REMEDIAL ACTION WORKPLAN

AMERICAN FELT & FILTER COMPANY
NEW WINDSOR, NEW YORK

Consent Order Index # W3-0784-04-06
Site # 3-36-036

Prepared for:
New York State Department of Environmental Conservation

Prepared by:

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Project No. 10000-003

March 20, 2012

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CERTIFICATION

I, Arnold F. Fleming, P.E. certify that I am currently a NYS registered professional engineer and that this Remedial Action Work Plan was prepared in accordance with all applicable statues and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

ARNOLD F FLEMING
050411

Arnold F. Fleming

Arnold F. Fleming, P.E.
Qualified Environmental Professional

March 20, 2012
Date

1.0 INTRODUCTION

The American Felt and Filter Company (AFFCO) property (Site) located in New Windsor, Orange County, New York (Figure 1), manufactures a variety of felt and filter products. Prior to 1978, the Site was owned and operated by the GAF Corporation, who manufactured the same products as AFFCO. During both GAF's and AFFCO's ownership, the facility used 1,1,1- trichloroethane (TCA) as a solvent and carrier for zinc resinate which was used to impregnate felt sheets in the Feutron Department. The TCA was stored onsite in 55-gallon drums in an enclosed area just outside the Feutron Building. Approximately 35 to 40 drums of TCA were generally present onsite during regular operations. Site investigations performed in 1988 revealed that groundwater and soil in the area near the Feutron Department contained TCA. The source of the contamination is believed to be a historic leakage within the enclosed process area and spillage in the drum storage area.

The Site was placed on the New York State Department of Environmental Conservation's (NYSDEC) List of Inactive Hazardous Waste Sites in 1991 (Site Code 3-36-036), due to the potential threat to the adjacent Quassaick Creek. The facility stopped using TCA in 1992 when the production line in the Feutron Department that utilized TCA was shut down.

Soil and/or groundwater sampling conducted in September 1994, August 1998, and October 2001 revealed that residual amounts of TCA were still present in the soil and groundwater in the former drum storage area near the Feutron Building. Fleming-Lee Shue (FLS) submitted a Remedial Design/Remedial Action Work Plan (RD/RAWP) in February 2005 to the NYSDEC. The RD/RA work plan included an in-situ Dual Phase Extraction (DPE) system design to remediate soil and groundwater in the former drum storage area and under the Feutron Building. The RD/RAWP was approved in September 2005.

At the time of the RD/RAWP submittal, the Feutron Building was in service as part of the AFFCO production line. After the RD/RAWP was approved (2006), the north-western portion of the Feutron Building, in the vicinity of the former drum storage area, was taken out of service and subsequently demolished. Therefore, in-situ treatment was no longer the best remedy for the impacted area.

FLS prepared a revised RAWP in 2008 to remediate the TCA-impacted soil by excavation and disposal. This RAWP was subsequently approved by NYSDEC in October 2008. Recent communications with NYSDEC resulted in approval to excavate vertically to the top of the water table and laterally until soil quality meets the NYSDEC Part 375 Regulations - Restricted Use Soil Cleanup Objectives for Commercial sites. Any remaining impacts below the water table will be treated via an in-situ remedial method.

This RAWP summarizes the subsurface conditions at the site and describes the proposed soil and groundwater remediation activities and health and safety procedures that will be used during the remedial activities.

2.0 SITE INFORMATION

2.1 Site Description

The AFFCO Site is an active manufacturing facility located on the north side of Walsh Avenue, west of River Road in New Windsor, New York (Fig. 1. The Site lies on the south side of Quassaick Creek, which flows into the Hudson River approximately 2 miles east of the Site. The surrounding area has a mixture of land uses, including industrial, commercial and residential. Potable water is supplied by the New Windsor Water Department. The total land area of the Site is approximately 9 acres, and includes several large buildings; as well as parking, open lawn and wooded areas (Fig. 2).

2.2 Site History/ Previous Investigations

The Site has been used for felt production for over 100 years. Investigation of the Site was initially undertaken when traces of TCA were measured in water samples collected from a stormwater outfall, which discharged to Quassaick Creek. The source of the TCA is believed to have been past leaks and spills from the enclosed process area and the drum storage area. Site conditions were assessed during five sampling programs conducted in January and December 1988, September 1994, August 1998, October 2001 and most recently in April 2011.

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2.2.1 January 1988

This initial study involved groundwater and surface water sampling of the Site. Five supply wells used for process water at the plant already existed at the Site; and nine additional, shallow groundwater monitoring wells (S-1 through S-9, shown on Fig. 2) were installed. The NYSDEC groundwater standard for TCA is 5 parts per billion (ppb). All of the groundwater monitoring wells sampled exhibited TCA levels above the standard. Monitoring well S-6, the monitoring well on the western portion of the Site, contained 91 ppb of TCA. The source of this TCA is not known. This portion of the Site has not been used by AFFCO, but was apparently used by GAF for the storage of equipment. Three surface water samples were collected from the Quassaick Creek and analyzed for TCA. The surface water analyses indicated that the upstream portion of the creek (C-1) did not contain any TCA, while the portion of the creek immediately downstream of the drum storage area (C-2) contained 33 ppb of TCA. The creek sample collected from the downstream east edge of the Site (C-3) contained 22 ppb of TCA. The Quassaick Creek is classified as a Class C surface water body. There are no standards or guidance values for TCA in Class C surface water bodies.

2.2.2 December 1988

A second round of groundwater sampling was conducted to assess whether the TCA levels had changed over time. The TCA concentrations detected during

December 1988 were approximately less than half of the levels detected in January 1988. Soil conditions in the vicinity of the Feutron Building were also evaluated to determine if there were any impacts from past surface spills. The soil sampling indicated that a localized area (approximately 50 feet (ft) by 50 ft.) located north of the Feutron Building, had TCA impacts that exceeded the NYSDEC Technical and Administrative Guidance Memorandum (TAGM 4046) Recommended Soil Cleanup Objectives (RSCO) of 800 ppb. The RSCO is based on potential for impact to groundwater used as a potable supply.

2.2.3 September 1994

A third round of groundwater monitoring was conducted, after the use of TCA at the site had ceased, to assess the groundwater conditions and to guide future Site work. The TCA concentrations in groundwater in the two wells near the drum storage area: S-8 (shallow) and E-1 (the former production well), which initially had 1,400 and 2,800 ppb of TCA, respectively, were found to contain 48 ppb and 10 ppb of TCA, respectively.

2.2.4 August 1998

In August 1998, the Site was investigated again to assess site conditions. This program examined soil, soil gas, and groundwater throughout the Site. Soil gas samples were collected and analyzed for the presence of organic vapors, an indication of contaminated soils. In areas where concentrations of organic vapors were found to be elevated, soil samples were collected and analyzed for volatile organic compounds (VOCs). Groundwater from all monitoring wells was also sampled during this investigation. The soil gas survey demonstrated that the soil contamination at the Site was generally limited to the vicinity of the area where TCA was stored and used on the Site. Groundwater sampling indicated that exceedances of the groundwater standards were found only in the wells immediately adjacent to the area where the TCA was stored and used (i.e., in monitoring wells S-6, S-8, and the former production well E-1).

2.2.5 October 2001

The soil gas in the northwest corner (both inside and outside) of the Feutron Building was resampled. Select soil and groundwater samples were also taken from this area (and were guided by the soil-gas sampling results). In addition, all of the Site’s monitoring wells were sampled. Because there were no records on the construction details of the former production well (E-1), a new bedrock (E-1 New) well was installed adjacent to E-1. Soil samples were collected during the installation of E-1 New and none were found to exceed the RSCO of 800 ppb. The soil-gas sampling results indicated that seven locations exhibited elevated levels of organic vapors, which prompted soil samples to be obtained from these areas and analyzed for VOCs. Four of the soil samples contained elevated levels of TCA that exceeded the RSCO.

2.2.6 February 2005

FLS submitted a Remedial Design/Remedial Action Work Plan (RD/RAWP) in February 2005 to the NYSDEC. The RD/RAWP included an in-situ Dual Phase Extraction (DPE) system design to remediate soil and groundwater in the former drum storage area and beneath the Feutron Building. The RD/RAWP was approved by the NYSDEC in September 2005.

2.2.7 2006

During 2006 the structure of the Feutron building was found to be failing. It was subsequently taken out of service and demolished.

2.2.8 August 2008

A revised RAWP was submitted to the NYSDEC on August 19, 2008. The demolition of the Feutron building provided access to the area of TCA-impacted soils that allowed for the consideration of excavation. It was determined that excavation would be a more timely, complete and cost-effective method of remediation then DPE. DPE had been proposed because of the limitations posed by the presence of the Feutron building.

The NYSDEC approved the revised RAWP on October 9, 2008.

2.2.8 October 2010

Soil gas and indoor air sampling was performed in December 2009. The results of the sampling indicated the presence of elevated concentrations of TCA in the soil gas and indoor air in the Piano Felt Building. As a result, a sub-slab depressurization system was installed beneath the Piano Felt Building in October 2011. The results of subsequent sampling, as detailed in the Sub-Slab and Indoor Air Sampling Report (May 2011) indicated that the SSDS is functioning as designed.

2.2.9 March –May 2011

As agreed upon during a March 21, 2011 meeting with the NYSDEC, additional soil and groundwater sampling was performed on April 4, 2011. The results were summarized in a letter report titled Results of the Soil and Groundwater Supplemental Remedial Investigation (SRI), dated May 23, 2010. As part of the conclusions of the SRI, it was proposed that soil remediation be performed to the Part 375 SCO for industrial use.

In a May 23, 2011 teleconference call the NYSDEC approved a revised remedial plan, which is to excavate vertically to the top of the water table and laterally until the soil quality meets the NYSDEC Part 375 Regulations - Restricted Use Soil Cleanup Objectives for Commercial sites. Any remaining impacts below the water table will be treated via an in-situ remedial method. This RAWP provides the details of the remedial plan.

2.3 Summary of Site Issues

Groundwater and soil contamination has been confirmed, delineated and monitored at the Site. The most recent investigation, conducted as part of the 2011 SRI, revealed that TCA was still present in, and adjacent to, the former drum storage area near the Feutron Building. However, TCA concentrations in the groundwater were significantly lower then those previously detected in 1994 and 1998.

FLS reviewed the current and historical soil and soil gas analytical results to estimate the total volume of soil impacted with TCA in and near the former drum storage area. The estimated dimensions for the impacted area are 50 ft. by 50 ft. and 10 ft. deep (Fig. 4).

3.0 REMEDIAL ACTION

Based on the nature of the contamination remaining in the Site soils, TCA-contaminated soil in the former drum area and beneath a portion of the former Feutron Building will be excavated and handled in accordance with federal, state, and local regulations.
Immediately prior to excavation of soil, a groundwater remedy consisting of insitu chemical oxidation will be implemented within and downgradient of the excavation area.

3.1 Pre-remedial Characterization

Prior to implementation of the remedial actions, additional characterization of the geology, hydrogeology and geochemistry is necessary. The results will be used to refine the treatment area, the contaminant mass estimate and to refine the chemical oxidation application process. The characterization will consist of the drilling and sampling of approximately 6-8 borings from within the proposed groundwater treatment area. Continuous soil samples will be collected from the surface to the top of the till layer, at approximately 20 feet. The soils will be scanned for the presence of VOCs using a photoionization detector (PID). Soil lithology as well as any observations with regard to soil contamination will be logged along with PID readings. Soil samples will be collected from each boring, at varying depths, and analyzed for VOCs. The objective is to determine contaminant mass and distribution within the saturated zone, so the majority of samples will be retained from intervals below the water table. The sample intervals will be selected randomly. Soil samples from each boring will also be analyzed for total organic carbon, bulk density and grain size. The locations of the six of the proposed borings are shown on Fig. 3. At least two additional borings will be drilled/sampled. The additional borings will be located based upon observations from the initial six.

Four of the borings will be converted into 1-inch diameter temporary monitoring wells. The wells will be used to collect groundwater samples, determine hydraulic conductivity and better define groundwater flow direction. Two-weeks following installation and development the wells will be sampled. In addition, wells EW-1, EW-0 E-1New and S-8 will be sampled. Each well will be sampled via low-flow sampling methods. The samples will be shipped by courier to Accutest Laboratories in Dayton, New Jersey and analyzed for VOCs, iron, sulfates, sulfides, chloride and alkalinity. The resultant groundwater analytical data will be used to refine the chemical oxidation application as well as to establish pre-treatment baseline conditions. Three of the wells will be constructed so that they can be utilized as injection wells during the chemical oxidation process. The selection of borings to be converted into monitoring/injections wells will be determined in the field.

Hydraulic conductivity or “slug” tests will be performed on 4 monitoring wells. The results will be used to confirm the injection rates for the chemical oxidant.

3.2 Groundwater Remediation

The TCA-impacted groundwater will be remediated by chemical oxidation. Specifically, the insitu chemical oxidation will be using the RemMetrik^{SM} method, which is based on the targeting of contaminant mass with treatment at the pore-scale level by using Wavefront Technology Solutions, Inc.'s Primawave^{TM} Technology, also known as Pressure Pulse Technology. The effectiveness of the chemical oxidation will be improved by the use of Surfactant-Enhanced In-Situ Chemical Oxidation (S-ISCO®). Details of the RemMetrik^{SM}, Wavefront's Primawave and S-ISCO® processes, and their proposed application at the site and the methods for monitoring and demonstrating effectiveness are provided in the following sections.

3.2.1 Description of the Remedial Action and Remedial Technology

The groundwater remedy includes three main components to address the technical obstacles to effective treatment. The first component is to quantify the contaminant mass and identify its location in three-dimensional space. This is accomplished by plotting the horizontal and vertical distribution of VOC concentrations and converting these into contaminant mass estimates. Through this process, the optimal locations for injection well placement are identified. This is critical to efficient and effective application of the oxidant.

The second component is to inject the treatment amendment at the pore-scale level, where the contaminant occupies the soil matrix. The combination of the precise identification of the contaminant mass quantity and spatial location, along with amendment treatment at the pore-scale level is known as the RemMetrik^{SM} process. Once the contaminant mass has been accurately quantified and located, RemMetrik^{SM} utilizes a specialized pressure-pulse delivery process (Wavefront Technology Solutions Pressure Pulse Technology, to inject the oxidant at the pore-scale level. It is known that the oxidant will degrade TCA. But success of the remedy relies on ensuring that the oxidant is delivered in a manner that maximizes contact between the oxidant and the complete TCA contaminant mass. If contact is only established in more coarse higher permeability soils, for example, the TCA present in the pore spaces of the lower permeability zones will not be treated and TCA will defuse back into the groundwater, resulting in a rebound of TCA concentrations in after treatment ceases. This approach allows treatment to reach deep into the soil matrix where the bulk of the contaminant occurs, regardless of permeability. It temporarily alters the soil matrix so that remediation is enhanced.

The third component is the use of a surfactant, mixed with the oxidant during the injection process. The introduction of surfactant-oxidant mixture causes the residual TCA molecules to dissolve into aqueous solution where it is then available for chemical oxidation. The use of the surfactant, in combination with the pressure-pulse injection and contaminant targeting, ensures the most effective and efficient use of the oxidant. The unique oxidant/surfactant mixture to be utilized at the site is VeruTEK's Surfactant Enhanced In Situ Chemical Oxidation (S-ISCO^{TM}).

The oxidant to be utilized is activated sodium persulfate which will be injected into the saturated zone along with the surfactant. Typical by-products of the oxidation process are carbon dioxide, water and residual sulfates. Sulfates are naturally occurring constituents of soil and groundwater. The addition of persulfate has been observed to raise sulfate levels materially above background.

Note that sodium persulfate (FMC Corp.'s Klozur®) lowers the pH to acidic levels. This is counteracted by the use of sodium hydroxide to activate the persulfate. Persulfate also leaves behind residual sulfates which can cause corrosion of concrete. Appendix A presents information on persulfate and its reaction with different materials.

The surfactant to be used is a plant-based surfactant, known as VeruSOL-3®. The surfactant will leave residual quantities of citrus terpenes, an organic compound extracted from citrus rinds and other plant-based sources.

The pressure-pulse injections will be performed using Wavefront Technology Solutions, Inc.'s Primawave™ Technology, also known as Pressure Pulse Technology, to reach the TCA at the pore-scale level and to promote even distribution of the oxidant mixture. The surfactant-oxidant mixture will be injected using the Wavefront's Sidewinder™ tool, which promotes penetration of the oxidant deep into the soil matrix.

The estimated contaminant mass to be treated is:

Treatment Zone	Total Contaminant Mass, lbs	Remediation Goal	Mass Removal, lbs
10-20 ft-bg	230	90%	207
10-20 ft-bg (9% Safety Factor)	250	90%	225

The planned quantities and concentrations of treatment chemicals are detailed in the following sections. The actual chemical concentrations and quantities applied may vary depending on field conditions and the results of regular groundwater monitoring that will be conducted during the injection process. Adjustments to the application rates, concentrations, injection rates, and chemical mass will be at the discretion of the field supervisor in keeping with the IRM cleanup objectives. Approximately 9,500 gallons of oxidant mixture will be injected for treatment.

3.2.2 Sodium Persulfate

Sodium persulfate, specifically FMC Corp.'s Klozur®, is the oxidant. Approximately 1,818 kg (4,000 lbs) of sodium persulfate are planned to be injected, sufficient to oxidize 250 lbs of contaminant mass. The sodium persulfate will be applied at a dosing rate of approximately 25 g/L to 75 g/L. The dosing ratio may be adjusted based upon field observations in an effort to maximize treatment and control for density effects. Fluid density may be increased, where necessary, to promote treatment in zones where density driven treatment is desired; sodium persulfate concentrations up to 150 g/L may be used.

The sodium persulfate will be brought on Site in dry form in bags and stored in a dry and secure location.

3.2.3 Sodium Hydroxide

The injection of the sodium persulfate will lower the pH to acidic levels. This will be counteracted by the use of sodium hydroxide to activate the persulfate. The initial sodium hydroxide dosage will be 20 g/L, which will help raise the pH and sustain the alkaline conditions necessary to activate the persulfate. An estimated 150 gallons will be injected. The doses may be varied based upon field observations to maintain optimum oxidizing conditions. The goal is to raise the pH of the soil solution to between 9.5 to 14 SU pH units. The sodium hydroxide will be brought to the Site as a liquid in high density polyethylene carboys.

The addition of sodium hydroxide will increase the pH of groundwater for some time. Increases of up to pH 14 may be observed and it may take several months before pH levels return to background.

3.2.4 VeruSOL®

VeruSOL-3® reduces the interfacial tension (IFT) of the NAPL and dissolves it into aqueous solution for oxidation. Concentrations ranging from 5 g/L to 20 g/L will be used resulting in an estimated total of 55 gallons of VeruSOL-3® being injected. The addition of VeruSOL-3® will reduce the IFT of groundwater for some time. Reductions from a typical baseline IFT of 72 mN/m^2 to 35 mN/m^2 may occur and may persist for several months or more before returning to normal.

3.2.5 Injection and Duration

The injections will be performed using three injections wells. The injection activities are anticipated to occur over an approximately 3-week period. Following equipment set up, baseline monitoring and mixing of solutions etc., the injections will occur over a 2-day period. Additional monitoring of conditions will be conducted during the second week, but no injections are anticipated. The injections will be resumed and conducted over a 2 day period during the third week.

The injections will be performed using Wavefront's Primawave pressure pulse technology to maximize contact of the oxidant with the TCA throughout the treatment zone.

The Primawave pressure pulsing generates subsurface pressure waves that open pore spaces in the saturated soils which greatly enhances the uniformity of the distribution of the oxidant as well as increasing the radius of influence. During recent applications of the Primawave pressure pulsing, the oxidant was found to distribute equally throughout soils of varying porosity.

In this manner, the injections will be optimized, based on real-time response to the treatment regimen (Table 5, Intermediate Monitoring). The injection dosing ratios, volumes and injection rates will be monitored and adjusted accordingly, based on the field supervisor's judgment to maximize treatment.

3.2.6 Monitoring

A field laboratory will be on the Site to monitor performance and process parameters. The ability to have real time analysis of field parameters allows for the injections to be optimized in a timely manner. The groundwater pH, IFT, temperature, sodium persulfate concentration, conductivity, and oxidation reduction potential will be conducted prior to, during injections and during the week between injection events. Monitoring of the creek for the same parameters will also be included to monitor potential off-site migration. Monitoring following the completion of injections will serve as the beginning of the post-treatment monitoring. Post-treatment monitoring will continue until deemed unnecessary by the project team but typically will be conducted periodically for 2 to 4 months.

3.2.7 Site Mobilization and Set Up

The treatment will utilize 2 to 4 tanks for mixing of the oxidant, a pump trailer for combining and dispensing the oxidant mixture to the well heads, a storage trailer, a sodium hydroxide storage tank and approximately 1 drum of VeruSOL-3®. The equipment will be set up adjacent to the treatment zone. Most of the equipment is mobile and is easily mobilized and removed. Demobilization consists of packing equipment into trucks, general Site cleanup, and disposal of wastes and disposables.

Spill control will be placed around storage and mixing tanks and the tanks will be double-walled or have secondary containment.

3.2.8 Cleanup Goals

The goal of the groundwater remedy is for the groundwater quality to meet NYSDEC TOGS 1.1.1, Class GA, Ambient Water Quality Standards and Guidance Values (TOGS). During the application of S-SISCO at other sites, degradation of the compounds of concern was observed to continue for up to 12 months following treatment and no rebound in concentrations was seen.

3.2.9 Confirmation and Documentation Sampling

The treatment will be monitored using a sampling methodology similar to that used to establish baseline soil conditions. Twelve new randomly located soil borings will be advanced, one on each grid cell. Two new randomly selected soil samples will be collected from each boring in the treatment interval and analyzed for TCL VOCs.

One round of groundwater samples for will be collected from the same wells as used to establish the baseline and analyzed for TCL VOCs, sulfates, sulfide, iron, chlorides, and alkalinity.

3.2.10 Site Restoration

Following the completion of treatment and post-treatment monitoring, Site restoration will be performed. Restoration activities will include removal of the treatment equipment, disposal of wastes, general cleanup, and dismantling of secondary containment structures around tanks.

3.3 Soil Remediation

The proposed remedial action at the AFFCO site will remove the TCA-impacted soil and to eliminate the source of contamination for groundwater. The remedial action consists of the following measures:

- Soil in the former drum storage area and from the area previously covered by the floor slab will be excavated and temporarily stockpiled on-site in small piles. Soil removal will be performed first by removing the upper 2 ft. within the impacted area. This scenario will be repeated every 2 ft. to the top of the water table (approximately 10-12 ft. below grade). Each stockpile will represent a 2-ft. interval and will be placed on and covered with polyethylene sheeting.

- Following the removal of impacted soil, the excavation walls and bottom will be screened for organic vapor using a photoionization detector (PID). If evidence of residual impacted soil contamination is observed, additional soil will be removed.

- Each soil stock pile will be sampled for VOCs. Soil containing concentrations of TCA that exceed the NYSDEC Part 375 Regulations - Restricted Use Soil Cleanup Objectives for Commercial Sites (SCOs) will be disposed of off site at an approved facility. Soil containing TCA concentrations less than the SCOs will be placed back in the excavation. All soils will be handled in accordance with the Soil Management Plan (Appendix B).

- Following completion of the soil excavation, post-excavation soil samples will be collected from the excavation pit walls at 30-foot intervals and from the excavation bottom at 900 square-foot intervals in accordance with NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation. At least on sample will be collected from each sidewall of the excavation as well.

- All remedial action operations on the site will be performed in accordance with a site-specific Health and Safety Plan (HASP) and the Community Air Monitoring Plan (CAMP) designed to protect workers on the site. The HASP is included as Appendix A and the CAMP is a subsection of the HASP.

- Following the completion of all remedial measures, the excavation will be backfilled with soil that meets NYSDEC Part 375 Regulations-Restricted Use SCOs for Commercial sites and will not exceed the lower of the commercial use or protection of groundwater SCOs.

3.4 Remedial Action and Progress Reports

All details regarding the Remedial Action will be detailed in a Remedial Action Report. Progress reports will be submitted to the NYSDEC on a quarterly basis for 1 year. Each progress report will include copies of the laboratory data for the groundwater analyses.

4.0 SCHEDULE

The schedule for all activities associated with the groundwater and soil remediation is provided as Fig. 5. It should be noted that treatment of the groundwater will continue for at least 60 days after the completion of injections. The soil remedy of excavation will be completed immediately following the completion of injections. The groundwater remedy is being implemented prior to the soil remedy so that the remediation team will have a firm surface for conducting injections and associated activities. The soils source will be removed before it can re-contaminate the groundwater.

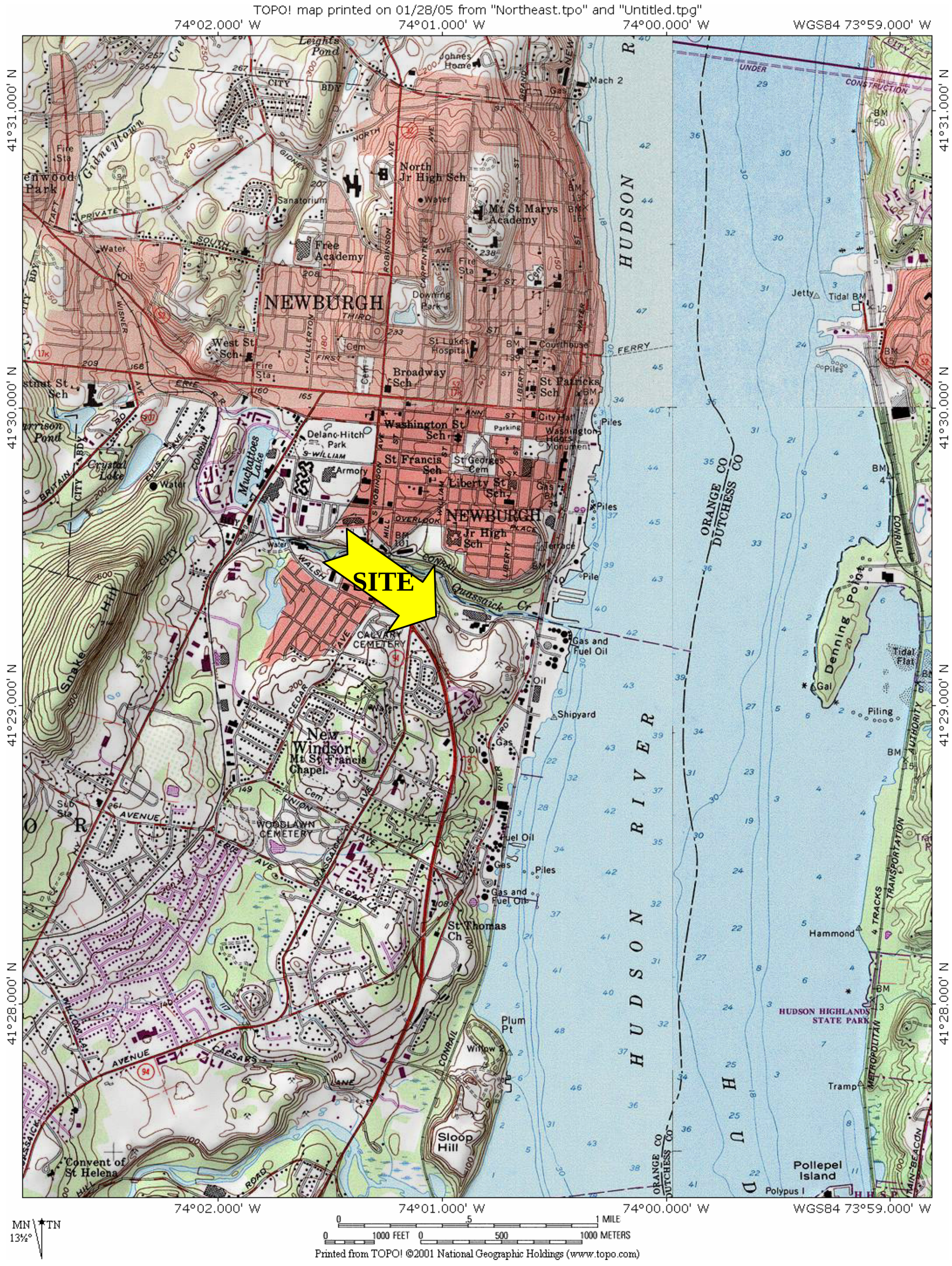
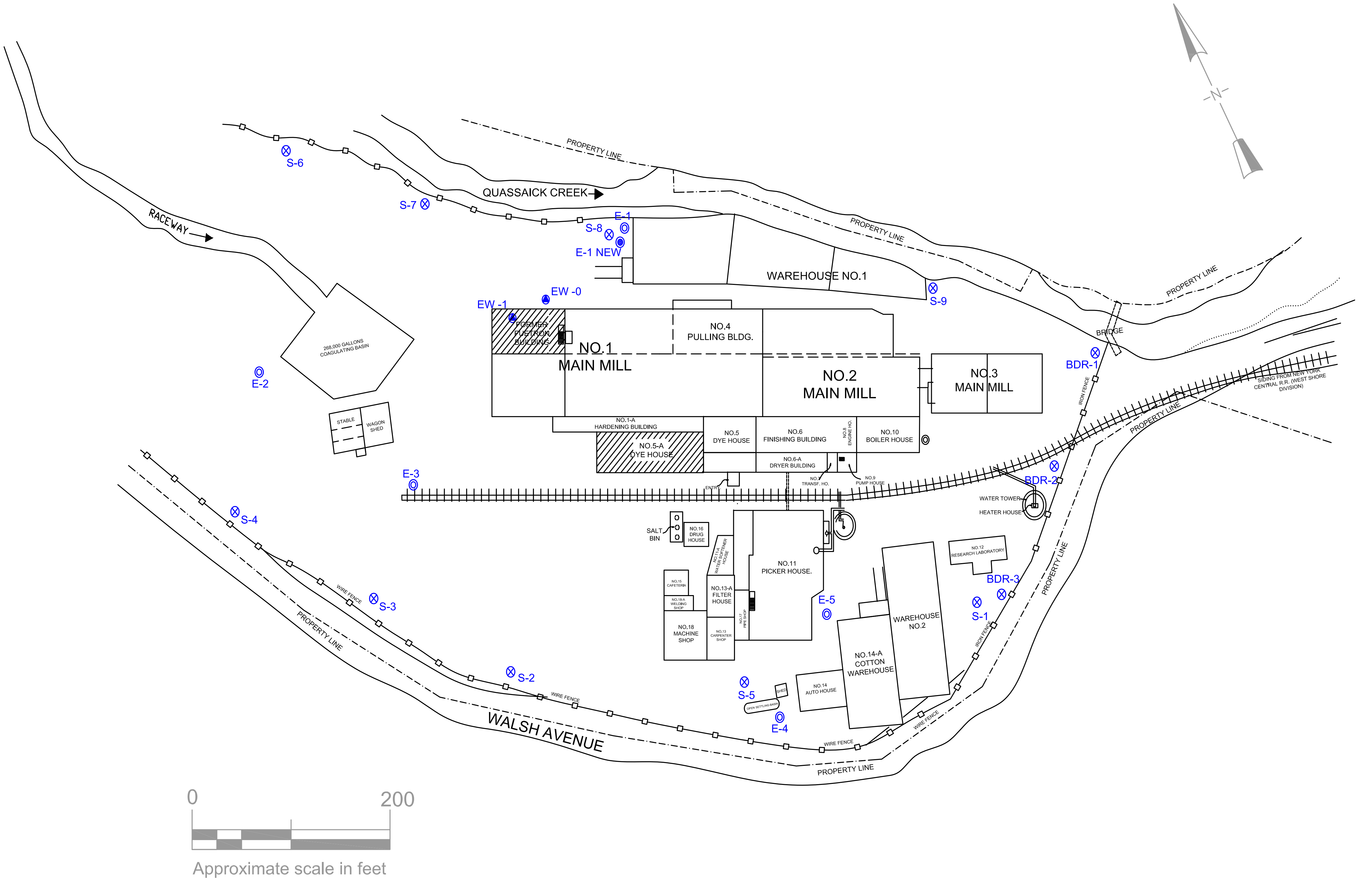


FIGURE 1 SITE LOCATION

American Felt & Filter Company
361 Walsh Avenue
New Windsor, NY

Fleming
Lee Shue

Environmental Management & Consulting, 158 West 29th Street, New York, NY 10001



Map Source: Associated Factory Mutual Survey Map,
February 28,1955

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Environmental Management & Consulting

158 West 29th Street, 9Fl.
New York, NY 10001

American Felt & Filter Co.
361 Walsh Avenue
New Windsor, NY

FIGURE 2

SITE LAYOUT

Date
SEPTEMBER 2011

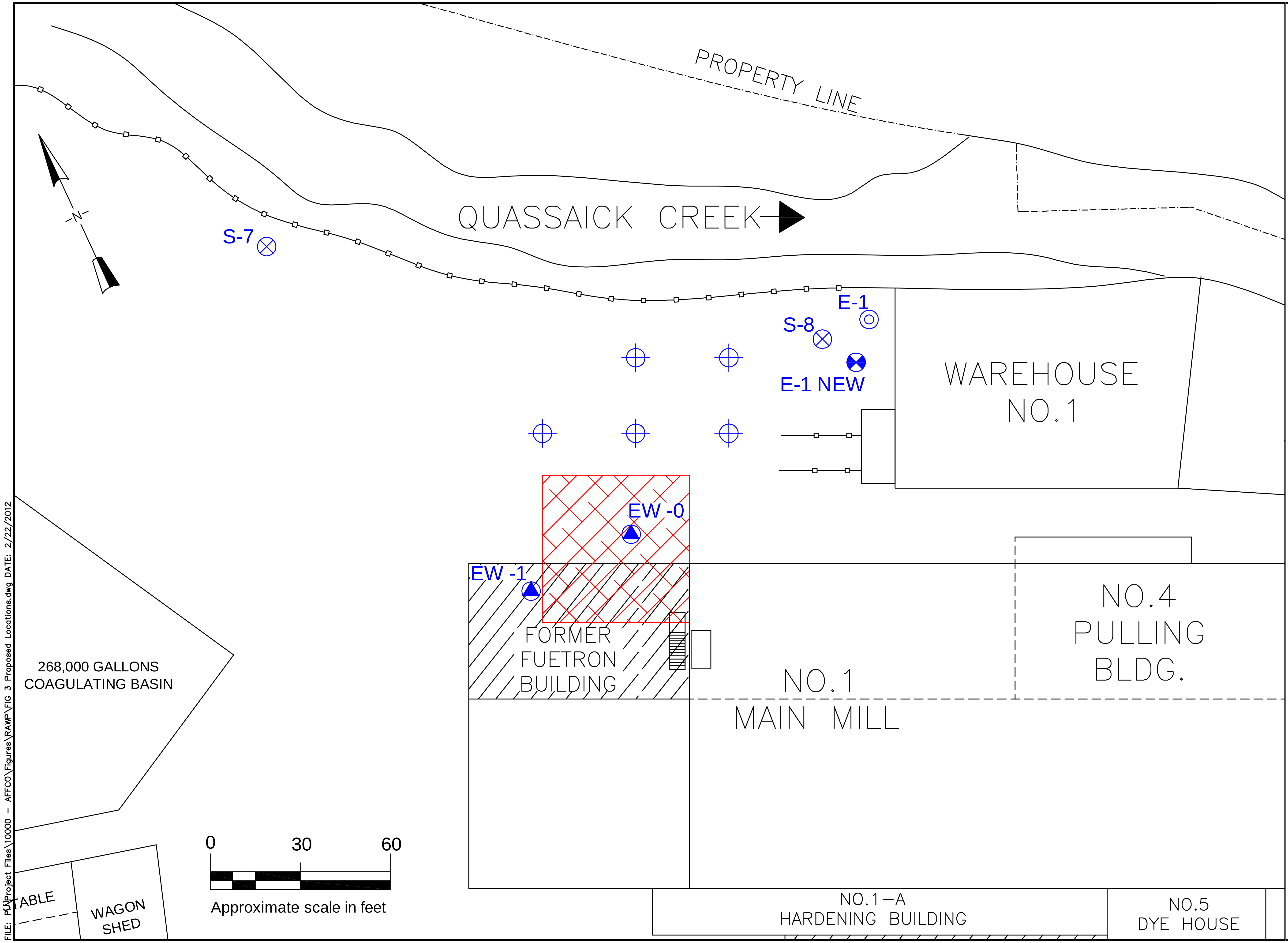
Project Number
10000

LEGEND

- -·- Property Line
- ⊗ Bedrock Well
- ⊗ Monitoring Well
- ◎ Former Production Well
- ▲ Soil Vapor Extraction Well

C:\Documents and Settings\Autocad.FLS\Desktop\FIG 2 Site Layout.dwg, 9/9/2011 9:07:29 AM, Adobe PDF

FILE: P:\Project Files\10000 – AFFCO\Figures\RAWP\FIG 3 Proposed Locations.dwg DATE: 2/22/2012



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158 West 29th Street, 9Fl.
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American Felt & Filter Co.
361 Walsh Avenue
New Windsor, NY

FIGURE 3

PROPOSED LOCATIONS OF SOIL BORINGS & TEMPORARY MONITORING WELLS

Date
February 2012

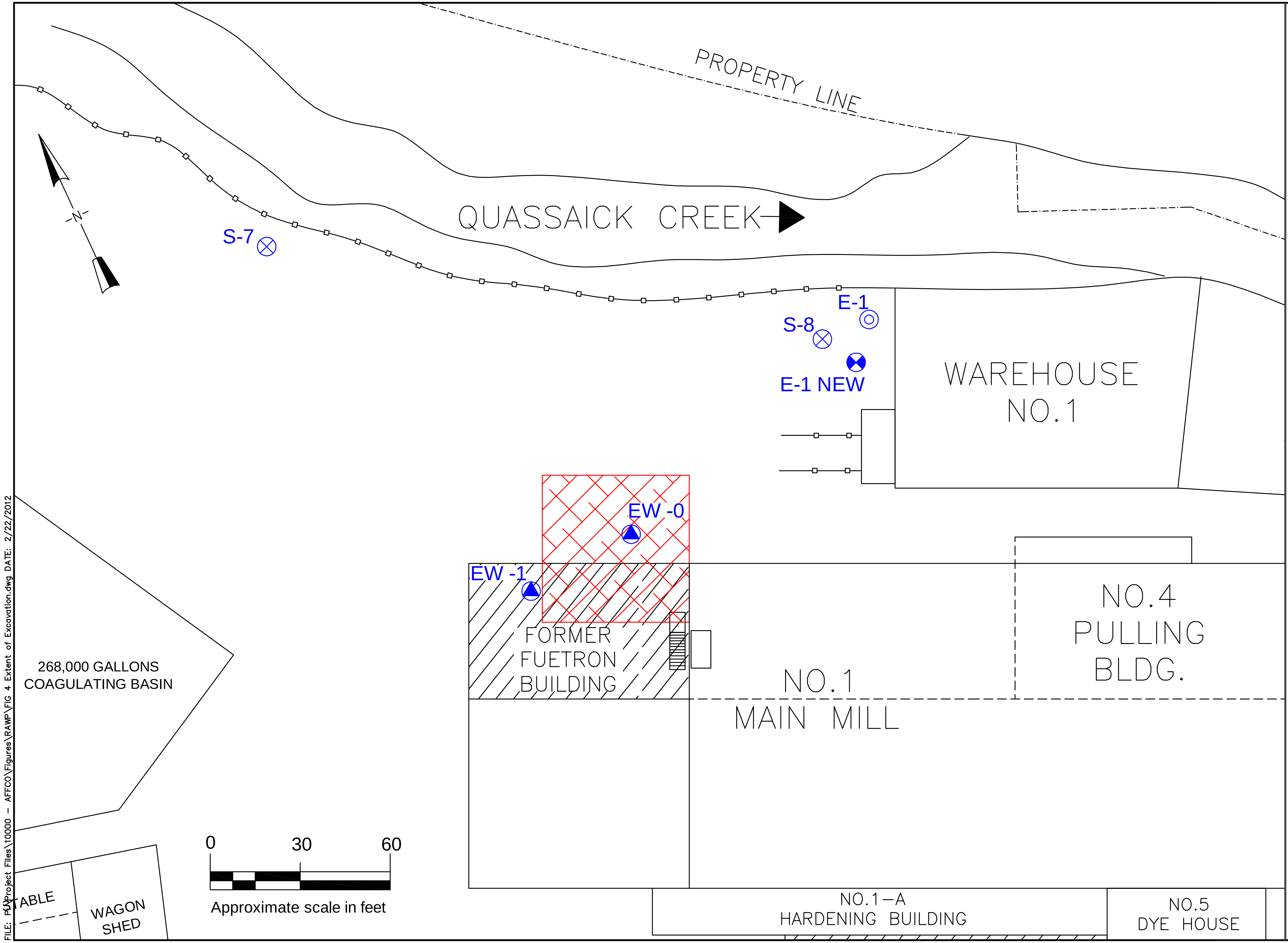
Project Number
10000

LEGEND

- 🟥 Area of Excavation
- ▨ Extent of Building Demolition
- –·– Property Line
- —□ Retaining Walls
- ⊗ Bedrock Well
- ⊗ Monitoring Well
- ◎ Former Production Well
- ▲ Soil Vapor Extraction Well
- ⊕ Proposed Boring & Temporary Monitoring Well

Map Source: Associated Factory Mutual Survey Map, February 28,1955

FILE: P:\Project Files\10000 – AFFCO\Figures\RAWP\FIG 4 Extent of Excavation.dwg DATE: 2/22/2012



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American Felt & Filter Co.
361 Walsh Avenue
New Windsor, NY

FIGURE 4

EXTENT OF EXCAVATION

Date
September 2011

Project Number
10000

LEGEND

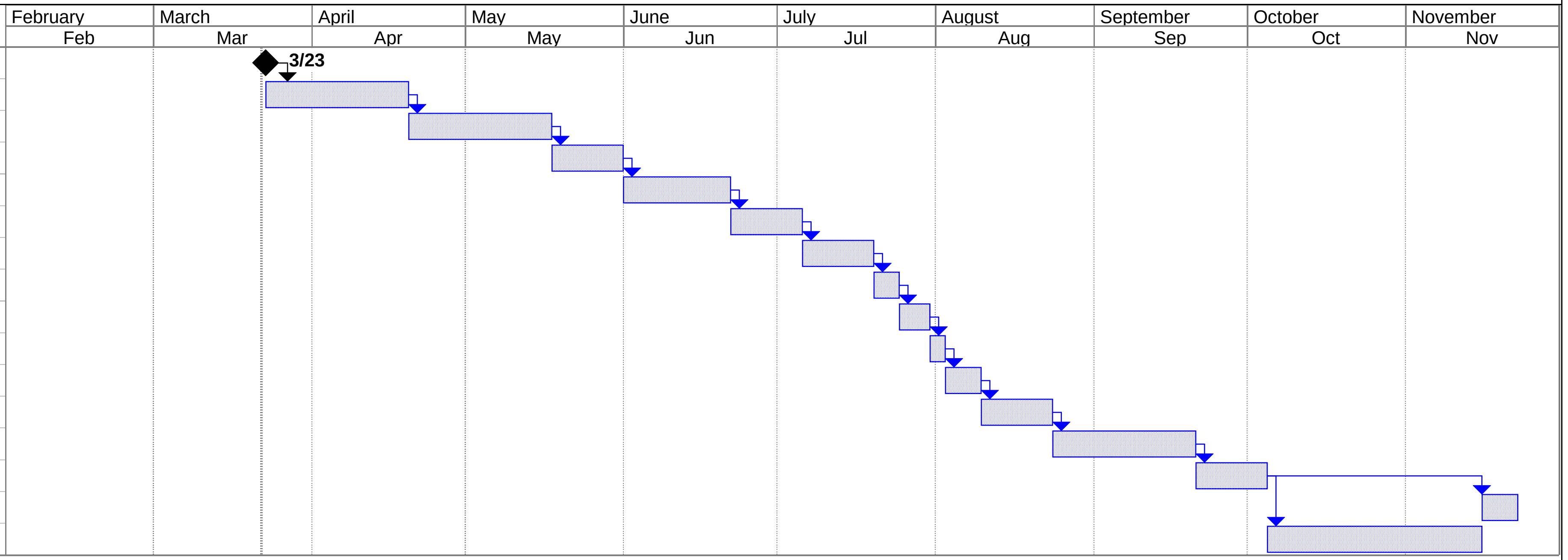
- ▨ Area of Excavation
- ▨ Extent of Building Demolition
- —·— Property Line
- —□ Retaining Walls
- ⊗ Bedrock Well
- ⊗ Monitoring Well
- ◎ Former Production Well
- ▲ Soil Vapor Extraction Well

Map Source: Associated Factory Mutual Survey Map, February 28,1955

Figure 5 - Project Schedule

AFFCo Schedule of Groundwater and Soil Remediation

ID	ℹ	Task Name	Duration	Start	Finish
1	📅	RAWP submitted to NYSDEC for review	0 days	Fri 3/23/12	Fri 3/23/12
2		NYSDEC Review	20 days	Fri 3/23/12	Thu 4/19/12
3	📅	Contracting and Mobilization	20 days	Fri 4/20/12	Thu 5/17/12
4		Pre-Remedial Site Characterization	10 days	Fri 5/18/12	Thu 5/31/12
5		Laboratory Analyses	15 days	Fri 6/1/12	Thu 6/21/12
6		Data Review	10 days	Fri 6/22/12	Thu 7/5/12
7		Mobilize for Groundwater Remediation	10 days	Fri 7/6/12	Thu 7/19/12
8		S-ISCO Injections	3 days	Fri 7/20/12	Tue 7/24/12
9		Groundwater Monitoring	4 days	Wed 7/25/12	Mon 7/30/12
10		Additional S-ISCO Injections	3 days	Tue 7/31/12	Thu 8/2/12
11		Confirmation and Documentation Sampling	5 days	Fri 8/3/12	Thu 8/9/12
12		Mobilization for Soil Remediation	10 days	Fri 8/10/12	Thu 8/23/12
13		Soil Excavation	20 days	Fri 8/24/12	Thu 9/20/12
14		Site Backfilling and Restoration	10 days	Fri 9/21/12	Thu 10/4/12
15		First Post-Remediaion Groundwater Monitoring Event	5 days	Fri 11/16/12	Thu 11/22/12
16		Remedial Action Report	30 days	Fri 10/5/12	Thu 11/15/12



Task	▭	Progress	▬	Summary	▬	External Tasks	▭	Deadline	⇩
Split	┈	Milestone	◆	Project Summary	▬	External Milestone	◆		

Environmental Solutions

Corrosion and Material Compatibility

Technical Bulletin

Background

Klozur® Persulfate solutions are used to treat contaminated soil and groundwater and can remediate a wide range of organic contaminants. However, Klozur® Persulfate is a very strong oxidant, and its solutions may be very acidic (pH ≤ 2) under many conditions, resulting in a corrosive environment for many metals and materials. In this bulletin, results from corrosion studies using un-activated and activated persulfate solutions are presented and recommendations regarding materials of compatibility are made. For additional information regarding the safety of Klozur® Persulfate, please refer to the Material Safety Data Sheet (MSDS), which is available from FMC.

Corrosion

Laboratory tests were conducted to evaluate the performance of commonly-used engineering materials exposed to Klozur® Persulfate solutions (both activated and un-activated). The tests were performed at two different persulfate solution concentrations: 20 wt% representing typical make-up solutions being injected, and 40 g / L representing typical *in situ* ground water concentrations. These tests were conducted per the guidelines outlined in ASTM G31-72. Corrosion rates for metallic coupons were calculated based on changes in weight over the exposure time. Non-metallic coupons were observed for visual changes and changes in physical properties. Structural properties of concrete and non-metallics were not measured.

Results

For un-activated Klozur® Persulfate solutions, no observable corrosion on stainless steel (304L and 316L) was observed during the testing. However, for carbon steel, copper and brass, severe corrosion was observed shortly after the testing was initiated, for both the concentrated (20 wt%) and diluted persulfate solutions. The corrosion rates for carbon steel and brass were observed to decrease when evaluated after one and two months as compared to the one week exposure. However, the rates were sufficiently high to indicate that general corrosion was on-going throughout the two month period, indicating that there was no formation of a protective corrosion-product layer. Kynar® and FRP demonstrated satisfactory performance over the one month exposure with no noticeable weight gain or softening observed. Concrete, natural rubber and synthetic rubber showed indications of degradation with long-term exposure to the concentrated persulfate solution.

In general, the impact of the Fe-EDTA activated persulfate solution was similar to the un-activated persulfate solution. No significant increases in corrosion were observed due to the presence of the activator system or subsequent formation of sulfate radicals.

For high pH activated persulfate solutions, sodium hydroxide was added to raise the pH to above 10 and to neutralize sulfuric acid formed upon persulfate decomposition. Significant decreases in corrosion rates were observed for high pH activated persulfate in contact with copper, brass and carbon steel. Negligible corrosion was observed for these metals after one month exposure, even at the 20% persulfate concentration. In addition, no noticeable corrosion was observed for stainless steel. Significant reaction with concrete was observed, however. Significant weight gain (5 – 10%) and bleaching were observed for the concrete after one month exposure to the high pH activated persulfate solution, and some dissolution of the concrete was noted during the test.

Table 1: Results for Un-Activated Klozur® Persulfate Solutions (20 wt%) at room temperature after 1 week and 1 months exposure time

mpy – milli-inches per year; ✓ - compatible material, **ϴ** - non-compatible material

Material	**1 week**	**1 month**	**Comments**
Stainless steels (304L, 316L)	✓	✓	< 1 mpy. No noticeable corrosion over 2 months
Copper Brass	> 100 mpy **ϴ**	20 – 50 mpy **ϴ**	Severe general corrosion, corrosion rate decreases with time.
Carbon steel	> 200 mpy **ϴ**	50 – 100 mpy **ϴ**	Severe general corrosion, etching at welds, corrosion rate decreases with time.
Kynar® (PVDF)	✓	✓	No noticeable changes after 2 months exposure
FRP (fiber-reinforced plastic)	✓	✓	No noticeable changes after 2 months exposure
Concrete	Weight gain, bleached appearance	Weight gain (5 – 10%), bleached appearance	Increasing weight gain over time. Some dissolution observed as residue in test chamber.
Natural Rubber	Slight weight gain	Slight weight gain	Cracks and blisters observed after 1 month exposure.
Synthetic rubber (neoprene)	Slight weight gain	Slight weight gain	Cracks and blisters observed after 1 month exposure

Table 2: Results for Un-Activated Klozur® Persulfate Solution (40 g / L) at room temperature after 1 week and 2 months exposure time

mpy – milli-inches per year; ✓ - compatible material, **ϴ** - non-compatible material

Material	**1 week**	**1 month**	**Comments**
Stainless steels (304L, 316L)	✓	✓	< 1 mpy. No noticeable corrosion over 2 months
Copper Brass	> 50 mpy **ϴ**	< 20 mpy **ϴ**	Severe general corrosion, corrosion rate decreases with time.
Carbon steel	> 50 mpy **ϴ**	< 20 mpy **ϴ**	Several general corrosion, etching at welds, corrosion rate decreases with time.
Kynar® (PVDF)	✓	✓	No noticeable changes after 1 month exposure
FRP (fiber-reinforced plastic)	✓	✓	No noticeable changes after 1 month exposure
Concrete	Weight gain, bleached appearance	Weight gain (5 – 10%), bleached appearance	Increasing weight gain over time. Some dissolution observed as residue in test chamber.

Natural Rubber	Slight weight gain	Slight weight gain	
Synthetic rubber (neoprene)	Slight weight gain	Slight weight gain	

Table 3: Results for Fe-EDTA Klozur® Persulfate Solutions, 20 wt% and 40 g / L at room temperature after 1 month exposure time

mpy – milli-inches per year; ✓ - compatible material, **Θ** - non-compatible material

Material	**20 wt% concentration**	**40 g / L**	**Comments**
Stainless steels (304L, 316L)	✓	✓	< 1 mpy. No noticeable corrosion over 1 month
Copper Brass	20 – 50 mpy **Θ**	< 20 mpy **Θ**	Severe general corrosion, corrosion rate decreases with time.
Carbon steel	> 50 mpy **Θ**	20 - 50 mpy **Θ**	Several general corrosion, etching at welds.
Kynar® (PVDF)	✓	✓	No noticeable changes after 1 month exposure
FRP (fiber-reinforced plastic)	✓	✓	No noticeable changes after 1 month exposure
Concrete	Weight gain, bleached appearance	Weight gain (5 – 10%), bleached appearance	Increasing weight gain over time. Some dissolution observed as residue in test chamber.
Natural Rubber	Slight weight gain	Slight weight gain	
Synthetic rubber (neoprene)	Slight weight gain	Slight weight gain	

Table 4: Results for high pH activate Klozur® Persulfate Solutions, 20 wt% and 40 g / L at room temperature after 1 month exposure time

mpy – milli-inches per year; ✓ - compatible material, **Θ** - non-compatible material

Material	**20 wt% concentration**	**40 g / L**	**Comments**
Stainless steels (304L, 316L)	✓	✓	< 1 mpy. No noticeable corrosion over 1 month
Copper Brass	✓	✓	Negligible general corrosion (< 2 mpy). Black film formation observed.
Carbon steel	✓	✓	Negligible general corrosion (< 2 mpy). Isolated rust spots observed
Concrete	Weight gain, bleached appearance	Weight gain (5 – 10%), bleached appearance	Bleached appearance, increasing weight gain over time, some dissolution observed as residue in test container.

Environmental Solutions

Material Compatibility

Recommend and Compatible Materials:

- Butyl rubber
- EPDM
- FRP (fiber reinforced plastic)
- Glass
- Neoprene
- Plexiglas®
- Polyethylene
- PVC
- Stainless steel (304L and 316L) for all mixing, conveyance and storage equipment
- Teflon®
- Viton

Incompatible Materials

- Aluminum
- Carbon steel
- Galvanized pipe
- Monel
- Nitrile rubbers
- Brass
- Copper
- Iron
- Nickel

Well Construction
- Use compatible materials, such as PVC or Stainless Steel (304L, 316L)

Pumps
- Check compatibility of all seals, gaskets, tubing and hoses

Geoprobe® Rods
- Threaded joints of rods are very susceptible to corrosion. To help reduce corrosion, several practical measures can be taken, such as applying a barrier layer like Loctite® or Teflon® grease to the threads, or utilizing the High pH activation system to reduce acidic corrosion.

Subsurface Utilities
- Always check for location and compatibility of subsurface utilities.

Hosing

- Klozur® persulfate solutions: 20 – 40%, neutral to mildly acidic conditions, moderate to low pressure

Master-Flex 300 EPDM or Equivalent

Specs (diameter)	Max Allowable Working Pressure (PSI)
1″	80
2″	60
3″	50
4″	45
6″	35

  - – 30 F to +140 F
  - EPDM black inner liner of hosing with polyethylene helix
  - Reinforced and a Type G (PVC) cover
  - Medium oil resistance

- Klozur® persulfate solutions: 20 – 40%, mildly acidic conditions, high pressure

  Alfagomma (Italian Company)
  - Model T 505 4-4 SP
  - 6 BAF (240 PSI)
  - XLPE chemical S&D

  Transporter Ultrachem (brand name)
  - 250 PSI water pressure

- Fittings

  304 Stainless – Schedule 40
  CPVC – Schedule 80 preferred (could lose strength when heated)
  PVC (may become embrittled with continued use)

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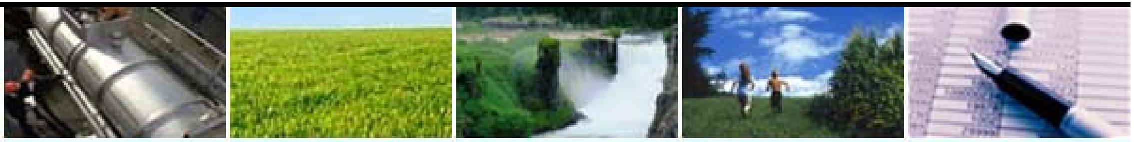
FMC Environmental Solutions



Hydrogen Peroxide Klozur® Klozur CR® PermeOx® Plus Resource Center

GO

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Peroxygen Talk

Feb 2007 - Klozur® Persulfate: The Impact of Sulfate Residual

Klozur® activated persulfate is a strong oxidant that can oxidize and destroy many organic contaminants, generating the by-product sulfate in the process. In this edition of *Peroxygen Talk*, the impact of sulfate on groundwater and on subsequent bioremediation processes is explored.

In general, one mole of the persulfate anion, $S_2O_8^{-2}$, will form two moles of sulfate, SO_4^{-2}, either through reaction with the contaminant or decomposition. As a result, one pound of sodium persulfate will generate 0.80 lb of sulfate. As an example, injection of Klozur® persulfate solution to achieve an *in situ* persulfate concentration of 20 g / L may result in a peak sulfate concentration of 16 g / L. The maximum sulfate concentration and the longevity of augmented sulfate levels in the groundwater are dependent upon many factors, including: groundwater flow rate, lithology and the population density of sulfate reducing bacteria (SRB), to name a few. Treatment zones with slow to no groundwater flow rate may be impacted by elevated concentrations of sulfate for extended periods of time.

Sulfate – Groundwater Quality

Sulfate is ubiquitous in the environment because of the abundance of sulfur on earth. From the US Geological Survey's National Water Quality Assessment program, results indicate nearly 100% of all surface and ground water sites have sample analytical detections of sulfate.[1] Sulfate has also been detected in public water systems compliance monitoring samples, and occurrence estimates are very high by all measures (87% of samples show sulfate detections, with a median concentration of 24 mg / L).[1]

The US EPA has recommended a secondary maximum contaminant level (SCML) for sulfate in drinking water of 250 mg/L.[2] This SCML is based on negative impacts on the aesthetic effects of a contaminant in drinking water, such as taste and smell, and is not a federally enforceable standard[1]. It is estimated that humans can detect sulfate in water starting at concentrations between 250 and 350 mg / L.[2] The World Health Organization (WHO) recommends sulfate concentrations in drinking water not exceed 400 mg / L based on taste. In addition, the EPA states that the available toxicological data on sulfate indicate that sulfate may cause adverse health effects in humans and animals. This is a result of a laxative effect when sulfate is consumed in high doses (estimated in the range of > 500 mg / L to > 1000 mg / L), but the adverse health effects are temporary and recovery is rapid.[1] Also, there are no significant dose-response associations between sulfate exposure and reports of diarrhea in adults. High sulfate concentrations do not exert adverse reproductive or developmental effects.

How does this impact your use of Klozur® activated persulfate? It is common for state and federal regulators to inquire about the generation of sulfate with respect to the SCML limitations. However, in the majority of instances, regulators have approved the use of Klozur® activated persulfate in order to remove contaminants of concern; with the general philosophy that residual sulfate is more acceptable than the contaminant being treated. While this is highly dependent upon the regulator, and may be impacted by specific site conditions, the general acceptance of persulfate injection is evidenced in that Klozur® activated persulfate has now been injected at over 300 sites in 35 different states. However, if Klozur® activated persulfate is being injected into aquifers from which drinking water is being drawn or is in close proximity to drinking-water wells, the impact of residual sulfate on water quality may be of concern and should be taken into account during the feasibility analysis.

Philip Block, Ph.D. is the Technology Manager for FMC's Environmental Industry Team. He earned a doctorate in physical chemistry from the University of North Carolina – Chapel Hill and a bachelor's degree in chemical engineering from North Carolina State University.

Archive

Oct2011 - Klozur® Persulfate Injection Concentration as a Design Consideration

Aug2011 - Stabilziation of Contaminants in Field Samples in the Presence of Persulfate

June2011 - The Importance of Site Characterization and Aquifer Tracer Tests

April2011 - Safety and the Use of Peroxygens

February2011 - PCBs and Persulfate

Dec2010 - Natural Oxidant Interaction (NOI): A Paradigm Shift

Oct 2010 - Activated Persulfate Chemistry: Combined Oxidation and Reduction Mechanisms

August 2010 - The Safe Use of Klozur® Persulfate Activators

One possible approach to reduce potential sulfate groundwater concentration is the use of lime (CaO) as a high-pH activator for Klozur® persulfate, especially when deploying Klozur® persulfate in soil blending applications. The calcium ions from the lime will react with the residual sulfate, forming gypsum ($CaSO_4 \bullet 2H_2O$), an insoluble mineral. This will result in a decrease in the soluble sulfate groundwater concentration.

Sulfate – A Role-player in Bioremediation

Sulfate can play an important role in the bioremediation of petroleum products, acting as an electron acceptor in a co-metabolic process. Several studies[3-8] have investigated the application of sulfate for the reduction of BTEX and other species, and has been demonstrated to function in the anaerobic oxidation of these compounds. Roychoudhury[5] collated redox reaction and thermodynamic data for reactions involving BTEX and sulfate. As an example for benzene:

$C_6H_6 + 3.754\ SO_4^{-2} + 3H_2O$ --> $2.25H^+ + 6HCO_3$- $+ 3.75HS^-$, ΔGº = -105 kg/mol

As a result, sulfate injection into the aquifer has been used as a method to stimulate BTEX biodegradation[9], especially in anoxic sediments. In addition, sulfate reduction via SRB has been suggested as a method to reduce metal contamination, through the production of hydrogen sulfide, and subsequent precipitation of the metal sulfide.[10]

In general, under aerobic conditions, oxygen is a very strong electron acceptor, and is thermodynamically favored over sulfate in this role. Nitrate in the soil also is thermodynamically favored over sulfate. However, in anaerobic zones, sulfate may be the primary electron acceptor in the bioremediation of petroleum contaminants. As a consequence, the use of activated persulfate may provide a two-fold remedial punch. This first is chemical oxidation of the contaminants of concern, especially in hot spot and / or source areas. Secondly, upon subsequent reaction / decomposition, a sulfate plume will extend from the injection zone, providing terminal electron acceptors for enhanced bioremediation of contaminants in the down-gradient areas. While this has yet to be demonstrated in the field, Klozur® activated persulfate may be considered a “combined remedy”, combining ISCO of source zones coupled with bioremediation of plumes, all in one product. Several studies are now underway to investigate this “combined remedy” approach.

The impact of sulfate on the bioremediation of chlorinated solvents may be positive or negative, depending upon which bioremedial pathway is favored. In general, two pathways exist: 1) chlorinated solvents may undergo reductive dechlorination by acting as an electron acceptor; 2) certain solvents may be oxidized by acting as an electron donor. At a given site, both processes may be operating; but in a many cases, the first pathway appears to be favored under natural conditions.[11]

For the first pathway, the process will be electron- donor limited, as for the following example for PCE:

H_2 + PCE --> TCE + Cl + H

where H_2 is the electron donor in this case. Native organic carbon can be used as an electron donor, but often additional carbon source (electron donor) is added in the form of lactate, molasses, vegetable oil or other additive to provide an ample amount of electron donor to drive the above reaction forward. The impact of sulfate in these circumstances may be negative, as sulfate will provide an additional source of electron acceptors (thermodynamically favored over chlorinated ethenes), burdening the electron donors that are present. As a consequence, treatment of a chlorinated solvent source via activated persulfate chemical oxidation may require additional carbon source be added to account for the increased sulfate concentration in down-gradient zones.

In the case where chlorinated solvents, such as vinyl chloride, dichlorinated ethenes and chlorinated ethanes, can act as an electron donor, the sulfate may play a role similar to that for the bioremediation of BTEX, and provide a beneficial outcome.

Sulfate – The Bottom Line

In general, the impact of sulfate on groundwater quality will be minimal; however, the SCML will most likely be exceeded. Sulfate may be an important remedial design

June2010 - Sulfate Revisited: The Fate of Sulfate in the Groundwater

March 2010 - The Use of Lime to Activate Klozur Persulfate and Its Impact on Contaminant Soil Concentrations consideration in cases where persulfate is injected into drinking-water aquifers or near wells. The presence of residual sulfate may provide significant benefits for down-gradient bioremediation / natural attenuation of petroleum contaminants. Benefits also may be observed for subsequent bioremediation of chlorinated solvents, but may negatively impact reductive biodechlorination efforts. Proposed field studies will elucidate the impacts of Klozur® activated persulfate application on bioremediation in the coming year or two. Check *Peroxygen Talk* for future updates on this topic.

[1] USEPA-815-R-03-16; 2003; “Contaminant Candidate List – Regulatory Determination Support Document for Sulfate

[2] USEPA, 1979; 44 FR 42195

[3] Anderson, R. and D. Lovley. **Environ. Sci. Technol** (34), 2000, p 2261.

[4] Cunningham, J. , H. Rahme, G. Hopkins, C. Lebron and M. Reinhard. **Environ. Sci. Technol** (35), 2001, p 1663.

[5] Roychoudhury, A. and G. Merrett. **Science of the Total Env.** (366), 2006, p. 262.

[6] Lovely, D., J. Coates, J. Woodward and E. Phillips. **Appl and Env Micro** (61), 1995, p 953.

[7] Weiner, J. and D. Lovley. **Appl and Env Micro** (64), 1998, p. 775.

[8] Lovely, D. and E. Phillips. **Appl and Env Micro** (53), 1987, p 2636.

[9] Krishnan, B. EPA Agreement Number R827015-01-0, “Enhancement of Microbial Sulfate Reduction for the Remediation of Hydrocarbon Contaminated Aquifers – a Laboratory and Field Scale Project”, 2002.

[10] Turick, C., P. McKinsey, M. Phifer, F. Sappington and M. Millings, Westinghouse Savannah River Company, WSRC-TR-2002-00346. “D-Area Sulfate Reduction Study Bacteria Population and Organic Selection Laboratory Testing”, 2002.

[11] Pirkle, R. Microseeps Technical Bulletin: “A Summary of the US EPA Technical Protocl for Evaluation of Natural Attenuation of Chlorinated Solvents in Ground Water”.

American Felt & Filter Company Site

Consent Order Index # W3-0784-04-06
Site # 3-36-036
361 Walsh Avenue
New Windsor, New York.

ENVIRONMENTAL HEALTH AND SAFETY PLAN

Prepared For:
American Felt & Filter Company
361 Walsh Avenue
New Windsor, New York 12553

FLS Project Number: 10000-005

Submitted to:

New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 3
21 South Putt Corner
New Paltz, New York 12561-1696

FEBRUARY 23, 2012

Fleming
Lee Shue

Arnold F. Fleming, P.E.

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1.0 INTRODUCTION

Fleming-Lee Shue, Inc. (FLS) prepared this Health and Safety Plan (HASP) on behalf of American Felt & Filter Company (AFFCO), for use and implementation by FLS employees and their representatives during remedial activities at the AFFCO Site (hereafter referred to as the “Site”), New Windsor, NY.

The Site is located at 361 Walsh Avenue in New Windsor, New York, and is shown in Figure 1. A square-shaped, 2,500 square feet (sf) portion of land located at the northwest corner of the site is heavily contaminated with TCA, and the subject of remediation.

The area of the contamination and remediation consist of an open area as well as a portion of the Fuetron Building at the site. Portion of that building has a basement and concrete slab that is anticipated to be free of structures at the time of remediation.

The surrounding neighborhood is a mix of industrial, commercial, and residential buildings.

The purpose of this HASP is to identify the real and potential hazards associated with planned environmental field activities and to stipulate appropriate health and safety procedures, particularly where hazardous materials are potentially present. The procedures and guidelines contained in this document are intended to minimize exposure to chemical, physical and biological hazards that may be present in the soil, groundwater, or air, and to reduce the potential for accidents and injuries.

The procedures described in this document were developed in accordance with the provisions of Occupational Safety and Health Administration (OSHA) rule 29 CFR 1910.120 and FLS’ experience with similar projects. All Site workers must review this HASP before entering the Site. The Health and Safety Officer (HSO) or designee will ensure that personnel have reviewed the HASP and will provide an opportunity to ask health and safety questions during attendance at a pre-field safety meeting. Field personnel will sign the acknowledgment form (Attachment I) maintained on-Site during the remediation. The recommended health and safety guidelines in this document may be modified, if warranted, by additional information obtained prior to, or during Site investigation. The HSO will also maintain copies of pertinent health and safety records for all field personnel.

The Occupational Safety and Health Act (1970) requires:

- Employers shall furnish each employee with a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm.
- Employers must comply with occupational health and safety standards and rules, regulations and orders pursuant to the Act, that are applicable to company business and operations.

- All employees must comply with occupational health and safety standards and regulations under the Act, which are applicable to their actions and situations.

- Employees are encouraged to contact their immediate superior for information that will help them understand their responsibilities under the Act.

1.1 Site History

The American Felt and Filter Company (AFFCO) property "the Site", located in New Windsor, Orange County, New York (Figure 1), manufactures a variety of felt and filter products. The GAF Corporation (the former owner), who manufactured the same products as AFFCO, operated the Site prior to 1978. During both GAF's and AFFCO's ownership, the facility used 1,1,1- trichloroethane (TCA) as a solvent and carrier for zinc resinate which was used to impregnate felt sheets in the Feutron Department. The TCA was stored on Site in 55-gallon drums in an enclosed area just outside the Feutron Building. About 35 to 40 drums of TCA were generally present on Site during regular operations. Site investigations performed in 1988 revealed that groundwater and soil in the area near the Feutron Department contained TCA. The source of the contamination is believed to be a historic leakage within the enclosed process area and spillage in the drum storage area.

The Site was placed on the New York State Department of Environmental Conservation's (NYSDEC) List of Inactive Hazardous Waste Sites in 1991 (Site Code 3-36-036), due to the potential threat to the adjacent Quassaick Creek. The facility stopped using TCA in 1992 when the production line in the Feutron Department that utilized TCA was shut down.

1.2 Previous Site Investigation Results

Site conditions were assessed during six sampling programs conducted in January and December 1988, September 1994, August 1998, October 2001 and most recently in April 2011.

1.2.1 January 1988

This initial study involved groundwater and surface water sampling of the Site. Five supply wells used for process water at the plant already existed at the Site; and nine additional, shallow groundwater monitoring wells (S-1 through S-9, shown on Figure 2) were installed. The state's groundwater standard for TCA is 5 parts per billion (ppb). All of the groundwater monitoring wells sampled exhibited TCA levels above the standard. S-6, the monitoring well on the western portion of the Site, contained 91 ppb of TCA. The source of this contamination is not known. This portion of the Site has not been used by AFFCO, but was apparently used by GAF for the storage of equipment. Three surface water samples were collected from the Quassaick Creek and analyzed for TCA (Figure 2). The surface water analysis indicated that the upstream portion of the creek (C-1) did not contain any TCA, while the portion of the creek immediately downgradient of the drum storage area (C-2) contained 33 ppb of TCA. The creek sample collected from the downstream east edge of the Site (C-3) contained 22 ppb of TCA. The Quassaick Creek is classified as a Class C surface water body. There are no standards or guidance values for TCA in Class C surface water bodies. Surface water sampling locations are shown in Figure 2.

1.2.2 December 1988

Since high concentrations of TCA were detected in January 1988, a second round of groundwater sampling was conducted to assess whether the contaminant levels had changed over time. The TCA concentrations detected during December 1988 were mostly less than half of those detected in January 1988. Soil conditions in the vicinity of the Feutron Building were also evaluated to determine if there was any contamination from past surface spills. The soil sampling indicated that a localized area (approximately 50 feet by 50 feet) located north of the Feutron Building, had TCA contamination exceeding the NYSDEC Technical and Administrative Guidance Memorandum (TAGM 4046) Recommended Soil Cleanup Objectives (RSCO) of 800 ppb. The RSCO is based on potential for impact to groundwater used as a potable supply.

1.2.3 September 1994

A third round of groundwater sampling was conducted to assess the latest groundwater conditions and guide any future Site work. TCA concentrations of groundwater in the two wells near the drum storage area: S-8 (shallow) and E-1 (the former production well), which initially had 1,400 and 2,800 ppb of TCA, respectively, were found to be at 48 ppb and 10 ppb of TCA, respectively at that time.

1.2.4 August 1998

In August 1998, the Site was investigated again to assess any changes in conditions since the last sampling event in September 1994. This program examined soil, soil gas, and groundwater throughout the Site. Soil gas samples were collected to test and were analyzed for the presence of organic vapors, an indication of contaminated soils. In areas where concentrations of organic vapors were found to be elevated in the soil, soil samples were collected and analyzed for volatile organic compounds (Figures 3 and 4). Groundwater from all monitoring wells was also sampled during this investigation. The soil gas survey demonstrated that the soil contamination at the Site was generally limited to the vicinity of the area where TCA was stored and used on the Site. Groundwater sampling indicated that exceedances of the groundwater standards (for use of the groundwater as a drinking water source without treatment) were found only in the wells immediately adjacent to the area where the TCA was stored and used (i.e., in monitoring wells S-6, S-8, and the former production well (E-1).

1.2.5 October 2001

The soil gas in the northwest corner (i.e., both inside and outside) of the Feutron Building was re-sampled. Select soil and groundwater samples were also taken from this area (and were guided by the soil-gas sampling results). In addition, all of the Site's ten (10) monitoring wells were re-sampled. Because there were no records on the construction details of the former production well (E-1), a new bedrock well was installed adjacent to E-1 (Figure 5). The new well was named E-1 New, while the old well remained E-1. Soils were sampled during the installation of this new well. However, none of soil samples collected from E-1 New exceeded the RSCO of 800 ppb. The soil-gas sampling results indicated that seven locations exhibited elevated levels of organic vapors, which prompted soil samples to be obtained from these areas and analyzed for volatile organic compounds (VOCs). Four of the soil samples contained elevated levels of TCA that exceeded the RSCO.\

1.2.6 March –May 2011

As agreed upon during a March 21, 2011 meeting with the NYSDEC, additional soil and groundwater sampling was performed on April 4, 2011. The results were summarized in a letter report titled Results of the Soil and Groundwater Supplemental Remedial Investigation (SRI), dated May 23, 2010. As part of the conclusions of the SRI, it was proposed that soil remediation be performed to the Part 375 SCO for industrial levels.

In a May 23, 2011 teleconference call the NYSDEC approved a revised remedial plan, which is to excavate vertically to the top of the water table and laterally until the soil quality meets the NYSDEC Part 375 Regulations - Restricted Use Soil Cleanup Objectives for Commercial sites. Any remaining impacts below the water table will be treated via an in-situ remedial method.

1.3 Problems Identified at the Site

Groundwater and soil contamination has been confirmed, delineated and monitored at the Site. The most recent investigation, conducted as part of the 2011 SRI, revealed that TCA was still present in, and adjacent to, the former drum storage area near the Feutron Building. However, TCA concentrations in the groundwater were significantly lower than those previously detected in 1994 and 1998.

FLS reviewed the current and historical soil and soil gas analytical results to estimate the total volume of soil impacted with TCA in and near the former drum storage area. The estimated dimensions for the impacted area are 50 ft. by 50 ft. and 10 ft. deep (Fig. 3).

2.0 TASKS TO BE PERFORMED UNDER THIS PLAN

The tasks to be performed under this plan are:

- Soil excavation and management oversight,
- VOC monitoring,
- Post-excavation soil sampling, and
- Backfilling with soil that meets criteria set in 6 NYCRR Part 375-6.7(d) for Restricted Commercial SCOs.

3.0 POTENTIAL CHEMICAL, PHYSICAL, AND BIOLOGICAL HAZARDS AND CONTROLS

This section discusses the potential chemical, physical, and biological hazards and controls associated with the investigation tasks above. A summary of potential site safety hazards and safety requirements is presented in Table 1.

3.1 Potential Chemical Hazards/Controls

Based on data collected during previous investigations at the Site, this HASP focuses on the following chemicals of concern:

- VOCs
    - 1,1,1 Trichloroethane (TCA)

Attachment II lists the recognized and suspected health hazards, exposure limits, physical and chemical properties, recommended protection levels and symptoms of exposure for the chemicals known or suspected to be present at the site. The chemical hazards will be minimized by limiting exposure of personnel to soil and groundwater and by the use of personnel protective equipment (PPE).

3.2 Physical Hazards/Controls

Physical hazards potentially present at the site include, but are not limited to, the following:

Hazard	**Control**
Slip, trip and fall (uneven terrain and slippery surfaces)	Avoid Uneven Terrain, Walk Slowly, Wear Sturdy/Supportive Shoes
Environmental (heat/cold) stress;	A discussion of heat stress and cold stress and related illnesses and controls is provided in Attachment III.

Vehicular Traffic	Avoid working in high traffic areas. If necessary, use cones, reflective vests, and consider use of a flagman/additional protection.
Fire	Ensure class ABC fire extinguisher is nearby to work area when using equipment that can provide an ignition source (heavy machinery, generators, power tools)
Noise hazards	Use ear plugs and/or ear muffs during demolition and excavation activities.
Use of heavy equipment	Stay clear of heavy equipment during operation. Maintain eye contact with operator when approaching equipment.
Flying Debris	Safety glasses and hard hats will be used during all demolition and excavation activities.

Anticipated site operations do not include the need for specific operations such as, lockout/tag-out, scaffolds or confined spaces; therefore these items are not addressed in this HASP. If site activities require these operations, the HASP will be amended and properly trained, experienced and competent personnel shall be utilized.

3.3 Biological Hazards/Controls

The work is scheduled to be completed during the early spring and is located indoors and outdoors, however the following hazards may or may not be present at the site.

Hazard	Control
Bites or stings from insects/animals (particularly ticks) resulting in skin inflammation, disease, or allergic response	Keep exposed skin covered. Use insect repellant if necessary. Inspect yourself carefully after work is completed.
Allergens and toxins from plants and animals, producing dermatitis, rhinitis, or asthma	Keep exposed skin covered using proper PPE. Wash hands regularly.

3.4 Levels of Personal Protection

Personal protective equipment (PPE) must be worn as required for each job in all operations where there is an exposure to hazardous conditions. Upon review of contaminant levels, physical and biological hazards, exposure routes and the nature of the field tasks, it has been determined that the Level D protection will be used during field activities.

Periodic readings above 5 ppm require caution. There is no short-term exposure limit or STEL for TCA. A sustained PID measurement greater than 5 ppm above the background level or objectionable nuisance odors, detected over a 15-minute period in the breathing zone, will require upgrading respiratory protection to Level C.

If a sustained PID measurement reaches 30 ppm above the background level or higher in the worker breathing zone, and 5 ppm or higher at the perimeter (20 feet from where the work is being done), it is recommended to stop the work and resume work only after the PID measurements drop below 30 ppm in the worker breathing zone.

Instrument	Action Level	Response Action
PID	< 5 ppm over background level	Level D
	≥ 5 and ≤ 30 pm over background level	Upgrade to Level C, notify HSO immediately, initiate perimeter monitoring
	> 30 ppm over backgroung level in worker breathing zone, or > 5 ppm over background at perimeter	Stop work, resume work after levels drop below 30 ppm in worker breathing zone

Lists of the protection equipments for Level D and Level C are given below:

3.4.1 Level D

Level D applies to work in areas where the possibility of contact with potentially contaminated groundwater and soil exists. The protective equipment required for Level D includes, but is not limited to, the following:

- Work clothes or coveralls;
- Safety boots, with steel toe;
- Safety glasses;
- Reflective vest;
- Hard hat;
- Disposable latex gloves;
- Hearing protection, to be used as needed

- HEPA Dust Mask for Nuisance Dust (As needed)

3.4.2 Level C

Level C protection will include, but is not limited to, the following:

- Protective clothing and other equipment required for Level D;
- Full-face air purifying respirator (APR) with high efficiency particulate/organic vapor cartridges (ultra-twin with GMCH cartridges);
- Saranex-coated disposable coveralls with hoods; and
- Boot covers.

3.5 General Hazard Controls

3.5.1 General Workplace Safety Rules

- Report unsafe conditions, accidents, injuries, or incidents to the HSO and Project Manager.
- Use eye and/or face protection where there is danger from flying objects or particles, (such as when grinding, chipping, burning and welding, etc.) or from hazardous chemical splashes.
- Dress properly. Loose clothing and jewelry shall not be worn.
- Keep all equipment in safe working condition. Never use defective tools or equipment.
- Report any defective tools or equipment to immediate supervisor. Defective equipment will be taken out of service immediately and repaired or destroyed.
- Properly care for and be responsible for all PPE.
- Do not leave materials in aisles, walkways, stairways, work areas, roadways, or other points of egress.
- Practice good housekeeping at all times.
- Training on equipment is required prior to unsupervised operation.
- During work, pause every few minutes and assess surrounding conditions.

- Crossing highways and major roadways is not recommended. Expect movement of cars and buses at any time along any roadway, regardless of traffic signals, stop signs, yield signs, etc.
- When walking on right-of-ways or road-shoulders, keep a sharp lookout in both directions.
- For personal safety, be cognizant of your surroundings and ensure that equipment is properly secured.
- Whenever possible, objects will be lifted and moved by mechanical devices (cranes, manually operated chain hoists, fork trucks, etc.) rather than by manual effort.
- The mechanical devices will be appropriate for the lifting or moving task and will be operated only by trained and authorized personnel.
- Objects that require special handling or rigging will only be moved under the guidance of a person who has been specifically trained to move such objects.
- Personnel will not pass under a raised load, nor will a suspended load be left unattended.
- Operations near overhead power lines are prohibited unless the power source has been shut off and locked out/tagged out or the appropriate clearance distances are maintained.
- Hand and power tools will be maintained in a safe condition to protect both the worker and the public from injury.
- Follow OSHA’s vehicle management requirements, designed to ensure that vehicles are maintained and operated in a safe condition to protect workers and the public.

3.5.2 Housekeeping

- Proper housekeeping is the foundation for a safe work environment. It definitely helps prevent accidents and fires, as well as creating a professional appearance in the work area.
- Material will be piled or stored in a stable manner so that it will not be subject to falling.
- Combustible scrap, debris, and garbage shall be removed from the work area at frequent and regular intervals.
- Stairways, walkways, exit doors, in front of electrical panels, or access to fire fighting equipment will be kept clear of materials, supplies, trash, and debris.

3.5.3 Fire Prevention

- All firefighting equipment shall be conspicuously located, accessible, and inspected periodically, and maintained in operating condition. An annual service check and monthly visual inspections are required for fire extinguisher.
- All employees must know the location of fire fighting equipment in the work area and have knowledge of its use and application.

3.5.4 Industrial Hygiene and Occupational Health

- Toilet facilities shall be provided as required for the number of workers.
- A first aid kit and portable eyewash station shall be kept on site.
- An adequate supply of potable water shall be provided.
- The use of a common drinking cup is prohibited.
- Employees must be protected against exposure to hazardous noise levels by controlling exposure or by use of proper PPE.
- Any FLS Activities will be assessed for lead exposure (particularly if drywall or any painted surfaces or abrasive blasting/grinding is involved) and/or asbestos exposure.

3.5.5 Personal Hygiene

Eating, drinking and the use of tobacco products in the work area are prohibited. The use of alcohol or other non-prescription drugs by personnel that could impair the ability to function at the work site is prohibited. The use of some prescription drugs may impair the ability to function and can create safety problems on-site. Field personnel taking prescription medication should alert the HSO in case of an emergency. Beards or facial hair that could interfere with the use of a respirator are not permitted. Dermal contact with groundwater should be avoided. This includes avoiding walking through puddles, pools, and mud, sitting or leaning on or against drums, equipment, or on the ground. Field personnel should wash their hands before eating, smoking, using the toilet, etc. Field personnel should wash their hands and face and shower (daily) as soon as possible after leaving the site.

4.0 TRAINING, PROJECT ORGANIZATION, AND PERSONNEL

4.1 Training

Knowledge of the safety rules supplemented by compliance is essential to safety. New employees will be provided orientation training and will be furnished information and literature covering the company health and safety policies, rules, and procedures. This orientation training must be provided prior to the employee's visit to the Site.

All employees will have successfully completed the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4]).

Employees must read the HASP and project-specific Work Plan, which contains the applicable regulations/standards for their job.

Prior to beginning work on-Site, and weekly thereafter, the HSO will lead safety-training sessions and/or "tailgate" training meetings. These meetings will be conducted to provide information and training on new equipment, new procedures, new chemicals, refresher/remedial training in specific areas, or meet annual requirements. Such training may be held in conjunction with the safety briefings/meetings addressed elsewhere in this program.

If necessary, the HSO will ensure that employees are scheduled and provided specialized training as required. Examples of specified training include (but are not limited to):

- Safe handling/use of flammables, poisons, or toxics;
- Respirator care/use;
- Hazard communication (hazardous chemicals);
- Slip, trip and fall hazards and fall protection;
- Suppression and Monitoring

Specialized training will be documented in the employees' personnel records and/or in a master training record.

4.2 Project Team Organization

All personnel who participate in field activities will be required to attend a Health and Safety meeting prior to the commencement of field activities. The project team organization is shown on Table 2, and the roles are described below.

Health and Safety Officer (HSO)

- Administers all aspects of the occupational health and safety program;
- Develops programs and technical guidance to identify and remove physical, chemical, and biological hazards from facilities, operations, and sites;
- Assists management and supervisors in the health and safety training of employees;
- Conducts inspections to identify unhealthy or unsafe conditions or work practices;
- Investigates all accidents and takes action to eliminate accident causes;
- Monitors to determine the degree of hazard;
- Determines the protection levels and equipment required to ensure the safety of personnel;
- Evaluates on-site conditions (i.e., weather and chemical hazard information) and recommending to the project manager and/or the field coordinator, modifications to the work plan and personnel protection levels;
- Monitors performance of all personnel to ensure compliance with the required safety procedures;
- Ensures that all personnel have been trained in proper site-safety procedures including the use of PPE, and have read and signed the Acknowledgment Form (Attachment I);
- Conducts daily briefings as necessary;
- Halts work if necessary;
- Ensures strict adherence to the Site HASP; and
- Reviews personnel medical monitoring participation.

Project Manager

- Familiar with health and safety regulations related to area of responsibility.
- Directs and coordinates health and safety activities within area of responsibility.
- Ensures arrangements for prompt medical attention in case of serious injury
- Requires all employees supervised to use individual protective equipment and safety devices.
- Ensures that safety equipment is available, maintained, used, and stored correctly.

- Instructs and trains all persons within area of responsibility in health and safety requirements.
- Conducts frequent and regular health and safety inspections of work area. Directs correction of unsafe conditions.
- Conducts weekly safety briefings with all supervisors and/or workers.
- Requires all subcontractors and subcontractor personnel to comply with health and safety regulations.

All Employees

The minimum personal qualifications for each individual participating in field activities are:

- OSHA-specific medicals including, but not limited to, audiometric testing under the hearing conservation program and medical approval for the use of respirators;
- Participation in the FLS Occupational Health Monitoring Program;
- Successful completion of the 40-hour OSHA health and safety training for hazardous material sites (29 CFR 1910.120[e][3][i]) and valid/up-to-date 8-hour refresher training (29 CFR 1910.120[e][4]);
- Be familiar with and comply with proper health and safety practices;
- Use the required safety devices and proper personal protective safety equipment; and
- Notify HSO/supervisor immediately of unsafe conditions/acts, accidents, and injuries.

4.3 Subcontractor Compliance

All FLS contracts and subcontracts require that state laws concerning health and safety will be observed by the subcontractor. The provisions of these health and safety responsibilities apply to subcontractors and their employees working for FLS. Failure to fulfill this requirement is a failure to meet the conditions of the contract.

5.0 INDIVIDUAL HEALTH AND SAFETY PROGRAMS LISTING

OSHA standards specify various individual programs that may be applicable to work performed on construction sites. Highlights of these programs are provided below, and specific written programs or procedures may be included into this written program, attached, or developed separately.

5.1 Hazard Communication Program

If employees are exposed to or work with hazardous chemicals at the job site, this program is required. Required elements of the written program include a master listing of chemicals; maintaining material safety data sheets on each chemical; and training of employees on the program, the chemicals exposed to, and material safety data sheets.

5.2 Respiratory Protection Program

If employees are exposed to hazardous/toxic chemical, paint or other gases, vapors, fumes, dusts, or mists above the National Institute for Occupational Safety and Health (NIOSH) permissible exposure limit (PEL), and/or employees wear respirators, this program is required. Program elements are written program for the selection, maintenance, care, and use of respirators; fit testing, training, and employee evaluation for use. .

5.3 Occupational Noise Exposure/Hearing Conservation Program

If employees are exposed to noise levels above the permissible noise exposures, protection against the effects of noise and an effective hearing conservation program are required. Such a program would include elements such as a written program, noise monitoring, hearing evaluations and follow-on testing, personal protective equipment (hearing protection), and maintenance of medical records.

5.4 Emergency Response Plan

If employees are engaged in emergency response to a hazardous substance/chemical release, an emergency response plan must be developed and implemented. Program elements include a written response plan, identification and training of responding employees, medical surveillance and consultation, and post response operations.

5.5 Asbestos Control Program

If employees are exposed to asbestos fibers in the workplace, then an initial monitoring for asbestos exposure must be made. If the monitoring results are above the permissible exposure limit (PEL), this program is required. Program elements include regulated areas, exposure monitoring, medical surveillance and records maintenance, engineering controls, personal protective equipment, and training.

5.6 Lead Exposure Program

If employees are exposed to lead in the workplace, then an initial monitoring for lead exposure must be made. If the monitoring results are above the permissible exposure limit (PEL), this program is required. Program elements include regulated areas, exposure monitoring, medical surveillance and records maintenance, engineering controls, personal protective equipment, and training.

6.0 COMMUNITY AIR MONITORING

A Community Air Monitoring Plan (CAMP) that includes real-time monitoring for volatile organic compounds (VOCs) will be implemented at the downwind perimeter of the work area when excavation activities are in progress at the TCA impacted areas. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminants releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown.

6.1 VOCs Monitoring

Real-time air monitoring for VOC levels at the perimeter of the work area will be performed. Continuous monitoring will be performed for all ground intrusive activities in the TCA impacted areas**.** Ground intrusive activities include soil excavation and handling.

Periodic monitoring for VOCs will be performed during non-intrusive activities as the collection of soil and groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection will consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap, monitoring during well baling/purging, and taking a reading prior to leaving a sample location.

6.1.1 VOC Response Levels, and Actions

VOCs will be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a continuous basis. Upwind concentrations will be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work will be performed using a photoionizaion detector (PID), or equivalent, to measure total organic vapor concentrations. The PID will be calibrated at least daily for organic vapors. The PID is capable of calculating 15-minute running average concentrations, which will be compared to the concentrations specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities will be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities will resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities will resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic level is above 25 ppm at the perimeter of the work area, activities will be shutdown.

  All 15-minute readings will be recorded and be available for New York State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes will also be recorded.

7.0 DECONTAMINATION

7.1 Site/Work Area Organization

A typical site work area will consist of an exclusion zone where the actual field activity will take place; a decontamination zone; and a command post located outside the decontamination area and exclusion zones.

Levels of personal protection in the exclusion zone will vary depending on air monitoring data, and will be specified by the Site HSO.

7.2 Personnel Decontamination

Decontamination (decon) of personnel consists of physically removing soil or contaminants using the correct procedures for washing and removal of PPE. Decon will take place in the designated decontamination zone using the following steps, if applicable:

- Soap and potable water wash and potable water rinse of gloves;
- Tyvek removal;
- Glove removal; and
- Field wash of hands and face.

7.3 Equipment Decontamination

The following decontamination procedure will be implemented in the field after field equipment has come in contact with contaminated material.

- Rinse equipment in tap water;
- Scrub equipment with non-phosphate detergent and tap water;
- Rinse equipment with distilled water
- Allow equipment to air dry

8.0 EMERGENCY AND CONTINGENCY PLAN

Emergency communications will be maintained during all on-site field activities. The emergency route to the hospital is depicted on Figure 2 and emergency contacts and their phone numbers are presented in Table 2.

A first aid kit will be available on-site at all times for any minor on-site injuries. Emergency medical assistance or ambulance can be reached by calling 911 for more severe injuries.

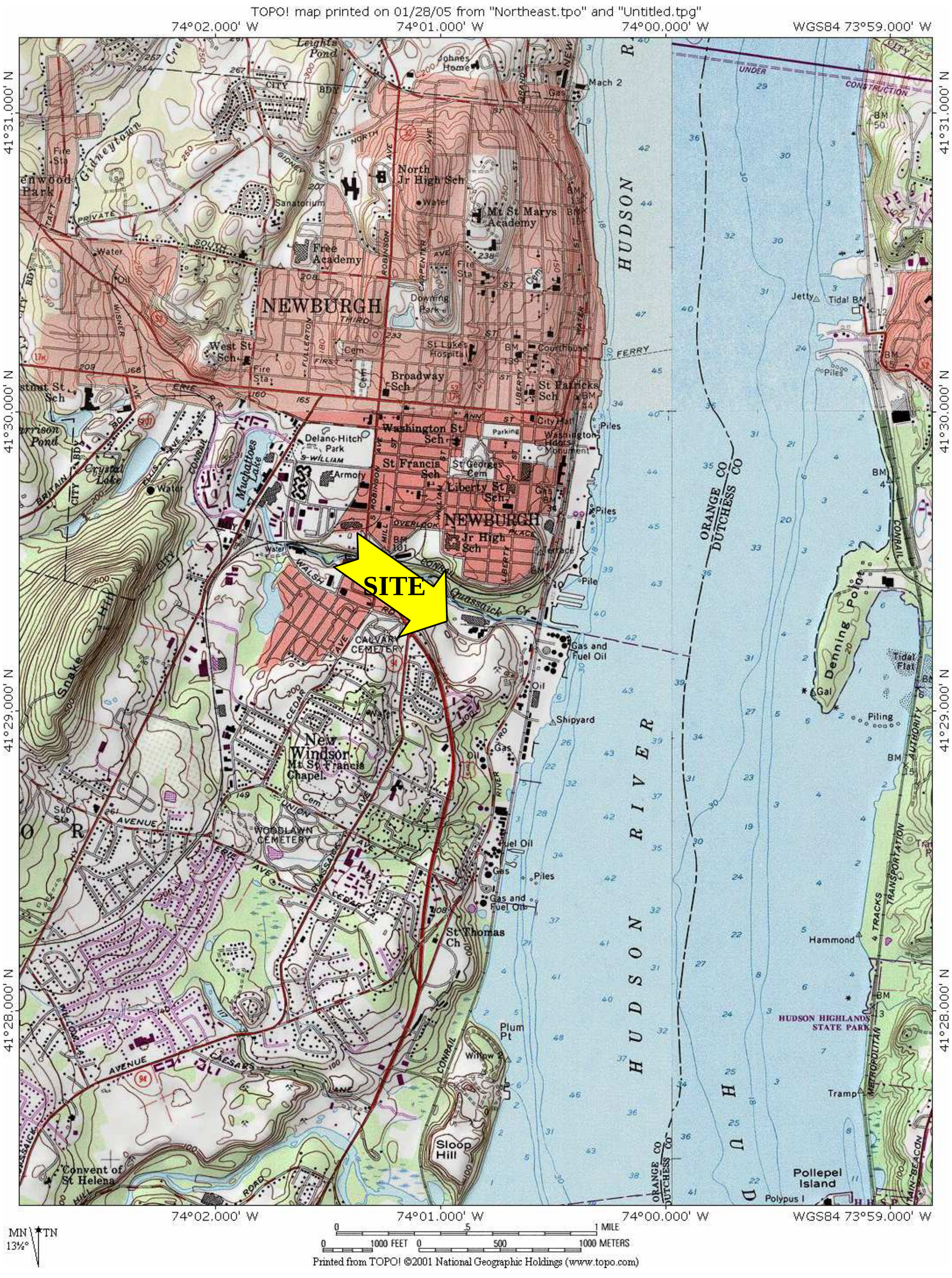
A site specific emergency plan will be developed in the field which will include evacuation procedures, chain of command, rally point, and emergency procedures.

TABLE 1
Emergency Contacts and Phone Numbers

Company	Title	Contact Number
FLS 158 West 29th Street New York, NY 10001		**(212) 675-3225**
Arnold Fleming	Project Director	(917) 885-1475 (cell)
Kevin McGuinness	Health and Safety Officer	(914) 318-2145 (cell)
Rahul Bhatia	Environmental Engineer	(516) 528-0268 (cell)
Bill Maniquez	Environmental Professional	(646) 584-2319 (cell)
American Felt & Filter Company 361 Walsh Avenue New Windsor, NY 12553		
Wilson H. Pryne	President & CEO, AFFCO	(845) 561-3566
EMERGENCY		911
HOSPITAL **St Luke's Hospital:** 70 Dubois Street, On Dubois Street Between 1st Street and Carter Street Newburgh, NY 12550, US		(845) 561-4400 (main and emergency line)
EMERGENCY SPILL RESPONSE: New York State Department of Environmental Conservation (NYSDEC) NYSDEC Hotline Oil or Abandoned Chemicals Releases from Underground Petroleum Storage Tanks Hazardous Waste		1-800-457-7362

TABLE 2
Project Team Organization

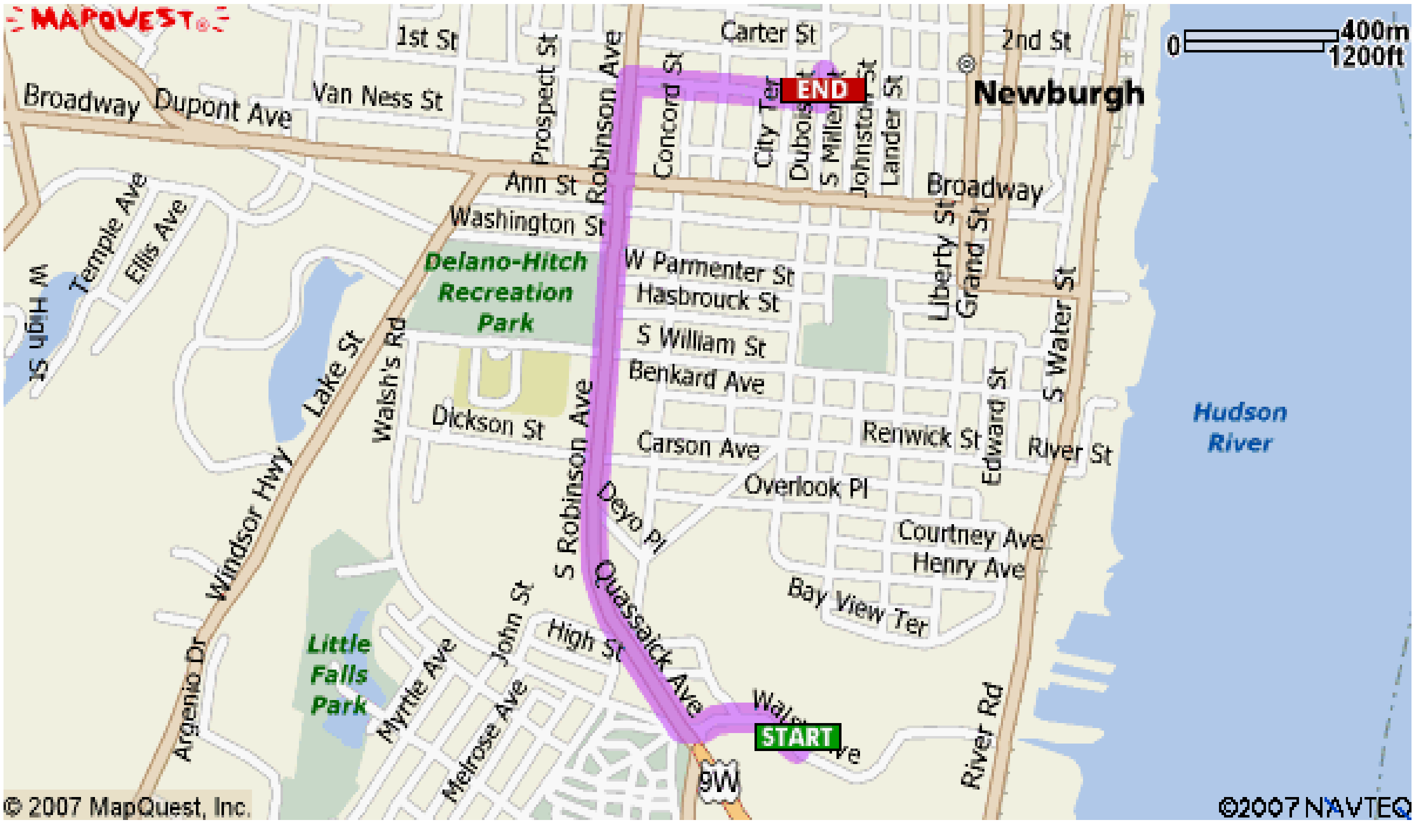
PERSONNEL	**RESPONSIBILITIES**
Arnold Fleming, P.E.	President, FLS Project Director
Kevin McGuinness	Project Manager QA Manager
Rahul Bhatia	FLS Task Manager FLS HSO
Bill Maniquez	FLS HSO Alternate



Fleming
Lee Shue

FIGURE 1: SITE LOCATION MAP

SITE: American Felt & Filter Company
361 Walsh Avenue,
New Windsor, NY.
CLIENT: American Felt & Filter Company.



St Luke's Hospital:
70 Dubois St, Newburgh, NY 12550, US

Directions Distance: **Total Est. Time:** 5 minutes **Total Est. Distance:** 1.59 miles

START 1: Start out going WEST on WALSH AVE toward PLYMPTON ST. 0.1 miles

↱ 2: Turn SLIGHT RIGHT onto QUASSAICK AVE / US-9W. Continue to follow US-9W. 1.0 miles

→ 3: Turn RIGHT onto 1ST ST. 0.3 miles

← 4: Turn LEFT onto DUBOIS ST. <0.1 miles

END 5: End at **St Luke's Hospital:**

Fleming
Lee Shue

FIGURE 2: ROUTE TO THE ST. LUKE'S HOSPITAL

SITE: American Felt & Filter Company
361 Walsh Avenue, New Windsor, NY
CLIENT: Joseph Conley, Outlet City, Inc.

Environmental Management & Consulting, 158 West 29th Street, New York, NY 10001

HASP ACKNOWLEDGMENT FORM

The following personnel have read the site-specific HASP and are familiar with its provisions.

Print Name	*Signature*	*Company*	*Function*	*Date*

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **METHYL CHLOROFORM**

CAS Number: 71-55-6
DOT Number: UN 2831

RTK Substance number: 1237
Date: September 1994 Revision: February 2001

HAZARD SUMMARY

- **Methyl Chloroform** can affect you when breathed in and by passing through your skin.
- **Methyl Chloroform** may cause mutations. Handle with extreme caution.
- Contact can irritate the skin and eyes.
- Exposure can cause headache, dizziness and lightheadedness. Higher levels can cause irregular heartbeat and even coma.
- Prolonged contact can cause thickening and cracking of the skin.
- **Methyl Chloroform** may damage the liver and kidneys.

IDENTIFICATION

Methyl Chloroform is a colorless liquid. It is used as a cleaning solvent in vapor degreasing, coatings, ink production and dry cleaning.

REASON FOR CITATION

- **Methyl Chloroform** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH, DEP, IARC, HHAG, NFPA and EPA.
- Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
- If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.
- **ODOR THRESHOLD = 390 ppm**.
- The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

OSHA:	The legal airborne permissible exposure limit (PEL) is **350 ppm** averaged over an 8-hour workshift.
NIOSH:	The recommended airborne exposure limit is **350 ppm**, which should not be exceeded at any time.
ACGIH:	The recommended airborne exposure limit is **350 ppm** averaged over an 8-hour workshift and **450 ppm** as a STEL (short-term exposure limit).

- **Methyl Chloroform** may cause mutations. All contact with this chemical should be reduced to the lowest possible level.
- The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- Wear protective work clothing.
- Wash thoroughly immediately after exposure to **Methyl Chloroform** and at the end of the workshift.
- Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Methyl Chloroform** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Methyl Chloroform**:

* Contact can irritate the skin and eyes.
* Exposure can cause headache, dizziness and light-headedness. Higher levels can cause irregular heartbeat and even coma.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Methyl Chloroform** and can last for months or years:

Cancer Hazard

* **Methyl Chloroform** may cause mutations (genetic changes).
* There is no evidence that **Methyl Chloroform** causes cancer in animals. This is based on test results presently available to the New Jersey Department of Health and Senior Services from published studies.

Reproductive Hazard

* According to the information presently available to the New Jersey Department of Health and Senior Services, **Methyl Chloroform** has been tested and has not been shown to affect reproduction.

Other Long-Term Effects

* Prolonged contact can cause thickening and cracking of the skin.
* **Methyl Chloroform** may damage the liver and kidneys.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

* Liver and kidney function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by **Methyl Chloroform**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically pump liquid **Methyl Chloroform** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Methyl Chloroform** should change into clean clothing promptly.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Methyl Chloroform**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Methyl Chloroform**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Methyl Chloroform**, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where **Methyl Chloroform** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

* Avoid skin contact with **Methyl Chloroform**. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/clothing material for your operation.

* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

* ACGIH recommends *Viton* or *Polyvinyl Alcohol* as protective materials.

Eye Protection

* Wear indirect-vent, impact and splash resistant goggles when working with liquids.

* Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* Where the potential exists for exposure over **350 ppm**, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

* Exposure to **700 ppm** is immediately dangerous to life and health. If the possibility of exposure above **700 ppm** exists, use a MSHA/NIOSH approved self-contained breathing apparatus with a full facepiece operated in a pressure-demand or other positive-pressure mode.

HANDLING AND STORAGE

* Prior to working with **Methyl Chloroform** you should be trained on its proper handling and storage.

* **Methyl Chloroform** must be stored to avoid contact with ACETONE; OXYGEN; LIQUID OXYGEN; DINITROGEN TETROXIDE; NITRITES; POTASSIUM; and SODIUM since violent reactions occur.

* **Methyl Chloroform** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE); CHEMICALLY ACTIVE METALS (such as MAGNESIUM and ZINC); HYDROGEN CHLORIDE; and HALOCARBONS.

* **Methyl Chloroform** reacts slowly with WATER to form *Hydrochloric Acid*.

* Do not allow vapor near sources of ultraviolet light (such as welding) because poisonous gases may be produced.

* Store in tightly closed containers in a cool, dry, well-ventilated area away from HEAT, WATER, and MOISTURE.

* DO NOT USE ALUMINUM CONTAINERS.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?

A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?

A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?

A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?

A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?

A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q: What are the likely health problems from chemicals which cause mutations?

A: There are two primary health concerns associated with mutagens: (1) cancers can result from changes induced in cells and, (2) adverse reproductive and developmental outcomes can result from damage to the egg and sperm cells.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 292-5677 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<

Common Name: **METHYL CHLOROFORM**
DOT Number: **UN 2831**
NAERG Code: **160**
CAS Number: **71-55-6**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	-	1
REACTIVITY	-	0
POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

- **Methyl Chloroform** is a noncombustible liquid, however, **Methyl Chloroform** vapor will burn.
- Use dry chemical, CO_2, water spray, or alcohol resistant foam extinguishers.
- POISONOUS GASES ARE PRODUCED IN FIRE, including *Hydrogen Chloride* and *Phosgene*.
- CONTAINERS MAY EXPLODE IN FIRE.
- Use water spray to keep fire-exposed containers cool.
- If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Methyl Chloroform** is spilled or leaked, take the following steps:

- Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
- Remove all ignition sources.
- Cover with dry lime, sand or soda ash, and place in covered containers for disposal.
- Ventilate and wash area after clean-up is complete.
- It may be necessary to contain and dispose of **Methyl Chloroform** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
- If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

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FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

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HANDLING AND STORAGE (See page 3)

FIRST AID

In NJ, for POISON INFORMATION call 1-800-764-7661

Eye Contact

- Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact

- Remove contaminated clothing. Wash contaminated skin with soap and water.

Breathing

- Remove the person from exposure.
- Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- Transfer promptly to a medical facility.

PHYSICAL DATA

Vapor Pressure: 100 mm Hg at 68°F (20°C)
Water Solubility: Insoluble

OTHER COMMONLY USED NAMES

Chemical Name:

Ethane, 1,1,1-Trichloro-

Other Names:

Chlorothene; Chlorothene VG; Methyltrichloromethane; 1,1,1-Trichloroethane

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Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

New Jersey Department of Health and Senior Services

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **TRICHLOROACETIC ACID**

CAS Number: 76-03-9
DOT Number: UN 1839
UN 2564 (Solution)

RTK Substance number: 1883
Date: May 1997 Revision: May 2004

HAZARD SUMMARY

* **Trichloroacetic Acid** can affect you when breathed in.
* **Trichloroacetic Acid** is a CORROSIVE CHEMICAL and contact can severely irritate and burn the skin and eyes with possible eye damage.
* Breathing **Trichloroacetic Acid** can irritate the nose and throat.
* Breathing **Trichloroacetic Acid** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.
* **Trichloroacetic Acid** may affect the liver.

IDENTIFICATION

Trichloroacetic Acid is a colorless, crystalline (sand-like) solid which is used in liquid solutions. It is used in making medicines, pharmaceuticals, and pesticides.

REASON FOR CITATION

* **Trichloroacetic Acid** is on the Hazardous Substance List because it is cited by ACGIH, DOT, NIOSH, IARC and IRIS.
* This chemical is on the Special Health Hazard Substance List because it is **CORROSIVE**.
* Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.1020.
* If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS

NIOSH: The recommended airborne exposure limit is **1 ppm** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **1 ppm** averaged over an 8-hour workshift.

WAYS OF REDUCING EXPOSURE

* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* Wear protective work clothing.
* Wash thoroughly immediately after exposure to **Trichloroacetic Acid** and at the end of the workshift.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Trichloroacetic Acid** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Trichloroacetic Acid**:

* Contact can severely irritate and burn the skin and eyes with possible eye damage.
* Breathing **Trichloroacetic Acid** can irritate the nose and throat.
* Breathing **Trichloroacetic Acid** can irritate the lungs causing coughing and/or shortness of breath. Higher exposures can cause a build-up of fluid in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Trichloroacetic Acid** and can last for months or years:

Cancer Hazard

* While **Trichloroacetic Acid** has been tested, it is not classifiable as to its potential to cause cancer.

Reproductive Hazard

* There is limited evidence that **Trichloroacetic Acid** is a teratogen in animals. Until further testing has been done, it should be treated as a possible teratogen in humans.

Other Long-Term Effects

* **Trichloroacetic Acid** can irritate the lungs. Repeated exposure may cause bronchitis to develop with cough, phlegm, and/or shortness of breath.
* **Trichloroacetic Acid** may affect the liver.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following are recommended:

* Chest x-ray and lung function tests.
* Liver function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.1020.

Mixed Exposures

* Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.
* Because more than light alcohol consumption can cause liver damage, drinking alcohol may increase the liver damage caused by **Trichloroacetic Acid**.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

* Where possible, automatically transfer solid **Trichloroacetic Acid** or pump liquid **Trichloroacetic Acid** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by **Trichloroacetic Acid** should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Trichloroacetic Acid**.
* Eye wash fountains should be provided in the immediate work area for emergency use.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with **Trichloroacetic Acid**, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted **Trichloroacetic Acid**, whether or not known skin contact has occurred.

- Do not eat, smoke, or drink where **Trichloroacetic Acid** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating, drinking, smoking, or using the toilet.
- For solid **Trichloroacetic Acid** use a vacuum or a wet method to reduce dust during clean-up. DO NOT DRY SWEEP.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

OSHA 1910.132 requires employers to determine the appropriate personal protective equipment for each hazard and to train employees on how and when to use protective equipment.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- Avoid skin contact with **Trichloroacetic Acid**. Wear acid-resistant gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
- Safety equipment manufacturers recommend *Viton* as a protective material.

Eye Protection

- For solid **Trichloroacetic Acid**, wear eye protection with side shields or goggles.
- Wear indirect-vent, impact and splash resistant goggles when working with liquids.
- Wear a face shield along with goggles when working with corrosive, highly irritating or toxic substances.
- Contact lenses should not be worn when working with this substance.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- Where the potential exists for exposure over **1 ppm**, use a NIOSH approved full facepiece respirator with high efficiency particulate prefilters and an acid gas cartridge/canister. Greater protection is provided by a powered-air purifying respirator. Particulate filters must be checked every day before work for physical damage, such as rips or tears, and replaced as needed.
- If while wearing a filter or cartridge respirator you can smell, taste, or otherwise detect **Trichloroacetic Acid**, or if while wearing particulate filters abnormal resistance to breathing is experienced, or eye irritation occurs while wearing a full facepiece respirator, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter or cartridge. If the seal is no longer good, you may need a new respirator.
- Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters or cartridges to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- Where the potential for high exposure exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in a pressure-demand or other positive-pressure mode. For increased protection use in combination with an auxiliary self-contained breathing apparatus operated in a pressure-demand or other positive-pressure mode.

QUESTIONS AND ANSWERS

Q: If I have acute health effects, will I later get chronic health effects?
A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.

Q: Can I get long-term effects without ever having short-term effects?
A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

Q: What are my chances of getting sick when I have been exposed to chemicals?
A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.

Q: When are higher exposures more likely?
A: Conditions which increase risk of exposure include <u>dust releasing operations</u> (grinding, mixing, blasting, dumping, etc.), <u>other physical and mechanical processes</u> (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and <u>"confined space" exposures</u> (working inside vats, reactors, boilers, small rooms, etc.).

Q: Is the risk of getting sick higher for workers than for community residents?
A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. This may be a problem for children or people who are already ill.

Q:	Can men as well as women be affected by chemicals that cause reproductive system damage?
A:	Yes. Some chemicals reduce potency or fertility in both men and women. Some damage sperm and eggs, possibly leading to birth defects.
Q:	Who is at the greatest risk from reproductive hazards?
A:	Pregnant women are at greatest risk from chemicals that harm the developing fetus. However, chemicals may affect the ability to have children, so both men and women of childbearing age are at high risk.
Q:	Should I be concerned if a chemical is a teratogen in animals?
A:	Yes. Although some chemicals may affect humans differently than they affect animals, damage to animals suggests that similar damage can occur in humans.

The following information is available from:

New Jersey Department of Health and Senior Services
Occupational Health Service
PO Box 360
Trenton, NJ 08625-0360
(609) 984-1863
(609) 984-7407 (fax)

Web address: http://www.state.nj.us/health/eoh/odisweb/

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call personnel at the Department of Health and Senior Services, Occupational Health Service, who can help you find the information you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know Survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

A **carcinogen** is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

CFR is the Code of Federal Regulations, which consists of the regulations of the United States government.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

IRIS is the Integrated Risk Information System database of the federal EPA.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m^3 means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEL is the Permissible Exposure Limit which is enforceable by the Occupational Safety and Health Administration.

PIH is a DOT designation for chemicals which are Poison Inhalation Hazards.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

STEL is a Short Term Exposure Limit which is usually a 15-minute exposure that should not be exceeded at any time during a work day.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

>>>>>>>>>>>>>>>>>> EMERGENCY INFORMATION <<<<<<<<<<<<<<<<<<

Common Name:	**TRICHLOROACETIC ACID**
DOT Number:	**UN 1839** **UN 2564 (Solution)**
NAERG Code:	**153**
CAS Number:	**76-03-9**

Hazard rating	NJDHSS	NFPA
FLAMMABILITY	0	-
REACTIVITY	0	-
CORROSIVE POISONOUS GASES ARE PRODUCED IN FIRE CONTAINERS MAY EXPLODE IN FIRE		

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

- * **Trichloroacetic Acid** may burn, but does not readily ignite.
- * Use dry chemical, CO_2, alcohol or polymer foam extinguishers.
- * POISONOUS GASES ARE PRODUCED IN FIRE, including *Chloroform, Phosgene* and *Hydrogen Chloride*.
- * CONTAINERS MAY EXPLODE IN FIRE.
- * Use water spray to keep fire-exposed containers cool.
- * If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If **Trichloroacetic Acid** is spilled or leaked, take the following steps:

- * Evacuate persons not wearing protective equipment from area of spill or leak until clean-up is complete.
- * Cover with dry lime, sand or soda ash and place in covered containers for disposal.
- * Ventilate and wash area after clean-up is complete.
- * It may be necessary to contain and dispose of **Trichloroacetic Acid** as a HAZARDOUS WASTE. Contact your state Department of Environmental Protection (DEP) or your regional office of the federal Environmental Protection Agency (EPA) for specific recommendations.
- * If employees are required to clean-up spills, they must be properly trained and equipped. OSHA 1910.120(q) may be applicable.

==

FOR LARGE SPILLS AND FIRES immediately call your fire department. You can request emergency information from the following:

CHEMTREC: (800) 424-9300
NJDEP HOTLINE: 1-877-WARN-DEP

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HANDLING AND STORAGE

- * Prior to working with **Trichloroacetic Acid** you should be trained on its proper handling and storage.
- * A violent reaction may occur when **Trichloroacetic Acid** is mixed with COPPER in DIMETHYL SULFOXIDE.
- * **Trichloroacetic Acid** is not compatible with OXIDIZING AGENTS (such as PERCHLORATES, PEROXIDES, PERMANGANATES, CHLORATES, NITRATES, CHLORINE, BROMINE and FLUORINE); and STRONG BASES (such as SODIUM HYDROXIDE and POTASSIUM HYDROXIDE).
- * Store in tightly closed containers in a cool, well-ventilated area away from METALS and MOISTURE.

FIRST AID

For POISON INFORMATION call 1-800-222-1222

Eye Contact

- * Immediately flush with large amounts of water. Continue without stopping for at least 30 minutes, occasionally lifting upper and lower lids. Seek medical attention immediately.

Skin Contact

- * Quickly remove contaminated clothing. Immediately wash area with large amounts of soap and water. Seek medical attention immediately.

Breathing

- * Remove the person from exposure.
- * Begin rescue breathing (using universal precautions) if breathing has stopped and CPR if heart action has stopped.
- * Transfer promptly to a medical facility.
- * Medical observation is recommended for 24 to 48 hours after breathing overexposure, as pulmonary edema may be delayed.

PHYSICAL DATA

Flash Point: greater than 230°F (110°C)

Water Solubility: Soluble

OTHER COMMONLY USED NAMES

Chemical Name:

Acetic Acid, Trichloro-

Not intended to be copied and sold for commercial purposes.

NEW JERSEY DEPARTMENT OF HEALTH AND
SENIOR SERVICES
Right to Know Program
PO Box 368, Trenton, NJ 08625-0368
(609) 984-2202

1.0 HEAT STRESS

Excessive exposure to a hot environment can bring about a variety of heat-induced disorders. The four main types of heat stress related illnesses: heat rash, heat cramps, heat exhaustion, and heat stroke, are discussed below.

1.1 Heat Rash

Heat rash also know as prickly heat, is likely to occur in hot, humid environments where sweat is not readily removed from the surface of the skin by evaporation and the skin remains wet most of the time. The sweat ducts become plugged, and a skin rash soon appears. When the rash is extensive or when it is complicated by an infection, prickly heat can be very uncomfortable and may reduce a worker's performance. The worker can prevent this condition by resting in a cool place part of each day and by regularly bathing and drying the skin.

1.2 Heat Cramps

Heat cramps are painful spasms of the muscles that occur among those who sweat profusely in heat, drink large quantities of water, but do not adequately replace the body's salt loss. Drinking large quantities of water tends to dilute the body's fluids, while the body continues to lose salt. Shortly thereafter, the low salt level in the muscles causes painful cramps. The affected muscles may be part of the arms, legs or abdomen, but tired muscles (those used to perform the work) are usually the ones most susceptible to cramps. Cramps may occur during or after work hours and may be relieved by taking salted liquids by mouth, such as the variety of sports drinks on the market.

CAUTION SHOULD BE EXERCISED BY PEOPLE WITH HEART PROBLEMS OR THOSE ON LOW SODIUM DIETS WHO WORK IN HOT ENVIRONMENTS. THESE PEOPLE SHOULD CONSULT A PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.3 Heat Exhaustion

Heat exhaustion includes several clinical disorders having symptoms that may resemble the early symptoms of heat stroke. Heat exhaustion is caused by the loss of large amounts of fluid by sweating, sometimes with excessive loss of salt. A worker suffering from this condition still sweats but experiences extreme weakness or fatigue, giddiness, nausea, or headache. In more serious cases, the victim may vomit or lose consciousness. The skin is clammy and moist, the complexion is pale or flushed, and the body temperature is normal or only slightly elevated.

A summary of the key symptoms of heat exhaustion is as follows:

- Clammy skin
- Confusion
- Dizziness
- Fainting
- Fatigue
- Heat Rash
- Light-headedness
- Nausea
- Profuse sweating
- Slurred Speech
- Weak Pulse

In most cases, treatment involves having the victim rest in a cool place and drink plenty of fluids. Victims with mild cases of heat exhaustion usually recover spontaneously with this treatment. Those with severe cases may require extended care for several days. There are no known permanent effects.

AS WITH HEAT CRAMPS, CERTAIN PERSONS SHOULD CONSULT WITH THEIR PHYSICIAN ABOUT WHAT TO DO UNDER THESE CONDITIONS.

1.4 Heat Stroke

This is the most serious of health problems associated with working in hot environments. It occurs when the body's temperature regulatory system fails and sweating becomes inadequate. The body's only effective means of removing excess heat is compromised with little warning to the victim that a crisis stage has been reached.

A heat stroke victim's skin is hot, usually dry, red or spotted. Body temperature is usually 105°F or higher, and the victim is mentally confused, delirious, perhaps in convulsions, or unconscious. Unless the victim receives quick and appropriate treatment, death can occur.

A summary of the key symptoms of heatstroke is as follows:

- Confusion
- Convulsions
- Incoherent Speech
- Staggering Gait
- Unconsciousness
- Sweating stops
- Hot skin, high temperature (yet extremities may feel chilled)

Any person with signs or symptoms of heat stroke requires immediate hospitalization. However, first aid should be immediately administered. This includes moving the victim to a cool area, thoroughly soaking the clothing with water, and vigorously fanning the body to increase cooling. Further treatment at a medical facility should include continuation of the cooling process and the monitoring of complications that often accompany the heat stroke. Early recognition and treatment of heat stroke are the only means of preventing permanent brain damage or death.

1.5 Preparing for the Heat

Humans, to a large extent, are capable of adjusting to heat. This acclimation to heat, under normal circumstances, usually takes about 5 to 7 days, during which time the body will undergo a series of changes that will make continued exposure to heat more tolerable.

On the first day of exposure, body temperature, pulse rate, and general discomfort will be higher. With each succeeding day of exposure, all of these responses will gradually decrease, while the sweat rate will increase. When the body does become acclimated to the heat, the worker will find it possible to perform work with less strain and distress.

A gradual exposure to heat gives the body time to become accustomed to higher temperatures, such as those encountered in chemical protective clothing.

1.6 Protecting Against Heat Stress

There are several methods that can be used to reduce heat stress:

- Limit duration of work periods
- Use protective clothing with cooling devices
- Enforce the use of the "Buddy System"
- Consume electrolyte solutions prior to suiting up
- Monitor workers for pulse recovery rates, body fluid loss, body weight loss, and excess fatigue
- Screen for heat stress susceptible candidates in your medical surveillance program
- Have all personnel know the signs and symptoms of heat stress

2.0 COLD STRESS

Persons working outdoors in temperatures at or below freezing may be frostbitten. Extreme cold for a short time may cause severe injury to the surface of the body, or result in profound generalized cooling, causing death. Areas of the body that have high surface-area-to-volume ratio such as fingers, toes, and ears, are the most susceptible. Two factors influence the development of a cold injury, ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature. For instance, 10 degrees Fahrenheit with a wind of 15 miles per hour (mph) is equivalent in chilling effect to still air at minus 18 degrees Fahrenheit.

As a general rule, the greatest incremental increase in wind chill occurs when a wind of 5 mph increases to 10 mph. Additionally, water conducts heat 240 times faster than air. Thus, the body cools suddenly when chemical-protective equipment is removed if the clothing underneath is perspiration soaked.

2.1 Frostbite

Local injury resulting from cold is included in the generic term frostbite. There are several degrees of damage. Frostbite of the extremities can be categorized into:

- Frost Nip or Initial Frostbite: characterized by suddenly blanching or whitening of skin.
- Superficial Frostbite: skin has a waxy or white appearance and is firm to the touch, but tissue beneath is resilient.
- Deep Frostbite: tissues are cold, pale, and solid; extremely serious injury.

2.2 Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering
- Apathy, listlessness, sleepiness, and (sometimes rapid cooling of the body to less than 95°F)
- Unconsciousness, glassy stage, slow pulse, and slow respiratory rate
- Freezing of the extremities
- Death

Thermal socks, long cotton or thermal underwear, hard hat liners and other cold weather gear can aid in the prevention of hypothermia. Blankets and warm drinks (other than caffeinated coffee) are also recommended.

Measures shall be taken to keep workers from getting wet, such as issuance of rain gear. Workers whose cloths become wet shall be given the opportunity to dry off and change clothes.

American Felt & Filter Company
New Windsor, New York
Consent Order Index # W3-0784-04-06
Site # 3-36-036

SOIL MANAGEMENT PLAN

American Felt & Filter Company (AFFCO)
34 John Street
New Windsor, New York 12550

FLS Project Number: 10000-008

Submitted to:
New York State Department of Environmental Conservation
Division of Environmental Remediation, Region 3
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1.0 INTRODUCTION

The American Felt and Filter Company (AFFCO) property “the Site”, located in New Windsor, Orange County, New York (Figure 1), manufactures a variety of felt and filter products. The GAF Corporation (the former owner), who manufactured the same products as AFFCO, operated the Site prior to 1978. During both GAF’s and AFFCO’s ownership, the facility used 1,1,1- trichloroethane (TCA) as a solvent and carrier for zinc resinate which was used to impregnate felt sheets in the Feutron Department. The TCA was stored on Site in 55-gallon drums in an enclosed area just outside the Feutron Building. About 35 to 40 drums of TCA were generally present on Site during regular operations. Site investigations performed in 1988 revealed that groundwater and soil in the area near the Feutron Department contained TCA. The source of the TCA is believed to be a historic leakage within the enclosed process area and spillage in the drum storage area.

The Site was placed on the New York State Department of Environmental Conservation's (NYSDEC) List of Inactive Hazardous Waste Sites in 1991 (Site Code 3-36-036), due to the potential threat to the adjacent Quassaick Creek. The facility stopped using TCA in 1992 when the production line in the Feutron Department that utilized TCA was shut down.

Soil and/or groundwater sampling conducted in September 1994, August 1998, and October 2001 revealed that residual amounts of TCA were still present in the soil and groundwater in the former drum storage area near the Feutron Building. Fleming Lee Shue (FLS) submitted a Remedial Design/Remedial Action Work Plan (RD/RA Work Plan) in February 2005 to the NYSDEC. The RD/RA work plan included an in-situ Dual Phase Extraction (DPE) system design to remediate soil and groundwater in the former drum storage area and under the Feutron Building. The RD/RA was approved in September 2005.

At the time of the RA/RD submittal, the Feutron Building was in service as a part of the AFFCO production line. Recently and after the RD/RA work plan was approved, the Feutron Building was taken out of service and demolished. Therefore, FLS prepared a Remedial Action Work Plan (RAWP) on behalf of AFFCO to remediate the TCA-impacted soil by excavation and disposal soil rather than by in-situ treatment under and around the Feutron Building.

1.1 Purpose

The purpose of the Soil Management Plan (SMP) is to present the methods, procedures, and guidance for handling all aspects of soil connected with the impacted area remediation. The SMP specifies the means and methods for dealing with soil and provides overall soil management goals.

1.2 Goals

The goals of the SMP are to handle all impacted soil and manage activities associated with soil in a manner that prevents it from reaching the community, factory workers, and the environment. Impacted soil must be managed in a manner that ensures removal, transport, and disposal such that it fulfills applicable regulatory requirements. Another goal is to keep objectionable odors from reaching the community. At the conclusion of remediation the impacted area must be secured and stable and left in a condition ready for any future use.

2.0 SITE DESCRIPTION AND REMEDY

2.1 Site Description

The AFFCO Site is an active manufacturing facility located on the north side of Walsh Avenue, west of River Road in New Windsor, New York. The Site lies on the south side of Quassaick Creek, which flows into the Hudson River approximately 2 miles east of the Site. The surrounding area has a mixture of land uses, including residential. Potable water is supplied by the New Windsor water department. The total land area of the Site is approximately four acres, and includes several large buildings; as well as parking, open lawn and wooded areas.

2.2 TCA-Impacted Soil Remediation

TCA-contaminated soil remediation consists of the following measures:

- The concrete floor slab inside the demolished Fuetron building footprint will be removed.

- Soil in the former drum storage area and under the floor slab will be excavated and temporary stockpiled on-site in small piles. Soil removal will be performed first by removing the upper two feet within the impacted area. This scenario will be repeated every two feet to the depth of 10 feet below grade. Each pile will represent a two-foot interval and will be placed on and covered with polyethylene sheeting.

- Following the removal of TCA-impacted soil from the impacted area, the excavation pit walls and bottom will be screened for organic vapor using a photoionization detector (PID) or an Organic Vapor Meter (OVM) Model 580B or equivalent. If impacted soil is encountered, additional soil will be removed.

- Each pile will be sampled for volatile organic compounds and other waste disposal characteristic that will be requested by the disposal facility. Soil containing elevated levels of TCA exceeding the NYSDEC Part 375 Regulations-Restricted Commercial Soil Cleanup Objectives will be disposed of off-site according to NYSDEC regulations. Soil containing TCA levels less than the NYSDEC Part 375 Regulations-Unrestricted Use Soil Cleanup objectives for commercial sites will be placed back in the excavated area.

- Following completion of the above remedial measures, excavated pit will be backfilled with soil that meets NYSDEC Part 375 Regulations-Restricted Use Commercial Soil Cleanup Objectives for commercial sites. If additional fill is needed, it will be imported from off-site.

3.0 SOIL MANAGEMENT

This section describes the procedures for managing soil the remediation activities.

3.1 Waste Characterization Sampling

Where soil will be disposed of off-site, it must first be characterized and accepted by the disposal facility (ies). To provide disposal facilities with characterization data prior to shipping TCA-impacted soil, stockpiled soil will be sampled and analyzed for disposal parameters required by the disposal facility (ies). Based on previous sampling results, it is expected that soil exceeds the NYSDEC Part 375 Regulations-Restricted Use Soil Cleanup objectives for commercial sites will be disposed of as hazardous material.

3.2 Site Preparation

The Site will first be prepared for remediation and soil management. Decontamination pad(s) will be established at the truck exit location(s) and will consist of a gravel pad sufficiently large to accommodate the largest truck and with enough space to allow workers to clean the vehicles before leaving the Site. The pad will have the means to collect wash water. Cleaning will take the form of brushing off gross soil followed by spraying with potable water to remove dust or soil residue on both the truck body and undercarriage. The rinse water will be collected and discharged to the sanitary sewer.

Protective fencing and/or barriers will be installed along the perimeter of the impacted area on the Site to protect the public from Site work and to control vehicle movement. Internal barriers for Site control and traffic management may also be added as necessary. A Site plan will be prepared that depicts the soil staging/stockpiling areas, ingress and egress points, decontamination areas, truck routes, work zones, safety barriers and fencing, and containment structures. The Site plan will be presented to NYSDEC and will be updated as necessary.

3.3 Soil Stockpiling

Soil stockpiling areas will be prepared by selecting locations that are sufficiently large to hold excavated soil. There will be enough area to accommodate the soil to be staged and to accommodate segregating soil into different types of piles. Since disposal options and costs differ appreciably depending on soil quality, pending the results of soil characterization sampling, enough space will be available to segregate soils into separate piles:

Each area will be prepared such that it is lined at a minimum with a double layer of 8-mil plastic. The stockpile area will be such that stormwater cannot transport impacted soil off the Site or onto other areas on the Site, such as the Quassaick Creek. Stormwater control will be accomplished by either encircling stockpiles with hay bales and silt fencing or equivalent, directing run-off to a point where it can be collected and disposed, or other similar means. All soil piles must be covered by plastic sheeting when inactive and the sheeting weighed down to prevent uncovering.

3.4 Soil Segregation

Soil will be segregated on the basis of the TCA levels. Site knowledge and direct observations during excavation will be recorded in the field notebook. Direct observations include visual observations of staining and sheen, odors, and photoionization detector (PID) readings. Segregation decisions will be made by an on-Site qualified environmental professional. The environmental professional will direct the contractor to place soil in the various pre-determined stockpiling areas.

3.5 Soil Loading, Transport, and Documentation

Soil loading for offsite disposal, if any, will be tracked and monitored. Each truckload will be recorded with the name of the transporter and the intended disposal facility. The type of material will be described (e.g., impacted concrete, heavily impacted soil etc.) and the bill of lading or hazardous manifest number recorded in the logbook. A copy of all manifests, bills of lading, or other transport documentation will be retained on Site and a copy made for the project file. After disposal, the disposal facility will send a certificate of disposal to the generator as part of the Site records.

Soil loaded from stockpiles will be monitored to control dust. A water spray will be available to wet soil, as necessary, to control dust.

During transportation, TCA-impacted soils will be placed in trucks with gasketed unloading gates and covered with a tightly sealed cover to minimize vapor or odor emissions from the truck during transport.

3.6 Excavation

Soil excavated as part of remediation will be stockpiled for classification and possible loading and disposal or for re-use as backfill on the Site. All stockpiles will have dust controlled by means of water mist if necessary. A source of water and means of applying water spray will be available and within easy access.

At the end of each work day the excavation will be secured in a manner that controls odors. If odors become objectionable or have the potential to adversely affect the surroundings, then odor control will be employed. Potential control measures may include covering the bottom and sidewalls of the excavation with tarps, plastic, soil or gravel, or some combination that is effective.

3.7 Protocol for Decontamination of Vehicles and handling of Decontamination-derived Waste

A truck wash area will be constructed for washing of all trucks and equipment that have come in contact or potentially have come in contact with impacted site soils. Existing soils and/or fill material adhered to construction vehicles and equipment will be removed prior to such vehicles and equipment leaving the Site. Brooms or shovels will be utilized for the gross removal of the material from vehicles and equipment. The decontamination procedure for the removal of the remaining soil will consist of steam cleaning or hand or power washing of the vehicles and equipment with water and detergent. Wastewater generated by the decontamination process will be collected for characterization and appropriate disposal. Soil generated by the gross removal and decontamination process will be returned to a stockpile.

3.8 Soil Demarcation

In the event if soils with residual impacts along any of the excavation walls cannot be excavated and will remain on site, a demarcation layer (meshed plastic orange fence) will be placed between the reusable soil or imported fill material.

3.9 Imported Backfill

Off-site material brought in as backfill must be certified that it is free of contamination as virgin source material with written documentation from the supplier certifying that the soil is from a source not known to have been impacted or have received hazardous materials, petroleum or other hydrocarbon-derived, toxic, or radioactive materials. If the material is not virgin, then the material will be tested at a frequency of one sample/250 yd^3 of soil for contaminants in line with the “unrestricted use” soil cleanup objectives identified in Table 375-6.8(a) of 6 NYCRR Part 375. The tested material will be considered acceptable for reuse on Site if it meets the requirements for the NYSDEC Part 375 Regulations-Unrestricted Use Soil Cleanup.

All imported soil will be free of organic material, debris, cinders, combustibles, wood, roots, and staining. All imported soils will be approved by NYSDEC before being brought to the Site. Backfill placement onsite must be approved by the Site environmental professional.

3.10 Future Intrusive Work

Although not anticipated to occur, any future intrusive work that will disturb the residual impacts will be performed in compliance with this SMP. Intrusive construction work must also be conducted in accordance with the procedures defined in the May 14, 2008 Health and Safety Plan (HASP) and Community Air Monitoring Plan (CAMP) (presented in Section 7 of the HASP) prepared for the Site.

4.0 Demobilization

The Site will be stabilized and secured at the conclusion of remediation. This means removing all equipment and materials used for remediation and ensuring that all former soil staging areas and cleaning apparatus have been decommissioned and cleaned and that no impacted soil or debris remains on Site.