the sewer discharge requirements for treated water from the remediation activities to be conducted. Mr. Steeprock stated that he is working with is IPP manager to determine the proper requirements and that since the site is in the town of Poughkeepsie and the WWTP is in the city of Poughkeepsie, there are some complications. I relayed the details of expected discharge concentrations and flow plus other details of the remediation. Mr. Steeprock said it would be most helpful for AECOM to fill out a IMP Groundwater Remediation Discharge Form, send it back, and this will assist in determining water discharge requirements to the WWTP.

I inquired about the approved method to tie into the sewer line and Mr. Steeprock said a hose down the manhole, while keeping the manhole closed, or a connection to the sewer line is ok.

Ed. Steeprock said the EPA visits the WWTP quite often, so he needs to be diligent on determining the appropriate requirements for us.

Action Item: On Friday 2/22, Mr. Steeprock sent AECOM the blank IMP Groundwater Remediation Discharge Form. Action Item and Follow up: On Tuesday 2/26, the IMP Groundwater Remediation Discharge Form was partially completed and returned to Mr. Steeprock requesting that this be used to determine the chloride and CVOC discharge requirements that would be required for the water discharge to the sewer.

J:\Rem_Eng\Project Files\NYSDEC\60165024-Duso ERH-Bio\Duso Chemical Site\60% Design\MHBP Thermal Deliverable\Appendices\App H\Edwared Steeprock call summary.docx

1799

City of Poughkeepsie, NY Groundwater Remediation Discharge Application Form

February 21, 2013

City of Poughkeepsie
GROUNDWATER REMEDIATION DISCHARGE
APPLICATION

This application is submitted to the City of Poughkeepsie requesting authorization to discharge treated wastewater from the below defined site pursuant to the Poughkeepsie Sewer Use Ordinance.

This form is a draft submittal prior to remediation design completion as requested by Ed Steeprock in order to assist the permitting process.

1. Responsible Parties:

Property Owner: *(Name of Party who owns the Property to be remediated)* Superfund Site under NYSDEC Division of Remediation (NYSDEC reference number for the site is 3-14-099)	Premeditating Company: *(Name of Premeditating Company that will design and oversee the actual remediation work)* AECOM Technical Services Northeast, Inc. (AECOM)
Property Address: Former Duso Chemical Site 15 Fulton Street, Town of Poughkeepsie, Dutchess County, NY Parcel 005836	Management Offices Address: 250 Apollo Drive, Chelmsford, MA 01824
Mailing Address: 625 Broadway, Albany, NY 12233-7012	Mailing Address: 250 Apollo Drive, Chelmsford, MA 01824
Contact Person: (name, title) NYSDEC Division of Remediation	Project Manager (name, title): Art Taddeo
Phone No. 518-402-9764	Phone No. 978-905-2100

2. Rates and Volumes:

Please provide the estimated volumes and rates of the following:

a. Estimated Total Volume of Soil to be remediated:	*NA*
b. Estimated Total Volume of Water to be remediated	*To be determined (2-6 gpm flow for 4-8 months)*
c. Estimated rate of treatment of Soil (tons/day, etc.)	*NA*
d. Estimated rate of treatment of water (gpd, gpm, etc.)	*2 – 6 gpm*
e. Estimated discharge rate (gpm, gpd)	*2 – 6 gpm*
f. Estimated On-Site Storage of untreated soil (cuyd, tons)	*NA*
g. Estimated On-Site Storage of treated soil (cuyd, tons)	*NA*
h. Estimated On-Site Storage of untreated water (gal)	*NA*
i. Estimated On-Site Storage of treated water (gal)	*zero*

3. Proposed Activity Schedule:

Please provide the following dates (add any additional important dates that impact the project.):

a. Remediation Commencement Date:	*Summer 2014*
b. Treated Wastewater Discharge Commencement Date:	*One month after system startup*
c. Remediation Completion Date:	*To be determined (6-8 months after startup)*
e. Site Closure Date:	*Not applicable – no wastewater discharge after system sh*

4. Pollutants of Concern (POC)

Identify all pollutants that must be remediated at the site, the average and peak concentrations for each POC in the untreated groundwater and/or soil. Identify the maximum concentration level (MCL) for each POC that must be attained *by the remediation activity. If soil is not be remediated indicate by placing "N/A" in the appropriate column. Also, indicate the units of measure with each concentration value. POC identification and accurate measurement is the permit applicant's responsibility. Failure to identify all pollutants of concern and their measured concentrations shall be considered a violation of the City Codes and subject to enforcement actions. Reported concentrations must be obtained by actual chemical analysis using EPA sample collection, handling, preservation, and analytical methodology and protocols approved for the type of remediation to be conducted. If there is any question concerning the appropriate protocols, the permit applicant may contact the City Pretreatment Staff, or use those methods and protocols approved under 40 CFR 136 of the Federal regulations. If the proposed remediation is for the treatment of petroleum contaminated soil and/or water the following pollutants of concern (POC) must be considered, in addition to, all other POC identified in the remediation project design: Total Petroleum Hydrocarbons, Total BTEX (the arithmetic sum of the concentrations of benzene, toluene, ethylbenzene, and the isomers of Xylene), Methyl tert-butyl ether (MTBE), pH, Total Suspended Solids, Chemical Oxygen Demand (COD). Total Petroleum Hydrocarbons is herein defined as the Silica-Gel Treated n-Hexane Extractable Material (SGT-HEM) measured in EPA Analytical Method #1664. A copy of the formal laboratory report must be attached to this application. The City shall consider the failure to attach the laboratory report as an incomplete application and the permit will not be issued. All chemical analysis of organic compounds must be capable of detection of the POC at concentration at, or below, 10 micrograms per liter (10 ug/L). Failure to attain this minimum detection level may be interpreted by the City as a POC presence at the MDL concentration reported. The applicant must report the highest concentration detected and the average of all concentration detected for all POCs, if more than one sample is analyzed, and submit copies of the laboratory reports for all POC analysis, for all media analyzed, on the remediation site. The applicant may add additional rows to the following table or attach a separate summary table to the application.*

Average POC Concentrations:

POC	**Untreated Conc.**		**Treated MCL**	
	Soil	**Groundwater**	**Soil**	**Groundwater**
Total CVOCs	NA	250 mg/L	NA	Non-detect to <50 µg/L
Chloride	NA	NA	NA	1,000 - 3,000 mg/L
Note on Chloride: the vapor treatment process results in chloride concentrations in the discharge water. Groundwater does not contain significant concentrations of chloride.				
Note for CVOCs: The primary CVOCs of concern include 1,1,1-TCA and 1,1-DCA. Other CVOCs include 1,2-DCA, tetrachloroethylene (PCE), cis-1,2-DCE, trichloroethylene (TCE), vinyl chloride, chloroethane.				

Maximum (Peak) POC Concentrations:

POC	**Untreated Conc.**		**Treated MCL**	
	Soil	**Groundwater**	**Soil**	**Groundwater**
Total CVOCs	NA	1,300 mg/L	NA	Non-detect to <50 µg/L
Chloride	NA	NA	NA	8,000 mg/L

See notes above and peak chloride is estimated and only would occur a short period of time at peak CVOC mass extraction.				

5. Pretreatment System:

Describe the following characteristics of the treatment system that will be used to treat the wastewater prior to discharge to the City sewer. Identify any variations to the selections provided:

a. Type Installation: (check appropriate installation type) [ ] Permanent , Fixed Site System: [x] Temporary, Fixed Site System: [ ] Mobile System owned and operated by contractor or property owner, and will remain on-site throughout remediation project. [ ] Mobile System owned and operated by subcontractor, and will remain on-site throughout remediation project. [ ] Mobile System, owned and operated by contractor or property owner to be on-site only while actually treating wastewater for discharge. [x] Mobile System, owned and operated by a subcontractor and system to be on-site only while actually treating wastewater for discharge.	Subcontractors: *Identify any subcontractors that will own and/or operate any portion of the planned treatment system. Provide company name, mailing address, contact person, and phone number. (Provide additional attachments if more space is needed.)* To be determined via NYSDEC after acceptance of AECOM design. Treatment will be liquid phase granular activated carbon.
b. Type of Treatment and Discharge: (check appropriate type) [x] Flow-Thru [ ] [ ] Batch [ ] [ ] Other: (describe)___________________________	If Flow Through provide flow rate (gpm):_2-6 (approximate)__ If Batch provide volume of each batch: _________gal If Batch provide to volume of each batch: _______gal

c. Provide a narrative description of the treatment units that will be used to pretreat the contaminated wastewater prior to discharge to the sewer. Include the treatment technology used and the POCs that will be treated by each technology. Include capacities where appropriate. Provide answer on a separate sheet as an attachment. ***Remediation wastewater anticipated to be treated by liquid GAC and discharged to sewer.***

d. Provide a one-line schematic, block diagram of the pretreatment system that will be used to treat the contaminated wastewater prior to discharge to the sewer. Provide answer on a separate sheet as an attachment. ***See attached Preliminary Process Flow Diagram. See bottom of Diagram for GAC unit.***

e. Provide a diagram of the site. Include the following: ***Design in process. Attached Figure 7 shows i, ii.***

- **i. property boundaries**
- **ii. Contamination boundaries** ***refer to thermal treatment footprint***
- ***iii.*** **Location of pretreatment system –** ***to be located just outside treatment footprint.***
- **iv. Location of any storage units (Untreated wastewater, Treated wastewater, Untreated Soil, Treated Soil, Hazardous wastes, non-Hazardous wastes, chemical, fuels, areas of access, security features, property access routes, emergency vehicle access routes, etc.)**
- **v. Include volume of all storage units**
- **vi. Location of the connection to the City sewer. –** ***to be determined***

f. Provide a street map. Mark the location of the site. ***See attached Figure 7***

g. Identify all monitoring instruments that will be used in the operational controls of the wastewater treatment units: (flow meter, pH monitors, turbidity monitors, etc.) ***flow meter, pH monitor, specific conductivity meter, chloride field test kits, salinity***

6. Emergency Contact Information:

a. Emergency Contact Person: (name, title):	NYDEC Division of Remediation (To be determined)
b. Emergency Contact Person employer	NYDEC Division of Remediation
c. Emergency Contact phone number: (this number must be capable of contacting the contact person at anytime there is a discharge from the permitted site.)	518-402-9764
d. Time required for Contact Person to arrive at permitted site	To be determined

7. List all other Environmental Permits that will be held by the permit holder regarding the regulation of releases and remediation activities from the permitted site:

In process of determining complete list of required permits with Town of Poughkeepsie.	
Building permit for sheds/detached garages	
Electrical Permit	
Plumbing Permit	
Heating Permit	
IPP Sewer Discharge Permit	

Applicant Certification Statement:

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Property Owner: ____ Date: ____________________
(print or type: name, title, company name)

____
(signature)

Richard L. DuPilka, P.E.
Commissioner of Public
Works / City Engineer
Phone: 845-451-4074
Fax: 845-451-4101

The City of Poughkeepsie

Engineering Department

62 Civic Center Plaza
Poughkeepsie, NY
12602

SPECIAL DISCHARGE PERMIT NO. 2013-SA01

ISSUED TO:	AECOM Technical Services Northeast, Inc. (AECOM)
SITE DESCRIPTION:	Superfund Site under NYSDEC Division of Remediation (NYSDEC reference number for the site is 3-14-099)
CLASSIFICATION:	Special Agreement (SA) (Non Categorical Pretreatment Standard)
LOCATED AT:	Former Duso Chemical Site
SITE ADDRESS:	15 Fulton Street, Town of Poughkeepsie, Dutchess County, NY Parcel 005836
SITE MAILING ADDRESS:	625 Broadway, Albany, NY 12233-7012
CONTACT NUMBER:	AECOM - 978-905-2100
Effective Dates:	
From:	March 1, 2013
To:	September 30, 2014
	Dates are Inclusive

TABLE OF CONTENTS

SPECIAL DISCHARGE PERMIT

PART I

AUTHORIZATION

Permit Number: **2013-SA01**

Effective Dates:
From: March 1, 2013
To: September 30, 2014
Dates are Inclusive

In accordance with provision of the City of Poughkeepsie Sewer Use Ordinances:

AECOM Technical Services Northeast, Inc. (AECOM)
Former Duso Chemical Site
15 Fulton Street, Town of Poughkeepsie, Dutchess County, NY
Parcel 005836

Is hereby authorized to discharge industrial wastewater under a special agreement from the outfall(s) identified herein, into the City of Poughkeepsie sanitary sewer system in accordance with the conditions set forth in this permit. Compliance with this permit does not relieve the permittee of its obligation to comply with all applicable pretreatment regulations, standards, or requirements under County, State, and Federal laws that are, or may become, effective during the term of this permit.

Noncompliance with any term or condition of this permit shall constitute a violation of the City of Poughkeepsie Sewer Use Ordinances.

If the permittee wishes to continue to discharge after the expiration date of this permit, an application must be filed for a renewal permit a minimum of 90 days prior to the expiration date.

This discharge permit supersedes any previously issued discharge permit.

This permit is not transferable.

By: _______________________________________
Commissioner of Public Works / City Engineer

Date of Issue: ________________________________

PART II

DEFINITIONS

1. Bypass:
   The intentional diversion of wastes from any portion of a treatment facility.

2. Compliance Monitoring:
   The sampling and analyses performed at the Industry by the Control Authority (City of Poughkeepsie) in accordance with 40 CFR 403.

3. Control Authority:
   City of Poughkeepsie WPCP. The City enforces Sewer Use Ordinance (SUO) laws, is permitted by New York State to operate the City of Poughkeepsie Water Pollution Control Plant (a POTW), and administers an Industrial Pretreatment Program (IPP) approved by the United States Environmental Protection Agency (US-EPA). IPP activities are administered through the office of the City Engineer.

4. Composite Sample:
   A combination of individual samples obtained at regular intervals over a specified time period. The volume of each individual sample should be proportional to the flow rate during the sample period.

5. Cooling Water:
   a. Uncontaminated water used only for cooling purposes, which has no direct contact with any raw material, intermediate or final product, and which does not contain a level of contaminants higher than that of the intake water.
   b. Contaminated water used only for cooling purposes which may become contaminated either through the use of water treatment chemicals used for corrosion inhibitors or biocides or by direct contact with process materials and/or wastewater.

6. Daily Maximum:
   The maximum allowable discharge of a pollutant during any 24 hour period. Where daily maximum limitations are expressed in units of mass, the daily discharge is the total mass discharged over the course of the day. Where daily maximum limitations are expressed in terms of concentration, the daily discharge is the arithmetic average measurement of the pollutant derived from all measurements taken that day.

7. Flashpoint (Closed-Cup):
   The minimum temperature of a liquid at which the liquid gives off a vapor in sufficient concentration to ignite when tested using the methods specified in 40 CFR 261.21.

8. Grab Sample:
   An individual sample collected in less than 15 minutes, without regard to flow or time.

9. Instantaneous Maximum Concentration:
   The maximum concentration allowed in any single grab sample.

10. Interference:
    A discharge that alone or in conjunction with a discharge or discharges from other sources both:
    a. Inhibits or disrupts the POTW, its treatment processes or operations or its sludge processes, use or disposal; and
    b. Causes a violation of any requirement of the POTW's SPDES permit (including an increase in the magnitude or duration of a violation) or prevents the use or disposal of sewage sludge in compliance with the following statutory provisions and regulations or permits issued there under (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA) and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA), the Clean Air Act, the Toxic Substances Control Act and the Marine Protection, Research and Sanctuaries Act.

11. Monthly average:
    The maximum allowable value for the average of all observations obtained during one calendar month. Compliance with the monthly limit is required regardless of the number of samples analyzed and averaged.

12. Pass-Through:
    A discharge which exits the POTW into waters of the State of New York in quantities or concentration which, alone or in conjunction with a discharge or discharges from other sources, cause a violation of any requirement of the POTW's SPDES permit (including an increase in the magnitude or duration of a violation).

13. Publicly Owned Treatment Works (POTW):
    A treatment works, as defined by Section 212 of the Clean Water Act, which is owned by the State or municipality. This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they convey wastewater to a POTW treatment plant. The City of Poughkeepsie Water Pollution Control Plant (WPCP) is the POTW relevant to this permit.

14. Regional Administrator (RA):
    The person in charge of Region II of the United States Environmental Protection Agency, or his/her duly appointed representative.

15. Resource Conservation and Recovery Act (RCRA):
    A Federal statute regulating the management of hazardous wastes from generation through ultimate disposal. The Act contains requirements for waste generators, transporters and owners and operators of treatment, storage and disposal facilities.

16. Self Monitoring:
    Sampling and analyses performed at the Industry by the Industry itself in accordance with 40 CFR 403.

17. Sewer Use Ordinance:
    City & Town of Poughkeepsie regulations relating to the use of the public sewers.

18. Significant Noncompliance:
    Significant noncompliance shall mean that an industrial user meets one or more of the following criteria:
    a. Chronic violations of wastewater discharge limits, defined here as those in which 66% or more of all of the measurements taken during a six month period exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter;
    b. Technical Review Criteria (TRC) violations, defined here as those in which 33% or more of all of the measurements for each pollutant parameter taken during a six month period equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, oil and grease, and 1.2 for all other pollutants except pH);
    c. Any other violation of a pretreatment effluent limit (daily maximum or longer term average) that the Control Authority determines has caused, alone or in combination with other discharges, interference or pass-through (including endangering the health, or safety, of POTW personnel or the general public);
    d. Any discharge of a pollutant that has caused imminent endangerment to human health, welfare, or to the environment or has resulted in the POTW's exercise of its emergency authority under paragraph (f) (1) (vi) (B) of Section 403.8 of the General Pretreatment Regulations (40 CFR 403) to halt or prevent such a discharge;
    e. Failure to meet, within 90 days after the schedule date, a compliance schedule milestone contained in a local control mechanism or enforcement order for starting construction, completing construction, or attaining final compliance;
    f. Failure to provide, within 30 days after the due date, required reports such as baseline monitoring reports, 90 day compliance reports, periodic self-monitoring reports, and reports on compliance with compliance schedules;
    g. Failure to adequately report noncompliance;
    h. Failure to pay the City for sampling and analyses performed at the facility.
    i. Any other violation or group of violations which the Control Authority determines will adversely affect the operation of the local pretreatment program.

19. Slug Load:

Any pollutant (including Biochemical Oxygen Demand) released in a discharge at a flow rate or concentration which will cause a violation of the specific discharge prohibitions in 40 CFR 403.5(b) to 403.12(f). Any discharge that is five times or more the daily average flow or concentration of pollutants therein, for any period time is a slug load.

20. Special Discharge Permit:
    Permit is issued under Sewer Ordinance Number 1, Section 14 ½ - 56. Special Agreements concerning treatment of industrial waste, page 22.

21. Total Toxic Organics (TTO):
    The sum of the concentrations of the specific toxic organic compounds regulated by specific categorical, or City of Poughkeepsie, pretreatment regulations, which is found in the discharge at specific quantifiable concentrations.

PART III

DISCHARGE LIMITATIONS and MONITORING PARAMETERS

Wastewater Discharge Permit No. 2013-SA01

The City of Poughkeepsie, NY Sewer Use Ordinance allows for Special Agreements to be made to allow for the discharge of pollutants which are not defined as Categorical Pretreatment Standard.

The City considered the application of the local limit based on a screening concentrations for creating toxic environments in the sewer collection system, flammable environments in the sewer collection system, and inhibition of the activated sludge treatment process of the POTW. the following table is generated using screening concentrations derived by the EPA and presented in the EPA Local Limits Development Guidance, EPA 833-R-04-002A, July 2004, Appendix G-Inhibition Values, and Appendix I – Discharge Screening Levels and Henry's Law Constants for Organic Compounds. The following table presents the concentrations from these tables.

Pollutant	Toxicity Screening Conc mg/L	LEL Ignitability Screening Conc mg/L	Activated Sludge Inhibition Threshold mg/L
Benzene	0.014	169	100-500
Toluene	2.075	152	200
Ethylbenzene	1.659	1.06	200
Total Xylene			
BTEX	3.748	322.06	500

Compliance Date:

One month after system startup

Discharge Sample Point #1:

For sample collection, is located at the end of the treatment system discharge line.

Sampling Frequency:

All parameters requiring quarterly analysis will be sampled March, June, September, and December. Results are to be submitted within 30 days of sampling event.

Continuous Flow Monitoring:

Flow will be recorded from the permittee's discharge flow meter. Flow

Flow Rate: Maximum Daily Flow Limit = 10, 000 gpd
Flow Rate: Average Daily Flow Limit = 8,640 gpd

Temperature and PH: Grab Samples

Steam or wastewater above 140 degrees Fahrenheit;
Wastewaters having a pH lower than 5.5 or higher than 9.5 or having any other corrosive property likely to cause damage to structures or equipment of the sewerage system or create a hazard to personnel;

Pollutant Limitations: Grab Samples

- BETX Maximum Daily Concentration Limit 1.0 mg/L

BETX is defined as the arithmetic sum of the concentrations of the constituents Benzene, Ethylbenzene, Toluene, and total Xylene.

- TPH (Total Petroleum Hydrocarbon) Max Daily Concentration 15 mg/L

Total Petroleum Hydrocarbon is defined by the method of analysis. TPH is the measured SGT-HEM material measured in the EPA method 1663, Silica Gel Treated-normal-Hexane Extracted Material. This value is based on the EPA study of Fats, Oils, and Grease where the mineral spirits based oils cause interference within the POTW.

- MTBE (Methyl tert-Butyl Ether) Max Daily Concentration 5.0 mg/L

The City has established a 5.0 ug/L limit based on the adverse impact of MTBE on sewer piping gaskets and the impact to the POTW.

- VOCs (As defined below) Average Daily Concentrations 50 ug/L

The primary CVOCs of concern include 1,1,1-TCA and 1,1-DCA. Other CVOCs include 1,2-DCA, tetrachloroethylene (PCE), cis-1,2-DCE, trichloroethylene (TCE), vinyl chloride, chloroethane.

PART IV

DISCHARGE LIMITATIONS

NOT APPLICABLE

In accordance with the Laws of the City of Poughkeepsie, Chapter 14 1/2, the maximum allowable concentration of any of the following pollutants in sewage being discharged to the City POTW shall not exceed the values contained below in the local limitations. Your facility will be monitored for these parameters once during the effective dates of this permit. The parameters that will be monitored are contained on page 7 of this permit. If the parameters are changed during the term of this permit, your facility will be notified as to the changes.

LOCAL LIMITATIONS

REGULATED POLLUTANT	DAILY MAXIMUM CONCENTRATION (mg/L)
Antimony	0.002
Arsenic	0.48
Beryllium	17.0
Cadmium	3.81
Chromium (Total)	12.82
Copper	1.98
Cyanide (Total)	1.31
Lead	2.02
Mercury	0.09
Nickel	3.44
Oil & Grease	100.0
Selenium	0.0016
Silver	0.52
Thallium	45.36
Zinc	1.54
PH (Range)	5.5 to 9.5 (S.U.)

- Wastewater, to be discharged from this facility, is understood to be domestic sewage and process wastewater from cleaning activities in the meat grinding room only.

- Process wastewater from washing and cleaning of equipment, floors, tools, etc. in the meat grinding area is understood to consist of waste meat products, water, and cleaning/disinfection agents (detergents/bleach) only.

PART V

MONITORING REQUIREMENTS

Compliance and Self Monitoring:

The City WPCP may perform compliance and self-monitoring sampling and analysis in accordance with 40 CFR 403. The sampling crew, after showing proper identification, must be allowed into the facility to perform this mandated monitoring.

The permittee will be sent an invoice for the City sampling and analyses performed at or for your facility by the City. The invoice is to be paid within 60 days of receipt. Failure to pay this invoice will be considered a violation of this permit and will be subject to enforcement proceedings in accordance with the City Sewer Use Ordinance.

PART VI

ADDITIONAL MONITORING AND REPORTING REQUIREMENTS

1. Additional Monitoring
   If the permittee monitors any pollutant more frequently than required by this permit, using test procedures prescribed in 40 CFR Part 136 or otherwise approved by EPA or specified in this permit, the results of such monitoring shall be submitted to the City Engineer within 30 days of receipt of the sampling results.

1. a Monitoring Reports
   Monitoring reports obtained shall be summarized and reported in an Industrial Monitoring Report, quarterly. The Self-Monitoring Reports are due no later than the 30th day of the month following the end of each reporting period.

2. Automatic Re-sampling
   If the results of the permittee's wastewater discharge sampling indicate a violation, the permittee shall:
   a. Notify the City Engineer within 24 hours of becoming aware of the violation.
   b. Repeat the sampling and analyses for the substance that was in violation of applicable regulations within 30 days of the date the violation became known, and submit the analytical results of the sampling to the City Engineer immediately.

3. Accidental Discharge Notification

In the event of a bypass, upset, slug discharge, or accidental discharge in violation of any provision of this permit, or the Sewer Use Ordinance, the permittee shall immediately notify the City WPCP, at any hour, by telephone at 845-471-8165. Within five days following an accidental discharge, the permittee shall submit to the Commissioner of Public Works / City Engineer a detailed written report. This report shall contain:

a. A description of the bypass, upset, slug, or accidental discharge, the cause thereof, and the impact on the permittee's compliance status. The description should also include the location of the discharge, type, concentration and volume of waste.
b. The duration of noncompliance, including exact dates and time of noncompliance, and if the noncompliance continues, the time by which compliance is reasonably expected to occur.
c. All steps taken to reduce, eliminate and prevent recurrence of such bypass, upset, slug, accidental discharge, or other conditions of noncompliance.

4. Operating Upsets

Any permittee that experiences an upset in operations that places the permittee in a temporary state of noncompliance with the provisions of either this permit or the Sewer Use Ordinance shall inform the City WPCP immediately upon the first awareness of the upset at 845-471-8165.

A written follow-up report thereof shall be filed by the permittee with the Commissioner of Public Works / City Engineer within five days. The report shall specify:

a. Description of the upset, the cause(s) thereof and the upset's impact on the permittee's compliance status;
b. Duration of noncompliance, including exact dates and times of noncompliance, and if the noncompliance continues, the time by which compliance is reasonably expected to occur;
c. All steps taken or to be taken to reduce, eliminate and prevent recurrence of such an upset, slug load or other conditions of noncompliance.

A documented and verified operating upset shall be an affirmative defense to any enforcement action brought against the permittee for noncompliance with categorical pretreatment standards attributable to the upset event if the requirements of 40 CFR 403.16(c) are met.

5. Planned Changes

The permittee shall give notice to the Commissioner of Public Works / City Engineer 90 days prior to any facility expansion, production increase, or process modifications(s) which result(s) in new or substantially increased discharges, or a change in the nature of the discharge.

6. Anticipated Noncompliance

The permittee shall give notice to the City Engineer of any planned changes in the permitted facility or activity which may result in noncompliance with this permit.

7. Signatory Requirements

All applications, reports or information submitted to the Control Authority shall contain the following certification and be signed as required in (a), (b), (c) or (d) below:

> "I certify under penalty of law that I have personally examined and am familiar with the information contained in this document and all attachments therein. Furthermore, based on my inquiry of those persons immediately responsible for obtaining the information contained in this document, I believe that this information is true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment. I further certify that the reported sampling results, if any, are representative of the facility's normal work cycles and expected pollutant discharges."

a. By a responsible corporate officer if the industrial user submitting the reports is a corporation. For the purpose of this paragraph, a responsible corporate officer means president, secretary, treasurer or vice-president of the corporation in charge of a principal business function or any other person who performs similar policy or decision-making functions for the corporation;
b. By a general partner or proprietor if the industrial user submitting the report is a partnership or sole proprietorship;
c. By a duly authorized representative of the individual designated in paragraph (a) or (b) of this section if:
    i. The authorization is made in writing by the individual described in paragraph (a) or (b);
    ii. The authorization specifies either an individual or a position having responsibility for the overall operation of the facility from which the industrial discharge originates, such as the position of plant manager, or a position of equivalent responsibility, or a position having overall responsibility for environmental matters for the company; and
    iii. The written authorization is submitted to the City Engineer.
d. If an authorization under paragraph (c) of this section is no longer accurate because a different individual or position has responsibility for the overall operation of the facility or overall responsibility for the environmental matters of the company, a new authorization satisfying the requirement of paragraph (c) of this section must be submitted to the City Engineer prior to or together with any reports to be signed by an authorized representative;
e. Pursuant to 40 CFR 403.8 (f) (**2**) **(**v), the permittee shall submit, within 30 days of the effective date of this permit to the City a slug discharge plan for the facility named in this permit. During the City's inspection of this facility, the slug discharge plan will be evaluated. If it is deemed unnecessary by this facility, pursuant to 40 CFR 403.8 (f) (2) (v) that a slug discharge plan is not needed, the facility must notify the City within 30 days of the effective date of this permit;

f. All reports required by this permit shall be submitted to the Control Authority at the following address:

Richard DuPilka, P.E.
Commissioner of Public Works / City of Poughkeepsie Engineer
62 Civic Center Plaza
Poughkeepsie, NY 12602

With copy to:

Edward Steeprock, Plant Manager
City of Poughkeepsie WPCP
Veolia Water NA-NE
173 Kittredge Place
Poughkeepsie, NY 12602

PART VII

OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance
   The permittee shall at all times properly operate and maintain all facilities and systems for treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes but is not limited to effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

2. Duty to Halt or Reduce Activity
   Upon reduction of efficiency of operation or loss or failure of all or part of the pretreatment facility, the permittee shall, to the extent necessary to maintain compliance with its permit, control production or all discharges until operation of the pretreatment facility is restored or an alternative method of pretreatment is provided. This requirement applies, for example, when the primary source of power of the pretreatment facility fails or is reduced. It shall not be a defense for a permittee in an enforcement action to state that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Bypass of Treatment Facilities
   a. Bypass is prohibited unless it is unavoidable to prevent loss of life, personal injury, or severe property damage or no feasible alternatives exist.

b. The permittee may allow any bypass to occur which does not cause discharge limitations to be exceeded, but only if it is also for essential maintenance to assure efficient operation.
c. Notification of Bypass:
   i. Anticipated bypass – If the permittee knows in advance of the need for a bypass, it shall submit prior written notice at least 10 days before the date of the bypass to the City Engineer.
   ii. Unanticipated bypass – The permittee shall immediately notify the City WPCP and submit a written notice to the City Engineer with 24 hours of becoming aware of the bypass.
d. Disposal of Hazardous Wastes
   All solids, sludge's, resins or residues, filter backwash or other pollutants removed in the course of pretreatment of wastewater shall be handled and disposed of in accordance with all New York State hazardous wastes requirements and RCRA requirements including, but not limited to, subtitles C and D thereof.

PART VIII

INSPECTION AND RECORDS

1. Inspection and Entry
   The permittee shall allow the Regional Administrator and/or duly authorized representatives of the Control Authority, upon the presentation of credentials and other documents as may be required by law, to:
   a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
   b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
   c. Inspect, at any time that non-domestic wastewater is being discharged, any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit;
   d. Sample or monitor, for the purposes of assuring permit compliance, any substance or parameters at any locations; and
   e. Inspect any production, manufacturing, fabricating or storage area which pollutants, regulated or required under this permit could originate, be stored, or be discharged to the public sewer.

   The applicant, by accepting any permit issued, does hereby consent and agree to entry upon the premises as described herein.

2. Retention of Records
   a. The permittee shall retain records of all monitoring information, including all calibration and maintenance records and original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for

a period of at least three years from the date of the sample, measurement, report or application as per Federal regulations 40 CFR 403.12(o) (2). This period may be extended by request of the Control Authority at any time.

b. All records that pertain to matters that are the subject of special orders or any other enforcement or litigation activities brought by the Control Authority shall be retained and preserved by the permittee at least three years or until all enforcement activities have concluded and all periods or limitations with respect to any and all appeals have expired, whichever is longer.

3. Record Contents

   Records of sampling information shall include:

   a. The date, exact place, time and methods of sampling of measurement, and sample preservation techniques or procedures;
   b. Who performed the sampling or measurements;
   c. The date(s) analyses were performed;
   d. Who performed the analyses;
   e. The analytical techniques or methods used; and
   f. The results of each analysis.

4. Falsifying Records

   It shall be unlawful to make any false statement representation or certification in any application, report, plan or other document required by this permit or to falsify, tamper with or knowingly render any monitoring device or method inaccurate.

PART IX

STANDARD CONDITIONS

1. Severability

   The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances and the remainder of this permit, shall not be affected thereby.

2. Duty to Comply

   The permittee must comply with the provisions of the General Pretreatment Regulations (40 CFR 403), applicable Federal Categorical Standards, The City of Poughkeepsie Sewer Use Ordinance, and all conditions of this permit. Failure to comply with these requirements may be grounds for administrative action, or enforcement proceedings including civil or criminal penalties, injunctive relief, and summary abatements.

3. Duty to Mitigate

   The permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this permit, including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

4. Permit Action

   This permit may be modified, revoked and reissued, or terminated for good causes including, but not limited to, the following:

   a. Incorporation of any new or revised Federal, State, or local pretreatment standards or requirements;
   b. Material or substantial alterations or additions to the discharger's operations which were not covered in the effective permit;
   c. A change in any condition that requires either a temporary or permanent reduction or elimination of the authorized discharge;
   d. Information indicating that the permitted discharge poses a threat to the City of Poughkeepsie wastewater collection and treatment systems, POTW personnel or the receiving waters;
   e. Violation of any terms or conditions of this permit
   f. Obtaining this permit by misrepresentation or failure to disclose fully all relevant facts.
   g. Upon request of the permittee, provided such request does not create a violation of any existing applicable requirements, standards, laws, or rules and regulations; or

   h. Correction of typographical or other errors in the permit.

   The filing of a request by the permittee for a permit modification, revocation and re-issuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

5. Property Rights

   The issuance of this permit does not convey any property rights of any sort, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any violation of Federal, State or local laws or regulations.

6. Limitation of Permit Transfer

   Wastewater discharge permits are issued to a specific user for a specific operation and are not assignable to another user or transferable to any other location without the prior written approval of the City Engineer. In the event of sale, the permittee must inform the Control Authority of the sale, and must inform the purchaser of all responsibilities and obligations under this permit.

7. Duty to Reapply

   If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee must apply for and obtain a new permit. The application must be submitted at least 90 days before the expiration date of this permit.

8. Dilution
   The permittee shall not increase the use of process water or, in any way, attempt to dilute a discharge as a partial or complete substitute for adequate treatment to achieve compliance with the limitations contained in this permit.

9. Applicable Regulations
   The permittee shall comply at all times with any and all applicable County, State, and Federal pretreatment standards and requirements, including any such standards or requirements that may become effective during the term of this permit.

10. Confidentiality
    Any information, except for discharge and effluent data, submitted to the Control Authority may be claimed by the discharger to be confidential. Any such claim must be asserted at the time of submission of the information, and should contain a stamped legend or any other suitable form of notice on each page containing such information, employing language such as trade secret, proprietary or confidential business information. If no claim is asserted at the time of submission, the information may be made available to the public without further notice. If a claim is asserted, it will be treated in accordance with the City of Poughkeepsie's business confidentiality procedures. Effluent data shall be available to the public without restriction.

11. Duty to Provide Information
    The permittee shall furnish to the Control Authority within a reasonable time, any information which the City Engineer may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the City Engineer, upon request, copies of records required to be kept by this permit.

12. Annual Publication
    A list of all industries which were in significant noncompliance (as defined in Part II of this permit) with the conditions or limitations of this permit during the previous calendar year shall be annually published by the Control Authority in the daily newspaper with the largest circulation within its service area.

13. Civil and Criminal Liability
    Nothing in this permit shall be construed to relieve the permittee from civil and/or criminal penalties for noncompliance with any applicable County, State, or Federal regulations.

14. Penalties for Violations of Permit Conditions
    The City of Poughkeepsie Sewer Use Ordinance provides that any person who fails to comply with any of the provisions of the Sewer Use Ordinance, or the conditions or limitations of this permit shall be liable for a civil penalty of up to $1,000.00 for each violation. In the case of a continuing violation, each day's continuance shall be a

separate and distinct offense. The permittee may also be subject to sanctions under State and/or Federal law.

15. Slug Control Plan (SCP)
A need for a plan to control or prohibit a "slug" from entering the POTW will be evaluated at least once during the life of the permit. If an SCP is required, it must be submitted to the City no later than 45 days after the requirement is noted. If the permittee feels as though it does not require an SCP, it must notify the City in writing.

16. Spill Containment Plan (SPCP)
A need for a plan to contain a chemical spill within the confines of the permittee will be evaluated at least once during the life of the permit. If an SPCP is required, it must be submitted to the City no later than 45 days after the requirement is noted. If the permittee feels as though it does not require an SPCP, it must notify the City in writing.

PART X

GENERAL PROHIBITIVE STANDARDS

The permittee shall comply with all of the general prohibitive discharge standards in the General Pretreatment Regulations, 40 CFR 403, and the City's Sewer Use Ordinance. Except as expressly allowed in this permit no person shall discharge or cause to be discharged, or allow to run, leak, or escape into any public sewer, pipe, channel, pumping station, catch basin or any other sewer appurtenances, or waterway connecting with any public sewer, or into any private sewer connected with a public sewer any of the following described materials, substances or wastes except such small quantities as may be present in normal household wastes:

a. Construction materials, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastic, wood, paunch manure, coffee grounds, fur, wax, or any solids or viscous substances capable of causing obstruction to the flow in sewers or other interference with the proper operation of the sewerage system;
b. Snow and ice at unauthorized locations;
c. Steam or wastewater above 140 degrees Fahrenheit;
d. Flammable or explosive liquids, solids or gases, including but not limited to gasoline, benzene and naphtha. Under no circumstances may any such substances be discharged into the sewerage system;
e. Oil sludge's;
f. Coal tar, its derivatives and waste;
g. Paints and waste products from paint manufacturing which tend to clog or otherwise interfere with the operation of the sewerage system;
h. Wastewaters having a pH lower than 5.5 or higher than 9.5 or having any other corrosive property likely to cause damage to structures or equipment of the sewerage system or create a hazard to personnel;

i. Toxic substances in such quantities which the person knows, or has reason to know, may, when discharged from a single source, or in combination with other sources:
    1. Interfere with any sewage treatment process, including sludge treatment;
    2. Limit the City's options for operating its sewerage system or disposing of the sewage sludge, grit or scum generated at water pollution control plants;
    3. Be detrimental to the health of human beings, animals, or aquatic life;
    4. Create any adverse effect in the receiving water; or
    5. Violate Federal or State laws or regulations or the requirements of a discharge permit of a sewage treatment plant issued pursuant to section 403 of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, as amended, or any other permit issued pursuant to Federal or State law.

j. Any liquids or wastes containing pollutants of such quality and/or quantity that becomes burdensome in the operation and maintenance of a sewage treatment plant;

k. Any noxious or malodorous gas or substance capable of creating a public nuisance;

l. Any wastewater or substance, which in the opinion of the City Engineer, will result in a violation of any applicable Federal, State or local water quality standard concerning discoloration or other undesirable physical changes in the appearance of the receiving waters.

m. No person shall discharge or cause to be discharged any radioactive material either directly or indirectly into the sewerage system, unless all restrictions, prohibitions, and requirements of the Dutchess County Health Department are fully complied with.

n. Any pollutants which create a fire or explosion hazard in the POTW, including, but not limited to, waste streams with a closed cup flashpoint of less than 140 degrees Fahrenheit, or 60 degrees Centigrade, using the test methods specified in 40 CFR 261.21.

Division of Environmental Remediation
Internal Guidance Procedure

Title: Injections for Remediation	**DER ID:**IGP- 22
Issuing Authority:	**Originating Unit:**
Name: Dale A. Desnoyers	Bureau: Technical Support
Title: DER Division Director	Section: Training and Technical Support
Signature:	Phone: (518) 402-9553
Date Issued: September 2, 2008	Latest Date Revised: OCT 0 5 2009

I. Summary:

This Internal Guidance Procedure (IGP) for the Division of Environmental Remediation (DER), entitled "Injections for Remediation," establishes guidance for the introduction of fluids into the soil or groundwater for remediation to ensure technical consistency and regulatory compliance, and to provide the necessary United States Environmental Protection Agency (EPA) notification forms. This guidance is applicable to the State Superfund Program (SSF); the Environmental Restoration Program (ERP); the Brownfield Cleanup Program (BCP); the Voluntary Cleanup Program (VCP); and the Spill Response Program (SRP).

II. Purpose and Background:

Purpose - Frequently, remedies selected under one of DER's programs include injection of fluids into the groundwater or soil to effect or enhance remediation. These remedies can be technically complex and are regulated under 40 CFR Part 144, EPA's underground injection control (UIC) program. This guidance is intended to provide technical and procedural information associated with these injections and to ensure consistent interpretation of, and compliance with the EPA regulations.

Background - The frequency with which selected remedies and pilot studies include fluid injections into the soil and groundwater is increasing. Fluids are injected to enhance natural (biological) degradation, physical removal (e.g. surfactants, enzymes) or chemical oxidation (e.g. permanganate, Fenton's Reagent) of contaminants. These fluids are frequently complex, contain proprietary ingredients, or are new to staff.

Subsurface injection of fluids (including gasses[1]) are regulated by EPA's UIC program, which has not been delegated to New York. Injections of fluids for remediation are generally made via Class V UIC wells. The regulation requires notification of the construction, use, and decommissioning of a Class V injection well.

III. Responsibility:

Responsibility for interpreting and maintaining this IGP lies with the Chief of the Training and Technical Support Section, Bureau of Technical Support (BTS). Responsibility for implementing this IGP lies with DER remedial staff in both the Central and Regional Offices. Responsible Parties (RPs) are responsible for UIC compliance, including notifications on RP-lead sites.

IV. Procedure:

A. Technical Considerations

Staff must understand the makeup of the injectant as a prerequisite to consider testing or using it. Frequently, vendors or consultants propose using products which they claim contain proprietary information. Vendors are often reluctant to release detailed information on the contents of the product. The vendor must provide this information before injections can be approved. Without this information, staff cannot adequately assess the product relative to standards, criteria and guidance (SCGs), determine its safety, or evaluate the design or effectiveness of a monitoring program for the product. Proprietary information can be kept confidential by storing it in a non-FOIL folder or reviewing and returning the information.

The product vendor or consultant must also be able to explain the mechanisms by which the products remediate the contamination, provide the basis or calculations for the required dosing, and describe the potential fate of the product and byproducts in environmental media. If they can't do this to staff's satisfaction, the injection of that product should not be approved.

In cases where additional confidence is needed regarding the performance of an injection remedy due to site-specific conditions or unfamiliarity with a product, well designed bench-scale/pilot tests including well thought out and comprehensive monitoring programs may be necessary. Also, depending upon the specific circumstances, active hydraulic and/or vapor control may be necessary as part of the pilot test and/or remedy.

The Technical Support Section may be consulted for assistance in the use of this technology, especially if it involves non-routine applications or materials.

B. Regulatory Considerations

1. <u>State Pollution Discharge Elimination System (SPDES)</u> - Injections are not subject to a SPDES permit because the injected materials are not considered an industrial discharge.

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[1] NOTE: While injection of gasses such as ozone are regulated, the USEPA does not consider air (e.g. air sparging) to be covered.

2. Chemical Facility Anti-terrorism Standards (6 CFR Part 27) - These standards apply in the case of certain commonly used oxidants. Potassium permanganate and hydrogen peroxide (35%) are on the Department of Homeland Security list of Chemicals of Interest (COI) (Appendix A of 6 CFR Part 27) as a Theft/Diversion Explosives/Improvised Explosive Devise Precursor (EXP/IEDP) concern. If the screening threshold quantity (STQ) for these or any other chemical on the list will be exceeded, the "Top-Screen" process must be completed. The STQ is the total amount of the chemical on site. For potassium permanganate and hydrogen peroxide (35%) the STQ is 400 pounds. The Top-Screen process can be found at the Department of Homeland Security website at http://www.dhs.gov/files/programs/gc_1235582326154.shtm.The Top-Screen process is somewhat burdensome. The cost of this process should be considered when considering selection of an injectant which is a COI. Hydrogen peroxide with concentrations < 35% and potassium permanganate under 400 pounds total do not trigger compliance with these regulations. Project managers should confirm that any contemplated injectant is not on the COI list.

3. Underground Injection Control (UIC) - UIC regulations do apply. Remediation injection wells or injection points are generally considered Class V UIC wells even if no physical well remains subsequent to the injection. This includes direct-push injections.

C. UIC Program Notification

Injection well owners/operators must provide information about the Class V injection wells to the EPA prior to construction of the wells. The notification should be made at least 30 days prior to construction/injection. It is not necessary to wait for a response from EPA. Generally, injections used to enhance or effect remediation will be authorized by rule and the notification is all that is required. If EPA requires additional information or if they determine that the injection requires a permit, they will respond to the notification in writing.

1. DER or our consultant is responsible for making the notification for state-lead sites. The notification should be e-mailed to EPA using the inventory spreadsheet which was created by EPA Region 2 for exclusive use by DEC (Attachment 1). The spreadsheet file is posted with this guidance on the DER internal website at http://internal.dec.state.ny.us/der/der369.html#igp.

2. RPs or volunteers should make the notification for sites where they are the lead using the inventory form referenced in 40 CFR 144.26 [USEPA form 7520-16] (Attachment 2). This form (and instructions) is posted with this guidance on the DER internal website at http://internal.dec.state.ny.us/der/der369.html#igp. The notification should be made by fax or mail and should include enough details for EPA to understand the site and the proposed process and should indicate that DEC is overseeing the project. A guidance summary to inform RPs/volunteers about their responsibility is included as Attachment 3.

Notifications should be sent to:

Chief, Groundwater Compliance Section*
U.S. EPA Region 2
290 Broadway, 20th Floor
New York, NY 10007-1866
Phone (212) 637- 3766
Fax (212) 637- 3953
Region2_UIC@epa.gov

**NOTE : The current name of the chief of the Groundwater Compliance Section can be found along with the attachments to this IGP at: http://internal.dec.state.ny.us/der/der369.html#igp*

Once the injection activity has been completed the UIC well must be closed in a manner which protects underground sources of drinking water. The wells should be closed in accordance with DEC's Groundwater Monitoring Well Decommissioning Policy, which can be found at http://internal.dec.state.ny.us/der/der369.html#cp . The UIC program must be notified of when and how the wells were closed.

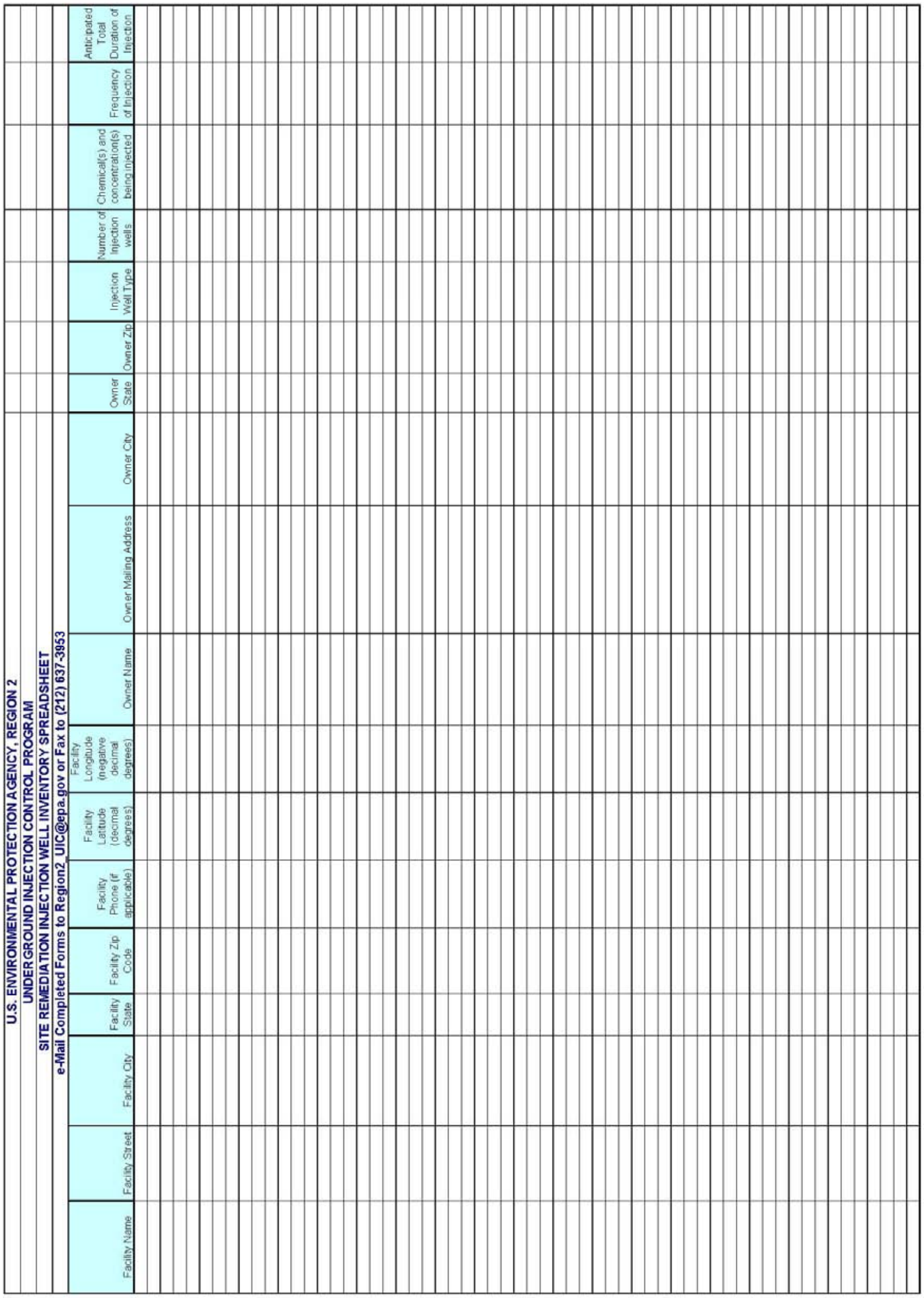
V. Related References:

- 40 CFR Subpart B - General Program Requirements, Sec. 144.12 Prohibition of movement of fluid into underground sources of drinking water
- 40 CFR Subpart C - Authorization of Underground Injection by Rule, Sec. 144.25 Requiring a permit.
- 40 CFR Subpart G - Requirements for Owners and Operators of Class V Injection Wells, Sec. 144.83 Do I need to notify anyone about my Class V injection well?
- 40 CFR Sec. 144.84 - Do I need to get a (UIC) permit?
- Protecting Drinking Water Through Underground Injection Control, Drinking Water Pocket Guide #2, USEPA
- 6 CFR Part 27 - Chemical Facility Anti-terrorism Standards.
- ITRC, DNAPLs-3, Technical and Regulatory Guidance for Surfactant/Cosolvent Flushing of DNAPL Source Zones

Attachments

Attachment 1 - Image of EPA Inventory Spreadsheet
Attachment 2 - EPA Inventory of Injection Wells Form (and Instructions)
Attachment 3 - Guidance Summary:Underground Injection Control (UIC) Program

Attachment 1 - Image of EPA Inventory Spreadsheet



U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 2

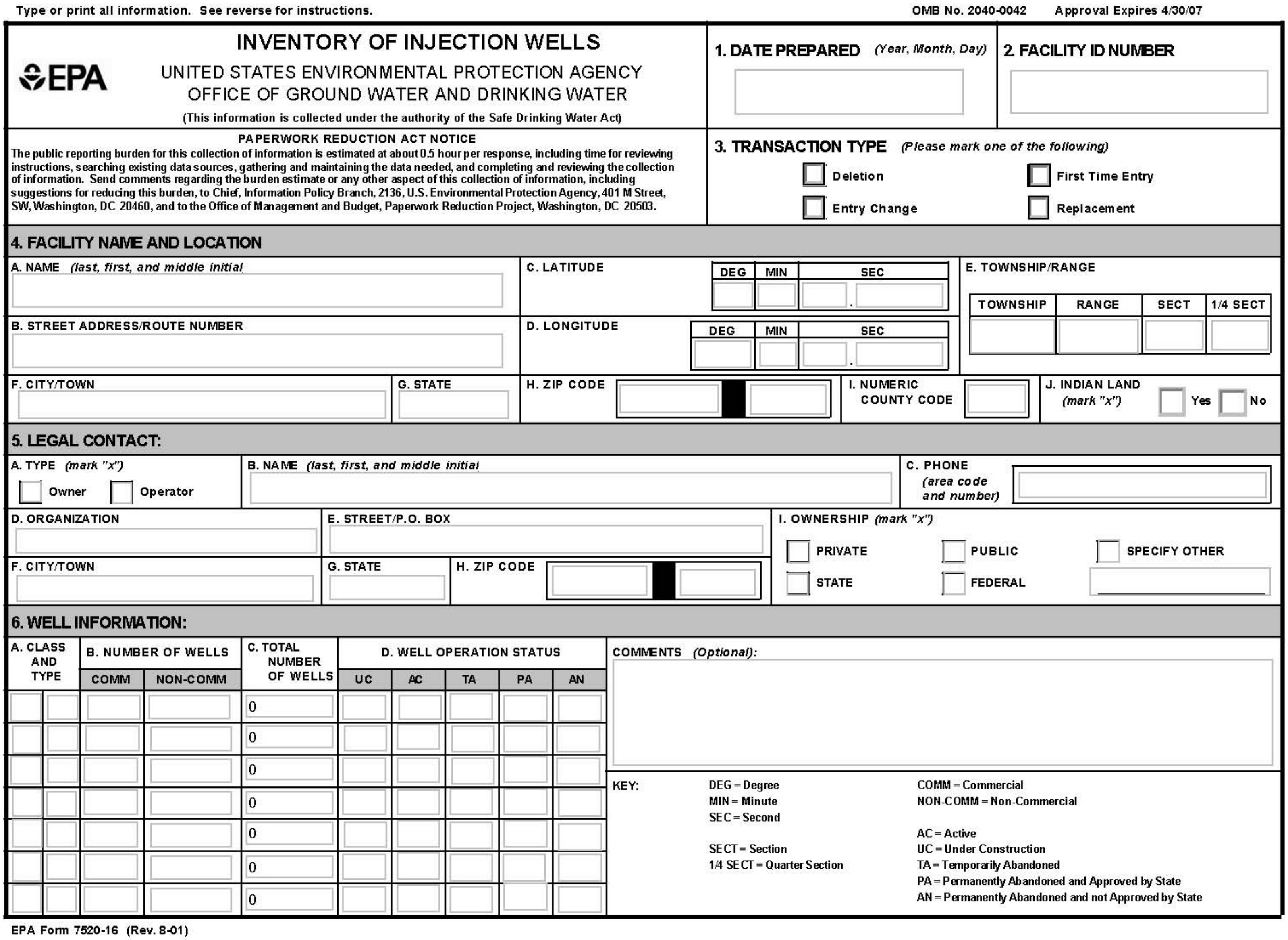
UNDERGROUND INJECTION CONTROL PROGRAM

SITE REMEDIATION INJECTION WELL INVENTORY SPREADSHEET

e-Mail Completed Forms to Region2_UIC@epa.gov or Fax to (212) 637-3953

Facility Name	Facility Street	Facility City	Facility State	Facility Zip Code	Facility Phone (if applicable)	Facility Latitude (decimal degrees)	Facility Longitude (negative decimal degrees)	Owner Name	Owner Mailing Address	Owner City	Owner State	Owner Zip	Injection Well Type	Number of Injection wells	Chemical(s) and concentration(s) being injected	Frequency of Injection	Anticipated Total Duration of Injection

Attachment 2 - EPA Inventory of Injection Wells Form



Type or print all information. See reverse for instructions. OMB No. 2040-0042 Approval Expires 4/30/07

INVENTORY OF INJECTION WELLS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF GROUND WATER AND DRINKING WATER
(This information is collected under the authority of the Safe Drinking Water Act)

1. DATE PREPARED *(Year, Month, Day)*

2. FACILITY ID NUMBER

PAPERWORK REDUCTION ACT NOTICE

The public reporting burden for this collection of information is estimated at about 0.5 hour per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Chief, Information Policy Branch, 2136, U.S. Environmental Protection Agency, 401 M Street, SW, Washington, DC 20460, and to the Office of Management and Budget, Paperwork Reduction Project, Washington, DC 20503.

3. TRANSACTION TYPE *(Please mark one of the following)*

☐ Deletion ☐ First Time Entry
☐ Entry Change ☐ Replacement

4. FACILITY NAME AND LOCATION

A. NAME *(last, first, and middle initial*

B. STREET ADDRESS/ROUTE NUMBER

C. LATITUDE DEG MIN SEC .

D. LONGITUDE DEG MIN SEC .

E. TOWNSHIP/RANGE

TOWNSHIP	RANGE	SECT	1/4 SECT

F. CITY/TOWN

G. STATE

H. ZIP CODE

I. NUMERIC COUNTY CODE

J. INDIAN LAND *(mark "x")* ☐ Yes ☐ No

5. LEGAL CONTACT:

A. TYPE *(mark "x")* ☐ Owner ☐ Operator

B. NAME *(last, first, and middle initial*

C. PHONE *(area code and number)*

D. ORGANIZATION

E. STREET/P.O. BOX

F. CITY/TOWN

G. STATE

H. ZIP CODE

I. OWNERSHIP *(mark "x")*

☐ PRIVATE ☐ PUBLIC ☐ SPECIFY OTHER
☐ STATE ☐ FEDERAL

6. WELL INFORMATION:

A. CLASS AND TYPE		B. NUMBER OF WELLS		C. TOTAL NUMBER OF WELLS	D. WELL OPERATION STATUS				
		COMM	NON-COMM		UC	AC	TA	PA	AN
				0					
				0					
				0					
				0					
				0					
				0					
				0					

COMMENTS *(Optional)*:

KEY:

DEG = Degree
MIN = Minute
SEC = Second

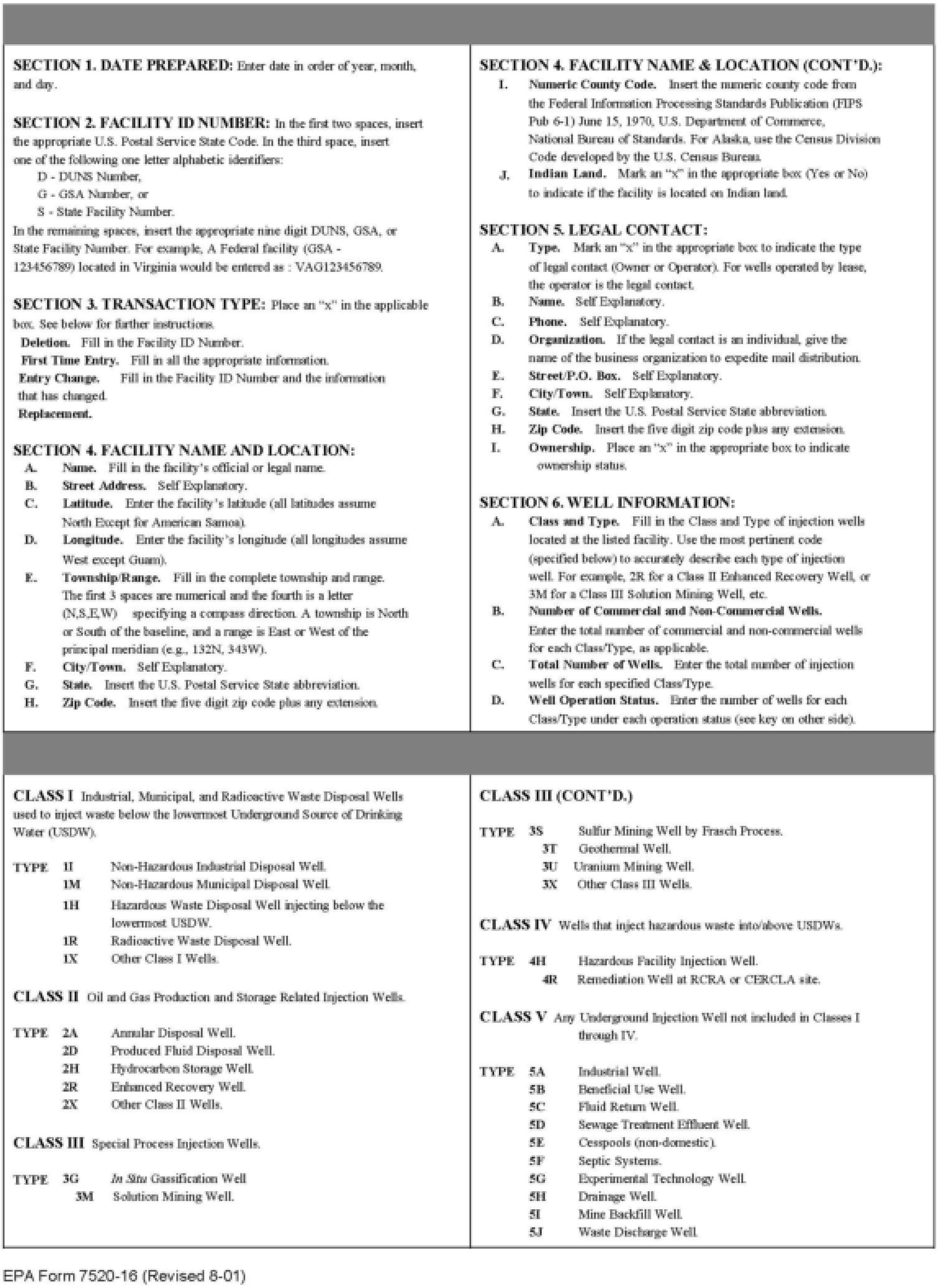
SECT = Section
1/4 SECT = Quarter Section

COMM = Commercial
NON-COMM = Non-Commercial

AC = Active
UC = Under Construction
TA = Temporarily Abandoned
PA = Permanently Abandoned and Approved by State
AN = Permanently Abandoned and not Approved by State

EPA Form 7520-16 (Rev. 8-01)

Attachment 2 (con't) – Instructions for EPA Inventory of Injection Wells Form



SECTION 1. DATE PREPARED: Enter date in order of year, month, and day.

SECTION 2. FACILITY ID NUMBER: In the first two spaces, insert the appropriate U.S. Postal Service State Code. In the third space, insert one of the following one letter alphabetic identifiers:

D - DUNS Number,
G - GSA Number, or
S - State Facility Number.

In the remaining spaces, insert the appropriate nine digit DUNS, GSA, or State Facility Number. For example, A Federal facility (GSA - 123456789) located in Virginia would be entered as : VAG123456789.

SECTION 3. TRANSACTION TYPE: Place an "x" in the applicable box. See below for further instructions.

Deletion. Fill in the Facility ID Number.
First Time Entry. Fill in all the appropriate information.
Entry Change. Fill in the Facility ID Number and the information that has changed.
Replacement.

SECTION 4. FACILITY NAME AND LOCATION:

A. **Name.** Fill in the facility's official or legal name.
B. **Street Address.** Self Explanatory.
C. **Latitude.** Enter the facility's latitude (all latitudes assume North Except for American Samoa).
D. **Longitude.** Enter the facility's longitude (all longitudes assume West except Guam).
E. **Township/Range.** Fill in the complete township and range. The first 3 spaces are numerical and the fourth is a letter (N,S,E,W) specifying a compass direction. A township is North or South of the baseline, and a range is East or West of the principal meridian (e.g., 132N, 343W).
F. **City/Town.** Self Explanatory.
G. **State.** Insert the U.S. Postal Service State abbreviation.
H. **Zip Code.** Insert the five digit zip code plus any extension.

SECTION 4. FACILITY NAME & LOCATION (CONT'D.):

I. **Numeric County Code.** Insert the numeric county code from the Federal Information Processing Standards Publication (FIPS Pub 6-1) June 15, 1970, U.S. Department of Commerce, National Bureau of Standards. For Alaska, use the Census Division Code developed by the U.S. Census Bureau.
J. **Indian Land.** Mark an "x" in the appropriate box (Yes or No) to indicate if the facility is located on Indian land.

SECTION 5. LEGAL CONTACT:

A. **Type.** Mark an "x" in the appropriate box to indicate the type of legal contact (Owner or Operator). For wells operated by lease, the operator is the legal contact.
B. **Name.** Self Explanatory.
C. **Phone.** Self Explanatory.
D. **Organization.** If the legal contact is an individual, give the name of the business organization to expedite mail distribution.
E. **Street/P.O. Box.** Self Explanatory.
F. **City/Town.** Self Explanatory.
G. **State.** Insert the U.S. Postal Service State abbreviation.
H. **Zip Code.** Insert the five digit zip code plus any extension.
I. **Ownership.** Place an "x" in the appropriate box to indicate ownership status.

SECTION 6. WELL INFORMATION:

A. **Class and Type.** Fill in the Class and Type of injection wells located at the listed facility. Use the most pertinent code (specified below) to accurately describe each type of injection well. For example, 2R for a Class II Enhanced Recovery Well, or 3M for a Class III Solution Mining Well, etc.
B. **Number of Commercial and Non-Commercial Wells.** Enter the total number of commercial and non-commercial wells for each Class/Type, as applicable.
C. **Total Number of Wells.** Enter the total number of injection wells for each specified Class/Type.
D. **Well Operation Status.** Enter the number of wells for each Class/Type under each operation status (see key on other side).

CLASS I Industrial, Municipal, and Radioactive Waste Disposal Wells used to inject waste below the lowermost Underground Source of Drinking Water (USDW).

TYPE	1I	Non-Hazardous Industrial Disposal Well.
	1M	Non-Hazardous Municipal Disposal Well.
	1H	Hazardous Waste Disposal Well injecting below the lowermost USDW.
	1R	Radioactive Waste Disposal Well.
	1X	Other Class I Wells.

CLASS II Oil and Gas Production and Storage Related Injection Wells.

TYPE	2A	Annular Disposal Well.
	2D	Produced Fluid Disposal Well.
	2H	Hydrocarbon Storage Well.
	2R	Enhanced Recovery Well.
	2X	Other Class II Wells.

CLASS III Special Process Injection Wells.

TYPE	3G	*In Situ* Gassification Well
	3M	Solution Mining Well.

CLASS III (CONT'D.)

TYPE	3S	Sulfur Mining Well by Frasch Process.
	3T	Geothermal Well.
	3U	Uranium Mining Well.
	3X	Other Class III Wells.

CLASS IV Wells that inject hazardous waste into/above USDWs.

TYPE	4H	Hazardous Facility Injection Well.
	4R	Remediation Well at RCRA or CERCLA site.

CLASS V Any Underground Injection Well not included in Classes I through IV.

TYPE	5A	Industrial Well.
	5B	Beneficial Use Well.
	5C	Fluid Return Well.
	5D	Sewage Treatment Effluent Well.
	5E	Cesspools (non-domestic).
	5F	Septic Systems.
	5G	Experimental Technology Well.
	5H	Drainage Well.
	5I	Mine Backfill Well.
	5J	Waste Discharge Well.

EPA Form 7520-16 (Revised 8-01)

Attachment 3

GUIDANCE SUMMARY

Underground Injection Control Program (UIC)

Remediation injection wells or injection points are considered Class V UIC wells. If a fluid is being injected into the groundwater or soil for remediation, the injection must comply with the UIC regulations.

What do you have to do?

You must notify the EPA of the construction, operation, and decommissioning of Class V injection wells. Injection well owners/operators must provide information about the wells (inventory). The notification should be made at least 30 days prior to construction and injection using the inventory form referenced in 40CFR144.26 (form OMB No. 2040-0042 [USEPA form 7520-16]). The notification should made by fax or mail and should include enough details for EPA to understand the site and the proposed process. If the site is being overseen by the NYSDEC and the NYSDEC has reviewed and approved the proposed injection, the notification should indicate this. It is not necessary to wait for a response from EPA. EPA makes the final determination as to whether the injection is authorized by rule or a permit is required. If EPA requires additional information or if they determine that the injection requires a permit, they will respond to the notification in writing.

Once the injection activity has been completed the UIC must be closed in a manner which protects underground sources of drinking water. The UIC program must be notified of when and how the wells were closed.

For questions and to submit notifications, use the following:

Chief, Groundwater Compliance Section
U.S. EPA Region 2
290 Broadway, 20th Floor
New York, NY 10007-1866
Phone (212) 637- 3766
Fax (212) 637- 3953
Region2_UIC@epa.gov

References:

- 40 CFR Subpart B--General Program Requirements, Sec. 144.12 Prohibition of movement of fluid into underground sources of drinking water
- 40 CFR Subpart C--Authorization of Underground Injection by Rule, Sec. 144.25 Requiring a permit.
- 40 CFR Subpart G--Requirements for Owners and Operators of Class V Injection Wells, Sec. 144.83 Do I need to notify anyone about my Class V injection well?
- 40 CFR Sec. 144.84 Do I need to get a (UIC) permit?

From:	Underhill, Scott
Sent:	Monday, June 03, 2013 7:29 AM
To:	Region2_UIC@epa.gov
Cc:	'David Chiusano'; Dombrowski, Paul (Wakefield); Taddeo, Arthur
Subject:	UIC Notification for Mid-Hudson Buisiness Park downgradient of the Former Duso Chemical Site NYSDEC Site No. 314103
Attachments:	MHBP IGP-22 Att1_DEC_Inventory_Spreadsheet.xlsx

On behalf of the New York State Department of Environmental Conservation (NYSDEC) Division of Remediation (DER), AECOM is presenting this notification of remediation injections at the Mid-Hudson Business Park (MHBP) Site that is located downgradient of the Former Duso Chemical Site (NYSDEC Site No. 314103) in Poughkeepsie, NY, which is a NYSDEC led site. In accordance with the DER Internal Guidance Policy (IGP-22), notification is being made directly by NYSDEC's consultant (AECOM) using the inventory spreadsheet which was created by EPA Region 2 for exclusive use by DEC (attached). Per the ROD issued by NYSDEC in March 2008, the selected remedy for the MHBP site is In-Situ Thermal Desorption (ISTD). This technology will require heating of the subsurface soils and groundwater to volatize the chlorinated volatile organic compounds. The anticipated number of injection wells is 110. The underground injection will be limited water (potable and condensate) to hydrate the subsurface during the initial heating period, which will be for 2 to 4 months. Please note the actual duration of heat and water injections will be determined by subsurface conditions. The NYSDEC project manager is David Chiusano. Please contact Mr. Chiusano or myself with any questions regarding the notification or the proposed remedial plan.

Thank you,
Scott

Scott Underhill, PE
Project Manager
Environment
D 518.951.2208 M 518.396.7638
scott.underhill@aecom.com

AECOM
40 British American Blvd, Latham, NY 12110
T 518.951.2200 F 518.951.2300
www.aecom.com

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 2
UNDERGROUND INJECTION CONTROL PROGRAM
SITE REMEDIATION INJECTION WELL INVENTORY SPREADSHEET
e-Mail Completed Forms to Region2_UIC@epa.gov or Fax to (212) 637-3953

Facility Name	Facility Street	Facility City	Facility State	Facility Zip Code	Facility Phone (if applicable)	Facility Latitude (decimal degrees)	Facility Longitude (negative decimal degrees)	Owner Name	Owner Mailing Address	Owner City	Owner State	Owner Zip	Injection Well Type	Number of Injection wells	Chemical(s) and concentration(s) being injected	Frequency of Injection	Anticipated Total Duration of Injection
Mid-Hudson Business Park Site (downgradient of Former Duso Chemical Site NYSDEC Site No. 314103)	3440-3444 North Road	Poughkeepsie	NY	12601	No phone at facility (use NYSDEC phone (518) 402-9814)	41.7003	73.9214	David J. Chiusano (NYSDEC)	625 Broadway, 12th Floor	Albany	NY	12233	Remediation	110 (heating elements for in-situ thermal remediation)	1. potable water 2. extracted condensate from thermal remediation system Small volumes of water added at the heater element during heating to maintain operation of the heating elements	daily	2 to 4 months

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 • FAX: (518) 402-9029
Website: www.dec.ny.gov

MEMORANDUM

TO: Robert Schick, Director, Division of Environmental Remediation

FROM: Mark Klotz, Director, Division of Water /s/

RE: Generic Effluent Criteria for Groundwater Discharges

Date: August 28, 2103

This memo is to transmit a general authorization for short term, batch groundwater discharges of water generated at remediation sites under the Division of Environmental Remediation's programs. These waters may be generated during sampling, pump tests, well development, and dewatering of excavations. The attached generic groundwater effluent criteria and general conditions were developed by DOW staff to reduce delays in implementing these short term groundwater discharges and to save staff time for both Divisions. Please have your staff pay particular attention to the footnotes listed at the end of the document.

The attached criteria are subject to the following conditions:

1. The attached criteria do not contain discharge limitations for radioactive discharges. Limitations on discharges of radiation or radioactive isotopes are addressed under Part 380 Radiation Control Permits.

2. Alternate frequencies, discharges limitations (where appropriate) or inclusion of parameters not identified in the attachments will be considered; however, a complete review by DOW staff will be required.

3. The attached parameter list is extensive and DOW's intent is for monitoring to be conducted only for those parameters which are known or suspected to be present at the site. Monitoring of parameters not present is not required by these criteria.

Additionally, for excavation dewatering:

1. Prior to beginning work, DER will review and approve the methods plan and equipment list of the proposed water treatment and handling system(s). The approved method plan will include provisions that fully comply with the conditions in this memo. This approval will be limited in duration to the term specified in the construction contract.

2. Approval for each batch discharges from temporary storage tanks (21,000 gallon tanks, approximately) will be granted based upon review and approval of sampling results by the Department and Engineer demonstrating that the treatment achieved compliance with the specified discharge criteria developed for site specific contaminants of concern. Representative samples shall be collected after approved water treatment has been completed and before it enters the temporary storage tank at a frequency of 1 sample per 7000 gallons treated. If any sample fails to meet the discharge criteria, it shall be assumed that the entire storage volume does not meet the discharge criteria. In such cases, the water will require re-treatment and re-sampling as specified above, demonstrating compliance before discharge will be allowed. Discharge rate limitations and infiltration design may be required to protect against erosion and prevent overland flow.

Division of Environmental Remediation (DER) will be responsible for ensuring compliance with the attached effluent criteria and approval of all engineering submissions. **Footnote 9** requires identification of the DER contact person who will receive all effluent results, engineering submissions and modification requests. The Regional Water Engineer should be kept appraised of the status of this discharge and sent copy of the effluent results for informational purposes.

Long term groundwater and both short and long term surface water discharges are not addressed in the attached criteria. A complete review of these proposed discharge scenarios will require full DOW review. All such requests should be directed to the Director of the Bureau of Water Permits in DOW.

If you have any questions, please call Brian Baker at 402-8124 or Shayne Mitchell at 402-8125.

Attachments

c: Regional Water Engineers
Koon Tang, DOW

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning: ________with the start of each discharge event

and lasting until: ________7 days from the start of the discharge.

The discharges from the treatment facility to **Groundwater** shall be limited and monitored by the operator as specified below:

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Flow	NA	Monitor	GPD	Continuous	Recorder	
pH (range)	NA	6.5 – 8.5	SU		Grab	
Oil and Grease	NA	15	mg/l	1	Grab	
Solids, Total Dissolved *applies only in the counties of Nassau and Suffolk	NA	1000*	mg/l	1	Grab	
Nitrogen, Total (as N) *applies only in the counties of Nassau and Suffolk	NA	10*	mg/l	1	Grab	
Foaming agents (as MBAS)	NA	1	mg/l	1	Grab	
Acenaphthene	83-32-9	20	µg/l	1	Grab	
Acetaldehyde	75-07-0	8	µg/l	1	Grab	
Acetone	67-64-1	50	µg/l	1	Grab	2
Acrolein	107-02-8	5	µg/l	1	Grab	
Acrylamide	79-06-1	5	µg/l	1	Grab	
Acrylic acid	79-10-7	50	µg/l	1	Grab	
Acrylonitrile	107-13-1	5	µg/l	1	Grab	
Alachlor	15972-60-8	0.5	µg/l	1	Grab	
Aldicarb *Refer to entry for “Aldicarb and Methomyl.”	116-06-3	0.35*	µg/l	1	Grab	2
Aldicarb sulfone	1646-88-4	2	µg/l	1	Grab	
Aldicarb sulfoxide	1646-87-3	4	µg/l	1	Grab	
Aldrin	309-00-2	ND	µg/l	1	Grab	3
Alkyl dimethyl benzyl ammonium chloride	68391-01-5	50	µg/l	1	Grab	
Alkyl diphenyl oxide sulfonates	NA	50	µg/l	1	Grab	
Allyl chloride	107-05-1	5	µg/l	1	Grab	
Aluminum	NA	2,000	µg/l	1	Grab	
Ametryn	834-12-8	50	µg/l	1	Grab	
4-Aminobiphenyl	92-67-1	5	µg/l	1	Grab	
Aminocresols *see Phenolic compounds – total phenols	95-84-1	*	µg/l	1	Grab	
Aminomethylene phosphonic acids salts *applies to each aminothylene phosphonic acid sals individually	NA	50*	µg/l	1	Grab	
Aminopyridines *Applies to the sum of these substances	462-08-8	1*	µg/l	1	Grab	
3-Aminotoluene	108-44-1	5	µg/l	1	Grab	

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
4-Aminotoluene	106-49-0	5	µg/l	1	Grab	
Aniline	62-53-3	5	µg/l	1	Grab	2
Anthracene	120-12-7	50	µg/l	1	Grab	
Antimony	NA	6	µg/l	1	Grab	
Arsenic	NA	50	µg/l	1	Grab	
Aryltiazoles *applies to each aryltiazole individually	NA	50*	µg/l	1	Grab	
Asbestos	NA	14,000,000	fibers/L	1	Grab	
Atrazine	1912-24-9	7.5	µg/l	1	Grab	
Azinphosmethyl	86-50-0	4.4	µg/l	1	Grab	
Azobenzene	103-33-3	5	µg/l	1	Grab	
Barium	NA	2,000	µg/l	1	Grab	
Benefin	1861-40-1	35	µg/l	1	Grab	
Benz(a)anthracene	56-55-3	0.002	µg/l	1	Grab	2
Benzene	71-43-2	1	µg/l	1	Grab	
Benzidine	92-87-5	5	µg/l	1	Grab	
Benzisothiazole	271-61-4	50	µg/l	1	Grab	
Benzo(b)flouranthene	205-99-2	0.002	µg/l	1	Grab	2
Benzo(k)fluoranthene	207-08-9	0.002	µg/l	1	Grab	2
Benzo(a)pyrene	50-32-8	ND	µg/l	1	Grab	3
Beryllium	NA	3	µg/l	1	Grab	
1-1’-Biphenyl	92-52-4	5	µg/l	1	Grab	
Bis(2-chloroethoxy)methane	111-91-1	5	µg/l	1	Grab	
Bis(2-chloroethyl)ether	111-44-4	1.0	µg/l	1	Grab	
Bis(chloromethyl)ether	542-88-1	5	µg/l	1	Grab	
Bis(2-chloro-1-methylethyl)ether	108-60-1	5	µg/l	1	Grab	
Bis(2-ethylhexl)phthalate	117-81-7	5	µg/l	1	Grab	
Boric acid, Borates & Metaborates *applies as boron equivalents to the sum of these substances.	NA	125*	µg/l	1	Grab	
Boron	NA	2,000	µg/l	1	Grab	
Bromacil	314-40-9	4.4	µg/l	1	Grab	2
Bromide	NA	2,000	µg/l	1	Grab	
Bromobenzene	108-86-1	5	µg/l	1	Grab	
Bromochloromethane	74-97-5	5	µg/l	1	Grab	
Bromodichloromethane	75-27-4	50	µg/l	1	Grab	
Bromoform	75-25-2	50	µg/l	1	Grab	
Bromomethane	74-83-9	5	µg/l	1	Grab	
Butachlor	23184-66-9	3.5	µg/l	1	Grab	
n-Butanol	71-36-3	50	µg/l	1	Grab	
cis-2-Butenal	15798-64-8	5	µg/l	1	Grab	
trans-2-Butenal	123-73-9	5	µg/l	1	Grab	
cis-2-Butenenitrile	1190-76-7	5	µg/l	1	Grab	
trans-2-Butenenitrile	627-26-9	5	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Butoxyethoxyethanol	112-34-5	50	µg/l	1	Grab	
Butoxypropanol	5131-66-8	50	µg/l	1	Grab	
Butylate	2008-41-5	50	µg/l	1	Grab	
n-Butylbenzene	104-51-8	5	µg/l	1	Grab	
sec-Butylbenzene	135-98-8	5	µg/l	1	Grab	
Tert-Butylbenzene	98-06-6	5	µg/l	1	Grab	
Butyl benzyl phthalate	85-68-7	50	µg/l	1	Grab	
Butyl isopropyl phthalate	NA	50	µg/l	1	Grab	
Carbon disulfide	75-15-0	60	µg/l	1	Grab	
Cadmium	NA	10	µg/l	1	Grab	
Captan	133-06-2	18	µg/l	1	Grab	
Carbaryl	63-25-2	29	µg/l	1	Grab	
Carbofuran	1563-66-2	15	µg/l	1	Grab	
Carbon tetrachloride	56-23-5	5	µg/l	1	Grab	
Carboxin	5234-68-4	50	µg/l	1	Grab	
Chloramben *includes realted forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.	NA	50*	µg/l	1	Grab	
Chloranil	118-75-2	5	µg/l	1	Grab	
Chlordane	57-74-9	0.05	µg/l	1	Grab	
Chloride	NA	500,000	µg/l	1	Grab	
Chlorinated dibenzo-p-dioxins and Chlorinated dibenzofurans	NA	$7x10^{-7}$	µg/l	1	Grab	
2-Chloroaniline	95-51-2	5	µg/l	1	Grab	
3- Chloroaniline	108-42-9	5	µg/l	1	Grab	
4- Chloroaniline	106-7-8	5	µg/l	1	Grab	
Chlorobenzene	108-90-7	5	µg/l	1	Grab	
4-Chlorobenzotrifluoride	98-56-6	5	µg/l	1	Grab	
1-Chlorobutane	109-69-3	5	µg/l	1	Grab	
Chloroethane	75-00-3	5	µg/l	1	Grab	
Chloroform	67-66-3	7	µg/l	1	Grab	
Chloromethyl methyl ether	107-30-2	5	µg/l	1	Grab	
2-Chloronaphthalene	91-58-7	10	µg/l	1	Grab	
2-Chloronitrobenzene	88-73-3	5	µg/l	1	Grab	
3-Chloronitrobenzene	121-73-3	5	µg/l	1	Grab	
4-Chloronitrobenzene	100-00-5	5	µg/l	1	Grab	
Chloroprene	126-99-8	5	µg/l	1	Grab	
Chlorothalonil	1897-45-6	5	µg/l	1	Grab	
2-Chlorotoluene	95-49-8	5	µg/l	1	Grab	
3-Chlorotoluene	108-41-8	5	µg/l	1	Grab	
4-Chlorotoluene	106-43-4	5	µg/l	1	Grab	
4-Chloro-o-toluidine	95-69-2	5	µg/l	1	Grab	
5-Chloro-o-toluidine	95-79-4	5	µg/l	1	Grab	
3-Chloro-1,1,1-trifuoropropane	460-35-5	5	µg/l	1	Grab	
Chromium	NA	100	µg/l	1	Grab	
Chromium (hexavalent)	NA	100	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Chrysene	218-01-9	0.002	μg/l	1	Grab	2
Copper	NA	1000	μg/l	1	Grab	
Cyanide	NA	400	μg/l	1	Grab	
Cyanogen bromide	506-68-3	5	μg/l	1	Grab	
Cyanogen chloride	506-77-4	5	μg/l	1	Grab	
Dalapon *Includes related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.	NA	50*	μg/l	1	Grab	
p,p’-DDD	72-54-8	0.3	μg/l	1	Grab	
p,p’-DDE	72-55-9	0.2	μg/l	1	Grab	
p,p’-DDT	50-29-3	0.2	μg/l	1	Grab	
Dechlorane Plus	13560-89-9	5	μg/l	1	Grab	
Diazinon	333-41-5	0.7	μg/l	1	Grab	
1,2-Dibromobenzene	583-53-9	5	μg/l	1	Grab	
1,3-Dibromobenzene	108-36-1	5	μg/l	1	Grab	
1,4-Dibromobenzene	106-37-6	5	μg/l	1	Grab	
Dibromochloromethane	124-48-1	50	μg/l	1	Grab	
1,2-Dibromo-3-chloropropane	96-12-8	0.04	μg/l	1	Grab	
Dibromodichloromethane	594-18-3	5	μg/l	1	Grab	
Dibromomethane	74-95-3	5	μg/l	1	Grab	
2,2-Dibromo-3-nitrilopropionamide	10222-01-2	50	μg/l	1	Grab	
Di-n-butyl phthalate	84-74-2	50	μg/l	1	Grab	
Dicamba	1918-00-9	0.44	μg/l	1	Grab	
Dichlorobenzenes *applies to each dichlorobenzene individually	95-50-1; 541-73-1; 106-47-6	3*	μg/l	1	Grab	
3,3’-Dichlorobenzidine	91-94-1	5	μg/l	1	Grab	
3,4-Dichlorobenzotriflouride	328-84-7	5	μg/l	1	Grab	
cis-1,4-Dichloro-2-butene	1476-11-5	5	μg/l	1	Grab	
trans-1,4-Dichloro-2-butene	110-57-6	5	μg/l	1	Grab	
Dichlorodifluoromethane	75-71-8	5	μg/l	1	Grab	
1,1-Dichloroethane	75-34-3	5	μg/l	1	Grab	
1,2-Dichloroethane	107-06-2	0.6	μg/l	1	Grab	
1,1-Dichloroethene	75-35-4	5	μg/l	1	Grab	
cis-1,2-Dichloroethene	156-59-2	5	μg/l	1	Grab	
Trans-1,2-Dichloroethene	156-60-5	5	μg/l	1	Grab	
Dichloroflouromethane	75-43-4	5	μg/l	1	Grab	
2,4-Dichlorophenol *see limit for Phenolic compounds (total phenols)	120-83-2	*	μg/l	1	Grab	
2,4-Dichlorophenoxyacetic acid	94-75-7	50	μg/l	1	Grab	
1,1-Dichloropropane	78-99-9	5	μg/l	1	Grab	
1,2-Dichloropropane	78-87-5	1	μg/l	1	Grab	
1,3-Dichloropropane	142-28-9	5	μg/l	1	Grab	
2,2-Dichloropropane	594-20-7	5	μg/l	1	Grab	

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
1,1-Dichloropropene	563-58-6	5	µg/l	1	Grab	
cis 1,3-Dichoropropene *applies to sum of cis- and trans- 1,3-Dichoropropene	10061-01-5	0.4*	µg/l	1	Grab	2
trans 1,3-Dichoropropene *applies to sum of cis- and trans- 1,3-Dichoropropene	10061-02-6	0.4*	µg/l	1	Grab	2
2,3-Dichlorotoluene	32768-54-0	5	µg/l	1	Grab	
2,4-Dichlorotoluene	95-73-8	5	µg/l	1	Grab	
2,5-Dichlorotoluene	19398-61-9	5	µg/l	1	Grab	
2,6-Dichlorotoluene	118-69-4	5	µg/l	1	Grab	
3,4-Dichlorotoluene	95-75-0	5	µg/l	1	Grab	
3,5-Dichlorotoluene	25186-47-4	5	µg/l	1	Grab	
Dieldrin	60-57-1	0.004	µg/l	1	Grab	2
Di(2-ethylhexyl)adipate	103-23-1	20	µg/l	1	Grab	
Diethyl phthalate	84-66-2	50	µg/l	1	Grab	
1,2-Diflouro-1,1,2,2-tetrachloroethane	76-12-0	5	µg/l	1	Grab	
1,2-Diisopropylbenzene	577-55-9	5	µg/l	1	Grab	
1,3-Diisopropylbenzene	99-62-7	5	µg/l	1	Grab	
1,4-Diisopropylbenzene	100-18-5	5	µg/l	1	Grab	
N,N-Dimethylaniline	121-69-7	1	µg/l	1	Grab	
2,3-Dimethylaniline	87-59-2	5	µg/l	1	Grab	
2,4-Dimethylaniline	95-68-1	5	µg/l	1	Grab	
2,5-Dimethylaniline	95-78-3	5	µg/l	1	Grab	
2,6-Dimethylaniline	87-62-7	5	µg/l	1	Grab	
3,4-Dimethylaniline	95-64-7	5	µg/l	1	Grab	
3,5-Dimethylaniline	108-69-0	5	µg/l	1	Grab	
3,3’-Dimethylbenzidine	119-93-7	5	µg/l	1	Grab	
4,4’-Dimethylbibemzyl	538-39-6	5	µg/l	1	Grab	
4,4’-Dimethyldiphenylmethane	4957-14-6	5	µg/l	1	Grab	
Dimethylformamide	68-12-2	50	µg/l	1	Grab	
alpha, alpha-Dimethyl phenethylanime	122-09-8	5	µg/l	1	Grab	
2,4-Dimethylphenol *see limit for Phenolic compounds (total phenols)	105-67-9	*	µg/l	1	Grab	
Dimethyl phthalate	131-11-3	50	µg/l	1	Grab	
2,4-Dinitrophenol *see limit for Phenolic compounds (total phenols)	51-28-5	*	µg/l	1	Grab	
Dimethyl tetrachloroterephthalate	1861-32-1	50	µg/l	1	Grab	
1,3-Dinitrobenzene	99-65-0	5	µg/l	1	Grab	
2,3-Dinitrotoluene	602-01-7	5	µg/l	1	Grab	
2,4-Dinitrololuene	121-14-2	5	µg/l	1	Grab	
2,5-Dinitrololuene	619-15-8	5	µg/l	1	Grab	
2,6-Dinitrololuene	606-20-2	5	µg/l	1	Grab	
3,4-Dinitrololuene	610-39-9	5	µg/l	1	Grab	
3,5-Dinitrololuene	618-85-9	5	µg/l	1	Grab	
Di-n-octyl phthalate	117-84-0	50	µg/l	1	Grab	
Dinoseb *see limit for Phenolic compounds (total phenols)	88-85-7	*	µg/l	1	Grab	
Diphenamid	957-51-7	50	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Diphenylamine	122-39-4	5	µg/l	1	Grab	
1,1-Diphenylhydrazine	530-50-7	ND	µg/l	1	Grab	3
1,2-Diphenylhydrazine	122-66-7	ND	µg/l	1	Grab	3
Diquat	2764-72-9	20	µg/l	1	Grab	
Disulfoton *Refer to entry for "Phorate and Disulfoton"	298-04-4	ND	µg/l	1	Grab	3
Dodecylguanidine acetate and Dodecylguanidine hydrochloride *applies to the sum of these substances	2439-10-3; 13590-97-1	50*	µg/l	1	Grab	
Dyphylline	479-18-5	50	µg/l	1	Grab	
Endothall	145-73-3	50	µg/l	1	Grab	
Endrin	72-20-8	ND	µg/l	1	Grab	3
Endrin aldehyde	7421-93-4	5	µg/l	1	Grab	
Endrin ketone	53494-70-5	5	µg/l	1	Grab	
Ethylbenzene	100-41-4	5	µg/l	1	Grab	
Ethylene chlorohydrin	107-07-3	50	µg/l	1	Grab	
Ethylene dibromide	106-93-4	6 x 10^{-4}	µg/l	1	Grab	
Ethylene glycol	107-21-1	50	µg/l	1	Grab	
Ethylene oxide	75-21-8	0.05	µg/l	1	Grab	
Ethylenethiourea	96-45-7	ND	µg/l	1	Grab	3
Ferbam	14484-64-1	4.2	µg/l	1	Grab	
Fluometuron	2164-17-2	50	µg/l	1	Grab	
Fluoranthene	206-44-0	50	µg/l	1	Grab	
Fluorene	86-73-7	50	µg/l	1	Grab	
Fluoride	NA	3000	µg/l	1	Grab	
Formaldehyde	50-00-0	8	µg/l	1	Grab	
Folpet	133-07-3	50	µg/l	1	Grab	
Glyphosate	1071-83-6	50	µg/l	1	Grab	
Guaifenesin	93-14-1	50	µg/l	1	Grab	
Heptachlor	76-44-8	0.04	µg/l	1	Grab	
Heptachlor epoxide	1024-57-3	0.03	µg/l	1	Grab	
Hexachlorobenzene	118-74-1	0.04	µg/l	1	Grab	
Hexachlorobutadiene	87-68-3	0.5	µg/l	1	Grab	
alpha-Hexachlorocyclohexane	319-84-6	0.01	µg/l	1	Grab	
beta-Hexachlorocyclohexane	319-85-7	0.04	µg/l	1	Grab	
delta-Hexachlorocyclohexane	319-86-8	0.04	µg/l	1	Grab	
epsilon-Hexachlorohexane	6108-10-7	0.04	µg/l	1	Grab	
gamma-Hexachlorohexane	58-89-9	0.05	µg/l	1	Grab	
Hexachloropentadiene	77-47-4	5	µg/l	1	Grab	
Hexachloroethane	67-72-1	5	µg/l	1	Grab	
Hexachlorophene *see limit for Phenolic compounds (total phenols)	70-30-4	*	µg/l	1	Grab	
Hexachloropropene	1888-71-7	5	µg/l	1	Grab	
2-Hexanone	591-78-6	50	µg/l	1	Grab	
Hexazinone	51235-04-2	50	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Hydrogen sulfide *see limit for Sulfides, total	7783-04-2	*	µg/l	1	Grab	
Hydroquimone *see limit for Phenolic compounds (total phenols)	123-31-9	*	µg/l	1	Grab	
1-Hydroxyethylidene-1,1-diphosphonic acid	2809-21-4	50	µg/l	1	Grab	
2-(2-Hydroxy-3,5-di-tert-pentylphenyl)-benzotriazole *see limit for Phenolic compounds (total phenols)	25	*	µg/l	1	Grab	
Indeno(1,2,3-cd)pyrene	193-39-5	0.002	µg/l	1	Grab	2
Iron *Also see Iron and Manganese	NA	600*	µg/l	1	Grab	
Iron and Manganese *Applies to the sum of these substances	NA	1000*	µg/l	1	Grab	
Isodrin	465-73-6	5	µg/l	1	Grab	
Isophorone	78-59-1	50	µg/l	1	Grab	
Isopropalin	33820-53-0	5	µg/l	1	Grab	
Isopropylbenzene	98-82-8	5	µg/l	1	Grab	
2-Isopropyltoluene	527-84-4	5	µg/l	1	Grab	
3-Isopropyltoluene	535-77-3	5	µg/l	1	Grab	
4-Isopropyltoluene	99-87-6	5	µg/l	1	Grab	
Kepone	143-50-0	ND	µg/l	1	Grab	3
Lead	NA	50	µg/l	1	Grab	
Magnesium	NA	35,000	µg/l	1	Grab	
Malathion	121-75-5	7	µg/l	1	Grab	
Mancozeb	8018-01-7	1.8	µg/l	1	Grab	2
Maneb	12427-38-2	1.8	µg/l	1	Grab	2
Manganese *Also see ‘Iron and Manganese’	NA	600*	µg/l	1	Grab	
Mercaptobenzothiazole	149-30-4	50	µg/l	1	Grab	
Mercury	NA	1.4	µg/l	1	Grab	
Methacrylic acid	79-41-4	50	µg/l	1	Grab	
Methacrylonitrile	126-98-7	5	µg/l	1	Grab	
Methomyl *see limit for “Aldicarb and Methomyl’	16752-77-5	*	µg/l	1	Grab	
Methoxychlor	72-43-5	35	µg/l	1	Grab	
(1-Methoxyethyl) benzene	4013-34-7	50	µg/l	1	Grab	
(2-Methoxyethyl) benzene	3558-60-6	50	µg/l	1	Grab	
N-Methylaniline	100-61-8	5	µg/l	1	Grab	
Methylbenz(a)anthracenes *applies to the sum of these substances	NA	0.002*	µg/l	1	Grab	
Methyl chloride	74-87-3	5	µg/l	1	Grab	
2-Methyl-4-chlorophenoxyacetic acid (MCPA)	94-74-6	0.44	µg/l	1	Grab	2
4,4’-Methylene-bis-(2-chloroaniline)	101-14-4	5	µg/l	1	Grab	
4,4’-Methylene-bis-(N-methyl)aniline	1807-55-2	5	µg/l	1	Grab	
4,4’-Methylene-bis-(N,N’-dimethyl) aniline	101-61-1	5	µg/l	1	Grab	
Methylene bisthiocyanate	6317-18-6	50	µg/l	1	Grab	
Methylene chloride	75-09-2	5	µg/l	1	Grab	
4-(1-Methylethoxy)-1-butanol	31600-69-8	50	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
2-Methylethyl-1,3-dioxolane	126-39-6	50	µg/l	1	Grab	
Methyl ethyl ketone	78-93-3	50	µg/l	1	Grab	
Methyl iodide	74-88-4	5	µg/l	1	Grab	
Methyl methacrylate	80-62-6	50	µg/l	1	Grab	
Methyl parathion *see limit for ‘Parathion and Methyl parathion’	298-00-0	*	µg/l	1	Grab	
alpha-Methylstyrene	98-83-9	5	µg/l	1	Grab	
2-Methylstyrene	611-15-4	5	µg/l	1	Grab	
3-Methylstyrene	100-80-1	5	µg/l	1	Grab	
4-Methylstyrene	622-97-9	5	µg/l	1	Grab	
Methyl tert-butyl ether (MTBE)	1634-04-4	10	µg/l	1	Grab	
Metolachlor ESA	171118-09-5	50	µg/l	1	Grab	
Metolachlor OA	152019-73-3	50	µg/l	1	Grab	
Metribuzin	21087-64-9	50	µg/l	1	Grab	
Mirex	2385-85-5	0.03	µg/l	1	Grab	2
Nabam	142-59-6	1.8	µg/l	1	Grab	2
Naphthalene	91-20-3	10	µg/l	1	Grab	
Niacinamide	98-92-0	500	µg/l	1	Grab	
Nickel	NA	200	µg/l	1	Grab	
Nitralin	4726-14-1	35	µg/l	1	Grab	
Nitrate	NA	20,000	µg/l	1	Grab	
Nitrate and Nitrite (as N)	NA	20,000	µg/l	1	Grab	
Nitrilotriacetic acid *includes related forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less	NA	3*	µg/l	1	Grab	
Nitrite (as N)	NA	2,000	µg/l	1	Grab	
2-Nitroaniline	88-74-4	5	µg/l	1	Grab	
3-Nitroaniline	99-09-2	5	µg/l	1	Grab	
4-Nitroaniline	100-01-6	5	µg/l	1	Grab	
Nitrobenzene	98-95-3	0.4	µg/l	1	Grab	
N-Nitrosodiphenylamine	86-30-6	50	µg/l	1	Grab	
2-Nitrotoluene	88-72-2	5	µg/l	1	Grab	
3-Nitrotoluene	99-08-1	5	µg/l	1	Grab	
4-Nitrotoluene	99-99-0	5	µg/l	1	Grab	
5-Nitro-o-toluidine	99-55-8	5	µg/l	1	Grab	
Octachlorostyrene	29082-74-4	0.2	µg/l	1	Grab	
Organic substances, total	NA	100	µg/l	1	Grab	
Oxamyl	23135-22-0	50	µg/l	1	Grab	
Paraquat	4685-14-7	3.0	µg/l	1	Grab	
Parathion *see limit for ‘Parathion and Methyl parathion’	56-38-2	*	µg/l	1	Grab	
Parathion and Methyl parathion *Applies to the sum of these substances	5638-2; 298-00-0	1.5*	µg/l	1	Grab	
Pendimethalin	40487-42-1	5	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Pentachlorobenzene	608-93-5	5	µg/l	1	Grab	
Pentachloroethane	76-01-7	5	µg/l	1	Grab	
Pentachloronitrobenzene	82-68-8	ND	µg/l	1	Grab	3
Pentachlorophenol *see limit for 'Phenolic compounds (total phenols)'	87-86-5	*	µg/l	1	Grab	
Phenanthrene	85-01-8	50	µg/l	1	Grab	
Phenol *see limit for 'Phenolic compounds (total phenols)'	108-95-2	*	µg/l	1	Grab	
Phenolic compounds (total phenols) *Applies to the sum of these substances	NA	2*	µg/l	1	Grab	2,10
Phenols, total chlorinated *see limit for 'Phenolic compounds (total phenols)'	NA	*	µg/l	1	Grab	
Phenols, total unchlorinated *see limit for 'Phenolic compounds (total phenols)'	NA	*	µg/l	1	Grab	
1,2-Phenylenediamine	95-54-5	5	µg/l	1	Grab	
1,3-Phenylenediamine	108-45-2	5	µg/l	1	Grab	
1,4-Phenylenediamine	108-45-2	5	µg/l	1	Grab	
Phenyl ether	101-84-8	10	µg/l	1	Grab	
Phenylhydrazine	100-63-0	5	µg/l	1	Grab	
Phenylpropanolamine	14838-15-4	50	µg/l	1	Grab	
3-Phenyl-1-propene	637-50-3	5	µg/l	1	Grab	
cis-1-Phenyl-1-propene	766-90-5	5	µg/l	1	Grab	
trans-1-Phenyl-1-propene	873-66-5	5	µg/l	1	Grab	
Phorate	298-02-2	ND	µg/l	1	Grab	3
Picloram *includes related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid.	NA	50*	µg/l	1	Grab	
PCB-1016	12674-11-2	0.20	µg/l	1	Grab	2,5
PCB-1221	11104-28-2	0.20	µg/l	1	Grab	2,5
PCB-1232	11141-16-5	0.20	µg/l	1	Grab	2,5
PCB-1242	53469-21-9	0.20	µg/l	1	Grab	2,5
PCB-1248	12672-29-6	0.20	µg/l	1	Grab	2,5
PCB-1254	11097-69-1	0.20	µg/l	1	Grab	2,5
PCB-1260	11096-82-5	0.20	µg/l	1	Grab	2,5
Principal organic contaminant	NA	5	µg/l	1	Grab	4
Prometon	1610-18-0	50	µg/l	1	Grab	
Propachlor	1918-16-7	35	µg/l	1	Grab	
Propanil	709-98-8	7.0	µg/l	1	Grab	
Propazine	139-40-2	16	µg/l	1	Grab	
Propham	122-42-9	50	µg/l	1	Grab	
n-Propylbenzene	103-65-1	5	µg/l	1	Grab	
Propylene glycol	57-55-6	1000	µg/l	1	Grab	
Pyrene	129-00-0	50	µg/l	1	Grab	
Pyridine	110-86-1	50	µg/l	1	Grab	
Selenium	NA	20	µg/l	1	Grab	
Silver	NA	100	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Simazine	122-34-9	0.5	µg/l	1	Grab	
Styrene	100-42-5	930	µg/l	1	Grab	
Sulfate	NA	250,000	µg/l	1	Grab	
Sulfide	NA	50	µg/l	1	Grab	
Tebuthiuron	34014-18-1	50	µg/l	1	Grab	
Terbacil	5902-51-2	50	µg/l	1	Grab	
Terbufos	13071-79-9	0.09	µg/l	1	Grab	
Tetrachlorobenzenes *value of 5 µg/l applies to each tetrachlorobenzene individually. Value of 10 µg/l applies to the sum of the substances.	636-66-2; 634-90-2; 95-94-3; 12408-10-5	*	µg/l	1	Grab	
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/l	1	Grab	
1,1,2,2-Tetrachloroethane	79-34-5	5	µg/l	1	Grab	
Tetrachloroethene	127-18-4	5	µg/l	1	Grab	
Tetrachloroterephthalic acid	2136-79-0	50	µg/l	1	Grab	
alpha, alpha, alpha, 4-Tetrachlorotoluene	5216-25-1	5	µg/l	1	Grab	
Tetrahydrofuran	109-99-9	50	µg/l	1	Grab	
1,2,3,4-Tetramethylbenzene	488-23-3	5	µg/l	1	Grab	
1,2,3,5-Tetramethylbenzene	527-53-7	5	µg/l	1	Grab	
1,2,4,5-Tetramethylbenzene	95-93-2	5	µg/l	1	Grab	
Thallium	NA	0.5	µg/l	1	Grab	
Theophylline	58-55-9	40	µg/l	1	Grab	
Thiram	137-26-8	1.8	µg/l	1	Grab	
Toluene	108-88-3	5	µg/l	1	Grab	
Toluene-2,4-diamine	95-80-7	5	µg/l	1	Grab	
Toluene-2,5-diamine	95-70-5	5	µg/l	1	Grab	
Toluene-2,6-diamine	823-40-5	5	µg/l	1	Grab	
o-Toluidine	95-53-4	5	µg/l	1	Grab	
Tolytriazole	29385-43-1	50	µg/l	1	Grab	
Toxaphene	8001-35-2	0.06	µg/l	1	Grab	2
1,2,4-Tribromobenzene	615-54-3	5	µg/l	1	Grab	
Tributyltin oxide	56-35-9	50	µg/l	1	Grab	
2,4,6-Trichloroaniline	634-93-5	5	µg/l	1	Grab	
Trichlorobenzenes * value of 5 µg/l applies to each tetrachlorobenzene individually. Value of 10 µg/l applies to the sum of the substances.	87-61-6; 120-82-1; 108-70-3; 12002-48-1	*	µg/l	1	Grab	
1,1,1-Trichloroethane	71-55-6	5	µg/l	1	Grab	
1,1,2-Trichloroethane	79-00-5	1	µg/l	1	Grab	
Trichloroethene	79-01-6	5	µg/l	1	Grab	
Trichlorofluoromethane	75-69-4	5	µg/l	1	Grab	
2,4,5-Trichlorophenoxyacetic acid	93-76-5	35	µg/l	1	Grab	
2,4,5-Trichlorophenoxypropionic acid	93-72-1	0.26	µg/l	1	Grab	
1,1,2-Trichloropropane	598-77-6	5	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
1,2,3-Trichloropropane	96-18-4	0.04	µg/l	1	Grab	
cis-1,2,3-Trichloropropene	13116-57-9	5	µg/l	1	Grab	
trans-1,2,3-trichloropropene	13116-58-0	5	µg/l	1	Grab	
alpha,2,4-Trichlorotoluene	94-99-5	5	µg/l	1	Grab	
alpha,2,6-Trichlorotoluene	2014-83-7	5	µg/l	1	Grab	
alpha,3,4-Trichlorotoluene	102-47-6	5	µg/l	1	Grab	
alpha, alpha,2-Trichlorotoluene	88-66-4	5	µg/l	1	Grab	
alpha, alpha,4-Trichlorotoluene	13940-94-8	5	µg/l	1	Grab	
2,3,4-Trichlorotoluene	7359-72-0	5	µg/l	1	Grab	
2,3,5-Trichlorotoluene	56961-86-5	5	µg/l	1	Grab	
2,3,6-Trichlorotoluene	2077-46-5	5	µg/l	1	Grab	
2,4,5-Trichlorotoluene	6639-30-1	5	µg/l	1	Grab	
2,4,6-Trichlorotoluene	23749-65-7	5	µg/l	1	Grab	
1,1,1-Trichloro-2,2,2-trifluoethane	354-58-5	5	µg/l	1	Grab	
1,1,2-Trichloro-1,2,2-trifluoethane	76-13-1	5	µg/l	1	Grab	
Trifluralin	1582-09-8	35	µg/l	1	Grab	
1,2,3-Trimethylbenzene	526-73-8	5	µg/l	1	Grab	
1,2,4-Trimethylbenzene	95-63-6	5	µg/l	1	Grab	
1,3,5-Trimethylbenzene	108-67-8	5	µg/l	1	Grab	
2,3,6-Trimethylpyridine	1462-84-6	50	µg/l	1	Grab	
2,4,6-Trimethylpyridine	108-75-8	50	µg/l	1	Grab	
sym-Trinitrobenzene	99-35-4	5	µg/l	1	Grab	
2,3,4-Trinitrotoluene	602-29-9	5	µg/l	1	Grab	
2,3,6-Trinitrotoluene	18292-97-2	5	µg/l	1	Grab	
2,4,5-Trinitrotoluene	610-25-3	5	µg/l	1	Grab	
2,4,6-Trinitrotoluene	118-96-7	5	µg/l	1	Grab	
3,4,5-Trinitrotoluene	603-15-6	5	µg/l	1	Grab	
Triphenyl phosphate	115-86-6	50	µg/l	1	Grab	
Uranyl ion	NA	10,000	µg/l	1	Grab	
Vinyl chloride	75-01-4	2	µg/l	1	Grab	
1,2-Xylene	95-47-6	5	µg/l	1	Grab	
1,3-Xylene	108-38-3	5	µg/l	1	Grab	
1,4-Xylene	106-42-3	5	µg/l	1	Grab	
Zinc	NA	5,000	µg/l	1	Grab	
Zineb	12122-67-7	1.8	µg/l	1	Grab	
Ziram	137-30-4	4.2	µg/l	1	Grab	

Footnotes:

1. Samples must be collected prior to each discharge event. Discharge may not commence until the sample results show compliance with the above discharge limitations.

2. Discharge limit is set at the Practical Quantitation Limit (PQL). Actual groundwater effluent standard/limitation is below this limit. The most stringent USEPA approved method must be used in the analysis of this parameter.

3. ND means non-detect. The most stringent USEPA approved method must be used in the analysis of this parameter.

4. Applies to any and every individual substance to which the ambient principal organic contaminant standard applies, except any substances that has an effluent standard or limitation value listed above. See Division of Water TOGS 1.1.1 for information on determining the applicability of the ambient POC standard to individual substances.
5. For PCBs:
    a. The treatment plant operator must monitor this discharge for PCBs using USEPA laboratory method 608. The laboratory must make all reasonable attempts to achieve a Minimum Detection Level (MDL) of 0.065 µg/l.
    b. 0.10 µg/l is the discharge goal. The treatment plant operator shall report all values above the MDL (0.065 µg/l per Aroclor). If the level of any Aroclor is above 0.10 µg/l, the treatment plant operator must evaluate the treatment system and identify the cause of the detectable level of PCBs in the discharge.
    c. If the Department determines that effluent monitoring results above 0.10 µg/l can be prevented by implementation of additional measures as proposed by the treatment plant operator in footnote 5.b above, and approved by the Department, the treatment plant operator shall implement such additional measures.

6. Only waters generated at remediation sites during sampling, pump tests, well development, or dewatering of excavations, are authorized for treatment and discharge.

7. Samples and measurements, to comply with the monitoring requirements specified above, must be taken from the holding tank prior to discharge to groundwater.

8. Discharge may not occur unless the ground is capable of accepting the treated effluent. The discharge water may not be ponded on top of saturated or frozen ground or permitted to flow across the ground surface. Also, a minimum separation distance of 100 feet must be maintained between the discharge location and any surface waters (including wetlands).

9. Discharge is not authorized until such time as an engineering submission showing the method of treatment and discharge is approved by the Department. The discharge rate may not exceed the effective treatment system or ground adsorptive capacity. All monitoring data, engineering submissions and modification requests must be submitted to the following DER contact person: __________________.

10. Total phenolics must be analyzed using EPA Methods 420.1 or 420.2.

New York State Department of Environmental Conservation
Division of Water
Bureau of Water Permits, 4th Floor
625 Broadway, Albany, New York 12233-3505
Phone: (518) 402-8111 • FAX**:** (518) 402-9029
Website: www.dec.ny.gov

MEMORANDUM

TO: Robert Schick, Director, Division of Environmental Remediation

FROM: Mark Klotz, Director, Division of Water /s/

RE: Generic Effluent Criteria for Surface Water Discharges

Date: August 28, 2013

This memo is to transmit a general authorization for short term, batch surface water discharges of water generated at remediation sites under one of the Division of Environmental Remediation's programs. These waters may be generated during sampling, pump tests, well development, or dewatering of excavations. Remedial investigations and designs have often required Division of Water (DOW) to provide rapid turnaround times to develop short term groundwater pump test and containerized well development water discharge criteria. The attached generic surface water effluent criteria and general conditions were developed by DOW staff to reduce delays in implementing these short term surface water discharges and to save staff time for both Divisions. Please have your staff pay particular attention to the footnotes listed at the end of the document.

The attached criteria are subject to the following conditions:

1. Discharges to surface waters within the New York City or City of Syracuse (Skaneateles Lake) watershed are not authorized by the attached criteria. A full DOW review is required by these discharges.

2. The criteria do not contain discharge limitations for radioactive discharges. Limitations on discharges of radiation or radioactive isotopes are addressed under Part 380 Radiation Control Permits.

3. Alternate monitoring frequencies, discharge limitations (where appropriate) or inclusion of parameters not identified in the attachment will be considered; however, a complete review by DOW staff will be required.

4. The attached parameter list is extensive and DOW's intent is for monitoring to be conducted only for those parameters which are known or suspected to be present at the site. Monitoring of parameters not present is not required by these criteria. If contaminants of concern are present at a site which do not appear on the attached list, those contaminants should be analyzed for, and DOW should be consulted if any measurable concentration of an unlisted COC is to be discharged.

Additionally, for excavation dewatering:

1. Prior to beginning work, DER will review and approve the methods plan and equipment list of the proposed water treatment and handling system(s). The approved method plan will include provisions that fully comply with the conditions in this memo. This approval will be limited in duration to the term specified in the construction contract.

2. Approval for each batch discharge from temporary storage tanks (21,000 gallon tanks, approximately) will be granted based upon review and approval of sampling results by the Department and Engineer demonstrating that the treatment and management practices have achieved compliance with the specified discharge criteria for site specific contaminants of concern. Representative samples shall be collected after approved water treatment has been completed and before it enters the temporary storage tank at a frequency of 1 sample per 7000 gallons treated. If any sample fails to meet the discharge criteria, it shall be assumed that the entire storage volume does not meet the discharge criteria. In such cases, the water will require re-treatment and re-sampling as specified above, demonstrating compliance before discharge will be allowed. Discharge rate limitations and energy dissipation devices may be required to protect against erosion and fluctuations in stream flow due to discharges.

Division of Environmental Remediation (DER) will be responsible for ensuring compliance with the attached effluent criteria and approval of all engineering submissions. **Footnote 7** requires identification of the DER contact person who will receive all effluent results, engineering submissions and modification requests. The Regional Water Engineer should be kept appraised of the status of this discharge and sent copy of the effluent results for informational purposes.

Long term surface water and both short and long term groundwater discharges are not addressed in the attached criteria. A complete review of these proposed discharge scenarios will still require full DOW review. The attached criteria may be used as a planning tool by your staff, consultants and PRPs determining the most feasible discharge option. All long term groundwater and surface water discharge requests and modifications of the short term groundwater discharge criteria should be directed to the Director of the Bureau of Water Permits in DOW.

If you have any questions, please call Brian Baker at 402-8124 or Shayne Mitchell at 402-8125.

Attachments

c: Regional Water Engineers
Koon Tang, DOW

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning: ________with the start of each discharge event

and lasting until: ________7 days from the start of the discharge.

The discharges from the treatment facility to **Surface water** shall be limited and monitored by the operator as specified below:

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Flow	NA	Monitor	GPD	Continuous	Recorder	
pH (range)	NA	6.5 – 8.5	SU	1	Grab	
Oil and Grease	NA	15	mg/l	1	Grab	
BOD, 5-day	NA	5	mg/l	1	Grab	
Solids, Total Suspended	NA	10	mg/l	1	Grab	
Solids, Total Dissolved	NA	200	mg/l	1	Grab	
Acenaphthene	83-32-9	5.3	µg/l	1	Grab	
Acenaphthylene	208-96-8	10	µg/l	1	Grab	
Acetaldehyde	75-07-0	8	µg/l	1	Grab	
Acetone	67-64-1	100	µg/l	1	Grab	2
Acrolein	107-02-8	5	µg/l	1	Grab	
Acrylamide	79-06-1	5	µg/l	1	Grab	
Acrylic acid	79-10-7	50	µg/l	1	Grab	
Acrylonitrile	107-13-1	2	µg/l	1	Grab	2
Alachlor	15972-60-8	0.5	µg/l	1	Grab	
Aldicarb	116-06-3	7	µg/l	1	Grab	2
Aldicarb sulfone	1646-88-4	2	µg/l	1	Grab	
Aldicarb sulfoxide	1646-87-3	4	µg/l	1	Grab	
Aldrin	309-00-2	0.02	µg/l	1	Grab	2
Alkyl dimethyl benzyl ammonium chloride	68391-01-5	50	µg/l	1	Grab	
Alkyl diphenyl oxide sulfonates	NA	50	µg/l	1	Grab	
Allyl chloride	107-05-1	5	µg/l	1	Grab	
Aluminum, ionic	NA	100	µg/l	1	Grab	
Ametryn	834-12-8	50	µg/l	1	Grab	
4-Aminobiphenyl	92-67-1	5	µg/l	1	Grab	
Aminocresols *see Phenolic compounds – total phenols	95-84-1; 2835-95-2; 2835-99-6	*	µg/l	1	Grab	
Aminomethylene phosphonic acids salts * applies to each aminomethylene phosphonic acid salt individually	NA	50^*	µg/l	1	Grab	
Aminopyridines * applies to sum of these substances	462-08-8; 504-24-5; 504-29-0; 26445-05-6	1^*	µg/l	1	Grab	
3-Aminotoluene	108-44-1	5	µg/l	1	Grab	
4-Aminotoluene	106-49-0	5	µg/l	1	Grab	
Ammonia, Total (as NH_3)	7664-41-7	660	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				Measurement Frequency	Sample Type	
Ammonia and Ammonium ($NH_3 + NH_4^+$ as N)	7664-41-7; NA	2200	µg/l	1	Grab	
Aniline	62-53-3	10	µg/l	1	Grab	2
Anthracene	120-12-7	3.8	µg/l	1	Grab	
Antimony	NA	10	µg/l	1	Grab	2
Arsenic	NA	50	µg/l	1	Grab	
Aryltiazoles * applies to each aryltiazole individually	NA	50*	µg/l	1	Grab	
Asbestos	NA	7,000,000	Fibers/L	1	Grab	
Atrazine	1912-24-9	8	µg/l	1	Grab	2
Azinphosmethyl	86-50-0	0.6	µg/l	1	Grab	2
Azobenzene	103-33-3	0.5	µg/l	1	Grab	
Barium	NA	1,000	µg/l	1	Grab	
Benz(a)anthracene	56-55-3	0.05	µg/l	1	Grab	2
Benzene	71-43-2	1	µg/l	1	Grab	
Benzidine	92-87-5	0.3	µg/l	1	Grab	2
Benzisothiazole	271-61-4	50	µg/l	1	Grab	
Benzo(b)flouranthene	205-99-2	0.07	µg/l	1	Grab	2
Benzo(k)fluoranthene	207-08-9	0.02	µg/l	1	Grab	2
Benzo(a)pyrene	50-32-8	0.09	µg/l	1	Grab	2
Benzo(ghi)perylene	191-24-2	10	µg/l	1	Grab	
Beryllium	NA	3	µg/l	1	Grab	
1-1’-Biphenyl	92-52-4	5	µg/l	1	Grab	
Bis(2-chloroethoxy)methane	111-91-1	5	µg/l	1	Grab	
Bis(2-chloroethyl)ether	111-44-4	0.03	µg/l	1	Grab	
Bis(chloromethyl)ether	542-88-1	5	µg/l	1	Grab	
Bis(2-chloro-1-methylethyl)ether	108-60-1	5	µg/l	1	Grab	
Bis(2-ethylhexl)phthalate	117-81-7	8	µg/l	1	Grab	2
Boric acid, Borates & Metaborates * apply to the sum of these substances	NA	125*	µg/l	1	Grab	
Boron	NA	1,000	µg/l	1	Grab	
Bromide	NA	2,000	µg/l	1	Grab	
Bromobenzene	108-86-1	5	µg/l	1	Grab	
Bromochloromethane	74-97-5	5	µg/l	1	Grab	
Bromodichloromethane	75-27-4	50	µg/l	1	Grab	
Bromoform	75-25-2	50	µg/l	1	Grab	
Bromomethane	74-83-9	5	µg/l	1	Grab	
n-Butanol	71-36-3	50	µg/l	1	Grab	
cis-2-Butenal	15798-64-8	5	µg/l	1	Grab	
trans-2-Butenal	123-73-9	5	µg/l	1	Grab	
cis-2-Butenenitrile	1190-76-7	5	µg/l	1	Grab	
trans-2-Butenenitrile	627-26-9	5	µg/l	1	Grab	
Butoxyethoxyethanol	112-34-5	50	µg/l	1	Grab	
Butoxypropanol	5131-66-8	50	µg/l	1	Grab	
Butylate	2008-41-5	50	µg/l	1	Grab	
n-Butylbenzene	104-51-8	5	µg/l	1	Grab	
sec-Butylbenzene	135-98-8	5	µg/l	1	Grab	
Tert-Butylbenzene	98-06-6	5	µg/l	1	Grab	

<table>
<tr><th>Outfall and Parameters</th><th rowspan="2">CAS No.</th><th rowspan="2">Limitations Daily Max.</th><th rowspan="2">Units</th><th colspan="2">Minimum Monitoring Requirements</th><th rowspan="2">FN</th></tr>
<tr><th>Outfall 001 – Containerized Well Development Water and/or Pump Test Water</th><th>Measurement Frequency</th><th>Sample Type</th></tr>
<tr><td colspan="7"></td></tr>
<tr><td>Butyl benzyl phthalate</td><td>85-68-7</td><td>50</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Butyl isopropyl phthalate</td><td>NA</td><td>50</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Cadmium</td><td>NA</td><td>1.2</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Carbofuran</td><td>1563-66-2</td><td>1.0</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Carbon disulfilde</td><td>75-15-0</td><td>60</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Carbon tetrachloride</td><td>56-23-5</td><td>0.5</td><td>µg/l</td><td>1</td><td>Grab</td><td>2</td></tr>
<tr><td>Carboxin</td><td>5234-68-4</td><td>50</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloramben</td><td>NA</td><td>50</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloranil</td><td>118-75-2</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chlordane</td><td>57-74-9</td><td>0.05</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloride</td><td>NA</td><td>250,000</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chlorinateddibenzo-p-dioxins and Chlorinated dibenzofurans</td><td>NA</td><td>0.008</td><td>µg/l</td><td>1</td><td>Grab</td><td>2</td></tr>
<tr><td>Chlorine, Total Residual</td><td>NA</td><td>13</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>2-Chloroaniline</td><td>95-51-2</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>3- Chloroaniline</td><td>108-42-9</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>4- Chloroaniline</td><td>106-7-8</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chlorobenzene</td><td>108-90-7</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>4-Chlorobenzotrifluoride</td><td>98-56-6</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>1-Chlorobutane</td><td>109-69-3</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloroethane</td><td>75-00-3</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloroform</td><td>67-66-3</td><td>7</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloromethyl methyl ether</td><td>107-30-2</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>2-Chloronaphthalene</td><td>91-58-7</td><td>10</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>2-Chloronitrobenzene</td><td>88-73-3</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>3-Chloronitrobenzene</td><td>121-73-3</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>4-Chloronitrobenzene</td><td>100-00-5</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chloroprene</td><td>126-99-8</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chlorothalonil</td><td>1897-45-6</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>2-Chlorotoluene</td><td>95-49-8</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>3-Chlorotoluene</td><td>108-41-8</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>4-Chlorotoluene</td><td>106-43-4</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>4-Chloro-o-toluidine</td><td>95-69-2</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>5-Chloro-o-toluidine</td><td>95-79-4</td><td>0.7</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>3-Chloro-1,1,1-trifuoropropane</td><td>460-35-5</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chromium</td><td>NA</td><td>50</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Chromium (hexavalent)</td><td>NA</td><td>30</td><td>µg/l</td><td>1</td><td>Grab</td><td>2</td></tr>
<tr><td>Chrysene</td><td>218-01-9</td><td>0.6</td><td>µg/l</td><td>1</td><td>Grab</td><td>2</td></tr>
<tr><td>Cobalt</td><td>NA</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Copper
Limit is 4.8 ug/l except in New York/New Jersey Harbor where it is 7.9 ug/l</td><td>NA</td><td></td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Cyanide (PQL)
Sum of HCN and CN^- expressed as CN</td><td>NA</td><td>1.0</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Cyanogen bromide</td><td>506-68-3</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
<tr><td>Cyanogen chloride</td><td>506-77-4</td><td>5</td><td>µg/l</td><td>1</td><td>Grab</td><td></td></tr>
</table>

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Dalapon * Includes related forms that convert to the organic acid upon acidification to a pH of 2 or less; and esters of the organic acid	NA	50*	µg/l	1	Grab	
p,p’-DDD	72-54-8	0.02	µg/l	1	Grab	2
p,p’-DDE	72-55-9	0.01	µg/l	1	Grab	2
p,p’-DDT	50-29-3	0.05	µg/l	1	Grab	2
Dechlorane Plus	13560-89-9	5	µg/l	1	Grab	
Demton FN: apply to the sum of these substances	8065-48-3; 298-03-3; 126-75-0	0.1				
Diazinon	333-41-5	0.08	µg/l	1	Grab	
Dibenzo(a,h) anthracene	53-70-3	0.1	µg/l	1	Grab	2
1,2-Dibromobenzene	583-53-9	5	µg/l	1	Grab	
1,3-Dibromobenzene	108-36-1	5	µg/l	1	Grab	
1,4-Dibromobenzene	106-37-6	5	µg/l	1	Grab	
Dibromochloromethane	124-48-1	10	µg/l	1	Grab	
1,2-Dibromo-3-chloropropane	96-12-8	0.04	µg/l	1	Grab	
Dibromodichloromethane	594-18-3	5	µg/l	1	Grab	
Dibromomethane	74-95-3	5	µg/l	1	Grab	
2,2-Dibromo-3-nitrilopropionamide	10222-01-2	50	µg/l	1	Grab	
Di-n-butyl phthalate	84-74-2	50	µg/l	1	Grab	
Dichlorobenzenes * applies to each isomer (1,2-, 1,3- and 1,4-dichlorobenzene) individually.	95-50-1; 541-73-1; 106-46-7	3*	µg/l	1	Grab	
3,3’-Dichlorobenzidine	91-94-1	5	µg/l	1	Grab	
3,4-Dichlorobenzotriflouride	328-84-7	5	µg/l	1	Grab	
cis-1,4-Dichloro-2-butene	1476-11-5	5	µg/l	1	Grab	
trans-1,4-Dichloro-2-butene	110-57-6	5	µg/l	1	Grab	
Dichlorodifluoromethane	75-71-8	5	µg/l	1	Grab	
1,1-Dichloroethane	75-34-3	5	µg/l	1	Grab	
1,2-Dichloroethane	107-06-2	0.6	µg/l	1	Grab	
1,1-Dichloroethene	75-35-4	0.5	µg/l	1	Grab	
cis-1,2-Dichloroethene	156-59-2	5	µg/l	1	Grab	
trans-1,2-Dichloroethene	156-60-5	5	µg/l	1	Grab	
Dichloroflouromethane	75-43-4	5	µg/l	1	Grab	
2,4-Dichlorophenol *See limit for Phenolic compounds (total phenols)	120-83-2	*	µg/l	1	Grab	
2,4-Dichlorophenoxyacetic acid	94-75-7	10	µg/l	1	Grab	
1,1-Dichloropropane	78-99-9	5	µg/l	1	Grab	
1,2-Dichloropropane	78-87-5	0.5	µg/l	1	Grab	
1,3-Dichloropropane	142-28-9	5	µg/l	1	Grab	
2,2-Dichloropropane	594-20-7	5	µg/l	1	Grab	
1,1-Dichloropropene	563-58-6	5	µg/l	1	Grab	
1,3-Dichoropropene FN: applies to the sum of cis- and trans- 1,3-Dichoropropene, CAS Nos. 10061-01-5 and 10061-02-6 respectively	542-75-6	0.4*	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
2,3-Dichlorotoluene	32768-54-0	5	µg/l	1	Grab	
2,4-Dichlorotoluene	95-73-8	5	µg/l	1	Grab	
2,5-Dichlorotoluene	19398-61-9	5	µg/l	1	Grab	
2,6-Dichlorotoluene	118-69-4	5	µg/l	1	Grab	
3,4-Dichlorotoluene	95-75-0	5	µg/l	1	Grab	
3,5-Dichlorotoluene	25186-47-4	5	µg/l	1	Grab	
Dieldrin	60-57-1	0.005	µg/l	1	Grab	2
Di(2-ethylhexyl)adipate	103-23-1	20	µg/l	1	Grab	
Diethyl phthalate	84-66-2	50	µg/l	1	Grab	
1,2-Diflouro-1,1,2,2-tetrachloroethane	76-12-0	5	µg/l	1	Grab	
1,2-Diisopropylbenzene	577-55-9	5	µg/l	1	Grab	
1,3-Diisopropylbenzene	99-62-7	5	µg/l	1	Grab	
1,4-Diisopropylbenzene	100-18-5	5	µg/l	1	Grab	
N,N-Dimethylaniline	121-69-7	1	µg/l	1	Grab	
2,3-Dimethylaniline	87-59-2	5	µg/l	1	Grab	
2,4-Dimethylaniline	95-68-1	5	µg/l	1	Grab	
2,5-Dimethylaniline	95-78-3	5	µg/l	1	Grab	
2,6-Dimethylaniline	87-62-7	5	µg/l	1	Grab	
3,4-Dimethylaniline	95-64-7	5	µg/l	1	Grab	
3,5-Dimethylaniline	108-69-0	5	µg/l	1	Grab	
3,3'-Dimethylbenzidine	119-93-7	5	µg/l	1	Grab	
4,4'-Dimethylbibemzyl	538-39-6	5	µg/l	1	Grab	
4,4'-Dimethyldiphenylmethane	4957-14-6	5	µg/l	1	Grab	
Dimethylformamide	68-12-2	50	µg/l	1	Grab	
alpha, alpha-Dimethyl phenethylanime	122-09-8	5	µg/l	1	Grab	
2,4-Dimethylphenol *See limit for Phenolic compounds (total phenols)	105-67-9	*	µg/l	1	Grab	
Dimethyl phthalate	131-11-3	50	µg/l	1	Grab	
Dimethyl tetrachloroterephthalate	1861-32-1	50	µg/l	1	Grab	
1,3-Dinitrobenzene	99-65-0	5	µg/l	1	Grab	
2,4-Dinitrophenol *See limit for Phenolic compounds (total phenols)	51-28-5	*	µg/l	1	Grab	
2,3-Dinitrotoluene	602-01-7	5	µg/l	1	Grab	
2,4-Dinitrololuene	121-14-2	5	µg/l	1	Grab	
2,5-Dinitrololuene	619-15-8	5	µg/l	1	Grab	
2,6-Dinitrololuene	606-20-2	5	µg/l	1	Grab	
3,4-Dinitrololuene	610-39-9	5	µg/l	1	Grab	
3,5-Dinitrololuene	618-85-9	5	µg/l	1	Grab	
Di-n-octyl phthalate	117-84-0	50	µg/l	1	Grab	
Dinoseb *See limit for Phenolic compounds (total phenols)	88-85-7	*	µg/l	1	Grab	
Dioxin *See Chlorinated dibenzo-9-dioxins and Chlorinated dibenzofurans	NA	*	µg/l	1	Grab	
Diphenamid	957-51-7	50	µg/l	1	Grab	
Diphenylamine	122-39-4	5	µg/l	1	Grab	
1,2-Diphenylhydrazine	122-66-7	10	µg/l	1	Grab	2

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Diquat * Applies to the concentration of diquat ion whether free or as an undissociated salt.	2764-72-9	20*	µg/l	1	Grab	
Dodecylguanidine acetate and Dodecylguanidine hydrochloride * Applies to the sum of these substances	2439-10-3; 13590-97-1	50*	µg/l	1	Grab	
Dyphylline	479-18-5	50	µg/l	1	Grab	
Endosulfan	115-29-7	.001	µg/l	1	Grab	
Endothall	145-73-3	50	µg/l	1	Grab	
Endrin	72-20-8	0.05	µg/l	1	Grab	2
Endrin aldehyde	7421-93-4	5	µg/l	1	Grab	
Endrin ketone	53494-70-5	5	µg/l	1	Grab	
Ethylbenzene	100-41-4	4.5	µg/l	1	Grab	
Ethylene chlorohydrin	107-07-3	50	µg/l	1	Grab	
Ethylene dibromide	106-93-4	6 x 10^{-4}	µg/l	1	Grab	
Ethylene glycol	107-21-1	50	µg/l	1	Grab	
Ethylene oxide	75-21-8	0.05	µg/l	1	Grab	
Fluometuron	2164-17-2	50	µg/l	1	Grab	
Fluoranthene	206-44-0	50	µg/l	1	Grab	
Fluorene	86-73-7	50	µg/l	1	Grab	
Fluoride	NA	1500	µg/l	1	Grab	
Formaldehyde	50-00-0	8	µg/l	1	Grab	
Glyphosate	1071-83-6	50	µg/l	1	Grab	
Guaifenesin	93-14-1	50	µg/l	1	Grab	
Heptachlor	76-44-8	0.01	µg/l	1	Grab	2
Heptachlor epoxide	1024-57-3	0.2	µg/l	1	Grab	2
Hexachlorobenzene	118-74-1	0.2	µg/l	1	Grab	2
Hexachlorobutadiene	87-68-3	1	µg/l	1	Grab	2
alpha-Hexachlorocyclohexane	319-84-6	0.01	µg/l	1	Grab	2
beta-Hexachlorocyclohexane	319-85-7	0.02	µg/l	1	Grab	2
delta-Hexachlorocyclohexane	319-86-8	0.04	µg/l	1	Grab	2
epsilon-Hexachlorohexane	6108-10-7	0.02	µg/l	1	Grab	2
gamma-Hexachlorohexane	58-89-9	0.02	µg/l	1	Grab	2
Hexachloropentadiene	77-47-4	2.0	µg/l	1	Grab	2
Hexachloroethane	67-72-1	0.6	µg/l	1	Grab	
Hexachlorophene * See limit for Phenolic Compounds (total phenols)	70-30-4	*	µg/l	1	Grab	
Hexachloropropene	1888-71-7	5	µg/l	1	Grab	
2-Hexanone	591-78-6	50	µg/l	1	Grab	
Hexazinone	51235-04-2	50	µg/l	1	Grab	
Hydrazine	302-01-2	5	µg/l	1	Grab	
Hydrogen sulfide	7783-04-2	2	µg/l	1	Grab	
Hydroquinone * See limit for Phenolic Compounds (total phenols)	123-31-9	*	µg/l	1	Grab	
1-Hydroxyethylidene-1,1-diphosphonic acid	2809-21-4	50	µg/l	1	Grab	
2-(2-Hydroxy-3,5-di-tert-pentylphenyl)-benzotriazole * See limit for Phenolic Compounds (total phenols)	25973-55-1	*	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Indeno(1,2,3-cd)pyrene	193-39-5	0.2	µg/l	1	Grab	2
Iron	NA	300	µg/l	1	Grab	
Isodecyl diphenyl phosphate	29761-21-5	1.7	µg/l	1	Grab	
Isodrin	465-73-6	5	µg/l	1	Grab	
Isophorone	78-59-1	50	µg/l	1	Grab	
Isopropalin	33820-53-0	5	µg/l	1	Grab	
Isopropylbenzene	98-82-8	2.6	µg/l	1	Grab	
2-Isopropyltoluene	527-84-4	5	µg/l	1	Grab	
3-Isopropyltoluene	535-77-3	5	µg/l	1	Grab	
4-Isopropyltoluene	99-87-6	5	µg/l	1	Grab	
Isothiazolones, total (isothiazolinones) (includes 5-chloro-2-methyl-4-isothiazolin-3-one & 2-methyl-4-isothiazolin-3-one)	NA	1	µg/l	1	Grab	
Lead	NA	4	µg/l	1	Grab	
Linear alkyl benzene sulfonates (LAS)	NA	40	µg/l	1	Grab	
Magnesium	NA	35,000	µg/l	1	Grab	
Malathion	121-75-5	0.6	µg/l	1	Grab	2
Manganese	NA	300	µg/l	1	Grab	
Mercaptobenzothiazole	149-30-4	50	µg/l	1	Grab	
Mercury	NA	5 x 10^{-2}	µg/l	1	Grab	4
Methacrylic acid	79-41-4	50	µg/l	1	Grab	
Methacrylonitrile	126-98-7	5	µg/l	1	Grab	
Methoxychlor	72-43-5	0.4	µg/l	1	Grab	2
(1-Methoxyethyl) benzene	4013-34-7	50	µg/l	1	Grab	
(2-Methoxyethyl) benzene	3558-60-6	50	µg/l	1	Grab	
N-Methylaniline	100-61-8	5	µg/l	1	Grab	
Methylbenz(a)anthracenes * Applies to the sum of these substances	NA	0.002*	µg/l	1	Grab	
Methyl chloride	74-87-3	5	µg/l	1	Grab	
4,4’-Methylene-bis-(2-chloroaniline)	101-14-4	5	µg/l	1	Grab	
4,4’-Methylene-bis-(N-methyl)aniline	1807-55-2	5	µg/l	1	Grab	
4,4’-Methylene-bis-(N,N’-dimethyl) aniline	101-61-1	5	µg/l	1	Grab	
Methylene bisthiocyanate	6317-18-6	50	µg/l	1	Grab	
Methylene chloride	75-09-2	5	µg/l	1	Grab	
4-(1-Methylethoxy)-1-butanol	31600-69-8	50	µg/l	1	Grab	
2-Methylethyl-1,3-dioxolane	126-39-6	50	µg/l	1	Grab	
Methyl ethyl ketone	78-93-3	50	µg/l	1	Grab	
Methyl iodide	74-88-4	5	µg/l	1	Grab	
2-Methylnapthalene	91-57-6	4.2	µg/l	1	Grab	
Methyl parathion * see Parathion and Methyl parathion	298-00-0	*	µg/l	1	Grab	
alpha-Methylstyrene	98-83-9	5	µg/l	1	Grab	
2-Methylstyrene	611-15-4	5	µg/l	1	Grab	
3-Methylstyrene	100-80-1	5	µg/l	1	Grab	
4-Methylstyrene	622-97-9	5	µg/l	1	Grab	
Methyl tert-butyl ether (MTBE)	1634-04-4	10	µg/l	1	Grab	
Metolachlor ESA	171118-09-5	50	µg/l	1	Grab	

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Metolachlor OA	152019-73-3	50	µg/l	1	Grab	
Metribuzin	21087-64-9	50	µg/l	1	Grab	
Mirex	2385-85-5	0.4	µg/l	1	Grab	2
Naphthalene	91-20-3	10	µg/l	1	Grab	
Niacinamide	98-92-0	500	µg/l	1	Grab	
Nickel	NA	8.2	µg/l	1	Grab	
Nitrate	NA	10,000	µg/l	1	Grab	
Nitrate and Nitrite (as N)	NA	10,000	µg/l	1	Grab	
Nitrilotriacetic acid *Includes realted forms that convert to nitrilotriacetic acid upon acidification to a pH of 2.3 or less	NA	3*	µg/l	1	Grab	
Nitrite (as N)	NA	1,000	µg/l	1	Grab	
2-Nitroaniline	88-74-4	5	µg/l	1	Grab	
3-Nitroaniline	99-09-2	5	µg/l	1	Grab	
4-Nitroaniline	100-01-6	5	µg/l	1	Grab	
Nitrobenzene	98-95-3	0.4	µg/l	1	Grab	
N-Nitrosodiphenylamine	86-30-6	50	µg/l	1	Grab	
2-Nitrotoluene	88-72-2	5	µg/l	1	Grab	
3-Nitrotoluene	99-08-1	5	µg/l	1	Grab	
4-Nitrotoluene	99-99-0	5	µg/l	1	Grab	
5-Nitro-o-toluidine	99-55-8	5	µg/l	1	Grab	
Octachlorostyrene	29082-74-4	6 x 10^{-6}	µg/l	1	Grab	
Oxamyl	23135-22-0	50	µg/l	1	Grab	
Parathion	56-38-2	0.065	µg/l	1	Grab	
Parathion and Methyl parathion ** Applies to the sum of these substances. For the waters of the Great Lakes System, the Department will substitute a guidance value for the aquatic Type standard if so determined under 702.15 (c).	5638-2; 298-00-0	0.008**	µg/l	1	Grab	
Pendimethalin	40487-42-1	5	µg/l	1	Grab	
Pentachlorobenzene	608-93-5	5	µg/l	1	Grab	
Pentachloroethane	76-01-7	5	µg/l	1	Grab	
Pentachlorophenol * See limit for Phenolic Compounds (total phenols)	87-86-5	*	µg/l	1	Grab	
Phenanthrene	85-01-8	1.5	µg/l	1	Grab	
Phenol * See limit for Phenolic Compounds (total phenols)	108-95-2	*	µg/l	1	Grab	
Phenolic compounds – Total Phenols * Applies to the sum of these substances	NA	8	µg/l	1	Grab	2,8
Phenols, total chlorinated * See limit for Phenolic Compounds (total phenols)	NA	*	µg/l	1	Grab	
Phenols, total unchlorinated * See limit for Phenolic Compounds (total phenols)	NA	*	µg/l	1	Grab	
1,2-Phenylenediamine	95-54-5	5	µg/l	1	Grab	
1,3-Phenylenediamine	108-45-2	5	µg/l	1	Grab	
1,4-Phenylenediamine	108-45-2	5	µg/l	1	Grab	
Phenyl ether	101-84-8	10	µg/l	1	Grab	

Outfall and Parameters Outfall 001 – Containerized Well Development Water and/or Pump Test Water	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
				Measurement Frequency	Sample Type	
Phenylhydrazine	100-63-0	5	µg/l	1	Grab	
Phenylpropanolamine	14838-15-4	50	µg/l	1	Grab	
3-Phenyl-1-propene	637-50-3	5	µg/l	1	Grab	
cis-1-Phenyl-1-propene	766-90-5	5	µg/l	1	Grab	
trans-1-Phenyl-1-propene	873-66-5	5	µg/l	1	Grab	
Phosphorus	NA	20	µg/l	1	Grab	
Picloram	NA	50	µg/l	1	Grab	
Polybrominated biphenyls *Applies to each congener individually	NA	5*	µg/l	1	Grab	
PCB-1016	12674-11-2	0.20	µg/l	1	Grab	2,3
PCB-1221	11104-28-2	0.20	µg/l	1	Grab	2,3
PCB-1232	11141-16-5	0.20	µg/l	1	Grab	2,3
PCB-1242	53469-21-9	0.20	µg/l	1	Grab	2,3
PCB-1248	12672-29-6	0.20	µg/l	1	Grab	2,3
PCB-1254	11097-69-1	0.20	µg/l	1	Grab	2,3
PCB-1260	11096-82-5	0.20	µg/l	1	Grab	2,3
Prometon	1610-18-0	50	µg/l	1	Grab	
Propham	122-42-9	50	µg/l	1	Grab	
n-Propylbenzene	103-65-1	5	µg/l	1	Grab	
Propulene glycol	57-55-6	1000	µg/l	1	Grab	
Pyrene	129-00-0	4.6	µg/l	1	Grab	
Pyridine	110-86-1	50	µg/l	1	Grab	
Quaternary ammonium compounds (including dimethyl benzyl ammonium chloride & dimethyl ethyl benzyl ammonium chloride) *Applies to the sum of these substances	NA	10*	µg/l	1	Grab	
Selenium	NA	4.6	µg/l	1	Grab	
Silver, Total	NA	50	µg/l	1	Grab	
Simazine	122-34-9	0.5	µg/l	1	Grab	
Styrene	100-42-5	5	µg/l	1	Grab	
Sulfate	NA	250,000	µg/l	1	Grab	
Sulfides, Total	NA	50	µg/l	1	Grab	
Tebuthiuron	34014-18-1	50	µg/l	1	Grab	
Terbufos	13071-79-9	100	µg/l	1	Grab	2
Tetrachlorobenzenes * Applies to the sum of 1,2,3,4-, 1,2,3,5- and 1,2,4,5-tetrachlorobenzene.	636-66-2; 634-90-2; 95-94-3; 12408-10-5	5*	µg/l	1	Grab	
1,1,1,2-Tetrachloroethane	630-20-6	5	µg/l	1	Grab	
1,1,2,2-Tetrachloroethane	79-34-5	0.2	µg/l	1	Grab	
Tetrachloroethene	127-18-4	0.7	µg/l	1	Grab	
alpha, alpha, alpha, 4-Tetrachlorotoluene	5216-25-1	5	µg/l	1	Grab	
Tetrahydrofuran	109-99-9	50	µg/l	1	Grab	
1,2,3,4-Tetramethylbenzene	488-23-3	5	µg/l	1	Grab	
1,2,3,5-Tetramethylbenzene	527-53-7	5	µg/l	1	Grab	
1,2,4,5-Tetramethylbenzene	95-93-2	5	µg/l	1	Grab	
Thallium	NA	0.5	µg/l	1	Grab	
Theophylline	58-55-9	40	µg/l	1	Grab	

Outfall and Parameters	**CAS No.**	**Limitations Daily Max.**	**Units**	**Minimum Monitoring Requirements**		**FN**
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				**Measurement Frequency**	**Sample Type**	
Toluene	108-88-3	5	µg/l	1	Grab	
Toluene-2,4-diamine	95-80-7	5	µg/l	1	Grab	
Toluene-2,5-diamine	95-70-5	5	µg/l	1	Grab	
Toluene-2,6-diamine	823-40-5	5	µg/l	1	Grab	
o-Toluidine	95-53-4	0.6	µg/l	1	Grab	
Tolytriazole	29385-43-1	50	µg/l	1	Grab	
Toxaphene	8001-35-2	1	µg/l	1	Grab	2
1,2,4-Tribromobenzene	615-54-3	5	µg/l	1	Grab	
Tributyltin oxide	56-35-9	50	µg/l	1	Grab	
2,4,6-Trichloroaniline	634-93-5	5	µg/l	1	Grab	
Trichlorobenzenes *Applies to the sum of 1,2,3-, 1,2,4- and 1,3,5-trichlorobenzene	87-61-6; 120-82-1; 108-70-3; 12002-48-1	5*	µg/l	1	Grab	
1,1,1-Trichloroethane	71-55-6	5	µg/l	1	Grab	
1,1,2-Trichloroethane	79-00-5	1	µg/l	1	Grab	
Trichloroethene	79-01-6	5	µg/l	1	Grab	
Trichlorofluoromethane	75-69-4	5	µg/l	1	Grab	
2,4,5-Trichlorophenoxypropionic acid	93-72-1	10	µg/l	1	Grab	
1,1,2-Trichloropropane	598-77-6	5	µg/l	1	Grab	
1,2,3-Trichloropropane	96-18-4	0.04	µg/l	1	Grab	
cis-1,2,3-Trichloropropene	13116-57-9	5	µg/l	1	Grab	
trans-1,2,3-trichloropropene	13116-58-0	5	µg/l	1	Grab	
alpha,2,4-Trichlorotoluene	94-99-5	5	µg/l	1	Grab	
alpha,2,6-Trichlorotoluene	2014-83-7	5	µg/l	1	Grab	
alpha,3,4-Trichlorotoluene	102-47-6	5	µg/l	1	Grab	
alpha, alpha,2-Trichlorotoluene	88-66-4	5	µg/l	1	Grab	
alpha, alpha,4-Trichlorotoluene	13940-94-8	5	µg/l	1	Grab	
2,3,4-Trichlorotoluene	7359-72-0	0.34	µg/l	1	Grab	
2,3,5-Trichlorotoluene	56961-86-5	0.34	µg/l	1	Grab	
2,3,6-Trichlorotoluene	2077-46-5	0.34	µg/l	1	Grab	
2,4,5-Trichlorotoluene	6639-30-1	0.34	µg/l	1	Grab	
2,4,6-Trichlorotoluene	23749-65-7	0.34	µg/l	1	Grab	
1,1,1-Trichloro-2,2,2-trifluoethane	354-58-5	5	µg/l	1	Grab	
1,1,2-Trichloro-1,2,2-trifluoethane	76-13-1	5	µg/l	1	Grab	
1,2,3-Trimethylbenzene	526-73-8	5	µg/l	1	Grab	
1,2,4-Trimethylbenzene	95-63-6	5	µg/l	1	Grab	
1,3,5-Trimethylbenzene	108-67-8	5	µg/l	1	Grab	
2,3,6-Trimethylpyridine	1462-84-6	50	µg/l	1	Grab	
2,4,6-Trimethylpyridine	108-75-8	50	µg/l	1	Grab	
sym-Trinitrobenzene	99-35-4	5	µg/l	1	Grab	
2,3,4-Trinitrotoluene	602-29-9	5	µg/l	1	Grab	
2,3,6-Trinitrotoluene	18292-97-2	5	µg/l	1	Grab	
2,4,5-Trinitrotoluene	610-25-3	5	µg/l	1	Grab	
2,4,6-Trinitrotoluene	118-96-7	5	µg/l	1	Grab	
3,4,5-Trinitrotoluene	603-15-6	5	µg/l	1	Grab	
Triphenyl phosphate	115-86-6	4	µg/l	1	Grab	
Vanadium	NA	14	µg/l	1	Grab	

Outfall and Parameters	CAS No.	Limitations Daily Max.	Units	Minimum Monitoring Requirements		FN
Outfall 001 – Containerized Well Development Water and/or Pump Test Water				Measurement Frequency	Sample Type	
Vinyl chloride	75-01-4	2	µg/l	1	Grab	
1,2-Xylene	95-47-6	5	µg/l	1	Grab	
1,3-Xylene	108-38-3	5	µg/l	1	Grab	
1,4-Xylene	106-42-3	5	µg/l	1	Grab	
Zinc	NA	66	µg/l	1	Grab	

Footnotes:

1. Samples must be collected prior to each discharge event. Discharge may not commence until the sample results show compliance with the above discharge limitations.

2. Discharge limit is set at the Practical Quantitation Limit (PQL). Actual surface water effluent standard/limitation is below this limit. Analysis of this parameter shall be of the most stringent USEPA approved method in accordance with 40 CFR 136.

3. For PCBs:
   a. The treatment plant operator must monitor this discharge for PCBs using USEPA laboratory method 608. The laboratory must make all reasonable attempts to achieve a Minimum Detection Level (MDL) of 0.065 µg/l.
   b. 0.065 µg/l is the discharge goal. The treatment plant operator shall report all values above the MDL (0.065 µg/l per Aroclor). If the level of any Aroclor is above 0.65 µg/l, the treatment must evaluate the treatment system and identify the cause of the detectable level of PCBs in the discharge.
   c. If the Department determines that effluent monitoring results above can be prevented by implementation of additional measures as proposed by the treatment plant operator in footnote 3.b 9above, and approved by the Department, the treatment plant operator shall implement such additional measures.

4. The water quality based effluent limit for mercury is 7 x 10^{-4} µg/l. The enforceable limit is set at 0.05 µg/l for the purposes of compliance. The enforceable limit maybe revised in the future if DEC determines another limit is more appropriate. Mercury must be analyzed using USEPA Method 1631.

5. Only waters generated at remediation sites during sampling, pump tests, well development, or dewatering of excavations are authorized for treatment and discharge.

6. Samples and measurements, to comply with the monitoring requirements specified above, must be taken from the holding tank prior to discharge to the receiving waterbody.

7. Discharge is not authorized until such time as an engineering submission showing the method of treatment and discharge is approved by the Department. The discharge rate may not exceed the effective treatment system or ground adsorptive capacity. All monitoring data, engineering submissions and modification requests must be submitted to the following DER contact person: __________________.

8. Total phenolics must be analyzed using EPA Methods 420.1 or 420.2.

9. Discharge to a surface waterbody within the New York City Watershed is not authorized by these effluent criteria. Separate review of any proposed discharge to surface water within the New York City Watershed is required.

Appendix I

Local-Town Permit Information

TOWN OF POUGHKEEPSIE BUILDING DEPARTMENT

1 OVEROCKER RD. – POUGHKEEPSIE, NY 12603
TEL.# 845-485-3655 / FAX # 845-486-7888

APPLICATION FOR ELECTRICAL & LOW VOLTAGE PERMITS
$40.00 FEE

CHECK #: ___________________ CASH : _____________________

APP.#: ______________________ PERMIT#: ___________________

DATE: ____________________________ GRID #: ____

JOB SITE ADDRESS: ____

OWNERS NAME: ____

OWNERS ADDRESS: ____

OWNERS TEL. #: ____

ELECTRICIAN/INSTALLERS NAME: ____

ELECTRICIAN/INSTALLERS ADDRESS: ____

ELECTRICIAN/INSTALLERS TEL.#: ____

DESCRIPTION OF WORK: ____

____

____

NO ELECTRICAL/LOW VOLTAGE WORK MAY BE PERFORMED UNTIL A PERMIT IS ISSUED

The owner of the property covered by this application and the undersigned applicant agree to conform to all applicable laws of this jurisdiction. The applicant is responsible for scheduling inspections with an electrical agency approved by the Town of Poughkeepsie.

The applicant swears that they have been specifically authorized by the owner to execute this application.

APPLICANTS SIGNATURE: ____

J# ____________________ Acct# __________________________

Central Hudson
Gas & Electric Corporation

COMMERCIAL ELECTRICAL DATA FORM

284 South Ave, Poughkeepsie, NY 12601-4838

(845) 452-2700 OR 1-800-527-2714 FAX: (845) 486-5657

Customer Name _________________________________

New Service Address ______________________________

Town _________________________________ Zip______

Mailing Address __________________________________

Town __________________________________Zip_____

Home #_____/_____/_____Work _____/______/_____

Cell # _____/______/______

E-mail address __________________________________

Contractor Business Name __________________________________

Electrician Name _________________________________ID_____

Address____

Town ____Zip______

Phone #_____ /______/________ Fax #_____/______/________

Cell # ______/_______/_______Pager ____/______/________

E-mail address ______________________________________

Appointment for site meeting needed? ☐ Yes ☐ No

"Electrical Specifications" at www.CentralHudson.com

COMPLETE SECTION "1" OR "2"

1. ☐ **Upgrade** Amps from ______ to _______ ☐ # Addt mtrs______ Total # mtrs _______

☐ **Relocate** Point of attachment. If yes, how far ________ft Is service open 3 wire ☐ Yes ☐ No

☐ **Repair** Type of repair ☐main brkr ☐entrance cable ☐main disconnect ☐riser ☐chg panel bx ☐other________

☐ **Retire** Date required for retirement____________________________

Existing Meter # __________________________

The **existing** service is ☐ Overhead ☐ Underground. The **upgraded** service will be ☐ Overhead ☐ Underground

2. ☐ **New Service** ☐ Temporary **or** ☐ Permanent ☐ Overhead **or** ☐ Underground **Date service desired**________

Voltage requested: ☐ 120 / 240 ☐ 120 / 208 ☐ 277 / 480 ☐ 4kv ☐ 13.2kv ☐ 34.5kv

Service Size (Amps): _______ Service Entrance Conductor Size: ___________ # of sets of Conductors: __________

Conduit size: ☐ 2" ☐ 4" ☐ 5"

Number of meters : _________

LIGHTING	HEAT	REFRIGERATION	AIR CONDITIONING	MOTORS
1ph _____ kw	1ph______kw	1ph______kw	1ph_____tons	1ph _____#motors, Total hp___code___
3ph _____kw	3ph______kw	3ph _____kw	3ph_____tons	3ph _____#motors, Total hp___code___

Total connected KW ________________ **Demand KW** __________________

Nearest Central Hudson (**enter number**): Pole # _____________ Splice box#_________________ Pad # _______________

Is foundation installed: ☐ Yes ☐ No If no, when is the expected date _________(Required if foundation is not installed)

Date structure to be completed _____________________Distance to structure from the road ___________________

Do you want natural gas service (if available): ☐ Yes ☐ No If yes, a Natural Gas Service Request will be required.

Provide nearest intersecting road:

Directions to property:

01/2009

Town of Poughkeepsie

Stan Lanigan
Plumbing Inspector
1 Overocker Rd.
Poughkeepsie, N.Y. 12603

Telephone (845) 485-3655

Fax (845) 486-7881

Date: ____________________________

Address: ____________________________

Owner: ____________________________

Licensed Plumber: ____________________________

-

I have hired the Licensed Plumber listed above to take out a Plumbing Permit and do plumbing work for me. I am the owner of the property listed above.

____

(property owner)

TOWN OF POUGHKEEPSIE
HEATING PERMIT APPLICATION

DATE ____________ $50.00 PER UNIT - RESIDENTIAL PAID: YES ___ NO ____
$75.00 PER UNIT - COMMERCIAL
$50.00 RESIDENTIAL GAS PIPING / $75.00 COMMERCIAL GAS PIPING
$50.00 – INGROUND TANK CLOSURE OR REMOVAL – RESIDENTIAL
*COMMERCIAL BOILERS – ASK FOR FEE SCHEDULE (BASED ON BTU'S)

HEATING PERMIT #____________ CHECK NO.___________RECEIPT NO.___________

PROPERTY ADDRESS____
ZIP CODE

OWNERS NAME____

OWNERS ADDRESS____
ZIP CODE

HOME PHONE________________________ BUS PHONE__________________________

DESCRIPTION OF EQUIPMENT : ____

TYPE OF FUEL: GAS ______ OIL ______ LP ______

SIZE OF TANK: __________ LOCATION OF TANK: __________________________

MODEL NO. ________________ SERIAL NO. ______________________

HEATING CONTRACTOR ____

CONTRACTOR'S ADDRESS ____
ZIP CODE

LICENSE NO. ______________ CONTRACTOR'S PHONE __________________________

THE OWNER OF THE PROPERTY COVERED BY THIS APPLICATION AND THE UNDERSIGNED APPLICANT AGREE:

1-TO CONFORM TO ALL APPLICABLE LAWS OF THE JURISDICTION.
2-TO PERMIT BUILDING DEPARTMENT PERSONNEL TO ENTER UPON AND INSPECT THE PROPERTY AT ALL REASONABLE TIMES.
3-THE UNDERSIGNED APPLICANT SWEARS THAT HE HAS BEEN SPECIFICALLY AUTHORIZED BY THE OWNER TO EXECUTE THIS APPLICATION.
4-THE UNDERSIGNED AGREES TO ADHERE TO ALL THE REQUIREMENTS OF THE FIRE INSPECTOR, NFPA AND CODES OF NEW YORK STATE.

_________________________________ ___________________________________
APPLICANT'S NAME (PRINT) APPLICANT'S SIGNATURE

TOWN OF POUGHKEEPSIE
NEW COMMERCIAL BUILDING
ADDITION TO COMMERCIAL BUILDING
PLAN SUBMITTAL REQUIREMENTS

Name of Applicant____
Building Address or Lot #____

In order to expedite your plan review, please check your plans and application to be sure the following information has been included. When each of the items has been checked by you, submit the form with your application, application fee, and two (2) sets of plans for Building Department review. NOTE: APPLICATIONS FOR BUILDING PERMITS CANNOT BE REVIEWED UNTIL THE SUBMITTAL IS COMPLETE.

Applicable Codes: *2007 NYS Building, Fire, Plumbing, Mechanical and Energy Conservation Codes*

Ground Snow Load	Wind	Seismic Design Category	Subject to Damage From				Winter Design Temp	Ice shield underlayment required	Flood Hazards
	Speed (mph)		Weathering	Frost line depth	Termite	Decay			
40	90	B	Severe	42”	Moderate to Heavy	Slight to Moderate	2	yes	Adopted 7/18/90 Current FIRM 9/8/99

BUILDING PERMIT APPLICATION
___ Application must be fully completed
___ Must be signed by owner or submitted with a letter of agency

SITE PLAN (See Planning Department for requirements)

BUILDING PLANS
___ Two complete sets required
___ Original stamp and signature of a NYS architect or Professional Engineer on each set.

CODE ANALYSIS
___ Plan review checklist forms are available on Town Website (http://www.townofpoughkeepsie.com/building/permits.htm)

SPECIAL INSPECTIONS
___ As required per the NYS Code Chapter 17 shall be listed on the plans and on a separate submittal sheet

ENERGY REVIEW: See Section 104 of the NYS Energy Conservation Code for compliance documentation.

DEPARTMENT APPROVALS

Prior to review the Building Department will contact other town departments to verify building permit approvals. It is your responsibility to contact the applicable departments for approvals. The departments contacted are:

___ Water Department, if connected to a town water system …..845-462-6535
___ Sewer Department, if connected to a town sewer system…..845-462-2280
___ Zoning Department…..845-485-3651
___ Planning Department…..845-485-3657
___ Engineering Department…..845-485-3638
___ Highway Department, if driveway enters a town road.(Phone # 452-1750) If the driveway connects to a state or county road a letter of approval for a curb cut permit must be submitted from the applicable department.
___ Approved address form from Dutchess County 911 must be included. See web site below for form (http://www.townofpoughkeepsie.com/building/permits.htm)
___ Septic System. An approval letter from the Dutchess County Health Department must be submitted with application….Phone # 845-486-3404

NYS Codes are available online at --- http://publicecodes.citation.com/st/ny/st/index.htm

Town of Poughkeepsie **Received:** **Permit # _______**

New Commercial Building
Addition to Commercial Building
(Includes R Occupancies)
Building Permit Application

Property Address: Street:________________________________ City:____________________ Zip:_________

Grid Number:__________________________________ Zoning District: _________

Owners Name:_____________________________________ Phone: (H) ____________(W) ________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Builders Name:_______________________________________ Phone:______________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Arch/Eng Name:______________________________________ Phone:______________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Electrician :____Phone:______________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Electrical Inspection Agency_________________________________ (*Attach Agency Application Form*)

Licensed Heating Contractor:____________________________Phone:______________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Licensed Plumber:_____________________________________Phone:______________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Fire Alarm Installer:___________________________________Phone:______________________

Address: Street:________________________________ City:_________________ State:_____ Zip:_________

Separate permits are required for plumbing, heating and fire alarm installations / Attach Contactor List Form for all additional Contractors / Attach Contractors workman comp. C105.2 or U26.3

Project Description:____

Is the property located in a flood zone? Yes ☐ No ☐ *If yes, a floodplain development permit is required.*

Are any wetlands located on the property? Yes ☐ No ☐

Please contact the Planning and Engineering Departments for information on wetlands and floodplains.

Square Footage including basement and garages: __________ Height of Building: ______ft. Stories: __________
Percent Lot Coverage: _____ Estimated Cost: ____________ Type of Construction: ________ Occupancy Class: ________

Is Truss Type Construction used in building? Yes ☐ No ☐ (Additional $50.00 Fee required)

Please Check any applicable below: (*Any items checked below must have applicable Town/County/State approvals)*

Town Water ☐ Town Sewer ☐ Septic ☐ Well ☐ Septic ☐ Road: *Town* ☐ *County* ☐ *State* ☐ *Private* ☐

The Owner/Applicant agrees to conform to all applicable laws of this jurisdiction, adhere to the plans and specifications affixed hereto and permit Building Department personnel to perform required inspections.

Applicant's Name: ____ *(attach letter of agency)*

Owner/Applicant Signature: ____ *Date* ______________

Application fee:					250.00
Square footage	________________(up to 50,000 sq. ft.)	X	.40/sq ft	=	__________
Square footage	________________(over to 50,000 sq. ft.)	X	.30/sq ft	=	__________
Truss Fee ($50.00)				=	__________
Other fees: _____________________________________				=	__________
Receipt # _________			Total Fee		___________

Taddeo, Arthur

From:	Eric Hollman [ehollman@TownofPoughkeepsie-ny.gov]
Sent:	Wednesday, February 27, 2013 9:55 AM
To:	Wright, Shamim
Cc:	Neil Wilson; Timothy Sickles; Sarah Davis; Keith Ballard; Franco Zani; Marc Pfeifer; Lisa Simmons; Todd Jicha; Taddeo, Arthur; Dombrowski, Paul (Wakefield)
Subject:	RE: Former Duso Chemical Site pemitting requirements

Shamim,

Based on the information you provided, no approvals will be required from the Planning Board.

I would ask that the work plan include a notification to the Planning Department prior to commencement of work including the project name and sponsor, location(s), brief description, contact person, and anticipated start date. The commercial site location on Fulton St. near Route 9 is a high-traffic area with a substantial volume of turning movements in/out of the site.

I am circulating this to other departments for their future reference, and recommend that you and/or your contractors contact them prior to commencing work to determine permits that may be needed and standards for proposed work such as connection to Town utilities, installation of concrete pads and work trailers/sheds, potential work in the Town highway ROW, etc.

Please also ensure that any work plan includes a “call before you dig” utility mark out requirement prior to commencement of work.

Current Town of Poughkeepsie contacts for your reference:
Water Department: Keith Ballard, 845-462-6535
Sewer Department: Franco Zani, 845-462-2280
Highway Department: Marc Pfeiffer, 845-485-3636
Building Department: Timothy Sickles, 845-485-3653
Police Department: Todd Jicha, Traffic Division, 845-485-3680

Thank you for contacting me in advance, and please call or email if I can be of further assistance.

Eric Hollman, Planner
Town of Poughkeepsie
1 Overocker Rd., Poughkeepsie, NY 12603
Tel. (845) 485-3658, Fax (845) 486-7885

From: Wright, Shamim [mailto:Shamim.Wright@aecom.com]
Sent: Tuesday, February 26, 2013 3:36 PM
To: Eric Hollman
Cc: Neil Wilson; Timothy Sickles; Taddeo, Arthur; Dombrowski, Paul (Wakefield)
Subject: RE: Former Duso Chemical Site pemitting requirements

Hello Mr. Hollman,
Thanks for passing this on. First clarification is that this thermal remediation work will only occur on Parcel 005836 (Parcel 1 of the map you created (2013-02-25 DEC.pdf)). The bioremediation work will occur at a later time and we are not addressing this now. Below are the answers to your questions about the site. Also, this is a temporary project and no earthwork will be conducted. The project will last 7 -9 months.

Would you provide a brief description of the proposed work plan regarding site disturbance and construction? I.e.,
will there be site grading in excess of 50 cubic yards NO
or 2 feet change in elevation, NO
ground disturbance $\geq$ 1 acre, NO
any alterations to building square footage, NO
or any permanent alterations to site use, access or circulation? NO

Thank you,
Shamim

Shamim H Wright
D 978-905-2467 C 978-727-7296

AECOM Environment
250 Apollo Drive
Chelmsford, MA 01824

From: Wright, Shamim [mailto:Shamim.Wright@aecom.com]
Sent: Monday, February 25, 2013 10:37 AM
To: Eric Hollman
Subject: Former Duso Chemical Site pemitting requirements

Hi Mr. Hollman,
Here's the information and I'm interested in knowing what local permits are required to do this work.   Hope this info clarifies – thanks very much.   Shamim Wright

- The site is at 15 Fulton Street in the town of Poughkeepsie.
- The site includes 5 parcels. Parcel #'s include 990867, 005836, 059876, 042826, 011773.
- Owner - see "duso property tax info_021813.xls" attached.
- I've attached some helpful site details.

Permits: air discharge permit is confirmed exempt, water discharge (discussing with wwtp manager), maybe electrical connection, maybe gas connection, maybe plumbing connection, and construction, building permit for sheds/tanks.

Site Information: (highlighted text is action requiring permits)
State superfund site.
Goals for the remedial program were established in the ROD through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and the environment, presented by the hazardous waste disposed at the Site through the proper application of scientific and engineering principles.

the MHBP property will undergo in-situ thermal treatment. In-situ thermal treatment will require the construction of thermal heating wells. A subset of heater wells would have vapor recovery screens to capture vapors generated during treatment. Vapors (steam, air, COCs) and water would be extracted from the vertical extraction screens and treated. In-situ thermal treatment will be followed by in-situ bioremediation in this area, as necessary.

Implementation of biormediation will consist of the injection of a carbon substrate in to the subsurface to modify groundwater geochemistry and create reducing conditions to stimulate indigenous microbial populations that can perform the progressive dechlorination of chlorinated VOCs.

Imposition of an institutional control in the form of an environmental easement will be conducted.

Site utility infrastructure will need to be evaluated prior to thermal remediation system construction. Higher voltage service, plumbing tie-in lines, and/or natural gas feed may be required depending on the specific thermal remediation technology selected (NYSDEC to select thermal vendor). All such utility work shall utilize the local utility companies and licensed contractors experienced in such work, under proper permits or approvals.

Wireless communications or telephone service will be required to be connected to the thermal remediation equipment to allow for remote monitoring and shut-down capability. Additional concrete pads may be required to be constructed for lay-down of transformers or other heavy equipment required for thermal remediation. Some equipment used for thermal remediation may be housed in sheds or shipping containers.

Shamim Hasan Wright
Environmental Engineer
AECOM Environment
D 978-905-2467 C 978-727-7296
shamim.wright@aecom.com

AECOM
250 Apollo Drive
Chelmsford, MA 01824
T 978-905-2100 F 978-905-2101
www.aecom.com

Town of Poughkeepsie Building Department

1 Overocker Rd. – Poughkeepsie, NY 12603
Phone # 845-485-3655 / Fax # 845-486-7888

- APPLICATION FOR FIRE ALARM PERMIT -

(Fee $50.00 Plus $2.00 Per Device)

FIRE ALARM PERMITS REQUIRE TWO (2) SETS OF PLANS BE SUBMITTED WITH THIS APPLICATION

APP.# : ________________ FA# : ______________________

CHECK #: __________ CASH : _________ AMOUNT PAID : _____________

DATE : ____________________ GRID #: _________________________

JOB SITE ADDRESS:

OWNERS NAME:

ADDRESS: ____

TEL#: ____

INSTALLATION CO. NAME : ____

ADDRESS: ____

____

TEL. #: ____ LICENSE #: ______________________________________

FIRE ALARM – PLEASE LIST NUMBER OF DEVICES:

PANELS: _________________________________

ANNUNCIATORS: __________________________

SMOKE/HEAT DETECTORS: __________________

HORNS / STROBES: _________________________

MANUAL PULL STATIONS: __________________

OTHERS: __________________________________

TOTAL: ____________________

FIRE ALARM/SECURITY SYSTEM PANEL: ________________________

TOTAL NO. OF SECURITY SYSTEM DEVICES BEING INSTALLED:

____

____

____

____

NO WORK MAY BE PERFORMED UNTIL A PERMIT IS ISSUED

The owner of the property covered by this application and the undersigned applicant agree:
To conform to all applicable laws of this jurisdiction and the applicant is responsible for scheduling inspections with an electrical agency approved by the Town of Poughkeepsie.
The applicant swears that they have been specifically authorized by the owner to execute this application.

APPLICANT'S SIGNATURE: ____

FIRE ALARM SYSTEM
RECORD OF COMPLETION

Name of protected property: ______________________________

Address: ______________________________

Representative of protected property (name/phone): ______________________________

Authority having jurisdiction: ______________________________

Address/telephone number: ______________________________

	Organization name/phone	*Representative name/phone*
Installer		
Supplier		
Service organization		

Location of record (as-built) drawings: ______________________________

Location of operation and maintenance manuals: ______________________________

Location of test reports: ______________________________

A contract for test and inspection in accordance with NFPA standard(s)

Contract No(s): ______________ Effective date: ______________ Expiration date: ______________

System Software

(a) Operating system (executive) software revision level(s): ______________________________

(b) Site-specific software revision date: ______________________________

(c) Revision completed by: ______________________________

(name) (firm)

1. Type(s) of System or Service

______ *NFPA 72,* Chapter 6 — Local

If alarm is transmitted to location(s) off premises, list where received: ______________________________

______ *NFPA 72,* Chapter 8 — Remote Station

Telephone numbers of the organization receiving alarm:

Alarm: ______________________________

Supervisory: ______________________________

Trouble: ______________________________

If alarms are retransmitted to public fire service communications centers or others, indicate location and telephone numbers of the organization receiving alarm: ______________________________

Indicate how alarm is retransmitted: ______________________________

______ *NFPA 72,* Chapter 8 — Proprietary

Telephone numbers of the organization receiving alarm:

Alarm: ______________________________

Supervisory: ______________________________

Trouble: ______________________________

If alarms are retransmitted to public fire service communications centers or others, indicate location and telephone numbers of the organization receiving alarm: ______________________________

Indicate how alarm is retransmitted: ______________________________

______ *NFPA 72,* Chapter 8 — Central Station

Prime contractor: ______________________________

Central station location: ______________________________

Means of transmission of signals from the protected premises to the central station:

________ McCulloh ________ Multiplex ________ One-way radio

________ Digital alarm communicator ________ Two-way radio ________ Others

Means of transmission of alarms to the public fire service communications center:

(a) ____

(b) ____

System location: ____

________ *NFPA 72,* Chapter 9 — Auxillary

Indicate type of connection: ________ Local energy ________ Shunt ________ Parallel telephone

Location of telephone number for receipt of signals: ____

2. Record of System Installation

(Fill out after installation is complete and wiring is checked for opens, shorts, ground faults, and improper branching, but prior to conducting operational acceptance tests.)

This system has been installed in accordance with the NFPA standards as shown below, was inspected by ________________________ on ________________________, includes the devices shown in 5 and 6, and has been in service since ________________ .

_____ *NFPA 72,* Chapters 1 2 3 4 5 6 7 8 9 10 11 (circle all that apply)

_____ NFPA 70, *National Electrical Code,* Article 760

_____ Manufacturer's instructions

_____ Other (specify): ____

Signed: ________________________________ Date: ________________

Organization: ____

3. Record of System Operation

Documentation in accordance with Inspection Testing Form, Figure 10.6.2.3, is attached ________________ .

All operational features and functions of this system were tested by________________________ date ________________ and found to be operating properly in accordance with the requirements of:

_____ *NFPA 72,* Chapters 1 2 3 4 5 6 7 8 9 10 11 (circle all that apply)

_____ NFPA 70, *National Electrical Code,* Article 760

_____ Manufacturer's instructions

_____ Other (specify): ____

Signed: ________________________________ Date: ________________

Organization: ____

4. Signaling Line Circuits

Quantity and class of signaling line circuits connected to system *(see NFPA 72, Table 6.6.1)*:

Quantity: ____________ Style: ________________ Class: ________________________

5. Alarm-Initiating Devices and Circuits

Quantity and class of initiating device circuits *(see NFPA 72, Table 6.5)*:
Quantity:__________ Style:__________ Class:__________

MANUAL
(a) Manual stations Noncoded______ Transmitters______ Coded______ Addressable______
(b) Combination manual fire alarm and guard's tour coded stations__________

AUTOMATIC
Coverage: Complete__________ Partial__________
Selective__________ Nonrequired__________

(a) Smoke detectors______ Ion______ Photo______ Addressable______
(b) Duct detectors______ Ion______ Photo______ Addressable______
(c) Heat detectors______ FT______ RR______ FT/RR______ RC______ Addressable______
(d) Sprinkler waterflow indicators: Transmitters______ Noncoded______ Coded______ Addressable______
(e) The alarm verification feature is disabled______ or enabled______, changed from______ seconds to______ seconds.
(f) Other (list):__________

6. Supervisory Signal-Initiating Devices and Circuits (use blanks to indicate quantity of devices)

GUARD'S TOUR
(a)______ Coded stations
(b)______ Noncoded stations
(c)______ Compulsory guard's tour system comprised of______ transmitter stations and intermediate stations
Note: Combination devices are recorded under 5(b), Manual, and 6(a), Guard's Tour.

SPRINKLER SYSTEM
Check if provided
(a)______ Valve supervisory switches
(b)______ Building temperature points
(c)______ Site water temperature points
(d)______ Site water supply level points

Electric fire pump:
(e)______ Fire pump power
(f)______ Fire pump running
(g)______ Phase reversal

Engine-driven fire pump:
(h)______ Selector in auto position
(i)______ Engine or control panel trouble
(j)______ Fire pump running

ENGINE-DRIVEN GENERATOR:
(a)______ Selector in auto position
(b)______ Control panel trouble
(c)______ Transfer switches
(d)______ Engine running
Other supervisory function(s) (specify):__________

7. Annunciator(s)

Number:__________ Type:________________ Location: ________________________

8. Alarm Notification Appliances and Circuits

NFPA 72, Chapter 6 — Emergency Voice/Alarm Service

Quantity of voice/alarm channels: ____________ Single: __________ Multiple:__________

Quantity of speakers installed: ____________ Quantity of speaker zones:__________

Quantity of telephones or telephone jacks included in system: ____________

Quantity and the class of notification appliance circuits connected to system *(see NFPA 72, Table 6.7)*:

Quantity:__________ Style:__________ Class: __________

Types and quantities of notification appliances installed:

(a) Bells __________ With Visible __________
(b) Speakers__________ With Visible __________
(c) Horns__________ With Visible __________
(d) Chimes__________ With Visible __________
(e) Other: __________ With Visible __________
(f) Visible appliances without audible: __________

9. System Power Supplies

(a) Fire Alarm Control Panel: Nominal voltage: __________ Current rating: __________
Overcurrent protection: Type: __________ Current rating: __________
Location: __________

(b) Secondary (standby):
Storage battery:__________ Amp-hour rating: __________
Calculated capacity to drive system, in hours: __________
Engine-driven generator dedicated to fire alarm system:__________
Location of fuel storage: __________

(c) Emergency system used as backup to primary power supply:__________
Emergency system described in NFPA 70, Article 700: __________

10. Comments

Frequency of routine tests and inspections, if other than in accordance with the referenced NFPA standard(s):

____

System deviations from the referenced NFPA standard(s) are: __________

____

____

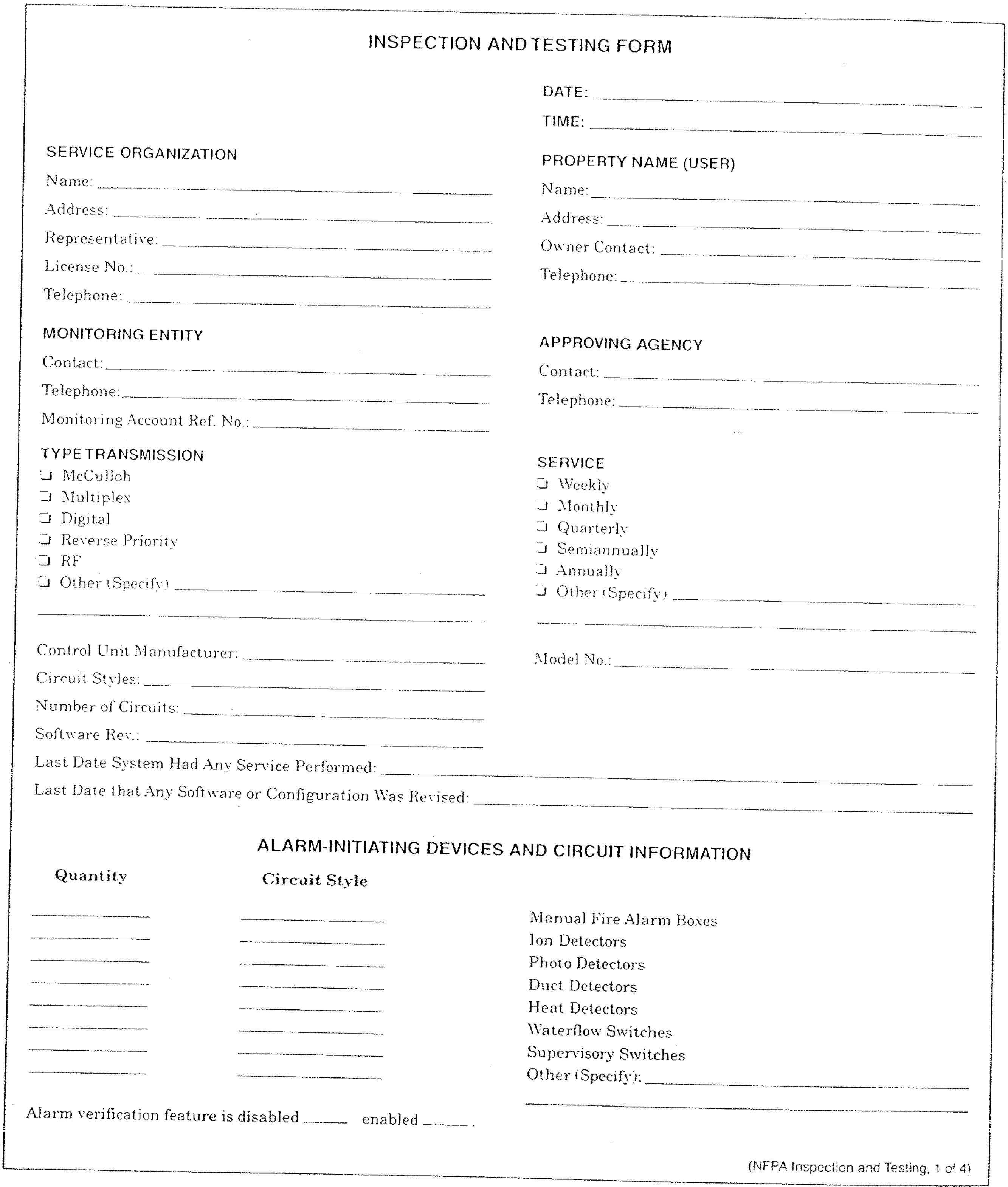
____
(signed) for installation contractor/supplier (title) (date)

____
(signed) for alarm service company (title) (date)

____
(signed) for central station (title) (date)

Upon completion of the system(s) satisfactory test(s) witnessed (if required by the authority having jurisdiction):

____
(signed) representative of the authority having jurisdiction (title) (date)



INSPECTION AND TESTING FORM

DATE: ____________________

TIME: ____________________

SERVICE ORGANIZATION

Name: ____________________

Address: ____________________

Representative: ____________________

License No.: ____________________

Telephone: ____________________

PROPERTY NAME (USER)

Name: ____________________

Address: ____________________

Owner Contact: ____________________

Telephone: ____________________

MONITORING ENTITY

Contact: ____________________

Telephone: ____________________

Monitoring Account Ref. No.: ____________________

APPROVING AGENCY

Contact: ____________________

Telephone: ____________________

TYPE TRANSMISSION

- ☐ McCulloh
- ☐ Multiplex
- ☐ Digital
- ☐ Reverse Priority
- ☐ RF
- ☐ Other (Specify) ____________________

SERVICE

- ☐ Weekly
- ☐ Monthly
- ☐ Quarterly
- ☐ Semiannually
- ☐ Annually
- ☐ Other (Specify) ____________________

Control Unit Manufacturer: ____________________

Model No.: ____________________

Circuit Styles: ____________________

Number of Circuits: ____________________

Software Rev.: ____________________

Last Date System Had Any Service Performed: ____________________

Last Date that Any Software or Configuration Was Revised: ____________________

ALARM-INITIATING DEVICES AND CIRCUIT INFORMATION

Quantity	**Circuit Style**	
______	______	Manual Fire Alarm Boxes
______	______	Ion Detectors
______	______	Photo Detectors
______	______	Duct Detectors
______	______	Heat Detectors
______	______	Waterflow Switches
______	______	Supervisory Switches
______	______	Other (Specify): ____________________

Alarm verification feature is disabled ______ enabled ______ .

(NFPA Inspection and Testing, 1 of 4)

FIGURE 10.6.2.3 Example of an Inspection and Testing Form.

ALARM NOTIFICATION APPLIANCES AND CIRCUIT INFORMATION

Quantity	Circuit Style	
		Bells
		Horns
		Chimes
		Strobes
		Speakers
		Other (Specify): ____________

No. of alarm notification appliance circuits: ____________

Are circuits monitored for integrity? ☐ Yes ☐ No

SUPERVISORY SIGNAL-INITIATING DEVICES AND CIRCUIT INFORMATION

Quantity	Circuit Style	
		Building Temp.
		Site Water Temp.
		Site Water Level
		Fire Pump Power
		Fire Pump Running
		Fire Pump Auto Position
		Fire Pump or Pump Controller Trouble
		Fire Pump Running
		Generator In Auto Position
		Generator or Controller Trouble
		Switch Transfer
		Generator Engine Running
		Other: ____________ ____________

SIGNALING LINE CIRCUITS

Quantity and style of signaling line circuits connected to system *(see NFPA 72, Table 6.6.1)*:

Quantity ____________ Style(s) ____________

SYSTEM POWER SUPPLIES

(a) Primary (Main): Nominal Voltage ____________ Amps ____________

Overcurrent Protection: Type ____________ Amps ____________

Location (of Primary Supply Panelboard): ____________

Disconnecting Means Location: ____________

(b) Secondary (Standby):

____________ Storage Battery: Amp-Hr. Rating ____________

Calculated capacity to operate system, in hours: ____________ 24 ____________ 60

____________ Engine-driven generator dedicated to fire alarm system:

Location of fuel storage: ____________

TYPE BATTERY

☐ Dry Cell
☐ Nickel-Cadmium
☐ Sealed Lead-Acid
☐ Lead-Acid
☐ Other (Specify):

(c) Emergency or standby system used as a backup to primary power supply, instead of using a secondary power supply:

____________ Emergency system described in NFPA 70, Article 700

____________ Legally required standby described in NFPA 70, Article 701

____________ Optional standby system described in NFPA 70, Article 702, which also meets the performance requirements of Article 700 or 701.

FIGURE 10.6.2.3 Continued

PRIOR TO ANY TESTING

NOTIFICATIONS ARE MADE	Yes	No	Who	Time
Monitoring Entity	☐	☐		
Building Occupants	☐	☐		
Building Management	☐	☐		
Other (Specify)	☐	☐		
AHJ Notified of Any Impairments	☐	☐		

SYSTEM TESTS AND INSPECTIONS

TYPE	Visual	Functional	Comments
Control Unit	☐	☐	
Interface Equipment	☐	☐	
Lamps/LEDS	☐	☐	
Fuses	☐	☐	
Primary Power Supply	☐	☐	
Trouble Signals	☐	☐	
Disconnect Switches	☐	☐	
Ground-Fault Monitoring	☐	☐	

SECONDARY POWER

TYPE	Visual	Functional	Comments
Battery Condition	☐		
Load Voltage		☐	
Discharge Test		☐	
Charger Test		☐	
Specific Gravity		☐	
TRANSIENT SUPPRESSORS	☐		
REMOTE ANNUNCIATORS	☐	☐	
NOTIFICATION APPLIANCES			
Audible	☐	☐	
Visible	☐	☐	
Speakers	☐	☐	
Voice Clarity		☐	

INITIATING AND SUPERVISORY DEVICE TESTS AND INSPECTIONS

Loc. & S/N	Device Type	Visual Check	Functional Test	Factory Setting	Measured Setting	Pass	Fail
		☐	☐			☐	☐
		☐	☐			☐	☐
		☐	☐			☐	☐
		☐	☐			☐	☐
		☐	☐			☐	☐
		☐	☐			☐	☐

Comments: ______________________________

(NFPA Inspection and Testing, 3 of 4)

FIGURE 10.6.2.3 Continued

EMERGENCY COMMUNICATIONS EQUIPMENT	Visual	Functional	Comments
Phone Set	☐	☐	
Phone Jacks	☐	☐	
Off-Hook Indicator	☐	☐	
Amplifier(s)	☐	☐	
Tone Generator(s)	☐	☐	
Call-in Signal	☐	☐	
System Performance	☐	☐	

INTERFACE EQUIPMENT	Visual	Device Operation	Simulated Operation
(Specify) ____________	☐	☐	☐
(Specify) ____________	☐	☐	☐
(Specify) ____________	☐	☐	☐
SPECIAL HAZARD SYSTEMS			
(Specify) ____________	☐	☐	☐
(Specify) ____________	☐	☐	☐
(Specify) ____________	☐	☐	☐

Special Procedures: ____________

Comments: ____________

SUPERVISING STATION MONITORING	Yes	No	Time	Comments
Alarm Signal	☐	☐		
Alarm Restoration	☐	☐		
Trouble Signal	☐	☐		
Supervisory Signal	☐	☐		
Supervisory Restoration	☐	☐		

NOTIFICATIONS THAT TESTING IS COMPLETE	Yes	No	Who	Time
Building Management	☐	☐		
Monitoring Agency	☐	☐		
Building Occupants	☐	☐		
Other (Specify)	☐	☐		

The following did not operate correctly: ____________

System restored to normal operation: Date: ____________ Time: ____________

THIS TESTING WAS PERFORMED IN ACCORDANCE WITH APPLICABLE NFPA STANDARDS.

Name of Inspector: ____________ Date: ____________ Time: ____________

Signature: ____________

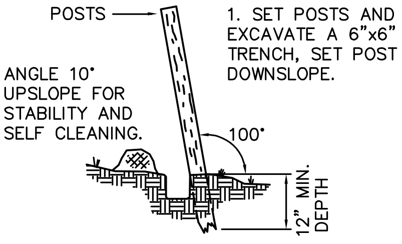
Name of Owner or Representative: ____________

Date: ____________ Time: ____________

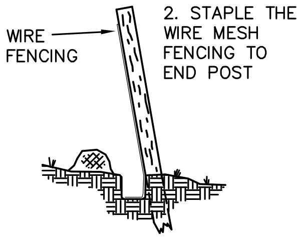
Signature: ____________

(NFPA Inspection and Testing, 4 of 4)

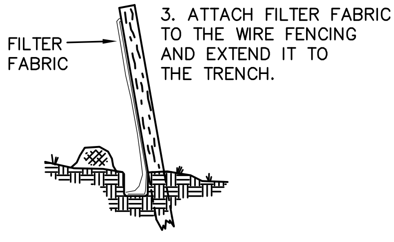
FIGURE 10.6.2.3 Continued



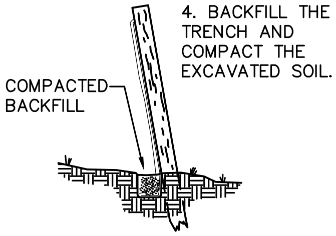
1. SET POSTS AND EXCAVATE A 6"x6" TRENCH, SET POST DOWNSLOPE.



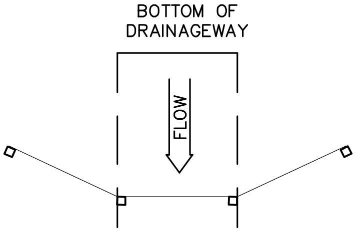
2. STAPLE THE WIRE MESH FENCING TO END POST



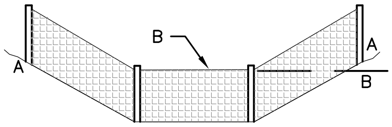
3. ATTACH FILTER FABRIC TO THE WIRE FENCING AND EXTEND IT TO THE TRENCH.



4. BACKFILL THE TRENCH AND COMPACT THE EXCAVATED SOIL.



PLAN VIEW



ELEVATION

POINTS 'A' SHOULD BE HIGHER THAN POINT 'B'.

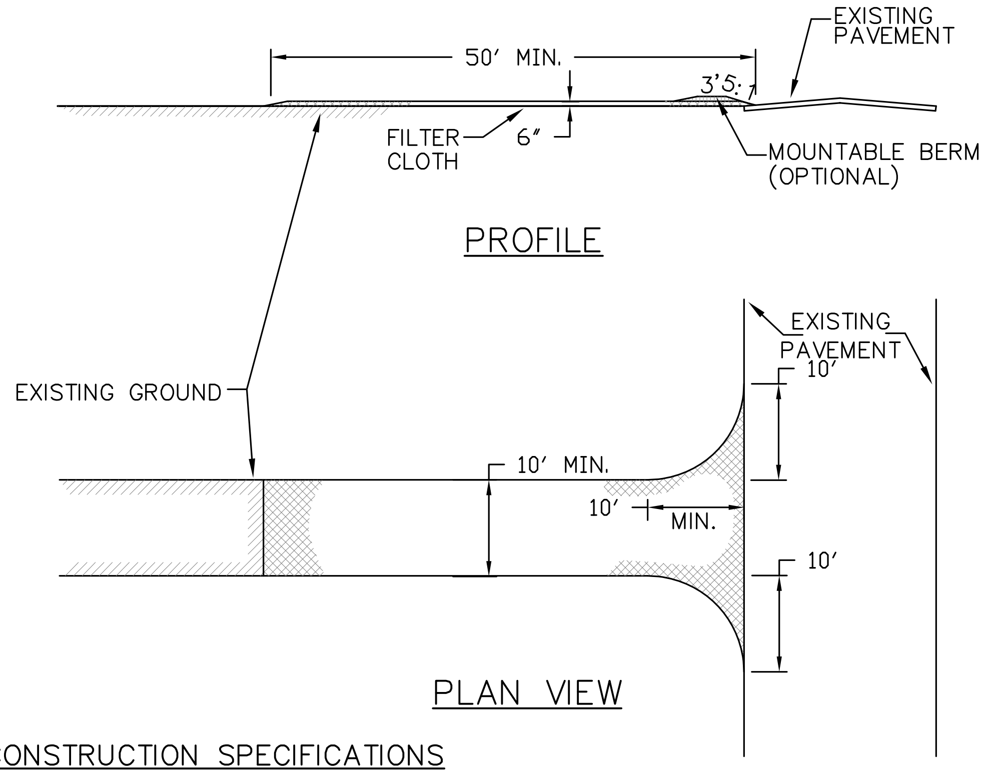
PLACEMENT AND CONSTRUCTION OF A SYNTHETIC FILTER BARRIER

CITY OF POUGHKEEPSIE
ENGINEERING DEPARTMENT
62 CIVIC CENTER PLAZA
POUGHKEEPSIE, NY 12601

FILE NO.: 001-DET
DATE: 3-6-00
SCALE: AS NOTED
DRAWN BY: JK

SYNTHETIC
SILT FENCE
BARRIER

1
PAGE NO.



CONSTRUCTION SPECIFICATIONS

1. Stone Size – Use 2” stone, or reclaimed or recycled concrete equivilent.
2. Length – As required, but not less than 50 feet (except on a single residence lot where a 30 foot minimum length would apply).
3. Thickness – Not less than six (6) inches.
4. Width – Ten (10) foot minimum, but not less than the full width at points where ingress or egress occurs.
5. Filter Cloth – Will be placed over the entire area prior to placing of stone. Filter will not be required on a single family residence lot.
6. Surface Water – All surface water flowing or diverted toward construction entrances shall be piped across the entrance. If piping is impractical, a mountable berm with 5:1 slopes will be permitted.
7. Maintenance – The entrance shall be maintained in a condition which will prevent tracking or flowing of sediment onto public rights–of–way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment. All sediment spilled, dropped, washed or tracked onto public rights–of–way must be removed immediately.
8. Washing – Wheels shall be cleaned to remove sediment prior to entrance onto public rights–of–way. When washing is required, it shall be done on an area stabilized with stone and which drains into an approved sediment trapping device.
9. Periodic inspection and needed maintenance shall be provided after each rain.

STABILIZED CONSTRUCTION ENTRANCE

CITY OF POUGHKEEPSIE
ENGINEERING DEPARTMENT
62 CIVIC CENTER PLAZA
POUGHKEEPSIE, NY 12601

FILE NO.: 001-DET
DATE: 3-6-00
SCALE: AS NOTED
DRAWN BY: JP

STABILIZED
CONSTRUCTION
ENTRANCE

Chapter 139. NOISE

[HISTORY: Adopted by the Town Board of the Town of Poughkeepsie 6-20-2007 by L.L. No. 11-2007.*Editor's Note: This local law also repealed former Ch. 139, Noise, adopted 9-21-1983 (Part II, Ch. 11, Art. IV, of the 1964 Code), as amended.* Amendments noted where applicable.]

GENERAL REFERENCES
Animals — See Ch. 57.
Mass public assemblies — See Ch. 60.
Peddling and soliciting — See Ch. 151.
Zoning — See Ch. 210.

§ 139-1. Findings; legislative authority.

The proliferation of unreasonably loud noises in the Town of such character, intensity, duration or repetition as to be detrimental to the life, health or safety of any individual or of the public has reached such proportions that the Town Board, pursuant to the authority of § 130 of the Town Law of the State of New York and New York Constitution, Articles IX and II, to preserve, protect and promote the public health, safety and welfare, has adopted a noise control ordinance which, pursuant to the standards hereinafter set forth, shall delineate permitted noise levels within the town.

§ 139-2. Definitions.

For the purposes of this chapter, the terms used herein shall be defined as follows:

ANSI
The American National Standards Institute or its successor bodies.

A-WEIGHTED SOUND LEVEL
The frequency-weighted sound pressure level (in decibels) measured on a sound-level meter with an A-weighted scale as specified in the American National Standards Institute (ANSI) specifications for sound-level meters S1.4-1983 (R2006)/ANSI S1.4a-1985 (R2006).

DECIBEL
A unit for measuring the volume of sound equal to 20 times the logarithm to the base of 10 of the ratio of the pressure of the sound measured to the reference pressure which is 20 micropascals (20 micronewtons per square meter).

EMERGENCY
A public calamity or the exposure of any person or property to imminent danger.

EMERGENCY WORK
Work or activity that is necessary to prevent or recover from an emergency, including but not limited to work to repair electric, gas, water, sewerage and telephone services.

L

The A-weighted sound level measured with slow response that is exceeded 10% of the time.

L_{50}

The A-weighted sound level measured with slow response that is exceeded 50% of the time.

L_{90}

The A-weighted sound level measured with slow response that is exceeded 90% of the time.

LEVEL

The logarithm of the ratio of a quantity to a reference of the same kind. The base of the logarithm is 10. The kind of level and the reference must be specified.

NOISE OF IMPULSIVE CHARACTER

Bursts of sound usually less than one second's duration, for example, explosions and gunshots, which significantly exceed the ambient sound level of the areas.

NOISE OF PERIODIC CHARACTER

A sound of short duration punctuated by pauses of indefinite duration; for example, a power saw.

OWNER

Any person who has regular control of a device or site, including but not limited to the owner of a freehold of the premises or lesser estate therein or mortgagees thereof or an agent or lessee of such person.

PERSON

Any individual, partnership, company, public or private corporation, association, firm, organization, political subdivision, governmental agency, administration or department, municipality, trust, estate, group of individuals or any other legal entity whatsoever.

RECREATIONAL VEHICLE

Any vehicle which is propelled by any power other than muscular power that is designated for or capable of cross-country travel, such as a motorcycle, trail bike or minibike, but not a snowmobile. A recreational vehicle is also classed as a motor vehicle when such recreational vehicle is operated or driven upon a public highway.

REFUSE COMPACTING VEHICLE

Any vehicle which is designated to be used or is actually used to compact and transfer refuse, garbage or trash.

SNOWMOBILE

Any self-propelled vehicle designed for travel on snow or ice, steered by skis or runners and supported in whole or part by one or more skis, belts or cleats.

SOUND LEVEL

The quantity in decibels measured by a sound-level meter satisfying the requirements of American National Standards Institute Specification for Sound-Level Meters S1.4-1983 (R2006)/ANSI S1.4a-1985 (R2006). This publication is available from the American National Standards Institute, Inc.'s webstore at www.webstore.ansi.org or by calling customer service at (212) 642-4900 for the name of a hard copy or compact disc reseller. "Sound level" is the frequency-weighted sound pressure level obtained with the standardized dynamic characteristic "fast" or "slow" and weighting A, B or C; unless indicated otherwise, the A-weighting with a slow response is understood.

SOUND-LEVEL METER

An instrument including a microphone, an amplifier, an output meter and frequency weighing network for the measurement of sound levels. Sound-level meters shall conform to the requirements of ANSI specifications for sound-level meters S1.4-1983 (R2006)/ANSI S1.4a-1985 (R2006), Type 1 or Type 2.

SOUND PRESSURE LEVEL

Twenty times the logarithm to the base 10 of the ratio of the root mean squared pressure of a sound to a reference pressure of 20 micropascals. The unit applied to this measure shall be the decibel (dB).

TOWN

The Town of Poughkeepsie, situated within the County of Dutchess and State of New York.

UNREASONABLE NOISE

A. Any excessive or unusually loud sound which injures or endangers the repose, health, peace or safety of a reasonable person or which causes injury to animal life or damages to a person's property or business.

B. The factors which will be used to determine that noise is unreasonable to a reasonable person are:

(1) The noise occurs at night between 10:00 p.m. and 7:00 a.m., rather than during the day;

(2) The source of the sound is permanent, rather than temporary;

(3) The noise is of a periodic or impulsive character, rather than continual and steady;

(4) The noise intrudes into a residential district or an area with sleeping facilities, including residences, apartments, motels, hotels or college dormitories;

(5) The duration of the noise is prolonged, rather than short;

(6) The noise is reoccurring on an intermittent basis, rather than continual and steady;

(7) The noise is louder and more intense than the volume and intensity of the background noise in the area; and

(8) The noise in unnatural, rather than sound normally occurring in nature.

C. Unreasonable noise emanating from private property shall be measured or determined at the adjoining property line or, in the case of a multiple residence, within the adjoining or adjacent apartment or hallway. Unreasonable noise emanating from public property shall be measured or determined at a distance of 50 feet or more from the sound source, at the adjoining property line or, in the case of a multiple residence, within the adjoining or adjacent apartment or hallway, whichever is closer.

ZONING DISTRICT

The zoning district within which a particular premises is situated shall be as indicated by the Zoning Ordinance of the Town then in effect.*Editor's Note: See Ch.* ***210****, Zoning.*

§ 139-3. Unreasonable noise prohibited; exception.

No person shall make or continue or cause or permit to be made or continued any unreasonable noise. Noncommercial public speaking and public assembly activities conducted in any public space shall be exempt from the operation of this section. While decibel readings provide presumptive evidence of unreasonable noise pursuant to § `139-5C`, a decibel reading is not required to prove a violation of this chapter.

§ 139-4. Unlawful noises.

The following acts and the causing thereof are declared to be in violation of this chapter:

A. Drums. The playing or the permitting of playing a drum or drum set between the hours of 10:00 p.m. and 7:00 a.m. in a manner so as to create unreasonable noise.

B. Building construction. Operating or permitting the operation of any tool or equipment used in construction, drilling or demolition work, including excavation, and the alteration or repair of any building between the hours of 10:00 p.m. and 7:00 a.m., except in the case of an emergency or the interests of public safety and then only with the permit of the Building Inspector, which permit may be issued for a maximum period of three days and may be renewed once for a maximum period of three days during the existence of the emergency period.

C. Refuse compacting. The operation of a refuse compacting vehicle in the process of compacting or collecting refuse contained in a dumpster or similar receptacle between the hours of 10:00 p.m. and 7:00 a.m. or the operation of a refuse compacting vehicle in the process of compacting or collecting refuse contained in individual garbage cans between the hours of 10:00 p.m. and 7:00 a.m.

D. Amplified sound. The using, operating of or permitting to be used or operated any device for producing, reproducing or amplifying sound, including, but not limited to, a radio, tape player, compact disc player, digital video disc player, or television, in such a manner so as to create unreasonable noise.

E. Horns and signaling devices. The sounding of any horn, signaling device or alarm (except as a danger warning, pursuant to § 375 of the Vehicle and Traffic Law of the State of New York) so as to create unreasonable noise.

F. Shouting and yelling. Shouting, yelling, singing, calling, hooting or whistling so as to create unreasonable noise.

G. Fraternities and sororities, private clubs, meeting halls and private residences. Noise from parties, entertainment, music or social gatherings of any kind, whether public or private, which creates unreasonable noise.

H. Engines. The operation, including the stationary idling, of any engine, including, but not limited to, an automobile, truck, motorcycle, motorbike, motorboat or minibike engine, so as to create unreasonable noise.

I. Heavy equipment. The operation of any pile driver, bulldozer, pneumatic hammer, grinder or other construction equipment which creates unreasonable noise, except between 7:00 a.m. and 8:00 p.m. on weekdays and Saturdays except in cases of urgent necessity in the interest of public safety.

J. Machinery. The operation of any machinery, equipment, pump, fan, air-conditioning apparatus or other mechanical device in such a manner as to create unreasonable noise.

K. Loading and unloading. The loading or unloading of any materials, equipment, or the handling of bales, boxes, crates, containers or similar objects so as to create unreasonable noise.

L. Domestic animals. Barking, squawking, whining, howling, neighing or other sounds of domestic animals that occur so as to create unreasonable noise.

M. Explosives, firearms and similar devices. The use or firing of explosives, firearms or similar devices so as to create unreasonable noise. The lawful use of firearms for hunting or at a firing range or at a gun club shall not constitute a violation of this chapter.

N. Vibration. The operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of an individual beyond the property where the source is located. For the purposes of this section, "vibration perception threshold" means the minimum ground- or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects.

O. Recreational vehicles. The operation of any recreational vehicle off a public highway at any time, at any speed or under any condition of grade, load, acceleration or deceleration or in any manner whatsoever as to exceed 92 dBA. The limit shall apply at a distance of 50 feet from such recreational vehicle. All measurements will be made on the A-weighted sound level of a sound-level meter with a slow response.

P. Snowmobiles. The operation of any snowmobile at any time, at any speed or under any condition or grade, load, acceleration or deceleration or in any manner whatsoever so as to exceed 92 dBA. The limit shall apply at a distance of 50 feet from such snowmobile. All measurements will be made on the A-weighted sound level of a sound-level meter with a slow response.

Q. Air-conditioning and air-handling devices.

(1) Except as provided by Subsection Q(4) of this section, the operation of an air-conditioning or air-handling device that exceeds the maximum sound-level limitations provided in this section. All measurements will be made on the A-weighted sound level of a sound-level meter with a slow response.

(2) In areas zoned residential, continuous sound in air which has crossed a property line shall not exceed any of the following sound levels:

(a) Fifty-five dBA at any point; or

(b) Fifty dBA outside of a living area window with the microphone not more than three feet from the window opening.

(3) In areas zoned for multiple dwellings or apartments, continuous sound shall not exceed 50 dBA outside any living area window with the microphone not more than three feet from the window opening.

(4) The provisions of this section shall not apply if the sound from the air-conditioner or air-handling device produces less than a five-decibel increase on the sound level that exists in the absence of such sound.

R. Places of public entertainment. The operation of a place of public entertainment, including but not limited to a restaurant, bar, cafe, discotheque or dance hall, in which the sound level is equal to or exceeds 95 dBA sustained for more than 30 seconds measured at the location of the spectators. All measurements will be made on the A-weighted sound level of a sound-level meter with a slow response.

§ 139-5. Presumptive evidence.

A. It shall be prima facie evidence that an act is in violation of this chapter when noise caused by and/or emanating from parties, entertainment, music or social gatherings of any kind, whether public or private, indoors or outdoors, can be heard inside any dwelling unit that is not the location of the source of the noise, where all exterior doors and windows of said dwelling unit are closed.

B. The use of any sound-producing, sound-reproducing or sound-amplifying device, machinery, domestic equipment, heavy equipment or engine so as to cause the sound produced thereby to be audible outside the building or beyond the boundary of the real property where it originates, between the hours of 10:00 p.m. and 7:00 a.m. the following day, shall be prima facie evidence of a violation of this chapter.

C. It shall be prima facie evidence that an act is in violation of this chapter when a sound-level meter indicates that the decibel level of a particular activity is in excess of 60 dBA between the hours of 7:00 a.m. and 9:00 p.m. and 50 dBA between the hours of 9:00 p.m. and 7:00 a.m. measured at a distance of 50 feet from the source of the noise. All measurements will be made on the A-weighted sound level of a sound-level meter with a slow response.

§ 139-6. Exempt sounds.

The following sounds shall not be deemed to be in violation of this chapter:

A. Sounds created by church bells or chimes;

B. Sounds created by any government agency or its agents, including but not limited to the use of an emergency warning device or authorized emergency vehicle;

C. Sounds created by lawn mowers with functioning mufflers and in good working order and home power tools in good working order in use between the hours of 7:00 a.m. and 8:00 p.m. on weekdays and Saturdays and 10:00 a.m. and 8:00 p.m. on Sundays and holidays;

D. Sounds created by public utilities in carrying out the operations of their franchise;

E. Sounds connected with sporting events of any public or private school or an authorized carnival, fair, exhibition, parade, etc., authorized by permit of the Town Board;

F. The sounds created by crop cultivation, production, harvesting and livestock production;

G. Sounds created by safety and protective devices used for their intended purpose;

H. Sounds created by snow removal equipment in good working order;

I. Sounds which are authorized as exempt from this chapter by resolution of the Town Board because said noise, although otherwise causing unreasonable noise, is part of a public works project, where the general health, safety and welfare of the citizenry of the Town of Poughkeepsie is concerned.

§ 139-7. Enforcement.

A. It shall be the duty of the Town of Poughkeepsie Police Department and the Zoning Administrator and any duly authorized deputy zoning administrator of the Town of Poughkeepsie to enforce the provisions of this chapter.

B. Appearance tickets. Town of Poughkeepsie police officers and the Zoning Administrator and any duly authorized deputy zoning administrator are authorized to issue appearance tickets as defined in § 150.10 of the Criminal Procedure Law for any violation of this chapter.

§ 139-8. Penalties for offenses.

[Amended 10-3-2007 by L.L. No. 21-2007; 6-3-2009 by L.L. No. 22-2009]

A. Fines.

   (1) The first violation of this chapter shall be punished by a fine of up to $1,000.

   (2) The second violation of this chapter, within 12 months after the first violation, shall be punished by a fine of not less than $1,000 and up to $1,500.

   (3) Further violations within 12 months after the last violation shall be punished by a fine of not less than $1,500 and up to $2,500.

B. Each such act which either continues or is repeated more than 1/2 hour after issuance of written notice of violation of this chapter shall be a separate offense and shall be prosecuted as a separate offense.

C. If the violation occurs on the premises of rental property which is occupied by someone other than the owner, then the owner must also be notified in writing that the violation has occurred, within five business days of said violation, except that failure to provide such notice shall not affect the prosecution of the person or persons charged with said violation.

D. In addition to any other remedies set forth herein authorizing the Town to enforce the provisions of this chapter, establishing penalties, and setting forth additional remedies, the person charged with the responsibility to enforce the provisions of this chapter may impose a civil fine or agree to a civil fine not to exceed $1,000 per day for each day of the violation. If said civil fine is imposed, then the alleged violator may appeal to the Town Board of the Town of Poughkeepsie.

AIR & NOISE COMPLIANCE

About Us

Contact Us

New York Noise Regulations

The State of New York does not have regulations that set community noise exposure criteria.

The New York State Department of Environmental Conservation Regulations 6NYCRR implement the provisions of the State Environmental Quality Review Act (SEQR). These regulations have established policy and guidance for comprehensive environmental impact assessment. The program policy for assessing and mitigating noise impacts are contained in DEP-00-1.

These regulations do not include specific noise impact criteria but constitute guidance on impact assessment procedures.

NY DEP-00-1

Individual communities can also establish noise regulations through community by-laws and some local communities have additional noise regulations. Inquire at the local town hall, the clerk or manager's office, to see if local noise regulations exist.

AIR & NOISE COMPLIANCE

Appendix J

Target Temperature and Treatment Duration Calculations

MHBP Property (Former Duso Chemical Site), Poughkeepsie, NY
Subject: Estimated Boiling Points for CVOC Mixtures at Depth

Performed by Paul M. Dombrowski, P.E. (MA, CT)		Date	3/4/2013
Checked by Christopher Shores, P.E. (NC)		Date	3/5/2013

Summary: The vapor pressure of a chemical increases with temperature, but the relationship is non-linear. However, a linear inverse relationship has been observed between the natural log of vapor pressure and the inverse of temperature (1/T Kelvin). The Clausius-Clapeyron Equation related vapor pressure and temperatue. This relationship is used in this calculation to ultimately determine target treatment temperatures at depth.

The Clausius-Clapeyron Equation

$$\ln P = \frac{-\Delta H_{vap}}{RT} + C \quad \text{or} \quad \ln P = -\frac{\Delta H_{vap}}{R}\left(\frac{1}{T}\right) + C$$

DHvap = heat of vaporization
R = gas constant
C = constant

y = [m * x] + b

From a linear regression of plotting ln P vs. 1/T, the slope (m) is the Dhvap / R and the intercept provides the constant

From CRC Handbook of Chemistry and Physics, 62nd Ed.

Site VOCs with highest concentrations and highest boiling points selecte

	Temp (oC)	Temp (K)	Vapor Pressure (mmHg)	1/T(K)	lnP		Temp (oC)	1/T(K)
Water	40	313.15	55.3	0.0032	4.01			
(BP=100C	61.2	334.35	157.8	0.0030	5.06			
@ 1 atm)	100	373.15	760	0.0027	6.63			
	121	394.15	1537	0.0025	7.34			
1,1,1-TCA	1.6	274.75	40	0.0036	3.69	Vinyl Chloride	-66.8	0.004846
(BP=74C	20	293.15	100	0.0034	4.61	(1-chloroethylene)	-53.02	0.004543
@ 1 atm)	54.6	327.75	400	0.0031	5.99		-28	0.004079
	74.1	347.25	760	0.0029	6.63		-13.8	0.003856
1,2-DCA	10	283.15	40	0.0035	3.69	Chloroethane	-47	0.004422
(BP=84C	29.4	302.55	100	0.0033	4.61	(ethyl chloride)	-32	0.004147
@ 1 atm)	64	337.15	400	0.0030	5.99		-3.9	0.003714
	82.4	355.55	760	0.0028	6.63		12.3	0.003503
TCE	11.9	285.05	40	0.0035	3.69	1,1-DCA	-10.2	0.003803
(BP=87.2C	31.4	304.55	100	0.0033	4.61		7.2	0.003567
@ 1 atm)	67	340.15	400	0.0029	5.99		39.8	0.003195
	86.7	359.85	760	0.0028	6.63		57.4	0.003025
1,1-DCE	-31.1	242.05	40	0.0041	3.69			
(BP=57.2C	-15	258.15	100	0.0039	4.61			
@ 1 atm)	14.8	287.95	400	0.0035	5.99			
	31.7	304.85	760	0.0033	6.63			

Regression curves for water, TCE, and 1,1,1-TCA plotted with regression curves displayed

Determine Temperature Where Boiling Point and Atmospheric Pressure are Equal at Atmospheric Pressur

Vapor pressure is a result of a sum of all components in the mixture
Boiling occurs when the vapor pressure is equal to atmospheric pressure
At the water table, atmospheric pressure = 760 mmH

	m	b
P(water) = e^(-5062.3/T + 20.196)	-5066.6	20.203
P(TCE) = e^(-4034.1/T + 17.853)	-4037.9	17.859
P(TCA) = e^(-3868.54/T + 17.791)	-3872.3	17.797
P (1,1-DCA)	-3776.8	18.062
P(1,1-DCE)	-3461.2	18
P(1,2-DCA)	-4091.6	18.134
P(CA)	-3207.1	17.886
P(VC)	-2977.1	18.125

Conservative Case - use VOC with highest boiling point (TCE)
P (TCE) + P(water) = 760 mmHg (boiling when combined vapor pressure = atmospheric pressure

T (C)	1/T (K)	Vapor Pressure (mmHg)
73.5	0.002886242	760

Use Excel GoalSeek to solve for temperature when Vapor Pressure = 760 mmHg.
Combined Boiling Point at 1 Atm for TCE and wate

Repeat for other CVOCs

	T (K)	1/T (K)	Vapor Pressure (mmHg)
1,1,1-TCA	65.3	0.002955633	760
1,1-DCA	53.2	0.003066021	760
1,1-DCE	30.3	0.003296887	760
1,2-DCA	71.3	0.00290436	760
Chloroethane	11.6	0.003513246	760
Vinyl Chloride	-14.0	0.003861004	760

Combined Boiling Point at 1 Atm for 1,1,1-TCA and wate

Determine Temperature Where Boiling Point and Atmospheric Pressure are Equal at Deepest Depth of Treatment Interval

Deepest Treatment is targeted for 50' bgs (~45' below water table
Pressure of water = rho * g * h (rho= density of water; g = gravity constant; h = water height

P =	1	g *	981	cm *	45	feet *	30.48	cm *	dyne
		cm3		sec2				ft	(cm-g)/sec2
P =	1.35E+06	dyne/cm2							
P =	1,010	mmHg							

Conversion   To convert dyne/cm2 multiply by   7.50E-04
http://www.tedpella.com/company_html/conversion.htm

Total Pressure = Atmospheric Pressure + Pressure from Water
Total Pressure at 50' =   1,770   mmHg

Conservative Case - use VOC with highest boiling point (TCE
P (TCE) + P(water) = 1769 mmHg (boiling when combined vapor pressure = atmospheric pressure

T (C)	1/T (K)	Vapor Pressure (mmHg)
98.1	0.0027	1770

Combined Boiling Point at 45' below water table for TCE and wate

Repeat for 1,1,1-TCA

T (C)	1/T (K)	Vapor Pressure (mmHg)
90.1	0.0028	1770

Combined Boiling Point at 45' below water table for 1,1,1-TCA and wate

Determine Water Only Boiling Point Depth

Depth (ft bgs)	Depth Below Water Table (ft)	Total Pressure (mmHg)	Boiling T (C)	1/T (K)	Vapor Pressure (mmHg)
5	0	760	100.2	0.00268	760
10	5	872	104.2	0.00265	872
20	15	1097	110.7	0.00261	1096
30	25	1321	116.2	0.00257	1321
40	35	1545	121.0	0.00254	1545
50	45	1770	125.2	0.00251	1770

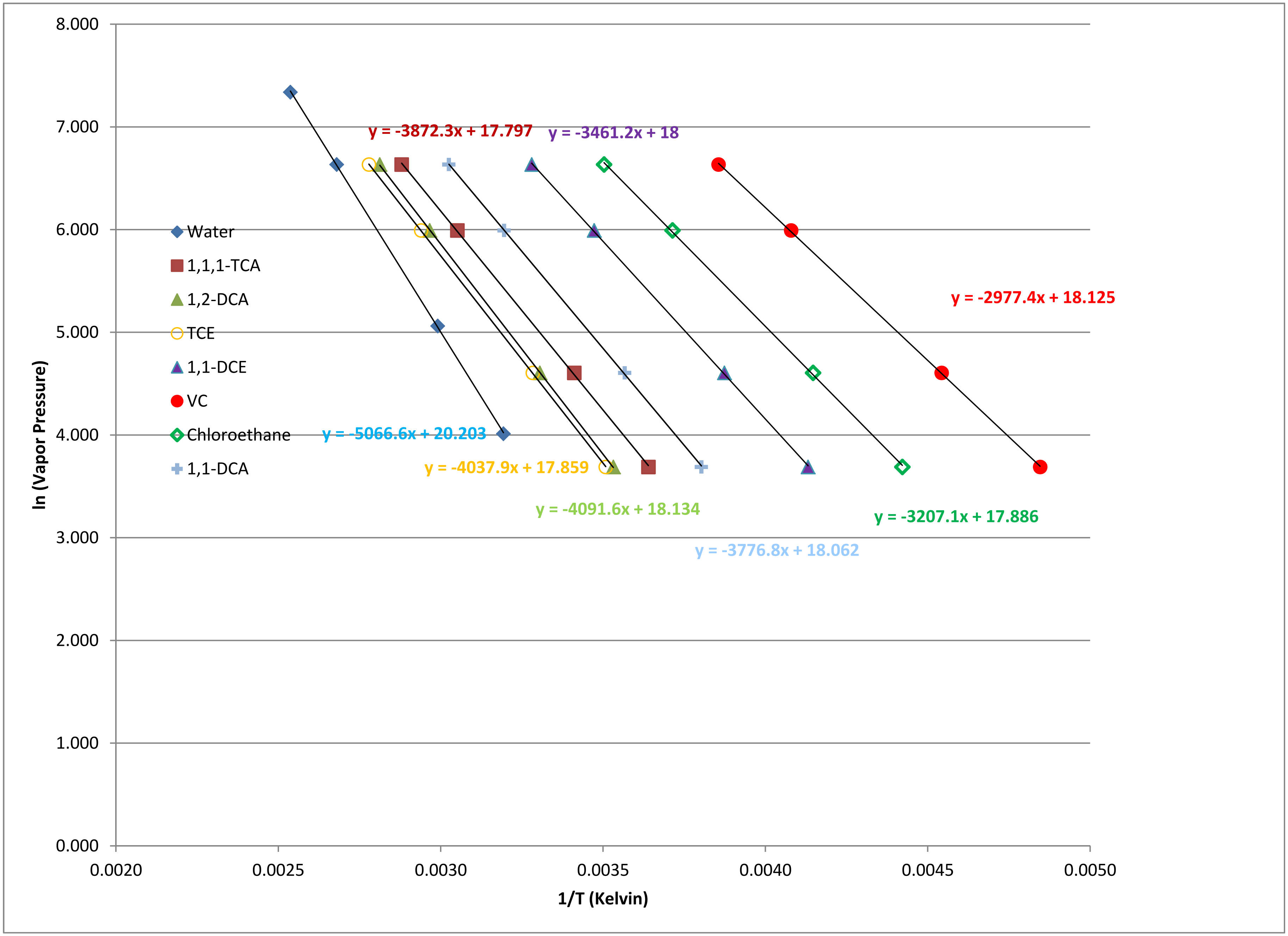
Determine 1,1,1-TCA NAPL Boiling Point Depth

Depth (ft bgs)	Depth Below Water Table (ft)	Total Pressure (mmHg)	Boiling T (C)	1/T (K)	Vapor Pressure (mmHg)
5	0	760	73.7	0.00288	760
10	5	872	78.2	0.00285	872
20	15	1097	85.7	0.00279	1097
30	25	1321	91.9	0.00274	1321
40	35	1545	97.4	0.00270	1545
50	45	1770	102.3	0.00266	1770

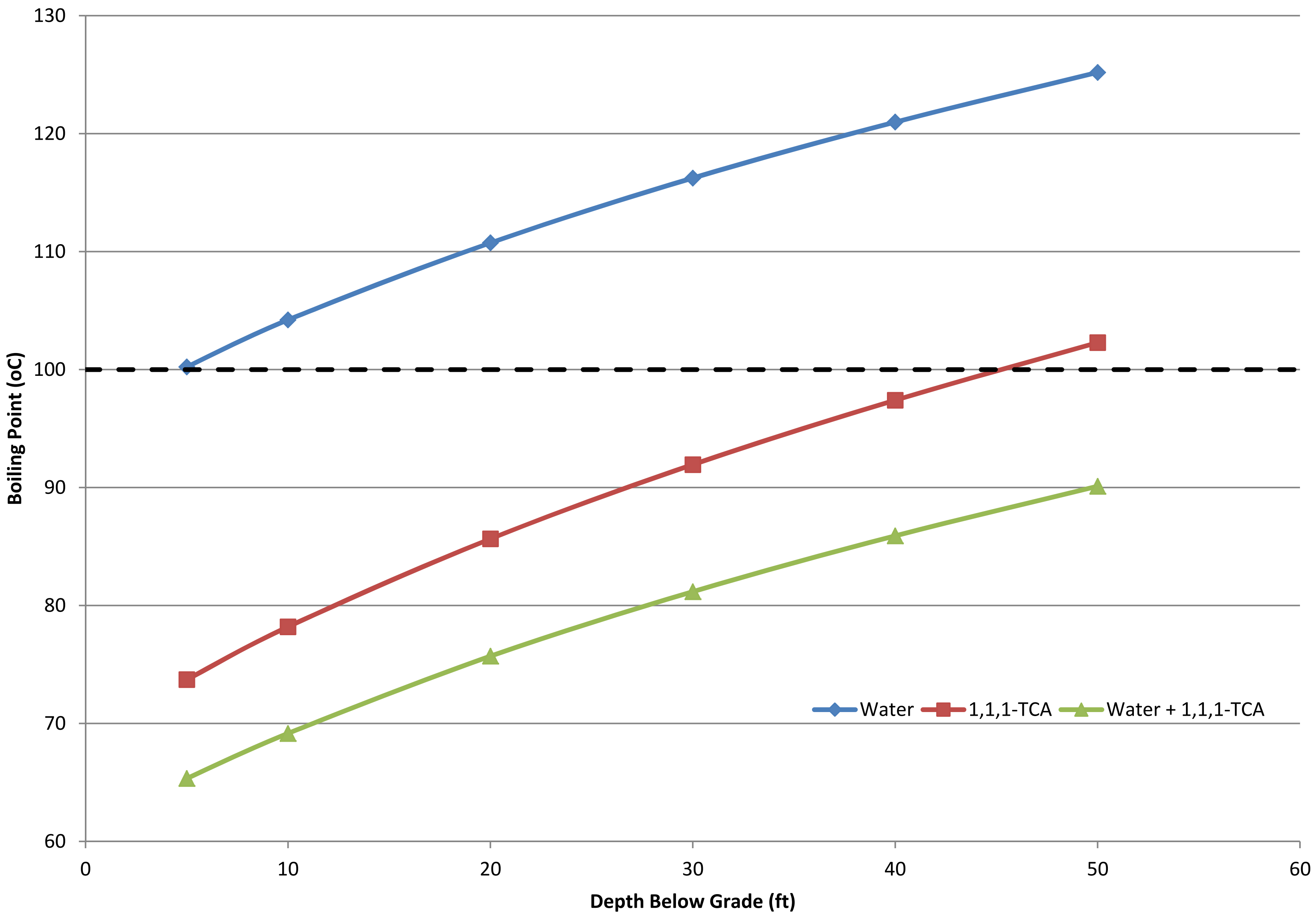
Determine Boiling Point Depth for Groundwater Mixture of 1,1,1-TCA and 1,1-DCA

These 2 VOCs constitute 85-90% of the CVOCs presen

Depth (ft bgs)	Depth Below Water Table (ft)	Total Pressure (mmHg)	T (C)	1/T (K)	Vapor Pressure (mmHg)
5	0	760	65.3	0.0030	760
10	5	872	69.2	0.00292	872
20	15	1097	75.7	0.00287	1097
30	25	1321	81.2	0.00282	1321
40	35	1545	85.9	0.00279	1545
50	45	1770	90.1	0.00275	1770



8.000
7.000
6.000
5.000
4.000
3.000
2.000
1.000
0.000
ln (Vapor Pressure)
0.0020
0.0025
0.0030
0.0035
0.0040
0.0045
0.0050
1/T (Kelvin)
◆ Water
■ 1,1,1-TCA
▲ 1,2-DCA
○ TCE
▲ 1,1-DCE
● VC
◇ Chloroethane
✚ 1,1-DCA
y = -3872.3x + 17.797
y = -3461.2x + 18
y = -2977.4x + 18.125
y = -5066.6x + 20.203
y = -4037.9x + 17.859
y = -4091.6x + 18.134
y = -3207.1x + 17.886
y = -3776.8x + 18.062


Boiling Point (oC)
130
120
110
100
90
80
70
60
0
10
20
30
40
50
60
Depth Below Grade (ft)
Water
1,1,1-TCA
Water + 1,1,1-TCA

reference (1)

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CRC Handbook of Chemistry and Physics

A Ready-Reference Book of Chemical and Physical Data

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62nd

EDITION

Editor

Robert C. Weast, Ph.D.

Formerly Vice President Research, Consolidated Natural Gas Service Company, Inc.
Formerly Professor of Chemistry at Case Institute of Technology

Associate Editor

Melvin J. Astle, Ph.D.

Formerly Professor of Organic Chemistry at Case Institute of Technology
and
Manager of Research at Glidden-Durkee Division of SCM Corporation

In collaboration with a large number of professional chemists and physicists whose assistance is acknowledged in the list of general collaborators and in connection with the particular tables or sections involved.

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Page
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VAPOR PRESSURE OF WATER BELOW 100°C

Pressure of aqueous vapor over water in mm of Hg for temperatures from −15.8 to 100°C. Values for fractional degrees between 50 and 89 were obtained by interpolation.

Temp. °C	0.0	0.2	0.4	0.6	0.8
−15	1.436	1.414	1.390	1.368	1.345
−14	1.560	1.534	1.511	1.485	1.460
−13	1.691	1.665	1.637	1.611	1.585
−12	1.834	1.804	1.776	1.748	1.720
−11	1.987	1.955	1.924	1.893	1.863
−10	2.149	2.116	2.084	2.050	2.018
− 9	2.326	2.289	2.254	2.219	2.184
− 8	2.514	2.475	2.437	2.399	2.362
− 7	2.715	2.674	2.633	2.593	2.553
− 6	2.931	2.887	2.843	2.800	2.757
− 5	3.163	3.115	3.069	3.022	2.976
− 4	3.410	3.359	3.309	3.259	3.211
− 3	3.673	3.620	3.567	3.514	3.461
− 2	3.956	3.898	3.841	3.785	3.730
− 1	4.258	4.196	4.135	4.075	4.016
− 0	4.579	4.513	4.448	4.385	4.320
0	4.579	4.647	4.715	4.785	4.855
1	4.926	4.998	5.070	5.144	5.219
2	5.294	5.370	5.447	5.525	5.605
3	5.685	5.766	5.848	5.931	6.015
4	6.101	6.187	6.274	6.363	6.453
5	6.543	6.635	6.728	6.822	6.917
6	7.013	7.111	7.209	7.309	7.411
7	7.513	7.617	7.722	7.828	7.936
8	8.045	8.155	8.267	8.380	8.494
9	8.609	8.727	8.845	8.965	9.086
10	9.209	9.333	9.458	9.585	9.714
11	9.844	9.976	10.109	10.244	10.380
12	10.518	10.658	10.799	10.941	11.085
13	11.231	11.379	11.528	11.680	11.833
14	11.987	12.144	12.302	12.462	12.624
15	12.788	12.953	13.121	13.290	13.461
16	13.634	13.809	13.987	14.166	14.347
17	14.530	14.715	14.903	15.092	15.284
18	15.477	15.673	15.871	16.071	16.272
19	16.477	16.685	16.894	17.105	17.319
20	17.535	17.753	17.974	18.197	18.422
21	18.650	18.880	19.113	19.349	19.587
22	19.827	20.070	20.316	20.565	20.815
23	21.068	21.324	21.583	21.845	22.110
24	22.377	22.648	22.922	23.198	23.476
25	23.756	24.039	24.326	24.617	24.912
26	25.209	25.509	25.812	26.117	26.426
27	26.739	27.055	27.374	27.696	28.021
28	28.349	28.680	29.015	29.354	29.697
29	30.043	30.392	30.745	31.102	31.461
30	31.824	32.191	32.561	32.934	33.312
31	33.695	34.082	34.471	34.864	35.261
32	35.663	36.068	36.477	36.891	37.308
33	37.729	38.155	38.584	39.018	39.457
34	39.898	40.344	40.796	41.251	41.710
35	42.175	42.644	43.117	43.595	44.078
36	44.563	45.054	45.549	46.050	46.556
37	47.067	47.582	48.102	48.627	49.157
38	49.692	50.231	50.774	51.323	51.879
39	52.442	53.009	53.580	54.156	54.737
40	55.324	55.91	56.51	57.11	57.72
41	58.34	58.96	59.58	60.22	60.86
42	61.50	62.14	62.80	63.46	64.12
43	64.80	65.48	66.16	66.86	67.56
44	68.26	68.97	69.69	70.41	71.14
45	71.88	72.62	73.36	74.12	74.88
46	75.65	76.43	77.21	78.00	78.80
47	79.60	80.41	81.23	82.05	82.87
48	83.71	84.56	85.42	86.28	87.14
49	88.02	88.90	89.79	90.69	91.59
50	92.51	93.5	94.4	95.3	96.3
51	97.20	98.2	99.1	100.1	101.1
52	102.09	103.1	104.1	105.1	106.2
53	107.20	108.2	109.3	110.4	111.4
54	112.51	113.6	114.7	115.8	116.9
55	118.04	119.1	120.3	121.5	122.6
56	123.80	125.0	126.2	127.4	128.6
57	129.82	131.0	132.3	133.5	134.7
58	136.08	137.3	138.5	139.9	141.2
59	142.60	143.9	145.2	146.6	148.0
60	149.38	150.7	152.1	153.5	155.0
61	156.43	157.8	159.3	160.8	162.3
62	163.77	165.2	166.8	168.3	169.8
63	171.38	172.9	174.5	176.1	177.7
64	179.31	180.9	182.5	184.2	185.8
65	187.54	189.2	190.9	192.6	194.3
66	196.09	197.8	199.5	201.3	203.1
67	204.96	206.8	208.6	210.5	212.3
68	214.17	216.0	218.0	219.9	221.8
69	223.73	225.7	227.7	229.7	231.7
70	233.7	235.7	237.7	239.7	241.8
71	243.9	246.0	248.2	250.3	252.4
72	254.6	256.8	259.0	261.2	263.4
73	265.7	268.0	270.2	272.6	274.8
74	277.2	279.4	281.8	284.2	286.6
75	289.1	291.5	294.0	296.4	298.8
76	301.4	303.8	306.4	308.9	311.4
77	314.1	316.6	319.2	322.0	324.6
78	327.3	330.0	332.8	335.6	338.2
79	341.0	343.8	346.6	349.4	352.2
80	355.1	358.0	361.0	363.8	366.8
81	369.7	372.6	375.6	378.8	381.8
82	384.9	388.0	391.2	394.4	397.4
83	400.6	403.8	407.0	410.2	413.6
84	416.8	420.2	423.6	426.8	430.2
85	433.6	437.0	440.4	444.0	447.5
86	450.9	454.4	458.0	461.6	465.2
87	468.7	472.4	476.0	479.8	483.4
88	487.1	491.0	494.7	498.5	502.2
89	506.1	510.0	513.9	517.8	521.8
90	525.76	529.77	533.80	537.86	541.95
91	546.05	550.18	554.35	558.53	562.75
92	566.99	571.26	575.55	579.87	584.22
93	588.60	593.00	597.43	601.89	606.38
94	610.90	615.44	620.01	624.61	629.24
95	633.90	638.59	643.30	648.05	652.82
96	657.62	662.45	667.31	672.20	677.12
97	682.07	687.04	692.05	697.10	702.17
98	707.27	712.40	717.56	722.75	727.98
99	733.24	738.53	743.85	749.20	754.58
100	760.00	765.45	770.93	776.44	782.00
101	787.57	793.18	798.82	804.50	810.21

Temp. °C	m
100	760
101	787
102	815
103	845
104	875
105	906
106	937
107	970
108	1004.
109	1038.
110	1074.
111	1111.
112	1148.
113	1187.
114	1227.
115	1267.
116	1309.
117	1352.
118	1397.
119	1442.
120	1489.
121	1536.
122	1586.
123	1636.
124	1687.
125	1740.
126	1795.
127	1850.
128	1907.
129	1966.
130	2026.
131	2087.
132	2150.
133	2214.
134	2280.
135	2347.
136	2416.
137	2488.
138	2560.
139	2634.
140	2710.
141	2788.
142	2867.
143	2948
144	3031.
145	3116.
146	3203.
147	3292.
148	3382.
149	3476.
150	3570.
151	3667.
152	3766.
153	3866.
154	3970.
155	4075.
156	4183.
157	4293.
158	4404.
159	4519.
160	4636.
161	4755.
162	4876.
163	5000.
164	5126.
165	5256.
166	5386.
167	5521.
168	5658.
169	5798.

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VAPOR PRESSURE OF WATER ABOVE 100° C.

Based on values given by Keyes in the International Critical Tables.

Temp. °C	Pressure		Temp. °F	Temp. °C	Pressure		Temp. °F	Temp °C	Pressure		Temp. °F	Temp. °C	Pressure		Temp. °F
	mm	Pounds per sq. in.			mm	Pounds per sq. in.			mm	Pounds per sq. in.			mm	Pounds per sq. in.	
100	760.	14.696	212.0	170	5940.92	114.879	338.0	240	25100.52	485.365	464.0	310	74024.00	1431.390	590.0
101	787.51	15.228	213.8	171	6085.32	117.671	339.8	241	25543.60	493.933	465.8	311	75042.40	1451.083	591.8
102	815.86	15.776	215.6	172	6233.52	120.537	341.6	242	25994.28	502.647	467.6	312	76076.00	1471.070	593.6
103	845.12	16.342	217.4	173	6383.24	123.432	343.4	243	26449.52	511.450	469.4	313	77117.20	1491.203	595.4
104	875.06	16.921	219.2	174	6538.28	126.430	345.2	244	26912.36	520.400	471.2	314	78166.00	1511.484	597.2
105	906.07	17.521	221.0	175	6694.08	129.442	347.0	245	27381.28	529.467	473.0	315	79230.00	1532.058	599.0
106	937.92	18.136	222.8	176	6852.92	132.514	348.8	246	27855.52	538.638	474.8	316	80294.00	1552.632	600.8
107	970.60	18.768	224.6	177	7015.56	135.659	350.6	247	28335.84	547.926	476.6	317	81373.20	1573.501	602.6
108	1004.42	19.422	226.4	178	7180.48	138.848	352.4	248	28823.76	557.360	478.4	318	82467.60	1594.663	604.4
109	1038.92	20.089	228.2	179	7349.20	142.110	354.2	249	29317.00	566.898	480.2	319	83569.60	1615.972	606.2
110	1074.56	20.779	230.0	180	7520.20	145.417	356.0	250	29817.84	576.583	482.0	320	84686.80	1637.575	608.0
111	1111.20	21.487	231.8	181	7694.24	148.782	357.8	251	30324.00	586.370	483.8	321	85819.20	1659.472	609.8
112	1148.74	22.213	233.6	182	7872.08	152.221	359.6	252	30837.76	596.305	485.6	322	86959.20	1681.516	611.6
113	1187.42	22.961	235.4	183	8052.96	155.719	361.4	253	31356.84	606.342	487.4	323	88114.40	1703.854	613.4
114	1227.25	23.731	237.2	184	8236.88	159.275	363.2	254	31885.04	616.556	489.2	324	89277.20	1726.339	615.2
115	1267.98	24.519	239.0	185	8423.84	162.890	365.0	255	32417.80	626.858	491.0	325	90447.60	1748.971	617.0
116	1309.94	25.330	240.8	186	8616.12	166.609	366.8	256	32957.40	637.292	492.8	326	91633.20	1771.897	618.8
117	1352.95	26.162	242.6	187	8809.92	170.356	368.6	257	33505.36	647.888	494.6	327	92826.40	1794.969	620.6
118	1397.18	27.017	244.4	188	9007.52	174.177	370.4	258	34059.40	658.601	496.4	328	94042.40	1818.483	622.4
119	1442.63	27.896	246.2	189	9208.16	178.057	372.2	259	34618.76	669.417	498.2	329	95273.60	1842.291	624.2
120	1489.14	28.795	248.0	190	9413.36	182.025	374.0	260	35188.00	680.425	500.0	330	96512.40	1866.245	626.0
121	1536.80	29.717	249.8	191	9620.08	186.022	375.8	261	35761.80	691.520	501.8	331	97758.80	1890.346	627.8
122	1586.04	30.669	251.6	192	9831.36	190.107	377.6	262	36343.20	702.763	503.6	332	99020.40	1914.742	629.6
123	1636.36	31.642	253.4	193	10047.20	194.281	379.4	263	36932.20	714.152	505.4	333	100297.20	1939.431	631.4
124	1687.81	32.637	255.2	194	10265.32	198.499	381.2	264	37529.56	725.703	507.2	334	101581.60	1964.267	633.2
125	1740.93	33.664	257.0	195	10488.76	202.819	383.0	265	38133.00	737.372	509.0	335	102881.20	1989.398	635.0
126	1795.12	34.712	258.8	196	10715.24	207.199	384.8	266	38742.52	749.158	510.8	336	104196.00	2014.822	636.8
127	1850.83	35.789	260.6	197	10944.76	211.637	386.6	267	39361.92	761.135	512.6	337	105526.00	2040.540	638.6
128	1907.83	36.891	262.4	198	11179.60	216.178	388.4	268	39986.64	773.215	514.4	338	106871.20	2066.552	640.4
129	1966.35	38.023	264.2	199	11417.48	220.778	390.2	269	40619.72	785.457	516.2	339	108224.00	2092.710	642.2
130	2026.16	39.180	266.0	200	11659.16	225.451	392.0	270	41261.16	797.861	518.0	340	109592.00	2119.163	644.0
131	2087.42	40.364	267.8	201	11905.40	230.213	393.8	271	41910.20	810.411	519.8	341	110967.60	2145.763	645.8
132	2150.42	41.582	269.6	202	12155.44	235.048	395.6	272	42566.08	823.094	521.6	342	112358.40	2172.657	647.6
133	2214.64	42.824	271.4	203	12408.52	239.942	397.4	273	43229.56	835.923	523.4	343	113749.20	2199.550	649.4
134	2280.76	44.103	273.2	204	12666.16	244.924	399.2	274	43902.16	848.929	525.2	344	115178.00	2227.179	651.2
135	2347.26	45.389	275.0	205	12929.12	250.008	401.0	275	44580.84	862.053	527.0	345	116614.40	2254.954	653.0
136	2416.34	46.724	276.8	206	13197.40	255.196	402.8	276	45269.40	875.367	528.8	346	118073.60	2283.171	654.8
137	2488.16	48.113	278.6	207	13467.96	260.428	404.6	277	45964.04	888.799	530.6	347	119532.80	2311.387	656.6
138	2560.67	49.515	280.4	208	13742.32	265.733	406.4	278	46669.32	902.437	532.4	348	121014.80	2340.044	658.4
139	2634.84	50.950	282.2	209	14022.76	271.156	408.2	279	47382.20	916.222	534.2	349	122504.40	2368.848	660.2
140	2710.92	52.421	284.0	210	14305.48	276.623	410.0	280	48104.20	930.183	536.0	350	124001.60	2397.799	662.0
141	2788.44	53.920	285.8	211	14595.04	282.222	411.8	281	48833.80	944.291	537.8	351	125521.60	2427.191	663.8
142	2867.48	55.448	287.6	212	14888.40	287.895	413.6	282	49570.24	958.532	539.6	352	127049.20	2456.730	665.6
143	2948.80	57.020	289.4	213	15184.80	293.626	415.4	283	50316.56	972.963	541.4	353	128599.60	2486.710	667.4
144	3031.64	58.622	291.2	214	15488.04	299.490	417.2	284	51072.76	987.586	543.2	354	130157.60	2516.837	669.2
145	3116.76	60.268	293.0	215	15792.80	305.383	419.0	285	51838.08	1002.385	545.0	355	131730.80	2547.258	671.0
146	3203.40	61.944	294.8	216	16104.40	311.408	420.8	286	52611.76	1017.345	546.8	356	133326.80	2578.119	672.8
147	3292.32	63.663	296.6	217	16420.56	317.522	422.6	287	53395.32	1032.497	548.6	357	134945.60	2609.422	674.6
148	3382.76	65.412	298.4	218	16742.04	323.738	424.4	288	54187.24	1047.810	550.4	358	136579.60	2641.018	676.4
149	3476.24	67.220	300.2	219	17067.32	330.028	426.2	289	54989.04	1063.314	552.2	359	138228.80	2672.908	678.2
150	3570.48	69.042	302.0	220	17395.64	336.377	428.0	290	55799.20	1078.980	554.0	360	139893.20	2705.093	680.0
151	3667.00	70.908	303.8	221	17731.56	342.872	429.8	291	56612.40	1094.705	555.8	361	141572.80	2737.571	681.8
152	3766.56	72.833	305.6	222	18072.80	349.471	431.6	292	57448.40	1110.871	557.6	362	143275.20	2770.490	683.6
153	3866.88	74.773	307.4	223	18417.84	356.143	433.4	293	58284.40	1127.036	559.4	363	144992.80	2803.703	685.4
154	3970.24	76.772	309.2	224	18766.68	362.888	435.2	294	59135.60	1143.496	561.2	364	146733.20	2837.357	687.2
155	4075.88	78.815	311.0	225	19123.12	369.781	437.0	295	59994.40	1160.102	563.0	365	148519.20	2871.892	689.0
156	4183.80	80.901	312.8	226	19482.60	376.732	438.8	296	60860.80	1176.856	564.8	366	150320.40	2906.722	690.8
157	4293.24	83.018	314.6	227	19848.92	383.815	440.6	297	61742.40	1193.903	566.6	367	152129.20	2941.698	692.6
158	4404.96	85.178	316.4	228	20219.80	390.987	442.4	298	62624.00	1210.950	568.4	368	153960.80	2977.116	694.4
159	4519.72	87.397	318.2	229	20596.76	398.276	444.2	299	63528.40	1228.439	570.2	369	155815.20	3012.974	696.2
160	4636.00	89.646	320.0	230	20978.28	405.654	446.0	300	64432.80	1245.927	572.0	370	157692.40	3049.273	698.0
161	4755.32	91.953	321.8	231	21365.12	413.134	447.8	301	65352.40	1263.709	573.8	371	159584.80	3085.866	699.8
162	4876.92	94.304	323.6	232	21757.28	420.717	449.6	302	66279.60	1281.638	575.6	372	161507.60	3123.047	701.6
163	5000.04	96.685	325.4	233	22154.00	428.388	451.4	303	67214.40	1299.714	577.4	373	163468.40	3160.963	703.4
164	5126.96	99.139	327.2	234	22558.32	436.207	453.2	304	68156.80	1317.937	579.2	374	165467.20	3199.613	705.2
165	5256.16	101.638	329.0	235	22967.96	444.128	455.0	305	69114.40	1336.454	581.0				
166	5386.88	104.165	330.8	236	23382.92	452.152	456.8	306	70072.00	1354.971	582.8				
167	5521.40	106.766	332.6	237	23802.44	460.264	458.6	307	71052.40	1373.929	584.6				
168	5658.20	109.412	334.4	238	24229.56	468.523	460.4	308	72048.00	1393.181	586.4				
169	5798.04	112.116	336.2	239	24661.24	476.871	462.2	309	73028.40	1412.139	588.2				

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ORGANIC COMPOUNDS

Pressures Less than One Atmosphere (Continued)

Name	Formula	Temperature °C						M.P.
		1 mm	10 mm	40 mm	100 mm	400 mm	760 mm	
2-Methyldisilazane	CH_9NSi_2	−76.3	−50.1	−29.6	−13.1	+17.2	34.0	—
Cyanogen iodide	CIN	25.2s	57.7s	80.3s	97.6s	126.1s	141.1s	—
Tetranitromethane	CN_4O_8	s	22.7	48.4	68.9	105.9	125.7d	13
Carbon monoxide	CO	−222.0s	−215.0s	−210.0s	−205.7s	−196.3	−191.3	−205.0
Carbonyl sulfide	COS	−132.4	−113.3	−98.3	−85.9	−62.7	−49.9	−138.8
Carbonyl selenide	COSe	−117.1	−95.0	−76.4	−61.7	−35.6	−21.9	—
Carbon dioxide	CO_2	−134.3s	−119.5s	−108.6s	−100.2s	−85.7s	−78.2s	−57.5
Carbon Selenosulfide	CSSe	−47.3	−16.0	+8.6	28.3	65.2	85.6	−75.2
Carbon disulfide	CS_2	−73.8	−44.7	−22.5	−5.1	+28.0	46.5	−110.8
Trichloroacetyl bromide	C_2BrCl_3O	−7.4	+29.3	57.2	79.5	120.2	143.0	—
1-Chloro-1,2,2-trifluoroethylene	C_2ClF_3	−116.0	−95.9	−79.7	−66.7	−41.7	−27.9	−157.5
1,2-Dichloro-1,2-difluoroethylene	$C_2Cl_2F_2$	−82.0	−57.3	−38.2	−23.0	+5.0	20.9	−112
1,2-Dichloro-1,1,2,2-tetrafluoroethane	$C_2Cl_2F_4$	−95.4	−72.3	−53.7	−39.1	−12.0	+3.5	−94
1,1,2-Trichloro-1,2,2-trifluoroethane	$C_2Cl_3F_3$	−68.0s	40.3s	−18.5	−1.7	+30.2	47.6	−35
Tetrachloroethylene	C_2Cl_4	−20.6s	+13.8	40.1	61.3	100.0	120.8	−19.0
1,1,2,2-Tetrachloro-1,2-difluoroethane	$C_2Cl_4F_2$	−37.5s	−5.0s	+19.8s	38.6	73.1	92.0	26.5
Hexachloroethane	C_2Cl_6	32.7s	73.5s	102.3s	124.2s	163.8s	185.6s	186.6
Tribromoacetaldehyde	C_2HBr_3O	18.5	58.0	87.8	110.2	151.6	174.0d	—
Trichloroethylene	C_2HCl_3	−43.8	−12.4	+11.9	31.4	67.0	86.7	−73
Trichloroacetaldehyde	C_2HCl_3O	−37.8	−5.0	20.2	40.2	77.5	97.7	−57
Trichloroacetic acid	$C_2HCl_3O_2$	51.0s	88.2	116.3	137.8	175.2	195.6	57
Pentachloroethane	C_2HCl_5	+1.0	39.8	69.9	93.5	137.2	160.5	−22
Acetylene	C_2H_2	−142.9s	−128.2s	−116.7s	−2107.9s	−92.0s	−84.0s	−81.5
1,1,1,2-Tetrabomoethane	$C_2H_2Br_4$	58.0	95.7	123.2	144.0	181.0	200.0d	—
1,1,2,2-Tetrabromoethane	$C_2H_2Br_4$	65.0	110.0	144.0	170.0	217.5	243.5	—
cis-1,2-Dichloroethylene	$C_2H_2Cl_2$	−58.4	−29.9	−7.9	+9.5	41.0	59.0	−80.5
trans-1,2-Dichloroethylene	$C_3H_2Cl_2$	−65.4s	−38.0	−17.0	−0.2	+30.8	47.8	−50.0
1,1-Dichloroethane	$C_2H_2Cl_2$	−77.2	−51.2	−31.1	−15.0	+14.8	31.7	−122.5
Dichloroacetic acid	$C_2H_2Cl_2O_2$	44.0	82.6	111.8	134.0	173.7	194.4	9.7
1,1,1,2-Tetrachloroethane	$C_2H_2Cl_4$	−16.3	+19.3	46.7	68.0	108.2	130.5	−68.7
1,1,2,2-Tetrachloroethane	$C_2H_2\ Cl_4$	−3.8	+33.0	60.8	83.2	124.0	145.9	−36
1-Bromoethylene	C_2H_3Br	−95.4	−68.8	−48.1	−31.9	−1.1	+15.8	−138
Bromoacetic acid	$C_2H_3BrO_2$	54.7	94.1	124.0	146.3	186.7	208.0	49.5
1,1,2-Tribromoethane	$C_2H_3Br_3$	32.6	70.6	100.0	123.5	165.4	188.4	−26
1-Chloroethylene	C_2H_3Cl	−105.6	−83.7	−66.8	−53.2	−28.0	−13.8	−153.7
Chloroacetic acid	$C_2H_3ClO_2$	43.0s	81.0	109.2	130.7	169.0	189.5	61.2
1,1,1-Trichloroethane	$C_2H_3Cl_3$	−52.0	−21.9	+1.6	20.0	54.6	74.1	−30.6
1,1,2-Trichloroethane	$C_2H_3Cl_3$	−24.0	+8.3	35.2	55.7	93.0	113.9	−36.7
Trichloroacetaldehyde hydrate	$C_2H_3Cl_3O_2$	−9.8s	+19.5s	39.7s	55.0	82.1	96.2d	51.7
1-Fluoroethylene	C_2H_3F	−149.3	−132.2	−118.0	−106.2	−84.0	−72.2	−160.5
Acetonitrile	C_2H_3N	−47.0s	−16.3	+7.7	27.0	62.5	81.8	−41
Methyl thiocyanate	C_2H_3NS	−14.0	+21.6	49.0	70.4	110.8	132.9	−51
Methyl isothiocyanate	C_2H_3NS	−34.7s	+5.4s	38.2	59.3	97.8	119.0	35.5
Ethylene	C_2H_4	−168.3	−153.2	−141.3	−131.8	−113.9	−103.7	−169
1-Bromo-1-chloroethane	C_2H_4BrCl	−36.0s	−9.4s	+10.4s	28.0	63.4	82.7	16.6
1-Bromo-2-chloroethane	C_2H_4BrCl	−28.8s	+4.1	29.7	49.5	86.0	106.7	−16.6
1,2-Dibromoethane	$C_2H_4Br_2$	−27.0s	+18.6	48.0	70.4	110.1	131.5	10
1,1-Dichloroethane	$C_2H_4Cl_2$	−60.7	−32.3	−10.2	+7.2	39.8	57.4	−96.7
1,2-Dichloroethane	$C_2H_4Cl_2$	−44.5s	−13.6	+10.0	29.4	64.0	82.4	−35.3
1,1-Difluoroethane	$C_2H_4F_2$	−112.5	−91.7	−75.8	−63.2	−39.5	−26.5	−117
Acetaldehyde	C_2H_4O	−81.5	−56.8	−37.8	−22.6	+4.9	20.2	−123.5
Ethylene oxide	C_2H_4O	−89.7	−65.7	−46.9	−32.1	−4.9	+10.7	−111.3
Acetic acid	$C_2H_4O_2$	−17.2s	+17.5	43.0	63.0	99.0	118.1	16.7
Methyl formate	$C_2H_4O_2$	−74.2	−48.6	−28.7	−12.9	16.0	32.0	−99.8
Mercaptoacetic acid	$C_2H_4O_2S$	−60.0	101.5	131.8	154.0d	—	—	−16.5
Ethyl bromide	C_2H_5Br	−74.3	−47.5	−26.7	−10.0	+21.0	38.4	−117.8
Ethyl chloride	C_2H_5Cl	−89.8	−65.8	−47.0	−32.0	−3.9	+12.3	−139
2-Chloroethanol	C_2H_5ClO	−4.0	+30.3	56.0	75.0	110.0	128.8	−69
Trichloroethylsilane	$C_2H_5Cl_3Si$	−27.9	+3.6	27.9	46.3	80.3	99.5	−40
Trichloroethyoxysilane	$C_2H_5Cl_3OSi$	−32.4	0.0	+25.3	45.2	82.2	102.4	—
Ethyl fluoride	C_2H_5F	−117.0	−97.7	−81.8	−69.3	−45.5	−32.0	—
Ethyltrifluorosilane	$C_2H_5F_3Si$	−95.4	−73.7	−56.8	−43.6	−19.1	−5.4	—
Ethyl Iodide	C_2H_5I	−54.4	−24.3	−0.9	+18.0	52.3	72.4	−105
Acetamide	C_2H_5NO	65.0s	105.0	135.8	158.0	200.0	222.0	81
Acetaldoxime	C_2H_5NO	−5.8s	+25.8	48.6	66.2	98.0	115.0	47
Nitroethane	$C_2H_5NO_2$	−21.0	+12.5	38.0	57.8	94.0	114.0	−90
Di(nitrosomethyl)amine	$C_2H_5N_3O_2$	+3.2	40.0	68.2	90.3	131.3	153.0	—
Ethane	C_2H_6	−159.5	−142.9	−129.8	−119.3	−99.7	−88.6	−183.2
Dichlorodimethylsilane	$C_2H_6Cl_2Si$	−53.5	−23.8	−0.4	+17.5	51.9	70.3	−86.0
Ethanol	C_2H_6O	−31.3	−2.3	+19.0	34.9	63.5	78.4	−112
Dimethyl ether	C_2H_6O	−115.7	−93.3	−76.2	−62.7	−37.8	−23.7	−138.5
1,2-Ethanediol	$C_2H_6O_2$	53.0	92.1	120.0	141.8	178.5	197.3	−15.6
Dimethyl sulfide	C_2H_6S	−75.6	−49.2	−28.4	−12.0	+18.7	36.0	−83.2
Ethanethiol	C_2H_6S	−76.7	−50.2	−29.8	−13.0	+17.7	35.5	−121
Dimethylantimony	C_2H_6Sb	44.0	86.0	118.3	143.5	187.2	211.0	—
Ethylamine	C_2H_7N	−82.3s	−58.3	−39.8	−25.1	+2.0	16.6	−80.6
Dimethylamine	C_2H_7N	−87.7	−64.6	−46.7	−32.6	−7.1	+7.4	−96
1,2-Ethanediamine	$C_2H_8N_2$	−11.0s	+21.5	45.8	62.5	99.0	117.2	8.5
Dimethylsilane	C_2H_8Si	−115.0	−93.1	−75.7	−61.4	−35.0	−20.1	—
Dimethyldiborane	$C_2H_{10}B_2$	−106.5	−82.1	−62.4	−47.0	−18.8	−2.6	−150.2
2-Ethyldisilazane	$C_2H_{11}NSi_2$	−62.0	−32.2	−8.3	+10.4	45.9	65.9	−127

Treatment Duration Calculation (Time to boil off pore wter)

Calculation Summary: Estimate time to completely boil off pore water via in-situ thermal treatment

Assume heating elements 20-ft apart, therefore, r = 10 ft

Area = 314 SF

29.2 m2

$$t_b = \frac{A\left\{\left[\rho_R C_R (1-\phi) + \rho_w C_w \phi S_w\right](T_b - T_i) + \rho_w h_w \phi S_w\right\}}{\beta}$$

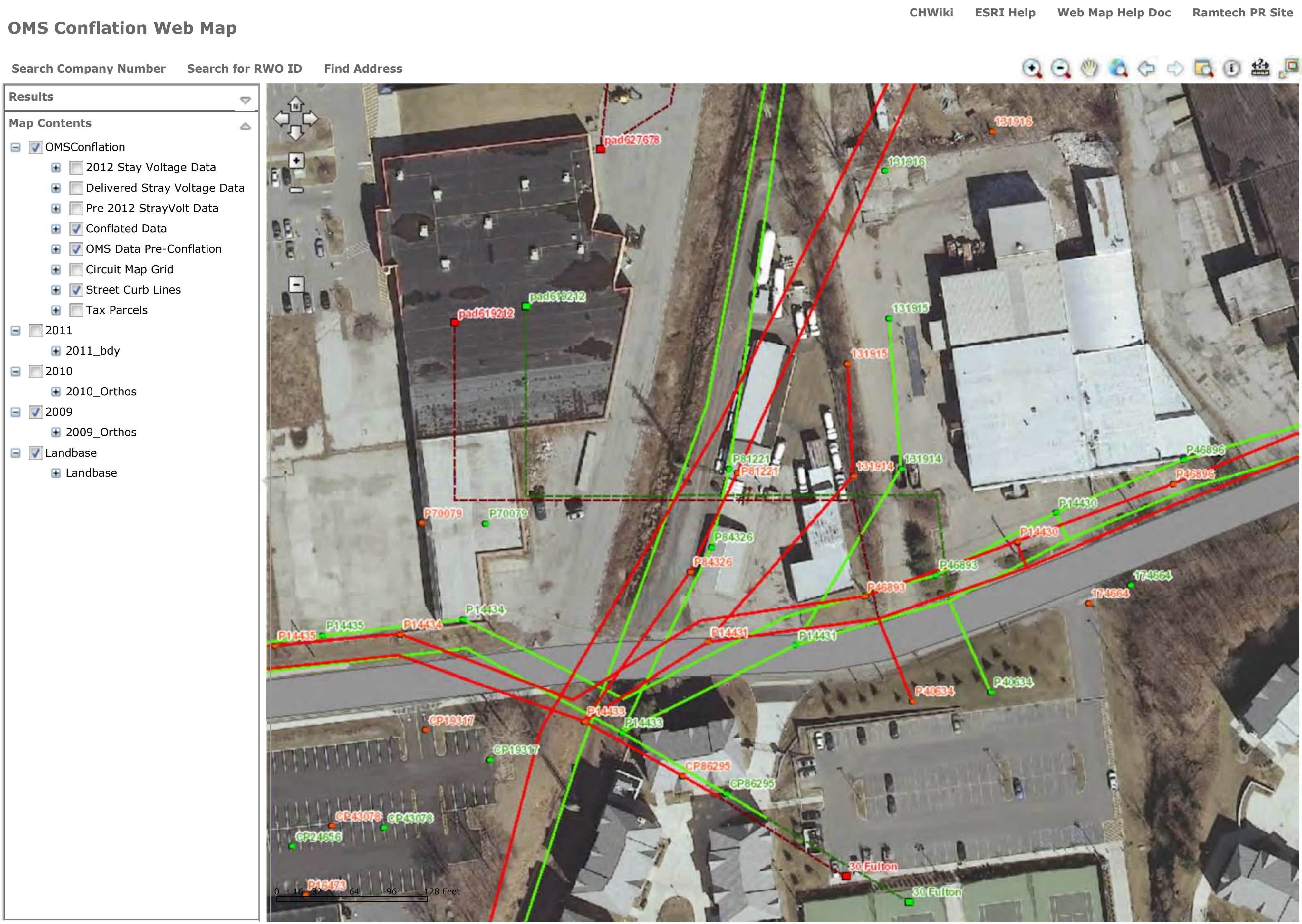
		value	unit	
ρ_R	=	2.65E+06	g/m3	density
C_R	=	1.211E-05	(W*day*C)/g	heat capacity
ϕ	=	0.3		typical porosity value
ρ_W	=	1.00E+06	g/m3	density of water
C_W	=	4.85E-05	(W*day*C)/g	heat capacity of water
S_W	=	0.6		typical water saturation
T_b	=	100	deg C	boiling point of water
T_i	=	10	deg C	typical initial temp value for near-surface soil
h_W	=	0.0261	(W day)/g	latent heat of vaporization of water at atmospheric pressure
β	=	984.2	W/m	average power input per unit length of thermal condition well
A	=	29.2	m2	Area heated by each well (assume 20' spacing)
t_b	=	223	days	treatment duration

site-specific input value

t_b 222.6

Appendix K

Utility Service Maps



OMS Conflation Web Map

Map Contents

- ⊟ ☑ OMSConflation
  - ⊞ ☐ 2012 Stay Voltage Data
  - ⊞ ☐ Delivered Stray Voltage Data
  - ⊞ ☐ Pre 2012 StrayVolt Data
  - ⊞ ☑ Conflated Data
  - ⊞ ☑ OMS Data Pre-Conflation
  - ⊞ ☐ Circuit Map Grid
  - ⊞ ☑ Street Curb Lines
  - ⊞ ☐ Tax Parcels
- ⊟ ☐ 2011
  - ⊞ 2011_bdy
- ⊟ ☐ 2010
  - ⊞ 2010_Orthos
- ⊟ ☑ 2009
  - ⊞ 2009_Orthos
- ⊟ ☑ Landbase
  - ⊞ Landbase

Notes: Points with "P####" are our utility pole numbers
"pad####" documents a padmount transformer
Both circuit (green and red) are 3 phase

2/15/2013

CHWiki How to use the Map ESRI Help Doc

CHG&E Gas Mapping Application

Find Address Find Regulator Station Find A Valve Find Service by Image Find: Test Station Print Map Buffer Points

Results

- ☑ **15 fulton st, poughkepsie, ny (1)**
  - ☑ 15 FULTON AVE, POUGHKEEPSIE, N

Map Contents

- ☐ Potential Customer HotSpot Analysis
  - ☑ Customers Without Gas
  - ☑ 100ft Customer Count by Main
- ☑ Gas
  - ☐ Map Reference
  - ☐ Leaks
  - ☑ Gas Transmission
  - ☑ Gas Distribution
- ☐ TaxParcels
  - ☑ Tax Parcels
- ☐ 2011 Imagery
  - 2011_bdy
- ☐ 2010 Imagery
  - 2010_Orthos
- ☑ 2009 Imagery
  - 2009_Orthos
- ☑ Landbase
  - Landbase

Length of black line = 345'

4" Plastic Main
14.5 psig

Appendix L

Community Air Monitoring Plan (CAMP) Guidance

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

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