New York State Department of Environmental Conservation

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Periodic Review Report Gladding Cordage Site

Site Number 7-09-009

New York State Department of
Environmental Conservation
Work Assignment D004443-5

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1. Executive Summary

The Gladding Cordage site is located in South Otselic, New York, along the western bank of the Otselic River. Gladding Cordage is the site of a braided wire and rope manufacturing facility, where past disposal practices of solvents resulted in the contamination of local groundwater with volatile organic compounds (VOCs) including 1,1,1-Trichloroethane (TCA). Treatment plant operation and maintenance activities are currently performed in accordance with a New York State Department of Environmental Conservation (NYSDEC) - approved Work Plan. Work Plan documents and monitoring data were reviewed to evaluate if the current operational, maintenance, and monitoring programs provide the appropriate levels of performance, effectiveness, and protectiveness as required for the remedy. Historical data were evaluated and field observations were made to provide additional information related to the effectiveness of the air stripping facility.

Based on review the available data, Corrective Measures (CMs) are recommended to increase the number of wells sampled for annual monitoring, survey groundwater monitoring wells, repair the treatment plant controls, and replace existing Work Plan documents with a Site Management Plan (SMP). A budget analysis indicates that sufficient funds are available to complete the existing Work Assignment and implement the recommendations of the Periodic Review (PR). A one year field-oversight PR evaluation is being recommended to assess the CMs.

2. Site Overview

2.1. Site Description

The Gladding Cordage site is located on Ridge Road, in South Otselic, Chenango County, New York (Figure 2-1), along the western bank of the Otselic River. The site consists of a braided wire and rope manufacturing facility.

2.2. Site History

Gladding Cordage is the site of a braided wire and rope manufacturing facility, in operation since 1892, where past disposal practices of solvents resulted in the contamination of local groundwater with VOCs. Site investigations were initiated in 1986 when the NYSDEC responded to a complaint of red dye in the Otselic River. Initial investigations confirmed improper storage and disposal of hazardous wastes at the site, and the presence of VOCs in on-site groundwater.

A Remedial Investigation/Feasibility Study (RI/FS) as initiated in May of 1988, with fieldwork being completed in 1989. A Record of Decision (ROD) was signed on March 31, 1993. The ROD required the extraction and treatment of contaminated groundwater. Construction of an on-site groundwater treatment system was completed in 1996. The groundwater is recovered from two extraction wells and treated utilizing an on-site air stripper to remove VOCs. After treatment, the effluent is discharged to the Otselic River.

3. Remedy Evaluation

Site work has been completed and/or implemented in accordance with the March 31, 1993 ROD. Monitoring activities are currently performed in accordance with a NYSDEC-approved Work Plan (Malcolm Pirnie, 2007). The Work Plan includes an Operation and Maintenance (O&M) Plan and Groundwater Monitoring Plan, and Health and Safety Plan (HASP) (Appendix A). No SMP exists for the Gladding Cordage site.

3.1. O&M Plan

The existing O&M program includes the operation and maintenance of the treatment plant in accordance with the Operation and Maintenance Manual, Volume I, Gladding Cordage Site, Site 7-09-009, TAMS Consultants, Inc., 1996) (O&M Manual) (Appendix B).

O&M for the existing treatment system is provided for the following major components:

- Groundwater recovery wells RW-1 and RW-2;
- Shallow tray air stripper;
- Air stripper blower motor; and
- Automated control system.

At the request of NYSDEC, a variable frequency drive (VFD) was installed to regulate the speed of the air stripper blower motor and provide the potential for future energy savings. The VFD was installed on January 8, 2008. Based electrical usage measured following the installation, the VFD may reduce electricity demand for the blower by up to 68% when operated at 44 HZ (Malcolm Pirnie, 2008). Noise data were monitored following the VFD installation to evaluate reductions in sound pressure levels with the air stripper blower operating at reduced frequencies. With the blower operating at full speed (60 HZ) the sound pressure level was measured at 91.5 decibels A weighted scale (dBA). The sound pressure level measured at 44 HZ (the current VFD setting) was 85.5 dBA.

Although all of the corresponding manufacturer O&M procedures and specifications have been appended to the O&M Plan, revised O&M procedures for newly installed components have not been formally updated in the text.

Recovery well pump and air stripper blower operation, as well as a sump level were designed to be monitored remotely via an automated control system. The system could

monitor well pump and blower operation and relay a set of pre-recorded system faults to a remote location utilizing an automatic dial feature. If a leak were present in system, water was designed to flow into a sump located in the treatment system building. When the level in the sump increased, a float switch would detect the rise and turn off the treatment system. Currently, the automatic dial system is not functional so the system is contacted remotely on a daily basis (business days only). If a fault is reported when the system is contacted, Malcolm Pirnie responds to the site to investigate and/or repair the issue. Currently, when a power outage causes the groundwater treatment system to shut down, a site visit is required to manually re-start the system.

The O&M program includes monthly influent/effluent sampling and analysis of the treatment system for Target Compound List (TCL) VOCs by USEPA Method 8260. The influent and effluent monitoring is conducted to measure the influent VOC concentrations in the groundwater and to monitor the contaminant removal efficiency of the air stripper system.

3.1.1. O&M Plan Compliance

Currently, all O&M activities are being performed in accordance with O&M Manual and Work Plan. O&M for recently upgraded equipment are performed in accordance with the corresponding manufacturer's recommendations.

3.1.1.1. O&M Summary

The following provides a summary of O&M activities completed at the Gladding Cordage site since 2007.

2007

On August 23, 2007, NYSDEC provided a training session to Malcolm Pirnie personnel concerning O&M of the groundwater treatment plant at the Gladding Cordage Site. Since then, Malcolm Pirnie has maintained operation of the groundwater treatment plant in accordance with the O&M Manual and as indicated in Section 3.1. In 2007, the groundwater treatment system operated with only minor interruption during the third quarter and was shut down only to perform routine maintenance and to calibrate the digital flow meter for recovery well RW-2. At the request of NYSDEC, locks on all of the groundwater monitoring wells were replaced with new keyed-alike locks and a lock-box was installed on the exterior wall of the treatment system building to secure entry keys for the treatment system building.

In the fourth quarter of 2007, based on conditions noted during the third quarter groundwater monitoring event, flush-mount protective well casings for monitoring wells TW-4I, TW-14S, TW-14I, and TW-14D, and stick-up protective well casings for TW-5S and TW-5I were replaced. In addition, inspection caps were installed on air stripper trays and a leaking effluent sample port and the associated piping were replaced. Furthermore,

the RW-2 flow meter was removed for repairs, and defective o-rings on the RW-2 flow control valve were replaced. On RW-1, a defective motor starter and a water level pressure transducer were replaced.

In the fourth quarter of 2007, the groundwater treatment system operated for 81 of a possible 92 days. The system was shut down for a total of 11 days for the above-mentioned maintenance. The treatment system operated continuously from October 18, 2007 through the end of 2007.

2008

The groundwater treatment system operated for 80 of a possible 91 days during the first quarter of 2008. As mentioned in Section 3.1, a VFD was installed on January 8, 2008. In addition, the system was shut down for 3 days in February and 8 days in March due to a defective mechanical blower pressure switch. The switch was replaced with an analog pressure transducer on March 26, 2008. In the second quarter of 2008, the groundwater treatment system operated for 88 of a possible 91 days. The system was shut down for 3 days in June due to a tripped circuit breaker for the auto-dial system. The circuit breaker fault was likely caused by a power surge from lightning. A new water level pressure transducer for RW-2 was also installed during the second quarter of 2008. The groundwater treatment system operated for 86 of a possible 92 days during the third quarter of 2008. The system was shut down for 3 days in July due to a tripped circuit breaker for the auto-dial system. The circuit breaker fault was likely caused by a power surge from lightning. The system was also shut down in August for three days due to localized power interruptions. The Gladding Cordage groundwater treatment system operated without significant interruption during the fourth quarter, 2008. The system was shut down for approximately two hours on October 17, 2008 to replace a faulty water level pressure transducer for recovery well RW-2. No other system interruptions occurred during the fourth quarter of 2008.

2009

In 2009, the groundwater treatment system operated without interruption during the first and second quarters. Malcolm Pirnie conducted a survey on June 11, 2009 to establish the top of casing elevations for groundwater monitoring wells TW-1, TW-2S, TW-2I, TW-2D, TW-9I, TW-9D, and TW-10D. The elevations were measured using an automatic level and were used to provide additional information on groundwater elevations across the site. The flush-mount protective casing for TW-15 was replaced on June 25, 2009 because the well could not be properly secured.

On June 25, 2009, the South Otselic Town Supervisor requested that the stick-up protective well casings for groundwater monitoring wells located within the Town Park (TW-6S, TW-6I, TW-6D, and TW-10D) be retrofitted with flush-mount protective

casings to reduce the Town's liability for tripping hazards. Malcolm Pirnie contacted NYSDEC and received approval to retrofit the wells. The repairs were performed during the third quarter 2009. Following the well repairs, the elevations of the wells were surveyed by Malcolm Pirnie using an automatic level.

The groundwater treatment system operated with minimal interruptions during the third and fourth quarter, 2009. The interruptions were related to power outages confirmed by personnel at the South Otselic NYSDEC Fish Hatchery.

2010

In 2010, the groundwater treatment system operated without interruption during the first quarter but was not operating several days during each consecutive quarter in 2010, mainly due to power interruptions confirmed by personnel at the South Otselic NYSDEC Fish Hatchery. During the May 14, 2010 site inspection, no flow was reported from recovery well RW-1 and the pump was found to be defective; however, no alarms were reported by the treatment system auto-dialer because the alarms for the recovery wells are based on power supplied to the well pump motor, not flow. The recovery well pumps and pump motors for both RW-1 and RW-2 were replaced and the pit-less adapters serviced on August 31, 2010. The flow meter for RW-2 stopped working in September 2011 and has not been repaired. Recovery well RW-2 did not operate for several days in October 2010 due to a tripped circuit breaker that was found to be caused by a chaffed wire in the well riser.

The monthly flow rates and total flow volumes for the groundwater treatment system are summarized in Table 3-1. As shown in Table 3-1, the groundwater treatment system pumping rates have remained stable since December 2007 with an average of 31.3 gallons per minute (GPM). The flow meter for RW-2 was removed for repairs in November 2007 and has not been replaced. In addition, as mentioned above, the flow meter for RW-1 has not worked since September 2010; therefore, no flow measurements are currently reported for the recovery wells. The flow rates for RW-1 and RW-2 are currently being estimated base on manual measurements and averages from historical flows. The estimated flow rates for RW-1 and RW-2 during the December 2010 site visit were 33 GPM and 25 GPM, respectively. Table 3-1 shows that approximately 85.6 million gallons of water were treated between August 2007 and December 2010.

Influent and effluent groundwater samples are collected from the Gladding Cordage treatment system on a monthly basis in accordance with the Work Plan and O&M Plan and submitted to Chemtech Laboratories following chain-of-custody protocols for analysis of TCL VOCs.

3.1.1.2. Influent Sample Results

Tables 3-2 and 3-3 summarize the VOC influent sample results for RW-1 and RW-2, respectively. Figure 3-1 provides a summary of 1,1,1- trichloroethane (1,1,1-TCA) concentrations in samples from recovery wells RW-1 and RW-2 since September 2007. Table 3-2 and Figure 3-1 show that the historical concentrations of 1,1,1-TCA in the samples from recovery well RW-1 ranged from 49 micrograms per liter (ug/L) to 93 ug/L. As shown in Table 3-3 and Figure 3-1, the historic 1,1,1-TCA concentrations in the samples from RW-2 ranged from 40 ug/L to 72 ug/L. These results exceed the corresponding NYSDEC Class GA Standard of 5 ug/L. As shown in Figure 3-1, the concentrations of 1,1,1-TCA in samples from RW-1 are consistently greater than those from RW-2. In addition, the concentrations of 1,1,1-TCA from the recovery wells over time show a strong positive correlation.

As shown in Table 3-2 and Table 3-3, the historic concentrations of 1,1-dichloroethane in the samples from RW-1 and RW-2, respectively, were less than the applicable NYSDEC Class GA Standard of 5 ug/L, with the exception of the December 2008 concentration of 6.4 ug/L from RW-1. The historic concentrations of 1,1-dichloroethene in RW-1 exceeded the applicable NYSDEC Class GA Standard of 5 ug/L during seven sampling events, ranging as high as 12 ug/L. Concentrations of 1,1-dichloroethene in the samples from RW-2 exceeded the applicable NYSDEC Class GA Standard during four sampling events, ranging as high as 9.6 ug/L (December 2010).

Carbon tetrachloride was detected in the January 8, 2009 and February 10, 2009 samples from recovery wells RW-1 (7.8 ug/L and 8.0 ug/L, respectively) and RW-2 (5.9 ug/L and 6.4 ug/L, respectively) at concentrations greater than the applicable NYSDEC Class GA Standard of 5 ug/L. As shown in Table 3-2, these were the only sampling events where carbon tetrachloride was detected in samples collected from recovery well effluent.

3.1.1.3. Effluent Sample Results

Table 3-4 summarizes laboratory analytical data for effluent samples collected from the treatment system. As indicated in Section 3.1, a VFD was installed on the air stripper blower motor on January 9. 2008. Following the installation of the VFD, effluent samples were collected at various blower motor frequencies (speeds) including 40 HZ, 50 HZ, and 60 HZ. The analyte 1,1,1-TCA was detected at 6 ug/l in the 40 HZ effluent sample but was not detected in the 50 HZ and 60 HZ samples. Following the completion of the January 9, 2008 sampling event the VFD was set to 50 HZ. Additional sampling was conducted in February 2008 to optimize the treatment system blower speed. Effluent samples were collected at 42 HZ, 44 HZ, and 46 HZ, respectively. No VOCs were detected in any of these effluent samples. Based on the results, the VFD setting was reduced to 42 HZ beginning in March 2008. Since then, the VFD setting has been regulated based on detections of VOCs in effluent samples. The current VFD setting is 46 HZ. As shown in Table 3-4, none of the VOCs detected in the monthly effluent

samples collected from the treatment system have ever exceeded the respective NYSDEC Class GA Standards.

Based on influent sample concentrations and the estimated total flow volumes from the Gladding Cordage treatment system, approximately 46 pounds of VOCs were removed by the treatment system between August 2007 and December 2010.

3.1.1.4. Planned Upgrades

Since the automated control system was limited in its capabilities to monitor system performance and frequent site visits were required to re-start the system following power interruptions, Malcolm Pirnie presented the NYSDEC with an Opinion of Probable Cost to repair and upgrade the Gladding Cordage site treatment system controls. The NYSDEC approved the repairs on March 25, 2010 and authorized Aztech Technologies (a NYSDEC "Call-out Contractor") to complete the work. The work will include replacement of the system control panel, recovery well flow meters and pressure transducers, and other system monitoring equipment. The upgrades will provide remote monitoring of system performance, the ability to communicate alarms to off-site personnel, and provide remote re-start capabilities following power interruptions. The expenditures for the upgrades will be paid by the NYSDEC Call-Out Contract.

3.1.2. O&M Conclusions

Operation and Maintenance are performed in accordance with the NYSDEC-approved Work Plan and O&M Manual. A VFD was installed in January 2008 to provide long-term energy savings. The O&M Manual needs to be updated to provide on-site personnel accurate operating procedures for the treatment plant. Automated controls for the treatment system are not functioning as designed, resulting in additional site visits to re-start the treatment plant following power interruptions. Between August 2007 and December 2010, response to the site to re-start the treatment plant due to power interruptions was required approximately 20 times.

Combined groundwater extraction rates for recovery wells RW-1 and RW-2 are estimated to average approximately 58 gpm; however, actual flow measurements from recovery wells RW-1 and RW-2 are not possible due to faulty flow meters. Based on monthly influent and effluent sampling, the treatment system successfully removes VOCs from groundwater in the capture zone. Based on the current status of the site, continuing O&M activities are required to ensure the performance, effectiveness, and protectiveness of the Gladding Cordage treatment system.

3.1.3. Recommendations

The following actions are recommended so that the Gladding Cordage treatment plant can provide effective control of the groundwater plume and be protective of downgradient receptors:

- Upgrade and repair system controls to provide for automated system operation with the capability to communicate alarms and monitor plant operation from a remote location as authorized by NYSDEC;
- Update the existing O&M Plan annually to include all NYSDEC-approved changes and modifications to the treatment plant;
- Continue maintenance and monthly influent and effluent sampling to facilitate the removal of VOCs from groundwater in the capture zone.

3.2. Monitoring Plan Compliance

The NYSDEC-approved Work Plan stated that groundwater samples would be collected using low-flow sampling techniques and analyzed for VOCs and metals (Figure 3-2 shows the location of the groundwater monitoring wells). However, NYSDEC later requested to have groundwater samples collected using passive diffusion bags (PDBs). On July 24, 2007, NYSDEC and Malcolm Pirnie conducted a conference call regarding groundwater sampling protocols and analysis for the site. Since analysis of metals is not possible from PDB samples, NYSDEC authorized groundwater samples to be analyzed for VOCs only.

3.2.1. Groundwater Monitoring Program

Groundwater in all monitoring wells associated with the site is sampled according to the operations and maintenance manual on a five quarter sampling schedule. Groundwater monitoring wells associated with the site are inspected and evaluated for integrity. As mentioned in Section 3.2, groundwater samples are collected using PDBs. The samples are analyzed for TCL VOCs by USEPA Method 8260B.

Groundwater levels are measured in monitoring wells at the same time that PDBs are installed. Water levels are measured to the nearest hundredth of a foot and recorded on a groundwater level data form. Water levels are used to calculate groundwater elevations across and facilitate an evaluation of groundwater flow conditions at the site.

In accordance with the current Work Plan, an annual report is submitted to the NYSDEC summarizing the site activities and monitoring results from the previous year. The report also provides an evaluation of the remedy performance and effectiveness.

3.2.2. Groundwater Monitoring Results

Groundwater monitoring wells were sampled in September 2007, October 2008, and June 2009 as described in Section 3.2.1. Results of these sampling events were submitted to NYSDEC with their respective Quarterly Report and Annual Groundwater Monitoring Summary.

3.2.2.1. Well Inspections

Existing on-site groundwater monitoring wells were evaluated for integrity and suitability for groundwater monitoring and water levels. The condition of each well was recorded on a well inspection form.

Between 2007 and 2009 the integrity of each well was generally acceptable, with the following exceptions:

- Groundwater monitoring wells TW-4I, TW-5I, TW-5D, TW-14S, TW-14I, and TW-14D required replacement of the protective well casings. This work was completed during the fourth quarter 2007.
- During the 2007 monitoring event, monitoring well TW-2I could not be located due to a significant over-growth of vegetation. During the 2008 sampling activities, monitoring well TW-2I was able to be located and appeared to be in acceptable condition.
- During the 2009 sampling event, groundwater monitoring well TW-15 could not be properly secured, and was repaired.
- Based on 2009 inspections, the integrity of the wells is generally acceptable and no additional repair or maintenance is required at this time.

As indicated in Section 3.1.1.1, the top of casing elevations were measured for monitoring wells that were converted from stick-up to flush-mount protective casings to provide measuring points for future water level surveys.

3.2.2.2. Water Level Survey

Prior to collecting samples, water levels were measured to the nearest hundredth of a foot and recorded on a groundwater level data form. Table 3-5 summarizes the groundwater levels and elevations from the site. As shown in Table 3-5, 2009 groundwater elevations in groundwater monitoring wells screened in the shallow groundwater monitoring zone ranged from 1202.87-feet above mean sea level (amsl) to 1205.12-feet amsl; groundwater elevations in monitoring wells screened in the intermediate groundwater monitoring zone ranged from 1202.50-feet amsl to 1203.76-feet amsl; and groundwater elevations in monitoring wells screened in the deep groundwater monitoring zone ranged from 1202.06-feet amsl to 1203.65-feet amsl.

As shown in Table 3-5, 2009 groundwater elevations in monitoring well cluster TW-3 was higher in the deep monitoring zone than the shallow monitoring zone (indicating an upward hydraulic gradient), while monitoring well clusters TW-5, TW-6, TW-7, and TW-9 have higher groundwater elevations in the shallow monitoring zones (indicating a downward hydraulic gradient). The groundwater elevations in monitoring well clusters TW- 2 and TW-14 converged at the intermediate zone, indicating a downward hydraulic gradient between the shallow to intermediate zone and an upward hydraulic gradient between the intermediate to deep zone. The difference in the hydraulic gradient at these

groundwater monitoring locations is likely due to the proximity of the well clusters to the Otselic River.

Shallow, intermediate, and deep potentiometric surfaces maps are provided on Figure 3-3, Figure 3-4, and Figure 3-5, respectfully. As shown on Figure 3-3, the direction of groundwater flow in the shallow groundwater monitoring zone is generally south toward groundwater recovery wells RW-1 and RW-2. Figures 3-4 and 3-5 show that groundwater flow in the intermediate and deep groundwater monitoring zones is generally southwest, toward the confluence of Ashbell Brook and the Otselic River.

3.2.3. Groundwater Sampling

Groundwater sampling results for the third quarter 2007, fourth quarter 2008, and second quarter 2009 sampling events are summarized in Table 3-6. Groundwater samples are generally collected from 19 groundwater monitoring wells in accordance with the Work Plan. However, in consultation with NYSDEC, groundwater samples were collected from all of the 26 groundwater monitoring wells during the 2009 groundwater monitoring event to provide additional information on the horizontal and vertical distribution of VOCs across the site. The additional wells sampled during the 2009 groundwater monitoring event were TW-1, TW-2S, TW-2I, TW-2D, TW-9I, TW-9D, and TW-10D.

3.2.3.1. Groundwater Sampling Results

Groundwater sampling results from each sampling event are summarized in Table 3-6. Acetone was reported in all of the groundwater samples collected during the second quarter 2009 groundwater sampling event. With the exception of two samples collected in 2008 that contained estimated (based on "J" qualifier) concentrations of acetone, this compound has not been detected in any other groundwater sample collected from the site as of 2007. Therefore, the acetone detections in the samples from the 2009 sampling event are expected to be the result of laboratory contamination.

3.2.3.2. Shallow Groundwater Monitoring Zone

As shown in Table 3-6, VOCs were detected at concentrations greater than the corresponding NYSDEC Class GA Standards in two of the seven groundwater samples collected from the shallow groundwater monitoring network in 2009. Table 3-6 shows that the concentrations of 1,1,1-TCA in the sample from TW-5S increased slightly from 11 ug/L in 2008 to 13 ug/L in 2009; while the sample from TW-7S decreased from 18 ug/L in 2008 to 7.8 ug/L in 2009. In 2008 the concentrations of 111-TCA (68 ug/L) and 1,1-dichloroethane (5.8 ug/L) in the sample from TW-14S were greater than the respective NYSDEC Class GA Standard of 5 ug/L. 1,1,1-TCA was not detected in the second quarter 2009 sample from this well. Although 1,1-dichloroethane was detected in the 2009 sample from TW-14S (1.2 ug/L), the result was less than the corresponding NYSDEC Class GA Standard of 5 ug/L. VOCs were not detected in any other samples

collected from the shallow monitoring network at concentrations greater than the applicable NYSDEC Class GA Standards.

3.2.3.3. Intermediate Groundwater Monitoring Zone

Table 3-6 shows that the concentrations of 1,1,1-TCA in 2009 samples collected from intermediate groundwater monitoring wells TW-5I (90 ug/L), TW-9I (5.5 ug/L), TW-14I (83 ug/L), and TW-15(95 ug/L) were greater than the applicable NYSDEC Class GA Standard of 5 ug/L. As shown in Table 3-6, the concentrations of 1,1,1-TCA in the samples from TW-5I and TW-15 increased compared to the previous two (2007 and 2008) sampling events; while the 1,1,1-TCA concentration in the sample from TW-14I initially increased between 2007 (39 ug/L) and 2008 (95 ug/L) then decreased in 2009 to 83 ug/L. In addition, the concentrations of 1,1,1-TCA in the samples collected from TW-3I, TW-4I, TW-5I, TW-6I, and TW-8I decreased from 6.7 ug/L, 1.1 ug/L, 3.5 ug/L, 1.3 ug/L, and 1.5 ug/L, respectively in 2008 to below the laboratory reporting limit (i.e. not detected) in the 2009 samples collected from these wells. Table 3-6 shows that the concentrations of benzene in the sample from TW-5I decreased from 6.2ug/L in 2007 to 3.5 ug/L in 2008. As shown in Table 3-5, benzene was not detected in the 2009 sample from TW-5I. No other VOCs were detected in samples from intermediate groundwater monitoring wells at concentrations greater than their applicable NYSDEC Class GA Standards.

3.2.3.4. Deep Groundwater Monitoring Zone

As shown in Table 3-6, the concentrations of 1,1,1-TCA exceeded the corresponding NYSDEC Class GA Standard of 5 ug/L in the 2009 samples from deep groundwater monitoring wells TW-5D (32 ug/L), and TW-7D (9.1 ug/L). Table 3-6 shows that the concentration of 1,1,1-TCA in the sample from TW-14D decreased from 42 ug/L in the sample from 2007 to 18 ug/L in 2008. As shown in Table 3-6, 1,1,1 TCA was not detected in 2009 samples from TW-14D. The 2007 sample collected from TW-14D contained 1,1-dichloroethene (7.2 ug/L) at a concentration greater than the NYSDEC Class GA Standard of 5 ug/L. This compound was not detected in the 2008 or 2009 samples from this well. No other VOCs were detected at concentrations greater than the applicable NYSDEC Class GA Standard in samples from the deep monitoring network.

3.2.4. Groundwater Monitoring Conclusions

Groundwater samples were collected from all of the groundwater monitoring wells at the Gladding Cordage site in 2009. Acetone was reported in all of the groundwater samples collected in 2009, but is considered to be a laboratory contaminant. The concentrations of VOCs in samples collected from the shallow, intermediate, and deep groundwater monitoring zones generally decreased compared to results from the 2008 monitoring event. Groundwater samples collected from two shallow, four intermediate, and three deep groundwater monitoring wells contained concentrations of VOCs greater than the applicable NYSDEC Class GA Standard. The sample from intermediate groundwater

monitoring well TW-15 contained the maximum concentration of total VOCs (100 ug/L, excluding acetone).

In general, groundwater samples collected from monitoring wells in the immediate vicinity of groundwater recovery wells RW-1 and RW-2 contained the greatest concentrations of VOCs. No VOCs were detected in the samples collected from the intermediate or deep groundwater monitoring wells (TW-12I and TW-12D) located adjacent to the South Otselic NYSDEC Fish Hatchery. Groundwater samples from TW-9I (not typically sampled as part of the Work Plan) contained concentrations of VOCs greater than the applicable NYSDEC Class GA Standards.

3.2.5. Groundwater Monitoring Recommendations

Based on the presence of VOCs in groundwater samples at concentrations greater than the respective NYSDEC Class GA Standards in the vicinity of the site, continued monitoring on an annual basis is required to properly evaluate changes in groundwater quality over time and monitor the horizontal and vertical distribution of VOCs.

Based on the presence of VOCs at concentrations greater than the NYSDEC Class GA Standards in samples from TW-9I, it is recommended that the TW-9 well cluster be added to the list of groundwater monitoring wells evaluated annually.

The horizontal and vertical locations of all groundwater monitoring wells should be surveyed by a New York State Licensed Surveyor to ensure groundwater level data are accurate.

3.3. Vapor Intrusion Evaluation

At the request of NYSDEC, a soil vapor intrusion (SVI) pathway investigation was performed at two locations (125 and 130 Route 13) down-gradient of the Gladding Cordage site to evaluate the potential for migration of VOCs to the indoor air and the potential for human exposures. Figure 3-6 shows the SVI sampling locations. The SVI investigation was performed on December 9 and December 10, 2009 in accordance with the New York State Department of Health (NYSDOH) Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH Guidance) (NYSDOH, 2006).

Each air sample was collected using pre-cleaned batch-certified 6-liter Summa canisters equipped with 24 hour flow controllers. The samples were submitted to Contest Analytical Laboratory in East Longmeadow, Massachusetts, a NYSDOH ELAP and NYSDEC ASP-approved laboratory, under chain-of-custody procedures for analysis of VOCs by USEPA Method TO-15. The final laboratory results were submitted to Data Validation Services in North Creek, New York for preparation of a Data Usability Summary Report (DUSR).

Ethanol was the maximum VOC concentration reported in air samples at each sampling location; however, the elevated ethanol levels may be due to the use of cleaning products prior to the sampling event. 1,1,1-TCA, PCE, and TCE were present at low levels in basement air samples collected at the structure located at 125 Route 13; however, none of these compounds were reported in the first-floor indoor air sample. The background concentrations of MEK, benzene, carbon tetrachloride, chloromethane, Freon 11, Freon 12, and toluene were consistent with the reported basement and first-floor indoor air concentrations and suggests that they are ubiquitous in the vicinity of the site. Based on the air sample results, vapor intrusion does not appear to be an exposure route for VOCs in groundwater down-gradient of the site.

3.4. Institutional Controls/Engineering Controls Certification

There is currently not an Institutional Controls/Engineering Controls (IC/EC) Plan for the site. As indicated in Sections 3.1 and 3.2, all site operations and monitoring are currently evaluated in accordance with the Work Plan. In accordance with NYSDEC PR requirements, an IC/EC Certification Form is provided in Appendix C. As indicated in the IC/EC Certification Form, the IC/ECs cannot be certified at this time due to the following:

- No SMP exists for the site;
- No IC/EC Plan exits for the site;
- The treatment plant O&M Manual is not current; and
- There are deficiencies with the treatment plant instrumentation and controls.

3.4.1. Institutional Controls

The ICs for the site were established as part of the ROD and include the following items:

- Minimize the potential for human exposure to site-related contaminants;
- Minimize the potential for off-site migration of site-related contaminants; and
- Contain, treat, and/or dispose of contaminated media in a manner consistent with State and Federal regulations.

Currently, the provisions for the above-mentioned items are met through compliance with the Work Plan. The Work Plan includes NYSDEC requirements for annual O&M and monitoring. This includes site inspections, as indicated in Sections 3.1 and 3.2, to verify that the treatment system is functioning properly, influent and effluent sampling, groundwater monitoring, and verifying the integrity of the monitoring wells. Together, this strategy is effective at providing containment of the contamination plume and complying with effluent discharge limits to the Otselic River. In addition, SVI sampling at two structures down-gradient of the site indicate that vapor intrusion is not an exposure route for VOCs in groundwater.

3.4.2. Engineering Controls

The ECs at the site as described in the ROD consist of a groundwater treatment system. Contaminated groundwater is extracted and treated through an on-site air stripper system for removal of VOC contaminants. The groundwater treatment system was constructed in 1996 in accordance with the ROD.

As indicated in Section 3.1.1.1, the groundwater treatment system has treated approximately 85.6 million gallons of water during the August 2007 through December 2010 O&M periods. The system includes two groundwater recovery wells which are equipped with submersible pumps. Pressure transducers in the wells record water levels and control operation of the pumps within each well. Extracted groundwater is routed through pressure mains directly to the air stripper system for treatment. The air stripper system is located within a secure pre-engineered building. Off gas generated during the air stripping process is released into the atmosphere through an exhaust stack above the building. Treated effluent is discharged by gravity through a discharge pipe to the Otselic River.

3.5. Institutional Controls/Engineering Controls Conclusions and Recommendations

The treatment plant is capable of meeting the conditions of the ROD, however, the instrument control panel is outdated and in poor condition. An improved instrument control panel and system monitoring equipment (as approved by NYSDEC) is recommended to allow greater control over the treatment system and provide remote monitoring capabilities. Remote monitoring capability would allow for remote starting associated with periodic power outages, improve the ability to monitor system performance, and decrease reaction times to potential system alarms.

An IC/EC Plan should be prepared for the site in accordance with DER-10 for NYSDEC approval. In addition, a Contingency Plan should be developed to provide response guidance for on-site personnel. The Contingency Plan should provide operations personnel with a process to follow if a deficiency or failure is noted.

4. Cost Evaluation

4.1. Work Assignment Budget

The estimated project budget for implementing the existing O&M and Groundwater Monitoring Plan was prepared in accordance with Malcolm Pirnie's Contract for Design/Construction services with the NYSDEC. A revised budget was approved in April 2011 that funds the work assignment through 2012. Based on the revisions, the total budget for the existing Work Assignment is $302,959. Table 4-1 provides a summary of costs estimated to complete the tasks listed in the existing Work Plan. As shown in Table 4-1, approximately $205,000 of the budgeted amount has been expended, providing approximately $98,000 to complete the remaining portion of the Work Assignment.

4.2. Periodic Review Costs

Table 4-2 provides an opinion of probable cost for performing the recommendations provided in the Periodic Review, including:

- Groundwater sampling at TW-9I and TW-9D on an annual basis.
- Surveying horizontal and vertical position of all groundwater monitoring wells.
- Updating site maps.
- Overseeing NYSDEC-approved upgrades and repairs for the treatment system instrumentation and controls.
- Updating the existing O&M Plan on an annual basis to include all NYSDEC-approved changes and modifications to the treatment plant; and
- Developing site documents including:
  - SMP
  - Corrective Action Plan (CAP)
  - O&M Plan
  - Long-term Monitoring (LTM) Plan
  - IC/EC Plan
  - Contingency Plan

As shown in Table 4-2, the estimated cost to implement the recommendations presented in the PR is approximately $31,300. However, with the exception of the estimated costs for surveying ($5,000), the costs for the recommendations have already been assumed in

the revised Schedule 2.11s. As stated in Section 3.1.1.4, the costs to upgrade the treatment system controls will be funded through a NYSDEC Call-Out Contract; however, labor for field oversight will be funded from the Work Assignment budget. Table 4-2 shows that the anticipated cost to perform annual O&M, sampling, and reporting for the remainder of the Work Assignment in accordance with the recommendations in the PR is approximately $92,200. Therefore, the total anticipated cost to complete the remaining work assignment is approximately $97,200. As shown on Table 4-2, the existing budget should be sufficient to complete the tasks in the Work Assignment and suggestions indicated in this PR. Therefore, it is anticipated that no additional funding will be required.

5. Recommendations and Conclusions

5.1. Recommendations

The PR was performed to evaluate the performance, effectiveness, and protectiveness of the current remedy. The PR consisted of an evaluation of the existing Work Plan, available site documents, monitoring data, and field observations. Although the treatment plant is currently capable of meeting the requirements listed in the ROD, additional groundwater monitoring is required to evaluate plume migration and groundwater quality over time. In addition, the NYSDEC-approved repairs to the instrumentation and controls should be verified to ensure that they are effective at meeting the remedial goals over the long-term. Therefore, the Gladding Cordage site will require Corrective Measures (CM) to ensure the appropriate level of protection to human health and the environment.

5.1.1. Corrective Action Plan

A CAP will be prepared to provide details for each of the CMs recommended during this PR cycle. The CAP will include a timeline to indicate when each of the following CMs would be implemented:

Site compliance with IC/EC Certification including:

- Groundwater monitoring for VOCs at TW-9I and TW-9D;
- Surveying the horizontal and vertical position of all groundwater monitoring wells;
- Updating site maps; and
- Upgrading and repairing treatment plant controls.

The CAP and a site-specific SMP will be submitted to NYSDEC for review and final approval. Details of the SMP are provided below.

5.1.2. Site Management Plan

A SMP will be developed in accordance with DER-10 to provide a framework for monitoring the effectiveness of the remedy at the Gladding Cordage site. The SMP will replace the current Work Plan procedures. The SMP will include the following site-specific documents:

- IC/EC Plan – describes the IC/ECs that are in place, effective and provide the appropriate levels of protection for human health and the environment.
- LTM Plan – provides the procedures and monitoring requirements to evaluate the short-and long-term effectiveness of the remedy.

- O&M Plan – identifies the proper procedures and contingency plans required to operate and maintain treatment, collection, and/or containment systems for the remedy.
- Site-specific Health and Safety Plan – identifies site-related hazards and provide requirements for the appropriate personal protective equipment (PPE) for on-site personnel.

5.1.3. Periodic Review Frequency

Since CMs have been recommended for the site, a one year field-oversight PR evaluation is recommended to verify that the CMs have either been implemented or completed and remain effective.

5.2. Conclusions

Operation and Maintenance at the Gladding Cordage site is being performed with out-dated guidance documents. The concentrations of VOCs in groundwater are consistently greater than the NYSDEC Class GA Standards and additional samples should be collected to evaluate plume migration. In addition, monitoring wells should be surveyed to provide accurate groundwater level data. Based on a review of available site documents, monitoring data, and field observations, the overall performance, effectiveness, and protectiveness of the selected remedy for the Gladding Cordage site are generally acceptable. However, the NYSDEC-approved treatment plant repairs will be required to maintain effective and efficient operation of the treatment plant over time. Therefore, CMs are recommended to bring the remedy into compliance with NYSDEC IC/EC Certification requirements. A SMP should be developed for the site to provide revised procedures for effective operation, maintenance, and monitoring the site over time. A one year field-oversight PR evaluation is recommended to assess the CMs and SMP activities.

6. References

Malcolm Pirnie, 2007, Gladding Cordage Site Work Plan, Malcolm Pirnie, Inc., June 2007.

Malcolm Pirnie, 2008, Gladding Cordage Site Quarterly Report, Malcolm Pirnie, Inc., May 2008.

Malcolm Pirnie, 2010a, Gladding Cordage Site Quarterly Report and Annual Groundwater Monitoring Summary, Malcolm Pirnie, Inc., July 2010.

Malcolm Pirnie, 2010b, Gladding Cordage Site Quarterly Report, Second Quarter 2010, Malcolm Pirnie, Inc., August 2010.

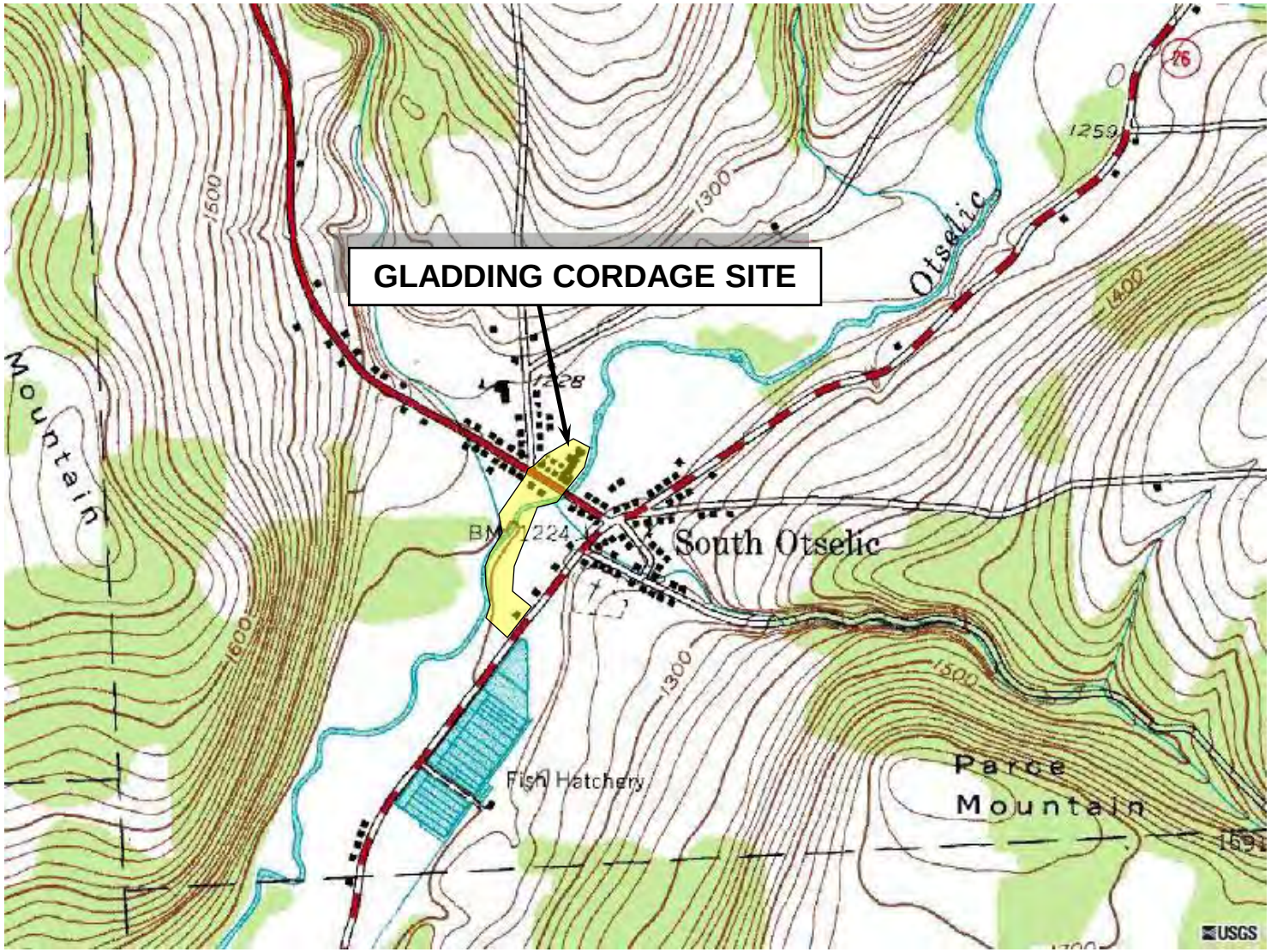
Malcolm Pirnie, 2010c, Gladding Cordage Site Quarterly Report, Third Quarter 2010, Malcolm Pirnie, Inc., November 2010.

Malcolm Pirnie, 2010d, Gladding Cordage Site Quarterly Report, Fourth Quarter 2010, Malcolm Pirnie, Inc., January 2011.

NYSDEC, 1993, Record of Decision, Gladding Cordage Site, Chenango County, New York, Site No. 7-09-009, New York State Department of Environmental Conservation, Division of Hazardous Waste Remediation.

NYSDEC, 2002, Division of Environmental Remediation, Draft DER-10, Technical Guidance for Site Investigation and Remediation, December 25, 2002.

NYSDEC, 2008, Division of Environmental Remediation, Remedial Bureau E, Internal Guidance Procedure – 8, Periodic Review of Site Management Activities, August 21, 2008.



SCALE IN FEET

0 500 1000 2000

SOURCE: U.S.G.S 7.5 MIN. SOUTH OTSELIC QUAD, 1988

MALCOLM PIRNIE

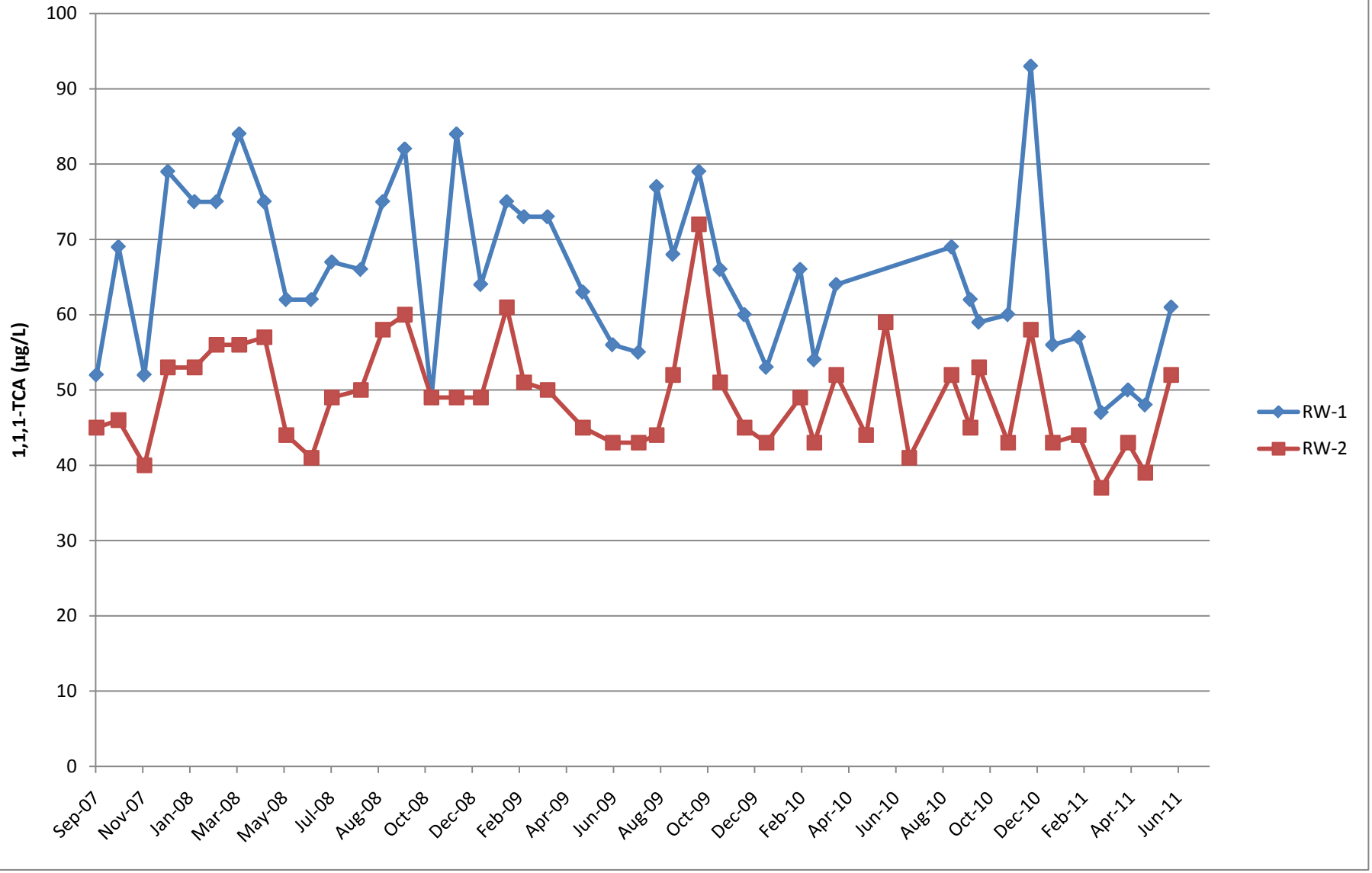
NYSDEC STANDBY CONTRACT NO. D004443-5
GLADDING CORDAGE – SITE NUMBER 7-09-009
SOUTH OTSELIC, NEW YORK

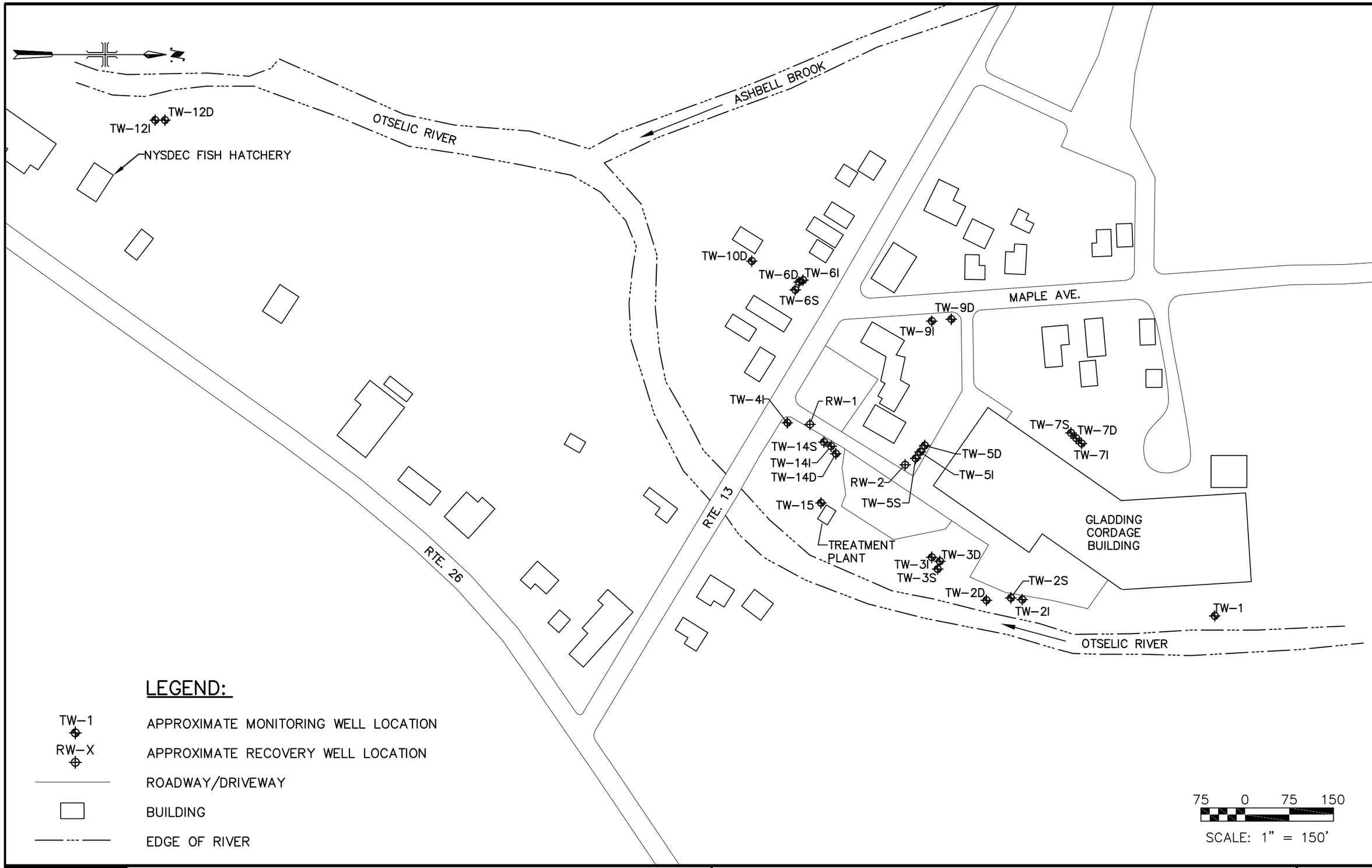
GLADDING CORDAGE SITE LOCATION

FIGURE 2-1

F:\PROJECT\0266365\FILE\REPORTS\Figure 2-1.ppt

Figure 3-1
Treatment System Influent Sample Concentrations (1,1,1-TCA)
Gladding Cordage Site
NYSDEC Site Number 7-09-009





MALCOLM PIRNIE

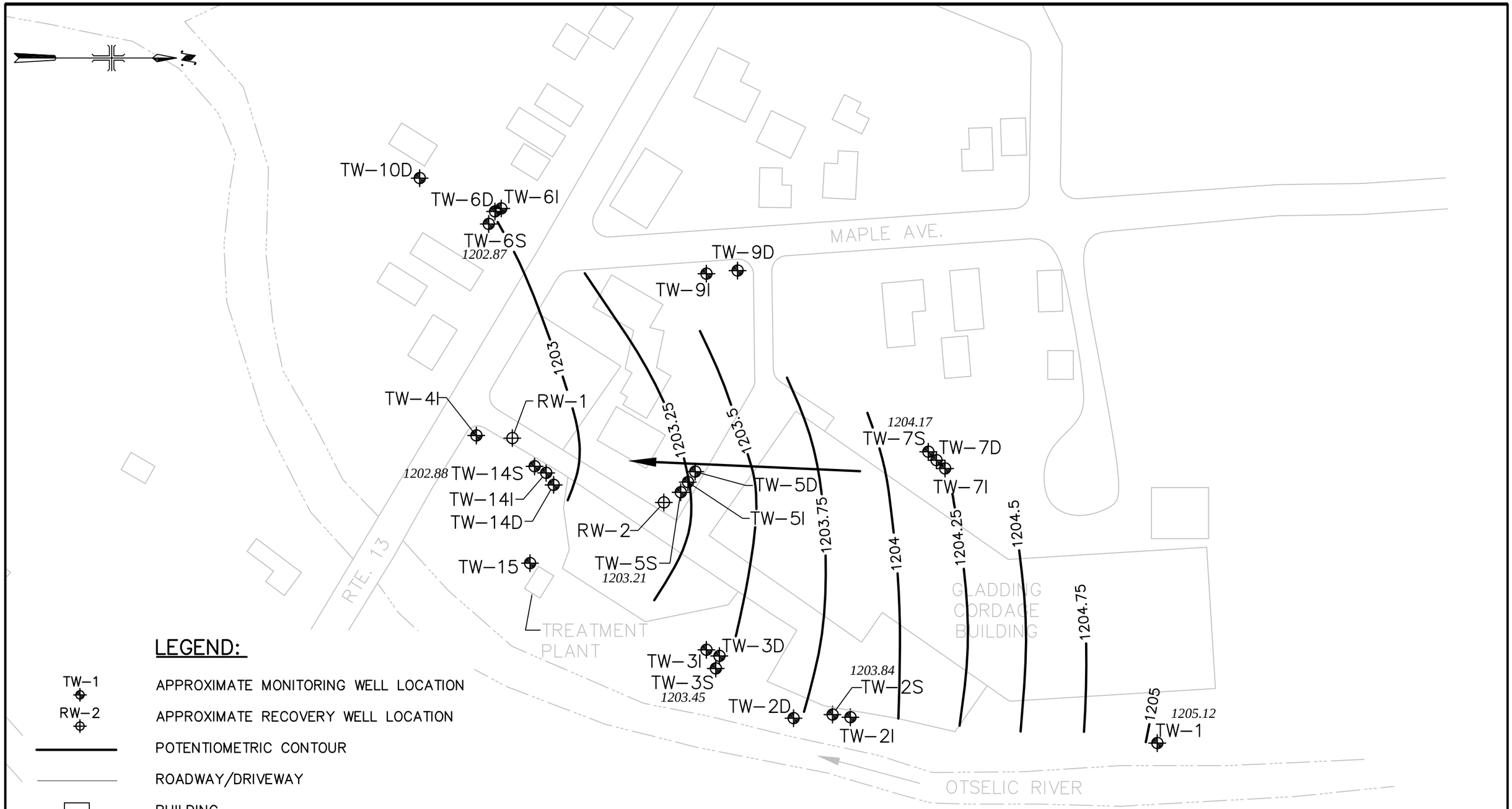
NYSDEC STANDBY CONTRACT NO. D004443-5
NYSDEC SITE NO. 7-09-009
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK

MONITORING WELL LOCATION MAP

SCALE: 1" = 150'

MALCOLM PIRNIE, INC.

FIGURE 3-2



MALCOLM PIRNIE

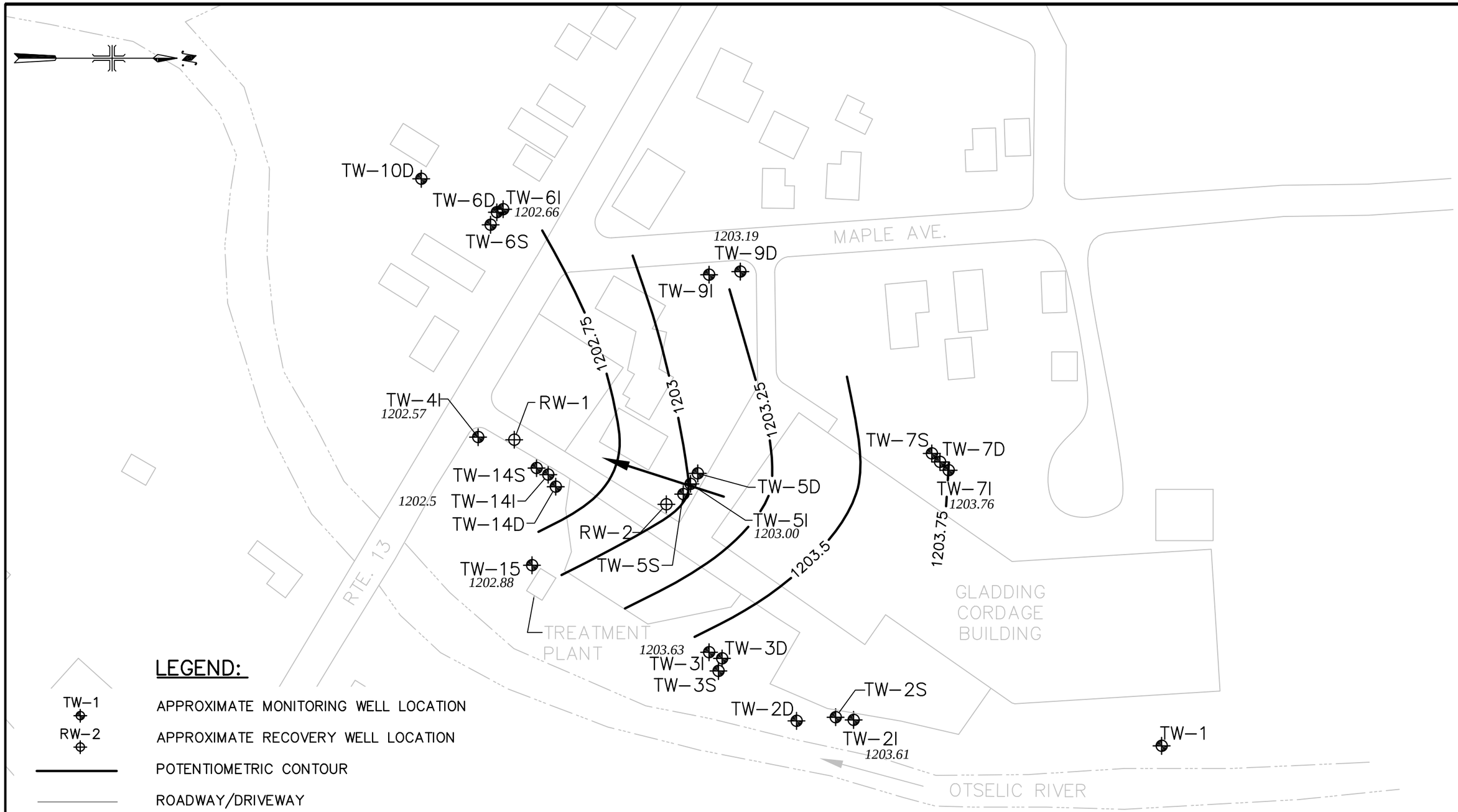
NYSDEC STANDBY CONTRACT NO. D004443-5
NYSDEC SITE NO. 7-09-009
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK

SHALLOW POTENTIOMETRIC SURFACE MAP (6/11/2009)

SCALE: 1" = 100'

MALCOLM PIRNIE, INC.

FIGURE 3-3



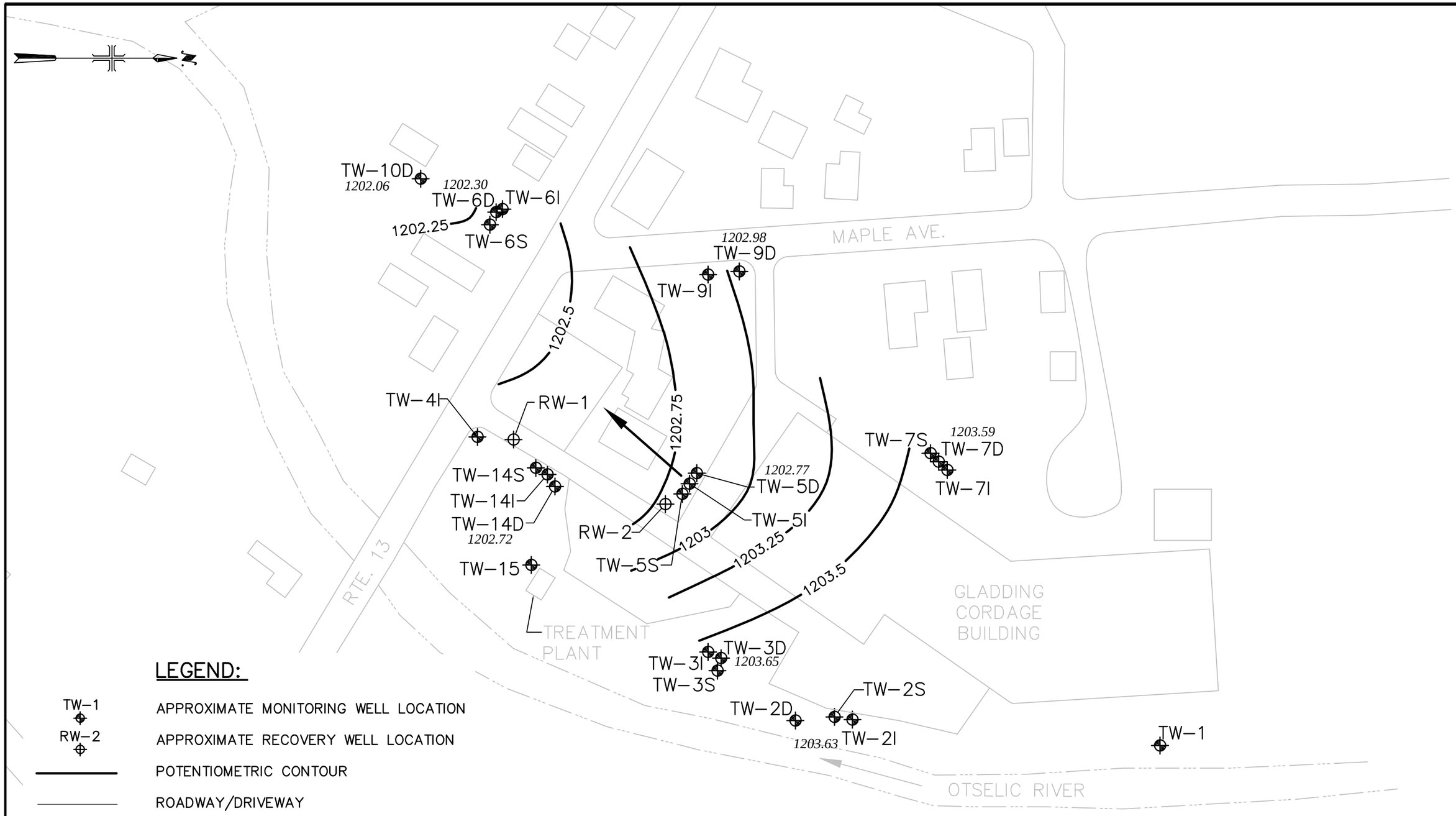
MALCOLM PIRNIE

NYSDEC STANDBY CONTRACT NO. D004443-5
NYSDEC SITE NO. 7-09-009
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK

INTERMEDIATE POTENTIOMETRIC SURFACE MAP (6/11/2009)
SCALE: 1" = 100'

MALCOLM PIRNIE, INC.

FIGURE 3-4



LEGEND:

- TW-1 — APPROXIMATE MONITORING WELL LOCATION
- RW-2 — APPROXIMATE RECOVERY WELL LOCATION
- POTENTIOMETRIC CONTOUR
- ROADWAY/DRIVEWAY
- BUILDING
- EDGE OF RIVER
- GROUNDWATER FLOW DIRECTION

MALCOLM PIRNIE

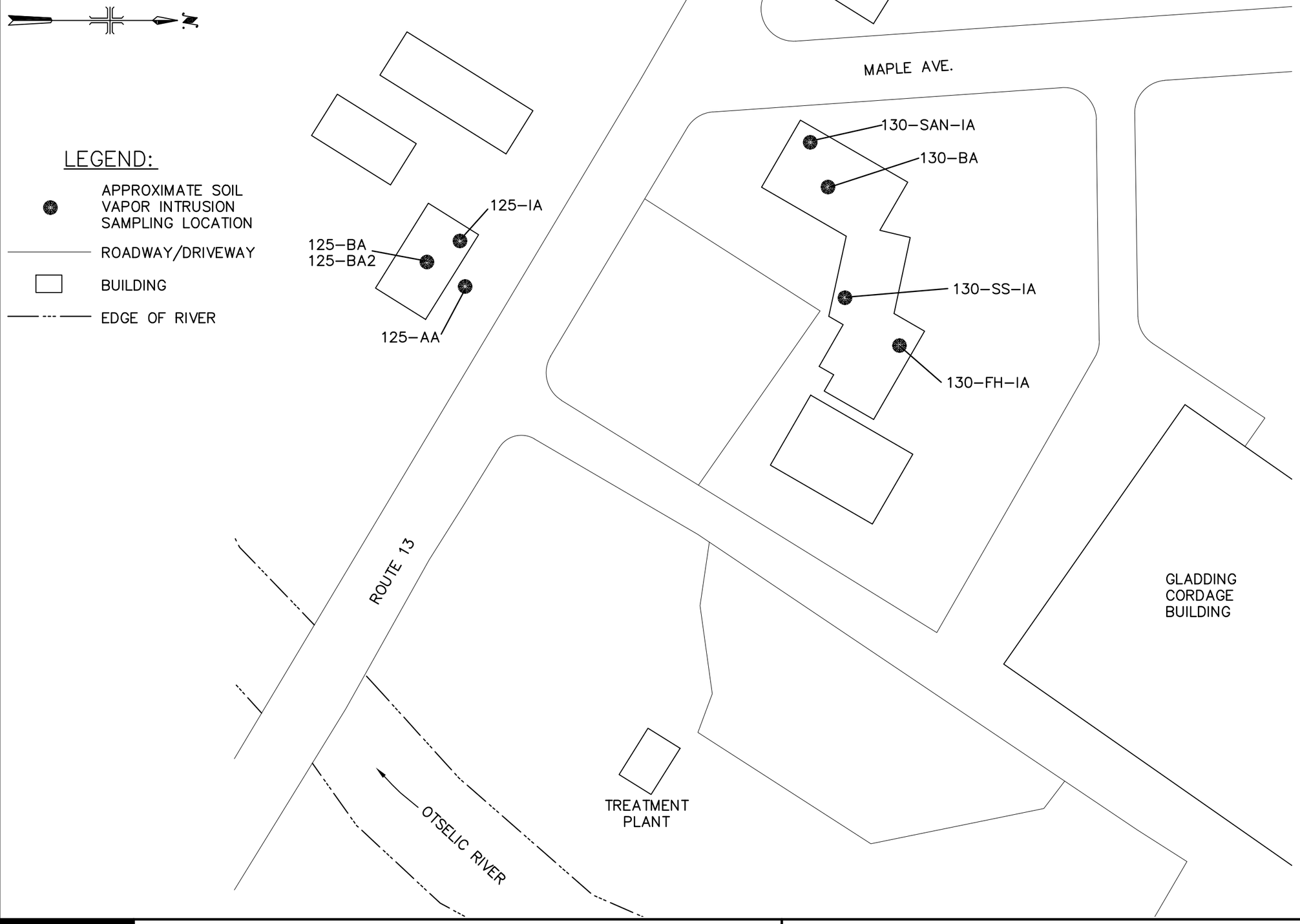
NYSDEC STANDBY CONTRACT NO. D004443-5
NYSDEC SITE NO. 7-09-009
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK

DEEP POTENTIOMETRIC SURFACE MAP (6/11/2009)

SCALE: 1" = 100'

MALCOLM PIRNIE, INC.

FIGURE 3-5



MALCOLM PIRNIE

NYSDEC STANDBY CONTRACT NO. D004443–5
NYSDEC SITE NO. 7–09–009
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK

SOIL VAPOR INTRUSION SAMPLING LOCATIONS

SCALE: 1"=50'

MALCOLM PIRNIE, INC.

FIGURE 3–6

TABLE 3-1
TREATMENT SYSTEM STATUS AND FLOW SUMMARY
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK
NYSDEC SITE NO. 7-04-009A

Date	System Operation (days)	System On-time (% of possible days)	Well On-time RW-1 (% possible)	Well On-time RW-2 (% possible)	Flow Rates RW-1 (gpm)	Flow Rates RW-2 (gpm)	Recovery Well Total Flows RW-1 (gallons)	Recovery Well Total Flows RW-2 (gallons)	Total System Flow (gallons)	Quarterly Totals (gallons)
August-07	8 (1)	100%	100%	100%	38	24	437,760 (3)	276,480 (3)	714,240	
September-07	30	100%	100%	100%	38	25	1,641,600 (3)	1,080,000 (3)	2,721,600	3,435,840
October-07	20	65%	100%	100%	38.2	25.7	1,100,160 (3)	740,160 (3)	1,840,320	
November-07	30	100%	67%	100%	39.9	24.9 (2)	958,840 (4)	1,075,680 (3)	2,034,520	6,172,646
December-07	31	100%	39%	100%	31.8	24.9 (2)	1,186,270 (4)	1,111,536 (3)	2,297,806	
January-08	31	100%	100%	100%	31.8	24.9 (2)	856,620 (4)	1,111,536 (3)	1,968,156	
February-08	26	90%	69%	88%	32	24.9 (2)	1,179,610 (4)	820,385 (3)	1,999,995	5,503,499
March-08	23	74%	100%	100%	32.9	24.9 (2)	710,660 (4)	824,688 (3)	1,535,348	
April-08	30	100%	100%	100%	30.8	24.9 (2)	1,051,520 (4)	1,075,680 (3)	2,127,200	
May-08	31	100%	100%	100%	31.3	24.9 (2)	1,238,580 (4)	1,111,536 (3)	2,350,116	6,846,908
June-08	27	90%	100%	100%	30.5	24.9 (2)	1,401,480 (4)	968,112 (3)	2,369,592	
July-08	28	90%	68%	100%	30.1	24.9 (2)	1,029,590 (4)	1,003,968 (3)	2,033,558	
August-08	28	90%	100%	100%	30	24.9 (2)	943,060 (4)	1,003,968 (3)	1,947,028	6,201,456
September-08	30	100%	100%	100%	29.8	24.9 (2)	1,145,190 (4)	1,075,680 (3)	2,220,870	
October-08	31	100%	100%	100%	30	24.9 (2)	1,212,410 (4)	1,111,536 (3)	2,323,946	
November-08	30	100%	100%	100%	31.7	24.9 (2)	1,532,370 (4)	1,075,680 (3)	2,608,050	7,494,552
December-08	31	100%	100%	100%	31.3	24.9 (2)	1,451,020 (4)	1,111,536 (3)	2,562,556	
Total Flow 2007							**5,324,630**	**4,283,856**	**9,608,486**	
Total Flow 2008							**13,752,110**	**12,294,305**	**26,046,415**	

Notes:
1 - System started on 8/23/07.
2 - Flow meter inoperative. Flow based on average flow from August, September, and October 2008.
3 - Calculated based on percentage of system on-time, flow rate, and percentage of recovery well on-time.
4 - Calculated from totalizer values.
gpm - Gallons per minute

TABLE 3-1
TREATMENT SYSTEM STATUS AND FLOW SUMMARY
GLADDING CORDAGE SITE
SOUTH OTSELIC, NEW YORK
NYSDEC SITE NO. 7-04-009A

Date	System Operation (days)	System On-time (% of possible days)	Well On-time RW-1 (% possible)	Well On-time RW-2 (% possible)	Flow Rates RW-1 (gpm)	Flow Rates RW-2 (gpm)	Recovery Well Total Flows RW-1 (gallons)	Recovery Well Total Flows RW-2 (gallons)	Total System Flow (gallons)	Quarterly Totals (gallons)
January-09	31	100%	100%	100%	31.3	24.9 (2)	1,392,710 (4)	1,111,536 (3)	2,504,246	
February-09	28	100%	100%	100%	30.8	24.9 (2)	1,363,120 (4)	1,003,968 (3)	2,367,088	6,931,910
March-09	31	100%	100%	100%	30.8	24.9 (2)	949,040 (4)	1,111,536 (3)	2,060,576	
April-09	30	100%	100%	100%	31.2	24.9 (2)	1,281,120 (4)	1,075,680 (3)	2,356,800	
May-09	31	100%	100%	100%	31.5	24.9 (2)	1,968,910 (4)	1,111,536 (3)	3,080,446	8,217,156
June-09	30	100%	100%	100%	31.1	24.9 (2)	1,704,230 (4)	1,075,680 (3)	2,779,910	
July-09	28	90%	100%	100%	30.4	24.9 (2)	736,020 (4)	1,003,968 (3)	1,739,988	
August-09	29	94%	100%	100%	30.6	24.9 (2)	982,480 (4)	1,039,824 (3)	2,022,304	5,833,432
September-09	30	100%	100%	100%	30.3	24.9 (2)	995,460 (4)	1,075,680 (3)	2,071,140	
October-09	20	65%	100%	100%	34.1	24.9 (2)	1,363,040 (4)	717,120 (3)	2,080,160	
November-09	29	97%	100%	100%	31.7	24.9 (2)	866,140 (4)	1,039,824 (3)	1,905,964	6,228,096
December-09	27	87%	100%	100%	33.7	24.9 (2)	1,273,860 (4)	968,112 (3)	2,241,972	
January-10	31	100%	100%	100%	29.2	24.9 (2)	1,327,190 (4)	1,111,536 (3)	2,438,726	
February-10	28	100%	100%	100%	34.8	24.9 (2)	2,029,590 (4)	1,003,968 (3)	3,033,558	7,478,090
March-10	31	100%	100%	100%	33	24.9 (2)	894,270 (4)	1,111,536 (3)	2,005,806	
April-10	26	87%	100%	100%	35.2	24.9 (2)	1,143,260 (4)	932,256 (3)	2,075,516	
May-10	28	90%	36%	100%	35.2	24.9 (2)	290,240 (4)	1,003,968 (3)	1,294,208	3,981,724
June-10	17	57%	0%	100%	0	25 (2)	0 (4)	612,000 (3)	612,000	
July-10	18	58%	0%	100%	0	24.9 (2)	0 (3)	645,408 (3)	645,408	
August-10	23	74%	0%	100%	0	24.9 (2)	0 (3)	824,688 (3)	824,688	4,034,736
September-10	30	100%	100%	100%	34.5 (2)	24.9 (2)	1,488,960 (3)	1,075,680 (3)	2,564,640	
October-10	31	100%	100%	90%	33.4 (2)	24.9 (2)	1,489,302 (3)	1,000,382 (3)	2,489,684	
November-10	30	100%	100%	100%	33.4 (2)	24.9 (2)	1,441,260 (3)	1,075,680 (3)	2,516,940	7,271,870
December-10	27	87%	100%	100%	33.4 (2)	24.9 (2)	1,297,134 (3)	968,112 (3)	2,265,246	
Total Flow 2009							**14,876,130**	**12,334,464**	**27,210,594**	
Total Flow 2010							**11,401,206**	**11,365,214**	**22,766,420**	

Notes:
1 - System started on 8/23/07.
2 - Flow meter inoperative. Flow based on previous average flows or from manual tests.
3 - Calculated based on percentage of system on-time, flow rate, and percentage of recovery well on-time.
4 - Calculated from totalizer values.
gpm - Gallons per minute

TABLE 3-2
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (INFLUENT - RW-1)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC Class GA Standard ug/L	RW-1 9/6/2007 WATER ug/L	RW-1 10/4/2007 WATER ug/L	RW-1 11/6/2007 WATER ug/L	RW-1 12/6/2007 WATER ug/L	RW-1 1/9/2008 WATER ug/L	RW-1 2/6/2008 WATER ug/L	RW-1 3/6/2008 WATER ug/L	RW-1 4/7/2008 WATER ug/L	RW-1 5/5/2008 WATER ug/L	RW-1 6/6/2008 WATER ug/L	RW-1 7/2/2008 WATER ug/L	RW-1 8/8/2008 WATER ug/L	RW-1 9/5/2008 WATER ug/L	RW-1 10/3/2008 WATER ug/L	RW-1 11/6/2008 WATER ug/L
VOCs																
1,1,1-Trichloroethane	5	52	69	52	79	75	75	84	75	62	62	67	66	75	82	49
1,1,2,2-Tetrachloroethane	5	0.30 U	0.30 U	0.30 U	0.49 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U
1,1,2-Trichloroethane	1	0.41 U	0.41 U	0.41 U	0.52 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1.3 U	1.3 U	1.3 U	0.35 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	1 U
1,1-Dichloroethane	5	0.38 U	0.38 U	2.4 J	3.4	2.6	3.4 J	3.8 J	3.2 J	0.67 U	2 J	2.8 J	2.6 J	0.67 U	3.1 J	2
1,1-Dichloroethene	5	12	4.0 J	1.3 J	6.0	1.6	2.6 J	6.9	2.2 J	5.5	4.8 J	5.5	3.3 J	0.67 U	0.67 U	3.2
1,2,4-Trichlorobenzene		0.46 U	0.46 U	0.46 U	0.41 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	0.38 U	0.38 U	0.38 U	0.45 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	1 U
1,2-Dibromoethane	5	0.32 U	0.32 U	0.32 U	0.56 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1 U
1,2-Dichlorobenzene	3	0.44 U	0.44 U	0.44 U	0.48 U	0.40 U	0.40 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	1 U
1,2-Dichloroethane	0.6	0.34 U	0.34 U	0.34 U	0.38 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U
1,2-Dichloropropane	1	0.40 U	0.40 U	0.40 U	0.56 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U
1,3-Dichlorobenzene	3	0.50 U	0.50 U	0.50 U	0.45 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U
1,4-Dichlorobenzene	3	0.54 U	0.54 U	0.54 U	0.43 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	1 U
2-Butanone	50	1.1 U	1.1 U	1.1 U	4.6 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	5 U
2-Hexanone	50	1.7 U	1.7 U	1.7 U	2.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	5 U
4-Methyl-2-Pentanone		1.6 U	1.6 U	1.6 U	2.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	5 U
Acetone	50	2.3 U	2.3 U	2.3 U	2.7	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	5 U
Benzene	1	0.39 U	0.39 U	0.39 U	0.52 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U
Bromodichloromethane	50	0.33 U	0.33 U	0.33 U	0.59 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1 U
Bromoform	50	0.32 U	0.32 U	0.32 U	0.42 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	1 U
Bromomethane	5	0.41 U	0.41 U	0.41 U	0.63 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1 U
Carbon Disulfide		0.40 U	0.40 U	0.40 U	0.51 U	0.20 U	0.20 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U
Carbon Tetrachloride	5	1.1 U	1.1 U	1.1 U	0.49 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U
Chlorobenzene	5	0.47 U	0.47 U	0.47 U	0.50 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U
Chloroethane	5	0.83 U	0.83 U	0.83 U	0.49 U	0.80 U	0.80 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	1 U
Chloroform	7	0.33 U	0.33 U	0.33 U	0.46 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U
Chloromethane		0.34 U	0.34 U	0.34 U	0.38 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U
cis-1,2-Dichloroethene	5	0.29 U	0.29 U	0.29 U	0.53 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	1 U
cis-1,3-Dichloropropene	0.4	0.36 U	0.36 U	0.36 U	0.54 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	1 U
Cyclohexane		0.36 U	0.36 U	0.36 U	0.37 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	1 U
Dibromochloromethane	50	0.26 U	0.26 U	0.26 U	0.45 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1 U
Dichlorodifluoromethane	5	0.17 U	0.17 U	0.17 U	0.43 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	1 U
Ethyl Benzene	5	0.45 U	0.45 U	0.45 U	0.50 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U
Isopropylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U
m/p-Xylenes	5	1.2 U	1.2 U	1.2 U	0.97 U	0.47 U	0.47 U	1.4 J	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	2 U
Methyl Acetate		0.20 U	0.20 U	0.20 U	0.92 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U
Methyl tert-butyl Ether		0.28 U	0.28 U	0.28 U	0.50 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1 U
Methylcyclohexane		0.34 U	0.34 U	0.34 U	0.43 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.52 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	1 U
o-Xylene		0.46 U	0.46 U	0.46 U	0.51 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	1 U
Styrene	5	0.41 U	0.41 U	0.41 U	0.48 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1 U
t-1,3-Dichloropropene	0.4	0.32 U	0.32 U	0.32 U	0.44 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U
Tetrachloroethene	5	0.48 U	0.48 U	0.48 U	0.68 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	1 U
Toluene	5	0.36 U	0.36 U	0.36 U	0.51 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	1 U
trans-1,2-Dichloroethene	5	0.40 U	0.40 U	0.40 U	0.57 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	1 U
Trichloroethene	5	0.46 U	0.46 U	0.46 U	0.56 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U
Trichlorofluoromethane	5	0.22 U	0.22 U	0.22 U	0.40 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	1 U
Vinyl Chloride	2	0.33 U	0.33 U	0.33 U	0.46 U	0.30 U	0.30 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U
Total VOCs		64	73	55.7	88.4	79.2	81	96.1	80.4	67.5	66.8	75.3	71.9	75	85.1	54.2

- Concentration exceeds corresponding NYSDEC Class GA Standard.

U - Not detected at the indicated concentration

J - Estimated concentration.

H:\PROJECT\0266365\FILE\Reports\Periodic Review Report\Tables - flow, in-eff samples3-2 RW-1

TABLE 3-2
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (INFLUENT - RW-1)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC Class GA Standard ug/L	RW-1 12/8/2008 WATER ug/L	RW-1 1/8/2009 WATER ug/L	RW-1 2/10/2009 WATER ug/L	RW-1 3/4/2009 WATER ug/L	RW-1 4/3/2009 WATER ug/L	RW-1 5/18/2009 WATER ug/L	RW-1 6/25/2009 WATER ug/L	RW-1 7/28/2009 WATER ug/L	RW-1 8/20/2009 WATER ug/L	RW-1 9/10/2009 WATER ug/L	RW-1 10/13/2009 WATER ug/L	RW-1 11/9/2009 WATER ug/L	RW-1 12/10/2009 WATER ug/L	RW-1 1/7/2010 WATER ug/L	RW-1 2/19/2010 WATER ug/L
VOCs																
1,1,1-Trichloroethane	5	84	64	75	73	73	63	56	55	77	68	79	66	60	53	66
1,1,2,2-Tetrachloroethane	5	1 U	1 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	6.4	2	3.2	3	2.6	2.8	2.4	2.5	3.4	3.2	4.1	3.8	2.9	2.6	3.2
1,1-Dichloroethene	5	7.8	2.1	2.4	0.47 U	2.8	1.3	1.6	3.2	3.4	3.4	3.1	3.9	2.5	2.5	3.2
1,2,4-Trichlorobenzene		1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	1 U	1 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	5	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	1 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	1 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	50	5 U	5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	50	5 U	5 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		5 U	5 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	1 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	50	1 U	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1 U	1 U	1 U	1 U	1 U	3.2	1 U	1 U
Bromomethane	5	1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide		1 U	1 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	7.8	8	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane		1 U	1 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	1 U	1 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane		1 U	1 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	1 U	1 U	1 U	1 U	1 U	2.2	1 U	1 U
Dichlorodifluoromethane	5	1 U	1 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Benzene	5	1 U	1 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m/p-Xylenes	5	2 U	2 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl Acetate		1 U	1 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether		1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane		1 U	1 U	0.68 U	0.68 U	0.68 U	0.68 U	0.68 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U	0.61 J	1 U	1 U
o-Xylene		1 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	5	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
t-1,3-Dichloropropene	0.4	1 U	1 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	1 U	1 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1 U	1 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs		98.2	75.9	88.6	76.0	78.4	67.1	60.0	60.7	83.8	74.6	86.2	73.7	71.4	58.1	72.4

- Concentration exceeds corresponding NYSDEC Class GA Standard.

U - Not detected at the indicated concentration

J - Estimated concentration.

H:\PROJECT\0266365\FILE\Reports\Periodic Review Report\Tables - flow, in-eff samples3-2 RW-1

TABLE 3-2
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (INFLUENT - RW-1)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC Class GA Standard ug/L	RW-1 3/9/2010 WATER ug/L	RW-1 4/6/2010 WATER ug/L	RW-1 8/31/2010 WATER ug/L	RW-1 9/24/2010 WATER ug/L	RW-1 10/5/2010 WATER ug/L	RW-1 11/11/2010 WATER ug/L	RW-1 12/10/2010 WATER ug/L
VOCs								
1,1,1-Trichloroethane	5	54	64	69	62	59	60	93
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	2.7	2.3	1 U	2.9	2.5	1 U	3.9
1,1-Dichloroethene	5	2.6	1.2	2.6	3.4	3.4	1.4	9.6
1,2,4-Trichlorobenzene		1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane		1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Benzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m/p-Xylenes	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl Acetate		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene		1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
t-1,3-Dichloropropene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs		59.3	67.5	71.6	68.3	64.9	62.4	106.5

- Concentration exceeds corresponding NYSDEC Class GA Standard.

U - Not detected at the indicated concentration

J - Estimated concentration.

H:\PROJECT\0266365\FILE\Reports\Periodic Review Report\Tables - flow, in-eff samples3-2 RW-1

TABLE 3-3
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (INFLUENT - RW-2)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC Class GA Standard ug/L	RW-2 9/6/2007 WATER ug/L	RW-2 10/4/2007 WATER ug/L	RW-2 11/6/2007 WATER ug/L	RW-2 12/6/2007 WATER ug/L	RW-2 1/9/2008 WATER ug/L	RW-2 2/6/2008 WATER ug/L	RW-2 3/6/2008 WATER ug/L	RW-2 4/7/2008 WATER ug/L	RW-2 5/5/2008 WATER ug/L	RW-2 6/6/2008 WATER ug/L	RW-2 7/2/2008 WATER ug/L	RW-2 8/8/2008 WATER ug/L	RW-2 9/5/2008 WATER ug/L	RW-2 10/3/2008 WATER ug/L	RW-2 11/6/2008 WATER ug/L
VOCs																
1,1,1-Trichloroethane	5	45	46	40	53	53	56	56	57	44	41	49	50	58	60	49
1,1,2,2-Tetrachloroethane	5	0.30 U	0.30 U	0.30 U	0.49 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U
1,1,2-Trichloroethane	1	0.41 U	0.41 U	0.41 U	0.52 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1.3 U	1.3 U	1.3 U	0.35 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	1 U
1,1-Dichloroethane	5	0.38 U	0.38 U	0.38 U	1.2	0.98 J	1.2 J	1.3 J	0.67 U	0.67 U	0.92 J	1 J	0.67 U	0.67 U	0.67 U	1 U
1,1-Dichloroethene	5	7.9	5.4	1.1 J	4.1	1.0	1.7 J	3.8 J	2.1 J	4.2 J	3 J	4.6 J	0.67 U	0.67 U	0.67 U	1 U
1,2,4-Trichlorobenzene		0.46 U	0.46 U	0.46 U	0.41 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	0.38 U	0.38 U	0.38 U	0.45 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	1 U
1,2-Dibromoethane	5	0.32 U	0.32 U	0.32 U	0.56 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	1 U
1,2-Dichlorobenzene	3	0.44 U	0.44 U	0.44 U	0.48 U	0.40 U	0.40 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	1 U
1,2-Dichloroethane	0.6	0.34 U	0.34 U	0.34 U	0.38 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U
1,2-Dichloropropane	1	0.40 U	0.40 U	0.40 U	0.56 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U
1,3-Dichlorobenzene	3	0.50 U	0.50 U	0.50 U	0.45 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U
1,4-Dichlorobenzene	3	0.54 U	0.54 U	0.54 U	0.43 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	1 U
2-Butanone	50	1.1 U	1.1 U	1.1 U	4.6 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	5 U
2-Hexanone	50	1.7 U	1.7 U	1.7 U	2.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	5 U
4-Methyl-2-Pentanone		1.6 U	1.6 U	1.6 U	2.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	5 U
Acetone	50	2.3 U	2.3 U	2.3 U	2.7 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	5 U
Benzene	1	0.39 U	0.39 U	0.39 U	0.52 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U
Bromodichloromethane	50	0.33 U	0.33 U	0.33 U	0.59 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1 U
Bromoform	50	0.32 U	0.32 U	0.32 U	0.42 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	1 U
Bromomethane	5	0.41 U	0.41 U	0.41 U	0.63 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1 U
Carbon Disulfide		0.40 U	0.40 U	0.40 U	0.51 U	0.20 U	0.20 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	1 U
Carbon Tetrachloride	5	1.1 U	1.1 U	1.1 U	0.49 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U
Chlorobenzene	5	0.47 U	0.47 U	0.47 U	0.50 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U
Chloroethane	5	0.83 U	0.83 U	0.83 U	0.49 U	0.80 U	0.80 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U	1 U
Chloroform	7	0.33 U	0.33 U	0.33 U	0.46 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U
Chloromethane		0.34 U	0.34 U	0.34 U	0.38 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U
cis-1,2-Dichloroethene	5	0.29 U	0.29 U	0.29 U	0.53 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.82 J
cis-1,3-Dichloropropene	0.4	0.36 U	0.36 U	0.36 U	0.54 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	1 U
Cyclohexane		0.36 U	0.36 U	0.36 U	0.37 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	2.8
Dibromochloromethane	50	0.26 U	0.26 U	0.26 U	0.45 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1 U
Dichlorodifluoromethane	5	0.17 U	0.17 U	0.17 U	0.43 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	1 U
Ethyl Benzene	5	0.45 U	0.45 U	0.45 U	0.50 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	1 U
Isopropylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U
m/p-Xylenes	5	1.2 U	1.2 U	1.2 U	0.97 U	0.47 U	0.47 U	1.2 J	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	2 U
Methyl Acetate		0.20 U	0.20 U	0.20 U	0.92 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U
Methyl tert-butyl Ether		0.28 U	0.28 U	0.28 U	0.50 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1 U
Methylcyclohexane		0.34 U	0.34 U	0.34 U	0.43 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.52 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	1 U
o-Xylene		0.46 U	0.46 U	0.46 U	0.51 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	1 U
Styrene	5	0.41 U	0.41 U	0.41 U	0.48 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	1 U
t-1,3-Dichloropropene	0.4	0.32 U	0.32 U	0.32 U	0.44 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U
Tetrachloroethene	5	0.48 U	0.48 U	0.48 U	0.68 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	1 U
Toluene	5	0.36 U	0.36 U	0.36 U	0.51 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	1 U
trans-1,2-Dichloroethene	5	0.40 U	0.40 U	0.40 U	0.57 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	1 U
Trichloroethene	5	0.46 U	0.46 U	0.46 U	0.56 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U
Trichlorofluoromethane	5	0.22 U	0.22 U	0.22 U	0.40 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	1 U
Vinyl Chloride	2	0.33 U	0.33 U	0.33 U	0.46 U	0.30 U	0.30 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	1 U
Total VOCs		53	51	41	58	55.0	58.9	62.3	59.1	48.2	44.0	54.6	50.0	58.0	60.0	52.6

- Concentration exceeds corresponding NYSDEC Class GA Standard.

U - Not detected at the indicated concentration

J - Estimated concentration.

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TABLE 3-3
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (INFLUENT - RW-2)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC Class GA Standard ug/L	RW-2 12/8/2008 WATER ug/L	RW-2 1/8/2009 WATER ug/L	RW-2 2/10/2009 WATER ug/L	RW-2 3/4/2009 WATER ug/L	RW-2 4/3/2009 WATER ug/L	RW-2 5/18/2009 WATER ug/L	RW-2 6/25/2009 WATER ug/L	RW-2 7/28/2009 WATER ug/L	RW-2 8/20/2009 WATER ug/L	RW-2 9/10/2009 WATER ug/L	RW-2 10/13/2009 WATER ug/L	RW-2 11/9/2009 WATER ug/L	RW-2 12/10/2009 WATER ug/L	RW-2 1/7/2010 WATER ug/L	RW-2 2/19/2010 WATER ug/L
VOCs																
1,1,1-Trichloroethane	5	49	49	61	51	50	45	43	43	44	52	72	51	45	43	49
1,1,2,2-Tetrachloroethane	5	1 U	1 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	4.3	1 U	1.2	1.2	0.36 U	1.1	0.94 J	0.85 J	0.95 J	1.1	1.8	1.3	1.1	0.9 J	1.1
1,1-Dichloroethene	5	5.2	1 U	1.8	0.47 U	0.47 U	0.73 J	0.87 J	1.9	1.7	2	2.5	2.2	1.6	1.7	1.9
1,2,4-Trichlorobenzene		1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	1 U	1 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	5	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	1 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	1 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	50	5 U	5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	50	5 U	5 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		5 U	5 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	1 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	50	1 U	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1 U	1 U	1 U	1 U	1 U	1.3	1 U	1 U
Bromomethane	5	1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide		1 U	1 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	5.9	6.4	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane		1 U	1 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	1 U	1 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane		1 U	1 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	1 U	1 U	1 U	1 U	1 U	0.78 J	1 U	1 U
Dichlorodifluoromethane	5	1 U	1 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Benzene	5	1 U	1 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m/p-Xylenes	5	2 U	2 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl Acetate		1 U	1 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether		1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane		1 U	1 U	0.68 U	0.68 U	0.68 U	0.68 U	0.68 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U	2.1	1 U	1 U
o-Xylene		1 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	5	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
t-1,3-Dichloropropene	0.4	1 U	1 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	1 U	1 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1 U	1 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs		58.5	54.9	70.4	52.2	50.0	46.8	44.8	45.8	46.7	55.1	76.3	54.5	51.9	45.6	52.0

- Concentration exceeds corresponding NYSDEC Class GA Standard.

U - Not detected at the indicated concentration

J - Estimated concentration.

H:\PROJECT\0266365\FILE\Reports\Periodic Review Report\Tables - flow, in-eff samples3-3 RW-2

TABLE 3-3
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (INFLUENT - RW-2)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC Class GA Standard ug/L	RW-2 3/9/2010 WATER ug/L	RW-2 4/6/2010 WATER ug/L	RW-2 5/14/2010 WATER ug/L	RW-2 6/8/2010 WATER ug/L	RW-2 7/8/2010 WATER ug/L	RW-2 8/31/2010 WATER ug/L	RW-2 9/24/2010 WATER ug/L	RW-2 10/5/2010 WATER ug/L	RW-2 11/11/2010 WATER ug/L	RW-2 12/10/2010 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	**43**	**52**	**44**	**59**	**41**	**52**	**45**	**53**	**43**	**58**
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1	1.1	0.96 J	1 U	0.91 J	1.4	0.94 J	1.3	1 U	1.2
1,1-Dichloroethene	5	1.7	0.86 J	1.7	1 U	1.2	1.9	2.6	1.4	0.86 J	**5.8**
1,2,4-Trichlorobenzene		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Benzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m/p-Xylenes	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl Acetate		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
t-1,3-Dichloropropene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Total VOCs		45.7	54.0	46.7	59.0	43.1	55.3	48.5	55.7	44.9	65.0

- Concentration exceeds corresponding NYSDEC Class GA Standard.

U - Not detected at the indicated concentration

J - Estimated concentration.

TABLE 3-4
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (EFFLUENT)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	EFF 9/6/2007 WATER ug/L	EFF 10/4/2007 WATER ug/L	EFF 11/6/2007 WATER ug/L	EFF 12/6/2007 WATER ug/L	EFF(40HZ) 1/9/2008 WATER ug/L	EFF(50HZ) 1/9/2008 WATER ug/L	EFF(60HZ) 1/9/2008 WATER ug/L	EFF(42HZ) 2/6/2008 WATER ug/L	EFF(44HZ) 2/6/2008 WATER ug/L	F(44HZ) Duplic 2/6/2008 WATER ug/L	EFF(46HZ) 2/6/2008 WATER ug/L	EFF(42HZ) 3/6/2008 WATER ug/L	EFF(42HZ) 4/7/2008 WATER ug/L	EFF(42HZ) 5/5/2008 WATER ug/L	EFF(43HZ) 6/6/2008 WATER ug/L	EFF(44HZ) 7/2/2008 WATER ug/L
VOCs																	
1,1,1-Trichloroethane	5	0.32 U	0.32 U	0.32 U	0.46 U	**6.0**	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	2.2 J	0.39 U	1.9 J	0.39 U
1,1,2,2-Tetrachloroethane	5	0.30 U	0.30 U	0.30 U	0.49 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
1,1,2-Trichloroethane	1	0.41 U	0.41 U	0.41 U	0.52 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U
1,1,2-Trichlorotrifluoroethane	5	1.3 U	1.3 U	1.3 U	0.35 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U	0.61 U
1,1-Dichloroethane	5	0.38 U	0.38 U	0.38 U	0.55 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U
1,1-Dichloroethene	5	0.42 U	0.42 U	0.42 U	0.55 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U
1,2,4-Trichlorobenzene		0.46 U	0.46 U	0.46 U	0.41 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U
1,2-Dibromo-3-Chloropropane	0.04	0.38 U	0.38 U	0.38 U	0.45 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U	0.58 U
1,2-Dibromoethane	5	0.32 U	0.32 U	0.32 U	0.56 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U
1,2-Dichlorobenzene	3	0.44 U	0.44 U	0.44 U	0.48 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.40 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U
1,2-Dichloroethane	0.6	0.34 U	0.34 U	0.34 U	0.38 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U
1,2-Dichloropropane	1	0.40 U	0.40 U	0.40 U	0.56 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U
1,3-Dichlorobenzene	3	0.50 U	0.50 U	0.50 U	0.45 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
1,4-Dichlorobenzene	3	0.54 U	0.54 U	0.54 U	0.43 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
2-Butanone	50	1.1 U	1.1 U	43	4.6 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U
2-Hexanone	50	1.7 U	1.7 U	1.7 U	2.9 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
4-Methyl-2-Pentanone		1.6 U	1.6 U	1.6 U	2.7 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U
Acetone	50	2.3 U	2.3 U	2.3 U	2.7 U	2.2 U	2.2 U	2.2	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U
Benzene	1	0.39 U	0.39 U	0.39 U	0.52 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U
Bromodichloromethane	50	0.33 U	0.33 U	0.33 U	0.59 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Bromoform	50	0.32 U	0.32 U	0.32 U	0.42 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Bromomethane	5	0.41 U	0.41 U	0.41 U	0.63 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U
Carbon Disulfide		0.40 U	0.40 U	0.40 U	0.51 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U
Carbon Tetrachloride	5	1.1 U	1.1 U	1.1 U	0.49 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
Chlorobenzene	5	0.47 U	0.47 U	0.47 U	0.50 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U
Chloroethane	5	0.83 U	0.83 U	0.83 U	0.49 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.80 U	0.8 U	0.8 U	0.8 U	0.8 U	0.8 U
Chloroform	7	0.33 U	0.33 U	0.33 U	0.46 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Chloromethane		0.34 U	0.34 U	0.34 U	0.38 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
cis-1,2-Dichloroethene	5	0.29 U	0.29 U	0.29 U	0.53 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U	0.72 U
cis-1,3-Dichloropropene	0.4	0.36 U	0.36 U	0.36 U	0.54 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U
Cyclohexane		0.36 U	0.36 U	0.36 U	0.37 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U	0.57 U
Dibromochloromethane	50	0.26 U	0.26 U	0.26 U	0.45 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Dichlorodifluoromethane	5	0.17 U	0.17 U	0.17 U	0.43 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U
Ethyl Benzene	5	0.45 U	0.45 U	0.45 U	0.50 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U	0.05 U
Isopropylbenzene	5	0.44 U	0.44 U	0.44 U	0.44 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U
m/p-Xylenes	5	1.2 U	1.2 U	1.2 U	0.97 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1.2 J	0.47 U	0.47 U	0.47 U	0.47 U
Methyl Acetate		0.20 U	0.20 U	0.20 U	0.92 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U
Methyl tert-butyl Ether		0.28 U	0.28 U	0.28 U	0.50 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
Methylcyclohexane		0.34 U	0.34 U	0.34 U	0.43 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U
Methylene Chloride	5	0.43 U	0.43 U	0.43 U	0.52 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U
o-Xylene		0.46 U	0.46 U	0.46 U	0.51 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
Styrene	5	0.41 U	0.41 U	0.41 U	0.48 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U	0.19 U
t-1,3-Dichloropropene	0.4	0.32 U	0.32 U	0.32 U	0.44 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U
Tetrachloroethene	5	0.48 U	0.48 U	0.48 U	0.68 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U	0.97 U
Toluene	5	0.36 U	0.36 U	0.36 U	0.51 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U	0.16 U
trans-1,2-Dichloroethene	5	0.40 U	0.40 U	0.40 U	0.57 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U
Trichloroethene	5	0.46 U	0.46 U	0.46 U	0.56 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U
Trichlorofluoromethane	5	0.22 U	0.22 U	0.22 U	0.40 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U
Vinyl Chloride	2	0.33 U	0.33 U	0.33 U	0.46 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U

Notes
U - Not detected at the indicated concentration.
J - Estimated concentration.

TABLE 3-4
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (EFFLUENT)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	EFF(44HZ) 8/8/2008 WATER ug/L	EFF(44HZ) 9/5/2008 WATER ug/L	EFF(44HZ) 10/3/2008 WATER ug/L	EFF(44HZ) 11/6/2008 WATER ug/L	EFF(44HZ) 12/8/2008 WATER ug/L	EFF(44HZ) 1//8/09 WATER ug/L	EFF(44HZ) 2/10/2009 WATER ug/L	EFF(44HZ) 3/4/2009 WATER ug/L	EFF(44HZ) 4/3/2009 WATER ug/L	EFF(44HZ) 5/18/2009 WATER ug/L	EFF(44HZ) 6/25/2009 WATER ug/L	EFF(44HZ) 7/28/2009 WATER ug/L	EFF(44HZ) 8/20/2009 WATER ug/L	EFF(44HZ) 9/10/2009 WATER ug/L	EFF(44HZ) 10/13/2009 WATER ug/L	EFF(44HZ) 11/9/2009 WATER ug/L
VOCs																	
1,1,1-Trichloroethane	5	0.39 U	0.39 U	0.39 U	1 U	1 U	1 U	0.4 U	0.4 U	0.4 U	0.4 U	2.1	2.2	2.7	1.3	1 U	1 U
1,1,2,2-Tetrachloroethane	5	0.37 U	0.37 U	0.37 U	1 U	1 U	1 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	5	0.61 U	0.61 U	0.61 U	1 U	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	0.67 U	0.67 U	0.67 U	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	0.67 U	0.67 U	0.67 U	1 U	1 U	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene		0.39 U	0.39 U	0.39 U	1 U	2.2	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	0.58 U	0.58 U	0.58 U	1 U	1 U	1 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	5	0.26 U	0.26 U	0.26 U	1 U	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	0.4 U	0.4 U	0.4 U	1 U	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	0.48 U	0.48 U	0.48 U	0.48 U	0.48 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	0.46 U	0.46 U	0.46 U	0.46 U	0.46 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	0.28 U	0.28 U	0.28 U	1 U	1 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	0.22 U	0.22 U	0.22 U	1 U	1 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	50	1.9 U	1.9 U	1.9 U	5 U	5 U	5 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	50	1.8 U	1.8 U	1.8 U	5 U	5 U	5 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		1.8 U	1.8 U	1.8 U	5 U	5 U	5 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	2.2 U	2.2 U	2.2 U	5 U	5 U	5 U	2.8 U	2.8 U	2.8 U	2.8 U	2.8 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	0.23 U	0.23 U	0.23 U	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U
Bromoform	50	0.44 U	0.44 U	0.44 U	1 U	1 U	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	5	1.4 U	1.4 U	1.4 U	1 U	1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide		0.2 U	0.2 U	0.2 U	1 U	1 U	1 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	0.27 U	0.27 U	0.27 U	1 U	1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	0.62 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	5	0.28 U	0.28 U	0.28 U	1 U	1 U	1 U	0.49 U	0.49 U	0.49 U	0.49 U	0.49 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	5	0.8 U	0.8 U	0.8 U	1 U	1 U	1 U	0.66 U	0.66 U	0.66 U	0.66 U	0.66 U	1 U	1 U	1 U	1 U	1 U
Chloroform	7	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U	1 U
Chloromethane		0.37 U	0.37 U	0.37 U	1 U	1 U	1 U	0.54 U	0.54 U	0.54 U	0.54 U	0.54 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	0.72 U	0.72 U	0.72 U	1 U	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	0.29 U	0.29 U	0.29 U	1 U	1 U	1 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane		0.57 U	0.57 U	0.57 U	1.9	1 U	1 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	50	0.23 U	0.23 U	0.23 U	1 U	1 U	1 U	0.52 U	0.52 U	0.52 U	0.52 U	0.52 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	5	0.88 U	0.88 U	0.88 U	1 U	1 U	1 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	1 U	1 U	1 U	1 U	1 U
Ethyl Benzene	5	0.05 U	0.05 U	0.05 U	1 U	1 U	1 U	0.53 U	0.53 U	0.53 U	0.53 U	0.53 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	0.37 U	0.37 U	0.37 U	1 U	1 U	1 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	1 U	1 U
m/p-Xylenes	5	0.47 U	0.47 U	0.47 U	2 U	2 U	2 U	0.95 U	0.95 U	0.95 U	0.95 U	0.95 U	2 U	2 U	2 U	2 U	2 U
Methyl Acetate		0.45 U	0.45 U	0.45 U	1 U	1 U	1 U	0.83 U	0.83 U	0.83 U	0.83 U	0.83 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether		0.23 U	0.23 U	0.23 U	1 U	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane		0.47 U	0.47 U	0.47 U	1 U	1 U	1 U	0.68 U	0.68 U	0.68 U	0.68 U	0.68 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	0.38 U	0.38 U	0.38 U	1 U	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U
o-Xylene		0.16 U	0.16 U	0.16 U	1 U	1 U	1 U	0.43 U	0.43 U	0.43 U	0.43 U	0.43 U	1 U	1 U	1 U	1 U	1 U
Styrene	5	0.19 U	0.19 U	0.19 U	1 U	1 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.36 U	1 U	1 U	1 U	1 U	1 U
t-1,3-Dichloropropene	0.4	0.31 U	0.31 U	0.31 U	1 U	1 U	1 U	0.29 U	0.29 U	0.29 U	0.29 U	0.29 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	0.97 U	0.97 U	0.97 U	1 U	1 U	1 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	0.16 U	0.16 U	0.16 U	1 U	1 U	1 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	0.44 U	0.44 U	0.44 U	1 U	1 U	1 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	0.34 U	0.34 U	0.44 U	1 U	1 U	1 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	0.53 U	0.53 U	0.34 U	1 U	1 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	0.3 U	0.3 U	0.53 U	1 U	1 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	1 U	1 U	1 U	1 U	1 U

Notes
U - Not detected at the indicated concentration.
J - Estimated concentration.

TABLE 3-4
SUMMARY OF GROUNDWATER TREATMENT SYSTEM VOCS (EFFLUENT)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	EFF(44HZ) 12/10/2009 WATER ug/L	EFF(44HZ) 1/7/2010 WATER ug/L	EFF(44HZ) 2/19/2010 WATER ug/L	EFF(44HZ) 3/9/2010 WATER ug/L	EFF(44HZ) 4/6/2010 WATER ug/L	EFF(44HZ) 5/14/2010 WATER ug/L	EFF(44HZ) 6/8/2010 WATER ug/L	EFF(44HZ) 7/8/2010 WATER ug/L	EFF(44HZ) 8/31/2010 WATER ug/L	EFF(46HZ) 9/24/2010 WATER ug/L	EFF(46HZ) 10/5/2010 WATER ug/L	EFF(46HZ) 11/11/2010 WATER ug/L	EFF(46HZ) 12/10/2010 WATER ug/L
VOCs														
1,1,1-Trichloroethane	5	1 U	1 U	1 U	2.6	2.4	1 U	1 U	1 U	4.2	1 U	0.67 J	1 U	0.61 J
1,1,2,2-Tetrachloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichloroethane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1,2-Trichlorotrifluoroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,1-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2,4-Trichlorobenzene		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromo-3-Chloropropane	0.04	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dibromoethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloroethane	0.6	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,2-Dichloropropane	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,3-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
1,4-Dichlorobenzene	3	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
2-Butanone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
2-Hexanone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
4-Methyl-2-Pentanone		5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Acetone	50	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U	5 U
Benzene	1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromodichloromethane	50	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromoform	50	1.7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Bromomethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Disulfide		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Carbon Tetrachloride	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chlorobenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloroform	7	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Chloromethane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
cis-1,3-Dichloropropene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Cyclohexane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dibromochloromethane	50	1.1	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Dichlorodifluoromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Ethyl Benzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Isopropylbenzene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
m/p-Xylenes	5	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U
Methyl Acetate		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methyl tert-butyl Ether		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylcyclohexane		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Methylene Chloride	5	2.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
o-Xylene		1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Styrene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
t-1,3-Dichloropropene	0.4	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Tetrachloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Toluene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
trans-1,2-Dichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichloroethene	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Trichlorofluoromethane	5	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U
Vinyl Chloride	2	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U	1 U

Notes
U - Not detected at the indicated concentration.
J - Estimated concentration.

Table 3-5
SUMMARY OF GROUNDWATER MONITORING WELL WATER LEVEL DATA
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC SITE No. 7-09-009

Well ID	Monitored Interval	Measuring Point Elevation [1] (feet)	8/23/2007 Elevation (feet amsl)	10/23/2008 Elevation (feet amsl)	6/11/2009 Elevation (feet amsl)
TW-1	Shallow	1212.71 [4]	-	-	1205.12
TW-2S	Shallow	1212.57 [4]	-	-	1203.84
TW-2I	Intermediate	1212.16 [4]	-	-	1203.61
TW-2D	Deep	1212.26 [4]	-	-	1203.63
TW-3S	Shallow	1213.60	1203.04	1203.26	1203.45
TW-3I	Intermediate	1213.19	1203.23	1203.45	1203.63
TW-3D	Deep	1213.47	1203.26	1203.46	1203.65
TW-4I	Intermediate	1209.96 [2]	1204.25	1202.15	1202.57
TW-5S	Shallow	1211.78	1203.19	1202.87	1203.21
TW-5I	Intermediate	1211.89	1202.86	1202.61	1203.00
TW-5D	Deep	1212.55	1202.63	1202.43	1202.77
TW-6S	Shallow	1212.38 [2]	-	1202.44	1202.87
TW-6I	Intermediate	1212.92 [2]	-	1202.23	1202.66
TW-6D	Deep	1212.35 [2]	-	1201.89	1202.3
TW-7S	Shallow	1213.48	1203.76	1203.96	1204.17
TW-7I	Intermediate	1213.60	1203.34	1203.4	1203.76
TW-7D	Deep	1213.25	1203.18	1203.35	1203.59
TW-9I	Intermediate	1213.75 [4]	-	-	1203.19
TW-9D	Deep	1213.84 [4]	-	-	1202.98
TW-10D	Deep	1212.47 [4]	-	-	1202.06
TW-12I	Intermediate	-	-	-	-
TW-12D	Deep	-	-	-	-
TW-14S	Shallow	1210.05 [2]	1204.46	1202.53	1202.88
TW-14I	Intermediate	1210.17 [2]	1204.05	1202.25	1202.5
TW-14D	Deep	1209.98 [2]	1204.06	1202.37	1202.72
TW-15	Intermediate	1212.94 [2]	1201.21	1202.51	1202.88
RW-1	Recovery Well	1169.98 [2,3]	-	-	1200.28
RW-2	Recovery Well	-	-	-	-

Notes:

1 - Measuring point elevations from: Operation and Maintenance Manual, Volume I, Gladding Cordage Site, TAMS Consulting, Inc., 1996.
2 - Based on December 2007 survey referenced from TW-5D top of casing elevation.
3 - RW-1 water elevation calculated from water level pressure transducer reading.
4 - Based on June 2009 survey referenced from TW-3S, 5D, and 6D top of casing elevations.

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-1 6/25/2009 WATER ug/L	TW-2S 6/25/2009 WATER ug/L	TW-2I 6/25/2009 WATER ug/L	TW-2D 6/25/2009 WATER ug/L	TW-3S 9/6/2007 WATER ug/L	TW-3S 10/17/2008 WATER ug/L	TW-3S 6/25/2009 WATER ug/L	TW-3I 9/6/2007 WATER ug/L	TW-3I 10/17/2008 WATER ug/L	TW-3I 6/25/2009 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	0.4 U	0.4 U	1.4	0.4 U	0.32 U	3.4	0.4 U	**9.1**	**6.7**	0.4 U
1,1-Dichloroethane	*	0.36 U	0.36 U	0.36 U	0.36 U	0.38 U	1 U	0.36 U	0.38 U	1 U	0.36 U
1,1-Dichloroethene	5	0.47 U	0.47 U	0.47 U	0.47 U	0.42 U	1 U	0.47 U	0.42 U	1 U	0.47 U
Acetone	50	10	11	9.5	19	2.3 U	5 U	13	2.3 U	5 U	16
Benzene	1	0.32 U	0.32 U	0.32 U	0.32 U	0.39 U	1 U	0.32 U	0.39 U	1 U	0.32 U
Carbon Tetrachloride	5	0.62 U	0.62 U	0.62 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U	1 U	0.62 U
Chloroform	7	0.34 U	0.34 U	0.34 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1 U	0.34 U
cis-1,2-Dichloroethene	5	0.35 U	0.35 U	0.35 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U	0.35 U
Tetrachloroethene	5	0.27 U	0.27 U	0.27 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U	0.27 U
Trichloroethene	5	0.28 U	0.28 U	0.28 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U	0.28 U
Total VOCs		10	11	10.9	19	0	3.4	13	9.1	6.7	16

Notes

- Concentration exceeds corresponding NYSDEC Class GA Standard.

* - NYSDEC Principal Organic Contaminant Standard of 5 ug/l applies to this compound.

U - The compound was not detected at the indicated concentration.

J - Compound detected below the reporting limit or Concentration is estimated for TICS.

D - Sample dilluted

1 - TW-11 is a duplicate sample collected at TW-6S

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-3D 9/6/2007 WATER ug/L	TW-3D 10/17/2008 WATER ug/L	TW-3D 6/25/2009 WATER ug/L	TW-4I 9/6/2007 WATER ug/L	TW-4I 10/17/2008 WATER ug/L	TW-4I 6/25/2009 WATER ug/L	TW-5S 9/6/2007 WATER ug/L	TW-5S 10/17/2008 WATER ug/L	TW-5S 6/25/2009 WATER ug/L	TW-5I 9/6/2007 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	0.32 U	1.3	1.4	**6.6**	1.1	0.4 U	0.32 U	**11**	**13**	4.8 J
1,1-Dichloroethane	*	0.38 U	1 U	0.36 U	0.38 U	3.8	3.8	0.38 U	1 U	0.48 J	0.38 U
1,1-Dichloroethene	5	0.42 U	1 U	0.47 U	0.42 U	1 U	0.47 U	0.42 U	1 U	0.47 U	0.42 U
Acetone	50	2.3 U	5 U	11	2.3 U	5 U	16	2.3 U	5 U	9.2	2.3 U
Benzene	1	0.39 U	1 U	0.32 U	0.39 U	1 U	0.32 U	0.39 U	1 U	0.32 U	**6.2**
Carbon Tetrachloride	5	1.1 U	1 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U
Chloroform	7	0.33 U	1 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U
cis-1,2-Dichloroethene	5	0.29 U	1 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U
Tetrachloroethene	5	0.48 U	1 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U
Trichloroethene	5	0.46 U	1 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U
Total VOCs		0	1.3	12.4	6.6	4.9	19.8	0	11	22.68	11.4

Notes

- Concentration exceeds corresponding NYSDEC Class GA Standard.

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D - Sample dilluted

1 - TW-11 is a duplicate sample collected at TW-6S

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-5I 10/17/2008 WATER ug/L	TW-5I 6/25/2009 WATER ug/L	TW-5D 9/6/2007 WATER ug/L	TW-5D 10/17/2008 WATER ug/L	TW-5D 6/25/2009 WATER ug/L	TW-6S 9/6/2007 WATER ug/L	TW-6S 10/17/2008 WATER ug/L	TW-6S 6/25/2009 WATER ug/L	TW-11[(1)] 6/25/2009 WATER ug/L	TW-6I 9/6/2007 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	**8.8**	**90**	**41**	**28**	**32**	0.32 U	0.53 J	0.4 U	0.4 U	0.32 U
1,1-Dichloroethane	*	1	3.5	0.38 U	1 U	0.36 U	0.38 U	1 U	0.36 U	0.36 U	0.38 U
1,1-Dichloroethene	5	1 U	0.47 U	0.42 U	1 U	0.47 U	0.42 U	1 U	0.47 U	0.47 U	0.42 U
Acetone	50	5 U	13	2.3 U	5 U	20	2.3 U	5 U	11	11	2.3 U
Benzene	1	**3.5**	0.32 U	0.39 U	1 U	0.32 U	0.39 U	1 U	0.32 U	0.32 U	0.39 U
Carbon Tetrachloride	5	1 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U	1 U	0.62 U	0.62 U	1.1 U
Chloroform	7	1 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1.6	1	0.99 J	0.33 U
cis-1,2-Dichloroethene	5	1 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U	0.35 U	0.35 U	0.29 U
Tetrachloroethene	5	1 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U	0.27 U	0.27 U	0.48 U
Trichloroethene	5	1 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U	0.28 U	0.28 U	0.46 U
Total VOCs		13.3	106.5	41	28	52	0	2.13	12	11.99	0

Notes

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1 - TW-11 is a duplicate sample collected at TW-6S

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-6I 10/17/2008 WATER ug/L	TW-6I 6/25/2009 WATER ug/L	TW-6D 9/6/2007 WATER ug/L	TW-6D 10/17/2008 WATER ug/L	TW-6D 6/25/2009 WATER ug/L	TW-7S 9/6/2007 WATER ug/L	TW-7S 10/17/2008 WATER ug/L	TW-7S 6/25/2009 WATER ug/L	TW-7I 9/6/2007 WATER ug/L	TW-7I 10/17/2008 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	1.3	0.4 U	0.32 U	1 U	0.4 U	**8.2**	**18**	**7.8**	0.32 U	1.5
1,1-Dichloroethane	*	1 U	0.36 U	0.38 U	1 U	0.36 U	0.38 U	1 U	0.36 U	0.38 U	1 U
1,1-Dichloroethene	5	1 U	0.47 U	0.42 U	1 U	0.47 U	0.42 U	1 U	0.47 U	0.42 U	1 U
Acetone	50	4.4 J	11	2.3 U	5 U	21	2.3 U	3.3 J	22	2.3 U	5 U
Benzene	1	1 U	0.32 U	0.39 U	1 U	1	0.39 U	1 U	0.32 U	0.39 U	1 U
Carbon Tetrachloride	5	1 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U	2.6	0.62 U	1.1 U	1 U
Chloroform	7	1 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1 U
cis-1,2-Dichloroethene	5	4.1	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U
Tetrachloroethene	5	2.4	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U
Trichloroethene	5	1.2	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U
Total VOCs		13.4	11	0	0	22	8.2	23.9	29.8	0	1.5

Notes

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D - Sample dilluted

1 - TW-11 is a duplicate sample collected at TW-6S

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-7I 6/25/2009 WATER ug/L	TW-7D 9/6/2007 WATER ug/L	TW-7D 10/17/2008 WATER ug/L	TW-7D 6/25/2009 WATER ug/L	TW-9I 6/25/2009 WATER ug/L	TW-9D 6/25/2009 WATER ug/L	TW-10D 6/25/2009 WATER ug/L	TW-12I 9/6/2007 WATER ug/L	TW-12I 10/17/2008 WATER ug/L	TW-12I 6/25/2009 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	0.4 U	**21**	3.8	**9.1**	**5.5**	0.4 U	0.53 J	0.32 U	1 U	0.4 U
1,1-Dichloroethane	*	0.36 U	0.38 U	1 U	0.36 U	0.36 U	0.36 U	0.36 U	0.38 U	1 U	0.36 U
1,1-Dichloroethene	5	0.47 U	4.8 J	1 U	0.47 U	0.47 U	0.47 U	0.47 U	0.42 U	1 U	0.47 U
Acetone	50	15	2.3 U	5 U	17	17	9.1	19	2.3 U	5 U	10
Benzene	1	0.32 U	0.39 U	1 U	0.32 U	0.32 U	0.32 U	0.32 U	0.39 U	1 U	0.32 U
Carbon Tetrachloride	5	0.62 U	1.1 U	1 U	0.62 U	0.62 U	0.62 U	0.62 U	1.1 U	1 U	0.62 U
Chloroform	7	0.34 U	0.33 U	1 U	0.34 U	0.34 U	0.34 U	0.34 U	0.33 U	1 U	0.34 U
cis-1,2-Dichloroethene	5	0.35 U	0.29 U	1 U	0.35 U	0.35 U	0.35 U	0.35 U	0.29 U	1 U	0.35 U
Tetrachloroethene	5	0.27 U	0.48 U	1 U	0.27 U	0.27 U	0.27 U	0.27 U	0.48 U	1 U	0.27 U
Trichloroethene	5	0.28 U	0.46 U	1 U	0.28 U	0.28 U	0.28 U	0.28 U	0.46 U	1 U	0.28 U
Total VOCs		15	25.8	3.8	26.1	22.5	9.1	19.53	0	0	10

Notes

- Concentration exceeds corresponding NYSDEC Class GA Standard.

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D - Sample dilluted

1 - TW-11 is a duplicate sample collected at TW-6S

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-12D 9/6/2007 WATER ug/L	TW-12D 6/25/2009 WATER ug/L	TW-14S 9/6/2007 WATER ug/L	TW-14S 10/17/2008 WATER ug/L	TW-14S 6/25/2009 WATER ug/L	TW-14I 9/6/2007 WATER ug/L	TW-14I 10/17/2008 WATER ug/L	TW-14I 6/25/2009 WATER ug/L	TW-14D 9/6/2007 WATER ug/L	TW-14D 10/17/2008 WATER ug/L
VOCs											
1,1,1-Trichloroethane	5	0.32 U	0.4 U	0.32 U	**68**	0.4 U	**39**	**95**	**83**	**42**	**18**
1,1-Dichloroethane	*	0.38 U	0.36 U	0.38 U	**5.8**	1.2	0.38 U	2.8	3.2	0.38 U	1 U
1,1-Dichloroethene	5	0.42 U	0.47 U	0.42 U	1 U	0.47 U	3.7 J	1.5	0.47 U	**7.2**	1 U
Acetone	50	2.3 U	14	2.3 U	5 U	14	2.3 U	5 U	13	2.3 U	5 U
Benzene	1	0.39 U	0.32 U	0.39 U	1 U	0.32 U	0.39 U	1 U	0.32 U	0.39 U	1 U
Carbon Tetrachloride	5	1.1 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U	1 U	0.62 U	1.1 U	1 U
Chloroform	7	0.33 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1 U	0.34 U	0.33 U	1 U
cis-1,2-Dichloroethene	5	0.29 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U	0.35 U	0.29 U	1 U
Tetrachloroethene	5	0.48 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U	0.27 U	0.48 U	1 U
Trichloroethene	5	0.46 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U	0.28 U	0.46 U	1 U
Total VOCs		0	14	0	73.8	15.2	42.7	99.3	99.2	49.2	18

Notes

- Concentration exceeds corresponding NYSDEC Class GA Standard.

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J - Compound detected below the reporting limit or Concentration is estimated for TICS.

D - Sample dilluted

1 - TW-11 is a duplicate sample collected at TW-6S

TABLE 3-6
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS (VOCS)
GLADDING CORDAGE
SOUTH OTSELIC, NEW YORK
NYSDEC Site No. 7-09-009

Sample ID Sampling Date Matrix Units	NYSDEC GA Standard ug/L	TW-14D 6/25/2009 WATER ug/L	TW-15 9/6/2007 WATER ug/L	TW-15 10/17/2008 WATER ug/L	TW-15 6/25/2009 WATER ug/L
VOCs					
1,1,1-Trichloroethane	5	0.4 U	**17**	**84 D**	**95**
1,1-Dichloroethane	*	0.36 U	0.38 U	3.3	3.4
1,1-Dichloroethene	5	0.47 U	4.6 J	2	1.8
Acetone	50	15	2.3 U	5 U	9.7
Benzene	1	0.32 U	0.39 U	1 U	0.32 U
Carbon Tetrachloride	5	0.62 U	1.1 U	1 U	0.62 U
Chloroform	7	0.34 U	0.33 U	1 U	0.34 U
cis-1,2-Dichloroethene	5	0.35 U	0.29 U	1 U	0.35 U
Tetrachloroethene	5	0.27 U	0.48 U	1 U	0.27 U
Trichloroethene	5	0.28 U	0.46 U	1 U	0.28 U
Total VOCs		15	21.6	89.3	109.9

Notes

- Concentration exceeds corresponding NYSDEC Class GA Standard.

* - NYSDEC Principal Organic Contaminant Standard of 5 ug/l applies to this compound.

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D - Sample dilluted

1 - TW-11 is a duplicate sample collected at TW-6S

Table 4-1
Work Assignment Budget
Gladding Cordage Site
NYSDEC Site Number 7-09-009

Work Assignment Budget **Item**	**Cost**
Labor	$64,042
Indirect Costs	$112,266
Direct Non-salary Costs	$55,703
Subcontractor Fees	
Laboratory - groundwater	$28,895
Laboratory - air	$2,405
Data Validation	$275
Field Assistance	$19,203
Subcontract Management Fee	$2,539
Fixed Fees	$17,631
Total	**$302,959**

Actual Project Expenses	
2007 Project Expenses (3rd and 4th quarter)	$31,123
2008 Project Expenses	$50,233
2009 Project Expenses	$48,702
2010 Project Expenses	$52,723
2011 Project Expenses (1st and 2nd quarter)	$22,787
Total Project Expenses	**$205,568**

Remaining Budget	**$97,391**

Note:
Work Assignment Budget information from 2.11 forms

Table 4-2
Opinion of Probable Cost
Gladding Cordage Site
NYSDEC Site Number 7-09-009

Periodic Review Recommendations **Item**	**Cost**
Additonal analytical for TW-9I and TW-9D (VOCs - two rounds of sampling)*	$800
Site survey by a New York State Licensed Surveyor	$5,000
Revise site maps and drawings*	$2,500
Field oversight for upgrade and repair of treatment system controls *	$3,000
Prepare site documents *	$20,000
CAP	
SMP	
O&M Plan	
LTM Plan	
IC/EC Plan	
Contingency Plan	
(A) Sub-total	**$31,300**
(B) Total cost of items included in the revised Schedule 2.11s	**$26,300**

Anticipated Costs	**Cost**
2011 Q3 and Q4 (O&M, Sampling, Reporting, and electric based on average of 2009 and 2010 CY)	$27,926
2012 Calendar Year (O&M, Sampling, Reporting, and electric based on anticipated costs for 2010 + 3%)	$52,234
Contingency (+15%)**	$12,024
(C) Sub-total	**$92,184**

Opinion of Probable Cost (A-B)+C	**$97,184**
(D) Remaining Work Assignment Funds	**$97,391**
Remaining Funds	**$207**

* - Costs included in revised 2.11s

* *- Based on USEPA Guide to Developing and Documenting Cost Estimates During the Feasibility Study, where Scope Contingency range is 10% to 25%.

New York State Department of Environmental Conservation
Periodic Review Report - Vestal Water Supply Site

Appendix A

Work Plan
(Malcolm Pirnie, 2007)

New York State Department of Environmental Conservation

Work Plan

GLADDING CORDAGE SITE WORK PLAN

Site Number 7-09-009
New York

New York State Department of Environmental Conservation
Work Assignment D004443-5

Prepared by:

Malcolm Pirnie, Inc.
43 British American Blvd.
Latham, NY 12110

June 2007
0266352

INDEPENDENT ENVIRONMENTAL ENGINEERS, SCIENTISTS AND CONSULTANTS

MALCOLM PIRNIE

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1.0 INTRODUCTION

The New York State Department of Environmental Conservation (NYSDEC) has issued a Work Assignment (# D004443-5) to Malcolm Pirnie, Inc. (Malcolm Pirnie) for Operation, Maintenance, and Monitoring at the Gladding Cordage Site in New York State. This site is currently in the site management phase.

Malcolm Pirnie has prepared this Work Plan following acceptance of the Work Assignment, which included Work Plan development, groundwater monitoring, and reporting tasks, and treatment plant operation. The Scope of Work presented in this Work Plan provides information on the following:

- Major tasks and subtasks;
- Schedule;
- Staffing Plan;
- Subcontracting Requirements;
- Cost Assumption and Budget; and
- MBE/WBE Utilization Plan.

2.0 MAJOR TASKS AND SUBTASKS – GLADDING CORDAGE SITE

2.1 SITE DESCRIPTION

The Gladding Cordage Site is located on Ridge Road, South Ostelic, Chenango County, New York (Figure 2-1), along the western bank of the Ostelic River.

2.2 TASK 1: WORK PLAN DEVELOPMENT

Malcolm Pirnie has developed and is submitting to the NYSDEC for review and approval this Work Plan, which includes the following:

- The complete Scope of Work, including task descriptions and purposes (Sections 2).
- A proposed progress schedule indicating key milestones and deliverables (Section 3).
- A project staffing plan identifying key management and technical staff to be assigned to each work element, along with their areas of responsibility (Section 4).
- Identification of potential areas for subcontracting and subcontracting requirements (Section 5).
- A complete estimated budget for the Work Assignment including 2.11 Schedules, details of costs for the Work Assignment and estimates for subcontracted services. Subcontractor costs herein are estimated (Section 6).
- Proposed Minority-owned and Women-owned Business Enterprise (MBE/WBE) and Equal Employment Opportunity (EEO) participation (Section 7).

2.2.1 Background Review and Site Visit

Malcolm Pirnie has reviewed available documentation to gain an understanding of the site conditions. Malcolm Pirnie also visited the site with NYSDEC representatives on October 24, 2006 to gain familiarity with the site and adjacent properties.

2.2.2 Scoping Meetings

Although an official scoping meeting has not occurred, the project scope was discussed during the site visit and subsequent conversations with NYSDEC.

2.2.3 Work Plan Finalization

After evaluating the information obtained from the background review, site visit, and conversations with NYSDEC representatives, Malcolm Pirnie has developed this Work Plan and is submitting it for review. Upon receipt of the NYSDEC's comments, if any, Malcolm Pirnie will finalize the Work Plan. The final budget will include all subcontractor costs and fees along with the relevant supporting documentation. Malcolm Pirnie will submit the final Work Plan to the NYSDEC within two weeks of receiving comments. Upon receipt of final Work Plan approval from the NYSDEC, Malcolm Pirnie will submit seven copies for distribution.

2.3 TASK 2: PLANT OPERATION

During the duration of this Work Assignment, Malcolm Pirnie will maintain continuous operation of the groundwater treatment plants at the Gladding Cordage site. This will include operation, maintenance, and influent/effluent sampling in accordance with the operations and maintenance manual. The Gladding Cordage operations and maintenance manual, written in March 1996 by TAMS Consultants, Inc., is entitled "Operation and Maintenance Manual, Volume I, Gladding Cordage Site, Site 7-09-009". Malcolm Pirnie will visit the site at least once a month during plant operation to collect influent and effluent samples. The system will be contacted remotely once per day via the telemetry system to monitor system performance. Malcolm Pirnie will subcontract with appropriate businesses to provide all necessary utilities. Appropriate Malcolm Pirnie personnel will attend a training session with the NYSDEC to acquire knowledge necessary to operate the groundwater treatment system. Effluent samples will be collected and analyzed for pH and VOCs. A one-time sample of the effluent will be collected and analyzed for BOD5, total suspended solids, total dissolved solids, total kjeldahl nitrogen, and ammonia.

2.4 TASK 3: GROUNDWATER MONITORING

In Task 3, Malcolm Pirnie will complete the required scope of work for groundwater monitoring at the site. Groundwater in all monitoring wells associated with the sites will be sampled according to the appropriate operations and maintenance manual on a five quarter sampling schedule. The surface and measuring point elevations of each of the monitoring wells is shown on Table 2-1. As part of this Work Assignment, groundwater will be sampled during a maximum of four sampling events. All monitoring wells at the site will be identified and inspected. Prior to sampling groundwater, water levels will be measured in each of the monitoring wells.

2.4.1 Well Inspection

Existing on-site and off-site groundwater monitoring wells associated with the sites will be evaluated for integrity and suitability for groundwater monitoring and water levels will be measured in these wells. Each well will be assessed for damage to the surface casing and/or curb box. If feasible, damaged monitoring wells will be rehabilitated for inclusion in the groundwater monitoring program. Additional information on groundwater monitoring well inspection procedures is provided in Appendix A.

2.4.2 Groundwater Monitoring Program

The monitoring well network will include the existing monitoring wells that can be located. Groundwater samples from monitoring wells will be collected using low flow groundwater purging and sampling procedures in accordance with the protocols outlined in Appendix B. Groundwater samples collected during the groundwater monitoring program will be analyzed for VOCs, iron, and manganese.

2.4.3 Water Level Survey

Groundwater levels will be measured in monitoring wells in conjunction with the groundwater monitoring program discussed above. Data will be measured to the nearest hundredth of a foot. Water levels will be used to calculate groundwater elevations across

the site to facilitate an evaluation of groundwater flow conditions at the site. Water level measurement procedures are provided in Appendix C.

2.5 TASK 4: REPORTING

Quarterly reports summarizing activities conducted at each of the sites during the previous quarter will be submitted to NYSDEC for review and approval. During quarters in which a monitoring event occurs, the corresponding quarterly report will include a summary and evaluation of the analytical results and a figure showing groundwater elevations. An annual report will also be submitted to NYSDEC summarizing the site activities and monitoring results from the previous year and an evaluation of the remedy performance and effectiveness. The reports will be submitted in PDF format.

3.0 SCHEDULE

The Work Assignment for this project included a project milestone schedule. According to the NYSDEC's project representatives, key milestones include:

1. Quarterly reporting; and
2. Annual reporting.

Other project milestones are provided in the following project milestone schedule:

Project Milestone	**Day(s)**
Work Assignment Authorization	0
Prepare Work Plan	1 – 90
Site Visits	50-90
Submit Draft Work Plan	90
NYSDEC comments on Draft WP	110
Submit Final Work Plan	130
Notice to Proceed	140
Monitoring	140 – 1460
Completion of Work Assignment	1460

4.0 STAFFING PLAN

The organizational structure proposed for the Operation, Maintenance, and Monitoring at the sites is presented on Figure 4-1. In addition to the personnel identified on Figure 4-1, support for the project will be provided by additional personnel from Malcolm Pirnie as required. Coordination of project activities and a majority of the work on this project will be performed by staff from Malcolm Pirnie's Latham, New York office. The responsibilities of key staff positions are summarized below.

4.1 PROPOSED PROJECT STAFF

Daniel Loewenstein, P.E., Project Officer, will have the final responsibility for the quality of work performed and the allocation of resources and personnel for the project.

Shi Ng, the Quality Assurance Officer, will perform project review independently of project management and will oversee Malcolm Pirnie's QA/QC program for the project.

Bruce Nelson, P.G., Project Manager, will be responsible for the day-to-day management of the project including the allocation of technical resources, development of work plans, and coordination of project activities and personnel. Mr. Nelson will be responsible for maintaining a clear definition of and adherence to the NYSDEC approved scope, schedule, and budget.

Jeremy Wyckoff, Deputy Project Manager, will manage the field investigations and reporting during the Operation, Maintenance, and Monitoring of the Site. He will interact with the Project Manager and other team members and support staff to complete and document the scope of work.

5.0 SUBCONTRACTING REQUIREMENTS

Subcontractors to Malcolm Pirnie will be required in the following area to conduct work necessary to support the Operation, Maintenance, and Monitoring activities:

- Environmental Laboratory
- Groundwater Sampling

The MBE/WBE Utilization Plan is provided in Section 7. The proposed Subcontractor identified to participate in the project is shown on Figure 4-1.

6.0 COST ASSUMPTION AND BUDGET

The estimated project budget is shown in the attached 2.11 series of schedules (Appendix D), prepared in accordance with Malcolm Pirnie's Contract for Design/Construction services with the NYSDEC. Schedule 2.11(a), Summary of Work Assignment Price, shows the estimated total price for the work described in this Work Plan.

7.0 PROPOSED MINORITY-OWNED AND WOMEN-OWNED BUSINESS ENTERPRISE (MBE/WBE) PARTICIPATION

This MBE/WBE Utilization Plan provides the good faith efforts to be undertaken by Malcolm Pirnie to comply with the requirements of the NYSDEC established in Contract D004443 to subcontract with minority-owned and women-owned business enterprises, and to employ minorities and women. The purpose of the MBE/WBE Plan is to demonstrate and document Malcolm Pirnie's intention to make a good faith effort to meet the goals as stated in the contract. These goals are as follows:

1. The Contractor agrees to make good faith efforts to subcontract at least 15 percent of the dollar value of this contract to Minority-Owned Business Enterprises and at least 5 percent of such value to Women-Owned Business Enterprises.
2. The Contractor agrees to make good faith efforts to employ or contractually require any Subcontractor with whom it contracts to make good faith efforts to employ minority group members for at least 10 percent of, and women for at least 10 percent of, the work force hours required to perform the work under this Contract.

This MBE/WBE Plan has been prepared to address MBE/WBE involvement in the tasks under NYSDEC Work Assignment D004443-5 for the Gladdington Cordage Site in New York State. This specific plan incorporates the provisions of Malcolm Pirnie's corporate plan for Affirmative Action.

7.1 MALCOLM PIRNIE AFFIRMATIVE ACTION STATEMENT

Malcolm Pirnie supports the NYSDECs commitment to minority- and women-owned business enterprises. The firm will make good faith efforts to meet or exceed the 15 percent MBE and 5 percent WBE goals for this contract. Malcolm Pirnie is in compliance with Title VII of the Civil Rights Acts of 1964, as amended by the Equal Employment Opportunity Act of 1972.

It is our policy to provide equal opportunity to all qualified persons without regard to race, color, religion, sex, age, national origin, physical handicaps, sexual or

affectional preference or marital status, and to promote the full realization of equal opportunity through a positive continuing affirmative action program. The firm assures applicants and staff members that equal opportunity and equal consideration is afforded in personnel actions with respect to recruiting and hiring, development programs, job assignments, promotion, compensation, transfer, and other status changes.

It is the objective of the firm to provide full employment opportunities for members of minority groups and to employ meaningful numbers at all job levels through effective upgrading and recruiting. Toward this end, the firm's Manager of Human Resources has the responsibility for ensuring that Malcolm Pirnie is in compliance with all aspects of federal and State civil rights laws.

It is the policy of Malcolm Pirnie to consider applicants for employment, training and upward mobility programs that may be necessary without regard to race, religion, color, sex, age, physical handicap or any other factor unrelated to job performance. Malcolm Pirnie also supports career counseling, and training and development for all employees. Minorities and women are encouraged and afforded every opportunity to participate in all company-sponsored educational, training, recreational, professional and social activities.

7.2 AREAS OF POTENTIAL MBE/WBE PARTICIPATION

The tasks identified under this Work Assignment are as follows:

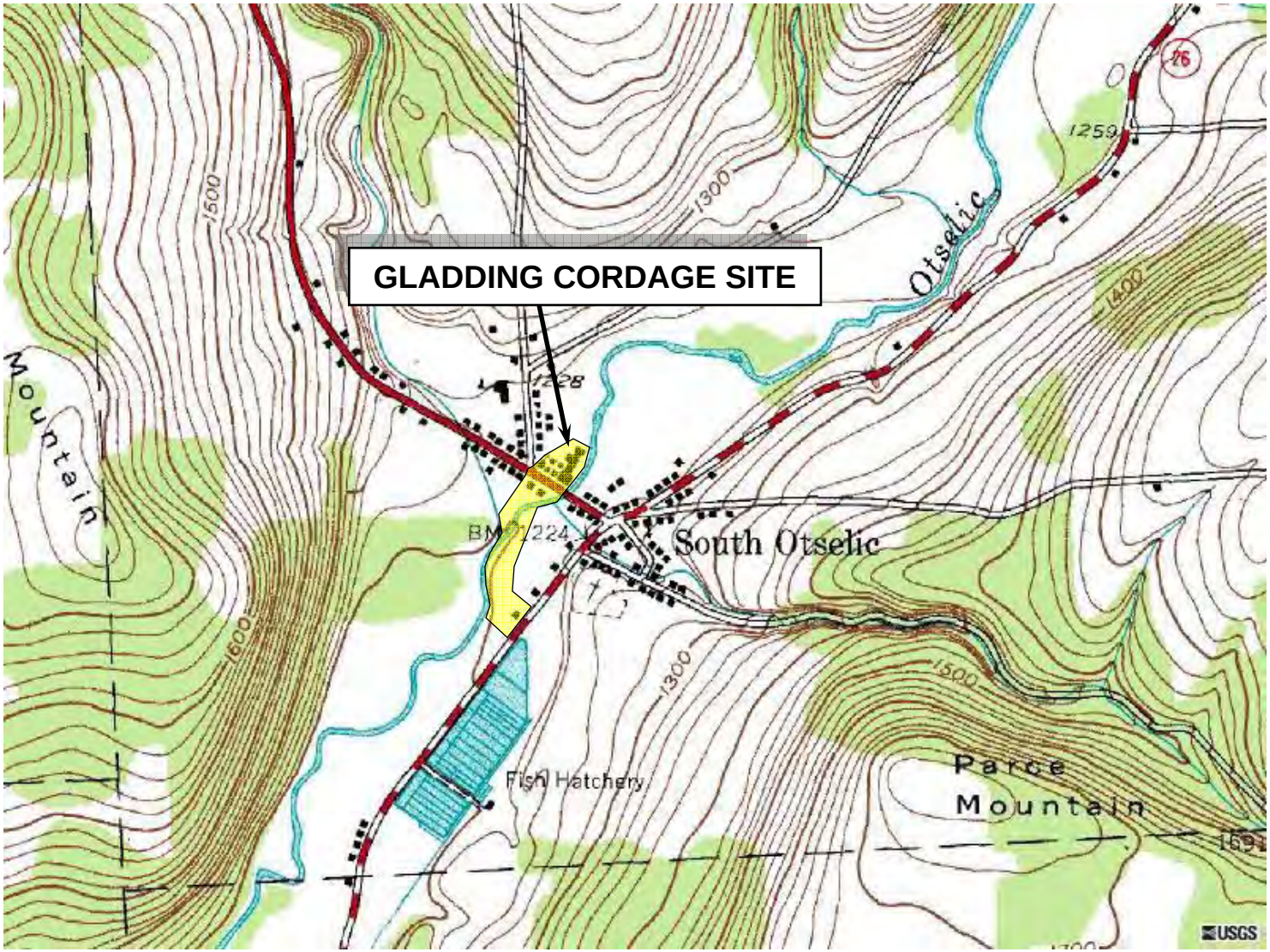
- Work Plan Development
- Plant Operation
- Groundwater Monitoring
- Reporting

Subcontractors and suppliers are anticipated to be needed to assist or provide supplemental services to Malcolm Pirnie in a number of areas. It is Malcolm Pirnie's intent to solicit MBE/WBEs during the procurement of subcontractors for this project. One or more MBE/WBE firms will be included in the list of firms solicited for each of the following subcontract areas of work:

- Environmental Laboratory Analysis
- Groundwater Sampling

A summary table of bids received for the work, including the MBE/WBE status of each firm is included in Appendix D.

FIGURES



SCALE IN FEET

0 500 1000 2000

SOURCE: U.S.G.S 7.5 MIN. SOUTH OTSELIC QUAD, 1988

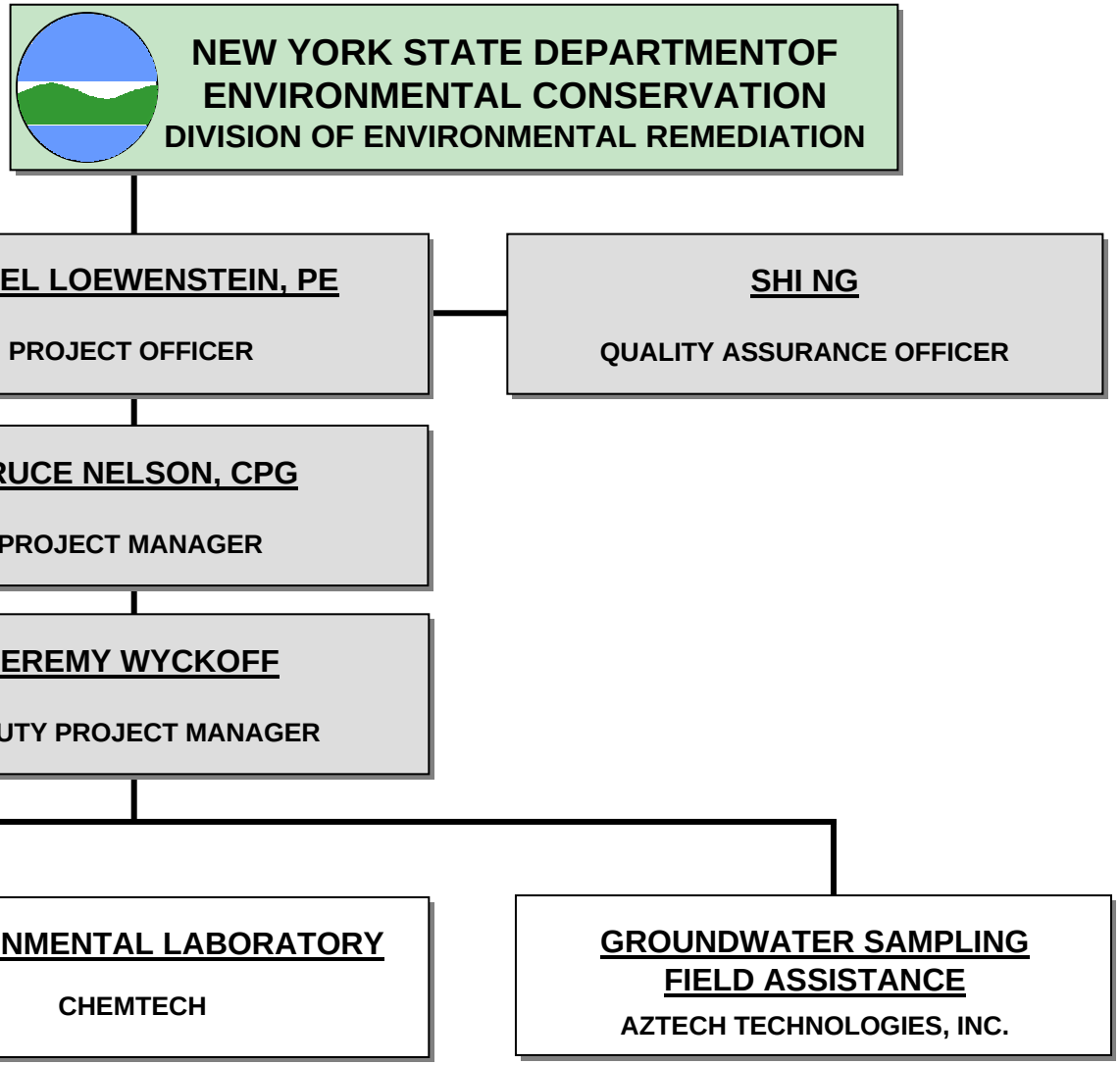
MALCOLM PIRNIE

NYSDEC STANDBY CONTRACT NO. D004443
GLADDING CORPORATION
SOUTH OTSELIC, NEW YORK

GLADDING CORDAGE SITE LOCATION

FIGURE 2-1

F:\PROJECT\0266352\FILE\Work Plan\Gladding Cordage\Work Plan\Figure 2-1.ppt



MALCOLM PIRNIE

OPERATION, MAINTENANCE, AND MONITORING
GLADDING CORDAGE SITE, NEW YORK

PROPOSED PROJECT TEAM

APRIL 2007

FIGURE 4-1

F:\PROJECT\026352\FILE\Work Plan\Gladding Cordage\Figure 4-1 Org Chart.ppt

TABLES

Table 2-1
Monitoring Well Network
Gladding Cordage
South Ostelic, New York

Well ID	Surface Elevation (feet)	Measuring Point Elevation (feet)
TW-3s	1211.10	1213.60
TW-3i	1210.75	1213.19
TW-3d	1211.21	1213.47
TW-4s	1210.19	1212.06
TW-4i	1210.16	1212.08
TW-4d	1210.25	1212.39
TW-5s	1209.98	1211.78
TW-5i	1209.90	1211.89
TW-5d	1210.00	1212.55
TW-7s	1211.04	1213.48
TW-7i	1211.13	1213.60
TW-7d	1211.35	1213.25
TW-14s	1209.76	1211.81
TW-14i	1209.77	1211.77
TW-14d	1209.81	1211.85
TW-15i	1209.67	1211.52
RW-1	N/A	1209.30
RW-2	N/A	1212.20

Note:
N/A - Not Available

APPENDIX A

Generally Acceptable Procedure for Groundwater Monitoring Well Inspections

GENERALLY ACCEPTABLE PROCEDURE

FOR

GROUNDWATER MONITORING WELL INSPECTIONS

INTRODUCTION

Sites with groundwater monitoring wells require periodic inspections of the wells to determine their integrity and functionality. If available, boring logs and well construction diagrams would be useful to review prior to conducting an inspection. In addition to periodic inspections on sites with established programs, inspections are important to gain information on the usefulness of wells where we are new to the site and/or the wells have not been regularly sampled. A simple checklist on a groundwater monitoring well inspection form can be used to record observations.

EQUIPMENT

Materials useful for well inspection:

- Groundwater Monitoring Well Inspection Forms
- Site Map
- Camera and Film
- Well Keys
- New Locks
- Bolt Cutters
- Measuring Tape/wheel
- Water Level Probe
- Photoionization Detector (PID)
- Bailer with Rope
- Turkey Baster (or other suction tool)
- Boring Logs/Construction Diagrams

PROCEDURES

1. **Field Forms**
   A groundwater monitoring well inspection form will be used for each monitoring well to record relevant observations. The form should include the information on the outward appearance, inner appearance, and downhole features as described below (see sample form attached). Any additional observations should be recorded at the bottom of the form.

2. **Outward Appearance**
   a. Locate well and determine well identification.
   b. Determine if there are any problems accessing the well.

c. Describe approximate location relative to fixed landmarks or provide a sketch with measures to fixed landmarks.
d. Measure and record flushmount diameter or stickup height.
e. Record the integrity of, material, and width or diameter of the protective casing.
f. Identify if there is a weep hole in the protective casing.
g. Document the integrity of the surface seal/apron if one exists. If so, determine the material of which it was constructed (cement, bentonite, etc.).
h. Determine if surface drainage will pond up near the well and potentially flow into the well or if drainage is away from the wellhead. Identify if there is any evidence of erosion of soils in the immediate area around the well casing. Determine if frost heave has damaged the concrete pad.
i. Record where any bollards are/should be present on a sketch and describe their condition.
j. Determine the condition of any paint or markings on the well casing, cap, or bollards.
k. Record if a well identification designation is present on the well and legible.
l. Document if a lock is present and functional (aboveground completion), or if tie-down bolts are present and functional (flush-mounted completion).
m. Take a photograph and describe on inspection form.

3. **Inner Appearance**
   a. Document if a lock is present and functional (flush-mounted completion).
   b. Unlock well, if applicable, or remove.
   c. Describe the integrity of, material, and width or diameter of the well casing.
   d. Verify if an inner cap exists and, if so, document the type of cap (i.e., threaded, slip, expansion plug).
   e. Record if a reference/measuring point exists and, if so, the type of point (i.e., groove, indelible ink mark).
   f. Determine if there is a dedicated bailer or tubing in the well.
   g. Identify if there is any evidence that the well is double cased.
   h. For flushmount wells (or stick-ups without weep holes or proper seals), indicate if water is present inside the casing and if surface water has the potential to enter the well. Purge the water from the casing with a suction tool, bailer, or sponge, as applicable. Inspect the rubber seal between the casing and the cap and confirm that all bolts are present and functioning.

4. **Downhole**
   a. Stand upwind, open the wellhead and collect a headspace PID reading.
   b. Describe any odors.
   c. Describe if the well casing is offset or bent.
   d. Measure and record the depth to water, depth to LNAPL (if applicable), and total well depth with a water level probe (Do not remove any dedicated bailer or tubing prior to measuring).
   e. Measure total depth of well
   f. Determine if there is any sediment at the bottom of the well and describe if it is hard or soft.

5. **Post Inspection**
   a. Replace inner cap and well cover
   b. Lock the well, if applicable.
   c. If it is a flushmount well, remove debris from around the well cover and replace bolts if they have been stripped or are missing. Make sure rubber seal between the casing and the cap is present and free of debris or tears.
   d. Document warranted maintenance items on Well Inspection Report and indicate completion date for actions.

APPENDIX B

Generally Acceptable Procedure for Low Stress (Low Flow) Groundwater Sampling

Generally Accepted Procedure

For

Low Stress (Low Flow) Groundwater Sampling

PURPOSE/APPLICATION

This low flow groundwater purging and sampling procedure presents a standard method for collecting groundwater samples that are representative of the formation from which they are being withdrawn. By using low flow rates for purging and sampling to minimize drawdown within the well, three primary benefits gained. First, using a low flow rate during sampling promotes laminar flow, which minimizes the disturbance of sediment at the bottom of a well or fine particles in the well's filter pack. Groundwater samples are therefore less turbid, which reduces sampling time and generally eliminates the need to filter. Second, the amount of groundwater purged from the sampling well is significantly reduced, minimizing investigation derived waste. Third, low flow purging and sampling reduces aeration and therefore helps to preserves the natural chemical characteristics of the groundwater sample. Low flow sampling may be used to collect groundwater samples for analysis of contaminants of concern, as well as geo-chemical and biological parameters.

This guideline is for information purposes and should not take precedence over the requirements of project specific plans. This is especially true for federal project sites, which are governed by regionally directed United States Environmental Protection Agency (USEPA) low flow groundwater sampling protocols.

EQUIPMENT

Low flow groundwater sampling requires traditional groundwater sampling equipment with the addition of the following:

- Multi-parameter water quality monitoring system (e.g. Horiba U-22 or equivalent) equipped with a flow through cell.
- An adjustable rate, positive displacement, groundwater pump (e.g., centrifugal, submersible, or bladder pumps) constructed of stainless steel or Teflon capable of achieving low flow pumping rates (i.e., 100 to 500 ml/min).
- Polyethylene tubing or equivalent.
- Flow measurement device (e.g., a graduated container and stop watch)
- A water level probe or oil/water interface probe.

PRE-SAMPLING PROCEDURES

The pre-sampling procedures for low flow groundwater sampling and purging are as follows:

1. To minimize the risk of cross-contamination, if possible, begin with the monitoring well that is known or believed to have the lowest contaminant concentrations.
2. Position a sheet of polyethylene over the monitoring well for placement of all sampling equipment.
3. Where applicable, measure the concentration of volatile organic compounds (VOCs) in the well's headspace with a photoionization detector (PID) and record the concentration in the field log book.
4. Measure and record the depth to water and if applicable, the depth to light non-aqueous phase liquid (LNAPL).

SAMPLING PROCEDURES

The procedures for collecting groundwater samples using low flow are as follows:

1. **Pump Installation:** Install the pump by slowly lowering the pump assembly and tubing into the well. The pump should be set to the appropriate depth with the intake being a minimum of two-feet above the bottom of the well to prevent disturbing and re-suspending any sediment at the bottom of the well.

2. **Water Level Measurement:** Measure the depth to groundwater from the top of the well casing using a water level probe. Leave the probe in the well for subsequent water level measurements.

3. **Purging:** Begin purging the well at a rate of 200 to 500 milliliters per minute (ml/min) and measure the water level. If excessive drawdown is observed in the well (i.e. greater that 0.3 feet), reduce the flow rate until the water level stabilizes. When the water level has stabilized, subsequent measurements should be made on five minute intervals. The flow rate, as well as flow rate adjustments should be recorded on a field purge log.

4. **Field Parameter Monitoring:** Field parameters (pH, conductivity, reduction/oxidation potential, DO, and turbidity) should be recorded every five minutes with water level measurements. The well is considered stable and ready to be sampled once the field parameters are stable over three consecutive readings (USEPA Region 2, 1998). The following criteria identify stabilized field parameters:
    - $\pm$ 0.1 for pH
    - $\pm$ 3.0 percent for conductivity
    - $\pm$ 10.0 mv for redox potential
    - $\pm$ 10.0 percent for DO and turbidity

    The pump should **not** be removed or shut off between purging and sampling.

5. **Sample Collection:** If necessary, reduce the flow rate to 100 to 250 ml/min to reduce turbulence while filling sample containers during sample collection. Where wells are purged at a flow rate less than 100 ml/min, maintain the same flow rate during sample collection. Disconnect the inflow line from the flow through cell and collect the groundwater sample. All sample containers should be filled directly from the tubing. Allow water to flow from the tubing gently down the inside of the containers to minimize turbulence during sample collection. Groundwater samples should be collected in order of importance, according to the project requirements.

6. **Pump Removal:** Once sampling is complete, slowly remove the pump assembly and tubing from the well. If the tubing is dedicated to the well, disconnect the tubing from the pump, re-insert the tubing into the well, and secure the tubing so it is easily accessible.

7. **Secure Well:** Secure the top of the well casing with a locking cap or expansion plug and close the well. In the case of a stick-up protective well cover, lock the outer casing.

DECONTAMINATION

All dedicated or "single use" groundwater sampling equipment should be disposed in accordance with all applicable local and federal regulations. The decontamination procedures for non-dedicated low flow groundwater sampling equipment are as follows:

1. **Pre-rinse:** Operate the pump and flush equipment thoroughly with deionized or distilled water for approximately five minutes.
2. **Wash:** Operate the pump and flush equipment thoroughly with Alconox or other non-phosphate detergent solution for approximately five minutes.
3. **Rinse:** Operate the pump and flush equipment thoroughly with deionized or distilled water for approximately five minutes or until all of the detergent has been removed from the equipment.

REFERENCES:

United States Environmental Protection Agency (USEPA) Region II, 1998, Ground Water Sampling Procedure, Low Stress (low flow) Purging and Sampling, GW Sampling SOP, March 16th.

POTENTIAL PROBLEMS/TROUBLESHOOTING

Insufficient yield, cascading, field parameters failing to stabilize, and aerating the groundwater sample are potential problems when trying to use low flow protocols to collect representative groundwater samples.

Insufficient Yield/Cascading

A low yielding well that cannot sustain a low flow purge rate may eventually go dry. The sampler should take care not to dewater the well below the top of the well screen to prevent cascading of the sand pack. Therefore, pumping a well dry should be avoided in all situations. If a well should go dry, the groundwater sample should be collected as soon as there is sufficient recharge to collect the sample. If the well has not recharged sufficiently within 48 hours, the well should not be sampled.

A low yielding well that consistently demonstrates that it cannot sustain a low flow purge rate of 250 ml/min or less should not be sampled using low flow protocols. Groundwater samples collected from low yielding wells are often representative of the stagnant groundwater within the well and the surrounding sand pack, and not representative of the geologic formation. In addition, these samples are typically very turbid, which can skew the analytical results of groundwater samples being analyzed for organic compounds and metals.

Key Field Parameters Fail to Stabilize

If any key parameters fail to stabilize within four hours of purging, then the following alternatives should be considered:

1. Continue purging until stabilization.
2. Stop purging, do not collect a sample, and document the activity.
3. Stop purging, collect a sample, and document the activity
4. Stop purging, secure the well, and resume purging the following day.

The key parameter for samples being analyzed for VOCs is dissolved oxygen (DO). The key parameter for all other analytical samples is turbidity. Typically DO and turbidity take the longest to stabilize.

Non-stabilizing turbidity measurements may be avoided by periodically removing sediments that may be trapped in the flow through cell during purging. Trapped sediments may cause artificial fluctuations in turbidity measurements. Additionally, the sampler should visually compare the turbidity of the groundwater in the Cell with the groundwater entering the Cell. If the groundwater entering the Cell is clearer, disconnect the inflow line, drain the turbid groundwater from the Cell, and reconnect the inflow line. Turbidity readings should more accurately reflect true groundwater conditions.

Fluctuations in DO measurements may be caused by air bubbles that form in the flow through

cell or sample tubing. Ensure that the inflow tubing is sealed tightly to the flow through cell to prevent the intrusion of air. It may be necessary to drain the flow through cell to remove all air bubbles that may interfere with accurate DO readings.

Aerating the Sample

To prevent inadvertently aerating the groundwater sample, the flow rate should be set so that pump suction and positive groundwater flow through the sample tubing is maintained. The sampler should minimize the length and diameter of the sample tubing. It is recommended that either one-quarter or three-eights-inch inner diameter tubing are used.

Where centrifugal pumps are being used to collect a groundwater sample from a deep well, preventing aeration and sustaining a low flow rate becomes problematic. These issues can be minimized if an impeller is removed from the pump. This allows the pump to run at a lower flow rate and reduces the potential for aerating the groundwater sample. There is also concern that the centrifugal pump will heat the groundwater sample, however, the increases in temperature rarely increases more than two degrees Celsius during sampling.

APPENDIX C

Generally Acceptable Procedure for Groundwater Level Measurement

GENERALLY ACCEPTABLE PROCEDURE

FOR

GROUNDWATER LEVEL MEASUREMENT

PURPOSE/APPLICATION

The objective of these guidelines is to provide general reference information and technical guidance on the measurement of the depth to groundwater in an open borehole, cased borehole, monitoring well, or piezometer.

METHOD SUMMARY

When measuring groundwater levels, there should be a clearly established reference point of known elevation, which is normally the top of the well casing. The reference point should be scored or permanently marked on the rim of the casing if the casing rim is not even and level. To be useful, the reference point should be tied to a USGS benchmark or a local datum. The field notes recorded should clearly describe the reference used. An arbitrary datum could be used for an isolated group of wells if necessary.

Before measurements are made, water levels should be allowed to stabilize for a minimum of 24 hours after well construction and development. In low-yield conditions, recovery of water levels to equilibrium may take longer. Groundwater levels should be measured and recorded to the nearest 0.01 foot. Water level measuring equipment must be decontaminated and, in general, measurements should proceed from the least to the most contaminated boreholes or wells, when possible.

Condition of the wells, piezometers, or boreholes should be recorded along with the name of the individual who has measured the groundwater levels. Groundwater levels that are subject to tidal influence should be measured in conjunction with a tidal chart. The frequency of such measurements should be pre-established.

LIMITATIONS

These guidelines give overall technical guidance only and could be modified as necessary based upon specified requirements of project-specific plans, site conditions, or equipment limitations.

DEFINITIONS

Water table – The surface in an unconfined aquifer where groundwater pressure is equal to atmospheric pressure.

Potentiometric (or piezometric) surface – An imaginary surface representing the total head of groundwater in an aquifer that is defined as the level to which water would rise in a well screened at and/or beneath the water bearing zone. The water table is a particular potentiometric surface.

EQUIPMENT

- Electronic Water Level Indicator with an accuracy of 0.01 foot.
- Field book or field form and pen.
- Decontamination materials.

An electronic water level indicator consists of a spool of graduated, small-diameter cable and a probe attached to the end. When the probe comes into contact with water, the circuit is closed and a meter, light, and/or buzzer attached to the spool will signal the contact. Nine-volt batteries are typically used for a power source.

PROCEDURES

The procedures for measuring groundwater levels are as follows:

1. Clean all the equipment entering the well by the following decontamination procedure:

    - Wash equipment with an Alconox solution followed by a deionized water rinse.
    - If organic contamination is present, and per the project-specific requirements, rinse with an approved solvent (e.g., methanol, isopropyl alcohol, acetone).

2. Check operations of equipment above ground.

3. Remove well cap, note well ID, time of day and date in site logbook or an appropriate groundwater level data form.

4. If required by site-specific conditions and/or work plans, monitor headspace of well with a photoionization detector (PID) or flame ionization detector (FID) to assess the presence of volatile organic compounds (VOCs), and record results in logbook.

5. Ensure well is at equilibrium with atmospheric pressure. In wells with air tight plugs, or without vents, the hydraulic head may not be the same as in an open or vented well. Allow sufficient time for the well to equilibrate to atmospheric pressure. Several measurements may be needed to verify if equilibrium has been reached. This is especially important for wells screened in confined aquifers.

6. Lower water level probe into well and record water level to the nearest 0.01 foot. If a separate phase is present, an oil/water interface probe is needed for measurement of Light Non-Aqueous Phase Liquid (LNAPL) thickness and water level.

POTENTIAL PROBLEMS/TROUBLESHOOTING

When there is LNAPL on the water table, high or low specific conductance, groundwater cascading in the well, or a turbulent water surface in the well, measuring groundwater levels with an electronic sounder may be difficult. Before lowering the probe into the well, the circuitry can be checked by dipping the probe in water and observing the indicator. The probe should be lowered slowly into the well and once the buzzer sounds, slowly raised and lowered until it just ceases sounding. At this point the depth to water is read directly from the graduated cable at the reference point and recorded to the nearest 0.01 feet.

REFERENCES

Fetter, C.W., 1994, Applied Hydrogeology, Third Edition, Prentice Hall Inc., pp. 691.

United States Environmental Protection Agency (USEPA) 2000, USEPA Environmental Response Team Standard Operating Procedures, Manual Water Level Measurements.

New York State Department of Environmental Conservation
625 Broadway • Albany, New York 12233-7011

Appendix A: Gladding Cordage Site Specific Health and Safety Plan

August 2007

Plan Prepared By:

Malcolm Pirnie, Inc.

43 British American Blvd.
Latham, New York 12110
518-782-2100

0266-NYSDEC

SITE SPECIFIC HEALTH AND SAFETY PLAN

MALCOLM PIRNIE

SECTION 1: GENERAL INFORMATION AND DISCLAIMER		PROJECT NUMBER:	0266365
PROJECT NAME:	Gladding Cordage Site	CLIENT NAME:	New York State DEC
PROJECT MANAGER:	Bruce Nelson	DEPUTY PROJECT MANAGER:	Jeremy Wyckoff
PREPARED BY:	Christine Thomas	DATE:	7/26/07

NOTE: This site specific Health and Safety Plan - Short Form (HASP-SF) has been prepared for use by **Malcolm Pirnie, Inc.** employees for work at this site / facility. **The plan is written for the specific site / facility conditions, purposes, tasks, dates and personnel specified, and must be amended and reviewed by those personnel named in Section 4 if these conditions change.** Malcolm Pirnie, Inc. is not responsible for its use by others.

Subcontractors shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations. In accordance with 1910.120(b)(1)(iv) and (v), Malcolm Pirnie, Inc. will inform subcontractors of the site / facility emergency response procedures, and any potential fire, explosion, health, safety or other hazards by making this Site Specific Health and Safety Plan and site information obtained by others available during regular business hours. All contractors and subcontractors are responsible for: (1) developing their own Health and Safety Plan, including a written Hazard Communication Program and any other written hazard specific or safety programs required by federal, state and local laws and regulations, that details subcontractor tasks, potential or actual hazards identified as a result of a risk analysis of those tasks, and the engineering controls, work practices and personal protective equipment to be utilized to minimize or eliminate employee exposure to the hazard; (2) providing their own personal protective equipment; (3) providing documentation that their employees have been health and safety trained in accordance with applicable federal, state and local laws and regulations; (4) providing evidence of medical surveillance and medical approvals for their employees; and (5) designating their own site safety officer responsible for ensuring that their employees comply with their own Health and Safety plan and taking any other additional measures required by their site activities.

Providing a copy of this Malcolm Pirnie plan to subcontractors, does not establish, nor is it intended to establish a "joint employer" relationship between the Contractor and Malcolm Pirnie. This allowance does not establish, nor is it intended to establish, a direct or indirect employer/employee relationship with subcontractor's employees.

THIS SITE SPECIFIC HASP MUST BE REVIEWED AND APPROVED BY CORPORATE HEALTH AND SAFETY FOR ONE OR MORE OF THE FOLLOWING CONDITIONS: IF AN UPGRADE TO "LEVEL C" OR ABOVE IS ANTICIPATED; A PERMIT REQUIRED CONFINED SPACE ENTRY OR ENTRY INTO AN EXCAVATION IS ANTICIPATED; SAMPLING OF UNKNOWN DRUMS AND/OR IN UNKNOWN CONDITIONS IS ANTICIPATED, OR IF THERE MAY BE RADIATION LEVELS GREATER THAN 0.5 mR (500µR)/HOUR.

SECTION 2: EMERGENCY INFORMATION

(A) LOCAL RESOURCES	SERVICE NAME	TELEPHONE NUMBER
EMERGENCY MEDICAL SERVICES	911	911
HOSPITAL (Map attached)	Chenango Memorial Hospital	(607) 674-4495
FIRE DEPARTMENT	South Otselic Fire Department	(315) 653-4455 or 911
POLICE / SECURITY	Chenango County Sheriff	(607) 334-2000 or 911
HAZMAT/ SPILL / OTHER RESPONSE	911	911

(B) CORPORATE RESOURCES

MALCOLM PIRNIE 24 / 7 EMERGENCY / INCIDENT TELEPHONE NUMBERS		(800) 478-6870 (24 HOURS)
CORPORATE HEALTH AND SAFETY **	JOSEPH GOLDEN, EMT-P, CET, CHMM	(914) 641-2978 WHI
FIER PROJECTS	JANE WEBER, CET	(914) 641-2559 WHI
MUNI/WEG/CMRT PROJECTS	LAURA LEE-CASEY,	(914) 641-2707 WHI
CORPORATE HEALTH PHYSICIST	LES SKOSKI	(201) 398-4377 NNJ
WORKERS COMP / OSHA LOG	LAURA LEE-CASEY, CHST, CET, EMT-P	(914) 641-2707 WHI
LEGAL DEPARTMENT **	JERRY CAVALUZZI	(914) 641-2950 WHI

**** TO BE NOTIFIED IN CASE OF ACCIDENT**

SECTION 3: PROJECT INFORMATION

(A) SITE / FACILITY INFORMATION:

SITE NAME: Gladding Cordage Site

ADDRESS: Route 13

TOWNSHIP/ COUNTY: South Otselic, New York

☐ FEDERAL ☒ STATE

SITE CLIENT CONTACT: Pason Long (NYSDEC)

PHONE NUMBER: 518-402-9745

SITE SAFETY CONTACT: N/A

☐ MUNICIPAL / REGIONAL ☐ PRIVATE

(B) SITE CLASSIFICATION: (check all that apply)

☐ HAZARDOUS (RCRA)	☐ UST / LUST	☐ REFINERY
☒ HAZARDOUS (CERCLA / STATE)	☐ BROWNFIELD	☐ WTP / WWTP
☐ CONSTRUCTION	☐ CHEMICAL PLANT	☐ OTHER:
☐ LANDFILL (NON-HAZARDOUS)	☒ MANUFACTURING	
☐ ACTIVE	☒ INACTIVE	

(C) TYPE OF FIELD ACTIVITY

☐ HAZARDOUS WASTE	☐ SOLID WASTE	☐ CONSTRUCTION
☒ HYDROGEOLOGY	☒ ENVIRONMENTAL	☐ AIR / ODOR
☐ WASTE WATER	☐ WATER	☐ OTHER:

(D) FIELD OBJECTIVES (Check all that apply)

		SAMPLING:	
☐ PRE-JOB VISIT	☐ AUDIT	☐ AIR	☐ SEDIMENT
☒ CONTRACTOR OVERSIGHT	☐ OTHER:	☐ SURFACE WATER	☐ SOIL
☐ CONSTRUCTION MGMT		☒ GROUND WATER	☐ LANDFILL
☒ INSPECTION		☒ WASTE WATER	☐ OTHER
☐ INVESTIGATION SURVEY		☐ WASTE STREAM	

DATE(S) OF FIELD ACTIVITIES: 2007 through 2011

(E) FIELD TASKS

MALCOLM PIRNIE TASKS

M1. Contractor Oversight

M2. Groundwater sampling

M3. Operations and Maintenance of Pump and Treat Facility

M4.

TASKS PERFORMED BY OTHERS

01. Groundwater sampling

02.

03.

04.

SECTION 4: PROJECT SAFETY ORGANIZATION, HEALTH AND SAFETY TRAINING, AND MEDICAL MONITORING

(A) PROJECT HEALTH AND SAFETY ROLES, RESPONSIBILITIES AND COORDINATION

PROJECT OFFICER	The Project Officer (PO) is ultimately responsible for project performance. The PO seeks and gets appropriate approvals for risk management decisions (e.g. from Regional/Practice Director(s), Legal Council, Corporate Health and Safety), and selects and effective and qualified project team. The PO supports the Project Manager or Deputy Project Manager with appropriate resources.
PROJECT MANAGER DEPUTY PROJECT MANAGER	The Project Manager (PM) has the responsibility for executing the project in accordance with the scope of work and good engineering practice. The PM will supervise the allocation of resources and staff to implement specific aspects of this HASP and may delegate authority to expedite and facilitate any application of the program. The PM implements and executes an effective program of site-specific personnel protection and accident prevention. The Project Manager reports to the Project Officer. Deputy Project Managers (DPM) are assigned all duties and responsibilities of the Site Safety Officer in his/her absence.
CORPORATE HEALTH & SAFETY	Corporate Health and Safety is responsible for Malcolm Pirnie's overall Health and Safety Program and provides project guidance on air monitoring methodology, data interpretation and assistance in determining appropriate project engineering controls, work practices, and personal protective equipment. Corporate Health and Safety also reviews and approve HASPs in accordance with Section 1.
SITE SAFETY OFFICER ALTERNATE SITE SAFETY OFFICER (S)	The Site Safety Officer (SSO) is responsible for interpreting and implementing the site health and safety provisions set out in this HASP, and will guide the efforts of field team personnel in their day-to-day compliance with this HASP. The SSO has the ability and authority to make necessary changes or additions to this HASP and provide technical assistance to field team personnel on problems relating to worksite safety. The SSO has the authority to correct safety-related deficiencies in materials or practice and to call a Project STOP in the most serious cases. Alternate Site Safety Officer (ASSO) is assigned all duties and responsibilities of the Site Safety Officer in his/her absence.
PUBLIC INFORMATION OFFICER:	The Public Information Officer (PIO) is responsible for all public, press and other news media request for information, and is the only person authorized to provide such information
SITE RECORDKEEPER:	The Site Recordkeeper is responsible for the documentation of all related heath and safety data documentation, including but not limited to metrological data, instrument calibration, accident and injury reports, and air monitoring data.
FIELD TEAM LEADER:	The Field Team Leader (FTL) is responsible for leading "on-site" activities of field team personnel, and to ensure field team personnel perform only those tasks that have been identified in this HASP.
FIELD TEAM PERSONNEL	Field personnel have the following health and safety responsibilities: • Implement the procedures set forth in the HASP; • Take all reasonable precautions to prevent injury to themselves and their fellow employees; and • Perform only those tasks that they believe they can do safely, and immediately report any accidents and/or unsafe conditions in accordance with Section 1.

(B) PROJECT TEAM - The following Malcolm Pirnie personnel are designated to carry out the stated project job functions on site. THE SITE SAFETY OFFICER, OR A DESIGNATED ALTERNATE WILL BE ON-SITE DURING **ALL** SITE ACTIVITIES. (NOTE: One person may carry out more than one job function.)

PROJECT MANAGER: Bruce Nelson

PROJECT OFFICER: Daniel Loewenstein

SITE SAFETY OFFICER: Jeremy Wyckoff

ALTERNATE SAFETY OFFICER(S): Jeremy Wyckoff

PUBLIC INFORMATION OFFICER: Bruce Nelson

SITE RECORDKEEPER: Jeremy Wyckoff

FIELD TEAM LEADER: Jeremy Wyckoff

FIELD TEAM PERSONNEL: Stephan Bagnato

Ely Moskal

Mark deJong

The following subcontractors and governmental agencies have been informed by Malcolm Pirnie of emergency response procedures, and any potential fire, explosion, health, safety or other hazards of the site / facility by making this Site Specific Health and Safety Plan and site information obtained by others available during regular business hours. Subcontractors and governmental agencies shall be solely responsible for the health and safety of their employees and shall comply with all applicable laws and regulations as described in **Section 1** of this plan.

SUBCONTRACTOR(S): Aztech Technologies

FEDERAL AND STATE AGENCY REPS: Pason Long (NYSDEC)

OTHER AGENCY REPS:

(C) HEALTH AND SAFETY TRAINING, MEDICAL MONITORING, AND FIT TESTING PROGRAM

The following project staff is included in the Malcolm Pirnie Health and Safety Training and Medical Monitoring programs. The details of these programs can be found in the Health and Safety Policies and Written Programs. (NOTE: At least one CPR/First Aid Trained person must be on-site during HAZWOPER and confined space entry activities.)

	HAZWOPER TRAINING				OTHER TRAINING								
NAME	INITIAL (DATE)	8HR (DATE)	MGR (DATE)	DOT (DATE)	CSE (DATE)	CPR / First Aid / (DATE)		BBP	MEDICAL (DATE)	FIT TEST MAKE	SIZE	TYPE	(DATE)
Stefan Bagnato	10/03	08/07	03/06			03/08	03/08	03/07	03/07				
Jeremy Wyckoff	06/04	08/07	03/06		11/05	03/08	03/08	03/07	03/07	NOR	M-L	FF	03/07
Ely Moskal	08/05	08/07	03/06			03/08	03/08	03/07	07/07				
Christine Thomas	11/06								09/07				
Kelley Roe	07/89	03/07	03/03			03/08	03/08	03/07	03/07	NOR	SML	FF	03/07
Mark deJong	05/04	08/07	03/06			03/08	03/08	03/07	05/08	MSA	LR	FF	03/07

SECTION 5: HAZARD ANALYSIS

(A) **ACTUAL OR POTENTIAL PHYSICAL HAZARDS** – (Check all that apply to Malcolm Pirnie activities)

- ☒ ANIMALS / PLANTS
- ☐ ASBESTOS / LEAD
- ☐ CHEMICAL EXPOSURE (See Section 5B/5C)
- ☐ CONFINED SPACE (See Section 12)
- ☐ DEMOLITION
- ☐ DRILLING
- ☐ DRUM HANDLING
- ☐ DUST, HARMFUL
- ☐ DUST, NUISANCE
- ☒ ELECTRICAL
- ☐ EXCAVATIONS (See Section 13)
- ☐ EXTREME COLD (See Section 10)
- ☐ FALL, >6' VERTICAL
- ☐ FALLING OBJECTS
- ☒ HEAT STRESS
- ☐ HEAVY EQUIPMT
- ☐ HEAVY LIFTING
- ☐ HOT WORK
- ☐ HUNTING SEASON
- ☐ IMMERSION
- ☐ IONIZING RADIATION
- ☐ LIGHT RADIATION (i.e., Welding, High Intensity)
- ☐ LIMITED CONTACT
- ☒ MOVING PARTS (LO / TO)
- ☐ NOISE (> 85 dB)
- ☐ NON-IONIZING RADIATION
- ☐ OVERHEAD OBJECTS
- ☐ POWERED PLATFORMS
- ☐ POOR VISIBILITY
- ☐ ROLLING OBJECTS
- ☐ SCAFFOLDING
- ☐ SHARP OBJECTS
- ☐ STEEP / UNEVEN
- ☐ TERRAIN
- ☒ TRAFFIC (STRUCK BY)
- ☐ OTHER: _____

(B) **PRESENCE OF HAZARDOUS MATERIALS STORED OR USED ON SITE** (CHECK ALL THAT APPLY)

☐ YES By Client / Owner ☐ YES By Malcolm Pirnie (See Section 11) ☒ NO

TYPE

- ☐ EXPLOSIVES
- ☐ COMPRESSED GASES
- ☐ FLAMMABLE / COMBUSTIBLE LIQUIDS
- ☐ FLAMMABLE / REACTIVE SOLIDS
- ☐ OXIDIZERS
- ☐ TOXIC / INFECTIOUS
- ☐ RADIOACTIVE
- ☐ CORROSIVE
- ☐ MISCELLANEOUS
- ☐ HAZARDOUS WASTE (Stored)

(C) **CHEMICAL HAZARDS OF CONTAMINANTS INFORMATION**

(1) IDENTIFIED CONTAMINANTS - Known or suspected hazardous/toxic materials (attach historical information, physical description, map of contamination and tabulated data, if available)

SUBSTANCES INVOLVED	CHARACTERISTICS	MEDIA	ESTIMATED CONCENTRATIONS	LOWEST PEL, or TLV
1,1,1,-Trichloroethane	VO, TO	GW	UNKNOWN	350 ppm
1,1-Dichloroethane	VO, TO	GW	UNKNOWN	100 ppm
1,2-Dichloroethene	VO, TO	GW	UNKNOWN	1 ppm

Media types: GW (ground water), SW (surface water), WW (wastewater), AIR (air), SL (soil), SD (sediment), WL (waste, liquid), WS (waste, solid), WD (waste, sludge), WG (waste, gas), OT (other).

Characteristics: CA (corrosive, acid), CC (corrosive, caustic), IG (ignitable), RA (radioactive), VO (volatile), TO (toxic), RE (reactive), BIO (infectious), UN (unknown), OT (other, describe

(2) DESCRIBE POTENTIAL FOR CONTACT WITH EACH MEDIA TYPE FOR EACH OF THE MPI TASKS LISTED IN SEC 3 (E):

MPI TASK	ROUTE OF EXPOSURE (INHAL/INGEST/CONTACT/ABSORB)	POTENTIAL FOR CONTACT (HIGH / MEDIUM / LOW)	METHOD OF CONTROL
1	Inhale/Ingest/Absorb	Low	WORK PRACTICES/PPE
2	Inhale/Ingest/Absorb	Low	WORK PRACTICES/PPE
3	Inhale/Ingest/Absorb	Medium	WORK PRACTICES/PPE

The Site Safety Officer will brief the MPI field team on symptoms and signs of overexposure to chemical hazards

SECTION 6: SITE CONTROL MEASURES

(A) WORK ZONES - EXCAVATIONS, DRILLING OPERATIONS, AND HEAVY EQUIPMENT

Jeremy Wyckoff has been designated to coordinate access control and security for Malcolm Pirnie operations on site. It is a Malcolm Pirnie policy that Malcolm Pirnie personnel will not enter trench or excavated areas without approval of Corporate Health and Safety. A safe perimeter has been established at the boundary of any excavation and/or a safe distance from excavators, drill rigs and other heavy equipment.

These boundaries are identified by: There will not be any excavations or drilling at the Site.

No unauthorized person should be within this area.

(B) WORK ZONES - CONTAMINATION

The prevailing wind conditions are WESTERLY A wind direction indicator is used to determine daily wind direction. The Command Post is located upwind from the Exclusion Zone or at a sufficient distance to prevent exposure should a release occur.

Control boundaries have been established and Exclusion Zone(s) (the contaminated area) have been identified. (Attach site map)

These boundaries are identified by: CONTAMINATION IS IN THE SUB-SURFACE – EXCLUSION ZONE WILL BE IMMEDIATE WORK AREA.

No unauthorized person should be within this area.

SECTION 7: SAFETY PROCEDURES / EQUIPMENT REQUIRED

Identify all procedures and equipment needed to eliminate or minimize exposure to hazards identified in Section 5.

- ☒ AIR MONITORING EQUIPMENT (See Section 9)
- ☒ BARRIER TAPE
- ☒ COMMUNICATIONS - ONSITE
- ☒ COMMUNICATIONS - OFFSITE (i.e., cell/digital phones if no other means)
- ☐ CONFINED SPACE PROGRAM & EQUIPMENT (See Section 12)
- ☐ EYE WASH
- ☐ EMERGENCY SHOWERS
- ☐ EMERGENCY AIR HORN
- ☐ FALL PROTECTION PROGRAM & EQUIPMENT
- ☐ FIRE EXTINGUISHER(S) - ABC
- ☒ FIRST AID KIT / BBP KIT
- ☐ FLOTATION DEVICE (USCG)
- ☐ GFCI EXTENSION CORDS
- ☐ HARNESS(S) / LIFELINE(S)
- ☐ INSECT / TICK REPELLANT
- ☐ HUNTING SEASON
- ☐ LADDER(S)
- ☐ LIGHTING - HAND HELD
- ☐ LIGHTING - FIXED / EMERGENCY
- ☐ LOCKOUT/TAGOUT PROGRAM & EQUIPMENT
- ☒ MSDSs – ATTACHED (See Section 11)
- ☐ MSDSs - FACILITY / OTHERS
- ☐ PPE - PHYSICAL HAZARDS (See Section 15)
- ☒ PPE - CHEMICAL HAZARDS (See Section 15)
- ☐ RESPIRATORY PROTECTION PROGRAM & EQUIPMENT (APR) (See Section 15)
- ☐ RESPIRATORY PROTECTION PROGRAM & EQUIPMENT (SAR) (See Section 15)
- ☒ TRAFFIC CONES
- ☐ VENTILATION EQUIPMENT
- ☐ OTHER:

SECTION 8: COMMUNICATIONS AND SAFE WORK PRACTICES

(A) COMMUNICATIONS - ONSITE

Whenever possible, communications between site personnel should be face-to-face. When verbal communications is not possible, radio communications shall be established.

In case of radio communications failure, or when respiratory protection is in use, the following hand signals will be used:

OK; I AM ALL RIGHT; I UNDERSTAND	THUMBS UP
NO; NEGATIVE	THUMBS DOWN
NEED ASSISTANCE	BOTH HANDS ON TOP OF HEAD
DANGER - NEED TO LEAVE AREA, NO QUESTIONS	GRIP PARTNERS WRIST WITH BOTH HANDS
HAVING DIFFICULTY BREATHING	HANDS TO THROAT

(B) COMMUNICATIONS - OFF SITE

If applicable, telephone communication to the Command Post should be established as soon as practical.

Telephone numbers that can be used to reach the command post are: 518-782-2100 and 518-782-2115

(C) SAFE WORK PRACTICES

1. A "BUDDY SYSTEM" IN WHICH ANOTHER WORKER IS CLOSE ENOUGH TO RENDER IMMEDIATE AID WILL BE IN EFFECT. CLIENTS AND/OR CONTRACTORS MAY SERVE AS A "DESIGNATED BUDDY."
2. WHERE THE EYES OR BODY MAY BE EXPOSED TO CORROSIVE MATERIALS, SUITABLE FACILITIES FOR QUICK DRENCHING OR FLUSHING SHALL BE AVAILABLE FOR IMMEDIATE USE (SEE SECTION 7).
3. DO NOT KNEEL ON THE GROUND WHEN CHEMICAL PROTECTIVE CLOTHING IS BEING USED.
4. IF DRILLING EQUIPMENT IS INVOLVED, HAVE A CURRENT UTILITY SURVEY, AND KNOW WHERE THE 'KILL SWITCH' IS.
5. CONTACT WITH SAMPLES, EXCAVATED MATERIALS, OR OTHER CONTAMINATED MATERIALS MUST BE MINIMIZED.
6. ALL ELECTRICAL EQUIPMENT USED IN OUTSIDE LOCATIONS, WET AREAS OR NEAR WATER MUST BE PLUGGED INTO GROUND FAULT CIRCUIT INTERRUPTER (GFCI) PROTECTED OUTLETS (SEE SECTION 7).
7. IN THE EVENT OF TREACHEROUS WEATHER-RELATED WORKING CONDITIONS (I.E., THUNDERSTORM, LIMITED VISIBILITY, EXTREME COLD OR HEAT) FIELD TASKS WILL BE SUSPENDED UNTIL CONDITIONS IMPROVE OR APPROPRIATE PROTECTION FROM THE ELEMENTS IS PROVIDED.
8. SMOKING, EATING, CHEWING GUM OR TOBACCO, OR DRINKING ARE FORBIDDEN EXCEPT IN CLEAN OR DESIGNATED AREAS.
9. USE OF CONTACT LENSES NEAR CHEMICALS OR DURING USE OF RESPIRATORY PROTECTION IS PROHIBITED AT ALL TIMES.
10. GOOD HOUSEKEEPING PRACTICES ARE TO BE MAINTAINED.
11. SITE / FACILITY SPECIFIC SAFE WORK PRACTICES:

Extreme caution will be used around pumps and moving equipment.

SECTION 9: ENVIRONMENTAL MONITORING ☐ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

(A) The following environmental monitoring instruments shall be used on site at the specified intervals and recorded in the site logbook. (NOTE: If monitoring period is "OTHER", monitoring schedule will be attached to this plan.)

EQUIPMENT	MONITORING PERIOD				ACTION LEVEL
☐ Combustible Gas Indicator	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ O_2 Meter	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ Toxics: ☐ CO ☐ H_2S	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ Other: _____	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☒ PID (Lamp 10.6 eV)	☐ Continuous*	☐ Hourly	☐ x Day	☒ Other	25 ppm
☐ FID	Head space monitoring implemented during well inspections.				
☐ Colorimetric tubes:					
_____	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
_____	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ Radiation: ☐ α ☐ β ☐ gamma	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ Respirable Dust Meter	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ Noise Meter	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
☐ Other:	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
_____	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	
_____	☐ Continuous	☐ Hourly	☐ x Day	☐ Other	

(B) Monitoring equipment is to calibrated according to manufacturers' instructions. Record calibration data and air concentrations in the Health and Safety on-site log book.

(C) Recommended Action Levels for Upgrade or Downgrade of Respiratory Protection, or Site Shutdown and Evacuation. These are average values. Consideration should be given to the potential for release of highly toxic compounds from the waste or from reaction by-products. Levels are for persistent (> 10 min) breathing zone measurements in non-confined spaces. **For unexpected conditions, stop all work and contact Corporate Health and Safety.**

<u>Oxygen Levels</u>	
Less than 19.5%	Level B necessary for work to start / continue. Consider toxicity potential.
19.5% to 23.5%	Work may start / continue. Investigate changes. Continuous monitoring.
Greater than 23.5%	PROHIBITED WORK CONDITION
<u>Flammability / Explosive Hazards</u>	
Less than 10% of LEL	Work may start / continue. Consider toxicity potential.
10% to 25% of LEL	Work may start / continue. Continuous monitoring.
Greater than 25% of LEL	PROHIBITED WORK CONDITION.
<u>Uncharacterized Airborne Organic Vapors or Gases</u>	
Background*	Work may start / continue. Continue to monitor conditions.
Up to 5 meter units (m.u. or "ppm") above background	Level C necessary for work to start / continue. Continuous monitoring. Use Colorimetric tubes to characterize vapors.
Up to 50 m.u. above background	Level B necessary for work to start / continue. Continuous monitoring.
Greater than 50 m.u.	PROHIBITED WORK CONDITION.
*** Off-site clean air measurement**	
<u>Characterized Airborne Organic Vapors or Gases</u>**	
Up to 50% of TLV, or PEL or REL	Work may start / continue. Continue to monitor conditions.
Up to 25 times the TLV, or PEL or REL	Level C necessary for work to start / continue. Continuous monitoring.
Up to 500 times the TLV, or PEL or REL	Level B necessary for work to start / continue. Continuous monitoring.
Greater than 500 times the TLV, or PEL or REL	PROHIBITED WORK CONDITION.
** **Use mixture calculations (% allowed = $3C_NEL_N$) if more than one contaminant is present.**	
<u>Radiation</u>	
Less than 0.5 mR/Hour (500 μR)	Work may start / continue. Continue to monitor conditions.
Up to 1 mR/Hour above background	Work may start / continue with Radiation Safety Officer present on site.
Greater than 1 mR/Hour above background	PROHIBITED WORK CONDITION.

*PID monitoring will be conducted continuously during intrusive activites (i.e., drilling and test pit excavation).

SECTION 10: PERSONAL MONITORING ☒ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

(A) PERSONAL EXPOSURE SAMPLING (Consider if high levels of noise or high concentrations of lead, mercury or arsenic are present) N/A

The following personal monitoring will be in effect on site:

A copy of personal monitoring results is to be sent to Corporate Health and Safety for inclusion in the Employee's Confidential Exposure Record File.

(B) HEAT / COLD STRESS MONITORING

The expected air temperature will be 60-80 ºF. If it is determined that heat stress or cold stress monitoring is required (mandatory for heavy exertion in PPE at temperatures over 70ºF, or at temperatures under 40ºF or wind chill equivalent), the following procedures shall be followed (describe procedures in effect, for heat stress i.e., monitoring body temperature, body weight, pulse rate; for cold stress i.e., appropriate clothing, shelter breaks):

HEAT AND COLD STRESS MONITORING BY PERSONAL OBSERVATION WILL BE PERFORMED.

SECTION 11: HAZARD COMMUNICATION PROGRAM ☐ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

If chemicals are introduced to the site by Malcolm Pirnie (e.g., decontamination liquids, preservatives, etc.), a copy of the Malcolm Pirnie Hazard Communication Program and Material Safety Data Sheets (MSDSs) of chemicals introduced by Malcolm Pirnie to the site is attached to this plan. The Site Safety Officer will review this information with all field personnel prior to the start of the project, and will inform other employers (e.g., Owner, Contractor and Subcontractors) the availability and location of this information. The Comprehensive List of Chemicals introduced by Malcolm Pirnie to this site is:

Alconox

Isopropanol

All chemicals being introduced to the site, hazardous/potentially hazardous samples prepared at the site, and/or any hazardous materials previously sent to the site, **that will be stored at the site or will be transported from the site by common carrier**, will be packaged, labeled and identified as hazardous materials in accordance with U.S. Department of Transportation (DOT) and/or International Air Transport Association (IATA) regulations by a trained HazMat employee.

(NOTE: At multi-employer sites, the Site Safety Officer will obtain information, if applicable, on hazardous chemicals other employers may produce or introduce to the job site to which Malcolm Pirnie employees may be exposed, including the location of their written hazard communication program(s), labeling program(s), and Material Safety Data Sheet(s).

SECTION 12: CONFINED SPACE ENTRY ☒ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

If a permit-required confined space entry will be made on site, a copy of the Malcolm Pirnie Confined Space Entry Program, and a completed Malcolm Pirnie Confined Space Pre-Entry Inspection Check List will be attached to this plan. A Confined Space Entry Permit must be completed and posted outside the confined space prior to entry, and the entry will follow the Malcolm Pirnie Confined Space Entry written program. Permits are to be saved and logged with project documentation.

SECTION 13: EXCAVATION SAFETY ☒ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

Excavations being created in order to accomplish Malcolm Pirnie tasks or in progress during Malcolm Pirnie inspection of other activities or tasks, shall be shored or slopped or otherwise protected to prevent accidental collapse prior to entry, in accordance with Subpart F of 29 CFR 1926. It is Malcolm Pirnie policy that Malcolm Pirnie personnel will not enter trench or excavated areas without approval of Corporate Health and Safety. If an entry into an excavation by Malcolm Pirnie personnel is necessary, a Excavation Plan identifying the Competent Person and the protective measure to be used (i.e., sloping, shoring, trench box) will be attached to this plan.

SECTION 14: DECONTAMINATION PROCEDURES ☐ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

Personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The Site Safety Officer is responsible for monitoring adherence with this decontamination plan.

A SITE SPECIFIC decontamination protocol shall be used with the following decontamination stations:

(1) Alconox wash

(2) Tap water rinse

(3) Isopropanol and/or 10% nitric acid rinse

(4) Deionized water rinse

(5) Air dry

(6) Aluminum foil wrap for transport

(7)

(8)

(Other)

The following decontamination equipment is required:

☐ Decon Pad (Plastic Sheet) ☐ Dry Brushes ☒ Buckets Other
☒ Trash Cans/Bags ☒ Wet Brushes ☐ Hose / Spray

Alconox/DI; Isopopanol/DI Will be used as the decontamination solution

SECTION 15: PERSONAL PROTECTIVE EQUIPMENT

TASK *	RESPIRATORS & CARTRIDGE[1]	USE ** (See Section 16)	CLOTHING ***	GLOVES	BOOTS	OTHER
1	N/A	N/A	N/S	N/S	SL	NA
2	N/A	N/A	N/S	N	SL	RV
3	FF, OV	SEE BELOW	T(SEE BELOW)	N	SL	HP,G

* Same as Section 3E

**UP = Upgrade
CONT = Continuous

***** NOTE:** PPE use will be in accordance with Malcolm Pirnie's Health and Safety Policy and Written Programs.

CODES:

RESPIRATORS[1]
HF = Half Face APR
FF = Full Face APR
ESCBA = Escape Bottle
SAR = Airline
SCBA = SCBA

CARTRIDGES[1]
P = Particulate
OV = Organic Vapors
AG = Acid Gas
Mult = Multi-Gas/Vapor
Other

CLOTHING
N/S = No Special
C = Coveralls
T = Tyvek
Sx = Saranex
PT = PE Tyvek

GLOVES[2]
Co = Cotton
Le = Leather [3]
L = Latex
N = Nitrile
B = Butyl
Neo = Neoprene
V = Viton
PVC = Polyvinyl Chloride
PVA = Polyvinyl Alcohol
Other:

BOOTS
SL = Leather Safety
H = Hip (Fireman)
O = Latex overboots

OTHER
HH = Hard Hat [3]
G = Safety Glasses [3]
GP = Glare Protection
GI = Goggles - Impact
GS = Goggles - Splash
FS = Face Shield
HP = Hearing Protection [3]
RV = Reflective Vests [3]

[3] **Should be considered for all field jobs**

[1] - List all that apply, i.e., FF w/ OV/AG/P

[2] - Use same codes for clothing and boots of same material

Respiratory protection will be upgraded under the following conditions: TYVEK AND FULL FACE AIR PURIFYING RESPIRATOR WITH ORGANIC VAPOR CARTRIDGES WILL BE WORN WHEN SERVICING OR CLEANING AIR STRIPPER, AND WHEN SERVICING BACKFLOW PREVENTER AND HEAT TRACE TAPE.

The following cartridge change out schedule is to be followed onsite (attach any calculations to plan):

SECTION 16: EMERGENCY ACTION PLAN

The following standard emergency response procedures will be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedure are followed.

(A) EVACUATION

All work activities are suspended and the site is to be EVACUATED IMMEDIATELY, when there is a threat to life or health as determined by individual good judgment, i.e. fire, hazardous chemical spill, dangerous gas leak, severe weather (i.e., tornado); or when notified by other site / facility staff and local fire or police officials.

If an evacuation is called for, the emergency alarm system for weather-related, medical, fire and other evacuation emergencies is:

PERSONAL NOTIFICATION OR HAND SIGNALS

Evacuation from the Exclusion Zone should whenever possible occur through the decontamination line. In those situations where egress in this manner cannot occur, the following emergency escape routes have been designated (document on map if possible):

N/A

Once evacuated off site, all staff should gather at Nearest Cross Street which is a minimum of 250 feet away from the incident

(B) FIRE OR EXPLOSION

Upon discovery of a fire or an explosion, the above-designated emergency signal shall be sounded and all personnel shall assemble at the decontamination line. The fire department is to be notified and all personnel moved to a safe distance (minimum 250') from the involved area.

If a person's clothing should catch fire, burning clothing may be extinguished by having the individual drop to the floor and roll. If necessary, physically restrain the person and roll them around on the floor to smother the flames. Use a fire blanket or extinguisher if one is readily available and you have been trained in its use. Call emergency medical services if not already done so.

If a person's clothing should become saturated with a chemical, douse the individual with water from the nearest safety shower if available. Consult the chemical Material Safety Data Sheets (MSDSs) for further information. Call emergency medical services if indicated by the MSDSs.

NEVER RE-ENTER THE SITE / FACILITY until the emergency has been declared over and permission to re-enter has been given by site / facility health and safety staff or local fire or police officials. If any staff is unaccounted for, notify an individual in charge.

(C) MEDICAL EMERGENCY

If you discover a medical emergency and are by yourself, CALL OUT FOR HELP. When someone arrives, tell them to call for help. If no one comes or you know you are alone, provide whatever care you can for 1 minute, then make the call yourself. (See Section 2)

Upon notification of an injury in the Exclusion Zone, the designated emergency signal shall be sounded. All site personnel shall assemble at the decontamination line. The SSO or alternate should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the Support Zone. The onsite CPR/FA personnel shall initiate the appropriate first aid, and contact should be made for an ambulance (and other emergency services as needed) and with the designated medical facility (if required). No persons shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

The hospital is 30 minutes from the site. Ambulance response time is _____ minutes. N/A of N/A was contacted on _____ and briefed on the situation, the potential hazards, and the substances involved. When IDLH conditions exist, arrangements should be made for onsite standby of emergency services.
A map for directions to the nearest hospital is attached to this plan. If not, the directions are: SEE ATTACHED MAP

(D) SAFETY EQUIPMENT FAILURE

If any other equipment (i.e., air monitoring) on site fails to operate properly, the FTL and/or SSO shall be notified to determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents completion of the Work Plan tasks, all personnel shall leave the work area until the situation is evaluated and appropriate actions taken.

(E) FOLLOW UP

In all situations, when an on site / facility emergency results in evacuation of the work area, or a “large spill” has occurred, staff shall not resume work until:

- The conditions resulting in the emergency have been corrected;
- The hazards reassessed by the SSO and Corporate Health and Safety;
- The HASP has been reviewed by the SSO and Corporate Health and Safety; and
- Site personnel have been briefed on any changes in the HASP by the SSO.

SECTION 17: SPILL CONTAINMENT / CONTROL ☒ THIS SECTION NOT APPLICABLE TO SITE ACTIVITIES

For most chemicals introduced to the worksite, or under control of Malcolm Pirnie employees, spills of chemicals would be considered incidental and would be controlled in the immediate area of the spill. Such spills shall be handled utilizing precautions appropriate for the chemical characteristics specified in the MSDS for the chemical including spill control methods and selection and use of minimum personal protective equipment.

For chemicals introduced to the worksite, or under control of Malcolm Pirnie employees, that would cause a "large spill" (greater than 55 gallons), a copy of the appropriate Emergency Response Guidebook (ERG) guide shall be attached to this plan, and a spill response contractor shall be identified in Section 2.

SECTION 18: EMPLOYEE ACKNOWLEDGEMENTS

PLAN REVIEWED BY:		DATE
Project Manager:	Bruce Nelson	8/8/07
Project Leader:	Jeremy Wyckoff	
Local H&S Coordinator:	Aaron Bobar	8/8/2007
Corporate H & S		

I acknowledge that I have read the information on this HASP, attached Material Safety Data Sheets (MSDSs), DOT Emergency Response Guides, and Health and Safety Programs.
I understand the site / facility hazards as described and agree to comply with the contents of the plan.

EMPLOYEE (Print Name)

VISITOR (Print Name)

ATTACHED DOCUMENTS

☒ MSDS(s)	☒ Hazard Communication Written Program	☐ Confined Space Entry Written Program	☐ DOT ERG Guides
☒ Site Map	☒ Personal Protective Equipment Written Program	☐ Excavation Safety Plan	☐ Respiratory Protection Program
☒ Hospital Directions	☐ Emergency Action Plan	☐ Evacuation Routes	☐ Cartridge Change Out Calculations
☒ Other Lockout/Tagout Written Program			

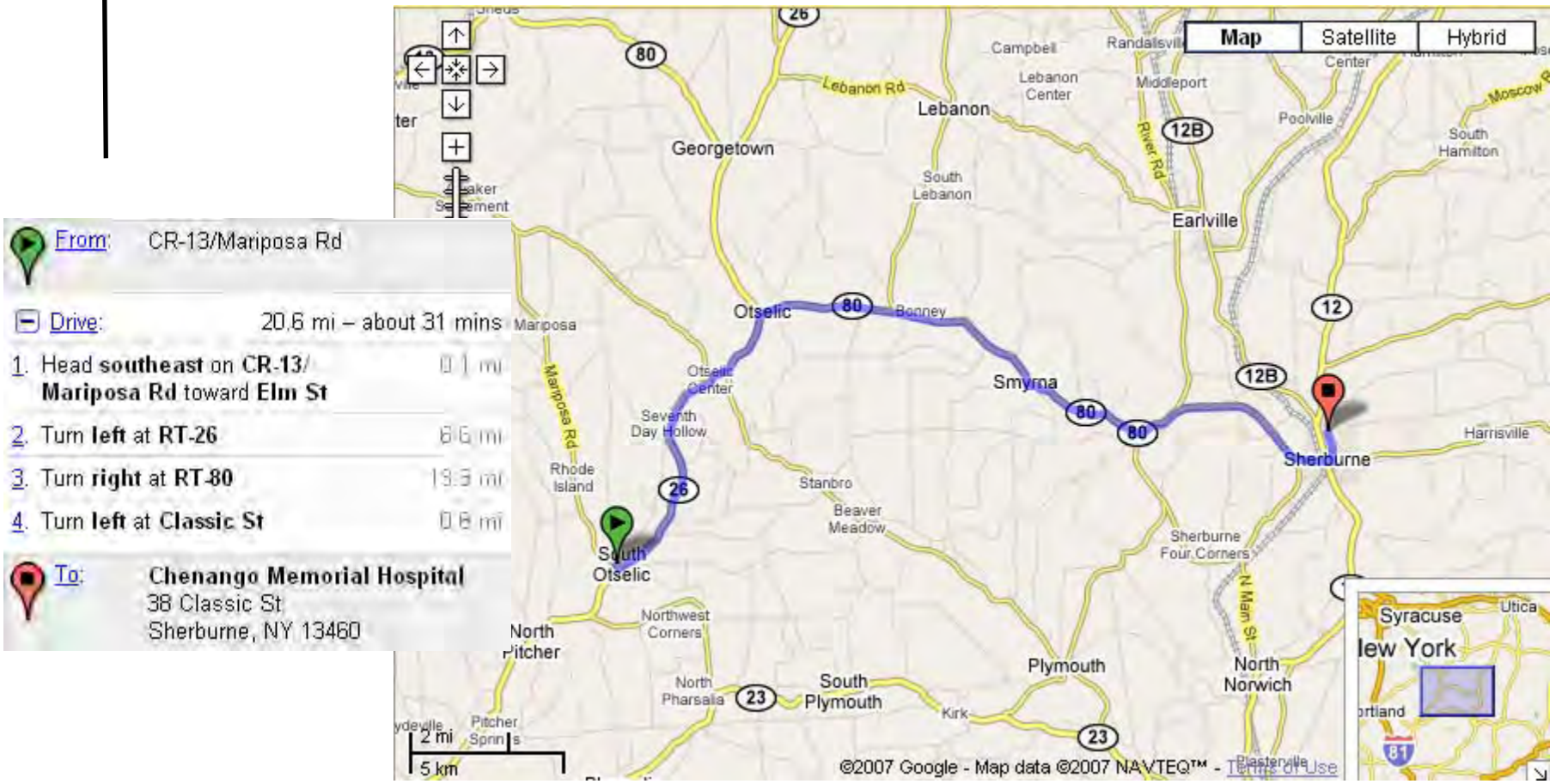
New York State Department of Environmental Conservation
Generic HASP for Work Assignments

Appendix B:
Hospital Directions

0266-NYSDEC

MALCOLM PIRNIE

N



SOURCE: GOOGLE MAP

MALCOLM PIRNIE

NYSDEC STANDBY CONTRACT NO. D004443
GLADDING CORPORATION
SOUTH OTSELIC, NEW YORK

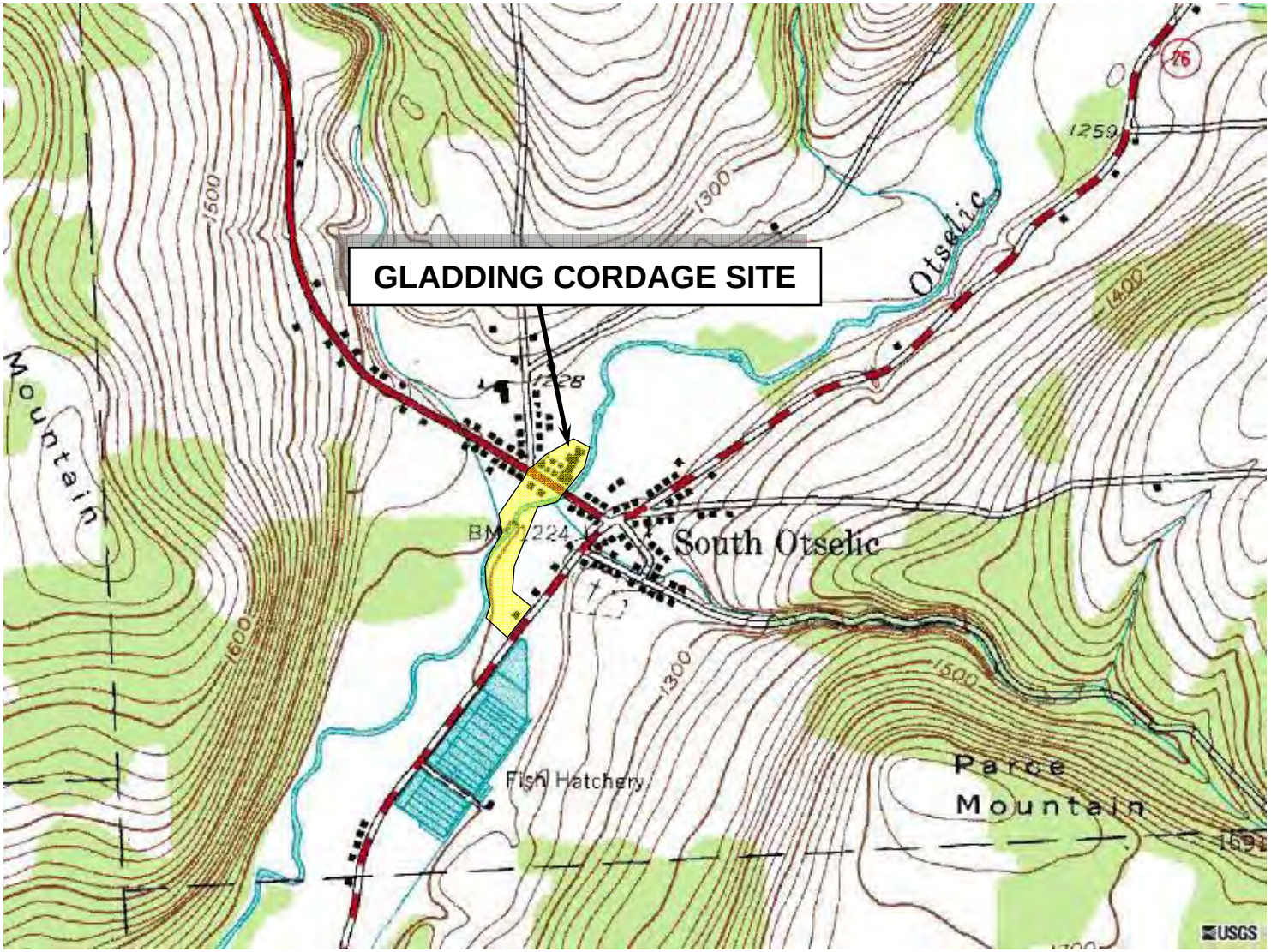
HOSPITAL DIRECTIONS

FIGURE 2

F:\PROJECT\0266352\FILE\Work Plan\Gladding Cordagel\ASP\Hospital Directions.ppt

Appendix C:
Site Map

MALCOLM PIRNIE



SCALE IN FEET

0 500 1000 2000

SOURCE: U.S.G.S 7.5 MIN. SOUTH OTSELIC QUAD, 1988

MALCOLM PIRNIE

NYSDEC STANDBY CONTRACT NO. D004443
GLADDING CORPORATION
SOUTH OTSELIC, NEW YORK

GLADDING CORDAGE SITE LOCATION

FIGURE 2

F:\PROJECT\0266352\FILE\Work Plan\Gladding Cordage\Work Plan\Figure 2-1.ppt

Appendix D:
Hazard Communication Written Program

MALCOLM PIRNIE

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APPENDICES

1.0 INTRODUCTION

Malcolm Pirnie's Hazard Communication Program was developed to meet the requirements of the OSHA Hazard Communication Standard, Title 29 Code of Federal Regulations 1910.1200 et seq. A copy of this standard is provided in Appendix A.

OSHA requires that employers make information available to staff members about hazardous chemicals they may be exposed to in the workplace. This information includes, but is not limited to, toxicology, physical and chemical hazards, means of detection, and protection against exposure.

Malcolm Pirnie makes this information available to staff members through this written hazard communication program, lists of chemicals in use, current copies of Material Safety Data Sheets (MSDSs), container labeling, and staff training.

The OSHA Hazard Communication Standard recognizes that Malcolm Pirnie may be the only employer on some work sites, and one of several employers on others. This Hazard Communication Program has provisions for requesting and communicating information on hazardous chemicals others bring to the work site that Malcolm Pirnie staff may be exposed to during the course of their duties.

For this reason, Malcolm Pirnie maintains a copy of this program at all Malcolm Pirnie work sites, whether or not the firm is responsible for the presence of hazardous chemicals at the site. Some states or local municipalities may have specific Right-To-Know or Community Right-To-Know requirements not addressed in this Hazard Communication Program. Accordingly, Office Managers, Project Managers, or their designees should determine the specific requirements of the localities where they operate.

2.0 ORGANIZATION AND RESPONSIBILITIES

The Manager, Health and Safety, WHI, is responsible for Hazard Communication Program content.

Office Managers are responsible for seeing that the program is implemented in their offices. They may delegate the administration of the program to a staff member they designate as the Hazard Communication Coordinator. This individual is typically the local Health and Safety Coordinator/Contact.

Project Managers are responsible for Hazard Communication Program implementation on their projects.

2.1 Manager, Health and Safety

The Manager, Health and Safety, WHI, is responsible for:

- Preparing and updating the written program, the Hazard Communication labeling program, and Hazard Communication training materials.
- Maintaining corporate Hazard Communication training records.
- Serving as a technical resource on chemical safety for technical and administrative staff.
- The implementation and execution of the corporate aspects of this program.

2.2 Office Managers

The Office Managers are responsible for:

- Designating a staff member (typically the Health and Safety Coordinator/Contact) to serve as Hazard Communication Coordinator.
- Supporting the Hazard Communication Coordinator by providing:
  - A Material Safety Data Sheet (MSDS) station at a visible location in the office;
  - The overhead time required to maintain the MSDS station and labeling program; and,
  - Visible and continuous support for the Program.
  - Ensuring that all staff who may be exposed to hazardous chemicals or materials receives appropriate hazard communication training before they start a task or assignment.

2.3 Hazard Communication Coordinators

Hazard Communication Coordinators are responsible for:

- Maintaining a current copy of the written Hazard Communication Program, and the OSHA Hazard Communication Standard in the MSDS station.
- Developing and maintaining a comprehensive list of hazardous chemicals based upon the MSDSs.
- Maintaining current MSDSs for hazardous chemicals used by project and office staff.
- Gathering and filing MSDSs for hazardous chemicals contractors, vendors and cleaning services use at their location.
- Inspecting incoming shipments of hazardous chemicals from manufacturers, wholesalers, retailers, formulators, laboratories, and others, for proper labeling, after being notified of their arrival.
- Providing or arranging for training for office and project staff on the hazards of chemicals in the work place, for all potentially exposed employees.
- Providing records of Hazard Communication training received by each employee, including type of training, date and name of instructor to Health & Safety, COR.

2.4 Project Managers

Project Managers are responsible for:

- Designating a project safety officer knowledgeable in the requirements of this Program.
- Assuring that the project safety officers implement the elements of this Program as they pertain to each project.

2.5 Project Safety Officers

Project Safety Officers are responsible for:

- Bringing a copy of the following documents to the project site:
  - The written Hazard Communication Program;
  - The OSHA Hazard Communication Standard; and,
  - Current Material Safety Data Sheets for each hazardous chemical Malcolm Pirnie introduces to the site.
- Developing and maintaining a comprehensive list of hazardous chemicals Malcolm Pirnie introduces to the job site, and making it accessible to all staff on the site.
- Notifying the designated Hazard Communication Coordinator when shipments of hazardous chemicals arrive at the site and giving Materials Safety Data Sheets (MSDSs) which accompany incoming shipments to the Hazard Communication Coordinator for review and filing.
- Contacting the source of the hazardous chemicals if the MSDSs are not complete or if an MSDS is not supplied with an initial shipment.
- Ensuring that temporary and permanent hazardous chemical containers are labeled.
- At multi-employer sites, telling the other employers the location of the written Malcolm Pirnie Hazard Communication Program and copies of MSDSs for the site.
- Communicating with other employers e.g., Owner, Contractors, Subcontractors, to obtain information about the location of their written hazard communication program(s), labeling program, and Material Safety Data Sheets, and, if applicable, information on the hazardous chemicals they may produce or introduce to the job site that Malcolm Pirnie employees may be potentially exposed to.

2.6 Project and Office Staff

Project and office staffs are responsible for:

- Reading and understanding the provisions of this Program.
- Reviewing the MSDSs for each hazardous chemical used in the workplace prior to handling or contact.

- Using proper labels for temporary containers.
- Alerting the project safety officer or the office Hazard Communication Coordinator to the arrival of new or additional shipments of hazardous chemicals to the office or worksite.

3.0 WRITTEN HAZARD COMMUNICATION PROGRAM

3.1 Program Availability

Copies of the written Hazard Communication Program and the OSHA Hazard Communication Standard are maintained at an accessible MSDS station. MSDS stations are designated in each permanent or long-term company location, including permanent offices, field offices, and field trailers.

At temporary job sites, if Malcolm Pirnie is bringing hazardous chemicals to the work site or if, based on past experience, another employer is expected to bring hazardous chemicals to the work site, a copy of this written Hazard Communication Program and relevant MSDSs are maintained on-site for the duration of field activities.

If Malcolm Pirnie is the only employer on a site, and if no hazardous chemicals are being brought to the site, it is strongly suggested that a copy of this written program be maintained on-site during field activities. However this is not a requirement.

4.0 COMPREHENSIVE LIST OF HAZARDOUS CHEMICALS

4.1 List Development

Complete the Comprehensive List of Hazardous Chemicals form provided in Appendix B, list each product containing a hazardous chemical, as defined in Appendix A of this section, 29 CFR 1910.1200 (d). Use the trade or common name of the product, the manufacturer, the hazardous chemical ingredients it contains, and the location where it is used and/or stored. Use as many lines as necessary. This list is to be updated as required.

A copy of the Comprehensive List of Hazardous Chemicals shall be maintained at the MSDS Stations of company and field locations, together with the written Hazard Communication Program.

5.0 MATERIAL SAFETY DATA SHEETS (MSDSs)

Malcolm Pirnie asks that its suppliers provide MSDSs for any purchased materials that contain hazardous chemicals as defined by OSHA. This request is made through language on Malcolm Pirnie contracts or verbally by staff members ordering materials, at the time an order is placed or a purchase made. MSDSs are kept for every chemical used and are made available to employees at company locations and work sites.

5.1 Establishing An MSDS Station

Office Managers shall provide sufficient space and resources to establish an MSDS Station within their company or field locations. Office MSDS Stations should consist of a labeled three ring binder and a sign (Laboratory Safety Supply 1992 model No. JX-12441 or equivalent). In temporary locations, an MSDS Station may be a bulletin board or a three-ring binder kept on-site.

Each MSDS Station shall be located in an accessible, common area such as a break room, copier room, or site trailer. It shall also contain a copy of: the written Hazard Communication Program, the OSHA Hazard Communication Standard, and the Comprehensive List of Hazardous Chemicals.

Original Material Safety Data Sheets are preferred, but copies may be substituted. Copies are to be current (dated within three years) and published by the manufacturer, importer, or formulator of the hazardous chemical. For small projects, or projects of short duration, the contents of the MSDS Station, described above, may be included with the site-specific Health and Safety Plan or other project documents.

5.2 Using A MSDS

It is in the company's best interest to make sure that everyone who uses a chemical product understands its dangers and the precautions they must take while using the product. The sheets also contain useful information for responding to an exposure or release.

A Material Safety Data Sheet (MSDS) is supplied to the company when a substance is purchased that contains a hazardous chemical(s) as defined by OSHA (The Occupational Safety and Health Administration). The delivery of a substance must not be accepted until the MSDS sheet has been received.

There is no specific format for providing this information; however, MSDSs typically consist of the following general sections. The sections listed on your specific MSDSs may be different from those listed below. The bulleted information presents a list of typical information contained in each of the sections.

5.3 Section 1 - General Information

- Name of Manufacturer
- Manufacturer's Address
- Emergency Phone Number
- Trade named of Product(s) with applicable stock number(s)
- Product name
- Product formula
- CAS Registry No.

5.4 Section 2 - Hazardous Components

- Chemical components of the product are listed if they present a physical or health hazard and are present at or above 1% in the mixture.
- Chemical components identified as carcinogens by NTP, IARC, and OSHA are listed if they are present at or above 0.1% in the mixture.
- Other components are listed if deemed appropriate.
- Identities of components listed generically are declared trade secrets by the raw material suppliers.
- Exposure recommendations are for individual components. Unless specifically listed as an OSHA Permissible Exposure Limit (PEL) and/or an American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV), all exposure limits are those on which OSHA and ACGIH concur.

5.5 Section 3 - Physical and Chemical Data

- Appearance and Odor - Physical appearance, color and smell.
- Boiling Point - If unknown, the lowest value of the component is listed for mixtures.
- Vapor Pressure - If unknown, the lowest value of the component is listed for mixtures.
- Vapor Density - Compared to Air. Expressed as lighter as or heavier than air if the vapor density of the product is not known.
- Evaporation Rate - Indicated as faster than or slower than Ethyl Ether or Butyl Acetate.
- Melting Point
- Specific Gravity
- Decomposition Temperature
- Solubility in Water
- Corrosion Rate
- Flash Point

5.6 Section 4 - Fire and Explosion Hazard Data

- Flash Point - Method Identified
- Flammability Limits - The lowest value and highest value of the individual components are listed for mixtures.
- National Fire Protection Association (NFPA) Rating
- Extinguishing Media - National Fire Protection Association Criteria
- Special Fire Fighting Procedures - Minimum equipment to protect firefighters from toxic products of vaporization, combustion, or decomposition in fire situations.
- Unusual Fire & Explosion Hazard - Known or expected hazardous products resulting from heating, burning, or other reactions.
- Category - The classification required by Department of Transportation (DOT) for shipping by road.

5.7 Section 5 - Reactivity Data

- Stability - Presents conditions to avoid preventing hazardous or violent decomposition.
- Conditions to avoid - Lists conditions to avoid so that hazardous reactions are avoided.
- Hazardous Polymerization - Conditions to avoid preventing hazardous polymerization that could result in a large release of energy.
- Materials to avoid/Incompatibles
- Hazardous decomposition products

5.8 Section 6 - Health Hazard Data

- Threshold Limit Value/Time Weighted Average (TLV/TWA)
- Permissible Exposure Limit (PEL)
- Toxicity (LD_{50} - Lethal Dose for 50% of the test population)
- Carcinogenicity
- Effects of Overexposure (Acute) - Potential local and systemic effects due to single or short-term overexposure to the eyes and skin, or through inhalation or ingestion.
- Signs and Symptoms of Exposure - Warning signs, which may indicate exposure to the skin or eyes, or through inhalation or ingestion.
- Target Organs
- Medical Conditions Generally Aggravated by Overexposure - Preexisting conditions that may contribute to the effects of overexposure to the eyes and skin, or through inhalation or ingestion.
- Primary Route(s) of Entry - Based on properties of the product and expected use.
- Emergency and First Aid Procedures - Procedures to be followed when dealing accidental overexposure.

5.9 Section 7 - Precautions for Safe Handling, Storage and Use
(Control and Protective Measures)

- Protective equipment, which may be needed to handle the product.
- Ventilation - Identifies forced mechanical ventilation that is required.
- Respiratory Protection
- Eye/Skin Protection

5.10 Section 8 - Spill and Disposal Procedures

- Lists reasonable precautions to take and methods of containment, cleanup and disposal.
- Resource Conservation and Recovery Act (RCRA) hazardous wastes and Comprehensive Environmental Response, Comprehension and Liability Act (CERCLA) hazardous substances are listed in this section.
- Landfill Ban Item - Identifies materials subject to RCRA Landfill ban.

5.11 Section 9 - Hazardous material Identification (Label Data or Transportation)

- Hazardous materials identification system rating, based on ratings of individual components
- Shipping Name
- Emergency Response Code
- Department of Transportation (DOT), International Maritime Organization (IMO), International Air Transport Association (IATA), American Fertilizers Institute (AFI) hazard class designations/information.
- Reportable Quantities

5.12 Section 10 - Special Precautions and Comments

- Presents relevant information not previously mentioned.

5.13 Removing MSDSs

If a product is no longer used or if its MSDS has become dated, the Hazard Communication Coordinator removes the corresponding MSDS from the station and places it in a permanent MSDS file labeled with the actual or approximate dates the chemical was used.

5.14 Updating MSDSs

MSDSs are to be updated whenever:

- New information on the hazards of chemicals present in the work place becomes available.
- Relevant occupational exposure standards change.
- The issue date of the MSDS is more than three years old.

5.15 Help Obtaining MSDSs

MSDSs must be readily accessible to Malcolm Pirnie staff plus staff of any other employer at the work place during regular work shifts. If, after repeated attempts, an MSDS cannot be obtained from the manufacturer or supplier, contact the Manager, Health and Safety, WHI, for assistance. A written request for help in obtaining the required MSDSs will be made to the Assistant Secretary of Labor for Occupational Safety and Health (OSHA) and the Director of the National Institute for Occupational Safety and Health (NIOSH).

5.16 Chemical Data Sheets No Substitute for MSDSs

Chemical hazard data retrieved from electronic data bases may be useful in assessing hazards posed by on-site chemical contamination. But these chemical "data sheets" may not be substituted for original, current MSDSs published by the manufacturer, importer, or formulator. Data sheets lack the correct name of the manufacturer and emergency phone number.

6.0 LABELS

All containers of hazardous chemicals received from manufacturers, importers, or distributors of hazardous chemicals, or others, shall be properly labeled.

6.1 Label Requirements

A proper label provides the following information:

- The identity of the hazardous chemical(s) in the container.
- The name and address of the chemical manufacturer, importer, formulator, or other responsible party.
- Appropriate hazard and target organ warnings.

Affixed labels on incoming containers will not be removed or defaced. When labels are or have become illegible, legible replacement labels will be affixed over the original label.

All containers must be legibly labeled in English. In the event that non-English speaking employees or employers are onsite, duplicate labels providing above required information presented in their language must be affixed to appropriate containers.

Each container of hazardous chemicals (hazardous waste and environmental samples

are exempt) shipped to or from Malcolm Pirnie shall be checked by the Hazard Communication Coordinator or the Project Safety Officer for proper container labeling as described above.

6.2 Hazardous Materials Identification Guide (HMIG) Labeling System

The HMIG labeling system identifies chemicals with standard hazard ratings from 0 - 4 for health, flammability and reactivity, plus alphabetical designations for required personal protective equipment. A complete explanation of the rating and PPE designations can be found at the end of this section in Appendix C.

Malcolm Pirnie staff shall apply labels to temporary or portable containers, using the Hazardous Materials Identification Guide (HMIG) labeling system described in Appendix C. Labels shall contain at least the information provided on Laboratory Safety Supply 1993 type QA-809 label or equivalent. Appendix C also has examples of pre-completed labels that may be copied and applied to commonly used chemicals.

6.3 Hazardous Waste Sample Labeling

OSHA exempts shipments of hazardous waste samples from hazard communication labeling requirements. However, Department of Transportation (DOT) labeling requirements (49 CFR 173 et. al.) may apply to DOT defined hazardous substances shipped in large quantities. Hazardous materials or compressed gases shipped by air or common carrier will have special packaging, marking, and labeling requirements. Only trained HazMat employees may offer Hazardous Materials or Dangerous Goods for shipment on behalf of Malcolm Pirnie. Contact the Health and Safety, WHI for more information.

6.4 Temporary Containers Must Be Labeled

When transferring chemicals from a labeled container to a portable container intended for immediate use, a label identifying the contents e.g., Acetone, must be applied. Project staff are responsible for properly emptying, cleaning, removing the label, and disposing of the portable container immediately after use.

6.5 Longer-term Containers Require HMIG Labels

When transferring chemicals from a labeled container to a portable container intended for longer than immediate use, or use by more than one employee, a completed HMIG label should be used.

7.0 MULTI-EMPLOYER/MULTI-LOCATION PROJECT SITES

7.1 Informing Other Employers

Project Safety Officers shall provide other employers at the work place with appropriate hazard communication information about hazardous chemicals Malcolm Pirnie introduces to the work site that their staff could be exposed to. Other employers will be presented with a copy of the written Hazard Communication Program upon request.

This hazard communication information shall include:

- Requirements and location of Malcolm Pirnie's written Hazard Communication Program.
- Locations of MSDSs or MSDS station.
- Location of Comprehensive Hazardous Chemical List.

For hazardous chemicals Malcolm Pirnie introduces to a work site, any precautionary measures being taken to protect Malcolm Pirnie staff from harmful exposure under normal operating conditions, and foreseeable emergencies.

7.2 Obtaining Information from Other Employees

Project Managers will support the efforts of the Project Safety Officer to obtain appropriate hazard communication information about hazardous substances used by other employers that Malcolm Pirnie staff may be exposed to.

This information should include:

- The location of the other employer(s) written Hazard Communication Programs, their Comprehensive List(s) of Chemicals, MSDSs or MSDS Station, and an explanation of the labeling system the other employer(s) use.
- Precautionary measures Malcolm Pirnie staff should take to protect themselves from harmful exposure to these hazardous chemicals under normal operating conditions, and foreseeable emergencies.

Appendix D at the end of this section has sample letters appropriate for soliciting this information from owners and other contractors.

7.3 Multi-location Project Sites

In the event that Malcolm Pirnie employees must travel between different work sites, the written Hazard Communication Program may be kept at a primary job site. When no primary work site has been designated, the employee must bring the written Hazard Communication Program with them.

8.0 NON-ROUTINE TASKS

The Project Manager must consult with the Hazard Communication Coordinator or the Project Safety Officer when planning a non-routine task to ensure that employees are informed of the hazards associated with these tasks and that appropriate personal protective equipment is provided.

Before work begins, a meeting between the Project Safety Officer and the potentially exposed employee(s) will be held to discuss the hazards and appropriate personal protective equipment required to complete the task. Information will be presented in the language of non-English speaking employees as well.

9.0 HAZARD COMMUNICATION TRAINING

Malcolm Pirnie employees complete initial Hazard Communication Training at the beginning of their employment and before starting tasks or assignments that may expose them to hazardous chemicals.

Project staff who work with or are potentially exposed to hazardous chemicals in the work place will receive additional training by the Project Safety Officer on their safe use. Office Managers and Project Managers shall provide resources sufficient to assure the availability of this training.

Hazard Communication Coordinators are responsible for conducting Hazard Communication Training or arranging for it to be provided. Both the training and associated materials may be developed locally to supplement materials provided by the Manager, Health and Safety, WHI.

9.1 Hazard Communication Training Program for Hazardous Chemicals Malcolm Pirnie introduces to the Workplace, Minimum Requirements

The Hazard Communication Training program for hazardous chemicals Malcolm Pirnie introduces to the work place emphasizes the following:

- Summary of the Hazard Communication Standard (see Appendix A, this section).
- Requirements and location of Malcolm Pirnie's written Hazard Communication Program.
- Development and location of hazardous chemical list.

- Use, locations, reading and interpreting MSDSs and how employees can obtain more hazard communication information.
- Reading, interpreting, and preparing HMIG container labels.
- Measures employees can take to protect themselves against the physical and health hazards of chemicals in the work place, including appropriate work practices or methods for using and handling chemicals, emergency response procedures, and, as required, the proper use and maintenance of personal protective equipment.
- Chemical and physical properties of hazardous chemicals e.g., flash point, and reactivity. Also, ways to detect the presence or release of hazardous chemicals in the work place, e.g., the visual appearance or odor of hazardous chemicals released. Also, air sampling devices to determine exposure concentrations.
- Health hazards, including signs and symptoms of exposure, associated with exposure to chemicals, and medical conditions aggravated by chemical exposure.

9.2 Hazard Communication Training Program for Hazardous Chemicals Other Employers introduce to the Work Place, Minimum Requirements

The Hazard Communication Training program for hazardous chemicals other employers introduce to the work place emphasizes the following:

- Information about hazardous chemicals Malcolm Pirnie staff may be exposed to at the work site, including ways to detect their presence, and exposure to them.
- An explanation of the other employers' labeling system.
- Information about precautionary measures Malcolm Pirnie staff members can take to protect themselves during normal operating conditions and in emergencies.
- The location of MSDSs for hazardous chemicals other employers introduce to a work site.

9.3 Hazard Communication Training Program Review

The Manager, Health and Safety, WHI, or designate shall review Malcolm Pirnie's Hazard Communication Training program and advise Office Managers on training or retraining needs.

Employees who may be exposed to hazardous chemicals are to be retrained whenever the chemical hazards change, and when Malcolm Pirnie introduces a new chemical hazard to the work place.

The Hazard Communication Training program assessment process includes periodically obtaining opinions from employees about the quality of the training they receive.

10.0 RECORDS RETENTION

Project Managers are also responsible for health and safety data storage after their projects are complete. Specific changes to the Hazard Communication Program developed for the project, correspondence, and copies of the MSDSs and other pertinent data on hazardous chemicals Malcolm Pirnie or others introduced to the job site are to be retained and stored together with the other project documents. Copies of occupational exposure data are to be filed in the employee's Health and Safety File with a copy forwarded to the Administrator, Health and Safety, WHI, for evaluation and retention.

APPENDIX A

THE OSHA HAZARD COMMUNICATION STANDARD
29 CFR 1910.1200

APPENDIX B

COMPREHENSIVE LIST OF HAZARDOUS CHEMICALS

MALCOLM PIRNIE

HAZARD COMMUNICATION

COMPREHENSIVE LIST OF HAZARDOUS CHEMICALS

LOCATION: Various Malcolm Pirnie Locations **PAGE** 1 **OF** 1

COMPLETED BY: Camille Carollo

DATE: 2/1/05

TRADE OR COMMON NAME	MANUFACTURER'S NAME AND ADDRESS	HAZARDOUS INGREDIENTS	STORAGE OR LOCATION OF USE
Alconox	Varies	Alconox	Various Locations
Gasoline	Varies	Gasoline	Various Locations
Hexane	Varies	Hexane	Various Locations
Hydrochloric Acid	Varies	Hydrochloric Acid	Various Locations
Isobutylene	Varies	Isobutylene	Various Locations
Nitric Acid	Varies	Isobutylene	Various Locations
Sodium Hydroxide	Varies	Sodium Hydroxide	Various Locations
Sulfuric Acid	Varies	Sulfuric Acid	Various Locations

APPENDIX C

HAZARD MATERIALS IDENTIFICATION GUIDE (HMIG) LABELING SYSTEM WITH EXAMPLES

HAZARDOUS MATERIALS IDENTIFICATION GUIDE (HMIG) LABELING SYSTEM[1]

This hazardous chemical labeling system uses the familiar colors and numbering system of the National Fire Prevention Association (NFPA) hazard diamond modified to quickly rate **ACUTE**[2] occupational and general physical hazards chemicals can pose. The potential health effects, flammability, and reactivity of a hazardous chemical are coded using a 0 - 4 numerical code system in blue, red and yellow boxes on the label. The numerical codes and corresponding general definitions are:

4	**Extreme**
3	**Serious**
2	**Moderate**
1	**Slight**
0	**Nominal**

The original MSDS for the chemical or mixture should be consulted to determine what degree (number) should be applied to the label. The toxicological information presented on the MSDS and in other chemical references can be compared to the ranges for LD_{50}; LC_{50}; and LD_{50} Skin listed in each degree. References such as the Merck Index, the Chemical Dictionary, the NIOSH Pocket Guide, the DOT Emergency Response Guidebook, and others can be used if the MSDS is incomplete. Approximate health factors (some interpretation by the Hazard Communication Coordinator is necessary with any of these systems) may be found in the NFPA hazard diamond ratings (see NFPA 49,) the NIOSH Pocket Guide, Irving Sax Toxicological Properties of Chemical Substances, and others. Wallet cards that provide a ready reference to the HMIG Labeling System are available from the Administrator, Health and Safety, WHI.

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[1] Copyright product of Lab Safety Supply

[1] Hazards such as carcinogenicity, mutagenicity and teratogencity are **not** adequately addressed by these numerical hazard systems.

HEALTH HAZARD/BLUE BOX

4 **- Extreme:** materials that could cause death or major residual injury after very short exposure, even with prompt medical treatment. Materials considered too dangerous to approach without specialized equipment, and that can penetrate most protective clothing. Materials that, under normal or emergency conditions, are extremely hazardous when inhaled, or absorbed through the skin, or through other contact. LD_{50} <0.001 g/kg; LC_{50} <10 ppm; LD_{50} Skin <0.005 g/kg

3 **- Serious:** materials that could cause serious temporary or residual injury after very short exposure even with prompt medical treatment. Materials requiring protection from all bodily contact. Materials giving off highly toxic combustion products. Materials corrosive to living tissue or toxic by skin absorption. LD_{50} 0.001-0.05 g/kg; LC_{50} 10-1100 ppm; LD_{50} Skin 0.005-0.043 g/k

2 **- Moderate:** materials that could cause temporary incapacitation or possible residual injury after intense or continued exposure without prompt medical treatment. Materials requiring the use of respiratory protection with independent air supply. Materials that give off toxic vapors lacking warning properties under normal or emergency conditions. LD_{50} 0.05-0.5 g/kg; LC_{50} 100-1,000 ppm; LD_{50} Skin 0.044-0.340 g/kg

1 **- Slight:** materials that would cause irritation upon exposure, but minor residual injury even without medical treatment. Materials that require the use of an approved, air-purifying respirator. Materials that could cause skin irritation without tissue destruction. LD_{50} 0.5-5.0 g/kg; LC_{50} 1,000-10,000 ppm; LD_{50} Skin 0.35-2.81 g/kg

0 **- Minimal:** materials that pose no hazard under normal occupational conditions. LD_{50} 5.0-15.0 g/kg; LC_{50} 10,000-100,000 ppm; LD_{50} Skin 2.82-22.6 g/kg

FLAMMABILITY/RED BOX

4 **- Extreme:** materials that rapidly and completely vaporize at atmospheric pressure and normal ambient temperature, or that are readily dispersed in air, and burn readily. Includes cryogenic materials, Class 1A flammable liquids. Materials that, because of their physical form or environmental conditions, form explosive mixtures with air and disperse readily in air, e.g., dusts of combustible solids and mists of flammable or combustible liquid droplets.

3 **- Serious:** liquids and solids that can ignite under all ambient temperature conditions. Materials in this degree produce hazardous atmospheres with air under almost all ambient temperatures, or are readily ignited under almost all conditions though they are unaffected by ambient temperatures. Includes Class 1B and 1C flammable liquids. Solid materials in the form of course dusts that may burn rapidly but generally do not form explosive atmospheres in air. Materials that burn with extreme rapidity, usually by reason of self-contained oxygen. Materials that ignite spontaneously when exposed to air.

2 **- Moderate:** materials that must be moderately heated, or exposed to relatively high ambient temperatures before they ignite. Under normal conditions, materials in this degree would not form hazardous atmospheres in air, but under high ambient temperatures or under moderate heating, they may release vapor sufficient to produce hazardous atmospheres with air. Includes liquids with a flash point between 100^{o}F and 200^{o}F, and solids and semisolids that readily give off flammable vapors.

1 **- Slight:** materials that must be preheated before they ignite. Materials in this degree require considerable preheating, under all ambient temperature conditions, for ignition and combustion to take place. Includes materials that will burn in air when exposed to a temperature of 1500^{o}F for five minutes or less; liquids, solids and semisolids with a flashpoint in excess of 200^{o}F; most combustible materials.

0 **- Minimal:** materials that will not burn. Includes materials that will not burn in air when exposed to a temperature of 1500^{o}F for five minutes.

REACTIVITY/YELLOW BOX

4 **- Extreme:** materials fully capable of detonation, explosive decomposition, or explosive reaction at normal temperatures and pressures. Materials sensitive to mechanical or localized thermal shock at normal temperatures and pressures.

3 **- Serious:** materials capable of detonation or explosive reaction, that require a strong initiating source or that must be heated under confinement before initiation. Includes materials sensitive to mechanical or localized thermal shock at elevated temperatures and pressures, or that react explosively with water or other chemicals with no heat or confinement requirement.

2 **- Moderate:** materials that are normally unstable and readily undergo violent chemical change, but do not detonate. Includes materials that undergo chemical change with rapid release of energy at normal temperatures and pressures, or undergo violent chemical change at elevated temperatures and pressures. Also, materials that may react violently with water or other chemicals, or may form potentially explosive mixtures with water or other chemicals.

1 **- Slight:** materials that are normally stable, but become unstable at elevated temperatures and pressures or that react with water and other chemicals with some release of energy, but not violently.

0 **- Minimal:** materials that are normally stable, and not reactive with water or other chemicals.

PPE

The HMIG system uses a series of codes and icons to describe various personal protective equipment ensembles. The original MSDS for the chemical or mixture should be consulted to determine what code to apply to the label.

A - Safety Glasses

B - Safety Glasses, Gloves

C - Safety Glasses, Gloves, Overgarment

D - Face Shield, Gloves, Overgarment

E - Safety Glasses, Gloves, Dust Mask

F - Safety Glasses, Gloves, Overgarment, Dust Mask

G - Safety Glasses, Gloves, Organic Vapor Respirator

H - Safety Goggles, Gloves, Overgarment, Organic Vapor Respirator

I - Safety Glasses, Gloves, Dust, Mist, Fume Respirator

J - Safety Goggles, Gloves, Overgarment, Dust, Mist, Fume Respirator

K - Air Supplied Respirator, Gloves, Overgarment with Hood, Protective Overboots

X - Special Ensemble, refer to Health and Safety Plan


HEXANE
ROUTE OF ENTRY
Eye Contact
Inhalation
Injection
Skin Absorption
Skin Contact
CHRONIC HEALTH EFFECTS
No Chronic Health Hazard
Carcinogen
Dermatitis
Irritant
Mutagen
Reproductive Toxin
Sensitizer
Teratogen
Corrosive
PHYSICAL HAZARDS
No Physical Hazards
Combustible
Explosive
Flammable
Organic Peroxide
Oxidizer
Pressure Hazard
Pyrophoric Liquid
Radioactive
Water Reactive
TARGET ORGANS
Bladder
Blood
Bone Marrow
Brain
Cardiovascular System
Eyes
Gastrointestinal System
Heart
Kidneys
Liver
Lungs
Mucous Membranes
Musculo-Skeletal System
Nervous System
Reproductive System
Respiratory System
Skin
Teeth
HEALTH 2
FLAMMABILITY 3
REACTIVITY 0
PROTECTIVE EQUIPMENT H
A
B
C
D
E
F
G
H
I
J
K
X


ASCORBIC ACID
ROUTE OF ENTRY
CHRONIC HEALTH EFFECTS
PHYSICAL HAZARDS
TARGET ORGANS
HEALTH 1
FLAMMABILITY 0
REACTIVITY 1
PROTECTIVE EQUIPMENT B
A
B
C
D
E
F
G
H
I
J
K
X

APPENDIX D

APPROVED LETTER FORMATS, MULTI-EMPLOYER WORK SITES

- Malcolm Pirnie Introduces Hazardous Chemicals to a Work Site
- Request for Location of Other Employer's MSDSs
- Follow-up Request for Location of Other Employer's MSDSs, no Response Received
- Follow-up Request for Location of Other Employer's MSDSs, no Response Received, Subcontractor involved

MALCOLM PIRNIE INTRODUCES HAZARDOUS CHEMICALS TO A WORK SITE

Date:

(Name and Address of Owner[1])

Re: OSHA Hazard Communication Standard

Dear *(name of owner)*:

The OSHA Hazard Communication Standard requires that each employer on a multi-employer work-site provide the other employers on the site with information about any hazardous chemical that may be produced or introduced onto the site.

As you are aware, employees of our company will be working at the *(name of site)* site. During the course of their work, our employees may be in proximity to hazardous chemicals that you may produce or introduce onto the site. Additionally, during the course of their work, your employees may be in proximity to hazardous chemicals that we may introduce to the site.

We are enclosing herewith information on the hazardous chemicals our company will introduce onto the site. *(See attached Appendix A)*.

We request the following information regarding your site, as required by the OSHA Hazard Communication Standard. Please advise us as to: where your Material Safety Data Sheets (MSDSs) are kept, any information regarding precautionary measures needed to protect our employees from exposure to hazardous chemicals under normal operating conditions and in any foreseeable emergency situations, and your labeling system for any hazardous chemicals at the site. Please respond in writing and direct all correspondence to the address below.

Thank you for your response to this request. If you have any questions, please contact *(insert your name)* at *(telephone number)*.

Very truly yours,

MALCOLM PIRNIE, INC.

(Your Name)
(Your Title)

Enclosure[2]

(Project Number)

Note:

[1] On projects involving the rehabilitation of a water or wastewater treatment plant, Owner will have treatment chemicals and probably will start introducing treatment chemicals and other hazardous chemicals to the project site as the project approaches Substantial Completion.

[2] Attach Exhibit A from site Hazard Communication Program

REQUEST FOR LOCATION OF OTHER EMPLOYER'S MSDS's

Date:

(Name and Address of Other Employer)

Re: OSHA Hazard Communication Standard
Title 29 CFR 1910.1200

Dear *(name of employer)*:

Employees of our company will be working on the (name of site) site at the same time as your company. During the course of their work, our employees may be in proximity to hazardous chemicals your company may produce or introduce onto the site. In order to comply with the OSHA Hazard Communication Standard, all employers who could cause hazardous exposure to another company's employees are required to provide information about the hazardous chemicals on site.

We are enclosing herewith information on the hazardous chemicals our company will introduce onto the site. *(See attached Appendix A).*

Please advise us as to: where your Material Safety Data Sheets (MSDSs) are kept, any information you may have regarding precautionary measures needed to protect our employees under normal operating conditions and in any foreseeable emergency situations, and your labeling system used on site. Please respond in writing and direct all correspondence to the address below.

Thank you for your response to this request. If you have any questions, please contact *(insert your name)* at *(telephone number).*

Very truly yours,

MALCOLM PIRNIE, INC.

(Your Name)
(Your Title)

Enclosure[1]

c: [2]

Note: [1] Attach Exhibit A from site Hazard Communication Program.

[2]When letter is sent to a Subcontractor, send a copy to the appropriate C

(Project Number)

FOLLOW-UP REQUEST FOR LOCATION OF OTHER EMPLOYER'S MSDSS, NO RESPONSE RECEIVED

Date:

(Name and Address of Owner)

Re: OSHA Hazard Communication Standard
Title 29 CFR 1910.1200

Dear *(name of owner)*:

By letter dated (date), we requested that you advise us as to where MSDSs are kept for all hazardous chemicals that you produce or introduce onto the (name of site) site. We also requested information regarding any precautionary measures to protect our employees during normal operations and in foreseeable emergencies, and your labeling system used on the site. To date, we have received no response.

In order for you and Malcolm Pirnie, Inc. to be in compliance with the OSHA Hazard Communication Standard, we must receive the requested information.

Your cooperation and prompt attention to this matter is appreciated.

Very truly yours,

MALCOLM PIRNIE, INC.

(Your Name)
(Your Title)

(Project Number)

FOLLOW-UP REQUEST FOR LOCATION OF OTHER EMPLOYER'S MSDSS, NO RESPONSE RECEIVED, SUBCONTRACTOR INVOLVED

Date:

(Name and Address of Other Employer)

Re: OSHA Hazard Communication Standard
Title 29 CFR 1910.1200

Dear *(name of employer)*:

By letter dated *(date)*, we requested that you advise us as to where MSDSs are kept for all hazardous chemicals that you produce or introduce onto the *(name of site)* site. We also requested information regarding any precautionary measures to protect our employees during normal operations and in foreseeable emergencies and your labeling system used on the site. To date, we have received no response.

In order for you and Malcolm Pirnie, Inc. to be in compliance with the OSHA Hazard Communication Standard, we must receive the requested information.

Your cooperation and prompt attention to this matter is appreciated.

Very truly yours,

MALCOLM PIRNIE, INC.

(Your Name)
(Your Title)

c:[1]

(Project Number)

Note: [1]When letter is sent to a Subcontractor, send a copy to the appropriate Contractor.

New York State Department of Environmental Conservation
Generic HASP for Work Assignments

Appendix E:
Personal Protective Equipment Written Program

MALCOLM PIRNIE

TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

The purpose of this section is to assist employees in the proper selection and use of personal protective equipment (PPE). Malcolm Pirnie staff shall use PPE when engaged in activities where there is a potential for exposure to chemical, biological, physical or mechanical hazards, or as otherwise required by applicable laws and regulations.

The occupational use of PPE is governed by a series of standards promulgated by the Occupational Safety and Health Administration (OSHA) and found in Title 29 CFR 1910, Subpart I, *Personal Protective Equipment*. These include 29 CFR 1910. 133, *Eye and Face Protection*; 29 CFR 1910.135, *Occupational Head Protection*; and, 29 CFR 1910.136, *Occupational Foot Protection*. PPE required by the OSHA *Respiratory Protection Standard*, 29 CFR 1910.134, and the *Noise Standard* including the *Hearing Conservation Amendment*, 29 CFR 1910.95, are addressed separately in this Manual.

The OSHA standards dealing with personal protective equipment consist of three types of requirements. Section 1910.132 is a set of general requirements covering all types of equipment and all situations where it is needed. Section 1910.132 requirements do not cover section 1910.134, *Respiratory Protection*, or section 1910.137, *Electrical Protective Devices*, which are subjects of separate rule making. The other sections of Subpart I each give requirements for one particular type of equipment; and certain paragraphs in standards not primarily concerned with PPE call for protective equipment to be used under working conditions regulated by that section. In deciding on protective equipment for a project, project managers may find that provisions of all three apply.

OSHA does not recommend PPE if administrative or engineering controls will eliminate a hazard. Such controls are always preferred over reliance on personal protection to shield an employee from chemicals, processes or machinery known to be dangerous.

2.0 POLICY

A written hazard evaluation will be conducted for all Malcolm Pirnie worksites, **on all field projects**, other than work in office environments, to:

- Determine potential hazards to the health and safety of Malcolm Pirnie.
- Evaluate the need for and the feasibility of engineering and/or administrative controls of the hazards.
- Specify effective types of personal protective equipment to reduce potential exposures.

Individual articles of a PPE ensemble will be chosen by a qualified employee, Project Safety Officer (PSO) or Corporate Health & Safety, to provide the best available protection against known or reasonably anticipated chemical and physical hazards.

Individual articles of a PPE ensemble will be sized to fit the individual wearing it.

Compromised PPE will not be worn by Malcolm Pirnie employees or employees of Malcolm Pirnie subcontractors.

Contaminated PPE materials will be left at the work site if this can be done in a **responsible** manner.

3.0 RESPONSIBILITIES

OSHA requires that Malcolm Pirnie initiate engineering and work practice controls, to the extent feasible, to minimize the potential for employee exposure to chemical, biological, physical, or mechanical hazards. If recognized health and safety hazards cannot be practically removed from the work environment, and if employee exposures cannot be significantly reduced by administrative means, Malcolm Pirnie must provide employees with appropriate PPE and ensure that it is used properly.

3.1. Non-Hazardous Waste Projects

Project Managers: Project Managers are responsible for providing the project resources necessary to determine the appropriate level of PPE for employees working on their projects. To this end, Project Managers and/or PSOs will conduct a preliminary hazard assessment of the worksite and tasks to be performed and specify the appropriate PPE ensemble for each task and location. The Hazard Assessment Checklist, found in Appendix A, should be used to conduct the preliminary hazard assessment. Based upon the information generated in the assessment, and good safety practices, the Project Manager or the PSO can:

- Evaluate, design or purchase feasible engineering controls to isolate the hazard.
- Develop procedures and work practices to control the hazard.
- Evaluate and specify PPE required for the safe completion of the project.

3.2. Hazardous Waste Projects

For hazardous waste projects, a hazard analysis is conducted when developing a Site Safety Plan (SSP) for field activities. The SSP writer and reviewers evaluate the potential safety and health hazards posed by the project tasks. Then, in the SSP, they specify levels of protection, the specific PPE in each level, and action level ranges that govern the selection of each level.

Any questions regarding hazard evaluations should be addressed to the SBU Health & Safety Leader or to the Manager, Health & Safety, COR.

Qualified Employee: As a practical matter, the Project Manager is likely to delegate the task and hazard evaluation to a junior member of the project team who will often serve as the PSO. Evaluating hazards and selecting appropriate engineering, work practice and PPE control methods for a project is an important responsibility. To promote the effective completion of this task, the Project Manager will delegate this task to an individual who meets certain education and training qualifications. Employees are considered qualified to select PPE if they meet either of these criteria:

- The employee has received formal training in industrial hygiene or safety practices.
- The employee has received training in the selection, use, maintenance and limitations of PPE (e.g., 40-Hour Hazardous Waste Operations, Construction Site Safety training, or PPE Training), is familiar with the site, the tasks to be completed and the known or reasonably anticipated site and task hazards.

Project Safety Officer: The Project Safety Officer (PSO) on hazardous waste projects has the responsibility and authority to see that the provisions of the approved SSP are implemented during site activities. The person selected to be PSO must meet the minimum qualifications above.

At the site, the PSO evaluates air-monitoring data, work tasks and site conditions and then specifies a pre-approved level of protection PPE ensemble to be used by Malcolm Pirnie employees. If site conditions change, the PSO may only upgrade or downgrade the level of protection in accordance with the action levels and PPE ensembles specified in the approved SSP. Modifications to the PPE ensembles, the task evaluations or the action levels as a result of unforeseen circumstances must be approved by the SBU Health & Safety Leader (HSL) and/or the Manager, Health & Safety, COR.

Equipment Coordinators: The office Equipment Coordinator (E.C.) is responsible for procuring and dispensing expendable PPE for that office.

Employees: Employees are responsible for using the PPE in accordance with both the training they receive, and instructions provided. Employees should alert the PSO or team leader if proper PPE has not been assigned, if they have not been trained in the use and limitations of assigned PPE, and if the PPE is damaged, compromised, or does not appear to be working.

4.0 HAZARD ASSESSMENT

Malcolm Pirnie prepares written hazard assessments in order to identify the appropriate PPE ensemble(s) for project work activities. The PPE ensemble(s) for hazardous waste projects are specified in the SSP. A particular ensemble is chosen based upon:

- Proposed work tasks.
- Potential routes of entry and points of contact.
- Airborne contaminant action levels specified in the SSP.

For projects that do not require a SSP, the Preliminary Hazard Assessment form (Appendix A) is used to develop PPE requirements. The written Hazard Assessment form provides the certifier's name, signature, date(s), and identification of assessment documents. Contact the HSL or the Manager, Health & Safety, COR for further assistance.

When new processes are implemented or when existing processes change, the PSO should be notified by the project staff so that the existing Hazard Assessment may be reviewed and updated as necessary.

5.0 PPE SELECTION

On projects defined by OSHA's *Hazardous Waste Operations and Emergency Response* standard (29 CFR 1910.120), and on other projects as determined by the hazard assessment, PPE ensembles (Levels of Protection) are selected based upon:

- The toxic materials, physical agents, or waste contaminants known to be present.
- Contaminant concentrations in the waste media.
- The toxicology and the probable routes of entry into the body exhibited by the contaminants.
- Known or expected airborne contaminant concentrations.
- Potential for exposure to physical agents (e.g., electrical, mechanical, hydraulic, pneumatic, chemical, thermal, nuclear, or non-ionizing radiation energy) based upon the type and strength of the energy source and the proximity of the employee to the source.

Individual articles of a PPE ensemble are chosen by a "qualified employee" (previously defined) to provide the best available protection against known or reasonably anticipated chemical and physical hazards. Multiple articles of PPE may be "layered" to provide multi-contaminant and full protection. The various elements of PPE will only protect a worker if the following conditions are met:

- The individual article of PPE must be effective against the hazard (see Appendix B).
- The individual article of PPE must be sized, fitted, worn and secured correctly.

- The functioning surface of the PPE must be intact and not compromised by holes, rips, tears, or split seams.
- The PPE ensemble (see Appendix C) chosen must be effective against all the hazards in the specific situation.

Non-specific action levels have been developed by the U.S. EPA and others as guidelines for determining respiratory and other PPE requirements when exposure air monitoring is conducted by non-specific response field instrumentation. Specific action levels may be used when a site is well characterized, the type and relative concentrations of air contaminants are well known, and appropriate field instrumentation is used to provide real-time exposure data. Malcolm Pirnie has adopted both sets of action levels. These can be found in Appendix C and in the current Malcolm Pirnie Short Form Site Safety Plan form. Airborne Contaminant Action Levels for Selection of PPE Ensembles is provided in Appendix D.

6.0 PPE USE

Individual articles of a PPE ensemble will be sized to fit the individual wearing it. To provide effective protection during removal and decontamination, PPE will be donned in the reverse order presented in the appropriate decontamination table. Duct tape will be used to seal overlaps between gloves /boots and the protective clothing, and to reinforce weak seams or tighten the waist of the garment. PPE will be cleaned and maintained in accordance with manufacturer specifications.

6.1. Fitting PPE

Proper fit of PPE is critical to providing adequate protection. Proper fit is also associated with comfort and comfort is essential if the employees are to wear the PPE provided. Malcolm Pirnie provides employees with a choice of PPE from several different vendors in a selection of sizes. In training, Malcolm Pirnie discusses and practices proper fitting, use and wear of the PPE.

OSHA believes fit is a critical factor in the overall effectiveness of PPE. PPE that fits poorly will not afford the necessary protection. PPE that is too small will bind and tear; PPE that is too large is harder to manage and can become tangled in equipment presenting additional hazards. Care should be taken to ensure the right size is selected. The user should be fit with the protective device and given instructions on care and use of the PPE. It is very important that employees be made aware of all warning labels for, and limitations of, their PPE.

Adjustment of the PPE should be made on an individual basis, with the goal of achieving a comfortable fit that will maintain the protective device in the proper position. Particular care should be taken in fitting devices for eye protection used against dust and chemical splashes, to ensure that the devices are sealed to the face. In addition, proper

fitting of helmets is important to ensure that no helmet will fall off during work operations. When manufacturer's instructions are available, they should be followed carefully.

6.2. Damaged PPE

Compromised PPE will not be worn by Malcolm Pirnie employees. When a PPE wearer or their buddy notices that an article of PPE has been compromised, the two will quickly move to the decontamination/support zone to replace or repair the defective article(s).

6.3. Employee-Owned PPE

Malcolm Pirnie provides all required PPE at no or little cost to its employees. When employees plan to use personally owned PPE, the employee must present it to the PSO for inspection prior to use at the work site. If the PSO finds that the employee-owned PPE is adequate and has been properly maintained, the employee may use their personal PPE.

7.0 IN-USE PPE MONITORING

When wearing PPE at sites, Malcolm Pirnie personnel shall report any perceived problems or difficulties to the PSO. Likely concerns are:

- Perception of odors while wearing APR/SAR.
- Skin, eye, or nasal irritation.
- Unusual residues on PPE.
- Suspected degradation of PPE ensemble.
- Excessive discomfort or fatigue.
- Sudden increases in breathing resistance.
- Personal responses such as rapid pulse, nausea, and chest pain.

Should personnel experience any of these problems while wearing PPE, the PSO will temporarily shut down both Malcolm Pirnie and subcontractors operations on the site and all personnel will move to the support zone until the cause of the problem is identified and corrected.

8.0 PPE INSPECTION

PPE shall be inspected by employees before donning and periodically while in use. Protective clothing should be visually inspected before its use for imperfect seams, uneven coatings, tears, and malfunctioning closures. Gloves should be checked for pinholes by entrapping air in the glove, then rolling the cuff toward the fingers, or by inflating the glove and holding it under water. In either case, no air should escape. If a defect is observed in

protective clothing or in gloves, the defective item should not be worn onsite. Clean defective apparel shall be disposed of in the trash. Contaminated defective apparel shall be left on-site in appropriate containers if possible.

During field activities, protective clothing should be periodically inspected by the employee and his/her assigned buddy for rips and punctures. Small rips or punctures observed in

garments may be taped over, or the garment may be exchanged for a new one. Large rips or punctures require exchange.

9.0 PPE DECONTAMINATION

Any site where hazardous waste operations occur must have a written plan that outlines decontamination procedures (see 29 CFR 1910.120 [k]). Employees must be trained on these procedures and the decontamination line must be operational when anyone enters areas on-site where there is suspected contamination.

9.1. The Decontamination Plan

The written decontamination plan addresses:

- The number and placement of decontamination stations.
- Decontamination equipment and methods.
- Methods for disposing of clothing and equipment that may not be completely decontaminated.
- Methods of cleaning decon equipment and disposing of decon wastes.

The decontamination plan shall be based on the assumption that all equipment and personnel leaving the Exclusion Zone ("hot zone") will be grossly contaminated. A personnel decontamination system will be established to wash and rinse (at least once) all reusable PPE worn in contaminated areas. This should be done in combination with a sequential doffing of protective equipment, starting at the first decontamination station with the most heavily contaminated item and progressing to the last decontamination station with the least contaminated article.

The decontamination plan developed should address the following factors:

- ***Type of Contaminant***. The extent of personnel decontamination is a function of the amount of the contaminant, its toxicity and its interaction with the PPE articles.

-

- ***Amount of Contamination***. Gross contamination increases the probability of personal contact or the degradation and permeation. Swipe tests may help determine the type and quantity of surface contaminants, or clear articles for disposal as non-hazardous trash.

- ***Type and Level of PPE***. Clothing variations and different levels of protection may require adding or deleting stations to the decontamination line.

- ***Work Function***. Those who are performing tasks that will not bring them into contact with contaminants may not need to have their garments washed and rinsed while others in the Exclusion Zone, with potential direct contact with the hazardous material, will require a more thorough decontamination.

- ***Location of the Contamination***. Contamination on the upper areas of protective clothing poses a greater risk to workers because volatile compounds may generate a hazardous breathing concentration for both the worker and the decontamination personnel. There is also an increased probability of skin contact when doffing the upper part of the clothing.

9.2. Decontamination Procedures and Equipment

Decontamination activities should be confined to a designed area within the Contamination Reduction Zone, known as the Contamination Reduction Corridor. The Corridor controls access into and out of the Exclusion Zone and confines decontamination activities to a limited area. The size of the Corridor varies depending on the number of stations in the decontamination procedure, overall dimensions of the work control zones, and the amount of space available at the site. On smaller sites or sites with limited contamination potential, the size of the decontamination area and the number of decontamination stations will be severely reduced.

Within the Corridor, distinct areas should be set aside for decontamination of personnel, portable field equipment, discarded clothing, etc. Step-by-step procedures for decontamination of personnel wearing PPE Levels B and C are found in Appendix E at the end of this section.

10.0 PPE DISPOSAL

There are few reference guidelines for disposal of contaminated or used PPE garments. Sites requiring Decontamination Corridors will also be equipped to drum, bag, or otherwise dispose of large volumes of PPE wastes generated by site operations. On smaller sites such as well drilling and sampling, or soils sampling projects, field teams are required to bring an adequate supply of heavy gauge opaque plastic garbage bags to hold disposable PPE garments after use.

Contaminated PPE materials will be left at the work site if this can be done in a **responsible** manner. This activity **must** be negotiated with the client / owner / operator / subcontractor in advance of the fieldwork. If this cannot be done, decontaminate contaminated PPE, conduct a swipe test on a representative sample, and bring it back, in clean plastic bags, to the office. PPE that is used but "clean" or was contaminated but tests "clean" may be disposed of in the office dumpster. PPE, which cannot be decontaminated or is contaminated by materials containing mercury, lead, solvents, petroleum, PCBs or dioxin, will be disposed of as hazardous waste.

11.0 TRAINING

Malcolm Pirnie personnel provided with PPE shall be trained in its use, care, capabilities, and limitations prior to using it in a hazardous work environment. Personnel engaged in hazardous waste operations site activities shall receive the initial 40-hour training, of which PPE instruction is an integral part. Subsequent refresher training will include an annual review in the use, limitations, inspection, and care of PPE. A combined refresher/PPE certificate will be issued documenting this training.

11.1. Initial Training

Initial training is provided to all employees that are required to wear PPE. Employees receive initial training in the proper use and care of PPE prior to wearing the PPE in the work place. This training is most effective when the employee understands the hazards that are present, how the PPE provides protection, and the limitations of the PPE.

At a minimum, the training portion of the PPE program should delineate the user's responsibilities utilizing both classroom and hands-on training when necessary to explain the following:

- When PPE is necessary to be worn.
- What PPE is necessary and the selection criteria used for this determination.
- The operation of the selected PPE, including capabilities and limitations.
- The nature of the hazards and the consequences of not using the PPE.
- The human factors influencing PPE performance.
- Instruction in inspecting, donning, doffing, checking, fitting, and using PPE.
- The user's responsibility for decontamination, cleaning, maintenance and repair of PPE.
- Limitations of the PPE.
- Useful life and disposal of the PPE.
- How to recognize emergencies.
- Emergency procedures and self-rescue in the event of PPE failure.
- The buddy system.
-

- Emergency action planning, and the user's responsibilities and duties in an emergency.

Employees are required to demonstrate their understanding in each of the subject areas listed above. Special emphasis should be placed on proper wear, fit, and limitations of the PPE. If the employee cannot demonstrate a full understanding of the material provided in the training, that employee shall be retrained and must exhibit complete understanding of the material presented before they are allowed to wear the PPE in the work place.

11.2. Additional Training

Refresher training is provided when an employee cannot demonstrate a good understanding of the five required OSHA training topics (see above). Employees that are observed using PPE improperly are retrained.

Additional training is provided whenever processes change and new hazards require the use of additional or different PPE.

Staff provided with ancillary PPE (e.g., safety belts, floatation gear) should be trained in its use and care by the PSO before actual use onsite.

Staff requesting PPE who are not in the hazardous waste Health and Safety Training Program and have not received PPE training should be trained in the use and care of the PPE by their PSO before actual use onsite. The PSO will provide the Administrator, Health and Safety, WHI, with an attendance list and a brief summary of the training material covered to document the training and to issue certificates.

Since PPE use often causes discomfort and inconvenience, there is a natural resistance toward wearing it conscientiously. The major thrust of training must be to make the user aware of the need for PPE and to instill the motivation to properly wear and maintain the necessary PPE.

12.0 RECORDKEEPING

PPE training should be documented in the site health and safety logbook. The Manager, Health and Safety, COR, will maintain a copy of all corporate PPE training records. A summary record will be maintained by Health and Safety, COR, in the PeopleSoft database, and will be updated according to the schedule established in the Health and Safety Training section of this manual.

The training records maintained in the local office file will include the following information:

- The dates of the training sessions.
- The contents or a summary of the training sessions.
- The names and qualifications of persons conducting the training.
- The names and job titles of persons attending the training sessions.

Training records shall be maintained for three years from the date on which the training occurred. Upon request, employees will have access to any of his/her training records maintained by the local office, the Manager, Health and Safety, COR.

APPENDIX A

PRELIMINARY HAZARD ASSESSMENT CHECKLIST

MALCOLM PIRNIE

PERSONAL PROTECTIVE EQUIPMENT

PART A
TASK(S)
WORK AREA(S)

PART B	
HEAD PROTECTION	
Hazards/Operations	*PPE/Options*
☐ **Construction**	☐ **Hard Hat**
☐ **Cold Weather**	**ANSI Z89.1-1986**
☐ **Confined Space**	**Class A and B**
☐ **Electrical**	☐ **Chin Strap**
☐ **Frequent Bending or Leaning**	☐ **Liner**
☐ **Heavy Equipment**	☐ **Hood**
☐ **Hot Weather**	☐ **Protective Hair Covering**
☐ **Low Ceilings/Piping**	☐ **Bump Cap**
☐ **Moving Machinery**	
☐ **Overhead Activity**	
PROTECTIVE BODY CLOTHING	
Hazards/Operations	*PPE/Options*
☐ **Chemical Transfer**	☐ **Fully Encapsulating Suit**
☐ **Cold Weather**	☐ **Non-Encapsulating Suit**
☐ **Confined Space**	☐ **Aprons, Leggings, and Sleeve Protectors**
☐ **Dirty Area**	☐ **Anti-Radiation Suit**
☐ **Fire Potential**	☐ **Flotation Gear**
☐ **Hot Weather**	☐ **Cooling Garment**
☐ **Laboratory**	☐ **Tyvek**
☐ **Sampling**	☐ **Warm Weather Clothing (Carhartt's, etc.)**
☐ **Wet Area**	☐ **Rain Gear**
EYE PROTECTION	
Hazards/Operations	*PPE/Options*
☐ **Acids/Caustics**	☐ **Safety Glasses with Side Shields**
☐ **Chemical Splashes**	☐ **Goggles**
☐ **Chemical Transfer**	☐ **Face Shields**
☐ **Confined Space**	☐ **Optical Inserts for Full Face Respirators**
☐ **Construction**	
☐ **Flying Particles**	
☐ **Gases and Vapors**	
☐ **Light (UV, Laser)**	

☐ Liquid Chemicals	
☐ Liquid Sampling	
☐ Molten Metal	
☐ Scraping	
☐ Waste Water/Sludge	
☐ Wire Wheel/Chipping	

HAND PROTECTION

Hazards/Operations	*PPE/Options*
☐ Acids/Caustics	☐ Gloves to Match Hazard(s)
☐ Chemical Transfer	☐ Inner linings
☐ Confined Space	☐ Mittens
☐ Cold Weather	☐ A combination of gloves, liners and mittens may be best
☐ Construction	
☐ Cutting Snips	
☐ Hammering	
☐ Hazardous Waste	
☐ Hot Surfaces	
☐ Laboratory	
☐ Liquid Chemicals	
☐ Pinch Points	
☐ Rough or Sharp Objects	
☐ Sample Handling	
☐ Sampling	
☐ Shoveling	
☐ Waste Water/Sludge	

FOOT PROTECTION

Hazards/Operations	*PPE/Options*
☐ Biological Decay	☐ Work Shoes
☐ Broken Ground	☐ Safety Shoes
☐ Confined Space	☐ Overboots
☐ Cold Weather	☐ Waders
☐ Construction	☐ Hip Boots
☐ Demolition	☐ A combination of foot protectors may be best
☐ Dirty Area	
☐ Drum Movement	
☐ Electrical Hazards	
☐ Falling or Rolling Objects	
☐ Heavy Equipment	
☐ Inclement Weather	
☐ Laboratory	
☐ Moving Machinery	
☐ Shallow Water (to 2 Feet)	
☐ Shallow Water (to 4 Feet)	
☐ Waste Water/Sludge	
☐ Wet Soil	
☐ Uneven Ground	

FALL PROTECTION

Hazards/Operations	*PPE/Options*
☐ Confined Space	☐ Full Body Harness w/Shock-absorbing Lanyard

☐ **Floor Openings (Above 6')**	☐ **Retractable Life Line**
☐ **Ladders (Above 28')**	☐ **Safety Line and Rope Grab**
☐ **Platforms (Above 6')**	
☐ **Roofs**	
☐ **Scaffolds**	

RESPIRATORY PROTECTION

Potential Hazards/Operations	*PPE/Options*
☐ **Acids/Caustics**	☐ **Half Face Air Purifying Respirator**
☐ **Chemical Transfer**	☐ **Full Face Air Purifying Respirator**
☐ **Confined Space**	☐ **Self Contained Breathing Apparatus (SCBA)**
☐ **Dusts and Mists**	
☐ **Gases and Vapors**	
☐ **Hazardous Waste**	
☐ **Laboratory**	
☐ **Liquid Chemicals**	
☐ **Sample Handling**	
☐ **Sampling**	
☐ **Waste Water/Sludge**	

Respiratory Protection Addendum--Partial List of Available Cartridges:

Multi-Gas/Vapor Super Cartridge
Organic Vapors Cartridge
Organic Vapors/Acid Gases Cartridge
Acid Gases Cartridge
Cartridge/P100 Filter Cartridge
Formaldehyde Cartridge
Organic Vapors Cartridge/P100 Filter Cartridge
P100 Filter Cartridge
Multi-Gas/Vapor Super Cartridge/P100 Filter Cartridge
Acid Gases Cartridge/P100 Filter Cartridge
Organic Vapors Cartridge/Acid Gases Ammonia/Methylamine Cartridge
Ammonia/Methylamine Cartridge/P100 Filter Cartridge
N95 Filter/Prefilter

Hearing Protection Addendum--Available Hearing Protection

Ear Plugs, Many Types and Styles
Ear Muffs
Combination of Ear Muffs and Plugs

Evaluator: _____ **Date:** _____

Department Head: _____ **Date:** _____

APPENDIX B

PPE SPECIFICATIONS, CAPABILITIES AND LIMITATIONS

- Introduction
- Protective Clothing
- Types of Protective Clothing
- Head Protection
- Eye and Face Protection
- Hearing Protection
- Hand Protection
- Foot Protection
- Ancillary PPE
- Reference

PPE SPECIFICATIONS, CAPABILITIES AND LIMITATIONS

1) INTRODUCTION

This appendix provides information on the technical specifications, capabilities and limitations of various types of PPE typically used by Malcolm Pirnie employees. This information is by no means exhaustive and may become rapidly dated by new research findings and product development. If you have any questions regarding the applicability of a particular piece of PPE, contact your SBU Health and Safety Leader or the Manager, Health and Safety, COR.

2) PROTECTIVE CLOTHING

Protective clothing is a type of PPE that provides protection against dermal contact with dirt, hazardous chemicals or waste. Protective clothing is made of various fabrics and fabric treatments, which impart the desired physical and chemical resistive properties. Protective clothing may be limited-use or repetitive use and is usually worn over street clothes, underwear, or bathing suits.

Protective clothing has two critical components: the fabric and the tailoring. The fabric imparts the physical and chemical properties of the garment. Fabric manufacturers conduct tests using American Society of Testing Materials (ASTM), American National Standards Institute (ANSI), and National Fire Protection Association (NFPA) protocols to determine and rate the protective characteristics of their products.

Protective fabrics are sold to safety clothing manufacturers who produce the final garment. The manufacturer's design or manufacturing (tailoring) processes may make superior protective clothing; or garments entirely unsuitable for their intended use. Common failure points are the seams, stitching and the zippers. Chemicals, which may not be able to permeate through the fabric, may easily pass through split seams, stitch holes or zipper teeth. Seams should be sewn, heat-sealed or taped.

a) Selection Criteria

Protective clothing shall be selected to protect employees from occupational hazards while considering the hazards presented by the garments themselves. When selecting protective clothing;

- Consider the hazardous chemicals present, the task(s) to be performed, and the ambient site conditions.
- Match the physical and chemical resistance characteristics of the garment against the requirements and limitations of the site and task-specific conditions.

- Choose the garment with the widest range of protection for a site that has a variety of chemical hazards.

Multiple layers of protection may be needed when more than one contaminant is present or when the hazards are unknown. Disposable boots, gloves, and splash suits are used to provide an extra layer of protection.

Evaluate the physical performance characteristics of each garment under consideration. These performance characteristics may increase the hazards associated with using the garment. The cost of certain types of protective clothing and the affect of the clothing on employee productivity are secondary but valid concerns.

b) Performance Characteristics

Heat Transfer - A garment with a low rate of heat transfer increases heat stress of the person wearing it.

Durability - is the degree to which the protective clothing resists tears, punctures, abrasions, and repeated decontamination.

Flexibility - The garment should be flexible to allow mobility.

Temperature effects - The garment should be able to maintain its protective integrity and flexibility in the temperature ranges expected at the work site.

Decontamination - If reusable protective clothing cannot be decontaminated easily, use a disposable garment with the same resistive properties.

Compatibility - The selected garment should not make it difficult or impossible to use other required protective equipment (e.g., a hard hat).

Lifetime - Lifetime is determined by the length of time a reusable garment can resist aging, especially under severe conditions.

Protective clothing comes in various sizes. The larger sizes (large, XL or XXL) are preferable during cold weather because they allow the garment to be worn over layered winter clothing. Pay particular attention to project team members who have special sizing requirements.

While protective clothing is useful to protect personal clothing from becoming soiled, there may be hazards involved in using protective garments. Therefore, using unnecessary PPE is discouraged.

The project or task evaluation in Appendix A, EPA's *Guidelines for the Selection of Chemical Protective Clothing* (Ref. 1), the *Quick Selection Guide to Chemical Protective Clothing* (Ref. 2), are useful in selecting appropriate protective clothing.

3) TYPES OF PROTECTIVE CLOTHING

a) Repetitive-Use Rainwear / Splash Protection

Rainwear garments are used alone or in combination with chemical protective clothing to prevent exposure to inclement weather and incidental mud or chemical splashes. When choosing these garments consider:

- Whether the garment will be subject to limited use or continuous exposure.
- What will be the specific physical or chemical hazards?
- What are the flexibility and thermal requirements?

b) Available Materials:

Vinyl - extremely lightweight PVC material that offers a reasonable initial barrier to liquid penetration. Good flexibility through changing temperatures. Best for short-term use with water-based liquids, mild acids, solvents, oils and salts.

PVC-Coated Fabrics - a broad class of synthetic thermoplastic polymers that protects against many liquids and chemicals. The degree of protection varies depending upon the specific formulation and the thickness of the coating. Resists salts, alkalies, oils, ketones, aldehydes, alcohols, some acids and organic esters.

Rubber-Coated Fabrics - A very flexible heavy fabric for heavy-duty use in extreme cold or heat. Abrasion and tear resistant and offers general protection against solvents and chemicals.

Neoprene-Coated Fabrics - A very flexible heavy fabric for heavy-duty use in extreme cold or heat. Abrasion and tear resistant and offers general protection against acids, hydrocarbons and oils.

Nitrile-Coated Fabrics - Thin-gauge material resistant to cuts and punctures. Resistant to grease, acids and solvents.

Polyurethane-Coated Fabrics - Light weight and sheds liquids easily. Breath ability depends upon thickness of coating and material additives. Good abrasion resistance. General protection against many liquids.

c) Laboratory Wear

Lab coats or splash aprons are required when using chemicals in a laboratory setting. Lab coats will be of cotton or cotton/polyester blend, have long sleeves and extend to the knee. Standard lab coats are not especially fire resistive nor do they provide protection against chemical splashes. Care should be exercised near open flames or hot surfaces. Splash aprons and over-sleeves made of the appropriate material (see Rainwear/Splash Protection) should be used in laboratory situations where chemical, sample or waste splashing is likely.

d) Limited-Use General Protection Clothing

Economical choice for protection against limited hazards such as lead and asbestos dusts, radionuclides, light chemical splashes and biohazards. When choosing these garments consider:

- Whether the garment will be stand up to the rigors of the work environment.
- The degree of protection offered by the garment against the contaminants (and concentrations) present.
- What are the flexibility and thermal requirements?

e) Available Materials

Tyvek - registered trademark of the E.I. DuPont Company. Tyvek is a spun-bonded olefin fiber, which delivers high tear resistance and a high level of protection against particulate materials. Available in a variety of styles and colors.

Kleenguard - registered trademark of the Kimberly-Clark Corporation. Kleenguard is a non-woven polypropylene fabric, usually layered, which effectively repels most non-hazardous liquids, oils and greases and but allows air to pass through reduce the potential for heat stress. Available in a variety of styles and colors.

f) Limited-Use Chemical Protective Clothing

Chemical Protective Clothing (CPC) is used prevent exposure to chemical contact or splashes. For protection from significant chemical or vapor hazards, choose garments that prevent hazardous liquid breakthrough for at least 240 minutes and prevent hazardous vapor breakthrough for at least 1440 minutes as tested by the ASTM F739 protocol. When choosing these garments consider:

4) HEAD PROTECTION

Head protection shall be worn when working in areas where there is danger of head injury from impacts, falling and flying objects, electrical shock and burns, and contact with hazardous chemicals.

Hard hats shall be worn on all construction sites, in the immediate vicinity of drilling operations, in industrial facilities where there are overhead activities, during confined space entry tasks, and in posted hardhat areas. Hardhat suspensions must always be in place, properly adjusted and free from defects. The hard hat selected shall be compatible with any other type of PPE in use including suits, respirators, face shields, and hearing protection.

a) Available Equipment

Hard Hats - hard hats that comply with ANSI Z89.1-1986, Class A and B, and are SEI certified, provide appropriate head protection from overhead impact and electrical hazards. Bump caps are not acceptable. Employees shall not deface, drill holes, or other wise tamper with hard hats in any way that might compromise their effectiveness.

Chin Straps - employees shall use chin straps when tasks involve strenuous bending, downward movements or in any circumstance, for instance, confined space entry, that may result in the hard hat falling off the employee's head.

– Liners - Hardhat liners can be worn inside the hard hat to provide thermal protection during cold weather.

Hoods - hoods can be worn with hard hats, and are usually attached to a whole-body CPC. Hoods protect the head and neck from hazardous chemicals. Hoods can be used to protect the hair when wearing respirators.

Visitor's Hardhats - project offices and trailers should be equipped with an adequate number of spare hard hats for the use of visitors to the project site.

b) Inspection and Maintenance

Hardhats and suspensions systems will be inspected before each use. Cracking, signs of excessive wear, or frayed webbing is cause for replacement. Contact your Equipment Coordinator for parts or hardhat replacement.

2) EYE AND FACE PROTECTION

Appropriate eye and face protection shall be worn by employee when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation.

Employees shall use eye protection that provides side protection when there is a hazard from flying objects.

Employees who wear prescription lenses while engaged in operations involving eye hazards shall wear eye protection that incorporates the prescription in its design, or shall wear eye protection that can be worn over the prescription lenses without disturbing the proper position of the prescription lenses or the protective lenses.

Contact lens shall not be worn in the presence of particulate, chemical, or gaseous eye hazards.

Employees working near sources of injurious light radiation including welding arc, cutting flame, class III and IV lasers, etc., shall use equipment with filter lenses that have a shade number that will protect the eyes from injury.

a) Available Equipment

Safety Glasses with Side Shields - safety glasses with full side shields (prescription to 20/40 vision if required) complying with ANSI Z87.1-1989 shall be worn during drilling operations, and when working near impact tools or equipment. The glasses protect the eyes from large particles

Goggles - goggles complying with ANSI Z87.1-1989 are available in two types: chemical-splash (indirectly vented) and non-vented. Both are available with polycarbonate lenses to protect the eyes from impact injury, chemical splashes, large particles, and projectiles. Non-vented goggles provide additional protection against vapors and gases. Goggles may be worn over prescription eyeglasses.

Face shields - face shields complying with ANSI Z87.1-1989 and at least 8" long protect the face and neck from chemical splashes but do not protect against projectiles. Face shields provide only limited eye protection. Goggles or safety glasses should be worn in conjunction with face shields. Face shields that attach directly to the hard hat are sealed to prevent overhead splashes from running down the inside of the face shield.

Full-face Respirators - because the lens of the full-face respirator is constructed of polycarbonate material meeting the impact resistance standards specified in 30 CFR 11, additional eye and face protection is not required when wearing a full-face respirator.

Optical Inserts - spectacle kits are provided by Malcolm Pirnie to users of full-face respiratory protection who wear corrective eye wear. Each eligible employee may take a spectacle kit to his or her personal eyewear provider to have prescription lens ground and fitted to the kit. The inserts should correct visual acuity to at least 20/40. Reasonable costs, excluding eye exams, are reimbursable as an group Health & Safety expense (Chart of Accounts 7931). The cost of associated eye examinations can be covered by VSP with

any balance submitted for reimbursement from your Flexible Spending Account (Medical).

b) Visitor's Safety Glasses

Project offices and trailers should be equipped with an adequate number of spare safety glasses and goggles for the use of visitors to the project site.

3) HEARING PROTECTION

Hearing protection shall be worn by employees who are exposed to noise levels in excess of those defined in OSHA standard 29 CFR 1910.95. See the Section on Hearing Conservation for additional information.

Two basic types of hearing protectors are available: ear plugs and earmuffs. The use of earplugs shall be considered with caution because earplugs can introduce chemical contaminants into the ear. The selection of hearing protectors shall be based on the attenuation requirements of 29 CFR 1910.95, and on the comfort of the wearer. Employees may require hearing protection when working near drilling and heavy equipment operations, high impact tools, or when working in the vicinity of generators, air compressors or other noisy machinery. Earmuffs are not a stock item since they need to be sized to the individual.

4) HAND PROTECTION

Employees shall use appropriate hand protection when exposed to hazards such as those from skin absorption of harmful substances; severe cuts and lacerations; severe abrasions; punctures; chemical burns; thermal burns; and harmful temperature extremes.

A qualified employee shall select gloves designed to provide protection against specific chemicals and physical demands of the site. Use flexibility, resistance to tearing and puncturing, and resistance to specific chemicals as criteria for selection.

If roughened-surface, chemical-resistant gloves are not available wear heavy leather gloves or disposable studded cotton gloves over chemical-resistant gloves to provide better gripping during manual labor.

Combinations or layers of chemical-resistant gloves are used to protect against multiple chemical contaminants. For example, a mixture of acids, caustics, and aromatic hydrocarbons may require the use of outer neoprene gloves for protection against acids and caustics, and inner PVA gloves for protection against the aromatics.

Disposable latex or vinyl (surgical) gloves are a general-purpose disposable inner glove and are routinely discarded after each use. Permeation-resistant outer gloves such as Viton and butyl rubber are selected based on the chemicals involved. Neoprene is a general-purpose

outer glove. Cotton liners are used inside chemical-resistant gloves to provide warmth during cold weather, or to absorb sweat during summer.

The qualified employee shall consider the glove's thickness and cuff length. Thick gloves with long cuffs (gauntlet type) provide more protection than thin, short gloves. However, the material should not be so thick that it interferes with the dexterity required by the task.

a) Available Materials

Natural Rubber (Polyisoprene). Resists degradation by alcohols and caustics. Not recommended for organics.

Butyl Rubber (Synthetic Rubber). Resists degradation by many contaminants including ketones and esters. Especially resistant to permeation by gases and water vapors. Not recommended for halogenated hydrocarbons and petroleum compounds.

Polyvinyl Alcohol (PVA). Resists degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds. Not recommended for water-based solutions, acids, bases, ethers and esters.

Neoprene (Chloroprene). Resists degradation by caustics acids, alcohols, and oils. Not recommended for halogenated and aromatic hydrocarbons, PCBs and ketones.

Nitrile (Acrylonitrile Polymers / Butadiene). Resists degradation by petroleum compounds, gasoline, alcohols, acids, caustics, and peroxides. Not recommended for aromatic or halogenated hydrocarbons, amines, ketones, and esters. Can be used for some chlorinated compounds.

Viton. Resists degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds, oxidizers, acids, and water-based solutions. Not recommended for aldehydes, esters, ketones, amines, and acetone.

Latex Surgical Vinyl (disposable). Poor chemical resistance. Not recommended as an outer glove. This type of glove rips and tears easily. Remember to remove large rings or rings with protrusions or sharp points to prevent tearing. Use only when dexterity and flexibility are needed in non-hazardous chemical situations.

Silver Shield. Resists degradation and permeation by aromatic and chlorinated hydrocarbons and petroleum compounds, oxidizers, acids, and most water-based solutions. Not recommended for amides.

5) FOOT PROTECTION

Footwear worn at field sites shall comply with the ANSI Z41-1991 and shall be chemically resistant. Proper footwear protects the foot from crushing, puncture, electrical, and chemical hazards.

a) Available Materials

Leather safety boots with steel toe and shank - resists punctures and crushing. Employees are responsible for purchasing their own boots and this expense may be reimbursed up to $120.00 per year with their manager's approval. These boots are generally not chemical or water-resistant without the use of disposable latex/butyl/"Tyvek" boot covers or neoprene overboots.

Overboots - made of PVC, latex, butyl, natural rubber, polyethylene, neoprene or vinyl provide protection from a wide range of chemicals. Some overboots have an integrated steel toe and puncture resistant insert.

Waders - waders are one-piece waterproof garments with boots and coveralls that protect the lower body (up to the hip/chest) from water immersion. Employees sampling water from ponds, streams or sewers at locations that are no more than waist deep are to wear waders.

Hip boots - are useful for water sampling or sewer inspections when the water level is below the thighs. Hip boots are less expensive and provide more mobility than chest-high waders.

6) ANCILLARY PPE

Ancillary PPE is used for protection against specific health and safety hazards.

a) Available Equipment

Belts, Harnesses, Lanyards and Lifelines - body harnesses, lanyards, and lifelines are used to prevent falls from elevated areas or into water, and to make possible the emergency retrieval of employees who have entered confined spaces. Fall protection belts are no longer allowable. Employees working on or moving across unguarded platforms or catwalks at elevations **greater than 6 feet** are required to tie off to some type of effective fall protection.

Safety belts used at sites shall comply with 29 CFR 1926.104 and also shall be constructed of spark-free hardware and chemical- resistant materials. Lifelines and fall protection devices must use double-action snap hooks. Safety restraints are selected on the basis of applicability to the task(s) for which they will be used.

Cooling Vests - cooling vests are used to remove excess heat generated by worker activity, protective clothing, or extremely hot environments. The most commonly used units resemble vests with cold pack pockets, and are used when personnel are wearing level B or C protection in warm weather, usually above 80^{o}F. To use the vests, ice-making equipment and cold pack storage must be available on-site. The availability of this equipment must be addressed in planning for the work.

Other cooling devices use forced air or circulation of a refrigerant through caps and vests. Maintenance problems and the increased weight (up to 25 pounds) borne by workers shall be evaluated when selecting these units.

Floatation Gear - floatation gear such as life jackets, work vests and cold water survival suites that meet United States Coast Guard (USGS) standards (46 CFR Part 160) shall be worn when working in or on surface waters e.g., ponds, lagoons, and streams, at chest high depths (four feet) or greater. Floatation gear is commonly worn over protective clothing. Floatation vests add bulk to the wearer and may restrict mobility. Floatation vests may be difficult to decontaminate.

Reflectorized Vests - reflectorized vests are to be worn be all employees when working near vehicular traffic and in situations where visibility is essential.

Tool Pouches and Belts - equipment pouches and belts may be worn by site personnel who use portable equipment and tools during field activities. Pouches and belts are worn around the waist, outside of the protective clothing.

Infection Control Kits - an infection control kit (ICK KIT) shall be available in each office, field office, field trailer, and field vehicle for use in the event of an injury resulting in contact with blood or other bodily fluids.

Protective Leggings - leggings are worn to protect against snakebites or other hazards to the lower extremities.

7) REFERENCES

- *EPA. Guidelines for the Selection of Chemical Protective Clothing. -1987.*
- *Forsberg, K. and S.Z. Mansdorf. Quick Selection Guide to Chemical Protective Clothing. Van Nostrum Reinhold, New York, 1989.*

APPENDIX C

PPE ENSEMBLES FOR HAZARDOUS WASTE OPERATIONS

Levels of Protection for Levels A - D

1) ENSEMBLES FOR HAZARDOUS WASTE OPERATIONS

Various types of personal protective clothing, respirators, and ancillary protective equipment are combined into ensembles that provide a sufficient level of protection from site-specific hazards. Using excessive levels of PPE is discouraged.

Four distinct levels -- A, B, C, and D -- have been defined by EPA, each providing protection against varying degrees of respiratory, dermal, and safety hazards. A specific level of protection shall be selected based on:

- The type, concentration, and toxicity of airborne contaminants.
- The potential for personal exposures, liquid splashes, or direct contact with hazardous materials in relation to site tasks /activities.

The main factor in selecting a level of protection is the magnitude of the respiratory and dermal hazards present or potentially present on- site. Levels A and B specify the same respiratory protection (self- contained or air-line breathing apparatus), but Level A includes specific dermal protection (fully encapsulating suit). Levels B and C generally specify the same dermal protection (chemical-resistant coveralls or partially encapsulating suit) but Level B includes a higher degree of respiratory protection. Level D, essentially an ordinary work uniform ensemble, is used only when there is minimal potential for exposure to hazardous materials or waste on-site.

Each standard level of protection may be modified in the Site Safety Plan (SSP) to account for varying degrees of respiratory and dermal hazard. For instance, a Level C ensemble may be modified for a task involving surface soil sampling for a semi-volatile compound in wet conditions by making the use of the respirator contingent upon air monitoring results but mandating full body protective clothing for dermal exposure control.

The SSP specifies the level of protection required for various site tasks and work zones. Upgrades or downgrades of protective levels are based on the action levels specified in the air-monitoring procedures of the SSP. An increase or decrease in the potential for exposure to hazardous materials necessitating a level of protection not specified in the SSP requires a written amendment to the SSP approved by the Project Safety Officer (PSO), the SBU Health and Safety Leader, and/or the Manager, Health and Safety, COR.

The four levels of protection that may be used by Malcolm Pirnie personnel are described below. Selection criteria are presented for general guidance only: protection shall be tailored to the site-specific contaminants and conditions.

a) Level A Protection

Level A shall be selected when the highest level of respiratory, skin, and eye protection is required due to the presence in the air of high concentrations of hazardous materials, or

the presence of contaminants highly toxic to the skin. Level A is also used when the hazards are unknown, inadequately defined, or when Level B protection is not adequate. Level A protection is extremely cumbersome and may be life- threatening due to heat stress. Level A is generally appropriate in emergency response and rescue circumstances not normally performed by Malcolm Pirnie personnel. For example, workers would use Level A protection when entering a confined area to repair a leaking chlorine gas valve.

Selection Criteria - Use Level A when:

- Hazardous materials have been identified on-site that require the highest level of respiratory, skin, and eye protection based on measured (or potentially) high concentrations of hazardous vapors, gases, or particulate atmospheres that are greater than levels determined to be "immediately dangerous to life or health" (IDLH).
- Site operations or tasks present a high potential for splashing of, contact with, or airborne exposure to substances highly toxic by skin absorption.
- Site operations or tasks to be conducted in confined or poorly ventilated areas where there is potential for encountering highly toxic substances.

Personal Protective Equipment at Level A consists of:

- Pressure-demand, full-face, self-contained breathing apparatus (SCBA) or a pressure-demand, supplied-air respirator / SCBA combination i.e., a dual-purpose breathing apparatus (DPBA).
- Fully encapsulating suit with intrinsic gloves, booties, and polycarbonate lens.
- Inner chemical-resistant gloves (latex or vinyl surgical type).
- Overboots of appropriate chemical - resistant materials with steel toe and shank. (The boots are worn over the intrinsic booties of the rubber suit, and the boots themselves may be covered by disposable booties.)

Additional Equipment that may be required for a Level A entry:

- Cooling vest/jacket
- Disposable chemical-resistant booties (latex/butyl)
- Coveralls
- Cotton long underwear
- Hard hat
- Hearing Protection
- Two-way radio communications (rated intrinsically safe)

b) Level B Protection

Level B shall be selected when the highest level of respiratory protection is required but a degree of dermal protection lower than that afforded by Level A is acceptable. The specific type of dermal protection may vary from site to site. A good quality, chemical-

resistant, one-piece garment with taped wrists, ankles, and hood often provides adequate dermal protection for splash or contact hazards on-site.

Level B is generally used in situations where respiratory hazards are difficult to evaluate. Level B protection is cumbersome and may cause heat stress. Level B protection shall be the minimum used during initial response or reconnaissance except when the respiratory hazard has been evaluated and it is determined that a lower level of respiratory protection is acceptable.

Selection Criteria: Use Level B when:

- The type and concentration of airborne contaminants have been identified as those requiring a high level of respiratory protection, but a lower level of skin protection, for example, when specific airborne substances, present in IDLH concentrations, do not present a severe skin contact/absorption hazard. Also when atmospheres do not meet the criteria that would permit use of air-purifying respirators.
- Atmospheres contain less than 19.5 percent oxygen.
- Site activities generate high concentrations of substances highly toxic by skin absorption but skin contact with toxic substances is not likely.
- When the air contaminants of concern do not have adequate warning properties of breakthrough or there are no approved filter cartridges for Level C respiratory protection.
- When significant time will be spent in areas with contaminant concentrations at or above occupational exposure limits.

Personal Protective Equipment at Level B consists of:

- Pressure-demand, full-face SCBA or DPBA.
- Chemical-resistant clothing, including disposable "Tyvek" coveralls, with or without various coatings. Also, butyl rubber aprons, or neoprene, acid-resistant, full body coveralls.
- Inner chemical-resistant gloves (latex or vinyl surgical type.)
- Outer chemical-resistant gloves (butyl, neoprene, Viton, or other appropriate material.)
- Neoprene rubber boots with steel toe and shank.
- Emergency escape bottle with 5 - 15-minute air supply.

Additional Equipment that may be required for a Level B entry:

- Cotton coveralls worn beneath CPC.
- Cotton long underwear.
- Disposable chemical-resistant booties (latex/butyl).
- Hard hat

- Hearing protection
- Two-way radio communications
- Cooling vest/jacket.

c) Level C Protection

Level C protection is composed of dermal protection and an air- purifying respirator (APR). Level C shall be used only when the types and concentrations of airborne substances are known, when the criteria for using APRs are met, and when skin exposure is unlikely.

Use of this level is limited by the restrictions placed on the use of APRs in 29 CFR 1910.134 and ANSI Z88.2-1992. Air contaminants shall be measured and compared to action levels specified in the SSP. Level C may be sufficiently cumbersome to cause heat stress.

Selection Criteria: Use Level C when:

- The type and concentration of airborne contaminants are known, an approved respirator cartridge/canister is available that will remove the contaminants, and the following criteria for use of APRs are met:
- Oxygen content is equal to or greater than 19.5 percent.
- Concentrations do not exceed the NIOSH-approved use levels for the respirator and cartridge/canister.
- Contaminants have obvious warning properties (e.g., contaminant can be detected by odor, taste, or irritation at concentrations below its exposure limit).
- Atmospheres are not IDLH.
- Airborne contaminants are known and will be monitored throughout site activities.

Site activities will not generate high airborne concentrations or liquid splashes or other means of contact with substances highly toxic to the skin.

Personal Protective Equipment at Level C consists of:

- Full-face APR or full-face powered APR with cart ridge/canister appropriate for the airborne contaminant present.
- Chemical-resistant clothing (same alternatives as for Level B, determined by site).
- Inner chemical-resistant gloves (latex or vinyl surgical type).
- Outer chemical-resistant gloves (butyl, neoprene, Viton, or other appropriate material).
- Work boot with neoprene rubber sole, and steel toe and shank.

Additional Equipment that may be required for a Level C entry:

- Coveralls.
- Disposable chemical-resistant latex or butyl booties.
- Cotton long underwear.
- Hardhat.
- Hearing protection.
- Two-way radio communications.

d) Level D Protection

A work uniform providing minimal protection constitutes Level D protection. Level D shall not be used in a hazardous atmosphere or environment. Level D will be used only when there is no indication of a hazardous atmosphere, and the work tasks preclude splashes, immersion, or other bodily contact with hazardous substances.

In situations where the possibility of a hazardous atmosphere exists, Level D is permissible when prescribed by the SSP as long as monitoring indicates the continued absence of a hazardous atmosphere. When hazardous atmospheres are detected, workers in Level D shall upgrade their protection in accordance with instructions in the SSP.

Selection Criteria: Use Level D on:

- Sites where the SSP writer and reviewer have made a reasonable determination that exposure to hazardous materials is unlikely.
- Sites where there is limited potential for exposure to hazardous materials, but procedures for monitoring onsite air and upgrading the protection level or evacuating the site have been established, and are being followed.

Personal Protective Equipment at Level D consists of:

- Coveralls (cotton or "Tyvek").
- Work boots with steel toe and shank.
- Safety glasses with side shields.

Additional Equipment that may be required for a Level D entry:

- Inner and outer gloves.
- Hardhat.
- Hearing protection.
- Emergency escape respirator (readily available onsite.)
- Air-purifying respirator (readily available onsite.)
- Aprons, boot covers.

APPENDIX D

AIRBORNE CONTAMINANT ACTION LEVELS FOR SELECTION OF PPE ENSEMBLES

Appendix D Airborne Contaminant Action Levels for Selection of PPE Ensembles

Action Levels

	Uncharacterized Airborne Vapors or Gases	Characterized Gases, Vapors, Particulates**
Level D	Background*	Up to 50% of PEL, REL or TLV
Level C	Up to 5 ppm above background	Up to 25 times PEL, REL or TLV
Level B	5 ppm to 500 ppm above background	UP to 500 times PEL, REL or TLV
Level A	500 ppm to 1000 ppm above background	Up to 1000 times PEL, REL or TLV

* Off-site "clean" air measurement.

** Use mixture calculations (% allowed = ΣC_n PEL_n) if more than one contaminant is present

Oxygen Deficiency

Concentration	Action Taken
< 19.5% O_2	Leave area. Reenter only with supplied-air respirators.
19.5% to 23.5% O_2	Work may continue. Investigate changes from 21%.
> 23.5% O_2	Work must stop. Ventilate area before returning.

Flammability

Concentration	Action Taken
< 10% of LEL	Work may continue. Consider toxicity potential.
> 10% LEL	Work must stop. Ventilate area before returning.

Radiation

Intensity	Action Taken
< 0.5 mR/hr	Work may continue.
< 1 mR/hr	Work may continue. Continue to Monitor. Notify Corporate Health and Safety and Corporate Health Physicist.
5 mR/hr	Radiation work zone. Work must stop.

APPENDIX E

MINIMUM AND MAXIMUM DECONTAMINATION STATIONS AND EQUIPMENT FOR PPE ENSEMBLE LEVELS B AND C

E-1 *MAXIMUM* DECONTAMINATION PROCEDURES FOR *LEVEL B*

Equipment Worn

This decontamination procedure outlined is the **maximum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece, hooded chemical-resistant splash suit
- SCBA
- hard hat
- chemical-resistant boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each piece of equipment may be contaminated to a different degree; therefore, segregation at the drop reduces the potential for contamination. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Suit, Boot Covers, and Glove Wash

Thoroughly wash and scrub fully encapsulating suit, outer boot covers, and gloves with a decontamination solution or detergent-waste solution. Equipment needed:

- container (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- two or three long-handled, soft-bristled scrub brushes

Station 3: Suit, Boot Covers, and Glove Rinse

Rinse off the decontamination solution from Station 2 using copious amounts of water. Repeat as many times as necessary. Equipment needed:

- container (30 to 50 gallon)
- high-pressure spray unit and splash guard
- water
- two or three long-handled, soft-bristled scrub brushes

Station 4: Tape Removal

Remove tape around boots and gloves and deposit it in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 5: Boot Cover Removal

Remove boot covers and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool

Station 6: Outer Glove

Remove outer gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 7: Suit, SCBA, Boot, and Glove Wash

If design does not include *Station 2*, wash suit at this station. Thoroughly wash suit, SCBA, boots, and gloves with a long-handled, soft-bristled scrub brush and copious amounts of decontamination solution or detergent-water solution. Wrap SCBA regulator (if belt-mounted type) with plastic to keep out water. Wash backpack assembly with sponges or cloth. Equipment needed:

- container (30 to 50 gallon)
- decontamination solution
- detergent-water solution
- two or three long-handled bristled scrub brushes
- small buckets
- sponges or cloths

Station 8: Suit, SCBA, Boot, and Glove Rinse

If design does not include *Station 3*, rinse suit at this station. Rinse off the decontamination solution or detergent-water solution using copious amounts of water. Repeat as many times as necessary. Equipment needed:

- container (30 to 50 gallon)
- high-pressure spray unit and splash guard
- water
- small buckets
- two or three long-handled, soft-bristled scrub brushes
- sponges or cloths

Station 9: Tank Change

If a worker leaves the exclusion zone to change their air tank, this is the last step in the decontamination procedure. They exchange the tank, don new outer gloves and boots, and have the joints taped. They then return to duty. Equipment needed:

- air tanks
- tape
- boot covers
- gloves

Station 10: Chemical-resistant Boot Removal

Remove chemical-resistant boots and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 50 gallon)
- plastic liners
- bench or stool
- bootjack

Station 11: SCBA Backpack Removal

While still wearing face piece, remove backpack and place it on a table. Disconnect hose from regulator valve and proceed to next station. Equipment needed:

- table

Station 12: Splash Suit Removal

With assistance, remove splash suit. Deposit it in a container with a plastic liner. Equipment needed:

- container (30 to 50 gallon)
- plastic liners
- bench or stool

Station 13: Inner Glove Wash

Wash with decontamination solution or detergent-water solution that will not harm skin. Repeat as many times as necessary. Equipment needed:

- basin or bucket
- decontamination solution
- detergent-water solution
- small table

Station 14: Inner Glove Rinse

Rinse with water. Repeat as many times as necessary. Equipment needed:

- water
- basin or bucket
- small table

Station 15: Face Piece Removal

Remove face piece. Deposit it in a container with a plastic liner. Avoid touching face with fingers. Equipment needed:

- container (30 to 50 gallon)
- plastic liners

Station 16: Inner Glove Removal

Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 17: Inner Clothing Removal

Remove inner clothing. Place it in a container with a plastic liner. Do not wear inner clothing off the site, since small amounts of contaminants may have been transferred in removing fully encapsulating suit. Equipment needed:

- container (30 to 50 gallon)
- plastic liners

Station 18: Field Wash

Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

Station 19: Redress

Put on clean clothes. A dressing trailer is needed in inclement weather. Equipment needed:

- table
- chairs
- lockers
- clothes

E-2 *MINIMUM* DECONTAMINATION PROCEDURES FOR *LEVEL B*

Equipment Worn

This decontamination procedure outlined is the **minimum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece, hooded chemical-resistant splash suit
- SCBA
- hard hat
- chemical-resistant boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability for cross-contamination. During hot weather operations, cool-down station may be set up within this area. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Suit, Boot Covers, and Glove Wash and Rinse

Thoroughly wash and scrub chemical-resistant splash suit, outer boots, and gloves with a decontamination solution or detergent-waste solution. Rinse off using copious amounts of water. Equipment needed:

- containers (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- rinse water
- high-pressure spray unit and splash guard
- two or three long-handled, soft-bristled scrub brushes

Station 3: Outer Boot and Glove Removal

Remove outer boots and gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool
- water
- two or three long-handled, soft-bristled scrub brushes

Station 4: Tank Change

If a worker leaves the exclusion zone to change their air tank, this is the last step in the decontamination procedure. They exchange the tank, don new outer gloves and boots, and have the joints taped. They then return to duty. Equipment needed:

- air tanks
- tape
- boot covers
- gloves

Station 5: Outer Garment Removal

Chemical-resistant splash suit, if worn outside the SCBA, is removed and deposited in separate containers with plastic liners. If the suit is worn underneath the SCBA, see station 5A. Equipment needed:

- containers (20 to 30 gallon)
- plastic liners

Station 5A: Suit Removal When Worn Underneath the SCBA

If the chemical-resistant splash suit is worn beneath the SCBA, remove SCBA backpack, but not the face piece, and hand to a buddy or lay down on plastic sheeting and remove suit. Equipment needed:

- plastic sheeting

Station 6: SCBA Removal and Decontamination

Wrap SCBA regulator (if belt-mounted type) with plastic to keep out water. Wash backpack assembly with sponges or cloth. Remove face piece while avoiding facial contact by fingers. SCBA is deposited on a clean plastic sheet. Equipment needed:

- water
- small buckets
- sponges or cloths
- plastic sheeting
- two or three long-handled, soft-bristled scrub brushes

Station 7: Inner Glove Removal

Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 8: Field Wash

Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

E-3 *MAXIMUM* DECONTAMINATION PROCEDURES FOR *LEVEL C*

Equipment Worn

This decontamination procedure outlined is the **maximum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece coverall
- full-face respirator
- hard hat
- safety boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

DECONTAMINATION PROCEDURES

Station 1: Segregated Equipment Dump

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Each piece of equipment may be contaminated to a different degree; therefore, segregation at the drop reduces the potential for contamination. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Boot Covers, and Glove Wash

Thoroughly wash and scrub outer boot covers, and gloves with a decontamination solution or detergent-waste solution. Equipment needed:

- container (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- two or three long-handled, soft-bristled scrub brushes

Station 3: Boot Covers, and Glove Rinse

Rinse off the decontamination solution from Station 2 using copious amounts of water. Repeat as many times as necessary. Equipment needed:

- container (30 to 50 gallon)
- high-pressure spray unit and splash guard
- water
- two or three long-handled, soft-bristled scrub brushes

Station 4: Tape Removal
Remove tape around boots and gloves and deposit it in a container with a plastic liner.
Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 5: Boot Cover Removal
Remove boot covers and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool

Station 6: Outer Glove Removal Remove outer gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 7: Canister or Mask Change
If a worker leaves the exclusion zone to change their canister (or mask), this is the last step in the decontamination procedure. The worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and the worker returns to duty. Equipment needed:

- respirator canisters appropriate to the field hazard
- extra respirators
- tape
- boot covers
- gloves

Station 8: Outer Garment Removal
One-piece coverall is removed and deposited in containers with plastic liners. Equipment needed:

- containers (20 to 30 gallon)
- plastic liners

Station 9: Inner Glove Wash
Wash with decontamination solution or detergent-water solution that will not harm skin. Repeat as many times as necessary. Equipment needed:

- basin or bucket
- decontamination solution
- detergent-water solution
- small table

Station 10: Inner Glove Rinse

Rinse with water. Repeat as many times as necessary. Equipment needed:

- water
- basin or bucket
- small table

Station 11: Face Piece Removal and Decontamination

Remove face piece while avoiding facial contact by fingers. Face-piece is deposited on a clean plastic sheet. Canisters are removed and deposited in containers with plastic liners. Respirators are scrubbed with soap and water and rinsed with copious amounts of clean water. Equipment needed:

- water
- soap
- small buckets
- small brushes
- sponges or cloths
- plastic sheeting

Station 12: Inner Glove Removal

Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 13: Inner Clothing Removal

Remove inner clothing. Place it in a container with a plastic liner. Do not wear inner clothing off the site, since small amounts of contaminants may have been transferred in removing outer suit. Equipment needed:

- container (30 to 50 gallon)
- plastic liners

Station 14: Field Wash

Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towel

Station 15: Redress

Put on clean clothes. A dressing trailer is needed in inclement weather. Equipment needed:

- table
- chairs
- lockers
- clothes

E-4 *MINIMUM* DECONTAMINATION PROCEDURES FOR *LEVEL C*

Equipment Worn

This decontamination procedure outlined is the **minimum** number of decontamination stations necessary for Malcolm Pirnie workers wearing the following protective clothing and equipment:

- one-piece coverall
- full-face respirator
- hard hat
- safety boots with steel toe and shank
- boot covers
- inner and outer gloves
- taped joints between gloves, boots, and suit

Station 1: Segregated Equipment Dump

Deposit equipment used on the site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability for cross-contamination. During hot weather operations, cool-down station may be set up within this area. Equipment needed:

- containers of various sizes
- plastic liners
- plastic drop cloths

Station 2: Boot Covers, and Glove Wash and Rinse

Thoroughly wash and scrub outer boots, and gloves with a decontamination solution or detergent-waste solution. Rinse off using copious amounts of water. Equipment needed:

- containers (20 to 30 gallon)
- decontamination solution
- detergent-water solution
- rinse water
- high-pressure spray unit and splash guard
- two or three long-handled, soft-bristled scrub brushes

Station 3: Outer Boot and Glove Removal

Remove outer boots and gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (30 to 40 gallon)
- plastic liners
- bench or stool
- water
- two or three long-handled, soft-bristled scrub brushes

Station 4: Canister or Mask Change

If a worker leaves the exclusion zone to change their canister (or mask), this is the last step in the decontamination procedure. The worker's canister is exchanged, new outer gloves and boot covers are donned, joints are taped, and the worker returns to duty. Equipment needed:

- respirator canisters appropriate to the field hazard
- extra respirators
- tape
- boot covers
- gloves

Station 5: Outer Garment Removal

One-piece coverall is removed and deposited in containers with plastic liners. Equipment needed:

- containers (20 to 30 gallon)
- plastic liners

Station 6: Face Piece Removal and Decontamination

Remove face piece while avoiding facial contact by fingers. Face-piece is deposited on a clean plastic sheet. Canisters are removed and deposited in containers with plastic liners. Respirators are scrubbed with soap and water and rinsed with copious amounts of clean water. Equipment needed:

- water
- soap
- small buckets
- small brushes
- sponges or cloths
- plastic sheeting

Station 7: Inner Glove Removal

Remove inner gloves and deposit them in a container with a plastic liner. Equipment needed:

- container (20 to 30 gallon)
- plastic liners

Station 8: Field Wash

Shower if highly toxic, skin-corrosive, or skin-absorbable materials are known or suspected to be present. Wash hands and face if shower is not available. Equipment needed:

- water
- soap
- small table
- basin or bucket
- field showers
- towels

Appendix F:
Lockout/Tagout Written Program

MALCOLM PIRNIE

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1.0 INTRODUCTION

On September 1, 1989, the Occupational Safety and Health Administration (OSHA) issued a final rule on the Control of Hazardous Energy (Lockout/Tagout), 29 CFR 1910.147. This standard, effective January 2, 1990, requires employers to develop a written Energy Control Program when employees are required to construct, install, set up, adjust, inspect, modify, maintain, and service machines or equipment. An energy control program is a standard operating procedure designed to safely shut down and lock out or tag-out machinery or equipment during service, maintenance, or inspection activities. The standard requires that employees receive training in their role in the energy control procedure, and that knowledgeable individuals conduct periodic evaluations to maintain or enhance specific energy control procedures. Lockout and Tagging of Circuits, 29 CFR 1926.416 is the OSHA regulation that addresses electrical energy control in the construction industry.

The Lockout/Tagout standard applies when Malcolm Pirnie employees enter confined spaces, service or maintain remediation equipment, pilot plant equipment, or conduct equipment inspections, and start-up operations requiring the removal or bypassing of a guard or safety device or when they must work in the danger zone created by the operating cycle of a machine. Staff and management are encouraged to reduce the hazards presented by stored energy by:

- Understanding the equipment, the potential hazards, and careful task planning.
- Obtaining or developing specific written energy control procedures for the equipment.
- Using the proper isolation/lockout/tagout devices for the equipment.
- Training staff in proper procedures.

Specific project circumstances may allow for some leeway in procedures based upon project tasks, owner procedures, and specific exemptions in the standard. Contact the Manager, Health and Safety, COR, to discuss unusual hazards or to resolve a question on hazard control methods.

2.0 RESPONSIBILITIES

2.1. Project Managers:

- Project managers will direct that a written, equipment-specific, Electrical Safety/Lockout/Tagout Program is developed for projects during which Malcolm Pirnie staff members are required to inspect, service, or maintain equipment or machinery.
- The Project Manager will direct that a copy of the client's, the vendor's, or contractor's lockout/tagout procedures be procured for each piece of equipment that a Malcolm Pirnie employee may be required to service or maintain.
- Project managers will provide the resources necessary to develop these programs and brief the project team on the procedures to be followed.
- The Project manager will also direct that the appropriate and necessary locks, tags, signage, barriers and other specific equipment be procured and available before the covered tasks begin.
- The Project Manager will chair the Lockout/tagout Review Team that will review and approve written Electrical Safety and Lockout/Tagout procedures for a specific location or project task.

2.2. Project Safety Officer:

- The project safety officer (PSO) is responsible for evaluating the stored energy hazards present at a project site and recommending to the Project Manager the appropriate engineering, administrative and personal protective equipment (PPE) controls to protect the safety of Malcolm Pirnie employees.
- The PSO is responsible for submitting the written plans called for in the Program in a timely manner for the required review and briefing the project team on the requirements and procedures.
- The PSO is responsible for observing the tasks when they are done for the first time and periodically thereafter to verify that the written procedures are being followed. Minor deviations will be worked out in the field. Major or hazardous deviations will be reported to the Project Manager and to the SBU Health & Safety Leader.

2.3. Corporate Health & Safety:

- The Manager, Health & Safety, COR is responsible for the content and direction of this written program guidance document and the periodic review and modification based upon feedback from the project PSOs. The SBU Health and Safety Leaders are responsible for reviewing submitted equipment or location–specific written procedures and resolving issues regarding the implementation of approved procedures.

2.4. Subcontractors:

- Subcontractors working in areas and on equipment covered by this Program will provide Malcolm Pirnie their written procedures for electrical and other hazardous energy control and evidence that their employees have been briefed on those procedures.
- The PSO will review subcontractor submissions for completeness and obvious shortcomings and mistakes and provide an assessment back to the Project Manager.
- The Project Manager will contact the subcontractor and discuss changes/improvements to the submitted procedures prior to allowing the start of covered tasks.

2.5. Malcolm Pirnie Employees:

- Malcolm Pirnie employees will use effective electrical safety and lockout/tagout procedures whenever they inspect, service, or maintain machines or equipment that may start, cycle, or release stored energy.

3.0 DEFINITIONS

Affected employee - An employee who works in an energy control area. The affected employee does not service, maintain, or inspect and is not responsible for carrying out the energy control program.

Authorized employee - An employee who services, maintains, or inspects machines or equipment. Authorized employees are responsible for carrying out the energy control procedures for their protection and the protection of others.

Energized - A machine or piece of equipment connected to an energy source or containing residual or stored energy.

Energy Control Program - A set of written site or equipment specific procedures that clearly and specifically outlines the scope, purpose, authorization, rules, and techniques to be used by staff for the control of hazardous energy, and the means to enforce compliance with the program. Lockout/tagout procedures and equipment may be one aspect of an energy control program.

Energy-isolating device - Any mechanical device that physically prevents the transmission or release of energy. Examples of energy-isolating devices include manually operated electrical circuit breakers; disconnect switches; line valves; and pipe blocks.

Energy source - any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, gravity or other type of energy.

Lockout - The placement of a lockout device on an energy-isolating device, according to established procedure, that ensures that the energy-isolating device and the controlled equipment cannot be operated until the lockout device is removed.

Lockout device - Any device that uses a positive means such as a lock, either key or combination type, to hold an energy-isolating device in a safe position, preventing energizing of machinery or equipment. When properly installed, blank pipe flanges or bolted pipe slip blinds are lockout devices.

Tagout - The placement of a tagout device on an energy-isolating device, according to established procedure, warning others that the energy-isolating device and controlled equipment may not be operated until the tagout device is removed.

Tagout device - Any prominent warning device, such as a tag and a means of attachment that can be securely fastened to an energy-isolating device according to an established procedure. The tag indicates that the machine or equipment is not to be operated until the removal of the tagout device according to the energy control procedure.

Lockout/Tagout Review Team - A team chaired by the Project Manager and comprised of process and design engineers familiar with the equipment, and the SBU Health & Safety Leader who will review electrical safety and lockout/tagout procedures developed by Malcolm Pirnie or by others to determine if the procedure meets the informational and protective requirements of the OSHA Standard.

4.0 LOCKOUT/TAGOUT PROCEDURES

The following simple lockout procedure is provided to assist Malcolm Pirnie Project Managers, PSOs, and Lockout/Tagout Review Teams in developing and reviewing specific electrical safety and lockout/tagout procedures. When the energy isolating devices are not lockable, tagout may be used, provided that employees receive additional training and more rigorous periodic inspections of the project site are conducted by the PSO. For more complex systems, more comprehensive procedures may need to be developed, documented and utilized.

This Program establishes the minimum requirements for the development of electrical safety and the lockout procedures for the use of energy isolating devices whenever maintenance or servicing is done on machines or equipment. The basic rule is that the machine or equipment is stopped, isolated from all potentially hazardous energy sources and locked out before employees perform any servicing or maintenance where the unexpected energizing or start-up of the machine or equipment or release of stored energy could cause electric shock or other injuries.

4.1. Program Compliance

Project managers are responsible for the development of an effective lockout/tagout procedure for each piece of equipment that a Malcolm Pirnie employee may be required to service, maintain or inspect. All employees are required to comply with the written restrictions and limitations detailed in the written lockout/tagout procedure. The authorized employees are required to perform the lockout in accordance with this procedure. All employees, upon observing a machine or piece of equipment which is locked out to perform servicing or maintenance shall not attempt to start, energize or use that machine or equipment.

Any employee found to be hindering or not performing lockout/tagout in accordance with this or another approved procedure will be subject to disciplinary action up to and including termination.

4.2. Equipment Specific Lockout/Tagout Template

Equipment specific procedures will be developed to provide protection for Malcolm Pirnie employees and to meet applicable provisions of the OSHA standards. The written procedures will be developed by experienced and knowledgeable personnel and then reviewed by the PSO and the Project Manager. These procedures will provide the following information:

- Administrative information such as procedure numbers, procedure development dates, and descriptions of the machines/equipment covered by the procedures;
- Application of energy control (lockout/tagout) procedures;
- Identification of potential energy sources;
- Shutdown preparation;
- Notification of affected and other employees;
- Machine or equipment shutdown;
- Machine or equipment isolation;
- Application of LO/TO devices;
- Stored energy management; and
- Isolation verification.

4.3. Basic Lockout/Tagout Sequence

To perform lockout/tagout on a piece of equipment, the following steps ensure equipment will be properly locked/tagged out:

Notify all affected employees that servicing, maintenance or inspection is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance.

****

Note: Site specific programs will add details of how this notification is to occur.

The authorized employee shall identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.

****

Note: Add details on the type and magnitude of the energy, the hazards of the energy, and the methods to control the energy for each piece of equipment.

All energy isolating devices needed to control the energy to a machine or equipment shall be physically located and operated to isolate the machine or equipment from the energy source(s).

****

Note: Add details on the location of all energy isolating devices needed to control the energy to each machine or piece of equipment.

If the machine or equipment is operating, shut it down by the normal stopping procedure (depress stop button, open switch, close valve, etc.).

****

Note: Add details on the normal stopping procedure.

De-activate the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).

Lock out the energy isolating device(s) with assigned individual lock(s) for the authorized employee. Lockout devices, where used, shall be affixed in a manner to that will hold the energy isolating devices in a "SAFE" or "OFF" position. Tagout devices, where used, shall be affixed in such a manner as will clearly show that the operation or movement of energy isolating devices from the "SAFE" or "OFF" position is prohibited.

Tagout devices used with energy isolating devices designed with locking capability shall be fastened at the lock attachment point. Where a tag cannot be affixed directly to the energy isolating device, the tag shall be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

Following the application of lockout or tagout devices, all potentially hazardous stored or residual energy (such as that in capacitors, elevated machine members, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc. Springs shall be set in a neutral position.

****

Note: Add details on dissipation or restraining of stored energy.

Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.

When there is a possibility of re-accumulation of hazardous levels of stored energy, isolation shall be continuously verified until completion of servicing, maintenance, or inspection, or until the possibility of accumulation no longer exists.

****

Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.

Prior to starting work on locked out or tagged out machines or equipment, the authorized employee shall verify the isolation of the machine or equipment and that the energy source has been disconnected.

The machine or equipment is now locked out.

4.4. Restoring Equipment to Service

Before removal of the lockout or tagout devices and the restoration of energy to the machine or equipment, procedures shall be followed and actions taken by the authorized employee(s) including the following:

- Check the machine or equipment and the immediate area around the machine or equipment to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact.
- Check the work area to ensure that all employees have been safely positioned or removed from the area. After the removal of lockout or tagout devices and before starting a machine or equipment, notify affected employees and employers of the removal of the lockout or tagout device(s).

- Verify that the controls are in neutral.
- Each employee who applied a device will then remove their lockout or tagout device from each energy-isolating device.
- Reenergize the machine or equipment.

****

Note: The removal of some forms of blocking may require re-energizing of the machine before safe removal.

Notify affected employees that the servicing or maintenance is completed and the machine or equipment is ready for use

Temporary Removal of Locks or Tags for Testing and Positioning Equipment

When lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine, equipment, or components, the following sequence of actions shall be followed:

- Clear the machine or equipment of tools and materials.
- Visually confirm that all employees are off of the machine or equipment.
- Remove the lockout or tagout devices.
- Energize the machine or equipment and proceed with testing or positioning.
- De-energize all systems and reapply energy control measures to continue the servicing, maintenance, or inspection in accordance with the specific written procedure for that equipment.

4.5. Lock or Tag Removal by Others

When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the Project Manager or PSO if specific procedures and training for such removal have been developed, documented and incorporated into the equipment's energy control procedure.

The Project Manager is responsible for developing the specific procedure that provides equivalent safety to the removal of the device by the authorized employee who applied it. The employee, in coordination with the Project Manager or PSO, must:

- Verify that the authorized employee who locked out the equipment is not available or on the site.
- Making all reasonable efforts to contact the authorized employee to inform him/her that his/her lockout/tagout device will be removed from the machine.

- Visually confirm that all employees, tools, and materials are clear of the equipment.
- Remove the lock.
- Make sure the authorized employee is notified that his/her lock has been removed before he/she resumes work at the facility.

4.6. Group Lockout/Tagout

When more than one staff member or more than one employer services, maintains, or inspects machines or equipment covered by this procedure, they shall use a procedure that affords each worker a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device. The following procedures must be implemented to provide protection for all employees:

The Project Manager or PSO shall designate a "primary" authorized employee, who is responsible for the any of the employees working under the protection of the group lockout device. The "primary" authorized employee is to ascertain the exposure status of each individual member participating in the group lockout. This ensures continuity of protection for each individual in the group. In addition, this "primary" authorized employee is responsible for notifying affected employees before and after lockout procedures are performed.

Each authorized employee must place his/her own personal lockout/tagout device on the energy isolating device and shall remove his/her own devices when he/she stops working on the machine or equipment.

When an energy isolating device can not accept multiple locks, a multiple tagout system must be used.

4.7. Shift or Personnel Change

Specific procedures shall be developed and used if shift or personnel changes require the continuity of lockout or tagout to remain unbroken. These procedures shall include provisions for the orderly transfer of lockout or tagout device protection between off-going and oncoming employees minimizing the potential exposure to hazards from the unexpected energizing or start- up of the machine or equipment, or the release of stored energy.

If a lockout/tagout procedure will extend into the following shift, the authorized employee who originally placed his/her personal lock must remove it. The lock must

immediately be replaced with the personal lock of the next authorized employee to continue the repair or maintenance on that equipment or machine.

4.8. Cord and Plug Connected Equipment

The following procedures are used when servicing or maintaining cord and plug equipment:

- Unplug equipment from its electrical socket.
- Place a lockable cover over the plug and lock the plug cover during the machine/equipment servicing and/or maintenance. This is necessary unless it is possible to maintain exclusive control of the equipment.
- Ensure that all other forms of hazardous energy are also locked out.

4.9. Outside Contractors

Whenever subcontracted servicing, maintenance, or inspection personnel are to be engaged in activities that may expose Malcolm Pirnie employees to hazardous energy sources, each shall inform the other of their respective lockout/tagout procedures. The guidance for subcontractor procedures is as follows:

- Obtain and review a copy of any vendor's or subcontractor's lockout/tagout procedures. These procedures must meet or exceed OSHA standards. This review should be completed by both the Project Manager and the PSO.
- Project Manager or PSO is required to ensure that Malcolm Pirnie employees understand and comply with the responsibilities of the subcontractor's lockout/tagout procedures.
- The subcontractor is to be provided with a copy of Malcolm Pirnie's written Electrical Safety/Lockout/Tagout Program, which includes all of the lockout/tagout procedures developed for the equipment to be serviced.
- If the subcontractor's employees encounter a Malcolm Pirnie lockout device, which prevents them from continuing their work, the subcontractor's employees shall make no attempt to remove, tamper with, or bypass the lockout device. The subcontractor is required to contact the Malcolm Pirnie Project Manager or PSO and make arrangements to have the lockout/tagout device removed in accordance with Malcolm Pirnie lockout removal policies.

4.10. Tag Limitations

The use and limitations of lockout tags are discussed in the training provided to the authorized, affected, and other employees. The following information points out the limitations of tags:

- Tags are warning devices affixed to energy isolating devices and do not provide the physical restraint that is provided by a lock.
- When a tag is attached to an energy isolating device, it is not to be removed without the express consent of the authorized person responsible for it. It is never to be bypassed, ignored, or otherwise defeated.
- In order to be effective, tags must be legible and understandable by all of the authorized, affected, and other employees whose work operations are, or may be, in the area.
- Tags and their means of attachment must be made of materials that will withstand the environmental conditions encountered in the workplace.
- Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program.
- Tags must be securely attached to energy isolating devices so that they can not be inadvertently or accidentally detached during use.

4.11. Lockout/Tagout Precautions

Observe the following precautions during implementation of lockout/tagout procedures:

- Pulling fuses is not a substitute for locking out. A pulled fuse does not guarantee that the circuit is dead. Even if it were dead, it is possible for someone to replace the fuse and energize the machine/equipment.
- Locking out one source of power to a machine may not be enough. Many machines use a combination of energy sources, electrical and pneumatic, steam and hydraulic, etc. In such cases, be aware of any auxiliary energy sources and ensure that they have "zero energy" potential by blocking elevated rams, bleeding hydraulic lines, etc.
- Employees should not be expected to guess which controls apply to which machines, or to have to trace piping or wiring to find the correct main controls. All disconnects or valves should be clearly marked. This is especially important when controls are far from the equipment or on master panels that contain several controls.
- Intermittently operating equipment, such as pumps, blowers, fans, and compressors, may seem harmless when dormant. Do not assume that equipment, which is not functioning, will stay that way - lock it out!
- No job is too small to merit locking out. Do not yield to the temptation to bypass lockout procedures because they seem to be unimportant nuisances, it can cost lives! Always lockout machinery when the job requires it. Employees must protect themselves and their fellow workers from unnecessary risks.

5.0 ENERGIZED EQUIPMENT ISSUES

Only qualified persons may work on electric circuits or equipment that is not deenergized. Qualified persons are able to work safely on energized equipment and are familiar with the proper use of precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

Malcolm Pirnie employees are not considered by the company to be a "qualified person", however, Malcolm Pirnie employees may work in areas where equipment is energized and therefore they are defined as "unqualified" persons for the purposes of complying with the OSHA Electrical Safety Standards (OSHA 29 CFR 1910.332, 333).

5.1. Overhead Lines

When work activities are near overhead lines, the lines will be deenergized and grounded, or other protective measures shall be provided prior to commencement of work activities. If the lines are not deenergized, it is necessary to prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment by using protective measures such as guarding, isolating, or insulating.

5.2. Unqualified Employees

If an unqualified employee is working in an elevated position near overhead lines, the employee (and the longest conductive object he/she may contact) cannot come closer than 10 feet to any unguarded, energized overhead line with a kilovoltage (kV) of 50 kV or less. For every 10 kV over 50 kV, the unqualified employee (or longest conductive object) cannot come any closer than 10 feet plus an additional 4 inches for each 10 kV over 50 kV.

5.3. Vehicles and Mechanical Equipment

Any vehicle or mechanical equipment will be operated by the subcontractor so that none of its parts are operated closer than 10 feet from those lines. If the overhead line voltage is over 50 kV, the equipment clearance will be increased 4 inches for every 10 kV over 50 kV. This clearance requirement may be reduced in accordance with requirements outlines in 29 CFR 1910.333(c) (3) (iii) (A).

Employees on the ground near a vehicle or mechanical equipment that could come in contact with an energized overhead line will not come in contact with the vehicle or equipment and will stay at least 10 feet away from such a vehicle. If the employee is wearing adequate protective equipment or if no uninsulated part of the equipment could

come closer to the over head line than the permitted clearance values (reference 29 CFR 1910.333(c) (3) (iii)), only then is it acceptable for the employee to come in contact with the vehicle or equipment.

If a vehicle or mechanical equipment has been grounded, employees will not stand at the grounding location whenever there is a chance of overhead line contact. Barricades, insulation, or other additional precautions will be taken to protect employees from hazardous ground potentials.

5.4. Underground Utilities

When planning intrusive work in the public right-of-way, arrangements will be made to contact the local Call-Before-You-Dig number the requisite number of days prior to the start of work. If the intrusive work is to be done on non-residential private property, the utility mark out service will typically mark out the utilities from the main line to a point along the property line at the edge of the public right-of-way. Mark outs on the property must be conducted using private utility mark out companies.

If a Malcolm Pirnie employee will not be present during a subcontractor's intrusive activities, then the Subcontract should be modified to make the subcontractor responsible for the utility mark out.

As-built drawings on industrial sites, utility properties and military bases should be considered starting points for a sub-surface utility mark out but the accuracy of these documents is often questionable.

The Project Manager should consider the addition of higher level subsurface scanning technology to the Project Plan for disturbed areas where little or no subsurface information is available or if the use of non-metallic pipe or conduit is suspected.

Hand digging to a depth of 7 feet may be warranted in some instances and should be considered.

5.5. Illumination of Work Areas

Adequate illumination is required for all work areas containing exposed energized parts. If adequate illumination is not available, then employees will not perform any work activities near the energized parts until adequate lighting is made available.

5.6. Confined or Enclosed Work Areas

If an employee is working in a confined or enclosed space that contains exposed energized parts, Malcolm Pirnie will provide protective shields, barriers, or insulating

materials that will prevent the employee from accidentally coming into contact with the energized parts.

5.7. Conductive Materials and Equipment

If an employee is handling conductive materials and equipment, the employee will perform work activities in a manner that ensures that the equipment will not come in contact with exposed energized parts. When handling long dimensional conductive objects in areas with exposed energized parts, Malcolm Pirnie will institute work practices (such as the use of insulation, guarding, and material handling techniques) in order to minimize the hazard.

5.7.1. Portable Ladders

When a Malcolm Pirnie employee will use a portable ladder in an area that could result in the contact with exposed energized parts, the portable ladder will have nonconductive side rails.

5.7.2. Conductive Apparel

Malcolm Pirnie employees will not wear conductive clothing or jewelry (e.g. watch bands, bracelets, rings, key chains, metalized aprons, metal headgear) if they might come in contact with exposed energized parts. These articles may be worn if they are covered, wrapped, or insulated so that they are not longer conductive.

6.0 PROTECTIVE MATERIALS AND HARDWARE

Project managers will make available locks, tags, chains, wedges, key blocks, plug blocks, adapter pins, self-locking fasteners, or other hardware for isolating, securing or blocking of machines or equipment from energy sources. Arrangements should be made in advance to use any specialized lockout devices configured specifically for an owner's equipment. Lockout devices and tagout devices shall be singularly identified, shall be the only device(s) used for controlling energy, shall not be used for other purposes, and shall meet the requirements stated in the following sections.

6.1. Durability

Lockout and tagout devices should be chosen to withstand the environment for the maximum period of exposure. Tagout devices shall be constructed and printed so that exposure to weather conditions or wet and damp locations will not cause the tag to deteriorate or the message on the tag to become illegible.

Tags shall not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

6.2. Standardization

Lockout and tagout devices shall be standardized within the facility by color, shape, or size. In addition, the print and format of tagout devices shall be standardized.

6.3. Substance

Lockout devices shall be substantial enough to prevent casual removal without the use of excessive force or unusual techniques, such as using bolt cutters or other metal cutting tools.

Tagout devices, including their means of attachment, shall be substantial enough to prevent inadvertent or accidental removal. The means of attachment of tagout devices shall be non-reusable, attachable by hand, self-locking, and non releasable with a minimum unlocking strength of 50 pounds. The means of attachment should have the general design and basic characteristics equivalent to a one-piece nylon cable tie.

6.4. Identifiable

Lockout devices and tagout devices shall show the identity of the employee applying the device(s).

Tagout devices shall warn against the hazardous conditions of energized machines or equipment and shall include a legend such as the following: Do Not Start, Do Not Open, Do Not Close, Do Not Energize, Do Not Operate.

7.0 PROGRAM INSPECTION

Project Managers will arrange through the PSO, an inspection of the energy control program at reasonable periods in relation to project duration, but not less than once annually (as required by 29CFR 1910.147 (c) (6)), to observe the proper use of the energy control procedures.

7.1. General Inspection Procedures

Comprehensive inspections are performed by the PSO or the SBU Health and Safety Leader as required by 29CFR 1910.147 (c) (6). These inspections are to verify that the current lockout/tagout procedures are effective and performed correctly by all authorized

personnel. Any deficiencies observed in the procedures must be identified and corrected. These inspections must meet the following requirements:

- Authorized employees, other than the one(s) using the energy control procedures, are to perform the inspections. The authorized employee performing the inspection will observe the authorized employee who normally performs the procedure being inspected.
- Each lockout/tagout procedure must be included in the inspection. A procedure, which is used on multiple pieces of equipment, will only need to be inspected on one piece of equipment.
- Procedures are reviewed with all authorized employees for each lockout/tagout location. Inspectors must personally verify that each authorized employee knows his/her responsibility under each of the procedures they are authorized to perform.

Where lockout/tagout is used for energy control, the inspection protocol requires that the inspector review each authorized and affected employee to verify that they understand their responsibilities under the procedure being inspected.

Results of the inspections are recorded. Records of inspections will include the identity of the machine or equipment that was inspected, the date of the inspection, the authorized employees included in the inspection, and the inspector's name. Deficiencies are noted, action items are assigned to specific individuals, dates for completion assigned, and deficiencies are closed out as completed.

A copy of the initial inspect results and the final close out report will be kept in the permanent project file and one copy should be sent to Health and Safety, COR, for review and record retention.

Program, procedural, equipment and management change will be implemented by the Project Manager to correct any deviations or inadequacies identified by the inspection.

7.2. New Equipment and Facility Modifications

Newly purchased equipment must be reviewed by the Project Manager and the PSO prior to the purchase, to ensure it can be locked out.

Whenever existing machinery or equipment is modified, it is necessary to ensure that the modifications do not inhibit the use of lockout devices. Existing machinery and equipment may occasionally have to be modified in order to accommodate lockout devices.

8.0 TRAINING

Project Managers shall arrange for energy control training of project staff. Basic electrical safety/lockout/tagout training is provided periodically as part of the Hazardous Waste 8-hour refresher training classes offered at each office. Project specific briefings may be offered in a brief classroom or site toolbox type setting. The training will include information on the purpose and function of the energy control program and provide staff with the knowledge and skills required for the safe application, use, and removal of the energy controls.

8.1. Training Requirements

All lockout/tagout training shall include the following:

- Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
- Each affected employee, who faces a risk of electric shock, shall be instructed in the purpose and use of the energy control program and about the prohibition relating to attempts to restart or re-energize locked out or tagged out machines or equipment, and safe clearance distances from energized equipment.
- When tagout systems are used, employees shall be trained in the limitations of tags.

8.2. Employee Retraining

Retraining shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment, or processes that present a new hazard, or when there is a change in the energy control procedures. The retraining shall reestablish staff proficiency and introduce new or revised control methods and procedures, as necessary.

Additional retraining shall be conducted whenever a periodic inspection reveals, or whenever the project manager finds, that there are deviations from, or inadequacies in, the employee's knowledge or use of the energy control procedures.

Project Managers are accountable for the completion and periodic updating of staff training. All electrical safety/lockout/tagout training will be documented. Notice of training/retraining shall be sent to the Administrator, Health and Safety, COR, who will issue the appropriate certificate to the employee. The certificate shall contain each employee's name, the dates of training, and a summary of training content. A copy of the

certificate will be maintained in the office health and safety file in the employee's assigned office.

9.0 RECORDKEEPING

9.1. Lockout/Tagout Documents

The Project Manager and PSO will maintain equipment specific lockout/tagout procedures for the duration of onsite work activities.

Records of inspections will be kept in the permanent project file and one copy will be retained by the Health and Safety, COR, for the duration of onsite work activities.

9.2. Training Records

Individual training certificates will be maintained in the local office Health and Safety files. The Manager, Health and Safety, COR, will maintain a copy of all corporate exposure control training records. A summary record will be maintained by Health and Safety, COR on PeopleSoft and will be updated according to the schedule established in the Health and Safety Training section of this manual.

The training records maintained in the local office file will include the following information:

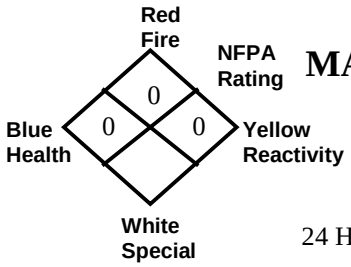
- The dates of the training sessions.
- The contents or a summary of the training sessions.
- The names and qualifications of persons conducting the training.
- The names and job titles of persons attending the training sessions.

Training records shall be maintained for at least three years from the date on which the training occurred. Upon request, employees will have access to any of his/her training records maintained by the local office and the Manager, Health and Safety, COR.

Appendix G:
MSDS

MALCOLM PIRNIE

Alconox ®



MATERIAL SAFETY DATA SHEET

Alconox, Inc.
30 Glenn Street. Suite 309
White Plains, NY 10603

24 Hour Emergency Number – Chem-Tel (800) 255-3924

I. IDENTIFICATION

Product Name (as appears on label)	ALCONOX
CAS Registry Number:	Not Applicable
Effective Date:	January 1, 1999
Chemical Family:	Anionic Powdered Detergent
Manufacturer Catalog Numbers for sizes	1104, 1125, 1150, 1101, 1103 and 1112

II. HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

There are no hazardous ingredients in ALCONOX as defined by the OSHA Standard and Hazardous Substance List 29 CFR 1910 Subpart Z.

III. PHYSICAL/CHEMICAL CHARACTERISTICS

Boiling Point (F):	Not Applicable
Vapor Pressure (mm Hg):	Not Applicable
Vapor Density (AIR=1):	Not Applicable
Specific Gravity (Water=1):	Not Applicable
Melting Point:	Not Applicable
Evaporation Rate (Butyl Acetate=1):	Not Applicable
Solubility in Water:	Appreciable-Soluble to 10% at ambient conditions
Appearance:	White powder interspersed with cream colored flakes.

IV. FIRE AND EXPLOSION DATA

Flash Point (Method Used):	None
Flammable Limits:	LEL: No Data UEL: No Data
Extinguishing Media:	Water, dry chemical, CO_2, foam
Special Fire fighting Procedures:	Self-contained positive pressure breathing apparatus and protective clothing should be worn when fighting fires involving chemicals.
Unusual Fire and Explosion Hazards:	None

V. REACTIVITY DATA

Stability:	Stable
Hazardous Polymerization:	Will not occur
Incompatibility (Materials to Avoid):	None
Hazardous Decomposition or Byproducts:	May release CO_2 on burning

VI. HEALTH HAZARD DATA

Route(s) of Entry:	Inhalation? Yes Skin? No Ingestion? Yes
Health Hazards (Acute and Chronic):	Inhalation of powder may prove locally irritating to mucous membranes. Ingestion may cause discomfort and/or diarrhea. Eye contact may prove irritating.
Carcinogenicity:	NTP? No IARC Monographs? No OSHA Regulated? No
Signs and Symptoms of Exposure:	Exposure may irritate mucous membranes. May cause sneezing.
Medical Conditions Generally Aggravated by Exposure:	Not established. Unnecessary exposure to this product or any industrial chemical should be avoided. Respiratory conditions may be aggravated by powder.
Emergency and First Aid Procedures:	Eyes: Immediately flush eyes with water for at least 15 minutes. Call a physician. Skin: Flush with plenty of water. Ingestion: Drink large quantities of water or milk. Do not induce vomiting. If vomiting occurs administer fluids. See a physician for discomfort.

VII. PRECAUTIONS FOR SAFE HANDLING AND USE

Steps to be Taken if Material is Released or Spilled:	Material foams profusely. Recover as much as possible and flush remainder to sewer. Material is biodegradable.
Waste Disposal Method:	Small quantities may be disposed of in sewer. Large quantities should be disposed of in accordance with local ordinances for detergent products.
Precautions to be Taken in Storing and Handling:	Material should be stored in a dry area to prevent caking.
Other Precautions:	No special requirements other than the good industrial hygiene and safety practices employed with any industrial chemical.

VIII. CONTROL MEASURES

Respiratory Protection (Specify Type):	Dust mask - Recommended
Ventilation:	Local Exhaust-Normal Special-Not Required Mechanical-Not Required Other-Not Required
Protective Gloves:	Impervious gloves are useful but not required.
Eye Protection:	Goggles are recommended when handling solutions.
Other Protective Clothing or Equipment:	None
Work/Hygienic Practices:	No special practices required

MATERIAL SAFETY DATA SHEET

Date-Issued: 09/25/2000
MSDS Ref. No: 213145
Date-Revised: 02/21/2001
Revision No: 1

Isopropyl Alcohol <50%>

1. PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Isopropyl Alcohol <50%>
PRODUCT DESCRIPTION: Isopropyl Alcohol <50%>
PRODUCT CODE: 213145
PRODUCT FORMULATION NAME: Isopropyl Alcohol <50%>
CHEMICAL FAMILY: Aliphatic Alcohols
GENERIC NAME: 2-Propanol, Isopropanol, IPA

MANUFACTURER

Americhem Sales Corporation
340 North Street
Mason, MI 48854
Contact: Americhem Sales Corporation
Product Stewardship: 517-676-9363
Transportation: 517-676-9363

24 HR. EMERGENCY TELEPHONE NUMBERS

CHEMTREC (U.S.): (800) 424-9300
Canutec (613) 996-6666
Emergency Phone: 800-424-9300

2. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	Wt.%	CAS#	EINECS#
2-Propanol	50	67-63-0	200-661-(
Water	50	7732-18-5	231-791-2

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

PHYSICAL APPEARANCE: Clear, Colorless liquid.

IMMEDIATE CONCERNS: CAUTION! May cause eye and skin irritation.

POTENTIAL HEALTH EFFECTS

EYES: Severe irritation and discomfort. Reversible and/or irreversible corneal damage may occure.

SKIN: No significant effects beyond minor irritation are expected.

INGESTION: Gastrointestinal tract irritation and/or discomfort is possible.

INHALATION: Respiratory tract irritation and/or headaches possible. Significant systemic toxic effects are likely following repeated exposure to high concentrations.

ROUTES OF ENTRY: Absorption, Inhalation, Ingestion

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4. FIRST AID MEASURES

EYES: Immediately flush eyes with plenty of water for 15 minutes. If irritation persists, seek medical attention.

SKIN: Wash exposed area with mild soap and water. Get medical attention if irritation develops or persists.

INGESTION: Do not induce vomiting. Danger from aspirating into lungs exceeds short term toxic effects. Get immediate medical help.

INHALATION: Remove victim from area of exposure. If unconscious, give oxygen. Give artificial respiration if not breathing. Get immediate medical attention.

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5. FIRE FIGHTING MEASURES

FLASHPOINT AND METHOD: ~(53°F)ASTM D56

FLAMMABLE LIMITS: 2 to 12

AUTOIGNITION TEMPERATURE: Not Available

EXTINGUISHING MEDIA: Use dry chemical, foam, or carbon dioxide.

EXPLOSION HAZARDS: Vapor accumulations may flash and/or explode if ignited. Keep ignition sources, open flames, ect., away from thse fumes.

FIRE FIGHTING PROCEDURES: Proper respiratory equipment to protect against the hazardous effects of combustion products is recommended. Water in a straight hose

stream may cause fire to spread and should be used as a cooling medium only.

6. ACCIDENTAL RELEASE MEASURES

SMALL SPILL:

Extinguish all ignition sources and ventilate area. Evacuate all non-essential personnel. Blanket spill with alcohol resistant foam to limit evaporation. Dike area to contain spill and clean up by absorbing on inert absorbent or by other means. Liquid may be flammable even when mixed with water unless heavily diluted (>5:1). Do not flush into sewers or natural waterways.

LARGE SPILL:

Contain material as described above and call the local fire or police department for immediate emergency assistance.

7. HANDLING AND STORAGE

HANDLING:

Use appropriate personal protective equipment as specified in Section 8. Handle in a well ventilated area.

STORAGE:

Store unopened containers under cool, dry and ventilated conditions. Keep away from heat, sparks and flame.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE GUIDELINES:

OSHA HAZARDOUS COMPONENTS (29 CFR 1910.1200)

		EXPOSURE LIMITS					
		OSHA PEL		ACGIH TLV		Supplier OEI	
		ppm	mg/m^3	ppm	mg/m^3	ppm	mg/m^3
2-Propanol	**TWA**	400	980	400	983	NL	NL
	STEL	500	1225	500	1230	NL	NL

ENGINEERING CONTROLS: If current ventilation practices are not adequate to maintain airborne concentrations below the established exposure guidelines, additional ventilation or exhaust systems may be required. Where explosive mixtures may be present, electrical systems safe for such locations must be used.

PERSONAL PROTECTIVE EQUIPMENT

EYES AND FACE: Wear safety glasses with side shields or goggles when handling this material.

SKIN: To prevent any contact, wear impervious protective clothing such as neoprene or butyl rubber gloves, apron, boots or whole bodysuit, as appropriate.

RESPIRATORY: Use NIOSH/MSHA approved respirators when vapors or mist concentrations exceed permissible exposure limits.

PROTECTIVE CLOTHING: Chemical resistant boots, apron, etc. as necessary to prevent contamination of clothing and skin contact.

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9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: Liquid

ODOR: Mild alcohol odor

APPEARANCE: Clear

COLOR: Colorless

pH: Not Available

PERCENT VOLATILE: 100

VAPOR PRESSURE: >10 mmHg at 20°C

VAPOR DENSITY: >1.0 (Air=1)

BOILING POINT: ~(180°F)

SOLUBILITY IN WATER: Complete

EVAPORATION RATE: Not Available

SPECIFIC GRAVITY: 0.89 (water=1) at (68°F)

10. STABILITY AND REACTIVITY

STABLE: YES

HAZARDOUS POLYMERIZATION: NO

CONDITIONS TO AVOID: Exposure to excessive heat, open flames and sparks. Avoid conditions that favor the formation of excessive mists and/or fumes.

STABILITY: Stable

POLYMERIZATION: Will not occur

HAZARDOUS DECOMPOSITION PRODUCTS: Oxides of Carbon when burned.

INCOMPATIBLE MATERIALS: Strong Acids, Alkalies, Oxidizers. Avoid contact with Aluminum, Zinc, or other reactive metals.

11. TOXICOLOGICAL INFORMATION

12. ECOLOGICAL INFORMATION

13. DISPOSAL CONSIDERATIONS

DISPOSAL METHOD: Conditions of use may cause this material to become a hazardous waste as defined by state or federal law. Use approved treatment, transporters and disposal sites.

EMPTY CONTAINER: Keep containers closed when not in use. Do not reuse empty containers.

14. TRANSPORT INFORMATION

DOT (DEPARTMENT OF TRANSPORTATION)

PROPER SHIPPING NAME: Isopropanol

PRIMARY HAZARD CLASS/DIVISION: 3

UN/NA NUMBER: UN1219

PACKING GROUP: II

LABEL: Flammable Liquid

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15. REGULATORY INFORMATION

UNITED STATES

SARA TITLE III (SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT)

311/312 HAZARD CATEGORIES:

FIRE: YES **PRESSURE GENERATING:** NO **REACTIVITY:** NO **ACUTE:** YES **CHRONIC:** YES

313 REPORTABLE INGREDIENTS: None known to be present at 1% or more by weight (0.1% for Carcinogens)

TSCA (TOXIC SUBSTANCE CONTROL ACT)

TSCA REGULATORY: This material or its components are listed in the TSCA inventory.

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16. OTHER INFORMATION

REVISION SUMMARY

Revision #: 1

This MSDS replaces the September 25, 2000 MSDS. Any changes in information are as follows:
In Section 1
Prepared By

HMIS CODES

HEALTH: *2 **FIRE:** 3 **REACTIVITY:** 0 **PROTECTION:** D

MANUFACTURER DISCLAIMER: The information in this MSDS was obtained from sources which we believe are reliable. However, the above information is provided without warranty, expressed or implied, regarding its correctness. The conditions or methods if handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibilty and expressly dislcaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the procuct.

ADDITIONAL MSDS INFORMATION: Treat as an OSHA Class IB Flammable Liquid.

Appendix B

Operation and Maintenance Manual (TAMS Consultants Inc., 1996)

MALCOLM PIRNIE

OPERATION AND MAINTENANCE MANUAL

VOLUME I

GLADDING CORDAGE SITE
SITE 7-09-009

WORK ASSIGNMENT No. D002520-25.0

Prepared for:

New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

Prepared by:

TAMS Consultants, Inc.
300 Broadacres Drive
Bloomfield, New Jersey 07003

MARCH 15, 1996

OPERATION AND MAINTENANCE MANUAL
GLADDING CORDAGE SITE
VOLUME I

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Manufacturer's Catalogs

REMEDIAL SYSTEM INC.: Tray Stripper, Operation, Installation and Maintenance Manual
RSR Industries: Air Stripper Control System, Operation Manual

DAYTON: Utility Unit Heater, Model 3E040C, 5.6KW
GRUNDFOS: Submersible Pump, Model 40S15-5
HAYWARD, Simplex Basket Strainer
HYDROMATIC, Sump Pump, SHEF50
Step Ladder, Assembly Instructions
VALVES

- CHEMTROL, PVC Ball and Check Valves
- KENNEDY, Cast Iron Wedge Valves

WATTS INDUSTRIES, Backflow Preventor
RAYCHEM, WinterGard Self-Regulating Heating Cable
FIAT, Sink
RED LION CONTROLS, Apolo Intelligent Meter Series
DUALLITE, Emergency Lighting Unit
FAIL-SAFE, Exit Light
HONEYWELL, Humidity Controller
SUNNE CONTROLS, Thermostat
ANSUL, Fire Extinguisher
ENCON, Eyewash Station
SQUARE D COMPANY, Panelboard

Electrical Equipment Installed, Specification Sheets

- Emergency Lighting Unit
- Exit Sign
- Outside Security lighting
- Fluorescent Light
- Panelboard Schedule and drawings
- Safety Switches
- Copper Wiring
- Flexible Steel Conduit, Conduit Fittings and Connectors, etc.
- Non-metallic Conduit and Fittings
- Galvanized Steel Conduit and Fittings
- Cast Device Boxes, Cover Boxes

BAKER MONITOR DIVISION, Industrial Pitless Unit
DBI/SALA, Tripod

CONTROLS

DWYER, Pressure Switch, Series 1950
OMEGA, Pressure Transmitters, PX410 and PX615 Series
WARRICK, Controls (Series 16) and Level Electrodes (Series 3W)
SPARLING FLOWMETERS, FM625 Tigermag
RED LION CONTROLS, Apollo Totalizing Counter
AMETEK, Series 90, Annunicator Systems
RACO, Verbatim Gateway, Owner's Manual, (Autodialer)
ALLEN-BRADLEY, SLC 500, Modular Hardware Style, (PLC)
- Installation and Operation Manual

ALLEN-BRADLEY, SLC 500, Analog I/O Modules
- User Manual

OPERATION AND MAINTENANCE MANUAL
GLADDING CORDAGE SITE
VOLUME II - 1

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1.0 INTRODUCTION

1.1 Objective

The objective of the Operation and Maintenance (O&M) program is to confirm the overall effectiveness of the groundwater recovery and treatment system by verifying the following:

- Remediation of the contamination in the aquifer;
- Proper operation of the equipment installed;
- Treated effluent meeting the discharge criteria; and
- Monitoring remediation progress.

The purpose of this Operation and Maintenance Manual is to provide guidance for the effective operation of the air stripper, the performance monitoring to assess site remediation, and the operation and maintenance of the various equipment at the site.

The purpose of the O&M Manual is also to provide operating personnel with a description of the process, an understanding of the unit operations and control parameters involved, and explain the system's start-up, normal unit operation, responses to alarms and shutdown procedures. Operation and maintenance procedures specified by the manufacturers of the following items will also be included in the Manual:

- Submersible well pumps;
- Low profile air stripper;
- Level sensors;
- Pressure transducers;
- Flowmeters;
- Valves;
- Pressure transmitters;
- Pre-engineered building;
- Sump pump;
- Electrical equipment;
- Programmable logic controller; and
- Autodialer.

This O&M Manual consists of three volumes, a Quality Assurance Plan and a Health and safety Plan. Volume I describes the remedial action goals and the O&M procedures. Volume II contains the manufacturer's catalogs and manuals. Volume III contains the As-built drawings.

1.2 Special Site Specific - Safety Warnings

1. Do not use detergents in the treatment building.

2. Follow the requirements of the Health and Safety Plan

3. Be extremely careful when loosening the air stripper tray clips. These are under tension and tend to snap back quickly and may cause injury to the hand if hit by the clip.

2.0 SITE DESCRIPTION

2.1 Site History and Background Information

The Gladding Cordage Site (ID No. 7-09-009) is located in the Town of Otselic, Chenango County, New York. Past disposal practices of solvents at this fishing rope manufacturing facility resulted in the contamination of the local groundwater system with 1,1,1-Trichloroethane (TCA).

On March 31, 1993, the NYSDEC issued a Record of Decision (ROD) for the Gladding Cordage Site. The ROD presented the remedial actions selected by the NYSDEC as being the most appropriate for the site based on findings of the RI/FS. The major components of the selected remedy are as follows:

- Recovery of contaminated groundwater from a groundwater recovery well system;
- On-site treatment of contaminated groundwater using an air stripper;
- Discharge of the treatment system effluent to the Otselic River; and
- Long-term monitoring to determine the effectiveness of the remedy.

The New York State Department of Environmental Conservation (NYSDEC) contracted Dunn Engineering Company (DUNN) and TAMS Consultants, Inc. (TAMS) to provide engineering services for the remedial design and construction management services during implementation of the remedial action for this site. These services are provided under the State Superfund Standby Program Work Assignment No. D002520-25.0.

A Construction Contract was awarded to Allstate PowerVac in August, 1995. The construction project was completed during January 1996. At the end of construction, the responsibility for operation and maintenance was assumed by the NYSDEC.

2.2 Site Hydro-Geology

Site geology, hydrogeology and groundwater chemistry is discussed in detail in the 1989 Preliminary Draft Remedial Investigation Report, Gladding Cordage Company Site, prepared by GHR Engineering Associates, Inc.

Additionally, a groundwater flow study was conducted based upon slug tests done on Gladding Cordage Site wells. A numerical groundwater model is presented as Appendix A in the September 29, 1994 Predesign Study Report, prepared by Rust Environment & Infrastructure.

3.0 GROUNDWATER RECOVERY AND TREATMENT SYSTEM

3.1 Description of the Remedial Action

The Contractor installed an on-site groundwater recovery and treatment system to remediate the volatile organic compounds (primarily TCA) identified as contaminants of concern in the RI/FS. The major components of the project consisted of the following:

- **Groundwater Recovery System**: The construction of the system included the modification of two existing groundwater recovery wells and the installation of pitless adapters, submersible pumps, manholes, piping and appurtenances. Two submersible pumps (Grundfos Model 40S15-5) were placed in the two existing eight-inch diameter groundwater recovery wells RW-1 and RW-2. Both wells were equipped with pressure transducers to monitor water levels and pressure transmitters to monitor pipe pressures. The pressure transducers record the water levels in the recovery well and control the operation of the submersible pumps within the wells. Groundwater will be pumped at a rate of about 38 gpm from RW-1 and about 29 gpm from RW-2.

  The extracted groundwater is directly conveyed to the air stripper for treatment via a network of pressure mains. Two- and three-inch diameter, Schedule 40 Polyvinyl Chloride (PVC) pipes were utilized for the pressure mains. The pressure mains were installed in trenches, approximately five-foot wide by 6.5-foot deep. Pipes were laid six feet below grade to prevent pipe freezing on a cushion sand layer within the trench. The pressure mains were supplied with flowmeters, valves, heat trace tape and fittings for the normal operation of the system.

- **Groundwater Treatment System**: The groundwater treatment system consists of a low profile air stripper, located inside a pre-engineered building.

  A prefabricated low profile air stripper, as manufactured by Remedial Systems, Inc. was installed. The design parameters for the air stripper were as follows:

  - Flow Rate: 100 g.p.m.
  - Contaminant of Concern: TCA
  - Influent Concentration: 500 ppb
  - Effluent Concentration: < 1 ppb
  - Off gas Loading Rate: < 0.1 pounds per hour (lb/hr)

  A pre-engineered building as manufactured by Parkline NorthEast Inc. is used to house the influent sampling manifolds, the air stripper, process instrumentation and controls, an effluent discharge pipe, and a storage cabinet. The building is 24 ft long, 16 ft wide and 10.5 ft high with a pitched roof. The facility is provided with lighting, ventilation, heating, electrical power, water, a utility sink, and a sump pit.

Additionally, a louvered air intake duct was installed on the leeward side of the building exterior to serve as an air source for the air stripper blower.

Off gas generated during air stripping is released into the atmosphere via a ten-inch diameter PVC air exhaust stack. The stack is erected perpendicular to the roof and extended 3.0 feet above the ridge of the building. A removable section of the air exhaust stack between the air stripper exhaust outlet and the ceiling is installed to facilitate the periodic cleaning of the air stripper trays. The air exhaust stack is equipped with an exhaust air sampling port.

A potable water service is provided to the treatment building. A 3/4" diameter copper pipe is tapped into an existing public water supply pipe at the site. The water service line conveys potable water to the treatment building. This water maybe used for periodic cleaning of the air stripper and hand washing. Detergents cannot be used for hand washing. The water service is buried five feet below grade in a trench. A minimum of five feet of spacing is maintained between the water service line and the groundwater pressure main. A backflow preventer and accessory valves are housed in a precast concrete box installed near the water tap connection to prevent contamination of the existing public water supply line through the water service line into the site. Insulation and heat tracing is installed to prevent freezing.

- **Effluent Discharge System**: Treated effluent is discharged by gravity to an outfall structure in the Otselic River via a four-inch and a six-inch diameter PVC discharge pipe. The outfall structure consists of reno-mattresses arranged in a stepped configuration.

3.2 Goals of the Remedial Action

The goal of the remedial action is to reduce the contamination in the aquifer and enhance the natural degradation of the plume. Attempting to remediate the entire plume was not considered practical due to the extent of the plume, the low concentrations downgradient of the site and the extensive pumping requirements.

The effectiveness of the short term pump and treat system will be monitored by sampling selected monitoring wells on-site on a yearly basis. The New York State ambient groundwater quality standard for TCA is 5 ug/l as outlined in the TOGS memo 1.1.1, dated October 22, 1993. After five years, the NYSDEC will evaluate the effectiveness of the system in achieving the goal and will decide if further treatment is required.

4.0 MONITORING, TESTING AND RECORDS

4.1 Start up

The treatment system was operated by the Contractor for a one month period. This was referred to as the Start up period. During this time the Contractor operated the system to verify that the system operated and performed as designed. The Contractor was required to conduct a continuous 60 hour test to verify that the system could operate over an extended period of time. The Contractor successfully completed this test.

4.2 Start up Monitoring Program

As part of start up, a start up monitoring program was conducted. This program was conducted to confirm the effectiveness of the air stripper and to verify that the effluent discharge criteria were achieved. The effluent limitations and monitoring requirements as specified by the Division of Water are included in Attachment 1. The program consisted of sampling both the influent into and effluent from the air stripper. A sample was taken from each recovery well and a sample was taken from the combined stream and analyzed for VOCs and inorganics (iron and manganese only). The effluent sample was analyzed for the same parameters. There were no exceedances of the discharge limitations. The average influent concentration of TCA was 126 ppb. The effluent concentration of TCA was non detect at the method detection limit of 0.4 ppb. Assuming an effluent concentration of 0.4 ppb for TCA, the removal efficiency of the air stripper is 99.68%. A tabulation of the analytical results obtained during start up as well as historical analytical results are enclosed in Attachment 2.

4.3 Effluent Discharge Monitoring Program

The effluent shall be sampled for TCA on a weekly basis for the first 24 weeks of operation in accordance with the effluent limitation and monitoring requirements, see Attachment 1. If there are no exceedences in the first 24 weeks of operation, then the frequency of sampling for TCA may be reduced to monthly. The effluent shall be sampled for DCA and TCA on a monthly basis with sampling for Iron and Manganese on a quarterly basis. The sampling procedures and analytical requirements are outlined in the Quality Assurance Plan, as prepared by RUST. The analytical results obtained should be tabulated and kept on file for easy reference.

4.4 Influent Monitoring

Quarterly sampling of the influent wells (RW-1 and RW-2) should be performed to measure the actual concentration of contaminants in the groundwater that the air

stripper is treating. These samples shall be analyzed for VOCs , iron and manganese. The results from this sampling shall be used to document and record the changes in recovery well contamination over time and to monitor the removal efficiency of the air stripper. The analytical results obtained should be tabulated and kept on file for easy reference.

4.5 Effectiveness Monitoring

Selected monitoring wells on site should be sampled on a yearly basis for the first five years. These samples shall be analyzed for VOCs , iron and manganese. The purpose of this sampling is to document and record the temporal change in TCA concentrations in the aquifer and to monitor progress towards the clean up goals. The analytical results obtained should be tabulated and appended to the tables shown in Attachment 2.

4.6 Water Level Measurements

Water level measurements shall be taken during the yearly monitoring well sampling (effectiveness monitoring). The purpose of these measurements is to document and record the drawdown around each pumping well. Attachment 3 contains the elevation of the monitoring well casings on site.

4.7 Recording Keeping

The treatment plant operator should visit the site on a weekly basis to verify that the treatment system is performing properly. During each visit to the site the operator should complete the "System Operation Tracking Form", enclosed. Copies of the form are contained in a three ring binder labeled "Air Stripper Operation Log Book" located adjacent to the door inside the treatment building. This form is used to document the readings displayed on the control panel. Any damage to the treatment building or to the treatment system shall be recorded in the comments column.

A second form to be completed is the Alarm Tracking Form. This form is to be completed by the operator when the autodialer alerts him of an alarm condition on site. This recording of alarms would help to determine if the same alarm condition occurs frequently which can be useful in diagnosing a particular problem. This form should be completed as soon as the operator receives an alarm message from the autodialer.

5.0 SITE MAINTENANCE

5.1 Periodic Inspection and Routine Maintenance

Maintenance is an essential key to efficient operation. It keeps the system running efficiently as intended by the design. By performing preventive and corrective maintenance on a regular and necessary basis, the failure frequency of equipment, and in turn the overall O&M costs, can be reduced.

Therefore, weekly and monthly inspections of the treatment system should be performed to observe system performance and any equipment wear, excessive vibration, improper heating, etc. A detailed maintenance schedule in included in Table 2.

5.2 Alarms and Responses

The autodialer will dial out if any of the 16 alarms conditions occur at the site. A detailed response to each alarm condition is shown on Table 1. The alarms should be recorded as outlined previously.

5.3 Waste Disposal

Small amounts of waste may be generated during the periodic cleaning of the groundwater recovery and treatment system. This waste should be stored in a 55-gal drum or equivalent and stored inside the building. The waste should be sampled for waste disposal characteristics. It is assumed that this will be TCLP sampling for solids. If the results indicate non-hazardous, then this material may be disposed off at a municipal solid waste landfill. However, additional testing maybe required by the disposal facility.

Personal protective equipment (PPE) may be decontaminated on-site. This may be accomplished by manually washing the PPE followed by a potable water rinse. The sink inside the building may be utilized for this activity. Once decontaminated the PPE may be disposed at a municipal solid waste landfill.

5.4 Treatment Building

The treatment building contains a roof vent and an adjustable wall louver. The operation of the roof vent is controlled by a thermostat and a humidistat. The purpose of the roof vent is to draw air from the exterior through the treatment building and thus cooling the building. During summer months it is expected that the roof vent will be activated by either the thermostat or by the humidistat. The settings on the thermostat is 85°F and 60% relative humidity. Therefore, during summer months the adjustable wall louver should be opened.

However, during the cold winter months, the adjustable wall louver should be closed and the roof vent register covered to prevent excessive heat loss from the building.

5.5 Miscellaneous Equipment

Certain equipment that the operator may need during operation and maintenance of the treatment system was specified in the contract documents and supplied by the Contractor. A list of this on site inventory is included in Table 3.

5.6 Roll-up Door

The roll up door is motor driven. However, during manual operation with the chain care must be taken to follow the instructions that are posted on the motor.

6.0 SITE SPECIFIC PROCEDURES

This section outlines some site specific procedures.

6.1 Normal Start Up Procedures.

1. Make sure the control panel has power. The displays should have readings visible. Check the alarm indicators by pressing the lamp test button. Then press the reset button.

2. Check that none of the influent valves are closed. Some may be partially closed to regulate the flow rate.

3. Check that the effluent valve to the river is fully opened and that the effluent valve adjacent to the building sump is closed.

4. Check that all the selector switches are in the "OFF" position.

5. Turn both well pump selector switches to the "AUTOMATIC" position. Note that the well pumps will not start as the blower is not operating.

6. Turn the blower selector switch to the "AUTOMATIC" position. This will start the blower. The green light indicating that the blower is running will light. After two minutes the pumps will start and the green light will light.

7. Check the flow rate for RW-1 and RW-2. The flow rate from RW-1 should be less than 40 gpm and the flow rate for RW-2 should be less than 30 gpm. The flow rate can be adjusted by closing or opening the 2" PVC ball valve adjacent to the flowmeter.

6.2 Normal Shut Down Procedures.

This procedure should be performed prior to restarting the system after the system has been shut down due to an alarm condition.

1. Turn both well pump selector switches to the "OFF" position. The green light will go off if the pumps were operating.

2. Turn the sump pump selector switch to the "OFF" position.

3. The blower will continue to operate for another five minutes after the well pumps have been turned off. When the blower stops automatically then turn the blower selector switch to the "OFF" position.

4. To restart the system follow the procedures outlined previously.

6.3 Procedure for Sampling the Influent and Effluent Inside the Treatment Building.

This procedure is in addition to the procedures outlined in the QA Plan. The QA Plan should be reviewed in conjunction with the reading of this procedure.

There are four water sampling ports located within the treatment building. Three of the sampling ports are located on the influent pipes into the air stripper and the other sampling port is located on the discharge pipe near the bottom of the air stripper sump.

These sample ports consists of ¼" petcock valves with a reducer nipple. Prior to sampling, the petcock valve should be opened for 10 seconds to drain any stagnant water from the valve. This water should be collected and discharged into the sump in the building for later treatment by air stripping.

For VOCs sample collection, the petcock valve should be opened slowly until steady flow is obtained. **Do not open fully as this will cause turbulent flow from the sample port thus causing loss of VOCs**. Once steady flow is obtained, fill two 40 mil. glass vials. For the inorganic sample collection, the petcock valve maybe opened fully.

6.4 Procedure for Removing the Treatment Building Sump Pump

This procedure is to be utilized in the event that the sump pump requires servicing.

1. Turn the sump pump selector switch to the "OFF" position on the control panel and unplug the sump pump power cord from outlet above the RW-1 inlet ball valve.

2. Carefully remove the metal grating from sump pit not disturbing the level sensor wiring.

3. Loosen and disconnect the 1½" union coupling located just above the sump grate.

4. Remove any duct tape which is holding the level sensor rod to the 1½" PVC pipe.

5. Remove the level sensor assembly (metal rod & level sensors) by cutting the electrical ties which are holding the metal rod to the 1½" PVC pipe. The level sensors (Warrick) are attached to the metal rod. **Do not remove the**

level sensors from the metal rod. The goal is to remove the entire assembly (metal rod & level sensors).

6. Set the level assembly on the floor adjacent to the wall.

7. Lift up sump pump and attached piping utilizing the rope attached to the handle.

Reinstallation

1. Reverse above procedure as follows; place pump in the sump and connect the 1½" PVC union.

2. Reinstall level sensor assembly. Align the top of metal assembly rod with black reference mark on PVC pipe. **Ensure that the metal rod does not touch any metal part of the pump.** Secure the top of the rod to the 1½" PVC pipe with duct tape. Secure the remainder of the metal rod to the 1½" PVC pipe with electrical ties.

3. When reinstalling sump pit grate, ensure that the grate does not touch the metal rod or snag the wiring.

4. Connect electrical cord to the outlet.

5. Turn the sump pump selector switch to the "AUTOMATIC" position. Test pump operation by filling the sump pit with water from the sink. Check that the blower selector switch is in the "AUTOMATIC" position. As the water reaches the high level sensor (middle sensor), the sump pump should be activated automatically.

Maxim

6.5 Procedure for Removing the Submersible Well Pumps

Equipment: Excavator or drill rig or crane (for lifting)
Rope or cable
Two large pipe wrenches
Various small wrenches

Review the As-built construction, pitless unit and submersible pump drawings.

1. Turn off and tag out the circuit breakers for the well pumps.

2. Unbolt flange bolts on the pitless adapter and remove cover.

3. Lift out the electrical junction box and electrical wires and set beside the pitless unit.

3. Loosen the set screws on the spider tie down

4. Using a rope or other suitable lifting device, tie to the spider tie down and begin lifting slowly. Care must be taken to keep the pipe centered as lifting progresses. Be careful not to pinch the electrical or control wires.

5. Lift the assembly at least 12 ft in the air. Clamp the 2" SS pipe to the top of the pitless unit to prevent it from falling into the well. Unscrew the spool assembly from the 2" SS pipe. Lift the 2" SS pipe a further 12 ft in the air. Reclamp to the top of the pitless unit housing. Repeat procedure until the pump has been extracted from the well.

6. Reverse the procedure to reinstall the pump.

7. As the pump is lowered into the well, tie the electrical cable to the 2" SS pipe using electrical ties as each section is lowered.

8. After the spool assembly is connected to the last section of 2" SS pipe, make sure that the O-ring seal is clean and remember to apply petroleum jelly to the O-ring.

9. Continue to lower the pump into the well until the spool assembly seats itself in place.

10. Tighten the set screws on the spider tie down and replace the electrical junction box.

6.6 Procedure for Air Stripper Cleaning

Interval: minimum every 6 months, maximum yearly, unless air stripper sump magnahelic pressure gauge read 25 inches or greater.

1. Prior to cleaning the stripper, ensure that the building floor sump is empty, if not it can be be pumped into stripper for treatment

2. Turn both well pump selector switches and the sump pump selector switch to the "OFF" position. The blower motor will shut off automatically after five minutes. If there is water in the bottom of the air stripper sump, turn the blower selector switch to the "MANUAL" position. This will turn on the blower motor. When all of the water has been removed from the air stripper sump turn the blower selector switch to the "OFF" position.

3. Turn power off to the control panel.

4. Place the air stripper sump drain hose into the building floor sump and open the drain valve.

5. Starting at top tray, remove the clean out port opposite the downcomer. Insert nozzle of pressure washer and move side to side, washing sediment towards the downcomer. Inspect tray for cleanliness and continue washing remaining trays in a similar fashion.

6. Remove blower inlet duct (blue) located in center of the air stripper sump. Insert pressure washing nozzle and wash bottom of the previous tray and then wash the air stripper sump walls and bottom. Inspect and reclean, if necessary.

7. Reinstall clean out ports and blower inlet duct. Close the air stripper sump drain valve.

8. Process the water collected in treatment building floor sump through the air stripper. This can be accomplished by turning the blower selector switch to the "MANUAL" position. Then turn the sump pump selector switch to the "MANUAL" position. The sump pump will pump the water from the sump into the air stripper for treatment. Any accumulated sediment will be removed by the basket filter. Collect and containerize the sediment in the basket filter.

9. After the building floor sump has been emptied, turn all selector switches to the "OFF" position.

10. Restart the treatment system using the normal start up procedure described earlier.

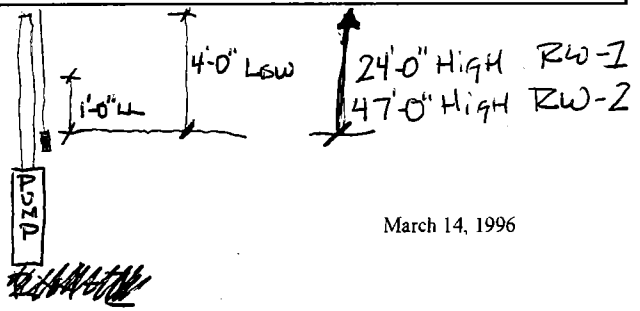
TABLES

Table 1: Response To Alarms From The Autodialer

Press the silence button on the Control Panel or "9" on the telephone to acknowledge an alarm.

Press the Reset on the Control Panel to reset the alarm condition. Please note that the condition causing the alarm must be remedied prior to restarting the system on automatic.

ALARM NO. & DESCRIPTION	*POSSIBLE CAUSES OF THE ALARM*	*RESPONSE TO THE ALARM*
Alarm No. 1 Well No.1: Low Level	The water level in RW-1 has been drawn down to low low level (one foot above the transducer), thus causing the pump to shut off. This is an alarm condition as the pump should have shut off at the low level setting (four feet above the transducer).	Determine why the pump failed to stop after the water level reached the low level set-point. The alarm can be reset once the water reaches the low level. The pump will restart when the water reached the high level in the well (47 feet above the transducer for RW-2 and 24 feet above the transducer for RW-1).
Alarm No. 2 Well Pump 1: High Discharge Pressure.	Usually cause by a blockage in the pipe (i.e., a closed value). NB. Goes @ Above 65 psi.	Turn the pump off. Determine the cause of the blockage. Check to see if all the valves are open. Open all valves fully. Reset the alarm. Restart the pump manually. Verify flow by checking the flow rate from the flowmeter. Slowly close the gate valve adjacent to the recovery well until the desired flow is achieved.
Alarm No. 3 Well Pump 1: Low Flow	The PLC has detected that there is low flow in the influent pipes. This may be caused by a partially closed valve, a pipe leak, etc.	Determine the cause. Open all valves fully. Reset the alarm. Restart the pump manually. Verify flow by checking the flow rate from the flowmeter. Slowly close the gate valve adjacent to the recovery well until the desired flow is achieved.



Alarm No. 4 Well Pump 1: Reverse Flow	Reverse flow has been detected by the flowmeter. Possibly caused by a break in the influent line, or a leaking check valve when a recovery well is not pumping. A reverse flow alarm may also occur when the pump is not pumping and is caused by the water remaining in the pipe.	Determine the cause of the alarm. Reset. Start pumps.
Alarm No. 5 Well Pump 1: Motor Failure	Thermal overload in well pump 1. Maybe caused by a binding of the pump impeller by sediment.	Shutdown the treatment system, turn off power to the control panel, open the control panel door, locate and reset the thermal overload reset button for the pump. Close the control panel door. Attempt to restart the pump. If the motor failure alarm goes off again, then the pump will have to be removed from the well to be serviced.
Alarm No.6 Well No. 2: Low Level	Same as for Alarm no. 1 above	Same as for Alarm no. 1 above
Alarm No. 7 Well Pump 2: High Discharge Pressure	Same as for Alarm no. 2 above	Same as for Alarm no. 2 above
Alarm No. 8 Well Pump 2: Low Flow	Same as for Alarm no. 3 above	Same as for Alarm no. 3 above
Alarm No. 9 Well Pump 2: Reverse Flow	Same as for Alarm no. 4 above	Same as for Alarm no. 4 above

Alarm No. 10 Well Pump 2: Motor Failure	Same as for Alarm no. 5 above	Same as for Alarm no. 5 above
Alarm No. 11 Air Stripper Low Air Flow	This may be caused by the removal of or a blockage in the flexible duct from the blower to the air stripper, a blockage in the air intake duct to the blower or that the ¼" polyethylene tubing from the pressure switch to the duct has been removed.	Determine the cause. Reset the alarm. Turn the blower on manually to verify that the blower is working correctly. If working, restart system on automatic.
Alarm No. 12 Air Stripper High Sump Level	Water is unable to flow from the air stripper sump. This maybe caused by a blockage in the effluent pipe (i.e., a closed valve). There maybe insufficient air pressure in the air stripper to force the water out of the sump through the inverted "U." The blower has shut off and water has accumulated in the sump to a level higher than the level of the high high level switch.	Determine the cause. Manually turn on the blower motor to force the water in the sump out of the air stripper. This water maybe diverted into the sump in the building floor for retreatment by air stripping. Reset the alarm once the water level in the air stripper sump is below the high high level sensor. The system may be restarted in automatic mode.
Alarm No. 13 Filter High Differential Pressure	Sediment has accumulated in the filter.	Turn off the sump pump. Remove and clean the filter. Replace the filter Reset the alarm Turn the sump pump to automatic.
Alarm No. 14 Sump Pump Motor Failure	A thermal overload in the sump pump located inside the building. Maybe caused by a binding of the pump impeller by sediment.	Shutdown the treatment system, turn off power to the control panel, open the control panel door, locate and reset the thermal overload reset button for the sump pump. Close the control panel door. Attempt to restart the pump on manual. If the motor failure alarm goes off again, then the pump will have to be removed from the sump pit to be serviced.

Alarm No. 15 Sump Pit High Level	Caused by too much water accumulating in the sump pit. Maybe caused by effluent being discharged to the building instead of to the river, a breakage in the influent lines inside the building or a substantial leak in the air stripper.	Determine the cause. Check if the water has accumulated in the blower impeller. If so, open the bled nut underneath the impeller. Turn the well pumps off. Turn the blower and sump pump on manual to drain the building floor and treat this water by air stripping ensuring that the treated water is discharged to the river. When the sump is drained, stop the sump pump and blower. Restart the system on automatic.
Alarm No. 16 Blower Motor Failure	Thermal overload in the blower motor. Maybe caused by a binding of the blower impeller or motor bearings.	Determine the cause. Open the bled nut underneath the impeller to drain any accumulated water. Try to bump the motor to free the impeller. If this does not work, the impeller assembly may have to be disassembled or the blower motor removed for service. Refer to the Air Stripper O&M manual for further details.

Please note that an initial alarm condition may be the cause of additional alarms. If the well pumps and blower are shut down, water may accumulate in the air stripper sump thus triggering the high high level sensor in the air stripper sump. Additionally, it has been observed that stagnant water in the pipe lines may trigger the reverse flow or low flow alarm conditions. Therefore, it is imperative that the operator responds as soon as possible to an alarm condition and if he is unable to correct the alarm condition that he turns the system off, opens the control panel door and turns off the autodialer. Otherwise, the autodialer will continue to dial out alarm messages until the condition has been fixed.

Table 2: Maintenance Schedule

Item	Frequency	Comments
Heater inside the building	Minimal.	Refer to the Operating Instructions and Parts Manual for troubleshooting.
Submersible Well Pumps	No routine maintenance required.	Refer to the Installation and Operation Instructions Manual for troubleshooting.
Flowmeters	No routine maintenance required.	Refer to the Instruction Data Sheet for troubleshooting.
Differential Pressure Switches (Filter & Blower Fail Safe Switches)	Six months	Drain the vent drain plug. Refer to the Air Stripper O&M Manual.
Blower Motor	Six months	Grease bearings and check operating temperature. Refer to the Air Stripper O&M Manual.
Air Stripper Cleaning	Six months	The air stripper should only be cleaned if the effluent results indicate a necessity for cleaning. The need for cleaning may also be determined by oberving the magnahelic pressure gauge on the air stripper sump. If the pressure readings begin to increase signficiently or are above 25" of water, then this indicates that the air stripper requires cleaning. Refer to the Air Stripper O&M Manual.
Heat trace tape	Once a year at the start of the winter.	Verify that current is flowing. Cold conditions can be simulated by placing ice on the tape and measuring the induced current. Refer to the Air Stripper O&M Manual.

Table 3: Inventory of Equipment Inside The Treatment Building

QUANTITY	DESCRIPTION
1	Ansul Sentry 2-A: 10-B: C Fire Extinguisher
1	Johnson & Johnson; 8161 First Aid Kit
1	Justrite Flammable Liquid Storage Cabinet (Gray)
1	DBI\SALA Lift Tripod & Winch
1	Encon Wall Mount Eyewash Station
1	DBI\SALA Full Body Harness Model #L-2000TS
1	Grundfos 1.5 hr. Well Pump Model #40S15-5
1	105 Pc. Tool Kit (to be provided) ✓
2	Pipe Wrenches (to be provided)
1	Bell South Model 473E Phone (Black)
1	Platform Steel Stepladder
1	6 Ft. water valve wrench
1	18" Pull Hook for Manhole Cover
1	30" Pull Hook for Manhole Cover
1	Flushmount Monitoring Well Opening Wrench
2	Keys for Flammable Liquid Storage Cabinet
2	Keys for Monitoring Wells
2	Keys for Circuit Breaker Panel
1	Dayton Electric Heater Nos. #3E040C, Ser #59181-06

FORMS

GLADDING CORDAGE SITE: SYSTEM OPERATION TRACKING FORM

		RECOVERY WELL RW-1 READINGS				RECOVERY WELL RW-2 READINGS				TOT. FLOW	TOT. FLOW
DATE	TIME	FLOW RATE	TOTAL FLOW	WATER LEVEL	LINE PRESS.	FLOW RATE	TOTAL FLOW	WATER LEVEL	LINE PRESS	TO-DATE	FROM PREV.
		gpm	GALS (x 10)	FT OF WATER	PSI	gpm	GALS (x 10)	FT OF WATER	PSI	GALS	GALS

COMMENTS:

GLADDING CORDAGE SITE: ALARM TRACKING FORM

NAME OF PHONE CONTACT	TIME	DATE	RECORD ALARM CODE	DETAIL RESPONSE TO CODE; ACTIONS TAKEN, ETC.	SYSTEM RESTART		NAME OF PERSON RESTARTING SYSTEM
					TIME	DATE	
Comments:							

ATTACHMENTS

Attachment 1

Effluent Limitations and Monitoring Requirements

EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning January 1, 1996

and lasting until January 1, 2001

the discharges from the treatment facility to the drainage ditch tributary to the Otselic River shall be limited and monitored by the operator as specified below:

Outfall Number & Effluent Parameter	Discharge Limitations Daily Avg.	Daily Max.	Units	Minimum Monitoring Requirements Measurement Frequency	Sample Type
Outfall 001 - Air Stripper Effluent:					
Flow	Monitor	165,500	gpd	Continuous	Meter
1,1,1-Trichloroethane	Monitor	0.01	mg/l	Weekly[4]	Grab
1,1-Dichloroethene	Monitor	0.01	mg/l	Monthly	Grab
1,1-Dichloroethane	Monitor	0.01	mg/l	Monthly	Grab
Iron, Total	Monitor	0.25	mg/l	Quarterly	Grab
Manganese, Total	Monitor	0.75	mg/l	Quarterly	Grab

Note 1: Discharge is not authorized until such time as an engineering submission showing the method of treatment is approved by the Department. The discharge rate may not exceed the effective treatment system capacity.

Note 2: Only site generated wastewater is authorized for treatment and discharge.

Note 3: Authorization to discharge is valid only for the period noted above but may be renewed if appropriate. A request for renewal must be received 6 months prior to the expiration date to allow for a review of monitoring data and reassessment of monitoring requirements.

Note 4: The minimum measurement frequency for 1,1,1-trichloroethane shall be Monthly following a period of 24 consecutive Weekly sampling events showing no exceedances of the stated discharge limitation . If the discharge limitation for 1,1,1-trichloroethane is exceeded the measurement frequency for this parameter shall again be Weekly, until a period of 8 consecutive sampling events shows no exceedances at which point Monthly monitoring may resume.

Attachment 2

Historical Tabulation of Analytical Results

GLADDING CORDAGE SITE
GROUNDWATER QUALITY DATA
Trichloroethane (TCA) concentrations in Groundwater (ppb)
Table 7.

34 WELLS

Well Id	Nov.-86	Dec.-86	Jul.-87	Jul.-88	Aug.-88	Oct.-88	Jan.-89	Jan.-90	Mar.-91	Dec.-91	May-93	Oct.-93	Jul.-94	Average Concentration since Jan.-90
TW1	5	227	5	ND	4	ND	-	ND	10	ND	-	ND	ND	10*
TW2S	37	497	11	1	10	3	-	ND	39	6	125	6	18	39
TW2I	-	-	-	-	-	11	15	2	16	25	75	ND	20	28
TW2D	0	-	-	-	-	20	14	4	6	26	20	2	8	11
TW3S	263	437	160	26	85	32	34	42	28	48	40	36	25	37
TW3I	-	-	-	-	-	14	21	8	16	32	100	37	33	38
TW3D	-	-	-	-	-	5	5	ND	ND	5	ND	1	3	3
TW4S	178	103	17	7	23	18	18	10	8	175	15	64	22	49
TW4I	11	31	8	11	8	17	38	39	54	97	250	110	90	107
TW4D	-	-				5	6	4	3	9	ND	2	9	5
TW5S	4	475	659	150	422	270	130	59	14	190	40	63	38	67
TW5I	186	243	111	99	116	190	320	180	83	180	500	215	154	219
TW5D	-	-	-	-	-	150	150	120	74	150	300	42	80	128
TW6S	-	-	-	-	-	3	-	ND	ND	ND	ND	2	1	2
TW6I	-	-	-	-	-	ND	-	15	5	20	15	8	6	12
TW6D	-	-	-	-	-	ND	-	ND	ND	ND	ND	ND	ND	ND
TW7S	-	-	-	-	-	79	150	74	10	50	35	57	31	43
TW7I	-	-	-	-	-	110	ND	150	34	185	75	88	44	96
TW7D	-	-	-	-	-	-	-	-	-	-	-	-	16	16*
TW8S	-	-	-	-	-	ND	ND	ND	ND	ND	ND	ND	ND	ND
TW8I	-	-	-	-	-	ND	-	ND	ND	ND	ND	ND	ND	ND
TW9I	-	-	-	-	-	3	4	3	ND	7	15	5	4	7
TW9D	-	-	-	-	-	ND	-	ND	ND	ND	ND	ND	ND	ND
TW10D	-	-	-	-	-	4	ND	ND	4	ND	ND	ND	ND	ND
TW11S	-	-	-	-	-	17	ND	9	14	45	30	6	9	19
TW11I	-	-	-	-	-	17	ND	13	9	55	50	21	16	27
TW12I	-	-	-	-	-	ND	-	-	7	60	30	8	10	23
TW12D	-	-	-	-	-	ND	-	-	-	-	ND	ND	ND	ND
TW13S	-	-	-	-	-	ND	-	-	-	-	-	ND	-	ND
TW13I	-	-	-	-	-	ND	-	-	-	-	-	ND	-	ND
TW14S	-	-	-	-	-	-	-	-	-	-	-	-	118	118*
TW14I	-	-	-	-	-	-	-	-	-	-	-	-	39	39*
TW14D	-	-	-	-	-	-	-	-	-	-	-	-	90	90*
TW15I	-	-	-	-	-	-	-	-	-	-	-	-	94	94*

Notes:
ND - indicates no TCA detected.
- - indicates no sample taken.
* - indicates only one sample.

Gladding Cordage Site
Preliminary Results of Water Quality Analyses
Recovery Well Pumping Tests
Table 6

Type of Test & Pumping Rate	Recov. Well RW-1 1,1,1-TCA	Recov. Well RW-2 1,1,1-TCA	Combined Sample (100 gpm) 1,1,1-TCA	iron	manganese	calc hardness	alkalinity	TDS	TSS
	ug/l	ug/l	ug/l	ug/l	ug/l	mg/l	mg/l	mg/l	mg/l
Step-Rate each well									
30 gpm									
start	110	130							
finish	120	120							
60 gpm									
finish	110	99							
80 gpm									
finish	-	110							
100 gpm									
finish	130	-							
Constant-Rate both wells									
50 gpm each well									
start	130	110							
finish	130	88	160	48.1	153	160	188	194	0.8
Carbon Effluent									
mid-test			0						

Duration of each step for the step-rate test was 100 minutes; duration of constant rate test was 24 hours.
At finish of constant rate test: temperature was 11.0-10.6 deg C, pH was 7.6-7.7, Spec. cond. was 317-276 mS/cm, and turbidity was 0 in RW-1 and RW-2, respectively.

TABLE 3: SUMMARY OF AQUEOUS SAMPLE ANALYTICAL RESULTS

SAMPLE NO.	DESCRIPTION	SAMPLE DATE	TCA	DCA	DCE	IRON	MANGANESE
			UG/L	UG/L	UG/L	UG/L	UG/L
			EFF<10 UG/L	EFF<10 UG/L	EFF<10 UG/L	EFF<250 UG/L	EFF<750 UG/L
GCTS1R122095	RW-1, UNTREATED	12/20/95	124 E	3.9	0.4 U	100 U	31.1
GCTS2R122095	RW-2, UNTREATED	12/20/95	117 E	2.5	0.4 U	100 U	15 U
GCTS3R122095	COMBINED, UNTREATED	12/20/95	117 E	2.5	0.4 U	100 U	20.3
GCTS4F122095	EFFLUENT, TREATED	12/20/95	0.2 U	0.4 U	0.4 U	116	18.2
GCTB122095	TRIP BLANK	12/20/95	0.2 U	0.4 U	0.4 U	NA	NA
GCTS1R122195	RW-1, UNTREATED	12/21/95	149 D	4.8	0.4 U	100 U	42.3
GCTS2R122195	RW-2, UNTREATED	12/21/95	104 D	2.7	0.4 U	100 U	15 U
GCTS3R122195	COMBINED, UNTREATED	12/21/95	132 D	3.7	0.4 U	100 U	16.4
GCTS4F122195	EFFLUENT, TREATED	12/21/95	0.2 U	0.4 U	0.4 U	100 U	17.5
GCTB122195	TRIP BLANK	12/21/95	0.2 U	0.4 U	0.4 U	NA	NA
GCTS1R122295	RW-1, UNTREATED	12/22/95	140 D	2.7	0.4 U	100 U	28.6
GCTS2R122295	RW-2, UNTREATED	12/22/95	128 D	2.3	0.4 U	100 U	15 U
GCTS3R122295	COMBINED, UNTREATED	12/22/95	138 D	3.1	0.4 U	100 U	16.3
GCTS4F122295	EFFLUENT, TREATED	12/22/95	0.2 U	0.4 U	0.4 U	100 U	15.4
GCTB122295	TRIP BLANK	12/22/95	0.2 U	0.4 U	0.4 U	NA	NA
GCTS1R122895	RW-1, UNTREATED	12/28/96	140	4.8	7.8	100 U	28.6
GCTS2R122895	RW-2, UNTREATED	12/28/96	130	3.2	11	100 U	15 U
GCTS3R122895	COMBINED, UNTREATED	12/28/96	140	4.0	9.7	100 U	17.7
GCTS4F122895	EFFLUENT, TREATED	12/28/96	0.4 U	0.4 U	0.4 U	100 U	15 U
GCTB122895	TRIP BLANK	12/28/96	0.4 U	0.4 U	0.4 U	NA	NA
GCTS1R010396	RW-1, UNTREATED	01/03/96	130	4.6	13	100 U	28.3
GCTS2R010396	RW-2, UNTREATED	01/03/96	110	0.4 U	8.5	100 U	15 U
GCTS3R010396	COMBINED, UNTREATED	01/03/96	120	3.9	9.9	100 U	17.5
GCTS4F010396	EFFLUENT, TREATED	01/03/96	0.4 U	0.4 U	0.4 U	100 U	16.9
GCDUP1010396	COMBINED, UNTREATED	01/03/96	120	3.9	9.7	100 U	16.1
GCTB010396	TRIP BLANK	01/03/96	0.4 U	0.4 U	0.4 U	NA	NA
GCTS1R010596	RW-1, UNTREATED	01/05/96	130	4.6	13	100 U	23.9
GCTS2R010596	RW-2, UNTREATED	01/05/96	82	0.4 U	14	100 U	15 U
GCTS3R010596	COMBINED, UNTREATED	01/05/96	120	3.7	7.2	100 U	15 U
GCTS4F010596	EFFLUENT, TREATED	01/05/96	0.4 U	0.4 U	0.4 U	100 U	15 U
GCTB010596	TRIP BLANK	01/05/96	0.4 U	0.4 U	0.4 U	NA	NA
GCTS1R011196	RW-1, UNTREATED	01/11/96	140	6.2	4	100 U	26.9
GCTS2R011196	RW-2, UNTREATED	01/11/96	100	0.4 U	3.7	100 U	15 U
GCTS3R011196	COMBINED, UNTREATED	01/11/96	120	5.2	3.7	100 U	15.4
GCTS4F011196	EFFLUENT, TREATED	01/11/96	0.4 U	0.4 U	0.4 U	100 U	16.3
GCTB011196	TRIP BLANK	01/11/96	0.4 U	0.4 U	0.4 U	NA	NA
GCTS1R011296	RW-1, UNTREATED	01/12/96	120	5.8	3.7	100 U	22
GCTS2R011296	RW-2, UNTREATED	01/12/96	83	0.4 U	3.4	100 U	15
GCTS3R011296	COMBINED, UNTREATED	01/12/96	110	5	3.7	100 U	15 U
GCTS4F011296	EFFLUENT, TREATED	01/12/96	0.4 U	0.4 U	0.4 U	100 U	15 U
GCTB011296	TRIP BLANK	01/12/96	0.4 U	0.4 U	0.4 U	NA	NA
GCTS1RO11796	RW-1, UNTREATED	01/17/96	150	3.8	10	100 U	17.1
GCTS2RO11796	RW-2, UNTREATED	01/17/96	110	1	5.9	100 U	15 U
GCTS3RO11796	COMBINED, UNTREATED	01/17/96	140	2.7	12	100 U	15 U
GCTS4RO11796	EFFLUENT, TREATED	01/17/96	0.4 U	0.4 U	0.4 U	100 U	15 U
GCDUP2011796	RW-2, UNTREATED	01/17/96	97	0.7	5.6	100 U	15 U
GCTB011796	TRIP BLANK	01/17/96	0.4 U	0.4 U	0.4 U	NA	NA

NOTES:

U - INDICATES COMPOUND ANALYZED FOR BUT NOT DETECTED. THE CONCENTRATION IN FRONT OF "U" IS THE METHOD DETECTION LIMIT.

NA - NOT ANALYZED

D - INDICATES RESULT IS BASED ON DILUTION

EFF - EFFLUENT CONCENTRATION LIMIT

TCA - 1,1,1-TRICHLOROETHANE

DCA - 1,1-DICHLOROETHANE

DCE - 1,1,1-DICHLOROETHYLENE

7-09-009 Gladding Cordage all results in ppb (mcg/l)

EFFLUENT (TCA)

Date	1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane	Tetrachloroethene	Toluene	Chlorobenzene	1,1,2,2-Tetrachloroethane	Methylene Chloride	Iron	Manganese
12/20/95	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
12/21/95	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
12/22/95	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
12/28/95	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
01/03/96	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
01/05/96	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
01/11/96	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
01/12/96	ND	ND	ND	NAF	NAF	NAF	NAF	NAF		
01/25/96	ND	ND	ND	ND	NAF	ND	<10	<10		
02/02/96	ND	ND	ND	ND	NAF	ND	<10	<10		
02/20/96	<10	<10	<10	<10	<10	<10	<10	<10		
02/26/96*	<10	<10	<10	<10	<10	<10	0.3 BJ	<10		
03/04/96	<10	<10	<10	<10	<10	<10	<10	<10		
03/11/96	<10	<10	<10	<10	<10	<10	<10	0.3 BJ		
03/19/96	<10	<10	<10	<10	0.07 J	<10	<10	<10		
03/25/96	<10	<10	<10	<10	0.04 BJ	<10	<10	<10		
04/01/96	<10	<10	<10	<10	<10	<10	<10	<10		
04/08/96	<10	<10	<10	<10	<10	<10	<10	<10		
04/15/96	<10	<10	<10	<10	<10	<10	0.3 BJ	0.5 BJ		
04/24/96	<10	<10	<10	<10	0.1 J	0.09 J	<10	0.5 J		
04/29/96	<10	<10	<10	<10	<10	<10	<10	<10		
07/02/96*	<10	<10	0.1 BJ	<10	<10	<10	<10	<10		
07/10/96	<10	<10	<10	<10	<10	<10	<10	<10		
07/18/96	<10	<10	<10	<10	<10	<10	<10	<10		
07/23/96	<10	<10	<10	<10	<10	<10	<10	<10		
07/30/96	<10	<10	<10	<10	<10	<10	<10	<10		
08/06/96	<10	<10	<10	<10	<10	<10	<10	<10		
08/13/96	<10	<10	<10	<10	<10	<10	<10	<10		
08/21/96	<10	<10	<10	<10	<10	<10	<10	0.2 BJ		
08/28/96	<10	<10	<10	<10	<10	<10	<10	<10		
09/05/96	<10	<10	<10	<10	<10	<10	<10	<10		
end of weekly sampling										
10/15/96	<10	<10	1.0 J	0.8 J	<10	<10	<10	<10		
11/14/96	<10	<10	<10	<10	<10	<10	<10	<10	Iron	Manganese
12/17/96	<10	<10	<10	<10	<10	<10	<10	<10	<10	<5
01/15/97	<10	<10	<10	<10	<10	<10	<10	<10		

* also recorded

02/26/96	Ethylbenzene	0.2 BJ
02/26/96	Total Xylenes	0.5 BJ
07/02/96	MIBK	0.9 BJ

NAF = Not Analyzed For

7-09-009 Gladding Cordage

RW-1

Date	1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane (TCA)	Tetrachloroethene	Toluene	Chlorobenzene	1,1,2,2-Tetrachloroethane	Methylene Chloride	Iron	Manganese
	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
12/20/95	ND	3.9	124 E	NAF	NAF	NAF	NAF	NAF	ND	31.1
12/21/95	ND	4.8	149 D	NAF	NAF	NAF	NAF	NAF	ND	42.3
12/22/95	ND	2.7	140 D	NAF	NAF	NAF	NAF	NAF	ND	28.6
12/28/95	7.8	4.8	140	NAF	NAF	NAF	NAF	NAF	ND	28.6
01/03/96	13	4.6	130	NAF	NAF	NAF	NAF	NAF	ND	28.3
01/05/96	13	4.6	130	NAF	NAF	NAF	NAF	NAF	ND	23.9
01/11/96	4	6.2	140	NAF	NAF	NAF	NAF	NAF	ND	26.9
01/12/96	3.7	5.8	120	NAF	NAF	NAF	NAF	NAF	ND	22
01/25/96	ND	3	130	<2.5	NAF	<4.0	<2.5	<12.5		
02/20/96	1 J	<10	150	<10	<10	<10	<10	<10		
03/04/96	1 J	4 J	140	<10	<10	<10	<10	0.4 BJ		
04/01/96	1 J	3 J	120	<10	<10	<10	<10	<10		
07/02/96	1 J	4 J	130	<10	<10	<10	<10	0.4 J		
08/06/96	1 J	4 J	110	<10	<10	<10	<10	0.5 BJ		
09/05/96	1 J	4 J	130	<10	<10	<10	<10	<10		
10/15/96	1 J	4 J	120	0.6 J	0.2 J	0.3 J	<10	<10		
11/15/96	1J	4J	100	<10	<10	<10	<10	<10		
12/17/96	1J	4J	90	<10	<10	<10	<10	<10		
01/15/97	1J	4J	110	<10	<10	<10	<10	<10		

NAF = Not Analyzed For
ND = Not Detected

a:gldrw1.wb2

7-09-009 Gladding Cordage

RW-2

Date	1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane (TCA)	Tetrachloroethene	Toluene	Chlorobenzene	1,1,2,2-Tetrachloroethane	Methylene Chloride	Iron	Manganese
	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
12/20/95	ND	2.5	117 E	NAF	NAF	NAF	NAF	NAF	ND	15
12/21/95	ND	2.7	104 D	NAF	NAF	NAF	NAF	NAF	ND	ND
12/22/95	ND	2.3	128 D	NAF	NAF	NAF	NAF	NAF	ND	ND
12/28/95	11	3.2	130	NAF	NAF	NAF	NAF	NAF	ND	ND
01/03/96	8.5	ND	110	NAF	NAF	NAF	NAF	NAF	ND	ND
01/05/96	14	ND	82	NAF	NAF	NAF	NAF	NAF	ND	ND
01/11/96	3.7	ND	100	NAF	NAF	NAF	NAF	NAF	ND	ND
01/12/96	3.4	ND	83	NAF	NAF	NAF	NAF	NAF	ND	15
01/25/96	<2.5	<2.5	99	<2.5	NAF	<4.0	<2.5	<12.5		
02/20/96	0.9 J	2 J	96	<10	<10	<10	<10	<10		
03/04/96	0.9 J	2 J	93	<10	<10	<10	<10	0.1 BJ		
04/01/96	0.7 J	1 J	77	<10	<10	<10	<10	<10		
07/02/96	1 J	<10	94	<10	<10	<10	<10	0.3 J		
08/06/96	0.7 J	<10	74	<10	<10	<10	<10	<10		
09/05/96	0.7 J	1 J	75	<10	<10	<10	<10	<10		
10/15/96	0.6 J	1 J	71	<10	<10	<10	<10	<10		
11/14/96	0.4J	<10	62	<10	<10	<10	<10	<10		
12/17/96	Not sampled	RW2 was not	operated at this time							
01/15/97	0.9J	1J	89	<10	<10	<10	<10	<10		

a:gldrw2.wb2

NAF = Not Analyzed For

ND = Not Detected

7-09-009 Gladding Cordage

COMBINED

Date	1,1-Dichloroethene	1,1-Dichloroethane	1,1,1-Trichloroethane (TCA)	Tetrachloroethene	Toluene	Chlorobenzene	1,1,2,2-Tetrachloroethane	Methylene Chloride	Iron	Manganese
	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
12/20/95	ND	2.5	117 E	NAF	NAF	NAF	NAF	NAF	ND	20.3
12/21/95	ND	3.7	132 D	NAF	NAF	NAF	NAF	NAF	ND	16.4
12/22/95	ND	3.1	138 D	NAF	NAF	NAF	NAF	NAF	ND	16.3
12/28/95	9.7	4	140	NAF	NAF	NAF	NAF	NAF	ND	17.7
01/03/96	9.9	3.9	120	NAF	NAF	NAF	NAF	NAF		
01/05/96	7.2	3.7	120	NAF	NAF	NAF	NAF	NAF	ND	ND
01/11/96	3.7	5.2	120	NAF	NAF	NAF	NAF	NAF	ND	15.4
01/12/96	3.7	5	110	NAF	NAF	NAF	NAF	NAF	ND	ND
01/25/96	<2.5	<2.5	110	<2.5	NAF	<4.0	<2.5	<12.5		
02/20/96	1 J	3 J	110	<10	<10	<10	<10	<10	<10	<5
03/04/96	1 J	3 J	110	<10	<10	<10	<10	<10		
04/01/96	1 J	3 J	100	<10	<10	<10	<10	<10		
07/02/96	1 J	3 J	110	0.08 J	<10	<10	<10	0.5 J		
08/06/96	1 J	3 J	93	<10	<10	<10	<10	0.3 BJ		
09/05/96	0.8 J	2 J	85	<10	<10	<10	<10	<10		
10/15/96	1 J	3 J	97	<10	<10	<10	<10	<10		
11/14/96	1J	3J	88	<10	<10	<10	<10	<10		
01/15/97	1J	3J	94	<10	<10	<10	<10	<10		

NAF = Not Analyzed For

ND = Not Detected

a:gldcomb.wb2

Attachment 3

Monitoring Well Casings Elevations

Gladding Cordage Site
Monitoring Well Elevations
Table 1.

Well ID	1988 Measuring Point Elevations	1994 Survey (Revised) Surface Elevation	1994 Survey (Revised) Measuring Point Elevation
TW-3s	1213.53	1211.10	1213.60
TW-3i	1213.18	1210.75	1213.19
TW-3d	1213.45	1211.21	1213.47
TW-4s	1212.05	1210.19	1212.06
TW-4i	1212.07	1210.16	1212.08
TW-4d	1212.39	1210.25	1212.39
TW-5s	1211.77	1209.98	1211.78
TW-5i	1211.85	1209.90	1211.89
TW-5d	1212.52	1210.00	1212.55
TW-7s	1213.44	1211.04	1213.48
TW-7i	1213.56	1211.13	1213.60
TW-7d	-	1211.35	1213.25
TW-14s	-	1209.76	1211.81
TW-14i	-	1209.77	1211.77
TW-14d	-	1209.81	1211.85
TW-15i	-	1209.67	1211.52
RW-1			1209.3 *
RW-2			1212.2 *

Notes:
All elevations are in feet above sea level (USGS datum)
- Indicates that the well was not installed at time of survey.
* 1996

Appendix C

IC/EC Certification Form

MALCOLM PIRNIE

Enclosure 1
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Site Management Periodic Review Report Notice
Institutional and Engineering Controls Certification Form

Site Details **Box 1**

Site No. 7-09-009

Site Name: Gladding Cordage Site

Site Address: County Route 13 Zip Code: 13155

City/Town: South Otselic

County: Chenango

Current Use: Treatment Plant

Intended Use: Treatment Plant

Verification of Site Details **Box 2**

		YES	NO
1.	Are the Site Details above, correct?	☒	☐
	If NO, are changes handwritten above or included on a separate sheet?	☐	
2.	Has some or all of the site property been sold, subdivided, merged, or undergone a tax map amendment since the initial/last certification?	☐	☒
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	
3.	Have any federal, state, and/or local permits (e.g., building, discharge) been issued for or at the property since the initial/last certification?	☐	☒
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	
4.	Has a change-of-use occurred since the initial/last certification?	☐	☒
	If YES, is documentation or evidence that documentation has been previously submitted included with this certification?	☐	
5.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), has any new information revealed that assumptions made in the Qualitative Exposure Assessment for offsite contamination are no longer valid ?	☐	☐
	If YES, is the new information or evidence that new information has been previously submitted included with this Certification?	☐	
6.	For non-significant-threat Brownfield Cleanup Program Sites subject to ECL 27-1415.7(c), are the assumptions in the Qualitative Exposure Assessment still valid (must be certified every five years) ?	☐	☐
	If NO, are changes in the assessment included with this certification?	☐	

SITE NO. **Box 3**

Description of Institutional Control	Control Certification	
	YES	NO
1. Minimize the potential for human exposure to site-related contaminants. 2. Minimize the potential for off-site migration of site-related contaminants. 3. Contain, treat, and/or dispose of contaminated media in a manner consistent with State and Federal Regulations. Deficiencies: No SMP, IC/EC Plan, O&M Manual out dated.		XX

Box 4

Description of Engineering Control	Control Certification	
	YES	NO
Groundwater recovery and treatment plant completed in 1996 in accordance with the ROD. Deficiencies: Automated treatment plant controls inoperative.		XX

Control Certification Statement

For each Institutional or Engineering control listed above, I certify by checking "Yes" that all of the following statements are true:

(a) the Institutional Control and/or Engineering Control employed at this site is unchanged since the date that the Control was put in-place, or was last approved by the Department;

(b) nothing has occurred that would impair the ability of such Control, to protect public health and the environment;

(c) nothing has occurred that would constitute a violation or failure to comply with the Site Management Plan for this Control; and

(d) access to the site will continue to be provided to the Department, to evaluate the remedy, including access to evaluate the continued maintenance of this Control.

(e) if a financial assurance mechanism is required by the oversight document for the site, the mechanism remains valid and sufficient for its intended purpose established in the document.

IC/EC CERTIFICATIONS
SITE NO.

Box 5

SITE OWNER OR DESIGNATED REPRESENTATIVE SIGNATURE

I certify that all information and statements in Boxes 2 and/or 3 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Payson Long, Environmental Engineer at New York State Department of Environmental Conservation, 625 Broadway 12th Floor, Albany, New York 12233-7013,
print name print business address

am certifying as Remdedial Party (Owner or Remedial Party)

for the Site named in the Site Details Section of this form.

_____ _____
Signature of Owner or Remedial Party Rendering Certification Date

Box 6

QUALIFIED ENVIRONMENTAL PROFESSIONAL (QEP) SIGNATURE

I certify that all information and statements in Box 4 are true. I understand that a false statement made herein is punishable as a Class "A" misdemeanor, pursuant to Section 210.45 of the Penal Law.

I Bruce Nelson, CPG at Malcolm Pirnie, Inc., 855 Route 146, Suite 210 Clifton Park, New York 12065,
print name print business address

am certifying as a Qualified Environmental Professional for the Remedial Party

(Owner or Remedial Party) for the Site named in the Site Details Section of this form.

_____ _____ _____
Signature of Qualified Environmental Professional, for the Owner or Remedial Party, Rendering Certification Stamp (if Required) Date