Initial Site Investigation	Work Scope
Corrective Action Feasibility	X Technical Report
Investigation Update	PCF Reimbursement Request
X Corrective Action Plan	General Correspondence
Corrective Action Summary Report	
Operations & Monitoring Report	

Corrective Action Plan Former UniFirst Plant Property Williamstown, Vermont

VT Site #77-0087

Latitude: 44°07'31" Longitude: 72°32'51"

Prepared for: UniFirst Corporation and Vermont Agency of Natural Resources

Prepared By: The Johnson Company, Inc. 100 State Street, Suite 600 Montpelier, Vermont 05602 Contact: Donald M. Maynard, P.E. (802) 229-4600

April 2013



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Corrective Action Plan Former UniFirst Facility Williamstown, VT

PROFESSIONAL ENGINEER'S REVIEW:

I have reviewed this *Corrective Action Plan* for the Former UniFirst Facility in Williamstown, Vermont dated April 2013.

22/

Date

Christopher M. Crandell The Johnson Company VT License No 5314



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EXECUTIVE SUMMARY

This document is a Corrective Action Plan (CAP) for additional remedial work to be conducted at the former UniFirst Corporation (UniFirst) plant property located at 100 Hebert Road in Williamstown, Vermont (the Property). This CAP was prepared in accordance with Section 4.2 of the Vermont Department of Environmental Conservation Investigation and Remediation of Contaminated Properties Procedure, April 2012 (VT IROCPP).

Substantial soil removal and other remedial work have already been performed at the Property under plans previously approved by the Vermont Agency of Natural Resources Sites Management Section (VT SMS). The Property continues to be subject to a Consent Decree entered by the Orange County Superior Court on March 24, 1997, and by the Management Plan incorporated by reference into that Decree. Demolition of the building that had been located on the Property has made additional areas accessible for remediation. The remedial work will be undertaken both as a Corrective Action and as an action related to the Consent Decree.

Details concerning site history, results of past environmental investigations completed on and near the Property, remedial objectives, and comparison of remedial alternatives were provided in the June 2011 Remedial Action Feasibility Investigation and Assessment Report - Former UniFirst Facility - Williamstown, Vermont prepared by The Johnson Company. That report is equivalent to a VT SMS Corrective Action Feasibility Investigation (CAFI). A brief summary of the CAFI is provided here, in accordance with Section 4.2.1 of the VT IROCPP.

The Property was originally developed in the early 1970's by Interstate Uniform Services Corporation (corporate predecessor to UniFirst Corporation) for the purpose of wet washing, dry cleaning and distribution of laundered uniforms. Laundry operations on the Property ceased in 1983. The Property was used as a depot and transfer station for soiled and cleaned garments until 2008. In 2011, the building on the Property was demolished, and the building slab was left in place. Following completion of the work described in this CAP, it is expected that the Property will be transferred for reuse as a parking area and for tennis and basketball courts.

Extensive investigations and excavations of soils impacted as a result of releases of tetrachloroethylene (also known as perchloroethylene or PCE) were performed during the early 1980s. Approximately 1,500 cubic yards of soil were removed from two areas on the Property and transported off-site for disposal. Additionally, groundwater interception and collection drains were installed downgradient from the Property. Several alterations have been made to the groundwater collection system since the 1980s to improve its effectiveness. The collected groundwater continues to be treated and discharged to an unnamed tributary to Rouleau Brook under a State of Vermont surface water discharge permit. In 2009, the Town of Williamstown adopted an Ordinance restricting groundwater uses and prohibiting installation of drilled or dug wells for use as a potable water supply within the water service boundaries of the Municipal Water District, which includes the Property.

As reported in the CAFI, additional field investigations were conducted on the Property in 2010 to determine the nature and extent of residual PCE in soils and soil vapor beneath the building slab, and to provide supporting information for the evaluation of potential remedial alternatives consistent with preliminary site reuse concepts. Soil vapor screening using a photoionization detector (PID) conducted in 2010 indicated VOC vapor concentrations up to 890 parts per million by volume (ppmV) beneath the slab. These soil vapor screening results were used to guide installation of additional borings and collection of soil samples to delineate PCE in soil exceeding the Soil Screening Value (SSV) residential guidance value of 800 parts per billion (ppb). Based on soil sampling results, a zone of soils with PCE concentrations that exceed the SSV was identified beneath the remaining building slab extending down to approximately ten feet, but not all the way to the till/bedrock interface.

Based on the results of historical and additional field investigations, the CAFI identified the following remedial goals for the corrective action at the Property:

- Remove remaining soils in which PCE concentrations have been measured at levels exceeding 800 ppb, the SSV for residential soils.
- Limit precipitation infiltration, changes in local hydrology, and increased contact between groundwater and dense non-aqueous phase liquid (DNAPL) in bedrock.
- Prevent increases in the mass flux of PCE from residual PCE in the overburden soils to underlying bedrock groundwater through infiltration control.
- Prevent creation of new exposure pathways and potential changes in hydrology and contaminant distribution by prohibiting installation and use of any water wells on the Property.
- Protect human health by controlling future land uses and construction practices.

The corrective action selected in the CAFI as the preferred alternative is excavation, removal and off-site disposal of soils beneath the slab having PCE concentrations in excess of 800 ppb, installation of an asphalt cap to reduce future infiltration, and implementation of institutional controls to control future land uses and construction practices. VT SMS approved the CAFI on August 11, 2011.

The estimated volume of soils to be excavated is approximately 650 cubic yards. The excavation area is approximately 2,150 square feet with depths ranging from 5 to 11 feet. Available data indicate that groundwater will not be encountered in the excavation.

The existing building slab and foundation will be removed to provide access to the soils to be excavated. Available data indicate that the concrete has not been impacted. The concrete will be

removed and broken up and disposed on-site under the State of Vermont Insignificant Waste Event rules.

The proposed isolation and infiltration control cap will be a 3.5 inch thick asphalt cap, placed over clean sub-base gravel. The asphalt cap will extend over an area of approximately 31,000 square feet.

Monitoring and environmental testing during the corrective action will include: 1) air monitoring during and immediately following remediation; and 2) confirmation sampling of soils following excavation and re-grading.

The estimated time frame for active construction on the Property is approximately 3 months. Ideally, all work will be completed by August 26, 2013, before school is in session, to reduce any potential safety risks to trespassing teenagers from heavy equipment and partially completed excavations.

Institutional controls, restrictions and covenants concerning future use of the Property will be recorded in the Town property records prior to Property transfer. Those institutional controls are expected to include the following:

- Installation of any new wells on the Property is prohibited (except if installed as part of a remediation or investigation effort consistent with the Consent Decree)
- Construction of any occupied structures, above grade or subsurface, is prohibited on the Property, to prevent vapor intrusion risks.
- Prior to any proposed utility or construction excavations or intrusive work on the Property, a work plan must be prepared and submitted and approved by the VT SMS. The work plan must describe proposed testing and protections that would ensure compliance with applicable deed restrictions as well as the safety and health of site workers and the public.
- Activities that could jeopardize or damage the asphalt cap on the Property will be prohibited.
- The asphalt cap shall be maintained. All cracks, settlement and similar deficiencies shall be promptly repaired.
- The Parcel shall be routinely inspected for erosion. Any erosion (rivulets, ditches, ravines, swales, etc.) equal to or greater than 0.5 feet (6 inches) below the surrounding ground surface shall be promptly repaired using clean fill, and seeded and mulched.

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1.0 INTRODUCTION

This document is a Corrective Action Plan (CAP) for additional remedial work to be conducted at the former UniFirst Corporation (UniFirst) plant property located at 100 Hebert Road in Williamstown, Vermont (the Property). This CAP was prepared in accordance with Section 4.2 of the Vermont Department of Environmental Conservation Investigation and Remediation of Contaminated Properties Procedure, April 2012 (VT IROCPP).

The Property is part of a site known as the UniFirst Plant Site. A Property location map (on a USGS 7.5 minute topographic quadrangle map), a map showing the location of the Property within the UniFirst Plant Site, and a topographic map of the Property are provided in Figures 1 through 3. The UniFirst Plant Site continues to be subject to a Consent Decree entered by the Orange County Superior Court on March 24, 1997, and by the Management Plan incorporated by reference into that Decree.

Substantial soil removal and other remedial work have been performed at the Property under work plans previously approved by the Vermont Agency of Natural Resources Sites Management Section (VT SMS). Demolition of the building that had been located on the Property has made additional areas accessible for remediation. This document focuses on investigations and remedial actions to address residual tetrachloroethene (PCE, or "perc") in soils and soil vapor beneath the building slab (which is still present at the Property) and to prepare the Property for reuse. This additional work will be undertaken both as a Corrective Action and as an action related to the Consent Decree. The remedial objectives, remedial actions, and monitoring plan established and implemented as part of the Management Plan, for the UniFirst Plant Site considered as a whole, will not be reviewed again here. A list of potentially interested third parties, including adjacent landowners, with respect to work to be undertaken on the Property is provided in Table 1.

This report presents a summary of the results of past environmental investigations completed on and near the Property, including the nature and extent of residual PCE in soils and soil vapor beneath the building slab. It describes the proposed corrective action – excavating remaining soils containing PCE above applicable screening levels, installing an asphalt cap, and recording deed restrictions to control future land uses and preserve the cap – and provides details concerning its implementation. This corrective action was compared with other alternatives and selected as the recommended remedy in the June 2011 Remedial Action Feasibility Investigation and Assessment Report (a corrective action feasibility investigation, or CAFI, as defined in the VT IROCPP) prepared by The Johnson Company (JCO, 2011a). VT SMS approved the June 2011 CAFI on August 11, 2011.

This report was prepared under the approved Proposal for Work (PFW) #40, dated June 23, 2011 (JCO, 2011b), in compliance with the provisions of the Consent Decree.

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2.0 REMEDIATION AND MONITORING HISTORY

Details concerning remedial actions previously completed on and near the Property, and additional environmental investigations completed more recently in connection with demolition of the former UniFirst building and in contemplation of potential reuse of the Property, were provided in the CAFI (JCO, 2011a). A brief summary of the CAFI is provided here, in accordance with Section 4.2.1 of the VT IROCPP.

2.1 **REMEDIATION HISTORY**

Extensive investigations and excavations of PCE-impacted soils outside the foot print of the building formerly located on the Property were performed in 1983 through 1985. The investigations included the installation of soil borings and soil sampling to delineate the extent of PCE-impacted soils, and installation and sampling of overburden and bedrock monitoring wells to delineate the extent of PCE in groundwater. The remediation included the excavation in two areas of a combined total of approximately 1,500 cubic yards of soil which were transported offsite for disposal. The extent of each of the two soil excavations is shown on Figure 4. The remedial goal for the soil excavations at the time was to remove all soils outside the building foot print containing more than 500 parts per billion (ppb) PCE, more than 1,000 ppb total volatile organic compounds (TVOC) by laboratory analysis, or more than 5 parts per million by volume (ppmV) TVOC as measured by a photoionization detector.

Additionally, groundwater interception and collection drains were installed at different times beginning in the early 1980's along the Property boundary towards the southeast, along Construction Hill Road towards the south, behind the Williamstown Elementary School, and on the Duff property (see Figure 2 for locations of the interception/collection drains).

The groundwater collection system has been modified on several occasions since the 1980's to improve its effectiveness. Currently, groundwater captured by the interception drains is routed by gravity to an activated carbon treatment facility located south of the Williamstown Elementary School (see Figure 2), and the treated water is discharged to an unnamed tributary to

Rouleau Brook in compliance with a State of Vermont surface water discharge permit. Prior to construction of the gravity-fed activated carbon treatment facility in 2000, all captured groundwater was routed to a pump station located along Construction Hill Road where the collected groundwater was pumped to the UniFirst building for treatment using activated carbon, and then discharged to the municipal sewer.

UniFirst extended the Town of Williamstown municipal water system during the 1980s, and it connected several residences formerly served by private water supply wells to that system. In 2009, the Town of Williamstown adopted an Ordinance restricting groundwater uses and prohibiting installation of drilled or dug wells for use as a potable water supply within the water service boundaries of the Municipal Water District, which includes the Property. VT SMS accepted the restrictions in the Ordinance as an institutional control under the Management Plan, in lieu of reclassification of groundwater in the vicinity of the Property.

On-going monitoring of water supplies, surface water, groundwater and air quality has been performed since 1997 in accordance with the Management Plan. Monitoring locations are presented on Figure 5, and discussed in Section 2.4.

2.2 RECENT ON-PROPERTY SOIL AND SOIL VAPOR TESTING

Soil and soil vapor investigations were completed on the Property in several phases, in accordance with the August, 2010 Remedial Action Feasibility Assessment Workplan (JCO, 2010a), followed by two subsequent addendums (JCO, 2010b; JCO 2010c). Results obtained from each phase of testing were used to develop the design and sampling locations for the later phases.

A sub-slab soil vapor survey was completed in September, 2010 to identify areas of relatively higher concentrations of chlorinated volatile organic compounds (CVOCs) beneath the building footprint and around the exterior edge of the building so that soil borings in the subsequent phase could be appropriately located. Ninety soil vapor points were installed,

including: 1) locations in the interior portion of the building (the warehouse/processing area, the loading docks, the maintenance bay, the utility room); 2) through the asphalt outside the northern and eastern edges of the building where the loading docks, maintenance bay doors, and former PCE fill pipe were located; and 3) along the outside of parts of the southern and northern walls of the building. The results of the sub-slab soil vapor survey, combined with information concerning past operations, locations of waste management infrastructure (waste pipes, clean-outs, wastewater trenches, recovery pits, etc.), and historical remedial excavations and soil testing results, formed the basis for the design of the first phase of a sub-slab soil sampling program. That program was described in a work plan addendum approved by VT SMS (JCO, 2010b) and implemented in the fall of 2010.

The first phase of the soil sampling program involved sampling of the shallow soils beneath the slab. The second phase involved sampling of deeper soils at locations selected based on the results of the shallow soil sampling results. Locations for the deeper soil borings and soil sampling were presented in a second work plan addendum approved by VT SMS (JCO, 2010c). Overall, soil samples from sixteen soil borings were collected at varying depths and analyzed to delineate the extent of residual CVOCs beneath and adjacent to the former building.

2.2.1 <u>On-Property Soil Vapor</u>

Soil vapor screening using a photoionization detector (PID) conducted in 2010 indicates CVOC vapor concentrations up to 890 ppmV beneath the building slab, while vapor points outside the building had readings of 6 ppmV or less, except at a localized spot near the truck bay access door on the north side of the building, which had a reading of 41 ppmV (SV-21), and adjacent confirmation locations SV-86 and SV-89, with readings of 12 and 14 ppmV, respectively.

Table 2 summarizes the PID screening results from each vapor point. Soil vapor sample location names and locations are shown in Figure 6. Figure 7 is a map of the sub-slab vapor point layout and the associated PID screening results. Figure 7 also shows the interpreted

isopleth lines from the PID screening data presented in ppmV. Only isopleth lines down to 50 ppmV are presented on Figure 7.

2.2.2 **On-Property Soil**

Soil contamination on the Property outside of the former building was well defined during several soil investigations in the early 1980s. Excavation of contaminated soils on the Property and outside the building was completed in 1983 through 1985. This remediation included the excavation and off-site transport and disposal of soils in two areas (see Figure 4). Confirmation testing at the time demonstrated that residual soil contamination outside the building was limited to PCE concentrations of less than 500 ppb, and less than 1,000 ppb TVOC by laboratory analysis (JCO, 2010a).

A soil investigation was conducted in 2010 to evaluate PCE concentrations in soils below the former building. Sixteen soil borings were used to collect samples. The locations are shown on Figure 6, and the detected CVOCs are provided in Table 3. Groundwater was not encountered in any of the borings advanced to refusal (presumed to be bedrock based upon the drilling characteristics and similar depths in historical outside excavations). Soils consist of up to three feet of gravelly fill (sub-slab gravel) over dense sandy glacial till.

PCE exceeding the Vermont Agency of Natural Resources (VT ANR) Soil Screening Value (SSV) (VT ANR, 2012) residential soils guidance value of 800 ppb were reported in soils beneath the former dry cleaning equipment and in the trailer truck receiving area. Contamination above 800 ppb extends down to approximately ten feet below the foundation, but not all the way to the till/bedrock interface, where reduced concentrations were present. This suggests that PCE dense non-aqueous phase liquid (DNAPL) may not have significantly migrated to the bedrock surface in these areas, unlike some of the areas excavated in 1983 and 1985.

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The maximum reported PCE concentrations in soil were 4,400 and 3,800 ppb, at 5 and 7 feet below the northeast corner of the building slab, respectively. This corner is in the vicinity of the garage drain pipe clean-out used for PCE disposal in the 1970's. The pipe historically discharged into an oil-water separator (Manhole #2). The separator was removed in 1985, together with surrounding soils outside the building with concentrations that exceeded 500 ppb (see Figure 4). The location with the next highest PCE concentration beneath the building (830 ppb in soils approximately three feet below the slab), was below the foundation of the former dry cleaning equipment (SB-12, see Figure 8). No other reported concentrations of PCE in soils exceeded 800 ppb.

The peak concentration reported in soils outside the building was 120 ppb at a depth of one foot below ground surface (fbgs) near the former PCE fill pipe on the north side (SB-15 on Figure 8). Deeper samples (from approximately 3 and 8 fbgs) at that location did not have detectible PCE. PCE also was reported at 17 ppb in the 1 fbgs sample from SB-16 (bored at soil vapor location SV-21), but not in the 3 fbgs sample from the same location collected at refusal.

Table 3 provides the results for all detected CVOCs in soils in 2010. Table 4 presents the PCE concentrations, sample depths and elevations of samples collected during the 2010 soil boring event. Figure 8 presents the maximum PCE concentration detected at each of the soil boring locations along with isopleth contours of maximum concentrations. The cross sections on Figures 9, 10 and 11 show PCE concentrations at each depth interval at each boring.

2.2.3 <u>On-Property Floor Drain Pipe Water</u>

A water sample was collected in 2010 from the floor drain pipe cleanout GD CO1 (located in the building corner near SB-1 - see Figure 6). The sample was bailed from standing water present in the pipe. Laboratory results indicate that PCE was present in the water at 350 ppb. Other CVOCs detected in the water sample included 1,1-dichloroethene (1,1-DCE) (20 ppb), cis-1,2-dichloroethene (cis-1,2-DCE) (19,000 ppb), trichloroethene (TCE) (40 ppb), and

vinyl chloride (34 ppb). These compounds are degradation products of PCE. The results are summarized in Table 5.

2.3 REMAINING MONITORING WELLS ON THE PROPERTY

Eleven monitoring wells (including three bedrock wells) were confirmed present on the Property based upon a visual evaluation conducted in July 2010. These wells are named: BRW-1, BRW-2, BRW-3, MWN1-T, MWS1-T, MWS2-T, PZ-2, PZ-3, PZ-4, DS-6 and MW-F (see Figure 4). Table 6 provides the details of their construction based upon the 2010 inventory and assessment. These wells are not part of the site-wide long term groundwater monitoring program described in Section 2.4. The last date any of them were sampled is believed to be 1986. Nine other wells referenced in historical documents as being on the Property were not found and/or have been destroyed (JCO, 2011a).

2.4 LONG TERM OFF-PROPERTY MONITORING

Under the Management Plan, long term monitoring of groundwater, drinking water wells, surface water and indoor and outdoor air quality has been conducted since 1997 at locations in the vicinity and downgradient of the Property. Since 2004, all monitoring required under the Management Plan has been carried out by the firms Waite Environmental Management and Waite Heindel Environmental Management (collectively WEM), as consultants to VT SMS. The results of all monitoring also are reported semi-annually in reports produced by WEM. The monitoring programs for each of the different media are described in the subsections that follow.

2.4.1 <u>Water Supplies and Groundwater</u>

Private water supply wells are monitored twice a year, most recently in April and October 2012. Water supply sampling from drilled residential wells is normally conducted at six residences (see Figure 5 for locations): the Jeffords residence (WP-3), the Beattie residence (WP-5), the McGlynn residence (WP-7), the Duke residence (WP-8), the Dindo residence (WP-13), and the Sweet (former Kriesz) residence (WP-20). Water supply samples are analyzed for

CVOCs via EPA Method 524.2. Table 7 provides water supply well CVOC analytical results from 2007 through 2012.

Groundwater in monitoring wells is monitored annually, most recently in October, 2012. Groundwater samples are collected from 14 monitoring wells, 5 seeps and 2 unused springs (see Figure 5 for locations) and analyzed using EPA Method 8260B (water) for PCE, TCE, cis-1,2-DCE and trans-1,2-dichloroethene (trans-1,2-DCE).

Water supply and monitoring well sampling is conducted in accordance with WEM's *Work Plan for Environmental Monitoring* (Waite, 2007) and with the *Field/Lab Coordination Memorandum for Water Monitoring* ("FLCM-Water") developed by Phoenix Chemistry Services (Phoenix, 2004).

Analytical results and groundwater elevations for the past four to five years of groundwater monitoring are provided in Tables 8 and 9, respectively. The distribution of dissolved phase CVOCs in groundwater in 2012 is shown in the VOC concentration contour map prepared by WEM (Figure 12). A contour map of the average piezometric head between 1983 and 1999 in all available overburden wells, seeps and surface water monitoring points is included as Figure 13.

2.4.2 Indoor and Outdoor Air Quality

Indoor and outdoor air sampling is conducted twice a year, most recently in January and August 2012. Sampling is conducted in accordance with WEM's *Work Plan for Environmental Monitoring* (Waite, 2007), and the *Field/Lab Coordination Memorandum for Air Monitoring* ("FLCM-Air") (Phoenix, 2007). Air samples are collected from three locations inside the Williamstown Elementary School, six residences, and the Masonic Lodge/Orange County North Supervisory Union offices; and at three outdoor locations on the grounds of the Williamstown Elementary School. Air samples are collected using 6-liter Silco steel air canisters through a

calibrated flow regulator over an approximately 4-hour period. The air samples are analyzed using EPA Method TO-15 (Low Level) for PCE, TCE, cis-1,2-DCE and trans-1,2-DCE.

Table 10 provides a summary of recent indoor air monitoring results from sampling locations in the vicinity of the Property. Table 11 provides a summary of recent outdoor air monitoring results in the vicinity of the Property.

2.4.3 Surface Water

Surface water testing is conducted annually in July (most recently in 2012) and analyzed using EPA Method 8260B (water) for PCE, TCE, cis-1,2-DCE and trans-1,2-DCE. Sampling is performed in the tributary to Rouleau Brook (see Figure 5 for locations) and conducted in accordance with WEM's *Work Plan for Environmental Monitoring* (Waite, 2007) and the *Field/Lab Coordination Memorandum for Water Monitoring* ("FLCM-Water") (Phoenix, 2004). Table 12 provides a summary of surface water monitoring results in the unnamed tributary.

2.5 CONTAMINANT FATE AND TRANSPORT

Results of monitoring conducted repeatedly since the remedial excavations on the Property were completed in 1983 show that contaminant concentrations downgradient in groundwater have reached a state of relative equilibrium and are generally stable or declining over time. During that period, the building, building slab, and asphalt paving have limited the potential for contact between infiltrating precipitation and PCE either in overburden soils or in DNAPL present in fractures and apertures in the bedrock beneath the Property.

The contaminant distribution in groundwater has not changed significantly in recent years. Concentrations of target compounds in most of the wells have been generally steady or decreasing since the mid-1990s. The exception is W-20, which has generally experienced increasing concentrations since 2005. Recent data indicate that previously increasing concentration trends in the three wells MW-D, PZ-102 and W-19 reached their highest levels around 2009 and have generally stabilized since then.

3.0 POTENTIAL RISKS AND POTENTIAL RECEPTORS

No existing water supply wells have been adversely affected above the Vermont Groundwater Enforcement Standard (VGES) based upon decades of monitoring data. No existing buildings have indoor air concentrations that exceeded Vermont Department of Health (VT DOH) indoor air guidance levels of 1.0 ppbV for PCE and TCE over the last two years. A list of potentially interested third parties and adjacent land owners with respect to proposed corrective actions to be completed on the Property is provided in Table 1, and the property locations owned by these people are shown on Figure 14.

The only nearby surface water is an unnamed tributary that passes east of the Elementary School and empties into Rouleau Brook south of the Elementary School, which flows into the Stevens Branch of the Winooski River. All of these waters are classified as Class "B" surface water. No significant ecological receptors or sensitive environments (including wetlands) have been adversely impacted by contamination from the Property based upon decades of monitoring data.

Future potential receptors include: 1) construction workers coming into contact with contaminated soil or inhaling vapors during excavation in the vicinity of the former UniFirst building; 2) hypothetical users of future buildings on the Property due to potential exposure to contaminated indoor air; and 3) potential future users of water supply wells installed on the Property.

4.0 REMEDIAL GOALS

Remedial goals for the corrective action at the Property have been developed considering regulatory guidance, conditions at the Property, prior remediation goals, and anticipated future uses of the Property. The development of remedial goals is discussed below. A summary table of specific numerical remedial goals is provided as Table 13.

4.1 SOILS

A remedial goal for soil excavation of 500 ppb PCE, or 1,000 ppb TVOC by laboratory analysis, was used during the 1985 soil excavations. The VT IROCPP contains guidance for VT SMS sites including a SSV table. The SSVs are intended to be used for initial screening of data collected during a site investigation. They are not intended to be considered clean-up standards, though they may be used to establish clean-up goals if the default exposure scenarios are consistent with or more conservative than the actual exposure pathways and durations at a site. The SSV table recommends using the VT DOH published soil screening value for residential exposure scenarios, which is 800 ppb for PCE (see Table 13). This clean-up value is therefore considered appropriate and applicable for use as a current remedial goal for soils on the Property. Removal of soils containing greater than 800 ppb PCE will not only reduce human health risks due to ingestion, soil vapor and direct contact, but will also reduce contaminant mass and remove CVOCs that could contribute to dissolved contamination in groundwater.

4.2 GROUNDWATER

PCE is present in the bedrock and in deep groundwater beneath the Property. Groundwater is being collected and remediated downgradient by the existing groundwater interception pipes and carbon treatment system that are described in Section 2.1. That groundwater remedy was selected and implemented under the 1997 Management Plan (JCO, 1997) adopted as part of the Consent Decree, among other reasons, because it is technically impracticable to remove DNAPL sources of PCE in bedrock on the Property. Groundwater is generally not present in the overburden on a majority of the Property. The Property is near the crest of a hill. Although an extensive groundwater collection and treatment system already exists downgradient, precipitation recharge on the Property should be controlled to prevent increased infiltration through areas of overburden and bedrock on the Property where residual DNAPL or sorbed CVOCs remain.

Results of monitoring conducted repeatedly since the remedial excavations on the Property were completed in 1983 show that contaminant concentrations downgradient in groundwater have reached a state of relative equilibrium. During that period, the building, building slab, and asphalt paving have limited the potential for contact between infiltrating precipitation and PCE in either overburden soils or DNAPL present in fractures and apertures in the bedrock beneath the Property. Although it is not possible to predict exactly what changes would occur if similar impermeable surfaces were not preserved in the future, increased infiltration could change local groundwater hydrology and increase groundwater contact with DNAPL, either or both of which could cause DNAPL mobilization and/or increases or changes in downgradient dissolved PCE concentrations. A remedial goal therefore has been established to preserve precipitation infiltration controls at the Property, and to ensure that such controls are maintained over the location of the former Manhole #2 1983 remedial excavation.

4.3 LAND USE CONTROLS

Because some amount of residual contamination will remain in bedrock, deep groundwater, soil and soil vapor in the future, institutional controls should be imposed to limit future land uses and regulate potential exposure during construction and utility work. A remedial goal is therefore established to prevent certain future uses of the Property to prevent exposure to this residual contamination.

4.4 SUMMARY OF REMEDIAL GOALS

In summary, following are the proposed remedial goals for the Property, to the extent feasible:

- Remove soils containing PCE exceeding the SSV residential soils guidance value of 800 ppb.
- Limit precipitation infiltration, changes in local hydrology, and increased contact between groundwater and DNAPL in bedrock.
- Prevent increases in the mass flux of PCE from residual PCE in the overburden soils to underlying bedrock groundwater through infiltration control.
- Prevent creation of new exposure pathways and potential changes in hydrology and contaminant distribution by prohibiting installation and use of any water wells on the Property.
- Protect human health by controlling future land uses and construction practices.

Subject to the above remedial goals, the selected remedial alternative should support productive future re-use of the Property.

5.0 DESCRIPTION OF THE SELECTED REMEDIAL ALTERNATIVE5.1 SUMMARY OF THE CORRECTIVE ACTION FEASIBILTY INVESTIGATION

Four remedial alternatives were evaluated in the CAFI (JCO, 2011a). These alternatives included: 1) installation of a soil vapor extraction system; 2) soil removal and transport for offsite disposal; 3) capping of soils in place via construction of an asphalt paved area or by sealing and re-using the existing building slab as a cap; and 4) soil removal and off-site disposal together with a cap over remaining soils in place. All of these alternatives included institutional controls to control future uses that could otherwise result in human exposures to residual PCE in groundwater, soil vapor and soil. VT SMS approved the CAFI on August 11, 2011.

5.2 OVERALL DESCRIPTION OF THE SELECTED REMEDY

The preferred alternative selected in the CAFI is remedial alternative number 4 above: soil removal and off-site disposal combined with institutional controls and an asphalt cap to reduce future infiltration. Design drawings showing the remedy are included in Attachment 1 and the associated construction specifications are included in Attachment 2. A brief description of individual aspects of the remedy is provided in the following subsections.

5.3 SOIL EXCAVATION

The preferred remedial alternative involves removal of the existing slab, bulk excavation of the soils, and off-site transport of the soils to a licensed treatment and disposal facility. Removal of the entire concrete slab will permit access to the soils beneath the slab to be excavated and will allow screening of remaining subslab soils.

The estimated zone of excavation required to remove all soils containing PCE in excess of the remedial goal of 800 ppb is shown on Figure 15. That zone is approximately 2,150 square feet with depths ranging from 5 to 11 fbgs. It is assumed that the excavation will be stable with vertical side walls. The estimated volume of soils to be excavated is approximately 650 cubic yards. This volume estimate is conservative, in that it includes removing soils between available data points where the actual PCE concentration is not known. For example, the area beneath the

former PCE tank and shallow soil sample SB-13 shown with question marks on Section A-A' (Figure 9) is included in the proposed excavation, as are some soils outside of the building foundation near the northeast corner of the building where PCE concentrations are uncertain (see Figure 15).

5.4 WASTE HANDLING

Excavation and capping will require removal of the existing concrete building slab and foundation walls. Available data suggest that the concrete is not impacted by CVOCs. The concrete will be removed and broken up and disposed on-site under the State of Vermont Insignificant Waste Event rules, either into the excavation or in a separate area (see Sheet 1 in Attachment 1).

PCE-impacted soils are assumed to be listed hazardous wastes based on the "contained in" rule. Under that interpretation, all soils excavated from the area delineated on Figure 15 (regardless of PCE concentrations) would be considered F-Listed (F002) Waste, requiring offsite transport and disposal at a licensed hazardous waste treatment, storage and disposal (TSD) facility under manifest. Because PCE-impacted soils would be managed as F-Listed Waste without regard to concentration, the relatively uncontaminated soils that must be excavated to reach the soils that exceed the 800 ppb soil remediation goal would not be segregated or disposed of separately.

Collected water generated during the remediation (excavation dewatering, decontamination, etc.) will be transferred, filtered and discharged to the existing activated carbon system located southeast of the Williamstown Elementary School for treatment. See Section 6.3.4 for details.

5.5 CAP

The proposed cap will be constructed of asphalt. Once the existing slab, foundation and impacted soils are removed, grading to achieve the desired paving subgrade will proceed. A

gravel base and new pavement will be installed, and final site grading and stormwater management features will be completed. The new asphalt surface will be 3.5 inches thick (constructed in two lifts), placed over clean sub-base gravel, and designed so that it covers the area of previously present soils contaminated above 800 ppb PCE beneath the building, as well as the area of the original Manhole #2 excavation in 1985, thereby functioning as an isolation and infiltration control cap.

A layout of the asphalt pavement cap, which covers an area of approximately 31,000 square feet, is provided on Sheet 1 of Attachment 1. This layout includes designs for stormwater controls which will direct runoff away from the new pavement to the east, where stormwater infiltration historically has occurred.

5.6 ADDITIONAL REMEDIATION TASKS

All overburden wells located on the Property during the monitoring well survey on July 19, 2010, including the damaged wells (wells MWN1-T, MWS1-T, MWS2-T, PZ-2, PZ-3, PZ-4, DS-6, and MW-F) will be closed in accordance with Vermont's Monitoring Well Closure Guidance (VT IROCPP Appendix G). If monitoring wells not previously located are found during remediation or future re-development efforts, they also will be closed per Vermont guidance.

The liquids in the garage drain pipes will be pumped out, transferred, filtered and discharged to the existing activated carbon system located southeast of the Williamstown Elementary School for treatment. This action will remove CVOCs in these liquids from the environment. The fluids will be pumped from floor drain clean out GD CO1 prior to excavation and removal of the concrete slab. Laboratory analysis indicates these fluids contain 19 ppm cis-1,2-DCE and 350 ppb PCE.

5.7 INSTITUTIONAL CONTROLS

The 2009 Town of Williamstown Municipal Water Ordinance already prohibits installation of drinking water wells in a larger area that encompasses the Property. The Ordinance states: "No drilled, dug wells, or springs shall be permitted as a potable water supply" within the boundaries of the Municipal Water District. As part of the corrective action, deed restrictions will be instituted to further and more directly prohibit installation of water wells on the Property for any purpose except monitoring in accordance with a VT SMS approved Work Plan. The Consent Decree also requires that UniFirst preserve rights of access, for itself and VT SMS, sufficient to allow continued implementation of the Management Plan. Such access rights will be provided as part of the institutional controls to be established.

Deed restrictions will be instituted to prevent construction of any occupied structures, above grade or subsurface, on the Property so as to prevent potential exposure to contaminants in indoor air that could migrate into a building via soil vapor in the subsurface.

Deed restrictions will be instituted to require a VT DEC-approved work plan prior to any utility or construction-related excavation or intrusive work on the Property so as to prevent worker exposure to residual contamination in the subsurface soils.

The corrective action includes an asphalt cap to minimize future infiltration and associated mobilization of bedrock contamination. The cap will extend over the area where subslab soils having PCE concentrations in excess of 800 ppb are to be removed, and over the area of the 1985 Manhole #2 excavation. This cap will need to remain in place and be functional over the long term. Deed restrictions will therefore be instituted to require ongoing maintenance of the cap, to restore any future eroded areas and to prohibit activities on the Property that could damage the cap.

In summary, the following restrictions and covenants concerning future use of the Property are expected to be recorded in the Town property records prior to Property transfer:

- Installation of any new wells on the Property is prohibited (except if installed as part of a remediation or investigation effort consistent with the Consent Decree).
- Construction of any occupied structures, above grade or subsurface, is prohibited on the Property, to prevent vapor intrusion risks.
- Prior to any proposed utility or construction excavations or intrusive work on the Property, a work plan must be prepared and submitted and approved by the VTSMS. The work plan must describe proposed testing and protections that would ensure protection of the health of site workers and the public.
- Activities that could jeopardize or damage the asphalt cap on the Property will be prohibited.
- The asphalt cap shall be maintained. All cracks, settlement and similar deficiencies shall be promptly repaired.
- The Parcel shall be routinely inspected for erosion. Any erosion (rivulets, ditches, ravines, swales, etc.) equal to or greater than 0.5 feet (6 inches) below the surrounding ground surface shall be promptly repaired using clean fill, and seeded and mulched
- Continuing rights of access will be reserved to UniFirst and VT SMS sufficient to allow continued implementation of the Management Plan.

A draft deed restriction notice is provided in Attachment 3. This document is preliminary, and subject to change prior to its finalization. The final document will be submitted to VT SMS for approval prior to its implementation.

6.0 IMPLEMENTATION

6.1 **PERMITS**

Two permits will be required to implement the corrective action:

- Insignificant Waste Management Event permit (to allow burial of uncontaminated concrete on-site); and
- Coverage under the Vermont Construction General Permit 3-9020.

Contact information for these two permits is provided in Table 14. An insignificant waste management activity application is included as Attachment 4. A Construction Permit Notice of Intent (NOI) is included as Attachment 5. The proposed project is eligible for construction stormwater permit coverage under Vermont Construction General Permit 3-9020 as a Low Risk project based upon completion of the Permit Appendix A: Total Score for Basic Risk Evaluation.

A general stormwater permit will not be required for the following reasons:

- 1. The proposed final impervious area on the Property is less than one acre;
- 2. The increased impervious area will be less than 5,000 square feet;
- 3. Existing impervious surfaces on the property have been present since before 1983; and
- 4. The proposed stormwater discharges are to the ground surface, with infiltration occurring prior to their reaching the nearest surface water body (the tributary to Rouleau Brook).

Based upon Jurisdictional Opinion #5-25 issued January 24, 2013 by the Vermont District 5 Environmental Commission (included in Attachment 6), a Vermont Act 250 Land Use Permit is not required for the corrective action: "*Pursuant to 10 V.S.A. §6001(D)(vi)(dd)* <u>'development' does not include a corrective action authorized in a corrective action plan</u> <u>approved by ANR under §6615b of this title. The clean-up work, will be performed under 10</u> <u>V.S.A. §6615 and §6615b – a Vermont SMS approved corrective action plan (CAP) – which</u> <u>means that the work performed under this CAP is not regulated by Act 250 because it does not</u> *constitute development under the statute.*" However, according to that same Jurisdictional Opinion, an Act 250 Permit Amendment will be required if ownership and associated uses of the Property change.

6.2 MONITORING

Monitoring and environmental testing during implementation of the corrective action will include: 1) air monitoring during soil excavation and related activities; 2) confirmatory soil testing following excavation; 3) testing of existing surficial soils; 4) confirmatory testing of soils brought to the Property during construction; and 5) post-construction outdoor air quality testing.

6.2.1 <u>Air Monitoring for Community and Site Worker Safety and Health</u>

Air monitoring will be conducted during all intrusive activities and during monitoring well closure. The monitoring will be performed using a calibrated PID in accordance with the Site Health and Safety Plan (HASP) (provided in Attachment 7). The PID will be calibrated daily on-site in accordance with the Johnson Company Standard Operating Procedure (JCO SOP) *SOP-JCO-044 for Calibration and Operation of the MiniRAE 3000 Portable Handheld VOC Photo-Ionization Detector* (provided in Attachment 8). Work shall stop, and engineering controls will be implemented, immediately upon any exceedances of the limits specified in the HASP (sustained readings in the breathing zone of 10 ppmV, or instantaneous readings of 25 ppmV or more). Engineering controls could include: covering stock-piles or excavations with polyethylene sheeting; applying foam to reduce CVOC volatilization from soils; or relocating sources of contaminants to positions downwind of potential human receptors.

6.2.2 <u>Confirmatory Soil Sampling</u>

Twenty samples will be collected from the soil excavation to confirm that the remedial goal of removing all soils with greater than 800 ppb PCE has been achieved. Five samples will be collected from the base of the excavation and 13 from the side-walls, plus two field duplicates collected for quality assurance purposes. The samples will be collected without entering the excavation. Extendable augers will be used when possible to collect the samples from the ground surface. If use of augers is impractical, then the excavator bucket will be

decontaminated, and the operator will be instructed to shave a sample from the excavation walls or floor. The elevation and location of each sample will be measured relative to the ground surface and edges of the excavation and recorded to the nearest foot (to the nearest yard if the excavator bucket is used). The edges of the excavation will be documented with a sub-meter global positioning system. The soils will be collected into 40-mL VOA vials in accordance with SOP-JCO-021 Standard Operating Procedures for Soil Sampling for Volatile Organic Compounds (provided in Attachment 8). The sample containers will include methanol preserved VOAs, and the samples will be analyzed using Method 8260b for PCE, TCE, cis- and trans-1,2-DCE and vinyl chloride. The samples immediately will be placed in an iced cooler after collection and shipped to the lab under chain-of-custody protocols (SOP-JCO-007 Standard Operating Procedure for Chain of Custody Records) (provided in Attachment 8). Independent data validation will be performed by Dr. Deborah Gaynor of Phoenix Chemistry Services.

6.2.3 <u>Testing of Existing Surficial Soils</u>

Given the possible future recreational uses of the Property, surficial soils will be tested to confirm that CVOC concentrations are below SSVs. To be conservative, SSVs for residential use will be used for comparison to testing results. Surface soil samples will be collected utilizing the incremental sampling methodology (ISM) described in guidance recently published by the Interstate Technology and Regulatory Council¹. ISM provides representative samples of specific soil strata within specific areas defined as decision units (DUs) by collecting numerous increments of soil that are combined, processed, and subsampled according to specific protocols. ISM is designed to provide an unbiased, statistically valid estimate of the mean value of an analyte within the DU. When using a decision unit strategy, the entire area of a DU is evaluated as a single entity based on the average contaminant data collected from that DU.

Incremental samples will be collected from each of the following DUs defined for the Property (see Figure 16 for area locations):

¹ ITRC, 2012. *Incremental Sampling Methodology*. ISM-1. Interstate Technology & Regulatory Council (ITRC), Incremental Sampling Methodology Team. Washington, D.C. Accessed at www.itrcweb.org.

- DU #1: The areas disturbed by the Corrective Action including soils at locations currently underlying the existing slab and asphalt that will be removed as part of the Corrective Action (except the area under the new asphalt cap, and areas described below for DU #2 and #3);
- DU #2: The vicinity of the former gasoline and fuel oil USTs;
- DU #3: The vicinity of the former TP-8 excavation (except the area under the new asphalt cap);
- DU #4: The eastern slope of the Property; and
- DU #5: The southern slope of the Property.

Incremental surficial soil samples will be collected from 0-0.5 feet deep from 30 approximately equal gridded sampling locations established for each DU. The 30 incremental soil samples will be combined into a single multi-increment sample (for each DU) for analysis for VOCs by Method 8260B (with independent data validation). Incremental samples will be collected from the approximate center of each sampling grid using a pre-determined weight of soil in the appropriate amount of methanol following the procedure recommended in the ITRC guidance (ITRC, 2012). To fall under the small-quantity exemption of the shipping regulations for methanol, ISM volatile subsets will be collected, preserved with methanol in the field, and submitted to the laboratory for combining before analysis. For example, six increments of 5 grams each will be collected in the appropriate container containing 30 mL of methanol. Five of these volatile subsets would be collected for each 30-increment ISM sample (i.e., for each DU) and submitted to the laboratory. The laboratory will then combine equal methanol aliquots from the five subsets for analysis. To assess variability using the ISM approach, two replicates as well as the primary sample will be collected at each of the DUs for VOC analysis. The replicate samples will be collected from the same approximate location within the grid cell as the initial ISM sample, but offset slightly so as not to sample in the same exact location as the original ISM sample.

A cylindrical coring tool or drill will be used to collect each incremental sample, collected as a 6-inch deep core. A roughly equal volume of soil will be collected from each location and placed in a methanol-preserved sample container for each MI sample or replicate as described above. Organic (e.g., vegetation) and oversized materials, such as stones and debris, will be removed from the ground surface before the sample is collected. All samples will be submitted to a laboratory experienced in MI sample preparation and analysis for VOC.

The maximum soil concentrations detected in any of the three replicates from each of the DUs will be used for comparison with the SSVs for residential exposure. Each DU will be evaluated separately (i.e., the results from the different DUs will not be averaged nor will one be selected as representative of all soils).

6.2.4 <u>Confirmation Testing During Construction</u>

Chemical analysis will be performed on all imported top soil brought on-site to confirm that residential soil screening levels are not exceeded at the end of construction. No imported soil shall contain any metals at concentrations above SSVs, or any detectible pesticides, PCBs, semi-volatile or volatile organic compounds, or petroleum constituents. A certification will be provided from each source of imported soil that the material meets these parameters. One sample of topsoil per 500 cubic yards, or a minimum of two per source, will be analyzed for Total Organic Content (TOC) via the Lloyd Kahn Method. One sample per 2,000 cubic yards, or a minimum of one sample per source, will be tested for chemical quality (metals, pesticides, PCBs, semi-volatile and volatile organic compounds) using the following methods:

- Methods 3010A/6010C for Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury (by Method 7470A), Nickel, Selenium, Silver, Thallium and Zinc;
- Method 8260B for Volatile Organic Compounds (full analyte list)
- Method 8270C for Semi-Volatile Organic Compounds (full analyte list)
- Method 8082 for PCBs
- Herbicides/pesticides by Methods 8151 and 8081 (full analyte list)

Five representative samples will also be collected from temporary stockpiles of topsoil that originated on the Property and are being moved or re-graded. These samples will be analyzed for CVOCs via Method 8260B for Volatile Organic Compounds. The purpose of this testing is to confirm that no residual CVOCs are present in the surface or near-surface soils above residential SSVs.

6.2.5 <u>Post-Construction Outdoor Air Quality Testing</u>

Three samples of outdoor air will be collected and analyzed following completion of the corrective action. The purpose of this testing is to confirm that no constituents of concern are present following completion of construction in ambient air in concentrations that may pose unacceptable risks to human health.

The sample locations will be spaced around the former building location in such a way that one will be located up-wind, and two downwind of the prevailing wind direction at the time of sampling. If winds are calm, the sample locations will be equally spaced around the former building. Sampling will be conducted in accordance with the FLCM-Air (Phoenix, 2007). Air samples will be collected using 6-liter Silco steel air canisters through a calibrated flow regulator over an approximately 4-hour period. The air samples shall be analyzed using EPA Method TO-15 (Low Level) for PCE, TCE, cis-1,2-DCE and trans-1,2-DCE.

6.3 INCIDENTAL WASTE MANAGEMENT

6.3.1 <u>Soils</u>

All soils excavated from the area delineated on Figure 15 (regardless of PCE concentrations) will be considered F-Listed (F002) Hazardous Waste, and will be transported off-site under manifest and disposed of at a licensed hazardous waste treatment, storage and disposal (TSD) facility.

If not loaded directly onto trucks, excavated contaminated soil will be placed in temporary stockpiles on minimum 6 millimeter (mil.) thick polyethylene liners and covered with polyethylene sheeting to prevent precipitation from entering the stockpile. Adjacent liner sections will be continuously overlapped by a minimum of three feet. The stockpile cover will be anchored on all sides to prevent it from being uplifted by wind. Surface water runoff will be directed away from any stockpiles.

The ground surface on which the stockpile liner is placed will be free of rocks greater than one-half inch in diameter and any other object which could damage the liner. Alternatively, the Contractor may place a layer of geotextile or plywood to fully underlie and protect the liner in any locations containing rocks or debris which are greater than one-half inch in diameter. A written log will be maintained to track the source of all material in each stockpile.

Stockpile areas will be returned to their original or better condition following completion of loading the soil for off-site disposal. The liner and cover of the stockpile will be disposed of with the contaminated soil. If the underlying liner is damaged and/or there is evidence that contaminated soil contacted the existing native soil within the stockpile footprint, a minimum of 6 inches of the underlying soil will be removed and disposed of with the stockpiled contaminated material.

6.3.2 <u>Concrete and Building Debris</u>

Excavation and capping will require removal of the existing concrete building slab and foundation walls. Soils that are excavated as part of removal of the concrete slab or foundation walls (with the exception of the soil area shown on Figure 15) will be returned to the excavation from which they were taken to the extent practicable. The concrete will be removed and crushed. Metal debris (including rebar) will be separated from the concrete and transported offsite for disposal or recycling at a licensed facility as a non-hazardous waste. Existing brick and concrete block debris from the 2010 building demolition, and the crushed concrete slab and foundation materials, will be disposed on-site under the State of Vermont Insignificant Waste Event rules, either into the excavation or in a pile in a separate area (see Sheet 1 in Attachment 1 and Attachment 4). The pile will be covered with geotextile and 0.5 feet of topsoil. The area will be seeded and a rolled erosion control product will be placed on top.

6.3.3 <u>Asphalt</u>

Much of the existing asphalt in the parking lot and driveways will be removed and transported off-site as a non-hazardous waste to a licensed facility for recycling (see Sheet 1 in Attachment 1 for locations).

6.3.4 <u>Water</u>

Excavation dewatering water and decontamination water generated during the remediation will be transferred to the existing activated carbon system located southeast of the Williamstown Elementary School for treatment. The water will be passed through a filter with a nominal pore size of 25 microns before discharge to the treatment facility. The filtered water will be discharged to the treatment system at a rate not exceeding 5 gpm so that the treatment plant capacity is not exceeded. Any used filters and sediment will be disposed of as F002 Listed Hazardous Waste in accordance with all applicable State and Federal Regulations.

Any water that enters and accumulates in the soil excavation will be removed, transported, filtered and disposed of at the existing treatment facility as described above.

A decontamination pad will be constructed on the Property. Construction equipment that comes in contact with impacted soils or liquids will be washed and rinsed on the pad before the equipment leaves the work area and/or before the equipment is used to place clean backfill. The pad will consist of a contained basin with a minimum 6 inch high curb or berm and a sloped bottom and sump. The sump capacity will be adequate to contain wash water required to clean the construction equipment used to excavate contaminated soil. The sump will be constructed so that it is easily accessible to allow pumping and containerizing of the collected decontamination and rinse water. The collected decontamination and rinse water will be transported, filtered and disposed of at the existing treatment facility as described above. A minimum 10 mil. continuous polyethylene sheeting liner will underlie the entire decontamination pad and the liner will be protected from damage, both from the underlying native ground surface and from the equipment to be decontaminated.

6.3.5 Sanitary Waste

A portable toilet will be provided on-site during active construction.

6.3.6 <u>Non-hazardous Solid Waste</u>

A dumpster will be provided on-site during active construction for non-hazardous solid waste such as coffee cups, trash, and similar incidental debris not described in the paragraphs above.

6.4 SITE CONTROLS

6.4.1 <u>Access</u>

A safety fence will be constructed around the entire area of construction prior to starting the remedial action (see Sheet 1 in Attachment 1 for the fence location). The fence will be a minimum of four feet high and supported with minimum 5 ft. long stakes every 6 ft. The intent of this fence is to control access and prevent trespassers from entering the construction area.

A temporary gate will be installed at the entrance to the work zone which will be closed and locked whenever construction workers or environmental professionals are not present at the Property. A sign will be installed on this gate prohibiting unauthorized access.

6.4.2 <u>Traffic</u>

Construction vehicles will yield to any public traffic whenever entering or leaving the construction site. A stop sign will be maintained at the exit from the construction site to control construction vehicles. Vehicular access will be maintained on public roads at all times for regular traffic as well as for emergency vehicles. Much of the work is scheduled to take place in the summer, before August 26th, when school is back in session to minimize conflicts with school-related traffic.
6.4.3 Erosion Control

Erosion and sediment control systems will be installed prior to the start of any excavation as shown on Sheet 1 in Attachment 1 and in accordance with the Vermont Low Risk Site Handbook for Erosion Prevention and Sediment Control. Stormwater runoff will be diverted around excavation areas. The contractor will be required to manage the excavations to prevent stormwater runoff into an area of impacted soil or from impacted area to uncontaminated areas.

Silt fence will be placed downhill of all disturbed areas to control off-site migration of sediment in stormwater runoff. During active construction, and until final vegetative stabilization is achieved, the silt fence will be inspected weekly and within 24 hours after one-half inch or more of rain or any precipitation that results in a discharge from disturbed areas on the Property. Conditions that would require repair include (but are not limited to): areas where runoff has eroded a channel beneath the fence, areas where the fence has sagged or collapsed and areas where the fence is inadequately trenched in the ground. Sediment accumulated along the fence will be removed when it reaches approximately one-third of the exposed height of the fabric, especially if heavy rains are expected. Removed sediment will be added to the crushed concrete and building debris on-site disposal area.

A stabilized construction entrance will be prepared in accordance with the Vermont Low Risk Site Handbook for Erosion Prevention and Sediment Control before any construction begins and removed when construction is complete. The stabilized construction entrance is intended to prevent the spread of mud and dirt on vehicle wheels onto public roads.

6.4.4 <u>Dust Control</u>

Dust control measures will be applied, if necessary, to traveled, excavation, stockpile, backfilling and soil load-out areas to control dust. Water and/or calcium chloride will be applied in these areas as necessary to prevent dust from becoming a nuisance to the public or workers. Misting will be used to control dust from excavation, stockpile and loading locations, whereas spraying will be used in traveled areas. The number of applications and the amount of water used will be dictated by field and weather conditions. If calcium chloride is used for dust control, it will be applied in such a manner and by such devices that uniform distribution is obtained over the entire area being treated. In general, calcium chloride would only be used on traveled ways and not on surfaces on which bituminous material will be applied.

6.4.5 <u>Noise</u>

The contractor will be directed to minimize noise to the greatest extent practicable during the remediation. All work will be conducted between the hours of 7:00 A.M. and 6:00 P.M. on weekdays, and between 8:30 A.M. and 6:00 P.M. on weekends. The excavation and backfill work is scheduled to take place in the summer, before August 26th, when school is back in session. Final site grading, paving, and site restoration will take place in the fall, after school is in session.

6.4.6 <u>Controls for Excavated Soils</u>

Excavated soils will be loaded directly into off-road transport trucks and/or containers whenever possible. When necessary, excavated soils will be temporarily stockpiled on, and covered with, 6 mil. polyethylene until loaded for off-site disposal.

Designated loading and stockpile areas will be used to prevent the spread of impacted soils to uncontaminated areas. Polyethylene sheeting will be placed down the sides of trucks, trailers or containers during loading. Inspection of wheels/tires and decontamination, as needed, will be performed to prevent tracking of impacted soil.

Excavation equipment that comes in contact with impacted soil will be decontaminated before moving to a clean area or to another excavation. Polyethylene sheeting overlain with plywood, swamp mats or other barrier systems will be used to support excavation and transport equipment as needed to prevent track and wheel contact with impacted soil.

7.0 IMPLEMENTATION SCHEDULE

A sequence of tasks and preliminary schedule for implementation are presented in Table 15.

As shown on Table 15, the overall time frame for implementation of the entire project is approximately 6 months, with active construction on the Property likely not exceeding 3 months. Paving is one of the last project tasks and paving season in Vermont typically ends between the end of October and mid-November (depending on the weather), and doesn't begin again until May. Therefore, since the paved area is an integral component of the corrective action (to prevent infiltration after excavation), the remedial construction should be completed by mid-November. Ideally, all demolition, excavation and backfilling would be completed by August 26th, before school is in session, to reduce any potential risks to trespassing teenagers from heavy equipment and partially completed excavations, and to minimize conflicts between school and construction related traffic.

8.0 SUBCONTRACTORS

Following is a preliminary list of subcontractors to whom requests for bids will be sent. The choice of subcontractors will be based upon their experience, ability to perform the work within the specified time frame, and cost. The list of final subcontractors will be provided to VT SMS prior to the start of work.

Laboratory Subcontractors

Eastern Analytical, Inc. Mike Becker, Customer Service 25 Chenell Drive Concord, NH 03301 t: (603) 228-0525 f: (603) 228-4591 e: GMBecker@eailabs.com

Test America Burlington Don Dawicki 30 Community Drive # 11 South Burlington, VT 05403-6834 t: (802) 660-1990 e: Don.Dawicki@testamericainc.com

Eurofins Lancaster Laboratories, Inc. Wendy Kozma 2425 New Holland Pike Lancaster, PA 17601 t: 717-556-7257 e: WKozma@lancasterlabs.com

Data Validator Subcontractor

Phoenix Chemistry Services
Dr. Deborah Gaynor
126 Covered Bridge Road
No. Ferrisburg, VT 05473
t: 802-233-2473
e: dgaynor@phoenixchemistryservices.com

Construction Sub-contractors

TMC Environmental Shelley Tamis, Service Center Manager 141 Banfield Road Suite 11 Portsmouth, NH 03801 t: 603.436.2364 c: 603.498.6298 f: 603.436.2386 e: stamis@tmcenvironmental.com

ENPRO Services, Inc. Scott Buckley, General Manager 54 Avenue D Williston, Vermont 05495 t: 802-488-3902 f: 802-488-3950 e: sbuckley@ENPRO.COM

Clean Venture Inc. Nicholas A. Foote, Technical Account Manager 133 Leland Street Framingham, MA 01702 t: (508) 872-5000 f: (508) 875-5271 c: (978) 852-5794 e: nfoote@cleanventure.com

Daly Environmental Contracting Paul Daly PO Box 894 So. Royalton, VT 05068 t: (802) 296-1796 f: (802) 763-7035 e: environmentalcontracting@gmail.com

Gurney Brothers Construction 19 Gurney Rd, North Springfield, VT 05150 (802) 886-2210

EPS of Vermont Steve Singer, Branch Manager 273 Commerce St. Williston, VT 05495 t: (802) 862-1212 f: (802) 860-7445 e: ssinger@epsofvermont.com

Physical Soils Testing (Density and Compaction)

Vermont Testing and Consulting Jacques Bouramia P.O Box 420 1841 US Route 2 Waterbury, Vermont 05676 t: 1-800-244-6131 f: (802) 244-5097 c: (802) 229-8685 e: info@vermonttesting.com

Bohn & Associates 38 A Street, Wilder, VT 05088 t: (802) 295-6692

Drilling Subcontractors for Monitoring Well Abandonment

New Hampshire Boring, Inc. Steve Garside PO Box 165 Derry, NH 03038 t: (603) 437-1610 f: (603) 437-0034 e: steveg@nhboring.com

Tri-State Drilling & Boring Inc. PO Box 208 West Burke VT 05871 t: 802-467-3123

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FIGURES











FIGURE 5 LONG TERM MONITORING LOCATIONS

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Source: "Plumbing Floor Plans, Interstate Uniform Rental Services, Inc., Williamstown, VT DWG. No. 2 Dated 07/24/72













FIGURE 12 TOTAL REPORTED VOCS IN GROUNDWATER OCTOBER 2012













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	Table 1 List of Potentially Interested Third Parties and Adjacent Landowners (names and addresses based upon review of Williamstown Town Clerk records April 11, 2013)													
Town Tax Map Parcel #	Owner	Phone Number	Mailing Address	City and State	Zip Code									
53165.00	Michael & Carol Noury	433-6011	195 Brush Hill Road	Williamstown, Vt.	05679									
05148.00	Masonic Temple - Summit Lodge #104	433-5510	P.O. Box 91	Williamstown, Vt.	05679									
53164.01	Richard and Loretta Perusse	433-5950	135 Brush Hill Road	Williamstown, Vt.	05679									
53-005.23	Leslie and Pauline Smith	455-2013	P.O. Box 414	Williamstown, Vt.	05679									
53005.01	Ron and Elaine Owen	433-6752	P.O. Box 73	Williamstown, Vt.	05679									
53162.00	Violet Jeffords	433-5470	85 Brush Hill Road	Williamstown, Vt.	05679									
53162.01	Holden, St. Onge and LaCount	433-5888	97 Brush Hill Road 148 Saldi Heights	Williamstown, Vt.	05679									
53155.00	Keith Hatch	Not available	976 East Coker Road	Fort Pierce, Fla.	34945-2119									
53004.00	Cynthia & Robert McGlynn	433-6250	P.O. Box 85	Williamstown, Vt.	05679									
53002.00	Horace and Helen Duke	433-5453	79 Hebert Rd.	Williamstown, Vt.	05679									
05147.00	Howard and Michelle Dindo	433-1139	195 Hebert Road	Williamstown, Vt.	05679									
53005.00	Brent and Lisa Duff	476-6161	Sugar Woods Drive	Barre, Vt.	05641									
53148.00	Alvin, Stephan and John Day	433-5327	P.O. Box 651	Williamstown, Vt.	05679									
53161.00	Gerald and Victoria Quintin	433-5827	P.O. Box 63	Williamstown, Vt.	05679									
53153.00	Steven Wilkin and Carol Rogers	433-1491 223-3361	10 Hemlock Road	Middlesex, Vt	05602									
53003.00	UniFirst Corporation (contact Tim Cosgrave)	978-658-8888 x4332	68 Jonspin Road	Wilmington, Ma.	01887									
05146.00	Williamstown School District Orange North Supervisory Union	433-5350 433-5818	PO Box 507 111-B Brush Hill Road	Williamstown, Vt.	05679									
53154.00	Williamstown Elementary School Williamstown Board of Selectmen	433-6653 433-6671	P.O. Box 647 P.O. Box 646	Williamstown, Vt.	05679									
05143.00	Theresa, Douglas and Alvin Poor	433-5304	252 Flint Rd.	Williamstown, Vt.	05679									
53001.00	Raymond Snow	Not available	P.O. Box 470	Kingston, N.H.	03848-0470									
05144.00	Shannon Sweet	Not available	229 Hebert Rd	Williamstown, Vt.	05679									
05145.00	Richard and Tina Gilbert	Not available	254 Hebert Rd	Williamstown, Vt.	05679									
05145.02	Kathleen Fassett	433-5952	320 Hebert Road	Williamstown, Vt.	05679									
53-182.00	Linda T. Archambault and David S. Traczyk	433-6703	270 Vt. Rte. 64	Williamstown, Vt.	05679									
53-160.00	Robert and Linda Morse	433-6668	P.O. Box 398	Williamstown, Vt.	05679									

	Photo	pionization De	Tal tector Soil Vapo	ble 2 or Screening I	Results on t	he Property	
Point ID ¹	Peak (ppmV)	Sustained (ppmV)	Background (ppmV)	Point ID ¹	Peak (ppmV)	Sustained (ppmV)	Background (ppmV)
SV-01	0.913	0.912	0.0	SV-45	151	151	0.60
SV-02	1.268	1.266	0.0	SV-46	103	103	0.30
SV-03	0.946	0.946	0.0	SV-47	69.0	69.0	0.50
SV-04	2.843	2.810	0.0	SV-48	70.0	70.0	0.75
SV-05	5.892	5.890	0.0	SV-49	184.0	184.0	0.55
SV-06	4.934	4.932	0.0	SV-50	2.609	2.470	0.0
SV-07	5.810	5.770	0.0	SV-51	1.238	1.238	0.0
SV-08	2.643	2.570	0.0	SV-52	4.8	4.8	0.05
SV-09	1.907	1.760	0.0	SV-53	1.65	1.65	0.05
SV-10	2.587	not stable	0.0	SV-54	10.0	10.0	0.10
SV-11	50.08	not stable	0.0	SV-55	24.1	24.1	0.05
SV-12	57.39	57.30	0.0	SV-56	42.5	42.5	0.05
SV-13	15.35	not stable	0.0	SV-57	138	138	0.20
SV-14	4.913	not stable	0.0	SV-58	89.5	89.5	0.30
SV-14B	1.7	1.7	0.1	SV-59	3.963	3.715	0.029
SV-15	160.19	not stable	0.0	SV-60	2.283	2.280	0.0
SV-16	50.70	50.70	0.05	SV-61	2.10	2.10	0.05
SV-17	75.0	75.0	0.10	SV-62	5.5	5.5	0.10
SV-18	68.15	68.15	0.10	SV-63	31.2	31.2	0.10
SV-19	150.5	150.5	0.00	SV-64	335	335	0.15
SV-20	19.5	19.5	0.05	SV-65	405	405	0.70
SV-21	41.30	41.15	0.0	SV-66	0.553	0.535	0.0
SV-21a	2.65	1.9	0.0	SV-67	0.461	0.400	0.0
SV-22	12.50	12.50	0.00	SV-68	6.173	6.151	0.0
SV-23	89	89	0.15	SV-69	4.959	4.890	0.0
SV-24	12.10	12.10	0.05	SV-70	28.0	28.0	0.20
SV-25	29.50	29.50	0.05	SV-71	4.367	not stable	0.053
SV-26	47.5	47.5	0.20	SV-72	1.966	1.950	0.0
SV-27	68	68	0.15	SV-73	0.992	0.888	0.0
SV-28	392	392	0.10	SV-74	1.248	1.213	0.0
SV-29	890	890	0.15	SV-75	0.55	0.55	0
SV-30	278	278	0.50	SV-76	0.5	0.5	0.05
SV-31	528	528	0.60	SV-77	0.45	0.45	0.05
SV-32	204	204	0.50	SV-78	2.1	2.1	0.05
SV-33	0.562	plugged	0.024	SV-79	1.6	1.6	0.05
SV-34	0.488	0.485	0.0	SV-80	1.3	1.3	0.05
SV-35	10.5	10.5	0.05	SV-81	1.95	1.95	0.05
SV-36	6.60	6.60	0.05	SV-82	1.85	1.85	0.05
SV-37	2.65	1.10	0.05	SV-83	1.75	1.75	0
SV-38	10.50	2.30	0.10	SV-84	1.05	1.05	0.05
SV-39	195.6	193.0	0.10	SV-85	1.2	1.15	0
SV-40	34	34	0.50	SV-86	11.75	not stable	0
SV-41	130	130	0.30	SV-87	7.2	5.45	0
SV-42	216	216	0.80	SV-88	2.5	2.2	0
SV-43	178	178	0.60	SV-89	14.2	not stable	0
SV-44	230	230	0.20	SV-90	3.95	3.75	0.35
¹ See Figure	6 for location	S					

	Table 3 Concentrations of CVOCs Detected in Soil on the Property													
Sample ID ¹	CVOC	Qualifier	Result	Unit	Matrix									
SB-01	Tetrachloroethene		800	ug/Kg dry wt.	soil									
SB-01-5	Tetrachloroethene		4400	ug/Kg dry wt.	soil									
SB-01-5	Trichloroethene	J	0.7	ug/Kg dry wt.	soil									
SB-01-7	Tetrachloroethene	J	3800	ug/Kg dry wt.	soil									
SB-01-11	Tetrachloroethene	J	230	ug/Kg dry wt.	soil									
SB-01-15	Tetrachloroethene	J	390	ug/Kg dry wt.	soil									
SB-02	Tetrachloroethene	U	46	ug/Kg dry wt.	soil									
SB-02-5	Tetrachloroethene		69	ug/Kg dry wt.	soil									
SB-03	Tetrachloroethene	U	54	ug/Kg dry wt.	soil									
SB-04	Tetrachloroethene		110	ug/Kg dry wt.	soil									
SB-05	Tetrachloroethene	U	36	ug/Kg dry wt.	soil									
SB-06	Tetrachloroethene		270	ug/Kg dry wt.	soil									
SB-06-2	Tetrachloroethene	J	370	ug/Kg dry wt.	soil									
SB-06-4	Tetrachloroethene	J	270	ug/Kg dry wt.	soil									
SB-06-6	Tetrachloroethene		63	ug/Kg dry wt.	soil									
SB-06-8	Tetrachloroethene		78	ug/Kg dry wt.	soil									
SB-07	Tetrachloroethene	U	28	ug/Kg dry wt.	soil									
SB-08	Tetrachloroethene		65	ug/Kg dry wt.	soil									
SB-09	Tetrachloroethene		110	ug/Kg dry wt.	soil									
SB-10	Tetrachloroethene	J	160	ug/Kg dry wt.	soil									
SB-10-3	Tetrachloroethene	U	54	ug/Kg dry wt.	soil									
SB-10-6	Tetrachloroethene	U	54	ug/Kg dry wt.	soil									
SB-10-8	Tetrachloroethene		64	ug/Kg dry wt.	soil									
SB-11	Tetrachloroethene		160	ug/Kg dry wt.	soil									
SB-11-3	Tetrachloroethene	J	160	ug/Kg dry wt.	soil									
SB-11-6	Tetrachloroethene	U	48	ug/Kg dry wt.	soil									
SB-11-8	Tetrachloroethene		75	ug/Kg dry wt.	soil									
SB-11-11	Tetrachloroethene		120	ug/Kg dry wt.	soil									
SB-12	Tetrachloroethene	J	350	ug/Kg dry wt.	soil									
SB-12-3	Tetrachloroethene	J	830	ug/Kg dry wt.	soil									
SB-12-6	Tetrachloroethene	U	24	ug/Kg dry wt.	soil									
SB-12-8	Tetrachloroethene	J	380	ug/Kg dry wt.	soil									
SB-12-11	Tetrachloroethene	U	30	ug/Kg dry wt.	soil									
SB-13	Tetrachloroethene		72	ug/Kg dry wt.	soil									
SB-14	Tetrachloroethene	J	99	ug/Kg dry wt.	soil									
SB-14-3	Tetrachloroethene	J	640	ug/Kg dry wt.	soil									
SB-14-7	Tetrachloroethene		120	ug/Kg dry wt.	soil									
SB-14-11	Tetrachloroethene	U	24	ug/Kg dry wt.	soil									
SB-14-12	Tetrachloroethene	U	21	ug/Kg dry wt.	soil									
SB-15	Tetrachloroethene		120	ug/Kg dry wt.	soil									

	Table 3 continued Concentrations of CVOCs Detected in Soil on the Property continued													
Sample ID1CVOCQualifierResultUnitMatrix														
SB-15-8	Tetrachloroethene	U	37	ug/Kg dry wt.	soil									
SB-16-1	1,2-Dichloroethylene	J	1	ug/Kg dry wt.	soil									
SB-16-1	cis-1,2-Dichloroethene J 1 ug/Kg dry wt. soil													
SB-16-1	Tetrachloroethene	J	17	ug/Kg dry wt.	soil									
SB-16-3	Tetrachloroethene	U	11	ug/Kg dry wt.	soil									
Notes: - U indicates co - J indicates an - CVOC = chlo ¹ See Figure 6 f	Notes: - U indicates compound not detected; associated value is practical quantitation limit. - J indicates an estimated concentration. - CVOC = chlorinated volatile organic compound. ¹ See Figure 6 for locations													

	Table 4 Tetrachloroethene (PCE) Concentrations in Soil on the Property															
Soil	San	ple Interva	al 1	Sam	ple Interva	12	Sam	Sample Interval 3			ple Interv	al 4	Sam	Maximum		
Boring ID ¹	Sample Depth	Sample Elev.	PCE Conc.	Sample Depth	Sample Elev.	PCE Conc	Sample Depth	Sample Elev.	PCE Conc.	Sample Depth	Sample Elev.	PCE Conc.	Sample Depth	Sample Elev.	PCE Conc.	Conc.
SB-01	2.5	1032.7	800	5	1030.2	4400	7	1028.2	3800	11	1024.2	230	15	1020.2	390	4400
SB-02	1	1032.3	U46	5	1028.3	69										69
SB-03	1.5	1029.8	U54													U54
SB-04	1.9	1031.8	110													110
SB-05	1	1030.4	U36													U36
SB-06	0.7	1030.7	270	2	1029.4	370	4	1027.4	270	6	1025.4	63	8	1023.4	78	370
SB-07	2	1031.4	U28													U28
SB-08	1.5	1033.7	65													65
SB-09	1.6	1033.6	110													110
SB-10	1.6	1033.6	160	3	1032.2	U54	6	1029.2	U54	8	1027.2	64				160
SB-11	1.6	1033.6	160	3	1032.2	160	6	1029.2	U48	8	1027.2	75	11	1024.2	120	160
SB-12	1.4	1033.8	350	3	1032.2	830	6	1029.2	U24	8	1027.2	380	11	1024.2	U30	830
SB-13	2.7	1032.5	72													72
SB-14	2	1033.2	99	3	1032.2	640	7	1028.2	120	11	1024.2	U24	12	1023.2	U21	640
SB-15	1	1032.4	120	3	1030.4	U30				8	1025.4	U37				120
SB-16	1	1032.4	17	3	1030.4	U11										17
Notes:	1	1	1	1	1	I	1	1	1	1	1	1		1	1	

- All concentrations in ppb. All depths and elevations in feet. U = PCE not detected; associated number is quantitation limit. Blank cells indicate sample not collected for analysis at that depth. ¹ See Figure 6 for locations

	Table 5 Concentrations of CVOCs Detected in Floor Drain Pipes												
Sample ID	CVOC	Qualifier	Result	Unit	Matrix								
GD-C01	1,1-Dichloroethene		20	ug/L	water								
GD-C01	1,2-Dichloroethylene (TOTAL)		19000	ug/L	water								
GD-C01	2-Butanone	J	110	ug/L	water								
GD-C01	Benzene	J	2	ug/L	water								
GD-C01	Cis-1,2-Dichloroethene		19000	ug/L	water								
GD-C01	Tetrachloroethene	J	350	ug/L	water								
GD-C01	Toluene	J	3	ug/L	water								
GD-C01	Trans-1,2-Dichloroethene		31	ug/L	water								
GD-C01	Trichloroethene		40	ug/L	water								
GD-C01	Vinyl Chloride		34	ug/L	water								
Notes: - J indicates an - CVOC = chlo	estimated concentration. orinated volatile organic compour	nd											

	Table 6 Monitoring Wells to be Closed												
Well Name	Diameter and Material	Top of Well Stick-up (fags)	Water Level on 7/19/10 (fbtoc)	Total Well Depth (fbgs)	Notes	Year Last Sampled							
BRW-1 RW	6" steel	1.8	20.30	34	Split-cap and well pump present, pitless adaptor ~3.75 fbtoc. 1986 drillers log indicates 23.38 feet of steel casing, rock at 21 fbgs, and a total depth of 34 fbgs.	1986							
BRW-2	6" steel	0	Inaccessible	147	Split-cap slipped into casing ~ 0.2 feet and clogged with dirt. Reported total well depth at time of drilling was 147 fbgs, with water level at 60 fbgs.	1984							
BRW-3	6" steel	1.0	27.90	99	Split-cap, pump wires and piping slipped down casing ~4.5 feet. Reported total well depth at time of drilling was 99 fbgs.	1984							
MWN1-T	2" PVC	2.7	Dry	14.5		Unknown							
MWS1-T	2" PVC	0	Inaccessible	Estimated 15	Casing filled with soil	Unknown							
MWS2-T	2" PVC	0	Inaccessible	Estimated 15	Guard bent so that PVC cap could not be removed	Unknown							
PZ-2	2" PVC	3.0	12.60	10.2	Tilted 30 degrees from vertical	Unknown							
PZ-3	2" PVC	2.2	11.44	12.1		Unknown							
PZ-4	2" PVC	2.8	9.98	11.0		Unknown							
DS-6	1.5" PVC	1.5	Dry	9.4		Unknown							
MW-F	2" PVC	1.0	Dry	11.5	Plugged at 2.8 fbgs	1983							

	Table 7 Concentrations of CVOCs in Water Supplies - 2007-2012																									
Well Name ¹	CVOC	VGES	Oct '	07	Apr '	08	Oct '08		May '09		Oct '09		Apr '10		Apr '10 Oct '10		Apr '10 Oct '10		Oct '10 Apr '11		Oct '11		Apr '12		Oct '12	
WP-3	PCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
	TCE	5	0.2	J	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.18	J	0.5	U	0.18	J	0.08	J	0.10	J		
WP-5	PCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
	TCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
WP-7	PCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
	TCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
WP-8	PCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
	TCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
WP-13	PCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.7	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
	TCE	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U		
WP-20	PCE	5	0.5	U	0.5	U	0.5	U																		
	TCE	5	0.5	U	0.5	U	0.5	U																		

Notes:

- CVOC = chlorinated volatile organic compound.

- cis-1,2-DCE and trans-1,2-DCE not detected.

- Blank cells indicate sample not collected on that date from that well.

- All values presented in micrograms/liter (ug/L). All samples analyzed by EPA Method 524.2.

- "VGES" = Vermont Groundwater Enforcement Standard; "PCE" = tetrachlorethene; "TCE" = tricholorethene; "DCE" = dichloroethene.

-"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value.

- Data from Waite-Heindel Environmental Management Annual Monitoring Report, UniFirst Plant Site, Williamstown, Vermont, January 23, 2013.

¹ See Figure 5 for locations

		Concen	trations	T of CVO	Table 8 Cs in G	roundwa	1. 1	9-2012						
Location ¹	CVOC	VGES	Oct	t-'09	Ap	r-'10	Oc	t-'10	Ap	r-'11	Oct	-'11	Oct	t-'12
	PCE	5	25				21				22		24	
W7 1	TCE	5	0.64	J			0.82	J			0.93	J	1.7	
w-1	cis-1,2-DCE	70	1	U			1	U			1	U	1	U
	trans-1,2-DCE	100	1	U			1	U			1	U	1	U
	PCE	5	8.7				2.7				3.9		8.1	
W/ 10	TCE	5	2				0.33	J			1	U	0.68	J
w-19	cis-1,2-DCE	70	1	U			1	U			1	U	1	U
	trans-1,2-DCE	100	1	U			1	U			1	U	1	U
	PCE	5	24				22				33		23	
	TCE	5	22				20				31		23	
w-20	cis-1,2-DCE	70	3.4				3				4.5		4.7	
	trans-1,2-DCE	100	1	U			1	U			1	U	1	U
	PCE	5	DRY		120				82				DRY	
W/ 22	TCE	5	DRY		3				2.3				DRY	
w-23	cis-1,2-DCE	70	DRY		0.24	J			1	U			DRY	
	trans-1,2-DCE	100	DRY		1	U			1	U			DRY	
	PCE	5	7.5				8.1				8.9		9.3	
W/ 25	TCE	5	1.2	U			1.6				1.9		3.3	
w-25	cis-1,2-DCE	70	0.27	J			0.19	J			1	U	0.38	J
	trans-1,2-DCE	100	1	U			1	U			1	U	0.25	J
	PCE	5	2				2.7				2.3		3.1	
NUL 20	TCE	5	2.9				3.1				2.2		4.6	
MW-50	cis-1,2-DCE	70	0.61	J			0.51	J			0.42	J	1.1	
	trans-1,2-DCE	100	1	U			0.25	J			1	U	1	U
Table 8 continued Concentrations of CVOCs in Groundwater 2009-2012														
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Location ¹	CVOC	VGES	Oct-'09	Apr-'10	Oct-'10	Apr-'11	Oct-'11	Oct-'12						
	PCE	5	DRY	DRY	DRY	DRY	DRY	DRY						
NAXY 51	TCE	5	DRY	DRY	DRY	DRY	DRY	DRY						
MW-51	cis-1,2-DCE	70	DRY	DRY	DRY	DRY	DRY	DRY						
	trans-1,2-DCE	100	DRY	DRY	DRY	DRY	DRY	DRY						
	PCE	5	DRY	DRY	DRY	DRY	DRY	DRY						
N 4337 A	TCE	5	DRY	DRY	DRY	DRY	DRY	DRY						
MW-A	cis-1,2-DCE	70	DRY	DRY	DRY	DRY	DRY	DRY						
	trans-1,2-DCE	100	DRY	DRY	DRY	DRY	DRY	DRY						
	PCE	5	16		11		13	20						
	TCE	5	0.84 J		0.85 J		0.85 J	2.3						
MW-C	cis-1,2-DCE	70	1 U		1 U		1 U	1 U						
	trans-1,2-DCE	100	1 U		1 U		1 U	1 U						
	PCE	5	77 J		40		54	73						
MWD	TCE	5	30 J		13		18	30						
MW-D	cis-1,2-DCE	70	3.3 J		1.3		1.8	3.3						
	trans-1,2-DCE	100	0.35 J		0.41 J		0.26 J	0.45 J						
	PCE	5	20		12		23	22						
MW E	TCE	5	6.4		4.4		8.8	8.5						
WW-E	cis-1,2-DCE	70	0.79 J		1.2		0.99 J	0.54 J						
	trans-1,2-DCE	100	1.5		1.1		1.3	0.52 J						
	PCE	5	5.6		3.3		6.3	5						
D7 101	TCE	5	1 U		1 U		1 U	1 U						
PZ-101	cis-1,2-DCE	70	1 U		1 U		1 U	1 U						
	trans-1,2-DCE	100	1 U		1 U		1 U	1 U						

Table 8 continued Concentrations of CVOCs in Groundwater 2009-2012														
Location ¹	CVOC	VGES	Oc	t-'09	Ap	or-'10	Oct	-'10	Ap	or-'11	Oct-'1	1	Oct-'12	
	PCE	5	15				13				8.6		17	
PZ 102	TCE	5	0.33	J			0.34	J			0.21	J	0.42	J
PZ-102	cis-1,2-DCE	70	1	U			1	U			1	U	1	U
	trans-1,2-DCE	100	1	U			1	U			1	U	1	U
	PCE	5	0.36	J	0.4	J	0.61	J			0.51	J	0.49	J
MW 25994	TCE	5	0.8	J	0.88	J	0.82	J			0.75	J	0.76	J
WI W -23004	cis-1,2-DCE	70	0.59	J	0.59	J	0.54	J			0.49	J	0.56	J
	trans-1,2-DCE	100	1	U	1	U	1	U			1	U	1	U
	PCE	5	0.26	J	1	U	1	U	1	U	0.25	J	0.31	J
W-SEEP	TCE	5	1	U	1	U	1	U	1	U	1	U	1	U
	cis-1,2-DCE	70	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	100	1	U	1	U	1	U	1	U	1	U	1	U
	PCE	5	2.3		1.8		1.5		1.4		1.4		3.7	
SEED 1 A	TCE	5	1.7		1.1		0.79	J	0.88	J	1.1		2.5	
SEEP-IA	cis-1,2-DCE	70	0.2	J	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	100	1	U	1	U	1	U	1	U	1	U	1	U
	PCE	5	1	U	1	U	1	U	1	U	1	U	1	U
55.2	TCE	5	1	U	1	U	1	U	1	U	1	U	1	U
55-2	cis-1,2-DCE	70	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	100	1	U	1	U	1	U	1	U	1	U	1	U
	PCE	5	DRY		5.8		4.2		4.2		2.2	J	DRY	
55.2	TCE	5	DRY		0.49	J	1	U	0.33	J	0.56	J	DRY	
SS-3	cis-1,2-DCE	70	DRY		1	U	1	U	1	U	0.26	J	DRY	
	trans-1,2-DCE	100	DRY		1	U	1	U	1	U	1	U	DRY	

	Table 8 continued Concentrations of CVOCs in Groundwater 2009-2012													
Location ¹	CVOC	VGES	Oc	t-'09	Ар	or-'10	Oc	t-'10	Apr	-'11	Oct-'1	1	Oct-'12	2
	PCE	5	1	U	0.66	J	0.39	J	0.77	J	0.25	J	1	U
00 <i>5</i>	TCE	5	0.85	J	0.75	J	0.59	J	0.51	J	1.2		0.37	J
22-2	cis-1,2-DCE	70	2.3		0.25	J	0.3	J	1	U	1.2		0.4	J
	trans-1,2-DCE	100	0.24	J	1	U	1	U	1	U	1	U	1	U
	PCE	5	1	U	1.8		0.73	J	9.9		0.31	J		
SD 2	TCE	5	1	U	1	U	1	U	0.69	J	1	U		
SP-3	cis-1,2-DCE	70	1	U	1	U	1	U	1	U	1	U		
	trans-1,2-DCE	100	1	U	1	U	1	U	1	U	1	U		
	PCE	5	5.6		8.6		11		6.4		10		2.7	
CD 4	TCE	5	1.6		2.7		1.7		2		3.4		0.81	J
Sr-4	cis-1,2-DCE	70	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	100	1	U	1	U	1	U	1	U	1	U	1	U

Notes:

All data in parts per billion (ppb).
CVOC = chlorinated volatile organic compound.
"PCE" = tetrachlorethene; "TCE" = tricholorethene; "DCE" = dichloroethene.

-"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported quantitation limit is an estimated value; " "Dry" = well dry during monitoring event.

-Blank spaces indicate that well/seep was not sampled. -Vermont Groundwater Enforcement Standards (VGES) from Table 1, Chapter 12 -Groundwater Protection Rule and Strategy, February 2005. -Data from Waite-Heindel 2012 Annual Monitoring Report UniFirst Plant Site, Williamstown, Vermont.

¹ See Figure 5 for locations

Table 9 Groundwater Table Elevations 2008-2012										
Location ¹	Oct-'08	May-'09	Oct-'09	Apr-'10	Oct-'10	Apr-'11	Oct-'11	Oct-'12		
MW-A	<944.8	<944.8	<944.8	<944.8	<944.8	<944.8	<944.8	<944.8		
MW-C	946.02		945.86		946.18		946.23	945.98		
MW-D	943.17		943.23		944.83		944.9	943.77		
MW-E	939.64		939.65		940.64		940.47	939.96		
MW-50	926.61		924.4		925.79		925.2	925.08		
MW-51	<906	<906	<906	<906	<906	<906	<906	<906		
W-1	945.47		945.41		945.5		945.53	945.42		
W-19	946.81		946.7		946.84		946.81	946.78		
W-20	948.46		947.61		948		947.92	947.74		
W-23	<956.7	959.93	<956.7	959.88	959.12	962.98	960.1	<956.7		
W-25	949.7		949.25		950.6		951.16	950.06		
PZ-101	947.14		947.15		949.14		948.73	947.78		
PZ-102	946.9		947.2		949.01		948.74	947.67		
MW-25884	904.46	905.09	904.43	905.73	905.4		905.06	904.69		

-"<"= less than bottom elevation of well, signifying a dry well.

- Blank cell = not tested.

- Data from Waite-Heindel Environmental Management Annual Monitoring Report, UniFirst Plant Site, Williamstown, Vermont, January 23, 2013.

¹ See Figure 5 for locations

Table 10																
Location ¹	CVOC	Conc Guidance Level	entration July	ns of C -'09	EVOCs in . Februa	lndoor . rv_'10	Air - 2	2009-20 v='10)12 	rv_'11	July	.'11	Januar	·v-'12	Αησης	st-(12
Location	Tetrachloroethene		0.017		0.022	l y- 10	0.012	y- 10	0.015	<u>i y- 11</u>	0 01	TT.	0.011	<u>y- 12</u>	0.012	12
	Trichloroethene	1	0.017	IT	0.022	TT	0.012	II	0.015	II	0.01	U	0.011	TT	0.012	TT
AVRM	cis 1.2 Dichloroethene	1	0.01	U U	0.01		0.01		0.01	U U	0.01	U	0.01		0.01	U U
	trans_1 2-Dichloroethene	15.0	0.01	U U	0.01		0.01		0.01	U U	0.01	U	0.01	U U	0.01	U U
	Tatrachloroathana	1	0.01		0.01	0	0.01		0.012	0	0.01	U	0.011	0	0.01	0
	Trichloroothono	1	0.01	U U	0.01	TT	0.01		0.012	T	0.01	U	0.011	TT	0.033	TT
GYM		1	0.01		0.01		0.01	UJ	0.01	U	0.01	U	0.01		0.01	
	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	UJ	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.01	U	0.025		0.011		0.01	U	0.012		0.01	U	0.011	
NECRNR	Trichloroethene	1	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.018		0.082		0.022		0.05				0.019		0.027	
	Trichloroethene	1	0.016		0.011		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
AQIIFLK	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.18		0.09	J	0.11		0.027		0.16		0.011		0.012	
AOIDEMT	Trichloroethene	1	0.27		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
AQIBSMI	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.018		NS		NS		NS		NS		NS		NS	
	Trichloroethene	1	0.01	U	NS		NS		NS		NS		NS		NS	
AQ2ABSMT	cis-1,2-Dichloroethene		0.01	U	NS		NS		NS		NS		NS		NS	
	trans-1,2-Dichloroethene	15.9	0.01	U	NS		NS		NS		NS		NS		NS	

Table 10 continued Concentrations of CVOCs in Indoor Air - 2009-2012																
Location ¹	CVOC	Guidance Level	July	-'09	Febru	ary-'10	July	y-'10	Januar	y-'11	July	-'11	Januar	y-'12	Augus	st-'12
	Tetrachloroethene	1	0.01	U	0.01	U	NS		NS		NS		0.012		NS	
	Trichloroethene	1	0.01	U	0.01	U	NS		NS		NS		0.01	U	NS	
AQ2BIFLK	cis-1,2-Dichloroethene		0.01	U	0.01	U	NS		NS		NS		0.01	U	NS	
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	NS		NS		NS		0.01	U	NS	
	Tetrachloroethene	1	0.20		5.3		0.032		0.20		0.012		0.18		0.01	U
	Trichloroethene	1	0.058		0.13		0.01	U	0.076		0.01	U	0.064		0.01	U
AQSIFLK	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.011		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.54		4.8		1.4		0.31		0.15		0.20		0.11	
AQ3BSMT	Trichloroethene	1	0.077		0.16		0.049		0.086		0.031		0.067		0.35	
	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.013		0.010		0.01	U	0.01	U	0.01	U	0.01	U	0.012	
	Tetrachloroethene	1	0.023		0.017		0.012		0.016		0.012		0.43		0.010	
	Trichloroethene	1	0.018		0.19		0.01	U	0.01	U	0.012		0.21		0.015	
AQJIFLK	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.021		0.012		0.012		0.014		0.012		0.37		0.024	
A OSDEMT	Trichloroethene	1	0.01	U	0.13		0.045		0.01	U	0.045		0.21		0.01	U
AQSESNIT	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.26		0.14		0.27		0.11		0.26		0.13		NA	
	Trichloroethene	1	0.078		0.018		0.11		0.026		0.11		0.025		NA	
AQOIFLK	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	NA	
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	NA	

	Table 10 cont. Concentrations of CVOCs in Indoor Air - 2009-2012															
Location ¹	CVOC	Guidance Level	July	-'09	Febru	ary-'10	July	y-'10	Janua	ry-'11	July	-'11	Janua	ary-'12	Augus	st-'12
	Tetrachloroethene	1	0.081		0.07		0.089		0.05		0.12		0.036		0.01	U
AOCDEMT	Trichloroethene	1	0.021		0.01	U	0.038		0.01	U	0.046		0.01	U	0.01	U
AQOBSMI	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.017		0.014		0.01	U	0.029		0.022		0.066		0.01	U
	Trichloroethene	1	0.027		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
AQ/IFLK	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Tetrachloroethene	1	0.02		0.016		0.01	U	0.014		0.011	J	0.095		0.011	
	Trichloroethene	1	0.013		0.01	U	0.016		0.01	U	0.01	UJ	0.016		0.027	J
AQ7BSMT	cis-1,2-Dichloroethene		0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2-Dichloroethene	15.9	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U

Notes:

All data presented in parts per billion by volume (ppbv).

All analysis by EPA Methods TO-14A and TO-15 Low Level.

• CVOC = chlorinated volatile organic compound.

"U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value; "UJ" = reported quantitation limit is an estimated value.

"R" = the data are unusable (analyte may or may not be present). -"NA" = Not Available; "NS" = No Sample collected.

Guidance levels for trans -1,2,-dichloroethene is based on the EPA Region III risk-based concentration (RBC) Target Indoor Air Concentrations for residential exposure (effective as of November 2012). No EPA or Vermont inhalation or toxicity information was available for cis-1,2,-dichloroethene. Vermont Department of Health 2002 Study Indoor Air Background Concentrations of PCE and TCE are both 1 ppby. These guidance values are for comparative purposes only, as they are not enforceable by Vermont.

Data copied from WEM 2012 3rd Quarter Monitoring Report for the UniFirst Plant Site, Williamstown, Vermont.

See Figure 5 for locations

Table 11 Concentrations of CVOCs in Outdoor Air- 2009-2012																		
Location ¹	CVOC	Guidance Level	Jan-'0	9	July-'	09	Feb-'1	10	July-'1	0	Jan-'1	1	July-"	11	Jan-'1	2	Aug-'1	12
NORTH SIDE	Tetrachloroethene	100,000	0.01	U	0.14		0.01	U	0.01	U	0.01	U	0.022		0.01	U	0.01	U
	Trichloroethene	100,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	cis-1,2-DCE	200,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2- DCE	200,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
AS-3	Tetrachloroethene	100,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.025		0.01	U	0.01	U
	Trichloroethene	100,000	0.01	U	0.01	U	0.01	U	0.01	UJ	0.01	U	0.01	U	0.01	U	0.01	U
	cis-1,2- DCE	200,000	0.01	U	0.01	U	0.01	U	0.01	UJ	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2- DCE	200,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
AS-4	Tetrachloroethene	100,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	Trichloroethene	100,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	cis-1,2- DCE	200,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
	trans-1,2- DCE	200,000	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U	0.01	U
Notes:																		

- All analysis by EPA Methods TO-14A and TO-15 Low Level.

- All data presented in parts per billion by volume (ppbv).

- CVOC = chlorinated volatile organic compound. -"U" = not detected above listed quantitation limit; "UJ" = reported quantitation limit is an estimated value; DCE = dichloroethene.

- Guidance levels are from the Occupational Health and Safety Administration (OSHA), and are based on a time-weighted average exposure (8-hour day, 5 days/week); source: 1910.1000, Tables Z-1 and Z-2, August, 1997.

- Data copied from WEM 2012 3rd Quarter Monitoring Report for the UniFirst Plant Site, Williamstown, Vermont. ¹ See Figure 5 for locations

	Table 12 Concentrations of CVOCs in Surface Water - 2007-2012																			
Location ¹	счос	Water Quality Standard	July-	·01	July	-'02	Jul	y-'03	Jul	y-'04	Ju	ly-'06	Jul	y-'07	Jul	-'09	Ju	ly-'11	July	-'12
WQ-1	PCE	0.8	1	U	0.65	J	1	UJ	1	U	1	U	0.39	J	1	U	1	U	1	U
	TCE	2.7	1	U	1	U	1	J	1	U	1	U	1	U	1	U	1	U	1	U
	cis-1,2-DCE	NA	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	NA	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
WQ-2	PCE	0.8	1	U	1	U	1	UJ	1	U	1	U	1	U	1	U	1	U	1	U
	TCE	2.7	1	U	1	U	1	J	1	U	1	U	1	U	1	U	1	U	1	U
	cis-1,2-DCE	NA	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	NA	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
WQ-3	PCE	0.8	DRY		1	U	1	UJ	1	U	1	U	1	U	1	U	1	U	0.49	J
	TCE	2.7	DRY		1	U	1	J	1	U	1	U	1	U	1	U	1	U	1	J
	cis-1,2-DCE	NA	DRY		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	NA	DRY		1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
WQ-4	PCE	0.8	1	U	1	U	1	UJ	1	U	1	U	1	U	1	U	1	U	1	U
	TCE	2.7	1	U	1	U	1	J	1	U	1	U	1	U	1	U	1	U	1	U
	cis-1,2-DCE	NA	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U
	trans-1,2-DCE	NA	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U	1	U

Notes:

- Analysis by Method 8260B.

- All values presented in micrograms/liter (ug/L).

- CVOC = chlorinated volatile organic compound.
- "PCE" = tetrachlorethene; "TCE" = tricholorethene; "DCE" = dichloroethene.

- "U" = not detected above listed quantitation limit; "J" = reported concentration is an estimated value;

"UJ" = reported quantitation limit is an estimated value; "Dry" = stream dry during monitoring event; "NA" = not applicable.

- Data from 2001-2003 were collected by Tighe & Bond; data from 2004-2012 were collected by Waite Environmental Management; data copied from WEM 2012 2nd Quarter Monitoring Report for the UniFirst Plant Site, Williamstown, Vermont.

- Water Quality Standard referenced from Appendix C of "Vermont Water Quality Standards" (water & organisms), effective July 2, 2000.

¹ See Figure 5 for locations

Table 13 Remedial Goals, Regulatory Standards and Screening Values for 2013 Soil Removal and Cap Installation										
Media	Compound	Regulatory Standard or Screening Value	Remedial Goal							
	Tetrachloroethene (PCE)	800 ppb ^a	800 ppb							
	Trichloroethene (TCE)	860 ppb ^a	860 ppb							
Soil	cis 1-2 dichloroethene	673,000 ppb ^a	673,000 ppb							
	trans 1-2 dichloroethene	135,000 ppb ^a	135,000 ppb							
	Vinyl chloride	60 ppb ^a	60 ppb							
	Tetrachloroethene (PCE)	5 ppb ^b	5 ppb							
	Trichloroethene (TCE)	5 ppb ^b	5 ppb							
Groundwater	cis 1-2 dichloroethene	70 ppb ^b	70 ppb							
	trans 1-2 dichloroethene	100 ppb ^b	100 ppb							
	Vinyl chloride	2 ppb ^b	2 ppb							
	Tetrachloroethene (PCE)	100 ppmv ^c	100 ppmv							
	Trichloroethene (TCE)	100 ppmv ^c	100 ppmv							
Outdoor Air	cis 1-2 dichloroethene	200 ppmv ^c	200 ppmv							
	trans 1-2 dichloroethene	200 ppmv ^c	200 ppmv							
	Vinyl chloride	1 ppmv ^c	1 ppmv							

Units:

ppb= parts per billion.

ppmv= parts per million by volume

Notes:

^a Vermont Soil Screening Values (SSV) (the higher of Vermont Department of Health or residential exposure SSV) is from Appendix A of The Vermont Department of Environmental Conservation Investigation and Remediation of Contaminated Properties Procedure, April 2012 (VT IROCPP). These guidance values are for comparative purposes only, as they are not enforceable by Vermont. ^b Vermont Groundwater Enforcement Standard (VGES).

^c Guidance levels are from the Occupational Health and Safety Administration (OSHA), and are based on a time-weighted average exposure (8-hour day, 5 days/week); source: 1910.1000, and 1910.0107 Tables Z-1 and Z-2, August, 1997.

Table 14 List of Permits and Contacts									
Permit	Contact								
Insignificant Waste Management Event permit (to allow burial of uncontaminated concrete, asphalt and rubble on-site)	Agency of Natural Resources Waste Management & Pollution Prevention Division dennis.fekert@state.vt.us								
Construction Stormwater Permit Notice of Intent	Agency of Natural Resources Padraic Monks, Program Manager Stormwater Program padraic.monks @state.vt.us 802- 490-6169								
Act 250 Permit Amendment (for change of Property use)	Act 250 Permit Office District #5 5 Perry Street, Suite 80 Barre, VT 05641 802-476-0185								

Table 15 Corrective Action Implementation Schedule									
Task Sequence	Estimated Time Frame	Approximate Completion Date							
Corrective Action Plan (CAP) VT SMS review/approval	2 weeks	5/3/13							
Public notice period	2 weeks	5/17/13							
Public informational meeting and finalize CAP	3 weeks	6/7/13							
Permitting (not including Act 250)	3 weeks (concurrent with CAP process)	6/7/13							
Close on-Property wells and UniFirst Drain clean-outs, remove liquids in garage drain pipes	One week. Concurrent with CAP process	6/7/13							
Bidding process	6/28/13								
Contracting	1 ¹ / ₂ weeks	7/10/13							
Pre-construction planning and mobilization	1 week	7/19/13							
Slab and foundation demolition, crushing and stockpiling	2 weeks	8/2/13							
Soil excavation, transport, and off-site disposal	2 weeks	8/16/13							
Backfilling and subgrade preparation	1 week	8/23/13							
Asphalt cap and site work (grading, paving, storm water features, topsoil placement, seeding)	4 weeks	9/20/13 (dependent on availability of paving contractors)							
Project close-out	1 week	9/27/13							
Establish institutional controls	Concurrent with construction	Fall 2013							

ATTACHMENT 1

DESIGN DRAWINGS



							/	
REVISIONS								
	#	Date	Drwn	Chk'd	App'd	Description		
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- 1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP'S), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. 2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP'S IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP'S EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP'S WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP'S.
- 3. ROLL CENTER RECP'S IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP'S WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
- 4. PLACE CONSECUTIVE RECP'S END OVER END (SHINGLE STYLE) WITH A 4" 6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE RECP's.
- 5. FULL LENGTH EDGE OF RECP'S AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6"DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- 6. ADJACENT RECP'S MUST BE OVERLAPPED APPROXIMATELY 2" 5" (DEPENDING ON RECP'S TYPE) AND STAPLED.
- 7. THE TERMINAL END OF THE RECP'S MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

NOTE: * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP'S.



Date Drwn Chk'd App'd Description

K: 1-0703-1 ACTIVE CAD Remedial Action.dwg

CRITICAL POINTS A. OVERLAPS AND SEAMS B. PROJECTED WATER LINE CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE: * HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE. ** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 cm) MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

ROLLED EROSION CONTROL PRODUCT INSTALLATION - SWALE 6) NOT TO SCALE



1. TWELVE (12) FOOT MINIMUM WIDTH, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE

3. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED

4. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING

OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR

5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT

BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE

INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.

2. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.

TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.



<u>NOTES</u>

PERMITTED.

REQUIREMENTS.

STABILIZED CONSTRUCTION ENTRANCE ΄7 \) SCALE







UNIFIRST CORPORATION 68 JONSPIN ROAD WILMINGTON, MA 01887

Johnson Company INVIRONMENTAL SCIENCE AND ENGINEERING SOLUTIONS

Job#: 1-0703-01

ATTACHMENT 2

CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

Corrective Action Plan Former UniFirst Facility Williamstown, Vermont

April 2013

Prepared by:



04-22-13 UniFirst Plant Site, Williamstown CAP - Specifications

SPECIFICATIONS TABLE OF CONTENTS

DIVISION 1 GENERAL REQUIREMENTS

-	Submittals and Substitutions
-	Testing Laboratory Services
-	Temporary Facilities
-	Control of Work
-	Environmental Protection
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02200	-	Exploratory Excavation
02221	-	Contaminated Soil Excavation and Handling
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02500	-	Imported Soils
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DIVISION 13 SPECIAL CONSTRUCTION

- Geotextile

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<u>Division 1</u> <u>General Requirements</u>

SectionNo. Pages01300 -Submittals and Substitutions301400 -Testing Laboratory Services301500 -Temporary Facilities101560 -Control of Work301700 -Environmental Protection5

SECTION 01300 SUBMITTALS AND SUBSTITUTIONS

PART 1.00 GENERAL

1.01 DESCRIPTION

A. Work included:

To ensure that specified products and materials are furnished and installed in accordance with design intent, procedures are established herein for advance submittal of product or material information to be reviewed and approved or rejected by the Engineer.

Wherever possible, minimum acceptable quality of workmanship and materials have been defined either by manufacturer's name and catalog number or by reference to recognized industry standards.

- B. Related work described elsewhere:
 - 1. Individual submittals required are identified in pertinent sections of these Specifications.

1.02 PRODUCT HANDLING

All submittals of Shop Drawings, samples, requests for substitutions, and other items shall be in strict accordance with the provisions of this Section.

PART 2.00 PRODUCTS

2.01 SHOP DRAWINGS

A. Scale Required:

Unless otherwise specifically directed by the Engineer, make all Shop Drawings accurately to a scale sufficiently large enough to show all pertinent features of the item and its method of connection to the work and submit no fewer than two (2) copies to the Engineer for review.

2.02 MANUFACTURER'S CERTIFICATIONS

For asphalt, pipe, cement, steel reinforcement, paint and similar materials which are normally tested by the manufacturer, furnish the Engineer records of physical, chemical and other pertinent tests and/or certified statements from the manufacturer that the materials have been manufactured and tested in conformity with the specifications. Where such a small quantity of material is required as to make physical tests or chemical analyses impractical, a certificate from the manufacturer stating the results of such tests or analyses of similar materials which were concurrently produced may, at the discretion of the Engineer, be considered as the basis for acceptance of such materials.

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B. Each manufacturer's certificate shall be endorsed or accompanied by the Contractor's certificate that the material certified by the manufacturer will be the material incorporated in the work.

2.03 <u>SAMPLES</u>

A. Accuracy of sample:

Unless otherwise specifically directed by the Engineer, all samples shall be of the precise article proposed to be furnished.

2.04 <u>SUBSTITUTIONS</u>

- A. Engineer's approval required:
 - 1. The Contract is based on the materials, equipment and methods described in the Contract Documents.
 - 2. The Engineer will consider proposals for substitution of materials, equipment, and methods only when such proposals are accompanied by full and complete technical data and all other information required to evaluate the proposed substitution.
 - 3. Do not substitute materials, equipment, or methods unless such substitution has been specifically approved for this work by the Engineer.
- B. "Or Equal":
 - 1. Where the phrase "or equal" occurs in the Contract Documents, do not assume that material, equipment or methods will be approved as equal by the Engineer unless the item has been specifically approved for this work by the Engineer.
 - 2. The decision by the Engineer will be final.
- C. Availability of specified items:
 - 1. Verify prior to bidding that all specified items be available in time for installations during orderly and timely progress of the work.
 - 2. In the event specified item or items will not be so available, so notify the Engineer prior to receipt of bids.

PART 3.00 EXECUTION

3.01 IDENTIFICATION OF SUBMITTALS

- A. Completely identify each submittal and resubmittal by showing at least the following information:
 - 1. Name and address of submitter, plus name and telephone number of the individual who may be contacted for further information.
 - 2. Name of project as it appears on these Specifications.
 - 3. Drawing number and Specifications Section number to which the submittal applies.
 - 4. Whether this is an original submittal or resubmittal.

3.02 COORDINATION OF SUBMITTALS

A. General:

Prior to submittal for Engineer's review, use all means necessary to fully coordinate all material, including the following procedures:

- 1. Determine and verify all field dimensions and conditions, materials, catalog numbers, and similar data.
- 2. Coordinate as required with all trades and with all public agencies involved.
- 3. Secure all necessary approvals from public agencies and others, and signify by stamp, or other means, that they have been secured.
- 4. Clearly indicate all deviations from the Contract Documents.
- B. Grouping of Submittals:

Unless otherwise specifically permitted by the Engineer make all submittals in groups containing all associated items; the Engineer may reject partial submittals as not complying with the provisions of the Contract Documents.

3.03 TIMING OF SUBMITTALS

A. General:

Make all submittals far enough in advance of scheduled dates of installation to provide all required time for reviews, for securing necessary approvals, for possible revision and resubmittal, and for placing orders and securing delivery.

B. Delays:

Costs of delays occasioned by tardiness of submittals will not be borne by the Engineer.

END OF SECTION

SECTION 01400 TESTING LABORATORY SERVICES

PART 1.00 GENERAL

1.01 **DESCRIPTION**

A. Work included:

From time to time during progress of the work, the Owner will require that testing be performed to determine that materials provided for the work meet the specified requirements; such testing may include, but is not necessarily limited to, backfill gradation and compaction, and bituminous concrete.

B. Related work described elsewhere:

Requirements for testing are described in various Sections of these Specifications; where no testing requirements are described but the Owner decides that testing is required, testing will be performed under current pertinent standards for testing.

- C. Work not included:
 - 1. Selection of testing laboratory:

The Owner will select prequalified independent testing laboratories. All testing will be accomplished by the chosen testing laboratories unless otherwise approved by the Engineer.

2. Payment for initial on-site testing services:

The Owner will pay for all initial on-site services of the testing laboratories as further described in Article 2.01 of this Section of these Specifications. The Contractor will pay for testing of products prior to their delivery to the Site, and for waste characterization testing as needed for disposal.

1.02 **QUALITY ASSURANCE**

A. Qualifications of testing laboratory:

The testing laboratories will be qualified to the Owner's approval in accordance with ASTM, AASHTO and NELAP testing standards as applicable.

B. Codes and standards:

Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society of Testing and Materials (ASTM), the American Association of State and Highway Transportation Officials (AASHTO), and EPA Methods.

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1.03 **PRODUCT HANDLING**

All required copies of test reports and related instructions will be promptly processed and distributed to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the work.

PART 2.00 PRODUCTS

2.01 PAYMENT FOR TESTING SERVICES

- A. The Owner will pay for all initial on-site testing services unless otherwise specified. The Contractor will pay for testing of products prior to their delivery to the Site.
- B. When initial tests indicate noncompliance with the Contract Documents, all subsequent retesting occasioned by the noncompliance will be performed by the same testing laboratory at the Contractor's expense.

2.02 <u>CODE COMPLIANCE TESTING</u>

Inspections and tests required by codes or ordinances, or by any local or State regulatory authority, shall be the responsibility of and shall be paid for by the Contractor, unless otherwise provided in the Contract Documents.

2.03 <u>CONTRACTOR'S CONVENIENCE TESTING</u>

Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

PART 3.00 EXECUTION

3.01 COOPERATION WITH TESTING LABORATORY

Representatives of the testing laboratory shall have access to the work at all times. Facilities shall be provided in order that the laboratory may properly perform its functions.

3.02 <u>SCHEDULES FOR TESTING</u>

- A. Establishing schedule:
 - 1. By advance discussion with the testing laboratory selected by the Owner, determination of the time required for the laboratory to perform its tests and issue each of its findings will be made.
 - 2. All testing time required will be provided within the construction schedule.

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B. Revising schedule:

When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the testing laboratory as required.

C. Adherence to schedule:

When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributable to the delay may be back-charged to the Contractor and shall not be borne by the Owner.

3.03 TAKING SAMPLES

A. Where the testing laboratory does not take samples, samples for testing collected on-site, unless otherwise provided in these Contract Documents, will be controlled by the Engineer. Samples will be collected by the engineer within 72 hours upon the request of the Contractor. All on-site sampling equipment and personnel will be the responsibility of the Engineer and all deliveries of samples to the testing laboratory will be the responsibility of the Contractor.

END OF SECTION

SECTION 01500 TEMPORARY FACILITIES

PART 1.00 GENERAL

1.01 **DESCRIPTION**

A. Work included:

The Contractor shall provide temporary facilities required which include but are not necessarily limited to the following:

- 1. Utilities required for Contractor's use such as potable water, electricity and telephone.
- 2. Sanitary facilities.
- 3. Trash receptacles

PART 2.00 PRODUCTS

2.01 <u>UTILITIES</u>

Temporary water supply, electricity and/or telephone services shall be provided by the Contractor. Any such temporary services shall be removed by the Contractor upon completion of, and prior to acceptance of the work.

2.02 <u>TEMPORARY FIELD OFFICE FACILITY</u>

If needed for the Contractor, a field office space shall be provided by the Contractor.

2.03 ACCESS ROUTES

Vehicular access shall be maintained on public roads at all times for regular traffic as well as for emergency vehicles.

2.04 <u>SANITARY FACILITIES</u>

Furnish and install all required temporary sanitary toilets for use of all workers; comply with all minimum requirements of the Health Department or other public agency having jurisdiction; maintain in a sanitary condition at all times.

PART 3.00 EXECUTION

3.01 MAINTENANCE

Maintain all temporary facilities as long as they are needed for the safe and proper completion of the work.

END OF SECTION

SECTION 01560 CONTROL OF WORK

PART 1.00 GENERAL

1.01 EQUIPMENT

The Contractor shall furnish manpower and equipment which shall be efficient, appropriate and capable of securing a satisfactory quality of work and a rate of progress that will ensure the completion of the work within the time stipulated in the Contract.

1.02 UTILITY LOCATIONS

The locations of existing utilities on the Drawings should be considered approximate and may be incomplete. Contractor shall confirm the presence and locations of existing utilities through all available means including dig-safe; review of Drawings; and exploratory excavations.

1.03 <u>TEST PITS</u>

Test pits for the purpose of locating underground pipeline or structures in advance of the construction, if needed, shall be excavated and backfilled by the Contractor. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained.

1.04 **OPEN EXCAVATIONS**

- A. All open excavations shall be adequately safeguarded by providing temporary barricades, fences, caution signs, lights and other means to prevent accidents to persons, and damage to property. The Contractor shall provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen where necessary. The length of open trench will be controlled by the particular surrounding conditions. If the excavation becomes a hazard as defined by trenching regulations (29 CFR 1926 Subpart P), or if it excessively restricts traffic at any point, special construction procedures may be required such as limiting the length of open trench, construction of shoring, and/or requiring that the trench not remain open overnight. Fences shall be placed around open excavations in excess of four feet deep when they are left unattended.
- B. The Contractor shall take precautions to prevent injury to the public due to open trenches. All trenches, excavated material, equipment, or other obstacles which could be dangerous to the public shall be well lighted at night. The Contractor is responsible for compliance with all trench safety standards prescribed by the Occupational Safety and Health Administration (OSHA) (29 CFR 1926 Subpart P) and any amendments to the Federal standards by the Vermont Occupational Safety and Health Administration (VOSHA).

1.05 <u>SAFETY AND HEALTH</u>

The Contractor shall prepare a site-specific Health and Safety Plan (HASP) that covers all aspects of the Contractors' on-site activities and is compliant with the requirements as set forth in 29CFR1910.120 and 29CFR1926. The Contractor will be required to submit documentation that all site workers (except those placing bituminous pavement) meet the 40 hour training

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requirements as set forth in 29CFR1910.120 "Hazardous waste operations and emergency response", as well as, documentation that all site workers are cleared for respirator use and have current "fit test" certification. The Contractor is also responsible to assure remedial activities are conducted in accordance with the Federal and State regulations for general construction as they may pertain.

1.06 CARE AND PROTECTION OF PROPERTY

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property within or beyond the limits of work by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, the Contractor shall restore the property, at his expense, to a condition similar or equal to that existing before the damage was done and at least meeting the specifications contained herein.
- B. All sidewalks, driveways, and curbing beyond the limits of construction which are disturbed by the Contractor's operations shall be restored to their original condition by the use of similar or comparable materials and constructed according to the specifications contained therein.
- C. Along the location of this work all fences, walks, bushes, trees, shrubbery, and other physical features shall be protected and restored in a thorough and workmanlike manner. Fences and other features removed by the Contractor shall be replaced in their original location. All grass areas beyond the limits of construction which have been damaged by the Contractor shall be regraded, seeded with a seed mix approved by the Engineer and mulched.

1.07 PROTECTION OF EXISTING STRUCTURES AND UTILITIES

A. The Contractor shall assume full responsibility for the protection of all buildings, structures, and utilities, public or private, including poles, signs, services to buildings, treatment plant piping, water pipes, hydrants, sewers, drains, and electric and telephone cables. The Contractor shall carefully support and protect all such structures and utilities from injury of any kind.

1.08 MAINTENANCE OF FLOW

The Contractor shall provide for the flow of sewers, drains, and water courses interrupted during the progress of the work.

1.09 PROTECTION OF STORM DRAINS, SEWERS AND WATER LINES

Where storm drains, water and/or sewer lines exist in the immediate area of construction, care must be taken not to disturb the pipes. In addition, any hydrants, valve boxes, manholes or other appurtenances at the ground surface must be protected from damage during construction.

1.10 DUST AND NOISE CONTROL

The Contractor shall minimize noise to the greatest extent practicable. The Contactor must comply with the dust control provisions, further defined in Section 01700, Part 3.03.

1.11 <u>CLEANUP</u>

During the course of the work, the Contractor shall keep the work site in as clean and neat a condition as is possible, and shall dispose of all solid waste resulting from the construction work. At the conclusion of the work, the Contractor shall remove and haul away any broken pavement, lumber, equipment, temporary structures, and any other refuse remaining from the construction operations, and shall leave the entire site of the work in a neat and orderly condition.

1.12 TRAFFIC SAFETY

- A. Construction shall be scheduled and excavated material shall be placed so that vehicular and pedestrian traffic is not impacted at all times.
- B. If necessary to protect the public and/or Site workers, traffic shall be protected by advance warning signs conforming to the Manual on Uniform Traffic Control Devices (MUTCD) as published by the Federal Highway Administration and applicable State Highway Standards. A stop sign shall be placed at the exit from the Site.

1.13 UNIFORMED TRAFFIC OFFICER

The Contractor may need to employ a uniformed traffic officer on a state or local highway or street when public safety or convenience requires the services of a uniformed officer.

PART 2.00 PRODUCTS

None in this Section.

PART 3.00 EXECUTION

3.01 WORK HOURS

All work will be conducted between the hours of 7:00 A.M. and 6:00 P.M. on weekdays, and between 8:30 A.M. and 6:00 P.M. on weekends.

3.02 <u>COORDINATION</u>

The Contractor will need to coordinate its remedial activities with the Engineer to minimize disruption to the neighborhood.

END OF SECTION

SECTION 01700 ENVIRONMENTAL PROTECTION

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. The Contractor shall follow all disposal, noise, water, and air pollution best management practices to assure environmental protection, and take appropriate actions during the Project to control and avoid adverse environmental impacts due to Work activities.
- B. The Contractor shall be responsible for developing, administering, implementing and monitoring Environmental Protection activities and policies. Environmental Protection shall address, but not be limited to, the following items, as described more fully herein:
 - 1. Land and water resource protection.
 - 2. Identification, handling, management, transportation, and disposal of all material waste, including but not limited to hazardous waste or material generated, released or encountered in-situ by the Contractor.
 - 3. Spill prevention and emergency response procedures including, but not limited to, response actions and prevention measures for Site accidents, emergencies, and chemical spills or releases. Special emphasis shall be given to avoid fuel spills when refueling equipment.

PART 2.00 PRODUCTS

None in this section.

PART 3.00 EXECUTION

3.01 CARE AND PROTECTION OF WATER RESOURCES

- A. The Contractor shall be responsible for the preservation of all public and private property and the protection of water resources. The Contractor shall not allow any construction site debris to enter any stream or discharge any water wastes, or other material from the construction site into any stream.
- B. During the Work, the Contractor shall prevent damage to land resources outside the areas to be excavated. The Contractor shall not deface, destroy, remove, or cut trees or shrubs other than only that needed to perform the Work.
- C. During all times of the year, all water resources shall be protected from any construction debris including, but not limited to, asphalt, concrete, blast media, the leaching of chemical pollutants, and Site erosion. Storage of chemicals, fuels, oil, greases, bituminous materials, solids, waste washing, and concrete shall be handled to prevent leaching or surface runoff into surface waters, in the event of a spill.
- D. The Contractor shall maintain all excavations, embankments, stockpiles, laydown areas, haul roads, access roads, borrow areas, and all other Work areas inside or outside the Site

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to control the generation of dust. Dust control methods specified in Paragraph 3.03 and temporary methods of stabilization consisting of sprinkling, chemical treatment or similar methods are acceptable for dust control.

3.02 CONTROL OF SOIL EROSION AND SILTATION

The Contractor is to comply with all requirements and procedures outlined in the Vermont *Low Risk Site Handbook for Erosion Prevention and Sediment Control* and those specified in the Contract Documents. Erosion control methods are specified in Section 02805.

It shall be the Contractor's responsibility to take all necessary precautions to prevent and control erosion and to construct sediment basins, diversion ditches or such other construction to satisfactorily accommodate runoff from any area subject to erosion during the construction of this project. Such precautionary measures include, but are not necessarily limited to, construction of sediment basins, diversion ditches, benches and berms, installation of silt fence, or laying fiber matting or rolled erosion control product on slopes until vegetation is established.

3.03 <u>DUST CONTROL</u>

- A. The Contractor shall control the generation of dust to the greatest extent practicable. If dust is created, the Contractor will need to provide control measures. These measures will consist of treating traveled, excavation, stockpiling, backfilling and soil load out areas to control dust.
- B. Materials for dust suppression include water and calcium chloride.
- C. DUST CONTROL WITH WATER. Water shall be applied to designated traveled areas or disturbed areas as necessary. The number of applications and the amount of water used shall be based upon field and weather conditions.
- D. DUST CONTROL WITH CALCIUM CHLORIDE. Dust Control with calcium chloride shall be applied in such a manner and by such devices that uniform distribution is obtained over the entire area being treated. Calcium chloride shall be applied at a rate not to exceed 270 g/m^2 (½ pound per square yard) for dust control. In general, calcium chloride shall be used on roadways under construction. It shall not be used on surfaces on which bituminous material will be applied.

3.04 <u>CLEANUP</u>

Cleanup shall be in accordance with Section 01560.

3.05 <u>EQUIPMENT</u>

- A. The Contractor's equipment shall be clean and well maintained and free of fuel, hydraulic and gear oil leaks. The equipment must be thoroughly pressure washed before delivery to the Site to assure no weed seed is present.
- B. All equipment brought on the Site is subject to the Engineer's approval. Any equipment declared by the Engineer as not suitable shall be immediately removed from the Site and replaced with acceptable equipment, at no additional cost to the Owner or Engineer.

3.06 MATERIAL AND WASTE MANAGEMENT

- A. The Contractor shall provide a Material Safety Data Sheet (MSDS) for each material furnished under or otherwise associated with the Work.
- B. Products shall be brought on the Site and stored in their original containers with original labels.
- C. Products shall be stored in a manner consistent with their labeling and in a manner which shall provide protection from accidental release to the environment.
- D. The Contractor shall be responsible for management and daily inspection of chemical products, equipment and waste generation (and associated accumulation and storage areas). All wastes shall be cleaned up daily and disposed of at a lawful disposal facility on a regular basis. All waste labeling, packaging and transport shall be completed by the Contractor in accordance with all applicable federal, state and local regulations. There shall be no onsite disposal of wastes except as specified in the Contract Documents. All wastes shall be disposed of at disposal facilities that have been properly licensed by the applicable Canadian authorities, the U.S. Environmental Protection Agency and/or the State of Vermont. The Contractor shall provide evidence of disposal at the facility using either hazardous waste manifest, bill of lading, and/or a certificate of disposal, as appropriate.

3.07 <u>REFUELING POLICY</u>

This policy shall be posted at all refueling points:

- A. Refueling or greasing shall not take place over surface water, within ten feet of surface water, or in locations where spilled materials could flow into surface water. If possible, refueling shall take place over impermeable surfaces such as asphalt or concrete, but in any event over areas that provide sufficient containment capacity.
- B. Prior to re-fueling or greasing, petroleum sorbent pads shall be placed to catch any incidental spills.
- C. All refueling operation equipment shall be in the immediate control (i.e., the nozzle or shut off switch in hand) of the person performing the refueling.

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D. In the event of a release not collected by the sorbent pads, the Engineer will be immediately informed, and affected soils shall be immediately dug up and placed in a labeled DOT approved drum. A photoionization detector will be used to screen soils left in place to insure all contaminated materials are removed. A record of the release, the response, and the personnel involved and the temporary disposition of the materials will be prepared by the Engineer as part of the daily report. Costs associated with spill response and remediation will be borne by the Contractor.

3.08 <u>SPILLS</u>

A. In the event of a spill or release of a hazardous substance, pollutant, contaminant, or oil, Contractor shall notify the Engineer immediately. Contractor shall follow applicable Vermont and US EPA rules and regulations for reporting and containment. Immediate containment actions shall be taken to minimize the effect of any spill or leak. Cleanup shall be in accordance with applicable federal, state, and local regulations. Additional sampling and testing shall be performed to verify spills have been cleaned up per the direction of the Engineer. Spill cleanup and testing shall be at no additional cost to the Owner or Engineer.

Following completion of clean-up activities the Contractor shall submit a report to the Engineer within 2 days that includes at a minimum:

- a. Time, date, location and cause of release.
- b. Amount of materials released, actions taken and amount recovered.
- c. Any property damage or ecological impact.
- d. Person(s) involved including and Federal and State Agencies on site or contacted.
- e. Any samples for analysis and all field data collected to verify clean-up.
- f. Additional actions, if needed, and an implementation schedule.

3.09 TRAINING

A. All Contractor employees who handle, transport or in any way manage hazardous wastes or substances, or participate in the cleanup of hazardous substances, are required to be trained in the proper management of hazardous wastes and substances. The Contractor training in management of hazardous waste and substances shall follow the requirements of the federal and state hazardous waste regulations in addition to applicable OSHA requirements. Training shall cover hazardous waste management, hazard communication standard, right-to-know laws and OSHA hazardous response training requirements. Since placement of asphalt and final site restoration activities will be performed only after potential sources of soil, groundwater and vapor risks to workers are remediated, OSHA 1910.120 training will not be required for workers placing the asphalt cap or completing site restoration, as long as all applicable federal, state and local regulations are met.

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B. As specified in the various regulations issued by the U.S. Environmental Protection Agency (EPA) and OSHA, certain Contractor employees require different levels of training depending on the employee's exposure potential and frequency of exposure to hazardous materials. The following Contractor employees shall be required to attend appropriate hazardous waste training.

Under federal and state hazardous waste management rules, all employees who have hazardous waste management responsibilities, including the implementation of emergency procedures, must be provided with supervisor level training under 29 CFR 1910.120. In addition, employees designated as hazardous waste cleanup personnel must first receive training in accordance with 29 CFR 1910.120.

New Contractor employees or reassigned employees shall be given hazardous waste training in accordance with 29 CFR 1910.120 within six (6) months of employment or reassignment. No unsupervised tasks involving management of hazardous waste shall be undertaken by the new or reassigned employee until the employee has undergone training. It is the responsibility of the Contractor to ensure that annual hazardous waste training for all Contractor employees who handle or manage hazardous waste is conducted.

C. Records of personnel training shall be kept by the Contractor and provided to the Engineer upon request. The Contractor shall also be responsible for maintenance of the records of training and ensuring that all Contractor employees are trained.

END OF SECTION

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No. Pages **Section** Clearing and Grubbing 3 02110 -Exploratory Excavation 2 02200 -Contaminated Soil Excavation and Handling 8 02221 -02223 -Contaminated Soil Transport and Off-Site Disposal 02500 -Imported Soils Backfill and Compaction 02525 -Paving and Surfacing 2 02600 -02805 -Erosion Control 5 Establishment of Growth 4 02821 -02995 -Decontamination 3

SECTION 02110 CLEARING AND GRUBBING

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. The work of this section consists of the clearing of existing asphalt pavement, building slabs and foundations, vegetation; removal of stumps, roots, and debris; disposal of unutilized materials; and related incidentals required to prepare the site for the work.
- B. Related work described elsewhere:

Contaminated Soil Excavation and Handling - Section 02221 Contaminated Soil Transport and Off-Site Disposal – Section 02223 Decontamination – Section 02995

1.02 JOB CONDITIONS

A. Work Limits:

The limits of regrading for placement of the asphalt pavement cap and stormwater control features shall be located and the area shall be cleared and grubbed. All existing building debris, foundations and the concrete slab shall be removed. The limits of clearing shall be kept to only that necessary to complete the Work.

B. Landscape Preservation:

Protect from injury all vegetation to remain.

1.03 **DEFINITIONS**

A. Clearing:

Clearing shall consist of the cutting of trees and brush and the proper disposal of the vegetation designated for removal.

B. Grubbing:

Grubbing shall consist of the removal and disposal of building debris, building foundations and slab, existing asphalt pavement, stumps, roots larger than 3 inches in diameter, and matted roots from the delineated areas. For payment purposes grubbing shall include materials of every description, and of whatever substances encountered, in the areas identified on the Drawings. No classification will be made of the materials excavated as to depth, nature, composition, hardness, nor degree of water content.
1.04 <u>SUBMITTALS</u>

A. The final disposal or recycling locations for all vegetation, debris, steel and other materials shall be submitted to the Engineer for approval a minimum of one week prior to transport.

PART 2.00 PRODUCTS

None in this Section.

PART 3.00 EXECUTION

3.01 PREPARATION

- A. The clearing/grubbing limits will be determined and the limits of clearing will be staked and/or flagged by the Engineer.
- B. Vegetation, fences and utilities to be left in-place shall be protected from damage incident to clearing, grubbing, excavation, stockpiling, backfilling and surface restoration by the erection of safety fence, warning tape, barriers or by other means as may be required by the circumstances.
- C. Protect existing utility lines (water supply and hydrant, and telephone pole) that are indicated to remain from damage. Notify the Engineer immediately of damage to, or an encounter with, an unknown existing utility line. The Contractor shall be responsible for the repairs of damage to existing utility lines that are indicated or made known to the Contractor prior to start of clearing and grubbing operations.

3.02 <u>CLEARING</u>

- A. Remove trees and brush within the delineated limits of clearing.
- B. The Contractor shall take measures to limit the contact of cut vegetation with contaminated soil and surface soil disturbance during clearing operations.
- C. Remove all vegetative debris from the Site.
- D. In areas which are to be disturbed but not excavated, and which essentially remain at the same grade, prune woody shrubs to within 2 inches of the ground surface.

3.03 <u>GRUBBING</u>

- A. As encountered within the limits of clearing, remove boulders greater than 1 foot diameter, stumps, roots, and debris.
- B. Minimize to the degree possible the amount of soil excavated during large stump removal to that of the root ball.
- C. The existing building concrete foundation frost and stem walls, and slab shall be excavated and crushed to less than 3 inch size. All wood and steel, including but not limited to pipes, webbing, and re-enforcing steel, shall be separated, transported and disposed of off-site at a licensed recycling or disposal facility. The crushed concrete and brick shall be used for excavation backfill as specified by the Engineer and shown on the Drawings, or used in construction of a permanent stockpile of the wastes on-site as shown on the Drawings. The estimated building foundation footprint is approximately 21,500 square feet. The slab thickness is generally ½ foot thick. The volume of existing building debris currently placed around the foundation is 516 cubic yards. The total estimated in-place volume of concrete and debris to be removed is 960 cubic yards. The total estimated volume of the building foundation sub-base gravel that will need to be excavated, moved and re-compacted is 885 cubic yards. All asphalt in areas not under the new cap will be removed and transported offsite for re-use, reclamation or recycling.

SECTION 02200 EXPLORATORY EXCAVATION

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. Exploratory excavation shall be performed for the purpose of determining the location of underground structures and utilities using tight control machinery supplemented by hand labor.
- B. The Contractor shall provide all labor, equipment and materials necessary to perform exploratory excavation as needed or directed by the Engineer.
- C. Damage to existing structures and utilities shall be avoided during exploratory excavation. Any such structure or utility damaged by the Contractor shall be replaced or repaired at no cost to the Engineer.
- D. Related work described elsewhere:

Contaminated Soil Excavation and Handling - Section 02221 Contaminated Soil Transportation and Offsite Disposal – Section 02223 Decontamination - Section 02995.

PART 2.00 PRODUCTS

None in this Section.

PART 3.00 EXECUTION

3.01 <u>SCHEDULING</u>

- A. The Contractor shall consult frequently with the Engineer as to the location of the exploratory excavations so that this work may be scheduled sufficiently in advance of installation of other items of the work.
- B. All available information on the location of existing underground structures and utilities shall be obtained prior to starting this type of excavation. Utility locating services shall be contacted between 3 and 10 days before scheduled exploratory excavation work.
- C. The owners of structures and/or utilities to be affected shall be notified in sufficient time to allow their representatives to observe the exploratory excavations.
- D. Exploratory excavations shall be scheduled to be the first work performed in an area of excavation, if required to locate utilities or other underground infrastructure near the planned excavation. Exploratory excavations shall be scheduled to facilitate an immediate transition to normal excavation activities once the exploratory excavations are complete.

3.02 EXCAVATION

- A. All excavations shall be conducted with extreme care so as not to damage any existing structure or utility. If damage occurs, the Engineer and the respective utility owner shall be notified immediately. Any repairs shall be made promptly.
- B. The Contractor shall use hand or vacuum excavation techniques while conducting excavations within one foot of the buried utility.
- C. The Engineer shall be notified when the location of underground structures or utilities has been determined.
- Excavated materials within the documented area of contamination shall be handled and disposed of in accordance with Section 02221, Contaminated Soil Excavation and Handling and Section 02223, Contaminated Soil Transport and Off-Site Disposal. Excavated materials outside the documented area of contamination shall be returned to the excavation in the approximate order that they were removed.
- E. The Contractor shall decontaminate all equipment before it leaves the area in accordance with Section 02995, Decontamination.

3.03 BACKFILL AND RESTORATION

- A. Exploratory excavations shall be backfilled to the existing ground surface unless otherwise directed by the Engineer.
- B. Exploratory excavations shall be restored using the same methods and materials as those employed for the contaminated soil excavation.

SECTION 02221 CONTAMINATED SOIL EXCAVATION AND HANDLING

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. The work of this section consists of excavation and handling of excavated soils from the excavation areas including loading and stockpiling excavated material. Contaminated soils will be loaded directly into transport trucks and/or containers whenever possible. When necessary, contaminated soils will be temporarily stockpiled on, and covered with 6 mil. polyethylene until loaded for off-site disposal.
- B. All material, equipment, supplies and accessories required are to be provided by the Contractor. All excavation shall be open cut, with stabilization provided by the Contractor as necessary to protect human health. Work items include: excavation; controlled stockpiling and loading of excavated materials; excavation protection; surface water management; and erosion and sediment controls.
- C. Related work described elsewhere:

Clearing and Grubbing – Section 02110 Exploratory Excavation – Section 02200 Contaminated Soil Transport and Off-site Disposal – Section 02223 Imported Soils – Section 02500 Backfill and Compaction – Section 02525 Erosion Control – Section 02805 Decontamination – Section 02995

1.02 JOB CONDITIONS

A. Dust Control:

Mist as needed to control dust on and near the work and on and near all excavation, stockpile and loading locations. Water and/or calcium chloride shall be applied to prevent dust from becoming a nuisance to the public or workers. See Section 01700, Environmental Protection.

B. Unauthorized Over-Excavation:

If unauthorized over-excavation occurs, the excavated soil will be assumed contaminated. The Contractor shall be responsible for the repair of the over-excavated area by backfilling with fill material approved by Engineer and compacting to a minimum of 90 percent maximum modified proctor density, as determined by ASTM D-1557-78. The Contractor will be responsible for the transport and proper disposal of the unauthorized excavated soil at no additional cost to the Owner or Engineer.

C. Control of Contaminated Soil:

Provide all means necessary to prevent the spread of contaminated soil to uncontaminated areas, including the use of designated loading areas, and polyethylene sheeting down the sides of trucks, trailers or containers. Inspection of wheels/tires and decontamination, as needed, shall be performed to prevent tracking of contaminated soil.

The Contractor shall decontaminate excavation equipment that comes in contact with contaminated soil before moving to a clean area or to another excavation (See Section 02995, Decontamination). The Contractor shall sequence the excavations to prevent stormwater runoff into an area of contaminated soil or from a contaminated area to uncontaminated areas.

D. Protection of Existing Conditions:

All means necessary shall be used to protect all materials, utilities, pavements and structures during the excavation, soil handling, or use of any heavy equipment on the site. In the event of damage, all repairs and replacements necessary shall be made immediately.

E. Environmental Protection:

Install and maintain all erosion and sediment control systems as shown on the Drawings and as required in accordance with the Vermont *Low Risk Site Handbook for Erosion Prevention and Sediment Control*. Divert and/or bypass stormwater runoff as necessary to prevent siltation during remedial actions and allow contaminated soil excavation.

F. Work Restrictions:

No excavation or loading shall be conducted when raining. Do not operate equipment on native soils until conditions have sufficiently dried out to prevent rutting. No excavation shall be performed when standing water is present in the excavation. Surface water shall be excluded from the excavation and excavation shall not resume until any surface water has infiltrated or the excavation has been dewatered.

All excavations greater than four feet in depth will be protected by fencing adequate to prevent trespassers from entering the excavation whenever construction is not being performed on-site, including, but not limited to, nights and weekends.

1.03 **DEFINITIONS**

A. Excavation Classification:

For payment purposes excavation shall include materials of every description, and of whatever substances encountered, to the depths and of the areas identified on the

Drawings. No classification will be made of the materials excavated as to depth, nature, composition, hardness, nor degree of water content.

B. Excavation Limits:

The horizontal and vertical limits of excavation are as shown on the Drawings.

C. Approved Additional Excavation:

Additional excavation may be required beyond the specified horizontal and/or vertical limits as directed by the Engineer and as a result of verification testing and additional contaminated soil delineation.

D. Unauthorized Over-excavation:

Excavations completed by the Contractor beyond the limits shown on the Drawings without prior approval from the Engineer will be considered unauthorized over-excavation.

E. Allowable Tolerances:

A tolerance of 0.33 foot beyond the specified depths and limits of excavation is the maximum allowed unless approved by the Engineer. This allowed tolerance level shall not be a basis for an additional pay request. All excavations shall be no shallower than the specified depth unless authorized by the Engineer.

1.05 <u>SUBMITTALS</u>

A. Water source for dust control, decontamination and compaction.

The Contractor shall identify the source of water and provide evidence that it is free of contamination. This may include analytical testing for surface water or the use of municipal potable water.

B. Minimum 6 millimeter thick polyethylene sheeting for segregation of contaminated soils.

PART 2.00 PRODUCTS

2.01 POLYETHYLENE SHEETING

Polyethylene sheeting for use under and covering temporary stockpiles or covering open excavations for dust control shall be a minimum 6 mil. thick continuous sheet polyethylene. Adjacent sheets will be overlapped a minimum of three feet.

2.02 <u>WATER</u>

Decontamination and dust control water shall be clean, and free from any harmful substances.

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PART 3.00 EXECUTION

3.01 <u>PREPARATION</u>

A. Erosion Control:

Prior to excavation, the Contractor shall install all necessary erosion/sediment control features.

B. The Contractor shall be responsible for identifying utilities and obtaining dig-safe clearance as follows:

Prior to excavation, the Contractor shall identify and locate any subsurface utility that exists in and/or adjacent to excavation areas. The Contractor shall perform exploratory excavations (See Section 02200) as necessary to locate subsurface utilities.

C. Establish Excavation Limits:

Examine and confirm horizontal extent excavation control points staked out by the Engineer and confirm vertical control points necessary to achieve and verify the required depth.

D. Ground Surface Preparation:

Prior to excavating, all clearing and grubbing operations and slab removal in the area of contaminated soil excavation shall be completed as detailed in Section 02110. Clearing limits shall be flagged by the Contractor and approved by the Engineer prior to cutting any vegetation.

E. Waste Characterization: Prior to excavation, identify the off-site disposal facility and waste characterization requirements for excavated soils.

3.02 EXCAVATION OF CONTAMINATED SOIL

- A. Contaminated soil shall be excavated to the horizontal and vertical limits shown on the Drawings after their location has been staked in the field by the Engineer.
- B. Install shoring and/or sheeting if necessary to protect workers.
- C. Divert upgradient surface water runoff away from the excavation.
- D. Keep the excavation open and dry until vertical and horizontal excavation limits are approved by the Engineer. The Engineer shall be responsible for collecting and the analysis of verification samples from the completed excavation with the assistance of the Contractor. Upon receipt of results (turn-around-time is estimated 3-7 days) the Engineer will determine if additional excavation is needed or the excavation can be backfilled.

- E. Whenever practical, load contaminated soil directly from the excavations into containers or truck or trailer beds for off-site transport to the disposal facility. Where direct load is not possible due to access or other constraints, use loaders or trucks to transfer contaminated soils to containers/beds for off-site disposal or to temporary stockpiles for subsequent load out.
- F. When practical, excavate the contaminated soils from the periphery of the excavation boundaries such that only the bucket and boom contact the contaminated soils.
- G. Remove disturbed soil from active excavations by the end of each workday. Keep areas beyond the limit of excavation undisturbed.

3.03 <u>UNAUTHORIZED OVER-EXCAVATING</u>

- A. Excavation beyond the horizontal excavation limits and vertical tolerance (0.33 feet) is considered unauthorized unless directed by the Engineer. Should unauthorized excavation occur due to the Contractor's actions, including errors, excavation methods, or for convenience, the unauthorized excavation shall be corrected by the Contractor at no additional cost to the Engineer. Excavation to the vertical tolerance (0.33 feet) shall not be the basis for an additional pay request.
- B. In areas of excavation where large rocks are present the maximum tolerance will be waived following inspection and approval by the Engineer. The excavation required to remove rocks shall be kept to the minimum reasonably possible.
- C. If unauthorized over-excavation occurs, the Contractor shall be responsible for the repair of the area, which shall include backfilling and compaction with imported clean soils, and surface restoration. This work shall be performed in accordance with the Contract Documents at the Contractor's expense.

3.04 LOADING OF CONTAMINATED SOIL

- A. The transport vehicle operator shall remain inside the vehicle during loading.
- B. When loading contaminated soil, place poly sheeting under and down the side of trucks or containers to protect the outside of the container/bed and to control any spillage. Any spilled soil shall be collected from the poly sheeting and added to the load. If the poly sheeting is significantly damaged and/or contaminated it shall be disposed of with the contaminated soil and not reused.
- C. Limit free-fall when loading contaminated soil/debris to prevent damage to the bed liner.
- D. Evenly load the transport vehicle bed or container to prevent shifting of the load during transport.
- E. Control dust as necessary by misting.

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- F. Assure no free liquid exists in the materials to be loaded or stabilize the materials with methods and materials approved by the Engineer and acceptable to the disposal facility.
- G. Do not load the transport vehicle bed or container beyond the tonnage that will result in the transport vehicle exceeding applicable weight restrictions.
- H. Securely cover the load in a manner that will prevent fugitive dust or other release of materials during transport.
- I. Inspect the transport vehicle and decontaminate as necessary for the Engineer's approval prior to travel over non-contaminated soil and/or public roadways.

3.05 CONTROL OF CONTAMINATED SOIL

- A. Use poly sheeting overlain with plywood, swamp mats or other Engineer approved barrier systems to support excavation and transport equipment as needed to prevent track and wheel contact with contaminated soil. The barrier must prevent tracking of any contaminated soil into adjacent clean areas, and allow equipment travel over areas within the excavation limits and simplify equipment decontamination.
- B. When loading contaminated soil, place poly sheeting under and down the side of trucks or containers to protect the outside of the container/bed and to control any spillage. Any spilled soil shall be collected from the poly sheeting and added to the load. If the poly sheeting is significantly damaged and/or contaminated, it shall be disposed of with the contaminated soil.
- C. Contaminated soil excavation shall be conducted to prevent mixing with soil outside of the excavation limits.
- D. No backfill shall be introduced to any contaminated soil excavation without approval by the Engineer. Engineer approval will be granted based on the results of the verification samples collected from the excavation.

3.06 **DEWATERING**

A. It is not expected that groundwater will be encountered in the excavation. If rainwater or stormwater runoff enters the excavation, the Contractor shall provide suitable equipment to remove water, and shall keep the excavation dewatered so that contaminated soil excavation and backfill can be carried out under dewatered conditions. All water pumped from excavations must be containerized in 55 gallon DOT-approved drums or "cage tanks" not to exceed 250 gallons capacity, and stored in an area identified by the Contractor and approved by the Engineer. Handling of potentially contaminated water (except for groundwater), including decontamination water and any precipitation or runoff, shall be at the Contractor's expense.

B. Discharge of uncontaminated water will be allowed only after approval is granted by the Engineer, and shall be to the ground surface in a manner and location that will not create erosion or result in a discharge to surface water or wetlands.

3.07 STORMWATER DIVERSION

A. Any stormwater shall be diverted around the excavation area.

3.08 TEMPORARY STOCKPILING OF CONTAMINATED SOIL

- A. Excavated contaminated soil not hauled directly off the Site shall be placed in temporary stockpiles within available area(s) identified by the Contractor and approved by the Engineer.
- B. All stockpiles of excavated and imported material shall not be placed within ten horizontal feet from the edge of any excavation.
- C. Stockpiles and stockpile areas shall be maintained in good condition.
- D. No material shall be stockpiled in such a manner as to endanger a partly finished structure, impair the efficiency or appearance of any structure, impair access to adjacent sites or facilities, or be detrimental to the completed work in any way.
- E. Stockpiles shall be underlain by polyethylene sheeting. Adjacent liner sections shall be continuously overlapped by a minimum of three feet. It is not necessary to seam adjacent liner sections below the stockpiles.
- F. The ground surface on which the liner is placed shall be free of rocks greater than ¹/₂ inch in diameter and any other object which could damage the liner. Alternatively, the Contractor may place a layer of geotextile or plywood to fully underlie and protect the liner in locations containing rocks or debris which are greater than 1/2 inch in diameter, on the ground surface, or in any areas through which vehicular traffic will travel.
- G. Stockpiles shall be covered with polyethylene sheeting to prevent precipitation from entering the stockpile. The stockpile cover shall be anchored to prevent it from being uplifted by wind. Direct surface water runoff away from the stockpile.
- H. A written log shall be kept to track the source of all material in each stockpile.
- I. Stockpile areas shall be returned to their original or better condition following completion of loading the soil for off-site disposal. The liner and cover of the stockpile shall be disposed of with the contaminated soil. If the underlying liner is damaged and/or there is evidence of contaminated soil in contact with the existing native soil within the stockpile footprint, a minimum of 6 inches of the underlying soil shall be removed as directed by the Engineer and disposed of as contaminated material. The cost of the additional excavation, transport and disposal, backfill and surface restoration shall be borne by the Contractor.

3.09 **DECONTAMINATION**

- A. Any on-site vehicle or large equipment shall be inspected by the Engineer for cleanliness before it is allowed to leave the discrete work area is has been used at.
- B. The Contractor shall decontaminate excavation and loading equipment surfaces that come into contact with contaminated soils and liquids before they leave the discrete work area and/or before they will be allowed to be used for backfill placement.
- C. All decontamination activities shall be conducted in accordance with Section 02995, Decontamination.

3.10 SHORING AND SHEETING

- A. All shoring and sheeting shall be constructed and maintained, as needed.
- B. All sheeting and shoring will be removed when safe to do so.
- C. Any shoring or sheeting that comes into with contaminated soils or liquids shall be decontaminated before leaving the site. Any soils that are removed with shoring and sheeting shall be disposed of as contaminated soils.

3.11 <u>SPILLS</u>

A. Spills or releases of a hazardous substance, pollutant, contaminant or oil shall be addressed as required in paragraph 3.08, Section 1700.

SECTION 02223 CONTAMINATED SOIL TRANSPORT AND OFF-SITE DISPOSAL

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. The work of this section consists of supplying, operating, maintaining and preparing transport vehicles and containers for holding and transporting contaminated soil; securing and covering the load, and decontamination of the transport vehicle and/or container; preparation of shipping documents that may include waste profiles, bills of lading and/or hazardous waste manifests; and off-site disposal of the waste materials.
- B. The Contractor shall submit a Transportation and Disposal Plan that details transportation equipment and transport companies, disposal facilities, etc. This plan shall also include an Emergency Response Plan that complies with the requirements of 49 CFR 172.
- C. The Contractor shall designate one person to act as the Transportation and Disposal Coordinator (TDC). The TDC shall serve as the single point of contact for all environmental regulatory matters and shall have overall responsibility for total environmental compliance at the site including, but not limited to: maintaining accurate identification and classification of hazardous waste and hazardous materials; determination of proper shipping names; identification of marking, labeling, packaging and placarding requirements; completion of waste profiles, hazardous waste manifests, asbestos waste shipment records, bill of ladings, exception and discrepancy reports; and all other required environmental documentation. The TDC shall have, at a minimum, one year of specialized experience in the management and transport of hazardous waste, and Department of Transportation certification under 49 CFR 172, Subpart H.
- D. Related work described elsewhere:

Clearing and Grubbing – Section 02110 Contaminated Soil Excavation and Handling – Section 02221 Backfill and Compaction – Section 02525 Erosion Control – Section 02805 Decontamination – Section 02995

1.02 <u>REFERENCES</u>

A. United States Code of Federal Regulations

40 CFR 261	Identification and Listing of Hazardous Waste
40 CFR 262	Standards Applicable to Generators of Hazardous Waste
40 CFR 263	Standards Applicable to Transporters of Hazardous Waste
40 CFR 264	Standards for NPSs and Operators of Hazardous Waste Treatment, Storage,
	and Disposal Facilities
40 CFR 265	Interim Status Standards for NPSs and Operators of
	Hazardous Waste Treatment, Storage, and Disposal Facilities
40 CFR 268	Land Disposal Restrictions
40 CFR 270	EPA Administered Permit Programs: The Hazardous Waste Permit
	Program

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40 CFR 279	Standards for the Management of Used Oil
40 CFR 300	National Oil and Hazardous Substances Pollution Contingency Plan
40 CFR 302	Designation, Reportable Quantities, and Notification
49 CFR 107	Hazardous Materials Program Procedures
49 CFR 171	General Information, Regulations and Definitions
49 CFR 172	Hazardous Materials Table, Special Provisions, Hazardous Materials
	Communications, Emergency Response Information, and Training
	Requirements
49 CFR 173	Shippers - General Requirements for Shipments and Packaging
49 CFR 177	Carriage by Public Highway
49 CFR 178	Specifications for Packaging
49 CRF 383	Commercial Driver's License Standards: Requirements and Penalties
49 CFR 385	Safety and Fitness
49 CFR 387	Minimum Levels of Financial Responsibility for Motor Carriers
49 CFR 390	Federal Motor Carrier Safety Regulations; General
49 CFR 391	Qualifications of Drivers and Longer Combination Vehicle (LCV) Driver
	Instructors
49 CFR 392	Driving of Commercial Motor Vehicles
49 CFR 393	Parts and Accessories Necessary for Safe Operation
49 CFR 395	Hours of Service of Drivers
49 CFR 396	Inspection, Repair, and Maintenance
49 CFR 397	Transportation of Hazardous Materials; Driving and Parking Rules

1.03 **DEFINITIONS**

A. Hazardous Waste:

A waste which meets criteria established in the Resource Conservation and Recovery Act (RCRA) or specified by the EPA in 40 CFR 261 or which has been designated as hazardous by a RCRA authorized State program.

B. Treatment, Storage or Disposal Facility (TSDF):

A facility that is permitted by federal, state and local authorities to treat, store, and/or dispose of hazardous waste.

1.04 SUBMITTALS

General:

A. Transportation and Disposal Plan:

The Contractor shall submit a Transportation and Disposal Plan within 21 calendar days after notice to proceed. No work at the Site, with the exception of Site inspections and surveys, shall be performed until the Plan is approved. No adjustment for time or money will be made if resubmittals of the Plan are required due to deficiencies in the Plan. At a minimum, the Transportation and Disposal Plan shall include but not necessarily be

limited to:

- 1. Transportation equipment and transport companies.
- 2. Identification of any necessary approvals by or coordination with Federal, State and/or local entities having jurisdiction over the transportation route(s).
- 3. Identification of disposal facilities, specific waste acceptance criteria, special waste handling requirements, hours/days of operation, etc.
- 4. Transportation Emergency Response Plan that complies with the requirements of 49 CFR 172.

Waste Transporter:

- A. The Contractor shall provide identification, qualifications, licenses, permits and certifications of hazardous waste transporters and a statement that the transporter is in compliance with all rules and regulations related to the waste being hauled (i.e., hazardous).
- B. Current Federal Motor Carrier Safety Rating:

Demonstration that the Transporter has received a Satisfactory rating by the Federal Highway Administration demonstrating adequate safety management controls to meet the safety fitness standard prescribed in 49 CFR §385.

- C. Valid operating licenses and permits for each transport vehicle and driver.
- D. For transport of hazardous waste, evidence that drivers are trained in accordance with 49 CFR 172, Subpart H.
- E. Insurance Certificates.

Disposal Facility:

- A. Identification, qualifications, licenses, permits and certifications of hazardous waste and of residual waste disposal facilities and a statement from the facility that it is in compliance with all rules and regulations related to the waste being disposed. Identify any non-compliance issues, enforcement actions, etc. that may be associated with the facility.
- B. Insurance Certificates.
- C. Any restrictions on waste delivery schedules, dimensions of bulk waste, etc.
- D. Types and frequencies of waste analysis/profile required for acceptance by the facility.
- E. Types and frequencies of waste analysis conducted by the facility to verify waste profiles from the project.

PART 2.00 PRODUCTS

2.01 <u>CONTAINERS, TRUCK AND TRAILER BEDS</u>

Transport containers for contaminated soil shall be free of holes, cracks and fully lined to prevent leakage. Covers shall be provided to prevent dust release and to exclude rain. Containers and transport units must be acceptable for transporting RCRA regulated waste. Contaminated soil is classified as a listed F002 hazardous waste.

2.02 <u>BED LINER</u>

The bed of transport containers shall be fully lined with pre-fabricated 10 mil. polyethylene, fitted liners.

2.03 POLYETHYLENE SHEETING

Polyethylene sheeting for use under/down the side of trucks/containers during loading to control the spread of contaminated soil shall be a minimum 6 mil. thick.

PART 3.00 EXECUTION

3.01 **PREPARATION**

- A. Inspect transport vehicles/containers to verify they are free of residual waste, are structurally sound and free of liquid.
- B. Place a bed liner in the transport bed or container that continuously lines the bottom and sides. Place the liner tight to the sides and corners to prevent tearing during loading.

3.02 WASTE PROFILING

- A. The Contractor will conduct waste sampling and analyses as needed to profile the waste for disposal purposes.
- B. Waste profiles will be signed by an authorized agent for the Owner.

3.03 <u>SHIPPING AND DISPOSAL DOCUMENTATATION</u>

- A. The Contractor shall prepare, as appropriate, a manifest or bill of lading to accompany each waste shipment to the disposal facility. The manifest or bill of lading will be signed by an authorized agent for the Owner.
- B. The Contractor shall provide weight slips for each load delivered to the disposal facility, and shall cross-reference all weight slips to the corresponding manifest or bill of lading.

3.04 TRANSPORT OF CONTAMINATED SOILS

- A. Comply with all applicable requirements of Federal State and Local regulations for the type of waste being transported.
- B. Transport contaminated soil directly to the disposal facility.
- C. Identify and placard transport vehicle/container as appropriate for the waste being hauled in accordance with Federal, State and Local regulations.
- D. Response to collisions during transport shall be in compliance with the Contractor's Transportation Emergency Response Plan and applicable State and Federal regulations. Provide the Engineer with a copy of the accident report and any citations issued. In the event a release of waste materials results from the accident, notify the Engineer immediately and take all measures necessary to control the release.

3.05 **DECONTAMINATION**

- A. Any transport vehicle mobilized to the site shall be inspected by the Engineer for cleanliness before it is allowed to be loaded. Any equipment that has soil, vegetation, excess grease or fluid leaks shall not be allowed. Replacement of such vehicles shall be performed at the Contractor's expense.
- B. The Contractor shall decontaminate transport equipment surfaces (except for the inside of the waste container) that come into contact with contaminated soils, sediments, and liquids before it leaves the discrete work area.
- C. All decontamination activities shall be conducted in accordance with Section 02995, Decontamination.

3.06 <u>SPILLS</u>

A. Spills or releases of a hazardous substance, pollutant, contaminant or oil shall be addressed as required in paragraph 3.08, Section 01700.

SECTION 02500 IMPORTED SOILS

PART 1.00 GENERAL

1.01 **DESCRIPTION**

A. Work Included:

All labor, materials, equipment and incidentals necessary to supply the soil materials necessary to backfill excavations and prepare the surface for vegetation or asphalt pavement as shown on the Drawings and specified herein.

B. Related work described elsewhere:

Backfill and Compaction – Section 02525 Erosion Control – Section 02805 Establishment of Growth - Section 02821 Decontamination – Section 02995

1.02 JOB CONDITIONS

- A. Materials shall be delivered to the site as needed and/or stockpiled in identified staging areas in a manner that prevents wind erosion of soil from the stockpile location(s).
- B. When necessary, erosion control devices shall be implemented to prevent stormwater driven erosion and/or migration of the stockpiled materials.

1.03 **DEFINITIONS**

A. Common Fill:

Imported soil for use in backfilling excavations to within 6 inches of the final design ground surface (in areas to be re-vegetated) to 1 foot of the final design subgrade (in areas to be resurfaced with asphalt pavement). Note that imported common fill is not anticipated to be required due to the on-site excavated soils and crushed concrete that will be available in sufficient quantities to use for backfilling.

B. Structural Fill:

Imported soil for use in backfilling the upper foot in areas to be resurfaced with asphalt pavement.

C. Topsoil:

Imported soil for use in backfilling the top 6 inches in areas to be re-vegetated.

D. Stone Fill:

Imported stone material to be used in level spreaders.

E. Stone for Stabilized Construction Entrance:

Imported stone material to be used to construct the Stabilized Construction Entrance.

1.04 <u>SUBMITTALS</u>

- A. Fill source documentation and samples as described in Part 2.00.
- B. Samples of proposed common and structural fill soils shall be submitted by the Contractor to an independent, qualified soils testing laboratory for gradation and moisture/density analysis at the frequency described in Part 2.00. This testing is at the Contractor's expense. The results shall be submitted to the Engineer a minimum of ten days prior to the date of anticipated use.
- C. Representative samples of topsoil shall be submitted by the Contractor to an independent, certified environmental testing laboratory for analysis of metals, pesticides, PCBs, semi-volatile and volatile organic compounds, and total organic carbon, at the frequency described in Part 2.00. This testing is at the Contractor's expense. The results shall be submitted to the Engineer a minimum of ten days prior to the date of anticipated use.

PART 2.00 PRODUCTS

2.01 CHEMICAL QUALITY

A. No imported soil shall contain any metals at concentrations above Vermont residential Soil Screening Values, or any detectible pesticides, PCBs, semi-volatile or volatile organic compound contaminants or contain any petroleum constituents. A certification must be provided from each source of imported soil that the material meets these chemical quality requirements.

2.02 <u>COMMON FILL</u>

- A. The Contractor must submit the source of common fill and a representative sample to the Engineer for approval prior to bringing common fill on-Site.
 - B. Common Fill shall be a silty fine sand that meets the following gradations:

<u>Sieve Size</u>	Percent Passing by Weight
a 10.11	
3/8"	100
No. 4	80-100
No. 200	0-35

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Sieve and moisture/density analysis shall be performed on one representative sample per 2,000 yards or a minimum of one per source, unless a processed soil is used in which case the sieve analysis frequency may be lessened at the discretion of the Engineer.

2.03 STRUCTURAL FILL

- A. The Contractor must submit the source of structural fill and a representative sample to the Engineer for approval prior to bringing structural fill on-Site.
- B. Structural backfill shall be well-graded crushed sandy gravel that meets the following gradation:

<u>Sieve Size</u>	Percent Passing by Weight	
No. 4	20-60	
No. 100	0-12	
No. 200	0-6	

Maximum particle size shall be less than 67% of the thickness of the lift being placed.

Sieve and moisture/density analysis shall be performed on one representative sample per 2,000 cubic yards or a minimum of one sample per source.

2.04 <u>TOPSOIL</u>

A. Topsoil shall be fertile, natural soil, typical of the locality, substantially free of stones, roots, or sticks greater than 2 inches in diameter or length, clay, peat, weeds and sod, and obtained from upland areas and free of exotic and invasive plant seeds. It shall not be excessively acidic or alkaline, and shall contain a minimum of 3 % organic matter. A topsoil mixture, enriched or blended with organic compost, may be acceptable provided it meets the specifications and it can be certified not to contain any waste materials (e.g., non-clean fill, sewage or other sludge). The Contractor must submit the source of topsoil and a representative sample to the Engineer for approval prior to bringing topsoil on-Site.

One (1) sample per 500 yards or a minimum of two per source shall be analyzed for Total Organic Content (TOC) via the Lloyd Kahn Method. One sample per source, or a minimum of one sample per 2,000 cubic yards, shall be tested for chemical quality (metals, pesticides, PCBs, semi-volatile and volatile organic compounds) using the following methods:

- Methods 3010A/6010C for Arsenic, Barium, Beryllium, Cadmium, Chromium, Copper, Lead, Mercury (by Method 7470A), Nickel, Selenium, Silver, Thallium and Zinc;
- Method 8260B for Volatile Organic Compounds (full analyte list)
- Method 8270C for Semi-Volatile Organic Compounds (full analyte list)
- Method 8082 for PCBs
- Herbicides/pesticides by Methods 8151 and 8081 (full analyte list)

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2.05 B. The Contractor must provide certification that the source of topsoil is free from *Phragmites* and Japanese Knotweed plants, including roots and Rhizomes. This certification is subject to review and approval by the Engineer.

2.06 STONE FILL

- A. Stone for stone fill shall be approved, hard, blasted, angular rock other than serpentine rock containing the fibrous variety chrysotile (asbestos). The least dimension of the stone shall be greater than 33 percent of the longest dimension. The stone fill shall be reasonably well graded from the smallest to the maximum size stone specified so as to form a compact mass when in place.
 - 1. Type I. The longest dimension of the stone shall vary from 1 to 12 inches, and at least 50 percent of the volume of the stone in place shall have a least dimension of 4 inches.

2.06 STONE FOR STABILIZED CONSTRUCTION ENTRANCE

A. Stone for stabilized construction entrance shall be an open graded crushed stone that meets the following gradation:

<u>Sieve Size</u>	Percent Passing by Weight
6"	100
4"	80-100
3"	40-60
2"	0-20
Sieve analysis shall be perf	formed on one representative sample per 2,000 cubic yards or a
minimum of one sample pe	er source.

PART 3.00 EXECUTION

3.01 <u>GENERAL</u>

B. See Section 02525 – Backfill and Compaction

SECTION 02525 BACKFILL AND COMPACTION

PART 1.00 GENERAL

1.01 **DESCRIPTION**

A. The work of this section includes backfilling necessary to restore the contaminated soil excavation to the proposed ground surface elevation, to abandon two existing stormwater catch basins and one existing (unused) sanitary sewer manhole (Manhole #1), and to prepare final grades as shown on the Drawings.

All material, equipment, supplies and accessories required are to be provided by the Contractor. All contaminated soil excavations shall be approved by the Engineer prior to any backfill placement. Work items include stormwater management and bypassing, dewatering, and placement and compaction of imported materials.

B. Related work described elsewhere:

Clearing and Grubbing – Section 02110 Contaminated Soil Excavation and Handling – Section 02221 Contaminated Soil Transport and Off-site Disposal – Section 02223 Imported Soils – Section 02500 Erosion Control – Section 02805 Establishment of Growth – Section 02821 Decontamination – Section 02995

1.02 JOB CONDITIONS

A. Dust Control:

All means to control dust on and near the work including on and near all stockpile locations shall be used by the Contractor. Water and/or calcium chloride shall be applied to prevent dust from becoming a nuisance to the public or workers.

B. Protection:

All means necessary shall be used by the Contractor to protect all materials, utilities, pavements and structures. Particular care shall be exercised to protect trees and vegetation.

C. Decontamination:

No equipment which has been in contact with contaminated soil shall be used in backfill operations unless it has been decontaminated to the satisfaction of the Engineer. Refer to Section 02995, Decontamination.

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1.03 **DEFINITIONS**

A. Common Fill:

Imported soil (in addition to crushed building and foundation debris) for use in backfilling excavations to within 6 inches of the final design ground surface (in areas to be re-vegetated) to 1 foot of the final design subgrade (in areas to be resurfaced with asphalt pavement).

B. Structural Fill:

Imported soil for use in backfilling the upper foot of excavations in areas to be resurfaced with asphalt pavement.

C. Topsoil:

Imported soil for use in backfilling the top 6 inches in areas to be re-vegetated.

D. Compaction Density:

Reference to densities will be as determined by ASTM D-1557.

PART 2.00 PRODUCTS

2.01 GENERAL

- A. All backfill including common fill, structural fill, and topsoil material (but excluding soils and materials excavated and re-used on-site) shall meet the requirements of Section 02500, Imported Soils.
- B. The amount of water used in compaction shall be optimized to obtain the percent relative compaction required. The amount of water required shall be controlled by the Contractor as needed considering conditions resulting from storms, drought, or other causes.
- C. The Contractor shall identify the source of water to be used in compaction, if needed, and provide evidence that it is free of contamination. This may include analytical testing for surface water or the use of municipal potable water.

PART 3.00 EXECUTION

3.01 **PREPARATION**

- A. Obtain the Engineer's approval to backfill each specific area of contaminated soil excavation prior to placement of any imported material. Remove stormwater catchment basin and Manhole #1 structures to a depth of at least 1.5 feet below the final grade as shown on the Drawings.
- B. Remove and containerize any surface or groundwater accumulated in the excavation. Any standing water in the excavation must be presumed contaminated and treatment will be required prior to discharge.

3.02 BACKFILL AND COMPACTION

A. Render and maintain the excavation free of water during the entire period of backfilling. No backfill shall be placed into water or onto frozen surfaces.

Area	Material	Compaction
Natural areas to be re-vegetated -	Top Soil	Consolidate with initial placement
top 6"		equipment (by tracking). No
		compaction density requirement.
Natural areas to be re-vegetated -	Common Fill and	Maximum 12" lifts, 90% maximum
to within ~ 6'' of final design	re-used on-site	density by ASTM D-1557.
grade and to within 1.3 feet of final	materials	
design grade in areas to be paved.		
Beneath areas to be paved –	Structural Backfill	Maximum 6" lifts, 95% of maximum
top 1 foot		density by ASTM D-1557.

B. Excavations shall be backfilled and compacted according to the following schedule:

- C. The entire area of each layer shall be uniformly compacted to at least the required minimum density by use of compaction equipment consisting of rollers, compactors, or a combination thereof. Earth-moving and other equipment not specifically manufactured for compaction purposes will not be considered as compaction equipment. Puddling or flooding excavation for consolidation of backfill or use of wheel rolling by construction equipment shall not be permitted.
- D. When the moisture content of the material in the layer under construction is less than the amount necessary to obtain satisfactory compaction by mechanical compaction methods, water shall be added. If the moisture content is too high to obtain satisfactory compaction, the wet soils shall be removed, handled and disposed of at the Contractors expense.

3.03 <u>TOPSOIL AND STRUCTURAL FILL PLACEMENT</u>

- A. Prior to topsoil or structural fill placement, rake the subgrade and remove all rubbish, sticks, roots and stones larger than 2 inches.
- B. Spread evenly a consolidated thickness of 6 inches. For the final lift, place material to achieve the final design ground or subgrade elevation. For topsoil, mound slightly to allow settlement to adjacent grades.
- C. Do not spread topsoil or structural fill when frozen or excessively wet or dry.
- F. Consolidate the topsoil by tracking with approved equipment used to initially place the top soil. On slopes, topsoil shall be placed from the bottom of the slope upward. Consolidate each lift of structural fill using approved compaction equipment to the specified 95% modified proctor density.
- G. For topsoil preparation steps required preceding seeding, refer to Section 02821, Establishment of Growth. For structural fill preparation steps prior to placement of asphalt paving, refer to Section 02600, Paving and Surfacing.

3.04 <u>SETTLEMENT</u>

The Contractor shall be responsible for preventing structural backfill settlement and for making any repairs due to such settlement for a period of one year after installation.

3.05 FIELD QUALITY CONTROL

- A. Soil Compaction Tests:
 - 1. Specified compaction shall be verified by in-place density tests. Percent (%) compaction shall be 90% of the maximum dry density for Common Fill, and 95% of the maximum dry density as determined by Modified Proctor Density Test (ASTM D 1557) for structural fill.
 - 2. If the fill does not meet the minimum density requirements, the fill shall be removed and/or compacted to the required density at the Contractor's expense, including density retesting.
 - The field density determination will be made by the Standard Method of Test for Density of Soil & Soil Aggregate In-Place by Nuclear Methods (Shallow Depth),
 - AASHTO T-238, or other procedure approved by the Engineer.

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- 4. Compaction testing will be performed at the locations and frequencies determined by the Engineer at the Engineer's expense. The cost to retest placed fill that initially fails to achieve the required minimum density shall be the Contractor's expense.
- B. Topsoil thickness verification;

The Engineer will verify the in-place consolidated top soil meets the minimum 6 inch thickness. Thickness verification testing will be performed at the locations and frequencies determined by the Engineer at the Engineer's expense.

SECTION 02600 PAVING AND SURFACING

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. Work included:
 - 1. All materials, labor, equipment, and incidentals required to furnish, place and compact the subbase and place asphalt pavement surfacing as shown on the Drawings shall be provided by the Contractor.
 - 2. Paved surfaces shall be placed in accordance with dimensions shown on the Drawings and approved by the Engineer.
- B. Related work described elsewhere:

Backfill and Compaction - Section 02525

1.02 <u>SUBMITTALS</u>

A. Documentation shall be submitted to the Engineer a minimum of ten days prior to paving the products used for paving shall conform to the Vermont Agency of Transportation (VTrans) 2011 Standard Specifications for Construction.

1.03 JOB CONDITIONS

- A. Water and/or calcium chloride shall be applied to prevent dust from being a nuisance to the public or workers, as directed by the Engineer.
- B. Traffic shall be directed throughout the project by warning signs providing maximum safety for the workers and traffic with the least interruption of the work.
- C. The Contractor shall maintain all pavement surfacing placed under this Contract during the guarantee period of one year and shall promptly refill and repave areas or otherwise repair which have settled or are otherwise unsatisfactory.

PART 2.00 PRODUCTS

2.01 BITUMINOUS PAVEMENT

Products used for paving shall conform to the Vermont Agency of Transportation (VTrans) 2011 Standard Specifications for Construction.

2.02 <u>WATER</u>

All water used for dust control shall be reasonably clear and free of harmful amounts of oil, salt, acids, alkalis, sugar, organic matter or other substances injurious to plant life or the establishment of vegetation.

PART 3.00 EXECUTION

3.01 BITUMINOUS CONCRETE PAVEMENT

- A. Bituminous (asphalt) surfaces shall be installed in Accordance with VTrans 2011 Standard Specifications for Construction, including but not limited to Sections 404.06 APPLICATION OF BITUMINOUS MATERIALS, and 406 – MARSHALL BITUMINOUS CONCRETE PAVEMENT. The pavement shall be installed and compacted in two lifts, with a total compacted thickness of 3.5 inches or greater. The compaction shall be a minimum of 95% of the maximum density of the mix.
- B. Bituminous concrete paving mixture shall be placed only when the proper density can be obtained. Precautions shall be taken at all times to compact the mixture before it cools too much to obtain the required density.

Bituminous material shall not be placed on a wet or frozen surface or when weather or other conditions would prevent the proper handling, finishing, or compacting of the material, unless otherwise approved by the Engineer.

C. All edges of adjacent pavements shall be trimmed to neat straight lines and cleaned to provide a firm, regular and clean surface to bond the new pavement. The adjacent pavement shall be tack coated with bituminous material to improve the bond between the old and new pavement.

3.02 <u>GUARANTEE</u>

The Contractor shall maintain pavement under this Contract during the guarantee period of one year, and shall promptly refill and repave areas which have settled, have cracks or are unsatisfactory for their intended use.

SECTION 02805 EROSION CONTROL

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. All labor, materials, tools and equipment necessary to stabilize and prevent erosion of embankments and slopes shall be furnished by the Contractor.
- B. The Contractor shall comply with all requirements and procedures outlined in the Vermont *Low Risk Site Handbook for Erosion Prevention and Sediment Control* and those specified in the Contract Documents.
- C. Related work described elsewhere:

Contaminated Soil Excavation and Handling - Section 02221 Establishment of Growth - Section 02821

1.02 <u>SUBMITTALS</u>

- A. Silt fence. Submit manufacturer's information sheets with sufficient information to show conformance with product specifications.
- B. Rolled erosion control product. Submit manufacturer's information sheets with sufficient information to show conformance with product specifications and manufacturer's installation procedure.
- C. Stone for stabilized construction entrance. Submit gradation analysis per section 02500.

PART 2.00 PRODUCTS

2.01 <u>MATERIALS</u>

A. Silt fence shall be purchased as a continuous roll of geotextile material with the following minimum geotextile properties:

Geotextile Property	Test Method	Minimum Average Roll Value
Grab Tensile Strength (lb.)	ASTM D4632	125 machine direction 100 cross machine direction
Static (CBR) Puncture (lb.)	ASTM D6241	275
Trapezoidal Tear Strength (lb.)	ASTM D4533	40
Apparent Opening Size (sieve)	ASTM D4751	#30 max.
Permittivity (s ⁻¹)	ASTM D4491	0.05
UV Resistance (% retained)	ASTM D4355	70% @ 500 hours

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- B. Silt fence shall be supported by wooden or steel posts with a minimum length of 3 feet and a minimum wooden cross-section of 3 square inches and maximum spacing of 8 feet on center.
- C. Silt fence shall be supported by metal staples to the posts.
- D. Straw or hay mulch shall consist of mowed and properly cured grass, legume or grain mowing, reasonably free from swamp grass, weeds, twigs, debris or other deleterious material. It shall be free from rot or mold.
- E. Rolled Erosion Control Product (RECP) shall be a machine-fabricated erosion control blanket and covered on both sides by netting and sewn together on two inch centers with minimum 750 denier photodegradable, polypropylene thread. Straw fiber shall be 100 percent weed free, homogeneously blended and distributed evenly throughout the RECP. Netting shall be photodegradable polypropylene with mesh openings of approximately 0.5 in by 0.5 in.

Property	Test Method	Units	Property
			Requirement
Thickness	ASTM D-1777	mm	6.4
		(in)	(0.25)
Tensile Strength	ASTM D-4595	kN/m	1.7 x 0.9
_		(lbs/ft)	(112 x 64)
Tensile Elongation	ASTM D-4595	percent	42 x 28

The RECP shall conform to the property requirements listed below:

Ground Anchoring Devices:

- 1. Length: 200 to 450 mm (8 to 18 inches); sufficient ground penetration to resist pullout. Use longer anchors for loose soils as required.
- 2. U-shaped wire staples, metal pins, or triangular wooden stakes.
- 3. Wire staples: Minimum 8 gauge.
- 4. Metal pins: Steel, minimum 5 mm (0.20 in) in diameter with 40 mm (1.5 in) steel washer.
- F. Safety Fence shall be a minimum of four feet high and supported with minimum five foot long stakes every six feet.
- G. Seed for erosion control shall conform to Section 02821, Establishment of Growth.

PART 3.00 EXECUTION

3.01 <u>SAFETY FENCE</u>

A. Construct the safety fence in accordance with the Drawings. Place safety fences before any construction begins.

3.02 STABILIZED CONSTRUCTION ENTRANCE

A. Construct a stabilized construction entrance in accordance with the Vermont *Low Risk Site Handbook for Erosion Prevention and Sediment Control* before any construction begins and remove when construction is complete. Use a mix of 1 to 4 inch stone, minimum 8 inches deep, 12 feet wide and 40 feet long (see Drawings). Place geotextile filter cloth under entire gravel bed.

3.03 <u>SILT FENCE</u>

- A. Construct the silt fence on the downhill side of the construction activities in accordance with the Drawings. Install silt fence across the slope at constant elevation. Place silt fences before any construction begins.
- B. Excavate an anchor trench a minimum of 6 inches deep to anchor the base of the silt fence. Turn ends of fencing uphill to prevent bypass. Leave silt fences up until grass is well established. The stakes go on the downhill side. Ensure that silt fence materials extend 16 inches into the trench in accordance with the Vermont *Low Risk Site Handbook for Erosion Prevention and Sediment Control*. Backfill the fabric in the anchor trench and extend the fabric a minimum 18 inches above ground surface. Use a minimum of 4 heavy duty wire ties (zip-ties) or staples per post as necessary to properly affix the fabric to the posts.
- C. Space posts a maximum of 8 feet apart; minimize joints in the filter fabric to the maximum extent possible. When joints are necessary, filter fabric shall be wrapped together at a support post with both ends of the silt fence fabric securely fastened to the support post, with a minimum 6-inch overlap. Wire ties shall be used to attach the silt fence to the support posts. Wire ties shall be spaced a maximum distance of 6-inches apart along the length of the support post.
- D. During active construction, and until final stabilization is achieved, inspect the silt fence every 7 days and within 24 hours after ½ inch or more of rain or any precipitation that results in a discharge from the Site. Repair as necessary. During inspections, check for areas where runoff has eroded a channel beneath the fence, or where the fence was caused to sag or collapse by runoff overtopping the fence. Ensure that silt fence is trenched in ground and there are no gaps.
- E. If the silt fence geotextile tears, begins to decompose, or in any way becomes ineffective, replace the affected segment of fence immediately.

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- F. Maintain the silt fence until its capacity has been reached or erosion activity in the area has stabilized. Remove sediment accumulated along the fence when it reaches approximately one-third of the exposed height of the fabric, especially if heavy rains are expected. Remove trapped sediment or stabilize on site.
- G. Remove silt fence within 30 days after the Engineer certifies that the restoration of the area being protected is completed including full establishment of the new vegetation. Permanently stabilize disturbed areas resulting from fence removal.

3.04 STABILIZATION

- A. All areas of disturbance must have temporary or permanent stabilization within 14 days of initial disturbance. Temporary stabilization is defined as placement of grass seed, mulch and/or RECP. After 14 days, any disturbance in the area must be stabilized at the end of each work day. The following exceptions apply: Stabilization is not required if earthwork is to continue in the area within the next 24 hours and there is no precipitation forecast for the next 24 hours. Stabilization is not required if the work is occurring in a self-contained excavation (i.e., no outlet) with a depth of 2 feet or greater.
- B. All areas of disturbance must have permanent stabilization within 48 hours of reaching final grade. Permanent stabilization means compacted structural fill, asphalt paving or vegetation, mulch and/or RECP as specified in Section 02821 Establishment of Growth.

3.02 <u>MULCH</u>

A. Mulching shall be done immediately after each area has been properly prepared. When seed for erosion control is sown prior to placing the mulch, the mulch shall be placed on the seeded areas within 48 hours after seeding. Straw or hay that has been thoroughly fluffed shall be applied at approximately 3 tons per acre unless directed differently by the Engineer. Blowing chopped mulch will be permitted when authorized. Authorization will be given when it can be determined that the mulch fibers will be of such length and applied in such a manner that there will be a minimum amount of matting that would retard the growth of plants. Straw or hay mulch should cover the ground enough to shade it, but should not be so thick that a person standing cannot see ground through the mulch. Matted mulch or bunches shall be removed or otherwise pulled apart and re-distributed.

3.03 ROLLED EROSION CONTROL PRODUCT

- A Surfaces and slopes to receive RECP shall be finished to a smooth and even condition with all debris, roots, stones, and lumps raked out and removed. Prepare seedbed by loosening the top 50 to 75 mm (2 to 3 in) of soil. Unless otherwise directed, seed shall be applied prior to placement of the RECP.
- B. Extend the RECP 600 to 900 mm (2 to 3 feet) over the crest of the slope, secure with anchoring devices, backfill, and compact with specified soil or as directed by Engineer.

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C. Unroll RECPs downslope, overlapping adjacent rolls a minimum of 75 mm (3 in). Lay material loosely, maintaining direct contact with soil. Secure RECP to slope with ground anchoring devices as follows:

Slope Grade (Batter)	Anchoring Frequency
Up to 3H:1V	1.2 anchors/square meter (1 anchor/square yard)

D. Alternate installation methods must be approved by Engineer prior to execution.

SECTION 02821 ESTABLISHMENT OF GROWTH

PART 1.00 SCOPE OF WORK

This work shall include, but is not limited to, site preparation, and furnishing and installing seed and plants. The areas to be seeded and planted shall include all disturbed areas designated on the Drawings except those with asphalt paving, and any ancillary areas damaged by the Contractor.

1.01 **DESCRIPTION**

- A. Work Included:
 - 1. All labor, materials, equipment and incidentals necessary to loam, fertilize, seed, plant, mulch and maintain all restored areas as shown on the Drawings and/or specified herein, and any other areas disturbed by the Contractor's operations shall be furnished.

1.02 QUALITY ASSURANCE

Trained personnel experienced in this type of work shall be employed.

1.03 PRODUCT DELIVERY AND STORAGE

- A. Fertilizer shall be delivered to the site in the original unopened containers each showing the manufacturer's guaranteed analysis, and stored in such a manner that when used it is dry and free flowing.
- B. Lime shall be delivered in sealed containers bearing the manufacturer's guaranteed analysis and maintained in a dry, free flowing condition until used.
- C. Seed shall be delivered in sealed containers bearing the dealer's guaranteed analysis and stored in a dry, protected place.

PART 2.00 PRODUCTS

2.01 <u>TOPSOIL</u>

A. See Section 02500, Imported Soils

2.02 <u>FERTILIZER</u>

A. Fertilizer shall be complete commercial fertilizer, 10-20-20 grade.

2.03 <u>LIME</u>

A. Lime shall be ground limestone containing not less than 85% calcium and magnesium carbonates.

2.04 <u>SEED</u>

- A. Seeds shall be supplied on the basis of bulk weight and percent live seed (PLS). The seed mixtures shall conform to the Vermont Conservation mixture specified below: 35% Creeping Red Fescue
 25% VNS Turf-type Tall Fescue
 15% Annual Ryegrass
 12% Perennial Ryegrass
 10% Kentucky Bluegrass 85/80
 3% White Clover
- B. Seed shall be from the same or previous year's crop and shall have not more than 1% weed content. Seed shall also meet the following requirements:
 - 1. Grass seed of the specified mixtures shall be furnished in fully labeled, standard, sealed containers.
 - 2. Percentage and germination of each seed type on the mixture, purity, and weed seed content of the mixture shall be clearly stated on the label.
 - 3. The weight of PLS is computed by the labeled purity percent times the labeled germination percent times the bulk seed weight. Conversely, the weight of bulk seed to provide the specified PLS weight is computed by dividing the PLS weight by the product of the labeled purity percent and the labeled germination percent.
 - 4. To illustrate the method of computing the required bulk seed weight to satisfy the specified PLS weight requirements, the following example is given: Required: 20 pounds PLS of a particular variety--stock available is 99.41% pure with 92% germination--20 divided by the product of .9941 and .92 equals 21.9 pounds on the tag basis to furnish 20 pounds of PLS.

2.05 <u>MULCH</u>

- A. Hay mulch (used in all upland areas) shall consist of mowed and properly cured grass or legume mowings, reasonably free from swamp grass, weeds, twigs, debris or other deleterious material. It shall be free from rot or mold.
- B. Straw mulch shall be stalks of oats, wheat, rye or barley relatively free from seeds, noxious weeds and other foreign material.
- C. Rolled Erosion Control Product (RECP) shall be a machine fabricated erosion control blanket (ECB) and covered on both sides by netting and sewn together on two inch centers with minimum 750 denier photodegradable, polypropylene thread. Straw fiber shall be 100 percent weed free, homogeneously blended and distributed evenly throughout the RECB. Netting shall be photodegradable polypropylene with mesh openings of approximately 0.5 in by 0.5 in.

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PART 3.00 EXECUTION

3.01 <u>GENERAL</u>

- A. The Contractor must examine the area and conditions under which work is to be performed. The area must be properly prepared before seeding begins.
- B. All operations shall be initiated and completed within the seeding or planting window specified herein. The work shall not be started until all earthwork in the area requiring seeding has been completed. Seeding shall not be done during periods of rain, severe drought, high winds, excessive moisture, frozen grounds, or other conditions that preclude satisfactory results. All planting is to be done in moderately dry to moist (not flooded) soil and at a time when the wind does not exceed a velocity of ten (10) miles per hour.
- C. All areas shall be seeded and mulched within 2 days of final grading. The soils shall be limed and fertilized at the time of seeding.

3.02 SITE PREPARATION

- A. Areas to be seeded shall be maintained at approved grades. All mechanical equipment for soil preparation or seeding shall be as approved and shall pass parallel to the contours. The Contractor shall till or rake, smooth, and firm the seed bed, as described below.
- B. Areas to be tilled shall be tilled to a minimum depth of 4 inches by disking or plowing and smoothed by harrowing or dragging. For all areas, if the grading has just been completed and the soil is loose and friable, not eroded or crusted, the tilling step may be omitted. The soil shall be left in this scarified condition and shall not be smoothedrolled. The Contractor shall be responsible for performing all work necessary to achieve and maintain an acceptable seed bed prior to seeding.
- C. After the topsoil is placed and before it is raked to true lines, spread limestone evenly over topsoil surface and thoroughly incorporate into the topsoil by heavy raking or tilling to at least one-half the depth of the topsoil.
- D. Preparation of the final topsoil surface immediately prior to seeding shall be completed as follows. Final grades shall be established by raking the topsoil surface. When finished grades are not indicated on the Drawings, they shall be uniform between the points for which finished grades are given, or form such points to existing grades, except that the top and bottom of the slopes shall be rounded. Compacted loam shall not be less than the depth specified. No topsoil shall be spread in water or while frozen or muddy.
- E. Uniformly spread fertilizer and immediately mix with the upper 2 inches of topsoil prior to seeding and mulching.
3.03 <u>SEED HANDLING</u>

A. During all operations including Contractor storage, seeds and seed bags shall be kept covered, shaded and out of direct sunlight. Seeds shall not be stored or temporarily stored in locations or vehicles where the temperature will be in excess of 90° Fahrenheit.

3.04 <u>SEEDING</u>

- A. Seeding shall occur on moist soils. If required for good establishment, the area shall be watered prior to the seeding operation.
- B. Immediately following site preparation, uniformly apply the seed and lightly rake the seed into the surface. Lightly roll the surface and water with a fine spray.
- C. Promptly thereafter or within 24 hours after the seeding operation, lightly and uniformly mulch areas with hay.
- D. Protect stormwater ditches with Rolled Erosion Control Product, installed as specified in Section 02805.

3.05 <u>APPLICATION RATES</u>

- A. Apply lime at a rate of 100 lbs. per 1,000 square feet.
- B. Apply fertilizer at the rate of 7 pounds per 1,000 square feet.
- C. Seed shall be applied a rate of three pounds per 1000 square feet.
- D. Apply mulch at the rate of 75-100 lbs. per 1,000 square feet.

3.06 MAINTENANCE

Keep all seeded areas watered and in good condition, reseeding if and when necessary, until a good, healthy, uniform growth is established over the entire area seeded.

END OF SECTION

SECTION 02995 DECONTAMINATION

PART 1.00 GENERAL

1.01 **DESCRIPTION**

- A. The work of this section consists of planning, preparing, and performing decontamination activities required to support the remedial action performed at the site. Work described in this section also includes collection, temporary storage and disposal of decontamination wash water.
- B. The Contractor shall submit a Decontamination Plan, which at a minimum, shall identify decontamination pad design and location on the Site, proposed methods for managing decontamination water, and a logistical sequence for decontaminating equipment during the remedial action. The Decontamination Plan shall also identify the method of decontamination water clarification and transport/discharge to the existing Treatment Plant.
- C. Related work described elsewhere:

Clearing and Grubbing - Section 02110 Contaminated Soil Excavation and Handling – Section 02221 Contaminated Soil Transportation and Off-site Disposal – Section 02223 Imported Soils – Section 02500 Backfill and Compaction – Section 02525 Erosion Control – Section 02805 Establishment of Growth – Section 02821

1.02 JOB CONDITIONS

A. Decontamination of all materials, equipment, and transport vehicles to be used in contaminated soil removal operations that come into contact with contaminated soils: 1) prior to arrival at the site; 2) prior to placing backfill; or 3) prior to leaving an individual excavation area.

PART 2.00 PRODUCTS

2.01 MATERIALS

A. Decontamination Pad. - The decontamination pad shall consist of a contained basin with a minimum 6 inch high curb or berm and a sloped bottom and sump. The sump capacity must be adequate to contain wash water required to clean the construction equipment used to excavate contaminated soil. The sump shall be easily accessible to allow pumping and containerizing of the collected decontamination and rinse water. A minimum 10 mil continuous poly sheeting liner shall underlie the entire decontamination pad and the liner shall be protected from damage, both from the underlying native ground surface and from the equipment to be decontaminated. The Contractor is responsible for the cleanup of any spills and infiltration into underlying soils at the Contractor's expense.

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- B. Decontamination Water water used during the decontamination process. This water may be used as wash water and rinse water to decontaminate equipment and materials which contact the contaminated soils.
- C. After the Decontamination Plan is approved, further changes, including decontamination pad design or location, must be made in writing to the Engineer (and approval obtained) no less than 30 days prior to any associated Site Work.

PART 3.00 EXECUTION

- A. Any equipment mobilized to the Site shall be inspected by the Engineer for cleanliness before it is unloaded. Any equipment that has soil, excess grease or fluid leaks shall not be allowed.
- B. The Contractor shall identify the water source to be used for decontamination and provide evidence it is free of contaminants or is municipally supplied water.
 Documentation relating to decontamination water shall be submitted to the Engineer.
- C. Decontamination water shall be stored and transported in tanks and trucks dedicated for clean water use.
- D. The Contractor shall decontaminate all equipment which contacts contaminated soils, sediments, and liquids before said equipment leaves the discrete excavation area or contacts imported clean soil materials. The Contractor shall obtain Engineer approval of equipment decontamination activities prior to transporting the equipment off site or importing soil materials to the Site. Based on field observations, the Engineer may require the Contractor to conduct additional decontamination activities.
- E. The Contractor shall capture, collect, and store all water used during decontamination activities. The Contractor shall be responsible for removal of sediment from decontamination and rinse water (see F. below), transfer of water into DOD-approved 55 gallon drums or tanks, and storage of the drums or tanks at an area on the Site designated by the Contractor and approved by the Engineer. The Engineer shall be responsible for the transport of the water to the existing treatment facility on the Elementary School property, and discharge to that facility.
- F. Decontamination water shall be passed through a filter with a nominal pore size of 25 microns before storage in the 55-gallon drums or "cage-tanks" not to exceed 250 gallons capacity. Any used filters and sediment collected in the transport container shall be disposed of by the contractor as hazardous waste in accordance with all applicable State and Federal Regulations.
- G. Construction equipment working in areas where contaminated soil is exposed at the surface shall be situated on a suitable barrier so that equipment tires and/or tracks do not come in contact with contaminated soils. Any tires and/or tracks of excavation equipment that do contact contaminated soils shall be decontaminated before the

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equipment leaves the delineated extent of the contaminated soil or must travel on a barrier that prevents contact with underlying clean soil.

- H. The Contractor shall supply all equipment and materials necessary to properly decontaminate equipment used in areas where contaminated soil is excavated, stockpiled and loaded. The Contractor shall construct or provide decontamination structures on site that can accommodate all types of equipment used.
- J. Once all on-site decontamination activities have been completed, the Contractor shall remove the decontamination pad. Waste materials shall be disposed of with the contaminated soil.
- K. After removing the decontamination pad, the Contractor shall reclaim the area in the vicinity of the pad, if necessary. Reclamation activities include, but are not limited to, restoring the original topography and establishment of growth.

END OF SECTION

Division 13 Special Construction

Section

<u>No. Pages</u>

13551 - Geotextile

2

SECTION 13551 GEOTEXTILE

PART 1.00 GENERAL

1.01 **DESCRIPTION**

A. The Contractor shall furnish all labor, materials, equipment and incidentals required for the installation of the geotextile specified herein or shown on the Drawings.

1.02 <u>SUBMITTALS</u>

B. Submit manufacturer's information sheets with sufficient information to show conformance with product specifications for each type of geotextile.

PART 2.00 PRODUCTS

2.01 MATERIALS

- A. Separator geotextile:
 - 1. The fabric shall be non-woven and must be ultraviolet treated and inert to biological degradation and degradation or damage from naturally encountered chemicals, alkalines and acids.
 - 2. Minimum property values for the fabric are as follows:

Property	Minimum Average Roll	Test Method
	Value	
Grab Tensile Strength	1070 N	ASTM D-4632-86
Grab Tensile Elongation	20% min.	ASTM D-4632-86
Mullin Burst Strength	2750 kPa	ASTM D-3786
Trapezoid Tear Strength	335 N	ASTM D-4533-86
Puncture Strength	445 N	ASTM D-3787
Apparent Opening Size	0.15 mm	ASTM D-4751
Weight	12 oz./square yard	

- B. Roadbed separator geotextile:
 - 1. The fabric shall be woven and must be ultraviolet treated and inert to biological degradation and degradation or damage from naturally encountered chemicals, alkalines and acids.
 - 2. Minimum property values for the fabric are as follows:

Geotextile Property for <50% Elongation at Failure	Test Method	Minimum Average Roll Value
Grab Tensile Strength (lb.)	ASTM D4632	250
Static (CBR) Puncture (lb.)	ASTM D6241	500
Trapezoidal Tear Strength (lb.)	ASTM D4533	90
Apparent Opening Size (sieve)	ASTM D4751	#40 max.
Permittivity (s ⁻¹)	ASTM D4491	0.02
UV Resistance (% retained)	ASTM D4355	50% @ 500 hours

Geotextile Property for >50% Elongation at Failure	Test Method	Minimum Average Roll Value
Grab Tensile Strength (lb.)	ASTM D4632	160
Static (CBR) Puncture (lb.)	ASTM D6241	310
Trapezoidal Tear Strength (lb.)	ASTM D4533	55
Apparent Opening Size (sieve)	ASTM D4751	#40 max.
Permittivity (s ⁻¹)	ASTM D4491	0.02
UV Resistance (% retained)	ASTM D4355	50% @ 500 hours

PART 3.00 EXECUTION

3.01 INSTALLATION

- A. The geotextile shall be installed after all subgrade elevations have been established.
- B. The application area must be shaped as shown on the Drawings and graded smooth and free of rocks, sticks or other sharp objects.
- C. The fabric shall be installed in accordance with the manufacturer's instructions.
- D. The fabric shall be furnished in rolls of a width and length which will minimize the number of overlaps. Where overlaps cannot be avoided, a minimum overlap of 2 feet shall be provided. Overlaps shall be pinned.
- E. The specified backfilled material must be placed so as not to disturb or damage the fabric.
- F. The surface receiving the geotextile shall be smooth and free of obstructions, depressions and debris.
- G. The geotextile shall be placed loosely without wrinkling such that placement of the stone fill or subgrade materials will not tear it.

END OF SECTION

ATTACHMENT 3

DRAFT DEED RESTRICTIONS

VERMONT QUIT CLAIM DEED, GRANT & AGREEMENT

KNOW ALL PERSONS BY THESE PRESENTS that UNIFIRST CORPORATION, a Massachusetts corporation, of Wilmington, in the County of Middlesex, and Commonwealth of Massachusetts (the "Grantor"), in consideration of Ten Dollars (\$10.00) and other good and valuable consideration, paid to it in full satisfaction by [______], of Williamstown, in the County of Orange and State of Vermont, with a place of business in the Town of Williamstown, County of Orange and State of Vermont (the "Grantee"), by these presents do freely REMISE, RELEASE AND FOREVER QUITCLAIM unto the said Grantee [______], and its successors and assigns, forever, a certain piece of land in Williamstown, in the County of Orange, State of Vermont, described, as follows, viz

It being all and the same land and premises conveyed to Interstate Industrial Uniform Rental Service, Inc., a Massachusetts corporation (now called UNIFIRST CORPORATION), by Warranty Deed dated January 14, 1972, recorded in Book 47, Page 189A in the Williamstown Land Records. This portion of the land and premises herein conveyed may be described as follows:

Commencing at a stone bound located on the northerly side of Town Highway #24, said stone bound being the southwesterly corner of Duff's property, and the southeasterly corner of the land herein conveyed; thence N. 28 53' 31" E., along the westerly boundary of Duff's property, a distance of 180.8' to a point; thence N. 36 27' 31" E., along the westerly boundary of Duff's land, a distance of 173.63' to a stone bound; thence N. 36 27' 31" E., a distance of 71.5' to an iron pin; thence N. 62 57' 33" W., a distance 539.76' to an iron pin; thence N. 72 02' 34" W., a distance of 252.12' to an iron pin located on the easterly side of Town Highway #6; thence S. 10 48' 09" W., along the easterly side of Town Highway #6, 50.0 ft. to an iron pin; thence southerly along the easterly side of Town Highway #6, 320', \pm , to an iron pin and the northwesterly boundary of the Mary Graham property; thence N. 74 16' 16" E. along the northerly boundary of the Mary Graham property, 79.32' to an iron pin; thence S. 14 51' 30" E, along the easterly boundary of the Graham property, 214.79' to an iron pin on the northerly side of Town Highway #24; thence S. 69 26' 16" E. along the northerly side of Town Highway #24, a distance of 362.41' to the point of beginning. The above-described parcel is supposed to contain 6.41 acres, more or less.

Reference may be made to a plan entitled "Survey of Portion of Garnick Property, Town Highway 24 &6, Williamstown, Vt., December, 1971, by Surveyors, Inc., Barre, Vt.", which plan is to be placed on file in the Town Clerk's office in the Town of Williamstown.

It also being all and the same land and premises conveyed to Interstate Uniform Services, Corp., a Massachusetts corporation (now called UNIFIRST CORPORATION), by Warranty Deed dated October 24, 1975, in Book 51, Page 70, in the Land Records of the Town of Williamstown. This portion of the land and premises herein conveyed may be described as follows:

Being a piece of land situated on the easterly side of the highway leading from Williamstown to Berlin Pond Road and located at the Northerly corner of the intersection of the above mentioned Berlin Pond Road and Construction Hill, socalled. Starting at the culvert, now existing, at the above mentioned road junction in a northerly direction and along the easterly side of the above-mentioned Berlin Pond Road a distance of one hundred seventy-four (174) feet to an iron post set in the ground; thence an angle to the right a distance of eighty (80) feet in a generally easterly direction to an iron post set in the ground; thence turning an angle to the right a distance of one hundred seventy-four (174) feet, more or less, to an iron post set in the ground on the northerly side of the above-mentioned Construction Hill Road; thence turning an angle to the right a distance of sixty (60) feet, along the northerly side of the above mentioned Construction Hill Road, to the point of beginning. Meaning hereby to convey a lot of land with one hundred seventy-four (174) feet frontage on the Berlin Pond Road; and a depth of eighty (80) feet on the northerly end; and a depth of sixty (60) feet on the southerly end.

Reference may be had to the above deeds and plans and the deeds and Land Records of the Town of Williamstown for a more complete description and source of title of the land and premises herein conveyed.

The land and premises are conveyed subject to a Consent Decree entered into the Orange Superior Court on March 24, 1997, by and among the State of Vermont (the "State"), the Town of Williamstown, Vermont (the "Town") and the Grantor, recorded in Book 90, Page 182 of the Land Records of the Town of Williamstown. Without limiting the generality of the foregoing, the Grantee shall not in any way interfere with the rights granted to and/or reserved by the State or the Town in the Consent Decree, nor shall the Grantee in any way interfere with the performance by the Grantor, its agents, employees, contractors, successors and assigns, of the Work, Remediation and/or Remedial Effectiveness Evaluations (all as defined in the Consent Decree). By way of example only, the Grantee shall provide unrestricted access to the land and premises to the Vermont Agency of Natural Resources, or any successor or other State Agency (collectively, the "State Agencies") and to the Grantor, as is provided for in paragraph 31 of the Consent Decree. The Grantee, by executing this Quitclaim Deed, hereby expressly GRANTS such unrestricted access to the State Agencies and the Grantor, its agents, employees, contractors, successors and assigns.

Specifically excluded from this conveyance is all and the same spring rights conveyed to Mary Graham by Quit-Claim Deed from Horace H. Duke, Jr., and Margaret O. Duke dated July 1, 1971 and recorded in Book 44, Page 181 of the Land Records of the Town of Williamstown, therein described as follows: --

"Being all of our right, title and interest in and to a certain spring formerly serving the home in which we now live, and lying approximately 500 feet easterly of the easternmost boundary of our land, together with any right to repair, relay, or maintain the said spring or any of its pipelines; being the same spring rights mentioned in a certain deed from Ernest Martel and Marion Martel, husband and wife, to the grantors herein, dated October 20, 1966 and recorded in Book 46, at Page 163 of the Land Records of the Town of Williamstown, Vermont."

The Grantee makes the following covenants and agrees to permanent use restrictions and obligations on behalf of Grantee, its successors and assigns, for the benefit of the State and the Grantor, and their authorized agents, employees, contractors, successors and assigns, which

covenants, restrictions and obligations (collectively, the "Restrictions") shall run with and bind the land and premises in perpetuity.

Grantee shall comply with all federal, state, and local laws and regulations regarding the handling and disposal of hazardous substances, pollutants or contaminants on or from the land and premises;

Grantee shall not use the land and premises or conduct any activities on the land and premises, or allow uses or activities to be conducted on the land and premises that would:

- i. Unreasonably interfere with any investigations of the environmental conditions at the land and premises;
- ii. Cause or exacerbate contamination of the land and premises or contamination of off-site properties; or
- iii. Pose or present any risk to the implementation, construction, operation, or maintenance of any environmental remedy.

In addition, Grantee shall not take or authorize any of the following activities or actions on the land and premises without the prior express written consent from the Grantor and the State:

- i. Construction, substantial improvement, or stabilization of buildings or any work on the foundations of buildings;
- ii. Plowing, tilling, ditching, draining, diking, filling, excavating, dredging, mining or drilling, removal of topsoil, sand, gravel, rock, minerals or other materials;
- iii. Construction activities which will materially change hydrogeologic conditions or will likely cause migration of contaminated groundwater;
- iv. Any other use that may impact or adversely affect the implementation, construction, operation, and maintenance of any environmental remedy.
- v. Installation of any new wells on the land and premises is prohibited (except if installed by the State or the Grantor as part of a remediation or investigation effort consistent with the Consent Decree).
- vi. Construction of any occupied structures, above grade or subsurface, is prohibited on the land and premises, to prevent vapor intrusion risks.
- vii. Prior to any proposed utility or construction excavations or intrusive work on the land and premises, a work plan must be prepared and submitted and approved by the State and Grantor. The work plan must describe proposed testing and protections that would ensure compliance with applicable deed restrictions as well as the safety and health of site workers and the public.
- viii. Activities that could jeopardize or damage the asphalt cap on the land and premises are prohibited.

Grantee shall perform the following maintenance activities to ensure that the remedial action continues to perform as designed:

- (i) The asphalt cap shall be maintained. All cracks, settlement and similar deficiencies shall be promptly repaired, including but not limited to: crack sealing and patching of potholes.
- (ii) The land and premises shall be routinely inspected for erosion. Any erosion (rivulets, ditches, ravines, swales, etc.) equal to or greater than 0.5 feet (6 inches) below the surrounding ground surface shall be promptly repaired using clean fill, and seeded and mulched.

The Grantor and the State shall be entitled to enforce the terms of these Restrictions by resort to specific performance or other legal process, including enforcement in the courts of the State of Vermont.

The Grantee agrees that a violation of the Restrictions will constitute irreparable harm and entitle Grantor and the State to injunctive relief.

All reasonable costs and expenses of Grantor and the State, including, but not limited to, attorneys' fees, incurred in any enforcement action shall be borne by the Grantee or its successors in interest or assigns, if Grantor or the State prevails in any such action.

All remedies available hereunder shall be in addition to any and all remedies available at law or in equity, including but not limited to federal and state hazardous waste management statutes. Nothing in these Restrictions shall be construed to limit or otherwise affect the Grantor's or the State's rights of entry and access provided by the Consent Decree, this Deed, by law or regulation.

Enforcement of the terms of these Restrictions shall be at the discretion of the Grantor and the State, and any forbearance, delay or omission to exercise their rights under these Restrictions shall not be deemed to be a waiver by the Grantor or the State of such term or of any subsequent breach of the same or any other term, or of any of the rights of the Grantor or the State under these Restrictions.

The provisions of these Restrictions are severable. If any provision of these Restrictions is invalid, or if any application of these Restrictions to any circumstance is invalid, the invalidity shall not affect other provisions or applications that can be given effect without the invalid provision or application.

The Restrictions, rights of access, easements, obligations and covenants, granted or referenced in this instrument and/or in the Consent Decree shall run with the land, and any portion thereof, in perpetuity, and shall be binding on the Grantee, the Grantee's agents, successors and assigns, and shall inure to the benefit of the State and the Grantor and their authorized representatives, successors and assigns.

Grantee, its successors and assigns, hereby agrees to incorporate these Restrictions, in full or by reference, into all leases, licenses, occupancy agreements, or any other instrument of transfer by which a right to use the land and premises, or any portion thereof, is conveyed.

Restrictions, rights of access and easements may be modified, or terminated in whole or in part only upon written agreement among the Grantor, the State and the Grantee, signed by all parties and recorded in the Land Records in the Town of Williamstown. Nothing contained herein shall give or grant to the public a right to enter upon or to use the land and premises or any portion thereof where no such right existed in the public immediately prior to the execution hereof.

If Grantee or its successors and assigns become delinquent in payment of taxes or assessments such that a lien against the land and premises is created, the Grantor and the State shall have the right to take actions as may be necessary to protect the Grantor's and the State's interest in the land and premises and to assure the continued enforceability of the rights granted herein.

The parties hereto recognize and agree that the benefits of the Restrictions, easements, and rights of access granted and imposed herein are in gross and are assignable by Grantor and the State, subject to notice to Grantee and recording of the assignment in the Land Records for the Town of Williamstown.

TO HAVE AND TO HOLD said granted land and premises, with all the privileges and appurtenances thereof, to the said Grantee, [_____], its successors and assigns, to its own use and behoof forever,

AND FURTHERMORE, the said Grantor, for itself and its successors and assigns, does covenant with the said Grantee, and with its successors and assigns, that from and after the ensealing of these presents, Grantor will have and claim no right to title in or to these premises.

[Remainder of page intentionally blank]

DRAFT

IN WITNESS WH , 2013.	EREOF, I here	eunto set my hand and seal this	day of
IN PRESENCE OI	F		
		UNIFIRST CORPORATION	
		By: Name:	
		Title:	
		[]
		D	
		By: Name:	
		Title:	
State of Vermont)		
State of Vermont) ss.		
County)		
At in	said County ar	nd State this day of	A.D. 2013, the
above-named, m	, as	of UNIFIRST CORPORAT	ION, personally
appeared, and he/she ackn his/her free act and deed	owledged this	instrument, by him/her sealed and su	lbscribed, to be
		Before me,	
		Notary Pu	ıblic
State of Vermont)	At this	
County) ss.	day of, A	A.D. 2013
County)		
as		of [] personally
appeared, and he/she ackn	owledged this	instrument, by his/her sealed and sul	oscribed, to be
		Before me,	

Notary Public

ATTACHMENT 4

INSIGNIFICANT WASTE DISPOSAL EVENT PERMIT APPLICATION



ph (802) 229-4600 fax (802) 229-5876 100 State Street, Suite 600 Montpelier, VT 05602 www.johnsonco.com

April 22, 2013

Mr. Dennis Fekert Waste Management Division Agency of Natural Resources 103 South Main Street, West Office Building Waterbury, Vermont 05676

 Re: Former UniFirst Williamstown Plant, Application for IWMEA 100 Hebert Road at the corner with Construction Hill Road in Williamstown, Vermont HMMD VT Site #77-0087 Latitude: 44°07'31" Longitude: 72°32'51" JCO #1-0703-1

Dear Dennis:

Enclosed is an application for an Insignificant Waste Management Event Approval (IWMEA) for disposal of crushed concrete from the existing building slab and frost walls as well as brick and concrete block demolition rubble from prior demolition activities at the above captioned project. The removal of the building foundation is part of a Corrective Action Plan (CAP) conducted in accordance with Vermont Hazardous Materials Management Division, Sites Management Section (SMS) guidance documents. The VT SMS Site manager is Gerold Noyes. The existing building foundation will be removed to permit excavation of impacted soils beneath the slab.

The concrete removed from the building slab and foundation will be crushed on-site and all reinforcing steel will be removed. The removed steel will be either recycled or disposed of off-site. The concrete will then be crushed and either used to backfill site excavations or stockpiled on the site along with the existing building brick and concrete block rubble in the disposal locations shown on the attached plans. The stockpile will be covered with a geotextile separator fabric and topsoil, seeded, and covered with a rolled erosion control product.

As shown in the attachments, the proposed waste disposal area in not within any of the following:

- Class I and II Ground Water Areas
- Source isolation zone or protection area
- 200 feet of a public or private water supply
- A watershed for Class A waters
- Class I or Class II wetlands or their associated buffer zones
- Class III wetlands
- A floodway or 100 year flood plain.

The disposal area is 50 feet from the property lines and public roads and more than 100 feet from Class B surface waters. The proposed maximum slope is 3:1.

The corrective action will be conducted under construction supervision by The Johnson Company. Measures taken to ensure that the disposal activity and waste materials will not result in a threat to public safety, public health, or the environment, or create a nuisance will include the following. Dust will be controlled through the application of water and/or calcium chloride as needed to prevent visible dust emissions from any portion of the site. Noise will be controlled through limiting the hours of operation at the site to between 7:00 a.m. and 6:00 p.m. on weekdays and between 8:30 a.m. and 6:00 p.m. on weekends and Federal holidays. The contractor will be required to maintain appropriate containers on the site for the disposal of solid waste and the recycling of construction waste. All construction equipment will be inspected for leaks before entering the site. The entire site will be enclosed in a safety fence that will be secured at the end of each work day to prevent access to the site by unauthorized persons.

Should you have any questions, or require more information, please do not hesitate to contact me.

Sincerely yours,

THE JOHNSON COMPANY, INC.

Man By

Donald Maynard Senior Scientist/Engineer

enclosure

cc: Tim Cosgrave, UniFirst Gerold Noyes, VT SMS

K:\1-0703-1\ACTIVE\TEXT\2011-2012 Plant Site Remedial Action\042213 Submittal to VTSMS\IWMEA Cover Letter 041913 DOC



Agency of Natural Resources Waste Management & Pollution Prevention Division 103 South Main Street, Waterbury, VT 05671-0404 Contact Info: <u>dennis.fekert@state.vt.us</u> Application Forms and Guidance Documents: <u>http://www.anr.state.vt.us/dec/wastediv/solid/permit.htm</u>

IWMEA APPLICATION FORM FOR DISPOSAL EVENTS July 2012

Applicant, Landowner, Site and Contact Person Information

1.	Applicant			
	Name (print):	UniFirst Corporation		
	Address:	68 Jonspin Road, Wilmington, MA 01887		
	Telephone number: Email Address:	978-658-8888 x4332 Tim Cosgrave Timothy_Cosgrave@unifirst.com		
2.	Landowner			
	Name (print):	UniFirst Corporation		
	Address:	68 Jonspin Road, Wilmington, MA 01887		
	Telephone Number:	978-658-8888 x4332 Tim Cosgrave		
Email Address:		Timothy_Cosgrave@unifirst.com		
3.	Disposal Site Location			
	Address: 10	0 Hebe <u>rt Road at the corner of Construction Hill Road</u>		
		Williamstown, Vermont		
4.	Contractor			
	Name (print):	The Johnson Company, Inc.		
	Address:	100 State St., Suite 600		
		Montpelier, Vermont 05602		
	Telephone Number:	802-229-4600 Donald M. Maynard, PE 7020		
	Email Address:	DMM@jcomail.com		

IWMEA Revised July 2012

Waste Description and Project Duration

Waste Source: identify the source or project from which the solid waste is generated
 Concrete and brick materials from building demolition, 100 Herbert Rd., Williamstown, VT

Гуре	Volume (cubic yards)
Concrete and brick rubble	1,100

(Note: the solid waste must be from a single source or project)

3. Disposal Event Duration: Starting Date: July 15, 2013 Ending Date: September 1, 2013

Attachments

2.

- A. A description of how the disposal site will be managed to control dust, noise, litter, spills, emissions and discharges such that the disposal site will not result in a threat to the public health and safety or to the environment, and will not create a nuisance. The description should include how access to the disposal site by unauthorized persons will be controlled.
- B. Information that demonstrates that the disposal site is not located in any prohibited area.
- C. A site plan (minimum size 8 ¹/₂" X 11" may be hand drawn) showing the layout of the site where disposal will occur and the waste management boundary. The site plan must show the location and distance to property lines, public roads, waters, public and private drinking water supply wells, wetlands, and any source protection area.
- D. A map which shows the location of the proposed site. The map may be from a Vermont Atlas and Gazetteer or a state highway map or a USGS topographical map or copy thereof.
- E. Written approval from the landowner if this form is not signed by the landowner
- F. Other pertinent information that may be helpful in reviewing the application.
- G. Fee Check in the amount of \$100.00 made payable to "Treasurer, State of Vermont".

ancilie

Landowner Signature:

Applicant Signature:

(Landowner, your signature constitutes approval to use this site for this disposal event)

Contractor Signature:





SOURCE REFERENCES: Buildings, Roads, Streams, Topography, Property Lines: "A Survey of Property of Interstate Uniform Services, Corp." by George B. Rock of Property Design of Montpelier, VT, Oct.1983, Revised Aug. 1984.

Utilities: "Site Plan, Proposed Reconstruction, Construction Hill Road, Williamstown, Vermont" by The Johnson Co. dated 9/25/98; "Pretreatment System, Unifirst Corporation, Williamstown, Vermont" by The Johnson Co. dated 26 SEP 85.



DG



Natural Resources Atlas Vermont Agency of Natural Resources

vermont.gov

VERMONT







ATTACHMENT 5

VERMONT CONSTRUCTION GENERAL PERMIT 3-9020 NOTICE OF INTENT (NOI)

Notice of Intent (NOI)

for Stormwater Discharges Associated with Construction Activity on

Low Risk Sites

Under Vermont Construction General Permit 3-9020

For Department Use Only NOI Number:



Submission of this completed Notice of Intent (NOI) constitutes notice that the entity in Section A intends to be authorized to discharge pollutants to waters of the State, from the project identified in Section C, under Vermont's Construction General Permit (CGP). Submission of the NOI constitutes notice that the party identified in Section A of this form has read, understands, and meets the eligibility conditions of the CGP; has determined that the project qualifies for coverage as a Low Risk project in conformance with Appendix A of the CGP; agrees to comply with all applicable terms and conditions of the CGP; understands that continued authorization under the CGP is contingent on maintaining eligibility for coverage; and that all applicable practices in the Low Risk Site Handbook for Erosion Prevention and Sediment Control must be implemented and maintained for the duration of construction activities. In order to be granted coverage, all information required on this form must be provided and an application fee of **\$50** payable to the State of Vermont must be submitted.

A. Landowner Information	T 0
1a. Name: UniFirst Corporation	1b. Contact (if applicable):
2. Mailing Address a. Street/P.O. Box:	
b. City/Town:	c. State: <u>Massachusetts</u> d. Zip: <u>01887</u>
3. Contact Information a. Phone:	C. Email:
B. Principal Operator Information (if known)	
1. Name: UniFirst Corporation	
2. Mailing Address a. Street/P.O. Box:	
b. City/Town:	c. State: <u>Massachusetts</u> d. Zip: <u>01887</u>
3. Contact Information a. Phone:	c. Email:
C. Application Preparer Information (if applicable)	
1a.Name: The Johnson Company, Inc.	Donald Maynard 1b. Contact (if applicable):
2. Mailing Address: 100 State Street, Suite 600 a. Street/P.O. Box:	
b. City/Town:	c. State: <u>Vermont</u> d. Zip: <u>05602</u>
3. Contact Information a. Phone:	c. Email:
See Filing Directions for Low Risk Projects	

D. Project Information			
1. Project Name: UniFirst Williamstown Plant Site Corrective Action			
2a. Is this project part of a Common Plan of Development ¹ ? ☐ Yes ☑ No 2b. If Yes, Name of Development:			
3a. Does this project have any previously issued or pending stormwater discharge permits? ☐ Yes ☑ No 3b. If Yes, Prior NOI Number(s):			
4. Location Address a. Street:			
c. Latitude: <u>45</u> <u>07</u> <u>32</u> <u>32</u> d. Longitude: <u>72</u> <u>32</u> <u>51</u> <u>8</u> e. County: <u>Orange</u>			
Use DEC's Waterbody Identification (WBID) ArcGIS webpage (click here) to answer questions 5 and 6 below.			
5. Name of receiving water(s) ² : Rouleau Brook 6. Include a topographic location map.			
7. Project Type: Residential Commercial Industrial I Other: Corrective Action - WMD Site #77-0087			
8. Total Area of Disturbance: <u>2.7</u> acres 9. Description of construction activities to be permitted (below):			
Removal of existing foundation and asphalt - on-site burial of foundation concrete - excavation of 1,000 tons PCE contaminated soils and backfill of excavation - final grading and placement of new 0.7 acre Asphalt Cap - mulch and seeding.			
You must provide a copy of this complete NOI form to the municipal clerk for posting in the municipality in which the project is located. If the project and the related discharge(s) are located in different municipalities, then the completed NOI must be filed with the municipal clerk in each municipality. The municipal clerk must post the completed NOI. In order to be considered complete, you must include the date of posting. Date of Posting at Municipal Office(s):			
Information for the Municipal Clerk regarding posting instructions can be found on Page 4 of this NOI.			
I hereby certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations. I also certify that the applicable practices in The Low Risk Site Handbook for Erosion Prevention and Sediment Control will be implemented for the duration of the project for which this NOI is submitted.			
Landowner Name: UniFirst Corporation Title: Tim Cosgrave, Senior Manager of EHS			
Signature: Date:			
Principal Operator: UniFirst Corporation Title: Tim Cosgrave, Senior Manager of EHS			
Signature: Date:			
Application Preparer: The Johnson Company (Chrism, Crandellititle: President			
Signature: Date: Date:			

¹ "Common Plan of Development" is defined within the CGP 3-9020, Appendix C – Definitions, page A-12 ² "Waters of the State" (i.e. receiving water) is defined within the CGP 3-9020, Appendix C – Definitions, page A-16

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For Department Use Only

VERMONT DEPARTMENT OF ENVIRONMENTAL CONSERVATION AUTHORIZATION TO DISCHARGE

A determination has been made that the proposed construction activities qualify for coverage under General Permit 3-9020 (amended 2008) as a Low Risk project. Subject to the conditions of General Permit 3-9020 (amended 2008) the applicant is hereby authorized to discharge stormwater runoff from a construction site as described in this Notice of Intent Number ________-9020.

Dated this ______ day of ______, 20_____

David K. Mears, Commissioner Department of Environmental Conservation

By: _

Padraic Monks, Program Manager Stormwater Program

PUBLIC COMMENT

Public comments concerning this Notice of Intent to discharge under CGP 3-9020 (amended 2008) are invited and must be submitted within 10 days of receipt of this Notice by the Municipal Clerk. Comments should address how the application complies or does not comply with the terms and conditions of CGP 3-9020 (amended 2008). A letter of interest should be filed by those persons who elect not to file comments but who wish to be notified if the comment period is extended or reopened for any reason. All written comments received within the time frame described above will be considered by the Department of Environmental Conservation in its final ruling to grant or deny authorization to discharge under CGP 3-9020 (amended 2008). Send written comments to:

Vermont Department of Environmental Conservation Watershed Management Division, Stormwater Program 103 South Main Street, Building 10 North Waterbury, VT 05671-0408

Please cite the NOI number in any correspondence.

APPEALS

Renewable Energy Projects - Right to Appeal to Public Service Board

If this decision relates to a renewable energy plant for which a certificate of public good is required under 30 V.S.A. §248, any appeal of this decision must be filed with the Vermont Public Service Board pursuant to 10 V.S.A. §8506. This section does not apply to a facility that is subject to 10 V.S.A. §1004 (dams before the Federal Energy Regulatory Commission), 10 V.S.A. §1006 (certification of hydroelectric projects) or 10 V.S.A. Chapter 43 (dams). Any appeal under this section must be filed with the clerk of the Public Service Board within 30 days of the date of this decision. For further information, see the Public Service Board website at http://psb.vermont.gov or call (802) 828-2358. The address for the Public Service Board is 112 State Street Montpelier, Vermont 05620-2701.

All Other Projects – Right to Appeal to Environmental Court

Pursuant to 10 V.S.A. Chapter 220, any appeal of this decision must be filed with the clerk of the Environmental Court within 30 days of the date of the decision. The Notice of Appeal must specify the parties taking the appeal and the statutory provision under which each party claims party status; must designate the act or decision appealed from; must name the Environmental Court; and must be signed by the appellant or their attorney. In addition, the appeal must give the address or location and description of the property, project or facility with which the appeal is concerned and the name of the applicant or any permit involved in the appeal. The appellant must also serve a copy of the Notice of Appeal in accordance with Rule 5(b)(4)(B) of the Vermont Rules for Environmental Court Proceedings. For further information, see the Vermont Rules for Environmental Court Proceedings, available online at www.vermontjudiciary.org or call (802) 828-1660. The address for the Environmental Court is 2418 Airport Road, Suite 1, Barre, Vermont 05641.

A copy of CGP 3-9020 (amended 2008) may be obtained by calling (802) 338-4835; by visiting the Department at the above address between the hours of 7:45 am and 4:30 pm; or by download from the Watershed Management Division's Web site at: www.vtwaterquality.org.

INFORMATION FOR MUNICIPAL CLERK

10 V.S.A. Chapter 47 §1263(b) provides for the public notice of an applicant's intent to discharge stormwater runoff associated with construction activity. Please post this notice and instruction sheet in a conspicuous place for 10 days from the date received. If you have any questions, contact the Watershed Management Division of the Department of Environmental Conservation at (802) 338-4835.

Submit this form and the ^{\$}50 fee to:

Vermont Department of Environmental Conservation Watershed Management Division, Stormwater Program 103 South Main Street, Building 10 North Waterbury, VT 05671-0408

APPENDIX A - RISK EVALUATION

Accurately answering the questions in this appendix will allow you to determine whether a proposed construction project is considered a Low Risk or Moderate Risk project, which defines the application and permit requirements that are applicable to your project.

The risk evaluation procedure consists of two parts. Part I is a Basic Risk Evaluation, which determines if a project is automatically categorized as Low Risk based upon the answers to a few basic questions.

If a project is not automatically categorized as Low Risk based upon the Basic Risk Evaluation, you must complete Part II, Detailed Risk Evaluation, to determine the risk category for your project. This part includes questions on more detailed aspects of the project.

Once the appropriate risk category has been determined, refer to Part III for the application requirements.

You should be aware that each completed Appendix A is incorporated by reference and included in the terms of this general permit, and each permittee shall undertake its construction activities in accordance with the completed Appendix A, as a condition of this permit. Failure to comply with the completed Appendix A shall be deemed a violation of this permit and subject to enforcement action.

APPENDIX A

Part I - Basic Risk Evaluation

A project may automatically be categorized as Low Risk based on a few basic project characteristics. Answer each question below to determine if a project is automatically categorized as Low Risk. For definitions of terms used in the following questions (e.g. disturbance, vegetated buffer) refer to Appendix C.

Ba	Basic Risk Evaluation					
	Criteria		wer	Score Direction	Enter Score	
1.	Will the proposed independent project alone disturb more than 2 acres of land?	YES NO	\checkmark	If YES, enter 1, if NO enter 0	1	
2.	Is the project within a watershed impaired due to stormwater or sediment as specified on Part A of the Vermont 303(d) list?	YES NO	\checkmark	If YES, enter 1, if NO enter 0	0	
3.	Will the project have any stormwater discharges from the construction site to receiving water(s) that <u>do not</u> first pass through a 50 ft vegetated buffer area?	YES NO	\Box	If YES, enter 1, if NO enter 0	0	
4.	Will the project have disturbed earth in any one location for more than 14 consecutive calendar days without temporary or final stabilization?	YES NO	↓	If YES, enter 1, if NO enter 0	0	
5.	Will the project have more than five acres of disturbed earth at any one time?	YES NO	\checkmark	If YES, enter 1, if NO enter 0	0	
	Total Score for Basic Risk Evaluation (ad	ld scor	e fro	m questions 1-5)	1	

If the Total Score for Basic Risk Evaluation is 0, the proposed project is eligible for coverage under this permit as a Low Risk project. Proceed to Part IV of Appendix A for a summary of the application requirements for Low Risk Projects. If not, proceed to Part II.

Criterion 1: Only include the disturbance planned for an independent project. For example, if a lot owner is only building on a single house lot in a residential subdivision, only consider the disturbance associated with that lot, not the entire common plan. Refer to Appendix C for definitions of independent project and disturbance.

Criterion 2: Refer to the following web page for a list of waters in these categories: http://www.vtwaterquality.org/stormwater/htm/sw_cgpeligibility.htm

Criterion 3: Refer to the Appendix C for the definition of vegetated buffer area.

Criterion 4: Refer to Appendix C for definitions of temporary and final stabilization.

Criterion 5: Refer to Appendix C for the definition of disturbed earth.

Part II - Detailed Risk Evaluation

For projects not automatically categorized as Low Risk in Part I, this Detailed Risk Evaluation must be completed to determine if a project is Low Risk, Moderate Risk, or requires an Individual Permit. This evaluation determines the risk category by weighing the balance of factors which contribute to and mitigate against the risk of a discharge of sediment from the construction project. Complete all questions in Part II for the independent project. For definitions of terms used in the evaluation, refer to Appendix C.

Detailed Risk Evaluation – Identify Risk Factors					
	Criteria	Answer	Score Direction	Enter Score	
A.	Will the proposed project have earth disturbance within 100 ft (horizontal) upslope of any lake or pond or 50 feet (horizontal) upslope of any rivers or stream (perennial or seasonal)?	YES □ NO ☑	If YES, enter 1, if NO enter 0	0	
В.	Will the project have stormwater discharges by direct conveyance (tributary, channel, ditch, storm sewer, etc.) to a water of the state listed on the 303 (d) Part A list as being impaired by stormwater or sediment; a Class A Water; or an Outstanding Resource Water?	YES □ NO ☑	If YES, enter 1, if NO enter 0	0	
C.	Will the project have more than five acres of disturbed earth at any one time?	YES □ NO 🗹	If YES, enter 1, if NO enter 0	0	
D.	Will the project have disturbed earth in any one location for more than 14 consecutive calendar days without temporary or final stabilization?	YES □ NO 🖌	If YES, enter 1, if NO enter 0	0	
E.	Will the project include more than one acre of disturbance on soil that is greater than 15% slope?	YES □ NO ☑	If YES, enter 1, if NO enter 0	0	
F.	Will the project include more than one acre of disturbance of soils with a high (K>0.36) erodibility rating?	YES □ NO ☑	If YES, enter 1, if NO enter 0	0	
G.	Total Score for Risk Fact	tors (add .	A through F)	0	

Criterion A: Measure lake distance from mean water level, and stream or river distance from top of bank. Do not include disturbance for the installation of stormwater treatment facilities or road stream crossings if there are no reasonable alternative locations.

Criterion B: Refer to <u>http://www.vtwaterquality.org/stormwater/htm/sw_cgpeligibility.htm</u> for the listing. Criterion C: The maximum allowable for Low Risk Projects is 7 acres. Moderate risk projects over 5 acres may be required to file an Individual Discharge Permit application if determined necessary by the Secretary.

Criterion D: The maximum allowable for Low Risk Projects is 21 days. Moderate risk projects over 21 days may be required to file an Individual Discharge Permit application if determined necessary by the Secretary.

Criterion E: Include disturbance for the duration of the project, not at any one point in time. Slope determinations should be based on a site survey of the future disturbance area.

Criterion F: Include disturbance for the entire individual project, not at any one point in time. The Erosion Factor K, is a measure of the inherent erodibility of a soil type. Refer to NRCS soil maps for your county. If soils data is not available (e.g. if the site is built on assorted fill material), contact ANR for directions on evaluating soil erodibility.

Part II Continued – Detailed Risk Mitigation Factor Evaluation

Detailed Risk Evaluation – Identify Risk Mitigation Factors						
Criteria			Score Direction	Enter Score		
H.	Will stormwater leaving the construction site pass through at least 50 feet of established vegetated buffer before entering a receiving water?	e construction site pass ablished vegetated buffer ceiving water?				
I.	Will the project be limited to two acres or less of disturbed earth at any one time?	YES □ NO ☑	If YES, enter 1, if NO enter 0	0		
J.	Will the project have a maximum of 7 consecutive days of disturbed earth exposure in any location before temporary or final stabilization is implemented?	YES □ NO ☑	If YES, enter 1, if NO enter 0	0		
K.	Will the project disturb less than two acres of soil with an erodibility higher than K=0.17?YES NO		If YES, enter 1, if NO enter 0	0		
L.	Will the project include less than two acres of disturbance on soil that is greater than 5% slope?	YES ☑ NO □	If YES, enter 1, if NO enter 0	1		
M.	I. Total Score for Risk Mitigation Factors (add H through L.)					

Criterion H: Refer to Appendix C for a definition of vegetated buffer.

Criterion I: Refer to Appendix C for a definition of earth disturbance.

Criterion J: Refer to Appendix C for definitions of temporary and final stabilization.

Criterion K: Include disturbance for the duration of the project, not at any one point in time. The Erosion Factor K, is a measure of the inherent erodibility of a soil type. Refer to NRCS soil maps available at USDA-NRCS District Offices. If soils data are not available (e.g. if the site is built on assorted fill material), contact DEC for directions on evaluating soil erodibility.

Criterion L: Include disturbance for the duration of the project, not at any one point in time. Slope determinations should be based on a site survey of the proposed disturbance area.

Total Risk Score					
N.	Moderate Risk Base Score 2				
О.	Enter Score from Line G above (Risk Factor Total)	0			
Р.	Add lines N and O	2			
Q.	Enter Score from Line M above (Risk Mitigation Factor Total)	2			
R.	OVERALL RISK SCORE: Subtract line Q from line P	0			

Part III- Interpreting the Detailed Risk Evaluation

OVERALL SCORE	Risk Category	Directions for Filing for Permits
<1	Low Risk	The proposed project is eligible for the Construction General Permit as a Low Risk project provided that the requirements of Subpart 2 are met. If these requirements cannot be met, contact DEC to determine if the project should seek coverage as a Moderate Risk project or under an Individual Discharge Permit.
		Refer to Part IV of Appendix A for a summary of the application requirements for Low Risk projects.
1-2	Moderate Risk	The proposed project is eligible for the Construction General Permit as a Moderate Risk project provided that the requirements of Subpart 3 are met. If these requirements cannot be met, contact DEC to determine if the project should seek coverage as a Moderate Risk project or under an Individual Discharge Permit. Refer to Part IV of Appendix A for a summary of the application
		requirements for Moderate Risk projects.
>2	Requires Individual Permit	The proposed project is not eligible for coverage under the Construction General Permit, and therefore requires coverage under an Individual Discharge Permit. Please refer to Stormwater Section on the Water Quality Division website for more information: www.vtwaterquality.org/stormwater.htm.

Part IV - Filing Directions

1. Low Risk Projects

Projects that qualify as Low Risk are required to implement the applicable practices detailed in the Low Risk Site Handbook for Erosion Prevention and Sediment Control. To obtain coverage under General Permit 3-9020 as a Low Risk project, applicants must submit the following to DEC:

- 1. A completed Notice of Intent form for General Permit 3-9020;
- 2. A completed Appendix A;
- 3. The required processing fee.

To satisfy the public comment requirement, applicants must file a copy of the completed Notice of Intent form, including a copy of Appendix A, with the municipal clerk in the municipalities where the project will occur prior to submitting this information to ANR. Details of the public notice process are in Part 2 of the general permit.

2. Moderate Risk Projects

Projects that qualify as Moderate Risk are required to implement a site-specific Erosion Prevention and Sediment Control (EPSC) Plan that conforms to *The Vermont Standards and Specifications for Erosion Prevention and Sediment Control.* To obtain coverage under General Permit 3-9020 as a Moderate Risk project, applicants must submit the following to DEC:

- 1. A completed Notice of Intent form for General Permit 3-9020;
- 2. A completed Appendix A;
- 3. A site-specific EPSC Plan;
- 4. A certification by the plan preparer that the EPSC Plan conforms to *The Vermont Standards* and Specifications for Erosion Prevention and Sediment Control;
- 5. The required processing fee.

To satisfy the public comment requirement, applicants must file a copy of the completed Notice of Intent form, including a copy of Appendix A, with the municipal clerk in the municipalities where the project will occur prior to submitting this information to ANR. Details of the public notice process are in Part 3 of the general permit.




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REVISIONS								
	#	Date	Drwn	Chk'd	App'd	Description		
	K: ∖1	-0703-1\/	ACTIVE	\CAD\	Remea	dial Action.dwg		





- 1. PREPARE SOIL BEFORE INSTALLING ROLLED EROSION CONTROL PRODUCTS (RECP'S), INCLUDING ANY NECESSARY APPLICATION OF LIME, FERTILIZER, AND SEED. 2. BEGIN AT THE TOP OF THE CHANNEL BY ANCHORING THE RECP'S IN A 6" DEEP X 6" WIDE TRENCH WITH APPROXIMATELY 12" OF RECP'S EXTENDED BEYOND THE UP-SLOPE PORTION OF THE TRENCH. ANCHOR THE RECP'S WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN THE BOTTOM OF THE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING. APPLY SEED TO COMPACTED SOIL AND FOLD REMAINING 12" PORTION OF RECP'S BACK OVER SEED AND COMPACTED SOIL. SECURE RECP'S OVER COMPACTED SOIL WITH A ROW OF STAPLES/STAKES SPACED APPROXIMATELY 12" ACROSS THE WIDTH OF THE RECP'S.
- 3. ROLL CENTER RECP'S IN DIRECTION OF WATER FLOW IN BOTTOM OF CHANNEL. RECP'S WILL UNROLL WITH APPROPRIATE SIDE AGAINST THE SOIL SURFACE. ALL RECP'S MUST BE SECURELY FASTENED TO SOIL SURFACE BY PLACING STAPLES/STAKES IN APPROPRIATE LOCATIONS AS SHOWN IN THE STAPLE PATTERN GUIDE. WHEN USING THE DOT SYSTEM, STAPLES/STAKES SHOULD BE PLACED THROUGH EACH OF THE COLORED DOTS CORRESPONDING TO THE APPROPRIATE STAPLE PATTERN.
- 4. PLACE CONSECUTIVE RECP'S END OVER END (SHINGLE STYLE) WITH A 4" 6" OVERLAP. USE A DOUBLE ROW OF STAPLES STAGGERED 4" APART AND 4" ON CENTER TO SECURE RECP's.
- 5. FULL LENGTH EDGE OF RECP'S AT TOP OF SIDE SLOPES MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6"DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.
- 6. ADJACENT RECP'S MUST BE OVERLAPPED APPROXIMATELY 2" 5" (DEPENDING ON RECP'S TYPE) AND STAPLED.
- 7. THE TERMINAL END OF THE RECP'S MUST BE ANCHORED WITH A ROW OF STAPLES/STAKES APPROXIMATELY 12" APART IN A 6" DEEP X 6" WIDE TRENCH. BACKFILL AND COMPACT THE TRENCH AFTER STAPLING.

NOTE: * IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP'S.



Date Drwn Chk'd App'd Description

K: 1-0703-1 ACTIVE CAD Remedial Action.dwg

CRITICAL POINTS A. OVERLAPS AND SEAMS B. PROJECTED WATER LINE CHANNEL BOTTOM/SIDE SLOPE VERTICES

NOTE: * HORIZONTAL STAPLE SPACING SHOULD BE ALTERED IF NECESSARY TO ALLOW STAPLES TO SECURE THE CRITICAL POINTS ALONG THE CHANNEL SURFACE. ** IN LOOSE SOIL CONDITIONS, THE USE OF STAPLE OR STAKE LENGTHS GREATER THAN 6" (15 cm) MAY BE NECESSARY TO PROPERLY ANCHOR THE RECP's.

ROLLED EROSION CONTROL PRODUCT INSTALLATION - SWALE 6) NOT TO SCALE



1. TWELVE (12) FOOT MINIMUM WIDTH, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE

3. ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED

4. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING

OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY, ALL SEDIMENT SPILLED, DROPPED, WASHED OR

5. PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED ACCORDING TO PERMIT

BENEATH THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE

INGRESS OR EGRESS OCCURS. TWENTY-FOUR (24) FOOT IF SINGLE ENTRANCE TO SITE.

2. GEOTEXTILE MUST BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.

TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.



<u>NOTES</u>

PERMITTED.

REQUIREMENTS.

STABILIZED CONSTRUCTION ENTRANCE ΄7 \) SCALE







UNIFIRST CORPORATION 68 JONSPIN ROAD WILMINGTON, MA 01887

Johnson Company INVIRONMENTAL SCIENCE AND ENGINEERING SOLUTIONS

Job#: 1-0703-01

Soil Map—Orange County, Vermont (UniFirst - Williamstown, Vermont)



Natural Resources Conservation Service

Web Soil Survey National Cooperative Soil Survey

	MAP L	EGEND)	MAP INFORMATION		
Area of Ir	iterest (AOI)	۵	Very Stony Spot	Map Scale: 1:1,880 if printed on A size (8.5" × 11") shee		
	Area of Interest (AOI)	¥	Wet Spot	The soil surveys that comprise your AOI were mapped at 1:20,0		
Soils	Soil Map Units	•	Other	Warning: Soil Map may not be valid at this scale.		
Special	Point Features	Special	Line Features	Enlargement of maps beyond the scale of mapping can cause		
ω	Blowout	\sim	Gully	misunderstanding of the detail of mapping and accuracy of soil		
\boxtimes	Borrow Pit	1.1.1	Short Steep Slope	soils that could have been shown at a more detailed scale.		
*	Clay Spot	~-	Other	Diagon roly on the her coole on each man cheet for accurate m		
٠	Closed Depression	Political F	Cities	measurements.		
×	Gravel Pit	Vater Fea	atures	Source of Map: Natural Resources Conservation Service		
	Gravelly Spot	~	Streams and Canals	Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov		
Ø	Landfill	Transport	ation	This product is generated from the LISDA NDCC sortified data a		
٨	Lava Flow	+++	Rails	the version date(s) listed below.		
علد	Marsh or swamp	~	Interstate Highways	Soil Survey Area: Orange County, Vermont		
*	Mine or Quarry	\sim	US Routes	Survey Area Data: Version 15, Jan 19, 2010		
0	Miscellaneous Water	$\sim\sim$	Major Roads	Date(s) aerial images were photographed: 8/23/2003		
	Perennial Water	\sim	Local Roads	The orthophoto or other base map on which the soil lines were		
~	Rock Outcrop			imagery displayed on these maps. As a result, some minor shi		
+	Saline Spot			of map unit boundaries may be evident.		
	Sandy Spot					
-	Severely Eroded Spot					
0	Sinkhole					
Ъ	Slide or Slip					
ø	Sodic Spot					
3	Spoil Area					



Map Unit Legend

Orange County, Vermont (VT017)								
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI					
CsD	Colrain very stony fine sandy loam, 8 to 25 percent slopes	2.8	14.8%					
NnB	Ninigret fine sandy loam, 0 to 8 percent slopes	3.0	15.9%					
Pc	Peacham soils	0.2	1.2%					
ТьС	Tunbridge-Woodstock rocky fine sandy loams, 8 to 15 percent slopes	12.6	68.0%					
Totals for Area of Interest		18.6	100.0%					

Orange County, Vermont

NnB—Ninigret fine sandy loam, 0 to 8 percent slopes

Map Unit Setting

Landscape: River valleys Elevation: 90 to 1,000 feet Mean annual precipitation: 30 to 50 inches Mean annual air temperature: 45 to 52 degrees F Frost-free period: 120 to 180 days

Map Unit Composition

Ninigret and similar soils: 85 percent Minor components: 15 percent

Description of Ninigret

Setting

Landform: Depressions on terraces Landform position (three-dimensional): Tread Down-slope shape: Concave Across-slope shape: Concave Parent material: Coarse-loamy glaciofluvial deposits over sandy and gravelly glaciofluvial deposits

Properties and qualities

Slope: 0 to 8 percent Depth to restrictive feature: More than 80 inches Drainage class: Moderately well drained Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr) Depth to water table: About 18 to 30 inches Frequency of flooding: None Frequency of ponding: None Available water capacity: Moderate (about 7.2 inches)

Interpretive groups

Farmland classification: All areas are prime farmland *Land capability (nonirrigated):* 2e *Hydrologic Soil Group:* B

Typical profile

0 to 7 inches: Fine sandy loam 7 to 29 inches: Fine sandy loam 29 to 60 inches: Gravelly fine sand

Minor Components

Agawam

Percent of map unit: 4 percent

Merrimac

Percent of map unit: 4 percent Landform: Terraces

<u>USDA</u>

Windsor

Percent of map unit: 4 percent *Landform:* Terraces

Walpole

Percent of map unit: 3 percent Landform: Depressions

Data Source Information

Soil Survey Area: Orange County, Vermont Survey Area Data: Version 15, Jan 19, 2010



Orange County, Vermont

TbC—Tunbridge-Woodstock rocky fine sandy loams, 8 to 15 percent slopes

Map Unit Setting

Landscape: Uplands Elevation: 300 to 2,000 feet Mean annual precipitation: 36 to 50 inches Mean annual air temperature: 37 to 46 degrees F Frost-free period: 90 to 135 days

Map Unit Composition

Tunbridge and similar soils: 45 percent *Woodstock and similar soils:* 35 percent *Minor components:* 20 percent

Description of Tunbridge

Setting

Landform: Hills, ridges Landform position (two-dimensional): Summit, backslope Landform position (three-dimensional): Interfluve, side slope Down-slope shape: Convex Across-slope shape: Convex Parent material: Coarse-loamy till

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Low (about 4.0 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance *Land capability (nonirrigated):* 3e *Hydrologic Soil Group:* C

Typical profile

0 to 7 inches: Fine sandy loam 7 to 29 inches: Fine sandy loam 29 to 33 inches: Unweathered bedrock

Description of Woodstock

Setting

Landform: Hills, ridges Landform position (two-dimensional): Backslope, summit Landform position (three-dimensional): Side slope, interfluve

USDA

Down-slope shape: Convex Across-slope shape: Convex Parent material: Coarse-loamy till

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Capacity of the most limiting layer to transmit water (Ksat): Low to high (0.01 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Very low (about 2.5 inches)

Interpretive groups

Farmland classification: Farmland of statewide importance *Land capability (nonirrigated):* 4e *Hydrologic Soil Group:* D

Typical profile

0 to 6 inches: Fine sandy loam 6 to 18 inches: Fine sandy loam 18 to 22 inches: Unweathered bedrock

Minor Components

Glover

Percent of map unit: 4 percent

Vershire

Percent of map unit: 4 percent

Buckland

Percent of map unit: 3 percent

Cabot

Percent of map unit: 3 percent Landform: Depressions

Colrain

Percent of map unit: 3 percent

Pomfret

Percent of map unit: 3 percent

Data Source Information

Soil Survey Area: Orange County, Vermont Survey Area Data: Version 15, Jan 19, 2010

Report—Physical Soil Properties

	Physical Soil Properties– Orange County, Vermont														
Map symbol and soil name	Depth	Depth	Sand	Silt	Clay	Moist bulk	Saturated hydraulic	Available water	Linear extensibility	Organic matter	E	Erosic factor	on 's	Wind erodibility	Wind erodibility
					density	conductivity	сарасну			Kw	Kf	т	group	index	
	In	Pct	Pct	Pct	g/cc	micro m/sec	In/In	Pct	Pct						
NnB—Ninigret fine sandy loam, 0 to 8 percent slopes															
Ninigret	0-7	40-65- 75	15-27- 50	3- 8- 12	1.00-1.25	4.23-42.33	0.15-0.24	0.0-2.9	2.0-5.0	.32	.32	3	3	86	
	7-29	40-65- 75	15-27- 50	3- 8- 12	1.35-1.60	4.23-42.33	0.14-0.22	0.0-2.9	0.5-3.0	.37	.37				
	29-60	75-98-10 0	0- 1- 20	0- 1- 2	1.45-1.70	42.33-141.11	0.01-0.10	0.0-2.9	0.0-1.0	.15	.17				
TbC— Tunbridge- Woodstock rocky fine sandy loams, 8 to 15 percent slopes															
Tunbridge	0-7	40-68- 75	15-25- 50	5- 7- 9	0.80-1.20	4.23-42.33	0.14-0.23	0.0-2.9	2.0-8.0	.24	.24	2	3	86	
	7-29	40-64- 75	15-31- 50	3- 5- 7	1.20-1.50	4.23-42.33	0.09-0.15	0.0-2.9	0.5-4.5	.20	.24				
	29-33	_	_	_	_	0.07-141.11	_	_	_						
Woodstock	0-6	40-66- 75	15-28- 50	3- 7- 10	0.60-0.80	14.11-42.33	0.14-0.20	0.0-2.9	5.0-9.0	.24	.24	1	3	86	
	6-18	40-62-75	15-35- 50	1- 3- 5	1.30-1.70	42.33-141.11	0.09-0.14	0.0-2.9	0.5-2.0	.20	.24				
	18-22	_	—	—	-	0.07-141.11	-	-	—						

ATTACHMENT 6

JURSIDICTIONAL OPINION #5-25 ISSUED JANUARY 24, 2013 BY THE VERMONT DISTRICT 5 ENVIRONMENTAL COMMISSION



January 24, 2013

Sonja A. Schuyler, Senior Scientist The Johnson Company 100 State Street, Suite 600 Montpelier, VT 05602

Re: Jurisdictional Opinion #5-25 UniFirst Property (Williamstown, VT), Proposed Recreation Area – Act 250 Jurisdiction

Dear Sonja:

Pursuant to Act 250 Rule 3 – Jurisdictional Opinion – you have requested a jurisdictional opinion to determine whether Act 250 jurisdiction applies to the UniFirst property in Williamstown, Vermont. The development of a recreation area – parking lot; tennis and basketball courts – is proposed on this tract of land upon completion of a corrective action plan (CAP) under terms of consent decree(s) with the Agency of Natural Resources (ANR). The CAP ensued following tetrachloroethylene contamination on the site as a result of dry cleaning and washing operations commencing in the 1970's. Upon further reading, conclusions are reached that the change of use – proposed modifications – are, in fact, "material changes," and that an amendment application must be filed for review by the District #5 Commission.

Procedural History

- 1. On April 26, 1972, Land Use Permit #5R0072 was issued to the Town of Williamstown School Board for the construction of an elementary school facility at the intersection of Brush Hill and Construction Hill Roads.
- On October 6, 1972, Land Use Permit #5R0153 was issued to Interstate Industrial Uniform Rental Services, Inc. – now UniFirst Corporation (UniFirst) – for the construction of a dry cleaning and washing facility on a site located off Herbert Road, uphill and across from Construction Hill Road from the elementary school site.
- 3. In the early 1980's, it was determined that the actions at the UniFirst site had resulted in the contamination of ground and surface waters with the chemical tetrachloroethylene a known carcinogen. Specifically in 1983, it became apparent that several private residences in the vicinity of the UniFirst facility had contamination present in their bedrock drinking water supply wells. Residential drinking water supplies that were affected were replaced



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Jurisdictional Opinion #5-25 Page 2 of 6

with hookups to the municipal water supply system. Investigations by the State of Vermont as to the source of the contamination continued through 1984.

- 4. The UniFirst facility was determined to be the cause of the contamination and it ceased dry cleaning operations in 1984.
- Several processes were commenced by the State of Vermont for the review of the contamination at the UniFirst site and related off-site locations. In addition to steps taken by the Agency of Natural Resources and the Department of Health toward a remediation effort, the Environmental Board (EB) and District #5 Environmental Commission (Commission) conducted proceedings.
- 6. As a result, in 1984, the Board issued Declaratory Ruling #147 directing UniFirst to file an amendment application for the review of an appropriate permit expiration date for the original project and for the as-built approval of a 40' x 50' building addition which was constructed in 1983. This decision resulted in proceedings before the Commission.
- 7. In 1985, UniFirst filed a petition for a second Declaratory Ruling (DR) requesting a determination from the Board as to whether it was appropriate for the Commission to review issues pertaining to investigatory and remedial work associated with the contamination of ground and surface waters. The Board dismissed the petition for DR #166 on procedural grounds.
- 8. In 1986, UniFirst entered into a consent decree in Orange Superior Court with the State of Vermont and Town of Williamstown that required clean up, long term monitoring, and the establishment of a trust fund to implement the aforementioned activities. The original consent decree had 10-year duration.
- 9. During the 1980's, a groundwater collection and treatment system was constructed by UniFirst. The system was designed as a series of curtain drains and piping designed to collect the contaminated water. Then water is pumped from a pump station on the school property to another station along Construction Hill Road and then up the hill to the UniFirst site where the contaminated water is to be treated in an active carbon absorption system. Treated water was then proposed to be discharged into the Town of Williamstown sewerage system.
- 10. In 1990, UniFirst constructed a third groundwater collection drain, known as the "Duff Drain," which is located at the foot of the hill between two residences and the UniFirst property to the East. The flow from this third drain is also directed into the pump station which, under the existing system, pumps to the groundwater treatment system.



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- 11. In 1996, the original Williamstown Elementary School drain became fouled by root growth. This drain line was rebuilt in its entirety and enlarged from a 4" diameter pipe to an 8" diameter pipe. The improvements to the efficiency of this drain system further increased the amount of water that is being collected, treated and discharged in the Williamstown municipal sewage treatment plant.
- 12. On March 24, 1997, the Orange Superior Court entered a second consent decree with 30year duration. Among other things, this consent decree directed UniFirst to seek a surface water discharge and any necessary permits for the discharge of the treated groundwater.
- 13. On June 3, 1997, the District #5 Coordinator issued Jurisdictional Opinion #5-97-9 which concluded that certain changes to the UniFirst groundwater collection and treatment system which was proposed as an attempt to comply with the consent decree(s) in Williamstown constituted a substantial and material change to LUP's #5R0153 and #5R0072 pursuant to Rule 34 (Environmental Board Rules (EBR)).
- 14. In 1997, UniFirst and the Williamstown School District were co-applicants on two projects: Land Use Permits #5R0072-1 and #5R0072-2:
 - <u>Re: UniFirst Corporation and Williamstown School District</u> LUP #5R0072-1 authorizing the installation of a culvert extension at each end of an existing culvert located under the Williamstown Elementary School (7/24/97)(also known as the "culvert" permit);
 - <u>Re: UniFirst Corporation and Williamstown School District</u> LUP #5R0072-2 authorizing the construction and operation of a modified collection system for groundwater contaminated with tetrachloroethylene (11/13/97) (also known as the "treatment" permit).
- 15. In 1997, the treatment permit LUP #5R0072-2 was appealed in 1997 by Joyce Day and Alvin Day. The Board conducted hearings in 1998, including a joint hearing with the Vermont Water Resources Board. On May 23, 2000, the parties – appellants and UniFirst – reached a settlement and the appeal was withdrawn. On June 1, 2000, the Board issued an amended permit - #5R0072-EB. Notwithstanding, UniFirst and the Agency of Natural Resources (ANR) filed a Joint Motion to Alter the amended permit. On July 20, 2000, the Board issued Amended Land Use Permit #5R0072-2-EB (Altered).
- 16. Currently, groundwater collected by the subsurface interception drains is routed by gravity to an activated carbon treatment facility located south of the Williamstown Elementary



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Jurisdictional Opinion #5-25 Page 4 of 6

School and the treated water is discharged to an unnamed tributary to Rouleau Brook under a State of Vermont surface water discharge permit.

- 17. All clean-up work performed prior to and under the Consent Decree has been under the supervision of the Site Management Section of the Department of Environmental Conservation (VT SMS).
- 18. In 2011, the building at the UniFirst site was demolished making it possible to remove previously-inaccessible contaminated soil. Pursuant to 10 V.S.A. §6615 and §6615b, the clean-up work will be performed under a VT SMS-approved Corrective Action Plan (CAP), which includes the following actions:
 - a. Demolish the existing concrete slab and bury the resulting debris on-site;
 - b. Excavate contaminated soils that currently reside under the slab and transport to an appropriate off-site licensed disposal facility;
 - c. Cap the residual contamination with asphalt pavement to prevent infiltration including appropriate management of stormwater runoff);
 - d. Configure the asphalt cap to accommodate a parking area consisting of approximately 50 spaces, a basketball court, and a tennis court;
 - e. Close existing unused monitoring wells; and
 - f. Establish institutional controls to prevent unacceptable future site uses e.g., occupied buildings, structures with basements, use of groundwater, etc. and to require VT DEC-approved work plans prior to any utility or construction-related activity e.g., excavation or intrusive work on the UniFirst site.
- 19. Upon completion of the final clean-up activities, UniFirst proposes to transfer the property to the Williamstown School District for reuse as a recreation area for the Middle/High School. Facilities include tennis and basketball courts and a parking area.
- 20. On November 13, 2012, the Williamstown School District voted 3 in favor and 2 against the following motion:
 - i. Motion That the Williamstown School District agree in principle to purchase the property currently known as the UniFirst Property provided the following requirements are met: all remedial work has been completed and a final report acceptable to the Williamstown School District Board of Directors has been produced showing the property is safe for the following uses: any and all surface uses to include parking lot; basketball and tennis courts; grass field activities such as athletics of any type, picnic type meals and simple traversing; non-food producing agricultural activities; and all agreed upon land improvements have been completed. Further a final agreement of purchase must include process and means to insure and hold the School



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District harmless for any and all claims, lawsuits or judgments of any kind relating to any condition that existed on the UniFirst Property prior to purchase.

Jurisdictional Analysis

As a general rule, the Vermont Supreme Court has held that once Act 250 jurisdiction is triggered and a permit obtained, subsequent events will not lift such jurisdiction, nor can jurisdiction be waived. *In Re John Rusin*, 162 Vt.185, 189 (1994), affirming, *Re: John Rusin*, #8B0393-EB, FCO at 5 (6/10/93) [EB#560]. Similarly, once jurisdiction is established, 10 V.S.A. §6081(a) mandates a land-use permit before commencement of any construction on a development. *Rusin* at 189.

In the present case, there are two related Land Use Permits – #5R0072 and #5R0153 – where jurisdiction attached in 1972. In the intervening years, and described above in the procedural history, amendments for these permits were obtained by UniFirst and the Town of Williamstown School District – as co-applicants – for the "culvert" and "treatment" permits.

In 1972, UniFirst received a Land Use permit for the construction of a dry cleaning and washing facility at the aforementioned location. The current proposal – completion of a CAP and development of a recreation area – is clearly an alteration – both physical and a change in use – that has and will take place. Progress has been made towards remediation, and the proposed recreation area is to be the final construction phase of the current project.

Pursuant to Act 250 Rule 2(C)(6) a "material change" means any change to a permitted development or subdivision which has a significant impact on any finding, conclusion, term or condition of the project's permit or which may result in a significant adverse impact with respect to any of the criteria specified in 10 V.S.A. § 6086(a)(1) through (a)(10).

The project will be evaluated to determine if it has a significant impact on any finding, conclusion, term or condition of the project's permit or *may result in significant impact with respect to any of the criteria specified in* 10 V.S.A. Section 6086(a)(1) through (a)(10).

Pursuant to 10 V.S.A. §6001(D)(vi)(dd) "development" does not include a corrective action authorized in a corrective action plan approved by ANR under §6615b of this title.

The clean-up work, will be performed under 10 V.S.A. §6615 and §6615b – a Vermont SMSapproved corrective action plan (CAP) – which means that the work performed under this CAP is not regulated by Act 250 because it does not constitute development under the statute.



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Jurisdictional Opinion #5-25 Page 6 of 6

All of the criteria specified in 10 V.S.A. Section 6086 (a)(1) through (a)(10) have been reviewed relative to the potential for impact or significant impact from the current project. Several criteria were identified as having potential for significant impact, i.e. the project may have result in significant impacts under Criteria 1, 1(B), 1E 4, 8, and 9(K). Accordingly, the current project is a material change and requires an Act 250 permit amendment.

Based on the analysis of the facts and procedural history, the current project constitutes a material change. An Act 250 permit is required because the proposed project is a material change to the permitted facility and subsequent amendments. It is a material change because the development has potential adverse impacts on water, waste disposal, streams, soils, aesthetics and public investments.

CONCLUSION

Pursuant to 10 V.S.A. §6081 and Rule 2(C)(6), an Act 250 permit is required for the proposed development of a recreation area – tennis and basketball courts; parking area – on the tract of land owned and controlled by UniFirst in Williamstown, Vermont.

Sincerely,

Clancy DeSmet District 5 Coordinator

This is a jurisdictional opinion issued pursuant to 10 V.S.A. § 6007(c) and Act 250 Rule 3(A). **Reconsideration requests** are governed by Act 250 Rule 3(B) and should be directed to the district coordinator at the above address within 30 days of the date of this opinion.

Any **appeal** of this decision must be filed with the Superior Court, Environmental Division within 30 days of the date the decision was issued, pursuant to 10 V.S.A. Chapter 220. The Notice of Appeal must comply with the Vermont Rules for Environmental Court Proceedings (VRECP). The appellant must file with the Notice of Appeal the entry fee required by 32 V.S.A. § 1431 and the 5% surcharge required by 32 V.S.A. § 1434a(a), which is \$262.50 as of January 2011.

The appellant must also serve a copy of the Notice of Appeal on the Natural Resources Board, National Life Records Center Building, Montpelier, VT 05620-3201, and on other parties in accordance with VRECP 5(b)(4)(B).

For additional information on filing appeals, see the Court's website at: <u>http://www.vermontjudiciary.org/GTC/environmental/default.aspx</u> or call (802) 828-1660. Superior Court, Environmental Division, 2418 Airport Road, Suite 1, Barre, VT 05641-8701.



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ATTACHMENT 7

SITE HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

FOR

UNIFIRST PLANT SITE, WILLIAMSTOWN, VERMONT

Prepared by:

THE JOHNSON COMPANY, INC. ENVIRONMENTAL SCIENCES AND ENGINEERING 100 State Street, Suite 600 Montpelier, Vermont 05602 (802) 229-4600

HEALTH AND SAFETY PLAN ACKNOWLEDGMENT FORM

I have read, understand, and will abide by the procedures set forth in this Health and Safety Plan, and any Amendments included in Appendix 1. I have also been briefed on the contents of this Plan and its Amendments, if any, and have been given sufficient opportunity to ask any questions that have arisen, <u>and</u> have received answers to my questions which I believe are appropriate and complete, which are contained in this Health and Safety Plan, or which are addressed and incorporated in Appendix 1 to this Health and Safety Plan as Amendment(s).

Printed Name	<u>Signature</u>	<u>Representing</u>	Date/Time

By acknowledging the contents of this plan, individuals are recognizing the hazards present on the site and are indicating that they are willing to accept the jurisdiction of the appropriate site officials as well as the policies and procedures required to minimize exposure to potentially hazardous substances.

Health and Safety Plan

for

The UniFirst Plant Site

Williamstown, Vermont

Date: Adopted by: Donald Maynard, Project Manager

Adopted by:_____ Tom Osborne, Site Safery Officer

Adopted by:__ Joel Behrsing/Corporate Health & Safety Officer

Date:

Date: 2010

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1.0 HEALTH AND SAFETY PLAN INFORMATION 1.1 EMERGENCY CONTACT INFORMATION

This information appears in this Health and Safety Plan in Sections 1.1 and 8.0 for ease of location in times of need.

Ambulance:	Barre Rescue	(802) 476-4111
Fire:	Barre Fire Department	(802) 476-4111
Police:	State Police	(802) 229-9191
	Barre Police Department	911
Hospital:	Central Vermont [*]	(802) 229-9121
Poison Control Center	: Burlington	(802) 658-3456
The Johnson Company	v, Inc.:	
Don Maynard	Project Manager	(802) 229-4600
Joel Behrsing	Project Manager	(802) 229-4600
Williamstown:		
Garrett Earls	Town Manager	(802) 433-6671
State of Vermont:		
Gerold Noyes	Vermont Sites Management S	ection (802) 241-3877
UniFirst:		
Jason Denbin	Burlington Manager	(802) 655-4054
Green Mountain Powe	r Corp Safety Manager	(802) 223-5235

^{*}The Central Vermont Hospital is at the corner of Fisher Road and Route 62 in Berlin, Vermont. Please see Figure 1 on the following page.

Directions to the Central Vermont Hospital: Take Route 64 from Williamstown to Interstate 89 (I-89) northbound. Proceed to Exit 7. The Hospital is on Fisher Road, at the third set of lights once off the exit, turn left. Hospital is on the right. The emergency entrance to the Hospital is the first right turn.



A summary of pertinent information on contaminants expected to be on this site is presented in Table 1 below.

TABLE 1 CONTAMINANT INFORMATION									
Chemical NameSynonymsActionIDLHTLVOdorLevel(PPM)(PPM)(PPM)Threshole (PPM)									
Perchloroethylene	Tetrachloroethene; Tetrachloroethylene; Perc; PCE	10 PPM	500	25 (PEL)	47				
Gasoline	Petrol	100 PPM		300	0.3				

Explanation of abbreviations

IDLH - Immediately Dangerous to Life or Health

TLV - Threshold Limit Value -The discovery of a PID reading indicating the potential presence of volatile organic(s) at or above this TLV shall result in a cessation of any confined space entry(s), evacuation of the immediate area and a full review of site conditions before work may resume.

PEL - VOSHA Permissible Exposure Limit - The discovery of a PID reading indicating the potential presence of volatile organic(s) at or above this PEL shall result in a cessation of any confined space entry(s), evacuation of the immediate area and a full review of site conditions before work may resume.

ACTION LEVEL - The discovery of a PID reading indicating the potential presence of volatile organic(s) at or above this Action Level shall result in Level C respiratory protection.

1.2 PURPOSE

This Health and Safety Plan (HSP) is written specifically for work at and in the vicinity of UniFirst Corporation's former plant located in Williamstown, Vermont. The intent of this HSP is to provide both general safety guidelines and task related procedures that insure the safety of all personnel while working on the site.

This document is not meant to be the definitive authority on all health and safety issues that may be encountered on the site; however this HSP provides a procedure for modification as outlined in Section 5 to allow for incorporation of the appropriate health and safety considerations in any eventuality. This HSP embodies the spirit and intent of health and safety precautions. Each person engaged in activity on this site is responsible for using an approach to any and all situations that is thoughtful, informed and based in common sense. Section 4.0, Workplan, of this document details General Health and Safety Guidelines that are to be followed by all personnel, at all times.

2.0 SITE INFORMATION

2.1 SITE LOCATION

The UniFirst Plant site is located on Hebert Road (formerly Brush Hill Road) in Williamstown, Vermont. Pump stations related to the system are located adjacent to Construction Hill Road and on the Williamstown Elementary School property.

2.2 SITE HISTORY

An unknown quantity of spent solvent that had been used in the dry cleaning process was inadvertently released to the environment through the un-grouted joints and lift holes of a manhole in the wastewater discharge system. The grit and lint left over from the solvent reclamation distillation process (still bottoms) were also buried in shallow, hand-dug holes on the site.

Investigations of the site were begun in the early 1980s and ultimately led to the construction of one sub-surface drain in 1984 and removal of contaminated soils from the plant site; construction of two additional drains and the institution of a treatment system for collected groundwater in 1985; the connection of the original (1984) drain to the treatment system in 1987; and finally, the completion of the collection system with the construction of the final length of drain in late 1990. The subsurface drain built in 1984 was rebuilt in 1996.

2.3 CONTAMINANTS

The principle contaminant in the groundwater being collected and treated is tetrachloroethene (tetrachloroethylene; perchloroethylene; PCE; or Perc, pronounced "perk"). PCE is known to be present in indoor air, soil vapor, soils and groundwater. Peak concentrations historically reported circa 1983-1985, included 88,000 parts per billion (ppb) in bedrock groundwater and 34,000 parts per million (ppm) in soils. The most recent air quality data from inside the UniFirst plant building (from 2009) indicated PCE concentrations up to 25 parts per billion by volume. There is likely also residual petroleum contamination present in the groundwater on the site. Although petroleum related contaminants have not been detected in the groundwater now being collected and treated, the possibility exists that, at some point in time, petroleum related contaminants may be present.

Although PCE is the indicator compound and also the contaminant of concern on this site, the potential for exposure to benzene and other constituents of petroleum hydrocarbons also exists due to the potential presence of petroleum contaminants in groundwater or soils on the site.

2.4 CONTAMINANTS BY MEDIA

2.4.1 <u>Soil</u>

Soil within the plant site area has the potential to contain PCE and petroleum related compounds.

2.4.2 <u>Groundwater</u>

The groundwater on the site is contaminated with PCE and petroleum products. All activities conducted on-site should be undertaken in a manner consistent with the presumption that the groundwater on-site is contaminated with both PCE and petroleum related compounds.

2.4.3 <u>Surface Water</u>

The primary surface water body on the site is an unnamed stream which is referred to by the project as "Duff Brook". This stream originates up-gradient of the eastern edge of the site, runs through a culvert under Construction Hill Road, past the Elementary School, and into the unnamed brook at the base of the hill which flows into the Stevens Branch on the eastern side of U.S. Route 14. The Duff Brook has historically contained detectable levels of PCE at concentrations of less than 5 ppb.

2.4.4 <u>Air</u>

The air inside the UniFirst plant building contains low concentrations of PCE. The quantities detected in routine ambient air monitoring are all below the indoor air quality standards set by OSHA. Concentrations of contaminants in the breathing zone of <u>unconfined</u> spaces are not anticipated to be elevated by the activities described in this document.

3.0 CONTAMINANTS ANTICIPATED TO BE ENCOUNTERED IN THIS SCOPE

The concentration of contaminants that are likely to be encountered in the breathing zone of any areas entered as a result of conducting the work scope described in this HSP is less than 5 PPM, total volatile organic compounds (TVOC).

A variety of hazardous materials may be present in the collected groundwater and in the atmosphere(s) of the confined space(s). The predominant contaminant is tetrachloroethylene. Other contaminants that may be encountered in the course of conducting the work described in this scope include the constituents of gasoline such as benzene, ethylbenzene, toluene and xylenes, and potentially some of the breakdown products of PCE.

4.0 WORKPLAN

4.1 SCOPE OF WORK CONTEMPLATED IN THIS HSP

The UniFirst Groundwater Infiltration Collection and Treatment System (GICATS) consists of a series of four laterally extended wells (drains) that collect groundwater contaminated with the dry cleaning solvent PCE and potentially with petroleum hydrocarbons.

One objective of the work described in this HSP is to effect monitoring, maintenance, service, diagnosis and repair, or replacement, of various components of the GICATS. Other objectives include further investigation and remedial tasks, including soil boring, well installation, sampling and abandonment, and excavation.

The pump stations are concrete vaults located below grade, have limited natural ventilation, a confined and restricted working area, and a limited means of access and egress as entrance is gained through a manhole in the "roof" of each tank. These tanks, or pump stations, meet the definition of a permit required confined space, and as such, entry into these pump stations is regulated by OSHA 29 CFR Part 1910.146.

4.2 GENERAL FIELD STANDARD OPERATING PROCEDURES

- 1. The "buddy system" will be used at all times by field personnel in the Exclusion Zone.
- 2. Visual, voice or radio communications will be maintained at all times.
- 3. Contact with contaminated surfaces or surface suspected of being contaminated, should be avoided. Workers should avoid if possible walking through discolored surfaces; kneeling on the ground; leaning, sitting or placing equipment on drums or containers.
- 4. Eating, drinking, or smoking is prohibited in the Exclusion Zone areas on the site.
- 5. Hands and face must be thoroughly washed upon leaving the decontamination area. Further, all personnel will shower as soon as possible upon exiting the site.
- 6. All personnel will complete a respiratory fit test as a mandatory prerequisite to admission into the Exclusion Zone.
- 7. All equipment must be decontaminated or discarded upon exiting the Exclusion Zone. All personnel must also be decontaminated upon exiting the Exclusion Zone.
- 8. Personal protective equipment will be required for all field personnel and may include, but is not limited to: respiratory protection, hard hat, chemical resistant coveralls, boots, gloves, safety glasses, and ear protection.
- 9. Anyone reporting to work under the influence of alcohol and/or illicit drugs will be subject to disciplinary action. Any employee taking prescription medication or under a physicians care must notify the Site Safety Officer prior to reporting to work.
- 10. All employees will listen for and yield the right-of-way to construction equipment and moving vehicles.
- 11. All equipment operators will provide warning prior to movement and watch for personnel in their path.

- 12. Employees are responsible to clean and maintain the protective equipment issued to them. Any and all defects or failures of the equipment shall be reported immediately to the Site Safety Officer.
- 13. All personnel must report all injuries and/or illnesses to the Site Safety Officer regardless of the severity of injuries.
- 14. Personnel will avoid any potentially dangerous environments or situations such as entering a confined space with out proper supervision, training and equipment.
- 15. A Dig Safe authorization number must be obtained at least 48 hours prior to drilling or digging, except for the excavation by hand of minor test pits, borings or trenches, none of which may exceed a depth greater than one foot.
- 16. All personnel are required to contact their project manager when conducting a field investigation or site assessment. They must at a minimum, call before entering and upon leaving the site.
- 17. Personnel encountering a potentially hazardous environment (e.g. noticing strong vapor levels of unidentified substances) shall instruct all other on-site personnel to leave the site and must call the on-site project manager and site safety officer for instruction. Personnel will not re-enter the site without proper protective clothing, and will not work at the site until the unknown substance is identified.
- 18. A hard hat must be worn at all times on this site, when an overhead hazard exists or when performing a Confined Space Entry (CSE).
- 19. A shirt and long pants must be worn at <u>all</u> times.
- 20. Safety glasses will be worn at all times as per JCO policy.
- 21. A face shield must be worn when handling chemicals that may damage the eyes.
- 22. Whenever decontamination procedures for outer garments are in effect, the entire body should be thoroughly washed as soon as possible after the protective garment is removed.
- 23. Skin abrasions must be thoroughly protected to prevent chemicals from penetrating the abrasion.
- 24. Personnel who have prior existing open wounds and/or infections may not enter any portions of the site where the potential for contamination through absorption would require protection clothing.

4.3 **PROCEDURES**

4.3.1 <u>Health and Safety Briefing</u>

This document will be reviewed with all personnel involved in the performance of the work. Questions will be solicited, and appropriate and acceptable answers will be found within, or incorporated into, this HSP. The locations for assembly and evacuation routes will be identified in the field. These procedures will be specifically reviewed as part of this process. Each person involved in the work will sign the HSP, and initial each amendment made thereto.

4.3.2 <u>Traffic Safety and Establishment of Restricted Zones</u>

Traffic safety measures will be implemented, including the placement of traffic cones and vehicles with operating emergency flashers in appropriate positions on the approach to the work area from each direction. Zones with restricted access will be established as determined necessary by the SSO and the Project Manager.

Generally, the project area will be broken into three separate zones: The Support Zone will be an area to which only designated personnel necessary for the project will be allowed to enter. The Decontamination Zone (DZ) will be immediately associated with the third area of restricted access: the Exclusion Zone (EZ). The DZ will have the necessary equipment to ensure proper cleaning of equipment and personnel. The EZ will be maintained at a distance no closer than 6 feet from the edge of any open manhole, 15 feet from any boring or well installation, and 25 feet from excavators and back-hoes.

This zone will be demarcated by appropriate measures, such as warning ribbon as necessary to prevent unauthorized access. No personnel shall be allowed within this zone without prior approval and authorization from the SSO and Project Manager.

4.3.3 <u>PPE</u>

All safety gear and clothing will be inspected prior to use. Monitoring equipment will be checked out and calibrated, as necessary. Level D protective gear will be utilized as described below.

The tasks described in this scope may include contact, or potential contact, with

contaminated water, soil and air as well as physical hazards including overhead obstructions, falling objects, electrical shock, slip-trip-and-fall risks, and contact with chemical preservatives used in sampling.

It is anticipated that Level D protection is adequate to initiate and conduct the work as planned and described, unless sustained readings of 10 ppm are detected at which point Level C PPE is required. If contaminants in the breathing zone increase to 25 PPM or more, work will cease and the area will be evacuated.

4.3.3.1 Level C Ensemble

Level C Personal Protective Equipment (PPE) should be used when the concentration(s) type(s) of airborne substance(s) are known and the criteria for using air purifying respirators are met. These criteria include performing continuous monitoring for an adequate supply of oxygen as well as continuously monitoring the concentrations and types of airborne substance(s) present. The appropriate respirator cartridges must be utilized based on the substance(s) of concern and on their properties. Table 1 on page 3 describes the contaminants of concern for this site, their action levels, and other pertinent information.

The ability to utilize Level C Ensemble is dictated in part by the criteria presented on page 3. Level C with air purifying respirators is appropriate for concentrations up to the Threshold Limit Value (TLV) for Perc. If contaminants in the breathing zone increase to 25 PPM or more, work will cease and the area will be evacuated until institutional controls or other methods reduce the hazards to acceptable levels.

4.3.3.1.1 Level C equipment:

The Action Level for this site is 10 ppm. If atmospheric monitoring indicates the presence of volatile organics at, or above 25 ppm, then all work shall cease, and the site should and will be immediately evacuated until institutional controls or other methods reduce the hazards to acceptable levels.

Level C respiratory protection is required between 10 ppm and 25 ppm. A

sustained concentration is 3 consecutive PID readings, above background, within a 10 minute period.

Level C Equipment is:

- 1. Full-face air purifying, canister-equipped respirators (NIOSH approved). Selection should be based on manufacturer's respirator selection criteria.
- 2. Hooded chemical-resistant clothing (overalls: two-piece chemical-splash suit or disposable chemical-resistant coveralls).
- 3. Coveralls.¹
- 4. Gloves, outer, chemical-resistant.
- 5. Gloves, inner, chemical-resistant.
- 6. Outer boots, chemical-resistant, steel toe and shank.
- 7. Boot-covers, outer, chemical-resistant (disposable).¹
- 8. Hard hat.
- 9. Escape mask.¹
- 10. Two-way radios.
- 11. Hearing protection.

Level C Respiratory Personal Protection

All employees working in atmospheres where volatile organics are present at sustained concentrations greater than 10 ppm above background shall be required to wear a NIOSH approved respirator with which they have been successfully fit-tested within the past 12 months. Each respirator will be outfitted with appropriate cartridges of the same manufacturer as the respirator. All cartridges shall have been stored inside the factory installed shrink wrap to prevent degradation of the cartridges through atmospheric adsorption. All cartridges shall have the date, start time, and initials of the user placed on them prior to use. The cartridges shall be exchanged once a day, after 8 hours, or after break through is detected by the employee, whichever is shorter.

4.3.3.2 Level D Ensemble

¹ Optional, as applicable.

The equipment used in the Level D ensemble is meant to provide protection from minimal hazardous contamination. Level D gear will be used for nuisance contamination <u>only</u>.

Boots/shoes: Heavy duty leather work boots with steel toe and shank. In wet environments, these can be substituted with heavy duty rubber boots with steel toe and shank.

Gloves: Heavy duty leather, used as necessary. Latex inner gloves and chemical resistant outer gloves shall be used when performing tasks that represent a risk of contact such as the confined space entries, changing of carbon drums, etc. This shall be as determined by the SSO

Coveralls: White Tyvek to protect clothes against nuisance contamination. No hood or booties required. As necessary.

Safety Glasses: NIOSH-approved². Hard Hat: ANSI-approved².

4.4 CONFINED SPACE ENTRY

The atmosphere in any of the confined spaces at the site may exceed ambient indoor air quality standards. Monitoring and ventilation procedures are to be followed before and during entry into any confined spaces and are detailed in this document. **Confined Space Entry (CSE) Permits** <u>ARE REQUIRED</u> in addition to this HSP.

4.4.1 Cones and/or Vehicles

Cones and/or vehicles will be placed to protect entrant from external hazards and to

² Optional, as applicable

protect the public.

4.4.2 <u>Ventilation and Dewatering</u>

The external blower will be set up and operated to purge the atmosphere of the confined space into which entry is planned. The blower will be operated so as to force clean, atmospheric air into the confined space, thereby displacing the atmosphere in the tank. The blower will be operated for at least 5 minutes, or until more than two volumes of the confined space has been exchanged, whichever is greater and the atmosphere tested for entry. The blower will run continuously while the entrant is in the confined space. Dewatering will be accomplished with external pump(s) discharge into the municipal sewer. Existing, operable pump(s) will be engaged to assist in the dewatering process. The flow through the force main from Pump Station 1A will be prevented during the dewatering process by de-energizing the pump control panel. The panel will be locked to prevent un-authorized re-energizing of the pumps.

4.4.3 <u>Emergency Equipment</u>

Emergency recovery equipment will be set up: i.e., tripod, harness and winch for recovering personnel.

4.4.4 Atmospheric Monitoring

The atmosphere in each tank will be monitored prior to entry and continuously while personnel are inside, or as determined necessary by the SSO or Project Manager. The oxygen content of the tank's atmosphere will be determined. The atmosphere will be assessed for the presence of hydrogen sulfide and volatile organic chemicals. The atmosphere in the tank will also be analyzed to determine if an explosive threat exists. While continuing to operate the ventilation blower, the environment will continue to be monitored, by lowering the monitoring equipment into the pump room remotely. Oxygen levels will be monitored continuously.

4.4.5 <u>Restoration of Flow</u>

The discharges to the tank will be restored upon completion of the work, by either opening the drain valve(s) and/or energizing the pump control panel, as appropriate.
4.4.6 <u>Tank Closure and Decon</u>

The manhole cover to the tank will be replaced in position and all retrieval equipment will be decontaminated and then repositioned at the next confined space, or stowed at the completion of work as appropriate.

4.4.7 General and Special Conditions

- When an authorized entrant has been in a confined space for 50 consecutive minutes, he (she) will exit the confined space. The entrant will rest for 10 minutes, will be evaluated by the SSO for health and safety concerns, will be debriefed and will be encouraged to drink fluids as required by the degree of effort encountered.
- All personnel will exit the confined space before energizing and/or testing any electrical components within the confined space.

4.5 PLANNED SITE ACTIVITIES

In addition to Confined Space Entries the operations and maintenance of the groundwater collection and treatment system involves the potential for exposure to contaminated groundwater during monthly compliance sampling and during pre-filter servicing. Drilling, coring, and excavation are also anticipated at infrequent intervals for further investigation and/or maintenance of the remedial system.

AIR

It is likely that PCE will be present in the air in the UniFirst Plant. The breathing zone will be monitored for levels of the airborne volatile organic compounds with a PID to determine the level of personal protective equipment required for personnel to conduct tasks at the various locations on the property. If PID monitoring reveals breathing zone sustained VOC levels of 10 ppm above background for 10 minutes or more, work will cease and the situation will be re-evaluated by the Project Manager and the Corporate Health and Safety Officer. Sustained levels means three consecutive PID readings, above background, within a 10 minute period.

GROUNDWATER AND SOILS

It is likely that PCE contaminated soil and groundwater will be encountered during sampling. Level D gear shall be worn as required by this HSP and the Site Safety Officer. NIOSH approved hard hats³, steel toe boots and eye protection³ shall be used. Level D gear includes: regular clothes with Tyvek coveralls, chemical-resistant boots³, nitrile inner gloves³, chemical resistant outer gloves³, and hard hat³.

Nitrile gloves shall be worn to protect personnel from prolonged direct contact with water or soils containing PCE. The gloves should be changed and replaced with new gloves within 10 minutes of contact with suspected contaminated media.

EXCAVATION

Excavations and trenches provide unique hazards to employees. The soil and groundwater may be contaminated with hazardous materials and there is significant threat of slumping or collapsing of the side walls.

All excavations which will be entered by workers are required to have sufficient side sloping (or use of shoring) and steps (when deeper than 4 feet) to permit adequate safety against trench collapse and provide the workers with methods to enter and exit the trench quickly and safely. All excavations will comply with the VOSHA Regulations contained in 29 CFR 1926.650 through 1926.653 (Subpart P), a copy of this regulation is attached.

Heavy equipment, such as backhoes, shall be operated by experienced and skilled operators. Care shall be taken in the movement and placing of equipment to prevent collision with other vehicles or equipment, to stay away from power sources, to avoid poor footing, and to avoid injury in the operation of the equipment. Equipment shall not be operated during or in the proximity of lightning storms. NIOSH approved hard hats, eye protection, and steel-toed boots shall be worn when working around heavy equipment.

³ Optional, as applicable

Before any subsurface investigation begins, the location of underground utilities such as storm drains, sewer lines, gas, electricity, and water supply in the immediate vicinity of the proposed excavation will be identified. Information necessary for this may be obtained from the client or representative of utility companies. Dig Safe will be contacted.

SOIL BORING AND WELL INSTALLATION OR CLOSURE

Potential hazards associated with drilling include Injury from utilities (e.g., buried electrical lines); physical injury due to impact from improper use of equipment and overhead hazards during coring; possible exposure and contact with contaminated soils and groundwater; chemical contamination with exposure pathways including: skin contact, absorption, ingestion, and inhalation.

Before any subsurface investigation begins, the location of underground utilities such as storm drains, sewer lines, gas, electricity, and water supply in the immediate vicinity of the proposed excavation will be identified. Information necessary for this may be obtained from the client or representative of utility companies. Dig Safe will be contacted.

Electrical hazards require that no drilling activities will be performed during lightning storms or around buried electrical or telephone cables or conduits. Care must be taken in the vicinity of gas lines and other explosive or high pressure utility lines.

Wear appropriate protective clothing to avoid contact with chemical contaminants. Wash after removing protective clothing at the end of the work day. NIOSH approved hard hats, eye protection, and steel-toed boots shall be worn, and gloves used when there is the possibility of contact with contaminated media.

4.6 **DECONTAMINATION**

4.6.1 <u>Clean Up and Decontamination Procedures</u>

Non hazardous rubbish shall be disposed of in containers provided by UniFirst on site.

4.6.2 <u>Decontamination of Personnel</u>

All disposable gloves and Tyvek will be disposed of properly. The heavy work boots will be washed of all nuisance contaminants. The employees' hands and face will be washed immediately.

4.6.3 <u>Decontamination of Machinery and Equipment</u>

All equipment will be decontaminated upon completion of the work. All hand-held equipment will be decontaminated by removal of disposable wrappings or by washing in soapy water.

4.7 URGENT & EMERGENCY RESPONSES

At any time an <u>URGENT</u> condition exists that is not covered in this HSP, then all procedures that will be employed in the completion of the task(s) necessary to rectify the situation should be thought out, discussed with at least two additional people in positions of responsibility who will determine the necessity for immediate action, and written down in detail prior to the beginning of the task(s). If time does not allow this procedure to occur, then all activities must STOP and a suitably equipped and trained <u>EMERGENCY RESPONSE TEAM</u> shall be activated.

5.0 MODIFICATIONS

All procedures that are described in this HSP shall be reviewed each time they are put into practice. Any modifications to the procedures that would improve health and safety for any activities on the site should be immediately written down, reviewed, initialed by the Project Manager and Site Safety Officer, and added to the HSP as an Amendment by incorporation into Appendix 1.

From time to time, a procedure or activity which is not covered by this HSP, that has the

potential for placing an individual at risk of injury or exposure to hazardous materials, will need to be performed. When this occurs, the work shall stop and the HSP shall be modified <u>before</u> continuing.

6.0 REVISED/UPDATED EDITIONS

All persons working on this project should confirm with the Project Manager that they are working from a current edition of this document **<u>BEFORE</u>** commencing work at the site. Any outdated copies of this document should be clearly marked as "Superseded", and filed for future reference.

7.0 TRAINING AND DOCUMENTATION REQUIREMENTS

All personnel, including subcontractors and visitors, who are required to enter an Exclusion Zone (EZ) or a Contamination Reduction Zone (CRZ) shall have fulfilled the appropriate training requirements stated in 29 CFR 1910.120, Occupational Safety and Health Administration, Hazardous Waste Operations and Emergency Response, Final Rule (March 6, 1989 and April 13, 1990) and adopted by the State of Vermont effective October 28, 1990 as part of Vermont Occupational Safety and Health Act (VOSHA).

Further site-specific training will be conducted prior to the initiation of field activities. This training will include, but will not necessarily be limited to: emergency procedures, site control, personnel responsibilities, and provisions of this HSP.

In addition, all personnel entering an EZ or a CRZ must have completed the appropriate medical monitoring requirements under 29 CFR 1910.120 (f) and must have successfully passed a qualitative respiratory fit test in accordance with 29 CFR 1910.134 within the last twelve months.

<u>Documentation of the required 40 hour training, baseline medical monitoring</u> (where required) and current respirator fit test must be supplied by all site workers to the

Site Safety Officer (SSO) PRIOR to entering restricted areas of the site.

8.0 HEALTH AND SAFETY PERSONNEL

Personnel responsible for the project's Health and Safety provisions are the Project Manager (PM) and Site Safety Officer (SSO).

Project Officer - Christopher M. Crandell

The Project Officer has the responsibility and authority to direct all hazardous waste operations for the project. He/she has the authority and responsibility to suspend or modify work practices for any reason, including health and safety issues. This position is filled by the officer in charge of the managing department.

Corporate Health and Safety Officer - Joel Behrsing

The Corporate Health and Safety Officer is responsible for the overall health and safety of the personnel conducting work associated with this project. Any significant changes in working conditions require a written amendment to this plan and the written, or documented and witnessed verbal, authorization of the Corporate Health and Safety Officer. The Corporate Health and Safety Officer will have the final word in any dispute with regards to health and safety.

Project Managers - Joel Behrsing and Don Maynard

The Project Manager is responsible for overseeing the entire operation, including the implementation of the HSP, ensuring that all affected personnel have received adequate safety training, have read and understand the project HSP and are provided with an adequate supply of safety equipment. He/she has the authority to enforce compliance with the HSP, suspend or modify work practices for safety reasons, and to dismiss any individual whose on-site conduct endangers his/her own health and safety or that of others.

Site Safety Officers

The Site Safety Officer is responsible for advising the Project Manager on Health and

Safety matters. Further, he/she shares responsibility for the implementation of this plan, supervising the air monitoring programs, establishing the necessary zones of work, and completion of any written amendments to this plan. The SSO has the authority to ensure compliance with the HSP, suspend or modify work practices for safety reasons, and to dismiss any individual whose on-site conduct endangers his/her health and safety or that of others.

Project Professionals

Project professionals are responsible for conducting individual tasks at project sites. Project professionals will sometimes perform one type of task at many sites or numerous tasks at that same site. They have the responsibility and authority to dismiss any subcontractors, client, etc. from the site for any reason, including health and safety issues.

Environmental Technicians

Environmental technicians are generally responsible for conducting monitoring as well as operation and maintenance (O/M) activities at project sites. They are responsible for following all guidelines and procedures contained in the HSP. They have the authority to suspend practices of subcontractors for safety and health reasons.

8.1 SUBCONTRACTORS & OTHER NON-JOHNSON COMPANY PERSONNEL

All subcontractors' personnel will abide by the conditions of this Health and Safety Plan, or their employers' HSP, whichever is more conservative. The Johnson Company, Inc. will conduct safety monitoring as required by this HSP, for its own use. Any entry upon the site, or into any confined space(s) referenced herein is done at the risk of the person doing the entry, and/or their employer. However, an entry into a confined space must be carried out in accordance with 29 CFR 1910.146.

In the interest of health and safety, and as required under the provisions of 29 CFR 1910, each employer whose personnel will be entering the site's exclusion zone(s) is required to submit a Health and Safety Plan for their personnel.

In all cases, by signing this HSP, all employers and their employees agree to abide by the

conditions contained in this HSP, and will abide by any directions given by The Johnson Company, Inc., as they pertain to the health and safety of personnel, property, or the environment. In the event of conflict between the conditions contained in this HSP and those of any other Health and Safety Plan written for this project, the more conservative and cautious condition or procedure will govern until, and unless, one HSP, or both, is amended to conform, as appropriate.

8.2 CHAIN OF COMMAND

The organizational structure at The Johnson Company for issues pertaining to health and safety pursuant to 29 CFR 1910.120 is as follows:



9.0 PROJECT PERSONNEL RESPONSIBILITIES DURING EMERGENCIES

The SSO has the primary responsibility for responding to, and correcting emergency situations. These duties of the SSO include evacuation and securing the work area; upgrading or downgrading the level of personal protection equipment; insuring the protection of the public and environment; notification of the appropriate Federal, State and local agencies; ensuring

appropriate decontamination procedures are implemented on all personnel; determining the cause of the incident and recommending changes to prevent its reoccurrence.

9.1 MEDICAL EMERGENCIES

All personnel who are injured or become ill in the exclusion zone must be decontaminated to the maximum extent possible. If injuries are minor, a full decontamination procedure will be completed and first aid administered, as needed, prior to transport. If injuries are severe, a partial decontamination will be completed which will include the removal of all contaminated clothing and redressing in clean coveralls or appropriate materials. First aid will be administered, as needed, prior to the arrival of medical personnel. Any person transported for further medical attention will take with them information regarding the chemical(s) they may have been exposed to. Any vehicle used to transport contaminated personnel will be cleaned or decontaminated as necessary.

9.2 EVACUATION ROUTES

In the event of an emergency that requires evacuation of the work area, all personnel will proceed to a point within the support zone; upwind of any smoke, vapors or spills and proceed with decontamination procedures, if reasonable. The primary assembly point, during an emergency is at the intersection of Construction Hill Road and Hebert Road (formerly Brush Hill Road) for a head count conducted by the SSO to ensure all personnel have been evacuated safely. A secondary, or back up assembly point shall be selected in the field at the beginning of each work day.

10.0 EMERGENCY CONTACT INFORMATION

This information appears in this Health and Safety Plan in Sections 1.1 and 8.0 for ease of location in times of need.

Ambulance:	Barre Rescue	(802) 476-4111
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Fire:	Barre Fire Depart	ment	(802) 476-4111
Police:	State Police		(802) 229-9191
	Barre Police Depa	artment	911
Hospital:	Central Vermont [*]		(802) 229-9121
Poison Control Center:	Burlington		(802) 658-3456
The Johnson Company,	Inc.:		
Don Maynard	Project Manager	(80	2) 229-4600
Joel Behrsing	Project Manager	(80	2) 229-4600
Williamstown:			
Garrett Earls	Town Manager	(80	2) 433-6671
State of Vermont:			
Gerold Noyes Vo	ermont Sites Manag	gement Section	(802) 241-3877
UniFirst:			
Jason Denbin B	urlington Manager	(802) 655-405	4
Green Mountain Power	Corp Safety Manag	er	(802) 223-5235

^{*}The Central Vermont Hospital is at the corner of Fisher Road and Route 62 in Berlin, Vermont.

Directions to the Central Vermont Hospital: Take Route 64 from Williamstown to Interstate 89 (I-89) northbound. Proceed to Exit 7. The Hospital is on Fisher Road, at the third set of lights once off the exit, turn left. Hospital is on the right. The emergency entrance to the Hospital is the first right turn.

APPENDIX 1

Amendments to the Health and Safety Plan

APPENDIX 2

Materials Safety Data Sheets

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

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GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

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15 20 25 30 35 40 45 50 55 60 65 70 75 60 85 90 95 100	55.400 55.260 55.130 54.990 54.850 54.710 54.570 54.570 54.430 54.290 54.160 54.020 53.880 53.740 53.600 53.740 53.600 53.460 53.320 53.180 53.350	40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.387 .393 .398 .404 .410 .415 .421 .426 .432 .437 .443 .448 .454 .460 .465 .471 .476 .482	35 40 45 50 55 60 65 70 75 80 85 90 95 100	.962 .953 .944 .935 .926 .917 .908 .899 .890 .881 .673 .864 .655 .846	15 20 25 30 35 40 45 50 55 55 60 65 70 75 80 85	938 .898 .862 .827 .794 .764 .735 .708 .682 .658 .635 .613 .592 .572 .554

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SOLUBILITY	2.21 IN WATER	SATURATED V	12.22 APOR PRESSURE	SATURATED	12.23 VAPOR DENSITY		
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
	I N S O L U B L E	60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260	.090 .127 .177 .242 .326 .434 .571 .743 .956 1.219 1.538 1.924 2.388 2.939 3.590 4.355 5.247 6.282 7.476 8.846 10.410	60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260	.00172 .00238 .00324 .00435 .00577 .00754 .00975 .01247 .01577 .01977 .02455 .03023 .03691 .04473 .05382 .06431 .07635 .09009 .10570 .12330 .14310	0 25 50 75 100 125 150 275 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600	.247 .260 .273 .266 .299 .311 .324 .336 .348 .360 .371 .383 .394 .406 .417 .427 .438 .449 .459 .469 .479 .489 .499 .508 .517

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Common Bynofryme 1, 4-Dinethybenzene Xylol Stop discherge I Gal frei departn Arod contact w hoase and rem Notty local heat	e Wetery Iquid Floats on water, Fl Freezong p Freezong , Freezong	Coloriess. Sweet odor ammable, imitaing vapor is produced. cont is 36'F.	6.1 6.2 6.4 6.5 6.4	 FIRE HAZARDS Flash Point: 81°F C.C., Flammable Limits in Alc: 1.1%-6.5%. Fire Extinguishing Agents: Foam, dry chemical, or canon dioards Fire Extinguishing Agents Not to be Used: Water may be instituctive. Special Hazards of Combustion Products: Not pertnent Behavior in Fire: Vacor is heavier than air and may travel considerable datance to a source of ignition and fash back. 	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U 11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable kaid 11.2 INAS Hazard Rating for Dufk Weter Transportations
Fire	PLAMAABLE Plashback along vapor trail m Vapor may explode it ignited Wass set-consisted breathing Extensish with loam, dry cre Water may be ineffective on I Cool exposed containers with	ay cools, n an enclosed area. ; addersbut, mocal, or carbon doexoe, ire, water,		Ignition Temperature: 6757F Bectrical Hazard: Cass I, Group D Barning Rate: 5.8 mm/min, 2 Adlabatic Fleme Temperature: Deta not available 1 Biokchometric Air to Fuel Ration; Data not available 2 Reme Temperature: Data not available	Free
Exposure	CALL FOR MEDICAL AID. VAPOR Initiating to eyes, noise and thi Initiated, will cause discriment loss of consciousness. Howe to hear bit, It breathing has statopoid, you it breathing has statopoid, you it breathing to skin and eyes, It breathing to skin and eyes, It evables will cause nature fill analyound, will cause nature hears affected areas with ple IF IN EYES, hold eyelds ope IF SWALLOWED and worth in or max.	roat. , difficul respiration, or a writing respiration, rypen. a, vonting, loss of consciousness, g and shoes, my of write, a and flush writi plenty of water, a CONSCIDUS, have victum dimik water	7.1 7.2 7.3 7.4 7.8 7.4 7.4 7.7	7. CHEMICAL REACTIVITY Reactivity With Water: No maction Reactivity with Common Materials: No reaction Biability During Transport: Stable Neutralizing Agents for Acids and Caustics: Not periment Polymerization: Not periment Inhohor of Polymerization: Not periment Not periment N	Assretic Effect
Water Pollution	NARMFUL TO AQUATIC LIF Found to shorehim. May be darperous it is entern Notify local health and within Notify local health and within	E IN VERY LOW CONCENTRATIONS. Vetor interes. e officials. iter interes.			12. PHYSICAL AND CHEMICAL PROPERT 12.1 Physical State at 15°C and 1 stric Liquid 12.2 Molecular Weight 106,16 12.3 Bolling Point at 1 stric 280.9°F = 130.3°C = 411.5°K 12.4 Freating Point:
2. RESPONSE (See Response Ma Issue verning-h Emcante ave Stack de remo Chemical and p	E TO DISCHARGE lethods Handbook) righ Ramnabäny oved physical treatment	2. UABEL 2.1 Category: Flammable Kquid 2.2 Class; 3	8.1 8.2 8.3 8.4	 WATER POLLUTION Aquatic Texknry; 22 ppm/95 hr/bluogil/TL_/frash water Waterfowt Texkshry; Data not evabable Biological Oxygen Demand (BOD); 0 b/b in 5 days Food Chain Concentration Potentiat: Data not available 	55.5"F = 13.3"C = 286.5"K 12.5 Critical Temperature: 569.4"F = 343.0"C = 615.2"K 12.6 Critical Pressure: 509.4 etm = 34.65 peia = 3.510 MN/m ² 12.7 Specific Gravity: 0.661 et 20"C (Spac) 12.1 Liquid Surface Tension: 26.3 Critical Tension:
1 CO Compatibility (Hydrocarbon 12 Formatic p-CA-H(C) 12 IMO/UN Designed 14 DOT ID No: 1307 25 CAS Registry No:	2 DESIGNATIONS Clease: Aromatic 2He)x 5001: 3.2/1307 2: 105-42-3	 4. Observable chabilities 4.1 Physical State (as shipped): Liquid 4.2 Color; Colories 4.3 Odor; Like bergane; characteristic aromatic 			12.9 Liquid Winter Interfacial Tension: 37.8 dynes/cm = 0.0378 N/m at 2 12.10 Yapor (Gas) Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gi 1.071 12.12 Laterri Heat of Yaportunbor: 150 Bu//b = 81 cu//g = 3.4 X 10 ³ J/bc
 E.1 Personal Protect plastic gioves at shin. It taken its edema. It ingest Kichey and iver E.3 Treetment of Eup Carypen It require Such with water E.4 Threetwork of Limb 1. E.5 Eront Term Inhak E.6 Toskicity by Ingee E.7 Linte Toskicity, Kid E.8 Yapor (Gae) Intil a pratem # preserver. 	5. HEAL the Equipment: Approved ca who Exposure: Vapors cause to longs, causes severe coug ited, causes nausea, voming r damage can occur, posure: INHALATION: remov- ed; call a doctor, INGESTION r for at least 15 min, SXIN, wi Value: 100 ppm lation Limits: 300 ppm for 30 ation: Grade 3; LDs = 50 to drive rank liver damage, and Characteristics: Vapors c ni In high concentrations. The	IN HAZAROS inister or air-supplied mask; goggles or face shield; is haddache and dizziness. Liquid initiates eyes and hing, distress, and rapidy developing pulmonary orantos, headache, and come. Can be talal. is to tresh bir; administer artificial respiration and to NOT induce vorming; call a doctor. EYES: pe off, wash with scap and water. inin. 500 mg/sg ause a slight amazing of the eyes or respiratory effect is temporary.	9.1 9.2 9.4	9. SHIPPING INFORMATION Grades of Purity: Research: 99.99%; Purs: 99.8%; Technical: 69.0% Biorege Temperstaurs; Antoient livet Atmosphere: No requirement Venting: Open (tame arrested) or pressure-vacuum	 12.13 Hart of Combustion:17,552 Bb//b 9754.7 cal/g =403.41 × 10² 12.14 Heat of Decomposition: Not periment 12.15 Heat of Soliton: Not periment 12.16 Heat of Polymertzation: Not periment 12.25 Heat of Pulsion: 37.83 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0,34 pais
 Liquid or Solid in remain, may cau famili, may cau 5.10 Odor Threshold: 8.11 IDUN Velue; 10,00 	ritari Characterialica; Unin use Emaring and reddening c 05 ppm 00 pmm	um hazard. If apilled on clothing and allowed to		Μ	

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1 SATURATED LI	2.17 QUID DENSITY	LIQUID HEA	2.18 T CAPACITY	12.19 LIQUID THERMAL CONDUCTIVITY			12.20 VISCOSITY	
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound F	Temperalure (degrees F)	British thermal unit-inch per hour- square fool-F	Temperature (degrees F)	Centipoise	
60 65 70 75 80 85 90 95 100 105 110 115 120	53.970 53.690 53.550 53.410 53.270 53.140 53.000 52.860 52.720 52.580 52.440 52.300	60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 250 250 250 250 280	.412 .418 .424 .429 .435 .440 .446 .451 .457 .462 .468 .474 .479 .485 .490 .496 .501 .507 .512 .518 .524 .529 .535	60 65 70 75 80 85 90 95 100	.935 .928 .921 .914 .907 .900 .892 .885 .878	60 65 70 75 80 85 90 95 100 105 105 100 105	.678 .654 .631 .610 .590 .571 .552 .535 .519 .503 .488 .474 .460	
	Table Albert		······		<u> </u>			

12.21 SOLUBILITY IN WATER 12.22 SATURATED VAPOR PRESSURE 12.23 SATURATED VAPOR DENSITY 12.24 IDEAL GAS HEAT CAPACITY Pounds per 100 pounds of water Temperature (degrees F) Temperature (degrees F) Pounds per square inch Temperature (degrees F) Pounds per cubic Temperature (degrees F) British thermal unit per pound-F 60 .096 60 .00183 0 .246 Ν 70 .135 70 .00252 25 .259 S 80 .00343 .187 80 50 .272 ο 90 .255 90 75 .285 L 100 .343 100 .00607 100 .297 U 110 .456 110 .00792 125 .309 B 120 .599 120 .01022 150 .321 L 130 .777 130 .01303 175 .333 ε 140 .998 140 .01646 200 .345 150 1.270 150 .02059 225 .357 160 1.600 160 .02553 250 .368 170 1.998 170 .03138 275 .380 180 2.475 180 .03826 300 .391 190 3.041 190 .04629 325 .402 200 3.710 200 .05561 350 .413 210 4.493 210 .06636 .375 .424 220 5.407 220 .07867 400 .435 230 6.465 230 .09270 425 .445 240 7.683 240 .10860 450 .456 250 9.080 250 .12650 475 .466 260 10.670 260 .14670 500 .476 525 .486 550 .496 575 .505 600 .515

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Common Sync 1, 2-Dimethytoenzen Xytol	myma Watery Iquid e Floats on water,	Coloriense Sweet odor	 E. FIRE HAZARDS L1 Flash Point: 63°F C.C.; 75°F D.C. L3 Flammable Limits in Air; 1,1%-7,0% L3 Fire Etringulahing Agents: Foam, dry chemical, or carbon denide 	10. HAZARD ASSESSMENT CODE (500 Hazard Abassameni Handbook) A-T-U
Siap Asch Call fra de Avbel cont Inolate and Notify local	arge if possible. Keep people swi partnert, act with loads and vapor, introve docharged material health and poliubon control spe	ıy. noët.	L.4 Pre Estinguishing Agents Not to be Used; Water may be ineffective. L.5 Special Hozards of Combustion Products; Not perform L.6 Behavior in Firs; Vapor is heavier than air and may travel considerable distance to a bucket of contino and flash be-sit	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flammable Iquid 11.2 RAS Hazard Rating for Buck Water Transportation
Fire	FLAMAAELE Flashback along vapor yas' Vapor navy explode it ignited west sen-contained breather Earloguesh evin loarn, ory cn Water may be ineffective on Cool exposed containers wit	nay cocur, in an arciclead area, g apparatus, immosi, or caliton decide, fire, h water,	 4.7 Ignition Temperature: 60°F 4.5 Electrical Hazard: Class I, Group D 4.9 Burning Rala: 5.8 mm/min. 6.10 Actabatic: Flame Temperature: Data not available 4.11 Electrical Air to Fuel Ratio: Data not available 4.11 Flame Temperature: Data not available 4.12 Flame Temperature: Data not available 	Carlegory Re Fre Heata Vapor Imtant Liquid or Solid Initiant Poisona Weller Polytion Human Toxicity
Exposure	CALL FOR MEDICAL AID. VAPOR Initiating Ic eyes, nose and I If shaled, wild cause headso of consciousness. Nove to breah sir, If breathing is difficult, ove of LOUID Initiating to skin and eyes. If swallowed, will cause near consciousness. Remove containvaled clock Fush affected breas with ph IF IN IFFES. hold eyesids op: IF SWALLOWED and victim or mak. DO NOT INDUCE VOMITING	roat. No. difficult breathing, or loss a striftical respiration, sypen, ost, vomiting, or loss of rg and shoes, rmy of water, a CONSCIOUS, have victim conk water L	 CHEMICAL REACTIVITY Teactbrity With Water: No reaction Reactbrity with Common Meterials: No reaction BibBity During Transport Stable Heutraking Agents for Acids and Caustics: Not pertinent Polymerization: Not pertinent Inhibitur of Polymerization: Not pertinent Molar Ratio (Reactant to Product): Data not available Reactivity Group: 32 	Acatalize Toochy Asstance Fract
Water Pollution	Dangerous to aquatic the In Fouling to shorefine. May be dangerous if it enter Notify local heath and widd Notify operators of nearby w	vigh concentrations. I wallo' intakes. 8 officials. Stor intakes.		12. PHTSICAL AND CHEMICAL PROPEI 12.1 Physical State at 15°C and 1 stre- Liquid 12.2 Molecular Weight: 106.16 12.2 Bolting Point at 1 stre: 201.9°F = 144.4°C = 417 stre
A RESP(Gee Responsi lasus warni Evicualis & Should be / Chemical &	DISE TO DISCHARGE w Methods Handbook) ng-high filaminability rea whoved hd physical treatment ICAL DESIGNATIONS	2. LABEL 2.1 Category: Flammable liquid 2.2 Class; 3	L WATER POLLUTION L1 Aquatic Tealetty: > 100 mg///66 tr/D, magna/TL_/tresh water L3 Weterfort Toatchy: Data not available L3 Biological Oxygen Demand (BOD): 0 b/b. 5 days: 2.5% (treor.), 6 days L4 Food Chain Concentration Potential: Data not available	12.4 Freating Point: 13.3*F 25.2*C = 248.0*K 12.5 Crtical Temperature; 874.8*F = 357.1*C = 630.3*K 12.6 Crtical Pressure; 541.5 atm = 35.84 psis = 3.722 MN/m* 12.7 Specific Carsety; 0.860 mi 20*C (Squid) 12.4 Liquid Surtace Templor; 0.860 mi 20*C (Squid) 12.3 Liquid Surtace Templor;
 CG Competible Hydrocarbo Formula: o-Cel HO/UN Desig HO/UN Desig DOT ID No.: 10 CAS Registry I 	Ny Class: Aromatic n 4.[CHs]s sation: 0.2/1307 No: 65-47-5	4. Bolannabi: Colores 4.1 Physical State (as shipped): Liquid 4.2 Color: Colories 4.3 Odor: Bergene-ške; characteriatic aromatic		15.5°C 12.5 Liquid Weise Interfacial Tension: 36.06 Oynes/on = 0.03606 N/m 20°C 12.10 Vapor (Qas) Specific Onivity: Not pertnern 12.11 Ratio of Specific Heets of Vapor (C 1.068
 8.1 Personal Prof plattic gloom 6.2 Symptoms Fo skin. If taker edemt. If in Kichey and . 6.2 Trestment of crypen if rec flush with we 4.4 Threshold Lin 6.5 Short Term in 6.5 Short Term in 6.5 Toxicity by in 6.7 Late Toxicity: 5.4 Vapor (Gas) is system if pro 9. United as 257 	5. HEAL sective Equipment: Approved ca is and bools. Mowing Exposure: Vapors cause india lange can accur, Exposure: INALATION: removing wird, call a doctor, INGESTION size for at least 15 min. SICH: with Value; 100 ppm halation Limite; 300 ppm for 30 geebors Grade 3; Lose = 50 to Koney and liver damage. Themic Charlestratics: Vapors of ment in high concernations. The	IN HAZARDS inster or air-supplied mask; goggles or face shield; I headache and doziness. Liquid imiales eyes and imig, distess, and rapidly developing putmonary cramps, headache, and coma. Can be tatal, I to fresh air, aziminister anticial respiration and do NOT induce vombing; call a doctor, EYES; per off, wash with soap and water, min, 500 mg/kg ause a slight amarting of the eyes or respiratory effect is temporary.	 SHIPPING INFORMATION Crades of Purity: Research: 99.09%; Pure 99.7%; Commercial: 95 + % Storage Temperature: Ambient Inert Atmosphere: No reaction Venting: Open (fame arrester) or pressure-resource 	 12.12 Lefert Heat of Vaportation: 149 Bu/D = 82.9 cal/g = 3.47 X 10 J/sg 12.13 Heat of Combustion:17.558 Bu/ 9754.7 cal/g =408.41 X 10 9754.7 cal/g =408.41 X 10 9754.7 cal/g =408.41 X 10 12.14 Heat of Decomposition: Not periment 12.15 Heat of Bokriton: Not periment 12.16 Heat of Fusion: 30.64 cal/g 12.26 Limiting Value: Data not available 12.27 Reid Vapor Pressure: 0.28 paie
 Uquid or Bolic remain, may Odor Thresho IDLH Value: 10 	i Inflant Characteristics: Minim Celuse amarting and reddening o dd 0.05 ppm 0,000 ppm	יה הצבעים. If באשפט סה כוסדאיהן בחם בנסייפט נס סיפ פאוה.	MO	TES

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SATURATED L	12.17 SATURATED LIQUID DENSITY		12.18 T CAPACITY	LIQUID THERMA	12.19 L CONDUCTIVITY	12.20 LIQUID VISCOSITY		
Temperalure (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square (oot-F	Temperature (degrees F)	Centipoise	
15 20 25 30 35 40 45 50 55 60 65 70 75 60 65 70 75 80 85 90 95 100	56.460 56.330 56.190 55.910 55.770 55.630 55.490 55.360 55.220 55.080 54.940 54.800 54.660 54.520 54.660 54.520 54.380 54.250 54.110	35 40 45 50 55 60 65 70 75 80 85 90 95 100	.389 .391 .394 .396 .398 .400 .402 .404 .406 .408 .411 .413 .415 .417	35 40 45 50 55 60 65 70 75 80 85 90 95 100	1.043 1.035 1.027 1.018 1.010 1.002 .993 .985 .977 .969 .960 .952 .944 .935	15 20 25 30 35 40 45 50 55 60 65 70 75 80 85	1.328 1.263 1.202 1.145 1.092 1.042 .995 .952 .911 .873 .836 .802 .770 .740 .712	
	n terrer da de la deservación de la de La deservación de la d La deservación de la d	•			· · · · · ·	a da anti-arte a da anti- arte da anti- arte da anti-arte da anti- arte da anti-arte da anti-arte da		

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1 SOLUBILITY	12.21 (IN WATER	SATURATED VA	12.22 APOR PRESSURE	SATURATED V	12.23 APOR DENSITY	IDEAL GAS H	12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	
		60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260	.071 .101 .141 .194 .263 .352 .465 .609 .787 1.007 1.277 1.605 1.999 2.469 3.028 3.686 4.456 5.352 6.389 7.581 8.947	60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 220 230 240 250 260	.00135 .00188 .00258 .00349 .00464 .00611 .01298 .01634 .02038 .02520 .03090 .03759 .04539 .04539 .05443 .06484 .07674 .09030 .10560 .12290	0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 425 450 475 500 525 550 575 600	.261 .274 .287 .299 .311 .323 .335 .347 .358 .370 .381 .392 .403 .414 .424 .435 .445 .455 .465 .455 .465 .475 .485 .494 .504 .513 .522	

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Andre gepanniskensken	Common Synon Phonylettene EB	yma Louid Figals on water, Fi	Coloriess 5=eet, gasokne-late bdor ammable, intalong vacor is produced.	 FIRE HAZARDS FIRE HAZARDS Filesh Point: 80°F O.C.; 59°F C.C. Flammable Limits in Air: 1.0%-6.7% Fire Estinguishing Agents: Foam (most effective), walker log, carbon dioxide or no chemical 	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U
den	A vaid contac W sar goggle lind Shut off grin Stop dechar Stay upend taolate and r Notify local r	I with load and vapor. Keep pa- s, kell-contained breathing appar- turing gloves) ion sources and call fre depant of sources and call fre depant and use water spray to "anopt o smore discharged material, weth and polytion control apen	ipie swicy, alus, and nutber overclothing ent. Iown ¹⁴ vapor. Ies.	6.4 Fire Ertinguishing Agents Not to be Used: Not pertnent 6.5 Special Hazerds of Combustion Products: Initialing vapors are generated when heated. 6.6 Behavior in Pire; Vapor is heavior than air	11. HAZARD CLASSIFICATIONS 11.1 Code of Federal Regulations: Flavimable Guid 11.2 NAS Hazard Rating for Bulk Weter Transportation:
An and a second s	Fire	FLAMMABLE Flashback along vapor trail m Vapor may explode if ignited Water gogiter, act-contained including glowes). Extinguish with dry chemical, Water may be inefficies on i Cool exposed containers with	ay popur, n en enclosed a/se. Institute experient, and nubber evereisting foam, or carbon donde. *e. water.	and may taxel considerable distance to the source of ignition and Rash back. 5.7 Ignition Tempersture: 50°F 6.8 Electrical Hazant: Not personen; 6.9 Burning Ratic 5.8 mm/min. 6.10 Adlabatic Flame Temperature; Data Not Available	Celegory Rating Fire3 Haatth Vapor Initiant2 Liquid or Solid Immant2 Poisons2 Water Polution Human Toxicny1 Anusin Texten 1
and a second a second a second a	Exposure	CALL FOR MEDICAL AID. VAPOR Initiating to eyes, note and th If shaled, will cause dischara Move to fresh air. It beamming has stopped, pive it beathing a official give on LOQUID Will born skin and eyes. Narmful if aveflowed. Remove contamnated clothar Flush attected areas with ple IF IN 2125, hold systics coe IF SWALLOWED and victim i of mit. DO NOT INDUCE VOMITING	rost or officult breathing, and call respiration, ypen, g and shoes, ity of water, and hush with plenity of water, it CONSCIOUS, have worm think water	Communication Communi	Asstatic Effort
40000000000000000000000000000000000000	Water Pollution	HARMFUL TO AQUATIC LIF Fouling to shorekine. May be dangeroux if it enter Notry local health and wildirk	E IN VERY LOW CONCENTRATIONS.		12. PHYSICAL AND CHEMICAL PROPERTIES 12.1 Physical State at 15°C and 1 atm: Liquid 12.3 Molecular Weight: 106.17 12.3 Boiling Point et 1 atm:
and a second secon	L RESPO (See Response Mechanical Should be in Chemical an	Nothy operators of nearby with NSE TO DISCHARGE e Methods Handbook) containment emoved id physical liteatment	2. LABEL 2.1 Category: Flammable Equid 2.2 Class: 3	L WATER POLLUTION 8.1 Aquatic Tozicity: 29 ppn/96 br/bloogil/TL_/fresh water 8.2 Weierford Tostety: Data not available 8.3 Skological Oxygen Demand (BOD): 2.8% (theor), 5 days 8.4 Food Chain Concentration Potentiat None	 2/12 F = 1362*C = 409.4*K 12.4 Freezing Point:
	3. CHEMI 3.1 CG Compatibili hydrocanon 3.2 Formula: CHJ 3.3 IMO/UN Design 3.4 DOT ID No: 11 3.5 CAS Registry H	CAL DESIGNATIONS Try Clease Aromatic 1 CHaCHa nation: 3.3/1175 75 No.: 100-41-4	4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as anloped): Liquid 4.2 Color: Colorisa 4.3 Odor: Aromatic		 12.9 Liquid Water Interfectal Tenulor: 35.48 dynes/cm = 0.03548 N/m at 20°C 12.10 Yapor (Gas Specific Gravity: Not pertinent 12.11 Ratio of Specific Heats of Vapor (Gas): 1.071 12.12 Latent Heat of Vaportization: 144 Bhu/fb = 80.1 cal/g =
an and a second se	5.1 Personal Prot 5.2 Symptoms Fo Moderate in 5.3 Treatment of warm and op INGESTION. chemical por and pel med 5.4 Threshod Life 5.5 Short Yarm to 6.6 Tozichy by In 5.7 Late Tozichy by In 5.7 Late Tozichy by In 5.7 Late Tozichy by In 5.7 Late Tozichy by In 5.8 Vapor (Las) b find high cor 5.9 Liquid or Sold short excount	5. HEAL settive Equipment: Self-contains allowing Exposure: Inhiston m ration of eys with corneal equip Exposure: INALATION: is it ef- induce vomting only upon phys- induce vomting only upon physical sectors and examples distribute the sector of the sec- vent above unpleasant. The effe distribute secondary burna kt: 140 ppm	TH HAZARDS If I basthing apparatus; safety googles, by Gause smather of nose, disziness, depression, possible, imitates skin and may cause briters, actu occur, remove vicion to trash air, keep him- ory; if breathing stops, give antificial respiration, cican's approval; material in lung may cause motify fluck with plenty of water (15 min, for eyes) contaminated dotting before reuse, min, 15 g/kg (mi) ause moderals imitation such that personnel will ct is temporary. re smarting of the skin and first-degree burns on on long exposure.	 SHIPPING INFORMATION Grades of Purity: Research grade: B9.84%; pure grade: D0.5%; lectnical grade: 09.0% Storage Temperature: Ambienti Inert Atmosphere: No requirement Venting: Open (hame americe) or pressure-vacuum FIRE HAZA 	3.35 X 10 ¹ J/kg 12.13 Heat of Combustion:17,780 Btu/kb
in Angeler and the second seco	B.11 IDLH Vaka: 2	-		6.11 Stokchlometric Air to Fuel Ratio: Data Not A 6.12 Flame Temperature: Data Not Available	Ava24274

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Temperature (degrees F) Pounds per cubic foot Temperature (degrees F) British thermal unit per pound-F Temperature (degrees F) British thermal unit-inch per hour- square foot-F Temperature (degrees F) Centipoise 40 54.990 40 .402 -90 1.065 40 .835 50 54.680 50 .404 -80 1.056 50 .774 60 54.370 50 .407 -70 1.047 60 .719 60 53.750 60 .412 -50 1.028 80 .565 90 53.430 90 .414 -40 1.018 90 .566 100 53.120 100 .417 -30 1.009 100 .516 110 52.500 120 .421 -10 .990 120 .486 120 51.870 140 .426 10 .921 .461 130 51.50 150 .429 20 .953 160	12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		LIQUID THERMA	12.19 LIQUID THERMAL CONDUCTIVITY		12.20 LIQUID VISCOSITY	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-Inch per hour- square foot-F	Temperature (degrees F)	Centipoise	
	40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	54.990 54.680 54.370 54.060 53.750 53.430 53.120 52.610 52.600 51.870 51.560 51.250 50.940 50.620 50.310 50.000 49.690	40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.402 .404 .407 .409 .412 .414 .417 .419 .421 .424 .426 .429 .431 .434 .436 .439 .441 .443	$ \begin{array}{c} -90\\ -80\\ -80\\ -70\\ -80\\ -50\\ -40\\ -30\\ -20\\ -10\\ 0\\ 10\\ 20\\ 30\\ 40\\ 50\\ 60\\ 70\\ 80\\ 90\\ 100\\ 110\\ 120\\ 130\\ 140\\ 150\\ 160\\ \end{array} $	1.065 1.056 1.047 1.037 1.028 1.018 1.009 1.000 .990 .981 .971 .962 .953 .943 .934 .924 .915 .906 .896 .896 .896 .887 .877 .868 .859 .849 .849 .840 .830	40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.835 .774 .719 .670 .626 .586 .550 .518 .488 .461 .436 .414 .393 .374 .358 .340 .325 .311	

SOLUBILITY	2.21 IN WATER	12.22 SATURATED VAPOR PRESSURE		12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	Pounds per 100 pounds of water	Temperature (degrees F)	Pounds per square inch	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit
68.02	.020	80 100 120 140 160 200 220 240 260 280 300 320 340 360 350	.202 .370 .644 1.071 1.713 2.643 3.953 5.747 6.147 11.290 15.320 20.410 26.730 34.460 43.800 54.950	80 100 120 140 160 200 220 240 260 280 300 320 340 360 380	.00370 .00654 .01099 .01767 .02734 .04087 .05926 .08363 .11520 .15510 .20490 .26570 .33910 .42620 .52850 .64720		007 .026 .060 .093 .125 .157 .187 .217 .246 .274 .301 .327 .353 .377 .401 .424 .445 .467 .487 .507 .525

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Toluol Methybenzens Methybenzol	yma Watery koud Floata on water, Fl	Coloriess Pleasant odor ammable, imating vapor is produced.	 E. FIRE HAZARDS E.1 Flash Point: 40°F C.C.; 55°F O.C. E.3 Flasmable Limits in Air; 1:27%-7% E.3 Fire Extinguishing Apenta: Carbon doar to der carbon do	10. HAZARD ASSESSMENT CODE (See Hazard Assessment Handbook) A-T-U		
Stop Gazhai Shai ofi ghi Shay Gawai Avod coma Isolate and Notity Iocal	ge if possible. Keep people area con sources and cas fire departs and use water spray to "turoch it with least and vapor, enrove discharged matenal health and poliution control spen	fund Sowa" velor, Cos.	6.4 Fire Extinguishing Agents Not to be Used: Water may be netfactive 6.5 Special Hozards of Combustion Producta: Not pertinent 8.6 Behavior in Fire: Vacor is heavier than and may three a considerable datace a source of involve and hash back	II. HAZARD CLASSIFICATIONS III. Code of Faderal Aegulations: Flammable liquid II.2 NAS Hazard Ruting for Buts Water Transportations Categoory Reting		
Fire	FLAMMABLE Flamback slong vacor trail in Vabor may explode a lighted that papers and contained that papers with the residual Waler may be instruction on Cool exposed containers with	ay occur, in an enclosed avea. The bracking separates. Kash, ir carbon Sonde fre. I weight.	L7 Ightion Temperture: 097 F L8 Electrical Hazart: Class L Group D L8 Burning Rate: 5.7 mm/min. 6.10 Adiabatic Flame Temperature: Data not available	Free		
Exposure	CALL FOR MEDICAL AD. VAPOR Inflating to yets, noise and to if invalued, will cause nauses, difficult breathing, or los More to treath sir. If breathing deficult, give cay if breathing deficult, give cay if breathing deficult, give cay if breathing deficult and yes. If serial bread will cause naus Remove containwalled clother Funch altectual areas with po if IN EYES, hold synkis tom IF SWALLOWED and victim or mile. DO NOT INDUCE VOLITIES	TOBL woming hasdeche, doziness, s of consocutness. a utificial respiration, gen. As, voniting or loss of consciousness, ng and shoes, ny of water, ny of water, n and fluch with plenty of water, is consSOOUS, have votim pink water k	 CHEMICAL REACTIVITY Reactivity With Water, No reaction Reactivity with Common Materials: No reaction Stability During Transport Stable Neutresting Agents for Acids and Cessitics: Not periment Polymerization: Not periment Inhibitor of Polymerization: Not periment Holar Ratio (Reactant to Product): Data not available Reactivity Group: 12 	Assthetic Effect		
Water Pollution	Dangerous to equatic He in Fouling to shorekne. May be derigencies it enter Notify local heath and which Notify local heath and whath	high concernuations. 9 water intakes. 9 officials. 810r vitakes.		 12. PHYSICAL AND CHEMICAL PROPERTION 12.1 Physical State at 16°C and 1 atra Liquid 12.1 Molecular Weight 92.14 12.2 Boltang Point at 1 atra 231.1°F = 110.6°C = 383.8°K 		
L RESP (See Respond Issue warn Evacuate a L CHEM 11 CC Compatib Hydrocarco 12 Formain: Call Hydrocarco 13 Formain: Call 13 MOUN Deal 13 MOUN Deal 13 CAS Registry	UNSE TO DISCHARGE Hethods Handbook) ing-high Rammability rea IICAL DESIGNATIONS Ethy Class: Aromatic 20 Jones Jones Jones 20 Hol: 108-88-3	2. LABEL 2.1 Cetegory: Flammable Squid 2.2 Class: 3 4. OBSERVABLE CHARACTERISTICS 4.1 Physical State (as shipped): Liquid 4.2 Color: Coloriess 4.3 Odor: Purgent, anomatic, bergane-Sur; distinct, pleasant	 8. WATER POLLUTION 6.1 Aquetic Textchy: 1180 mg/W65 tr/sunfsh/TL_/hexh water 8.2 Waterfowl Textchy: Data not evalable 8.3 Biological Orygen Demand (BOD): 0%, 5 days 33% (theor), 8 days 8.4 Food Chain Concentration Potentist: None 			
L1 Personal Pro 6.3 Symptoms F headache, aspirated, ingested c surfar for a visit for a surfar for a surfar for a L4 Threshold L 6.5 Short Term 6.1 Toxicity by 6.1 Vapor (Ges) system II (6.9 Uquid or So	5. HEA rective Equipment Air-supplet obowing Exposure: Vajors init Anesthesia, respiralory arrest. U causes coupling, geoging, dare suses vomiting, grönig, dartes suses vomiting, grönig, dartes suses vomiting, grönig, dartes uses vomiting, grönig, dartes and a doctor, INGESTION: do NOI it least 15 min, SKON: wips off, e mit Value; Hold Lindberg, org wind value; dottegen group initiant Characteristics; Vacon resent in high concentrations; The Informations; diver damage may are in high concentrations; in the Infram; Characteristics; Mino	LTH HALARDS make goggles or face shield; plastic gloves, is eyes and upper respiratory that; cause Schimas, quid influite yees and causes driving of shim it sa, and noticity developing pulmonary edems. It depressed respiration, we to fresh at, give artificial respiration and oxygen if i induce vorning; call a doctor, EYES; hush with saft with scap and water. 10 min. to 5 g/kg 10/low ingestion, cause a slight smaring of the eyes or respiratory re effect is lemporary. mum hazard. It spixed on clothing and allowed to	 SHIPPING INFORMATION Grades of Purity: Research, nameni, rombon-all 99.8 + %; inclustratic contains 64 + %, with 5% rylens at amail amounts of betterns and non-aromatic hydrocarbons; 60/120; less pure than inclustrat, 8.1 Storage Temperature: Ambert 8.1 Inset Atmosphere: No requirement 8.4 Venting: Open (frame amaster) or pressure-vectors 	12.13 Heat of Combustor:		
 E.9 Liquid or Solid Inftant Characteristics: Himmun hazard. If splitd on blothing and allowed to remain, may cause structing and reddening of the skin. E.10 Edden Threshold: 0.17 ppm E.11 IDLH Value: 2,000 ppm 			6. FIRE HAZAROS (Continued) 6.11 Stolchlometric Air to Fuel Ratio: Data not evailable 6.12 Flame Temperature: Data not available			

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12.17 SATURATED LIQUID DENSITY		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY			
Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F	, Temperature (degrees F)	British thermal unit-inch per hour- square foot-F	Temperature (degrees F)	Centipoise
30 20 10 0 20 30 40 50 60 70 80 90 100 110 120	57.180 56.870 56.550 55.240 55.930 55.620 55.310 54.990 54.680 54.370 54.060 53.750 53.430 53.120 52.810 52.810 52.500	0 5 10 15 20 25 30 35 40 45 55 55 50 60 65 70 75 80 85 90 95 100 105 110 115 120 125	.396 .397 .399 .400 .402 .403 .404 .406 .407 .409 .410 .411 .413 .414 .415 .417 .418 .420 .421 .422 .424 .422 .424 .425 .427 .428 .429 .431	0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 . 180 190 200 210	1.026 1.015 1.005 .994 .983 .972 .962 .951 .940 .929 .919 t.908 .897 .886 .876 .865 .854 .843 .833 .833 .822 .811 .800	0 5 10 25 30 35 40 45 55 60 65 70 75 80 85 90 95 100	1.024 .978 .935 .894 .857 .821 .768 .757 .727 .700 .673 .649 .625 .603 .582 .562 .544 .526 .509 .493 .477

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12.21 SOLUBILITY IN WATER 12.22 SATURATED VAPOR PRESSURE 12.23 SATURATED VAPOR DENSITY 12.24 IDEAL GAS HEAT CAPACITY Temperature (degrees F) Pounds per 100 pounds of water Temperature (degrees F) Pounds per square inch Temperature (degrees F) Pounds per cubic foot Temperature (degrees F) British thermal unit per pound-F 68.02 .050 0 .038 .00070 .00103 0 0 .228 10 .057 10 25 .241 20 .00150 .084 20 50 .255 30 .121 30 75 .268 40 .172 40 .00296 100 .281 50 .241 50 .00405 125 .294 60 .331 60 .00547 150 .306 70 .449 70 .00727 175 .319 80 .600 80 .00954 200 .331 90 .792 90 .01237 225 .343 100 1.033 100 .01584 250 .355 110 1.332 110 .02007 275 .367 120 1.700 120 .02518 300 .378 2.148 2.690 130 130 .03127 325 .389 140 140 .03850 350 .400 150 .04700 .05691 3.338 150 375 .411 160 4.109 160 400 .422 170 5.018 170 .06840 425 .432 180 6.083 180 .08162 450 .443 190 7.323 190 .09675 475 .453 200 8.75B 200 .11400 500 .462 210 10.410 210 .13340 525 .472 550 .482 575 .491

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12.17		12.18 LIQUID HEAT CAPACITY		12.19 LIQUID THERMAL CONDUCTIVITY		LIQUID VISCOSITY	
Temperature (degrees F)	Pounds per cubic	Temperature (degrees F)	British thermal unit per pound-F	Temperature (degrees F)	British thermal unit-inch per hour- square lool-F	Temperature (degrees F)	Centipoise
55 60 65 70 75 80 95 100 105 110 115 120 125 130 135 140 145 155 160 165 170 175	55.330 55.140 54.960 54.770 54.580 54.400 54.210 54.030 53.840 53.660 53.470 53.290 53.100 52.920 52.730 52.540 52.360 52.730 52.540 52.360 52.170 51.990 51.800 51.620 51.430 51.250 51.060 50.870	45 50 55 60 65 70 75 80 85 90 95 100	.394 .396 .398 .400 .403 .405 .407 .409 .411 .414 .416 .418	75 80 85 90 95 100 105 110 115 120 125 130 135 140 145 150 155 160 165 170	.988 .981 .975 .969 .962 .956 .950 .944 .937 .931 .925 .919 .912 .906 .900 .893 .887 .881 .875 .868	55 60 65 70 75 80 85 90 95 100 105 110 115 120	.724 .693 .665 .638 .588 .566 .544 .524 .505 .487 .470 .453 .438

12	.21			12.23 SATURATED VAPOR DENSITY		12.24 IDEAL GAS HEAT CAPACITY	
SOLUBILITY Temperature	Pounds per 100	Temperature	Pounds per square	Temperature (degrees F)	Pounds per cubic foot	Temperature (degrees F)	British thermal unit per pound-F
(degrees F) 77.02	.180	50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.881 1.171 1.535 1.989 2.547 3.227 4.049 5.033 6.201 7.577 9.187 11.060 13.220 15.700 18.520 21.740 25.360	50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210	.01258 .01639 .02109 .02681 .03371 .04196 .05172 .06317 .07652 .09194 .10960 .12980 .15270 .15270 .17850 .20750 .23970 .27560	0 25 50 75 100 125 150 175 200 225 250 275 300 325 350 375 400 425 450 475 500 525 550 575 600	.204 .219 .234 .248 .261 .275 .288 .301 .313 .325 .337 .349 .360 .371 .381 .392 .402 .412 .421 .421 .431 .440 .449 .457 .465 .474

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Common Synony	ns: Watery Squid	Coloriens	Gasoline-like odor				
Senzole	Floats on wate point i	r. Flammable, initating v s 42°F.	apor is produced. Freezing:				
Avoid contact Wear goggles Shut oft ignits Stop discharg Stay upwind i Isotale and re Notity local h	with liquid and vapor. Keep and salf-contained breather in sources and call fire dep a if possible. Ind use water spray to "kno move discharged material. salth and pollubon control a	o people away. vg apparatus. ariment. ock down" vapor. ugencies.					
FLAMMABLE. Flashback along vapor trail may occur. Vapor may explode it ignited in an endosed area. Wear goggles and self-contained breathing apparatus. Estinguish with end rothermack, foam, or carbon dioxide. Water may be instituctive on fire. Cool exposed containers with water.							
Exposure	CALL FOR MEDICAL AI VAPOR Initiating to eyes, noso a Hi shallod wit cause he Move to fresh air. Hi breating has stopped I breating to skin and eye Harmhal if awallowed. Remove contarinisated Flush alfocida areas wi JF IN EYES, hold eyek IF SWALLOWED and v or milk.	ICAL AID. nose and threat use headsche, difficuit breathing, or loss of consciousness. stopped, give erificial respreasion. thoul, give oxygen. and eyes. wood. unsated clothing and shoes. uess with plenty of water. d eyelds open and hush with plenty of water. D and woom is CONSCIOUS, have victim drick water					
Water HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS. Water May be dangerous if it enters water intakes. Pollution Netity local health and wildlile officials. Notity operators of nearby water intakes.							
1. RESF (See Respon Issue wan Restrict a	GNSE TO DISCHARGE * Netrods Handbook) hing-high flammability ;ceaa	2 LAB 2.1 Categor 2.3 Classe 3	IEL קי, Flammuble (קעוס) ו				
3. CHE 3.1 CG Compating 1.2 Formula: Co 3.3 IMO/UN Der 3.4 DOT ID No: 3.5 CAS Regist	MICAL DESIGNATIONS billty Class: Aromatic bon He ugenetion: 3.2/1114 1114 y No.: 71-43-2	4. 08 4.1 Physic 4.2 Color: 4.3 Odor: odo	SERVABLE CHARACTERISTICS al State (az ahlpped): Liquid Colorleas Aromatic; rather pleasant promatic r; characteristic odor				
5.1 Personal f hydrocau hydrocau 5.2 Symptomu headact 5.3 Trastmen contami NHALA stoppod 5.4 Threshok 5.5 Short Tet 6.5 Todcity f 5.7 Lats Tod 5.8 Vapor (G of eyes 6.9 Liquid or remain 5.10 Odor Th 5.11 IOLH Val	5 trotective Equipment: Hyd bon-insciluble nubber or pla bon-insciluble nubber or pla bon-insciluble apton such a fallowing Exposure: SKIN: fanh nated clothing and wash at TON: remove from espoar , start resuscilation, admini ; Limit Value: 10 ppm m Inhatelton Umila: 75 pp m Inhatelton Grade 3; LDI city: Leukemia es) Intiunt Characteristics may cause amarting and r exhicit: 4.88 ppm ue: 2,000 ppm	HEALTH HAZAROS recarbon vapor canisler, sic gloves; chomical go, is neoprene. ziness, excitation, pallor, nostiniction. Came and pe with water followed by s an EYES: flush with plet re inmediately. Call a pl ster oxygen. im for 30 min. a = 50 to 500 mg/kg it If present in high conc attact is temporary. Heat Minimum hazard. If eddening of the skin.	supplied air or a hose mask; ggles or face splash shield; lollowed by flushing, weakness, suble death. loap and water, remove nhy of water until irritation subsides. hysician. IF breathing is irregular or spilled on clothing and allowed to				

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 6. FIRE MARADS 6. FIRE ALARDS 6. FIRE ALARDS 6. FIRE ALARDS 6. FIRE ALARDS 6. FIRE STANGULARS (C. 127 - 7.25) 6. Special Hazards of Combustion Products (No performent and may travel considerable distance to a course of ippion and fash back (C. 12 - 127 - 127 - 127 - 127 - 128 - 127 - 128 - 127 - 128 - 127 - 128		
 Plank Pohle 12* C C. Pohle 12* C C. Plank Pohle 12* C C. Pohle 12* C Pohle 12* C C. Pohle 12* C Pohle 12* C C. Pohle 12* C Pohle 12* C C C	FIRE HAZARDS	10. HAZARD ASSESSMENT CODE
 2. First Etamonable Limits In Art. 13%-79%. 3. First Etamonable Limits In Art. 13%-79%. 3. First Etamonable Limits In Art. 13%-79%. 3. First Etamonable Limits In Art. 13%-79%. 4. First Etamonable Export Internable Export	oint 12°F C.C.	(See Hazard Assessment Handbook)
 a) First Extinguishing Agents by Dornes, Ioan, or carbon dotted Used: Water may be instruction and may travel condetable distance to a borne of iphion and flash back is derived in First Vapor is heavier than air and may travel condetable distance to a borne of iphion and flash back is the interpretative: D3P First Back and a stable is derived in First Vapor is heavier than air and may travel condetable distance to a borne of iphion and flash back is the interpretative: D3P First Back and a stable is derived is the fourt Ratio: 	ble Limits in Air: 1.0%-7.9%	A-1-U-Y-W
 A. Pive Enlinguisation exacts and markets in the base of the second ensation in th	Ungulahing Agenta: Dry chemical,	
 Lued: Water may be indirective Special Planetards of Combustion Products: Not perform Behavior in First Vice's is heavier that all and may Torel considerable distance to source of ignition and flash back Source of ignition and flash back 	Unguishing Agents Not to be	······································
 4.5 Special Hazards of Combustion Products: Not periment and mary yould considerable Gistance to a borce of ignition and flash back at Hightion Temperature: 1037-F di Electical Hazard: Class 1, Group D di Burning Rate: 60 mm/min. di Bischichenstic At to Suell Balto: Data not available 6.13 Stochichenstic At to Suell Balto: Data not available 6.13 Electical Hazard: Class 1, Group D di Bischichenstic At to Suell Balto: Data not available 6.13 Electical Hazard: Class 1, Group D di Balton Temperature: Data not available 7.1 Reactivity With Water: No reaction 7.2 Reactivity with Common Materiatic: No raction 7.3 Polymerization: Not periment 7.4 Inhibitor of Polymerization: Not periment 7.5 Reactivity Droup: 32 1.4 WATER POLLUTION 6.1 Aquatic Toxicity: 5 ppm/6 hr/minew/ishabi/ 7.3 Fload Chain Concentration Potential: None 9. SHIPPING INFORMATION 8.1 Grades of Purint: Notation 9. SHIPPING INFORMATION 8.2 Venting: Pressure vacuum 	: Water may be ineffective	11. HAZARD CLASSIFICATIONS
Products: Noi Previous is heavier than air and may travel considerable distince to source of lipition and teach back of guiden and teach back of g	Hazarda of Combustion	11.1 Code of Federal Regulations:
 and may taxet considerable distance to a source of ignion and flash back considerable distance to a source of ignion and flash back considerable distance to a source of ignion and flash back considerable distance to a source of ignion and flash back considerable distance to available flame temperature: Data not available flame temperature: Not periment flame flam	ucla: Not permant	Flammable liquid
 Borce of gnisen and fash back Borce of gnisen and fash back Bitter Hazard Cass I, Group D Chendensetic At to Fuel Ratio Chendensetic At to Seat Bate State Reactivity With Common Materialian Not perinent Chendensetic At to perinent Moter Ratio (Rescant to Perinent) Producti: Data not available Reactivity Droup: 32 I. Aquatic Toxicity: S pom/8 th/minnew/lashal/Galidod wiste S water Politics I for Case of Parine A Grod Chain Concentration Potentiat: None S ShifPPIKC INFORMATION Gride Strate of Parine S ShifPPIKC INFORMATION Gride Strate of Parine S ShifPPIKC INFORMATION Gride Strate of Parine S Uner Almosphere: No requirement Venting: Pressure viacuum 	may travel considerable distance to a	11.3 NAS Hazard Rating for Bulk Water
 a. Character 1997/F b. Beteched Hazard: Casa I, Groop D b. Burning Rate: 60 mm/min. b. A catabatic Flame Tempershure: Data not available c. ChERICAL REACTIVITY 7. CHERICAL REACTIVITY 7. CHERICAL REACTIVITY 7. Reactivity With Vasta: No reaction 7. Reactivity With Common Materials: No reaction 7. Beactivity With Common Materials: No reaction 7. Beactivity With Common Materials: No reaction 7. Beactivity With Common Material: No reaction 7. Beactivity Common Material: No reaction 8. WATER POLLUTION 8. WATER POLLUTION 8. WATER POLLUTION 8. WATER POLLUTION 8. Water Polling Common (BOO): 1. Janno all Specific Creavity: 3. Biological Coryon Demand (BOO): 1. Join, 10 days	ce of ignition and flash back	Catagoria Costa
 Berndray Rate 60 m/min. Berndray Rate 60 m/min. Allabatic Flame Temperature: Data not available Stochtometric At to Fuel Ratio: Data not available Biolochtometric At to Fuel Ratio: Data not available Freedow Favailable CHEMICAL REACTIVITY Reactivity With Water No reaction 7. CHEMICAL REACTIVITY Reactivity With Water No reaction 7. CHEMICAL REACTIVITY Reactivity With Water No reaction 7. Chemicals	a Temperature: 1097*F	Fire
 B. Burning Parks of Human Content of Parks of Human Toxicity. B. Baactivity With Common Materials: No reaction C. CHEMICAL REACTIVITY A Reactivity With Common Materials: No reaction T. Beactivity With Common Materials: No reaction Caustics: Not performed Product): Data not available Bublity During Transport: Stable Caustics: Not performed Product): Data not available I. Aquat: Coxicity. Beactivity Oroup: 32 I. Aquat: Coxicity: Spom/2 A tri/sunish/TL_/Lap water Bit Food Chain Concentration Potentiat: None ShiPPIKG INFORMATION Grades of Puring: Nation ShiPPIKG INFORMATION Grades of Puring: Nation ShiPPIKG INFORMATION ShiPPIKG INFORMATION ShiPPIKG INFORMATION ShiPPIKG INFORMATION ShiPPIKG INFORMATION Grades of Puring: Industrial 90%94% ShiPPIKG INFORMATION ShiPPIKG INFORMATION<td>cal Hazard: Class I, Group U</td><td>Heatm</td>	cal Hazard: Class I, Group U	Heatm
Bata not available Data not available B.11 Biokhometrick Art to Fuel Ratio:	g Hate: 6.0 minorate atic Flame Temperature:	Vapor Imlant.
 Elistichiometric Art to Fuel Ratio: Daia net available B.12 Planne Temperature: Data not sveiable 7. CHEMICAL REACTIVITY 7. Reactivity with Common Materials: No reaction 7. Stability During Transport: Stable 7.4 Neutraticing Agents for Acids and Cautics: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Industrial prometation: 8.1 Aquatic Toxicity: Spm/24 hr/annish/TL_/Lap water 8.2 WATER POLLUTION 8.1 Aquatic Toxicity: Spm/24 hr/annish/TL_/Lap water 8.2 WATER POLLUTION 8.4 Food Chain Concentration Potentiat: None 9. ShiPPING INFORMATION 8.1 Greades of Purity: Industrial prome	not available	Liquid or Solid Imtant
 Data net available 8.12 Flame Temperature: Data not available 8.12 Flame Temperature: Data not available 7. CHEMICAL REACTIVITY 7.1 Reactivity With Common Materials: No reaction 7.2 Reactivity With Common Materials: No reaction 7.3 Guability During Transport: Stable 7.4 Neutratizing Agents for Acids and Caustics: Not performed 7.4 Neutratizing Agents for Acids and Caustics: Not performed 7.7 Motur Ratio (Resctant to Product): Data not available 7.8 Reactivity Droup: 32 12 PHYSICAL AND CHEMIC 8.1 Aquatic Toxicity: 3 ppm/6 tri/minnow/listb/TL_/Lap water 8.4 WATER POLLUTION 8.1 Aquatic Toxicity: 2 Water Pollution 3 diological Drygen Damand (BOD): 1.2 Julyo, 10 days 8.4 Food Chain Concentration Potentiat: None 9. SHIPPING INFORMATION 8.1 Grades of Purity: Industrial pure	lometric Air to Fuel Ratio:	Water Polution
8.12 Plante Temperature: Over State 7. CHEMICAL REACTIVITY 7. Reactivity With Water: No reaction 7.2 Reactivity With Water: No reaction 7.3 Reactivity with Common Materials: No reaction 7.4 Reactivity mith Common Materials: No reaction 7.5 Stability Ouring Transport: Stable 7.4 Neutrization: Not pertinent 7.5 Polymerization: Not pertinent 7.6 Producty: Data not available 7.8 Reactivity Oroup: 32 8.1 Aquatic Toxicity: 8.1 Aquatic Toxicity: 8.1 Reactivity Oroup: 32 8.1 Reactivity Oroup: 32 8.1 Aquatic Toxicity: 8.1 Aquatic Toxicity: 9.1 Aquatic Toxicity: 9.2 Spm/B hr/minnew/lathal/dailed water 2.2 Depring 4 hr/minnew/lathal/dailed water 2.3 Biological Drygen Demand (BOD): 1.2 Liquid Materiality: 9. SHIPPING INFORMATION 8.1 Grades of Purity: Industrial pure 99 + % 9.2 <td< td=""><td>i not available Tomosotuve: Data poi svejable</td><td>Human Toxicity</td></td<>	i not available Tomosotuve: Data poi svejable	Human Toxicity
7. CHEMICAL REACTIVITY 7. Beactivity with Water, No reaction 7. Reactivity with Common Materials: No reaction 7. Sublify During Transport: Stable 7. A resolution Common Materials: No reaction 7. Sublify During Transport: Stable 7. Biblitor of Polymerization: Not periment 7. A quartic Toxicity: 8. WATER POLLUTION 8.1 Aquatic Toxicity: 9. Supm/3 tr/minnow/lothal/databled water 20 ppm/3 tr/minnow/lothal/databled 12. Science Contextual 12. Stable 13. Biological Oxygen Demand (BOD): 12. Submet Contextraiton Potential: None 9. SHIPPING INFORMATION 9.1 Grades of Purity: Industrial DVR 9. SHIPPING IN	femperatie: baar not starmer	Aquate Toxicity 1
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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC. 959 ROUTE 46 EAST PARSIPPANY, NEW JERSEY 07054-0624 EMERGENCY CONTACT: CHEMTREC 1-800-424-9300 INFORMATION CONTACT: 973-257-1100

SUBSTANCE: TETRACHLOROETHYLENE

TRADE NAMES/SYNONYMS:

MTG MSDS 238; PERCHLOROETHYLENE; 1,1,2,2-TETRACHLOROETHYLENE; ETHYLENE TETRACHLORIDE; PERC; TETRACHLORETHYLENE; PERCHLORETHYLENE; TETRACHLOROETHENE; PCE; RCRA U210; UN 1897; C2Cl4; MAT22900; RTECS KX3850000

CHEMICAL FAMILY: halogenated, aliphatic

CREATION DATE: Jan 24 1989 REVISION DATE: Jun 17 2004

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: TETRACHLOROETHYLENE **CAS NUMBER:** 127-18-4 **PERCENTAGE:** 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=3 FIRE=0 REACTIVITY=0

EMERGENCY OVERVIEW: COLOR: colorless PHYSICAL FORM: volatile liquid ODOR: faint odor, sweet odor MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, cancer hazard (in humans)

POTENTIAL HEALTH EFFECTS: INHALATION: SHORT TERM EXPOSURE: irritation, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat,





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headache, drowsiness, dizziness, disorientation, mood swings, loss of coordination, blurred vision, lung congestion, kidney damage, liver damage

LONG TERM EXPOSURE: irritation, nausea, stomach pain, loss of appetite, headache, drowsiness, dizziness, disorientation, sleep disturbances, pain in extremities, loss of coordination, blurred vision, hormonal disorders, internal bleeding, heart damage, liver damage, birth defects, brain damage, tumors, cancer SKIN CONTACT: SHORT TERM EXPOSURE: irritation (possibly severe) LONG TERM EXPOSURE: irritation EYE CONTACT: SHORT TERM EXPOSURE: irritation LONG TERM EXPOSURE: irritation

INGESTION: SHORT TERM EXPOSURE: same as effects reported in short term inhalation **LONG TERM EXPOSURE:** same as effects reported in long term inhalation

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For inhalation, consider oxygen. For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Negligible fire hazard.

EXTINGUISHING MEDIA: carbon dioxide, regular dry chemical

Large fires: Use regular foam or flood with fine water spray.

FIRE FIGHTING: Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).



FLASH POINT: No data available.

6. ACCIDENTAL RELEASE MEASURES

SOIL RELEASE:

Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:

Absorb with activated carbon. Remove trapped material with suction hoses. Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.

OCCUPATIONAL RELEASE:

Avoid heat, flames, sparks and other sources of ignition. Stop leak if possible without personal risk. Small liquid spills: Absorb with sand or other non-combustible material. Large spills: Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

STORAGE: Store and handle in accordance with all current regulations and standards. Store in a cool, dry place. Store in a well-ventilated area. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS: TETRACHLOROETHYLENE: TETRACHLOROETHYLENE (PERCHLOROETHYLENE): 100 ppm OSHA TWA 200 ppm OSHA ceiling 300 ppm OSHA ceiling 300 ppm OSHA peak (5 minutes in any 3 hours) 25 ppm (170 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 100 ppm ACGIH STEL

VENTILATION: Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and



quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

At any detectable concentration -

Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Escape -

Any air-purifying respirator with a full facepiece and an organic vapor canister.

Any appropriate escape-type, self-contained breathing apparatus.

For Unknown Concentrations or Immediately Dangerous to Life or Health -

Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE: liquid **APPEARANCE:** clear **COLOR:** colorless **PHYSICAL FORM:** volatile liquid ODOR: faint odor, sweet odor **MOLECULAR WEIGHT: 165.83** MOLECULAR FORMULA: Cl2-C-C-Cl2 **BOILING POINT:** 250 F (121 C) FREEZING POINT: -2 F (-19 C) VAPOR PRESSURE: 14 mmHg @ 20 C VAPOR DENSITY (air=1): 5.83 SPECIFIC GRAVITY (water=1): 1.6227 WATER SOLUBILITY: 0.015% PH: Not available **VOLATILITY:** Not available **ODOR THRESHOLD:** 50 ppm EVAPORATION RATE: 2.8 (butyl acetate=1) **COEFFICIENT OF WATER/OIL DISTRIBUTION:** Not available SOLVENT SOLUBILITY: Soluble: alcohol, ether, benzene, chloroform, oils

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10. STABILITY AND REACTIVITY

REACTIVITY: Stable at normal temperatures and pressure.

CONDITIONS TO AVOID: Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES: acids, metals, bases, oxidizing materials, combustible materials

HAZARDOUS DECOMPOSITION:

Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION: Will not polymerize.

11. TOXICOLOGICAL INFORMATION

TETRACHLOROETHYLENE: IRRITATION DATA:

810 mg/24 hour(s) skin-rabbit severe; 500 mg/24 hour(s) skin-rabbit mild; 162 mg eyes-rabbit mild; 500 mg/24 hour(s) eyes-rabbit mild

TOXICITY DATA:

4100 ppm/6 hour(s) inhalation-rat LC50; >10000 mg/kg skin-rabbit LD50 (Dow); 2629 mg/kg oral-rat LD50 **CARCINOGEN STATUS:** NTP: Anticipated Human Carcinogen; IARC: Human Limited Evidence, Animal Sufficient Evidence, Group 2A; ACGIH: A3 -Animal Carcinogen; EC: Category 2

LOCAL EFFECTS:

Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:

Moderately Toxic: ingestion

Slightly Toxic: inhalation

TARGET ORGANS: central nervous system

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: eye disorders, heart or cardiovascular disorders, kidney disorders, liver disorders, nervous system disorders, skin disorders and allergies **TUMORIGENIC DATA:** Available.

MUTAGENIC DATA: Available.

REPRODUCTIVE EFFECTS DATA: Available.

ADDITIONAL DATA: May be excreted in breast milk. Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:

FISH TOXICITY: 8430 ug/L 96 hour(s) LC50 (Mortality) Flagfish (Jordanella floridae)



INVERTEBRATE TOXICITY: 7500 ug/L 48 hour(s) EC50 (lmmobilization) Water flea (Daphnia magna)

ALGAL TOXICITY: 509000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (Skeletonema costatum)

FATE AND TRANSPORT:

BIOCONCENTRATION: 49 ug/L 1-21 hour(s) BCF (Residue) Bluegill (Lepomis macrochirus) 3.43 ug/L

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U210. Hazardous Waste Number(s): D039. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.7 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101: PROPER SHIPPING NAME: Tetrachloroethylene ID NUMBER: UN1897 HAZARD CLASS OR DIVISION: 6.1 PACKING GROUP: III LABELING REQUIREMENTS: 6.1 MARINE POLLUTANT: TETRACHLOROETHYLENE



Page 6 of 7

CANADIAN TRANSPORTATION OF DANGEROUS GOODS: SHIPPING NAME: Tetrachloroethylene UN NUMBER: UN1897 CLASS: 6.1 PACKING GROUP/RISK GROUP: 111

15. REGULATORY INFORMATION

<u>U.S. REGULATIONS:</u> CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): TETRACHLOROETHYLENE (PERCHLOROETHYLENE): 100 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21): ACUTE: Yes



CHRONIC: Yes FIRE: No REACTIVE: No SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65): TETRACHLOROETHYLENE (PERCHLOROETHYLENE)

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS: California Proposition 65: Known to the state of California to cause the following: TETRACHLOROETHYLENE (PERCHLOROETHYLENE) Cancer (Apr 01, 1988)

CANADIAN REGULATIONS: WHMIS CLASSIFICATION: D2

NATIONAL INVENTORY STATUS: U.S. INVENTORY (TSCA): Listed on inventory.

TSCA I2(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

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TRICHLOROETHYLENE

MSDS Number: T4940 --- Effective Date: 09/14/00

1. Product Identification

Synonyms: Trichloroethene; TCE; acetylene trichloride; Ethinyl trichloride CAS No.: 79-01-6 Molecular Weight: 131.39 Chemical Formula: C2HCl3 Product Codes: J.T. Baker: 5376, 9454, 9458, 9464, 9473, 9474 Mallinckrodt: 8598, 8600, 8633

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Trichloroethylene	79-01-6	100%	Yes

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN

IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

J.T. Baker SAF-T-DATA^(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing) Flammability Rating: 1 - Slight Reactivity Rating: 1 - Slight Contact Rating: 2 - Moderate Lab Protective Equip: GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:

Vapors can irritate the respiratory tract. Causes depression of the central nervous system with symptoms of visual disturbances and mental confusion, incoordination, headache, nausea, euphoria, and dizziness. Inhalation of high concentrations could cause unconsciousness, heart effects, liver effects, kidney effects, and death.

Ingestion:

Cases irritation to gastrointestinal tract. May also cause effects similar to inhalation. May cause coughing, abdominal pain, diarrhea, dizziness, pulmonary edema, unconsciousness. Kidney failure can result in severe cases. Estimated fatal dose is 3-5 ml/kg.

Skin Contact:

Cause irritation, redness and pain. Can cause blistering. Continued skin contact has a defatting action and can produce rough, dry, red skin resulting in secondary infection.

Eye Contact:

Vapors may cause severe irritation with redness and pain. Splashes may cause eye damage. Chronic Exposure:

Chronic exposures may cause liver, kidney, central nervous system, and peripheral nervous system effects. Workers chronically exposed may exhibit central nervous system depression, intolerance to alcohol, and increased cardiac output. This material is linked to mutagenic effects in humans. This material is also a suspect carcinogen.

Aggravation of Pre-existing Conditions:

Persons with pre-existing skin disorders, cardiovascular disorders, impaired liver or kidney or respiratory function, or central or peripheral nervous system disorders may be more susceptible to the effects of the substance.

4. First Aid Measures

Inhalation:

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion:

Induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. Call a physician.

Skin Contact:

Immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.

Eye Contact:

Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

Note to Physician:

Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

5. Fire Fighting Measures

Fire:

Autoignition temperature: 420C (788F) Flammable limits in air % by volume:

lel: 8; uel: 12.5

Explosion:

A strong ignition source, e. g., a welding torch, can produce ignition. Sealed containers may rupture when heated.

Fire Extinguishing Media:

Use water spray to keep fire exposed containers cool. If substance does ignite, use CO2, dry chemical or foam.

Special Information:

In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! US Regulations (CERCLA) require reporting
spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Isolate from incompatible substances. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:

Trichloroethylene: -OSHA Permissible Exposure Limit (PEL): 100 ppm (TWA), 200 ppm (Ceiling), 300 ppm/5min/2hr (Max)

-ACGIH Threshold Limit Value (TLV): 50 ppm (TWA) 100 ppm (STEL); listed as A5, not suspected as a human carcinogen.

Ventilation System:

A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.

Personal Respirators (NIOSH Approved):

If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has poor warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.

Skin Protection:

Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Neoprene is a recommended material for personal protective equipment.

Eye Protection:

Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance: Clear, colorless liquid. Odor: Chloroform-like odor. Solubility: Practically insoluble in water. Readily miscible in organic solvents. Specific Gravity: 1.47 @ 20C/4C pH: No information found. % Volatiles by volume @ 21C (70F): 100 **Boiling Point:** 87C (189F) **Melting Point:** -73C (-99F) Vapor Density (Air=1): 4.5 Vapor Pressure (mm Hg): 57.8 @ 20C (68F) Evaporation Rate (BuAc=1): No information found.

10. Stability and Reactivity

Stability:

Stable under ordinary conditions of use and storage. Will slowly decompose to hydrochloric acid when exposed to light and moisture.

Hazardous Decomposition Products:

May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition.

Hazardous Polymerization:

Will not occur.

Incompatibilities:

Strong caustics and alkalis, strong oxidizers, chemically active metals, such as barium, lithium, sodium, magnesium, titanium and beryllium, liquid oxygen.

Conditions to Avoid:

Heat, flame, ignition sources, light, moisture, incompatibles

11. Toxicological Information

Toxicological Data:

Trichloroethylene: Oral rat LD50: 5650 mg/kg; investigated as a tumorigen, mutagen, reproductive effector.

Reproductive Toxicity:

This material has been linked to mutagenic effects in humans.

\Cancer Lists\			
	NTP	Carcinogen	
Ingredient	Known	Anticipated	IARC Category
Trichloroethylene (79-01-6)	No	Yes	2A

12. Ecological Information

Environmental Fate:

When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material has an experimentally-determined bioconcentration factor (BCF) of less than 100. This material is not expected to significantly bioaccumulate. When released into the air, this material may be moderately degraded by reaction with photochemically produced hydroxyl radicals. When released into the air, this material is expected to have a half-life between 1 and 10 days.

Environmental Toxicity:

The LC50/96-hour values for fish are between 10 and 100 mg/l. This material is expected to be slightly toxic to aquatic life.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: TRICHLOROETHYLENE **Hazard Class:** 6.1 **UN/NA:** UN1710 Packing Group: III Information reported for product/size: 5GL

International (Water, I.M.O.)

Proper Shipping Name: TRICHLOROETHYLENE Hazard Class: 6.1 UN/NA: UN1710 Packing Group: III Information reported for product/size: 5GL

International (Air, I.C.A.O.)

Proper Shipping Name: TRICHLOROETHYLENE Hazard Class: 6.1 UN/NA: UN1710 Packing Group: Ill Information reported for product/size: 5GL

15. Regulatory Information

\Chemical	Inventory Status - Part	1\				
ingreatent			TSCA	EC	Japan 	Australia
Trichloroethylene	(79-01-6)		Yes	Yes	Yes	Yes
\Chemical	Inventory Status - Part	2\				
Ingredient			Korea	DSL	NDSL	Phil.
Trichloroethylene	(79-01-6)		Yes	Yes	No	Yes
\Federal,	State & International R	egulati	ons - 302-	Part 3	L\	
Ingredient		RQ	TPQ	Li	st Che	mical Catg.
Trichloroethylene	(79-01-6)	No	No	Ye	6	No
\Federal,	State & International R	egulati	ons -	Part :	2\	
Ingredient		CERCL	A	261.3	1 3 B	(d)
Trichloroethylene	(79-01-6)	100	_	U228	N	0

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No Reactivity: No (Pure / Liquid)

WARNING:

THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: No information found. Poison Schedule: S6 WHMIS:

This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 1 Reactivity: 0 Label Hazard Warning:

WARNING! HARMFUL IF SWALLOWED OR INHALED. AFFECTS HEART, CENTRAL NERVOUS SYSTEM, LIVER AND KIDNEYS. CAUSES SEVERE SKIN IRRITATION. CAUSES IRRITATION TO EYES AND RESPIRATORY TRACT. SUSPECT CANCER HAZARD. MAY CAUSE CANCER. Risk of cancer depends on level and duration of exposure.

Label Precautions:

Do not get in eyes, on skin, or on clothing.

Do not breathe vapor.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Keep away from heat and flame.

Label First Aid:

If swallowed, induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician. Note to physician: Do not administer adrenaline or epinephrine to a victim of chlorinated solvent poisoning.

Product Use:

Laboratory Reagent.

Revision Information:

MSDS Section(s) changed since last revision of document include: 8, 11.

Disclaimer:

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Prepared by: Strategic Services Division Phone Number: (314) 539-1600 (U.S.A.)

APPENDIX 3

PPE Selection & Descriptions

1.0 PERSONAL PROTECTION EQUIPMENT SELECTION

1.1 INTRODUCTION

The process used for selecting personnel protection equipment (PPE) is presented in this section. The standard approach is presented as a three step process. Contaminant identification; contaminant characterization; and trigger level establishment. This approach should be the basis of the PPE selection program. Site specifics need to be incorporated into the process.

1.2 STANDARD APPROACH

1.2.1 Contaminant Identification

One of the most important pieces of background information concerning the site is a list of possible contaminants that may be present. Sources of this information that should be investigated include, but are not limited to, owner/operators of a site, governmental agencies and previous investigations or reports. When The Johnson Company is satisfied that potential contaminants have been identified, the PPE selection process may move to the next step.

1.2.2 <u>Contaminant Characterization</u>

1.2.2.1 Exposure Guidelines

The next step in the PPE process is to characterize the hazards and risks associated the identified contaminants. The following is a list of breathing zone standards and sources of information:

<u>Standard</u>	Source
Threshold Limit Value (TLVs) (subgroups: Time weighted average, (TWA); Short Term Exposure Limit (STEL); Cuing (C).	American Conference of Governmental Industrial Hygienist (ACGIH) <u>Threshold Limit Values</u> and Biological Exposure <u>Indices</u> .
Recommended Exposure Limits (RELs)	National Institute for occupation Health and Safety (NIOSH).
Occupational Safety and Health Administration (OSHA).	Permissible Exposure Limits (PELs)
Immediately Dangerous to Life and Health (IDLH).	NIOSH Guide to Chemical Hazardous.

As a general rule, the PEL will be used for PPE selection. However, in cases where the TLV/TWA or REL are lower than the PEL, the appropriate PPE selection criteria should be determined on a case by case basis.

PELs and RELs are also accompanied by a "skin" notation if the overall exposure to a particular compound may also be through the eyes or skin.

1.2.2.2 Physical Characteristics

The physical characteristics of hazardous substances are important because they determine a compound's fate and pathways that may lead to worker exposure.

When developing a site specific HSP, one should consider the solubility, vapor pressure, Henry's Law constant, partitioning coefficients and other parameters when assessing where a contaminant may be residing, and what the most likely exposure pathways may be.

2.0 PERSONAL PROTECTIVE EQUIPMENT DESCRIPTIONS AND INSTRUCTIONS2.1 INTRODUCTION

As required by OSHA 1910.120, Personal Protection Equipment (PPE) must be selected which will protect employees from the specific hazards which they are likely to encounter during their work on-site.

Selection of the appropriate PPE is a complex process which must take into consideration a variety of factors. Key factors involved in this process are identification of the hazards, or suspected hazards, the routes of exposure to the employees (inhalation, skin absorption, ingestion, and eye or skin contact), and the performance of the PPE materials (and seams) in providing a barrier to these hazards. The amount of protection provided by PPE is materialhazard specific. That is, protective materials will protect well against some hazardous substances and poorly, or not at all, against others. In many instances, protective equipment materials can not be found which will provide continuous protection from the particular hazardous substance. In these cases the breakthrough time of the protective material should exceed the work durations, or the exposure after breakthrough must not pose a hazardous level.

Other factors in this selection process to be considered are matching the PPE to the employee's work requirements and task-specific conditions. The durability of PPE materials, such as tear strength and seam strength, in relation to the employee's tasks must be considered. The effects of PPE in relation to heat stress and task duration are a factor in selecting and using PPE. In some cases layers of PPE may be necessary to provide sufficient protection, or to protect expensive PPE inner garments, units or equipment.

The more that is known about the hazards at the site, the easier the job of PPE selection becomes. As more information about the hazards and conditions at the site becomes available, the site supervisor can make decision to up-grade or down-grade the level of PPE protection to match to tasks at hand.

2.2 DESCRIPTION OF LEVELS

The following are guidelines which can be used to <u>begin</u> the selection of the appropriate PPE. As noted above, the site information may suggest the use of combinations of PPE selected from the different protection levels (i.e. C or D) as being more suitable to the hazards of the work. It should be cautioned that the listing below does not fully address the performance of specific PPE material in relation to the specific hazards at the job site, and that PPE selection, evaluation and re-selection is an ongoing process until sufficient information about the hazards and PPE performance is obtained.

2.3 LEVEL C ENSEMBLE

Level C should be used when the concentration(s) and type(s) or airborne substance(s) are known and the criteria for using air purifying respirators are met.

Level C equipment; used as appropriate:

- 1. Full-face or half mask, air purifying, canister-equipped respirators (NIOSH approved).
- 2. Hooded chemical-resistant clothing (overalls; two-piece chemical-splash suit; disposable chemical-resistant overalls).
- 3. Coveralls.⁴
- 4. Gloves, outer, chemical-resistant.
- 5. Cloves, inner, chemical-resistant.
- 6. Boots (outer), chemical-resistant steel toe and shank.
- 7. Boot-covers, outer, chemical-resistant (disposable).²
- 8. Hard hat.
- 9. Escape mask.²
- 10. Two-way radios (worn under outside protective clothing).
- 11. Face shield.²

2.3.1 <u>Respiratory Personal Protection</u>

All employees working in the Exclusion zone will be required to wear a NIOSH

approved respirator with which they have been successfully fit tested with in the past 12 months.

⁴ Optional, as applicable.

The respirators will be outfitted with organic carbon or organic carbon/acid gas cartridges. All cartridges will have the date, start time, and initial of users placed on them prior to use. The cartridges will be exchanged once a day, after 8 hours, or after breakthrough is detected by the employee, which ever is shorter.

All respirators will be disassembled and thoroughly washed with warm soapy water at the end of each working day. The equipment will be allowed to air dry prior to reassembly.

2.3.2 <u>Personal Protective Clothing</u>

Boots: All boots will be made of heavy duty rubber with steel toes and shanks. They will be in good repair and impermeable to water.

Outer Gloves: The outer gloves will be nitrile that extend up to the mid fore arm at a minimum. The gloves will be in good repair and impermeable to water. Inner Gloves: The inner gloves will be surgical grade latex, non-sterile, disposable gloves. Two pairs of gloves will be used by all employees.

Boot covers: The boot covers will be made of tyvek with reinforced soles. They will be maintained in good condition and replaced at the first sign of wear. The SSO may require double boot covers to ensure minimal possibilities of contamination.

Coveralls: Complete poly-coated tyvek coveralls with attached hoods and elastic ankles will be used. The coveralls will be maintained in good condition and will be replaced at the first sign of wear or if they become splashed or soiled by contaminated water or soil.

Head covering: All individuals will be required to wear a NIOSH approved hard hat at all times.

Eye Protection: Protective eye and face equipment shall be worn when there is a reasonable probability of injury that can be prevented by such equipment. As per VOSHA 29 CFR 1910 - 133(a)2-6).

2.3.3 <u>Dressing in Level C Ensemble</u>

The following sequence will be followed when donning Level C gear to ensure proper protection of individuals:

1.	Inner boots	7. Taping at wrists
2.	Tyvek	8. Donning respirator
3.	Outer boots	9. Donning hood
4.	Taping ankles	10. Taping neck openings
5.	Inner gloves	11. Donning hard hat
6.	Outer gloves	12. Taping on hard hat

2.4 LEVEL D ENSEMBLE

The equipment used in the Level D ensemble is meant to provide minimal protection from hazardous materials. It should only be used for nuisance contamination.

Boots: Heavy duty work boots with steel toe and shank. In wet environments these will be substituted with heavy duty rubber boots with steel toe and shank.

Gloves: As necessary.

Coveralls: White tyvek may be used to protect clothes against nuisance contamination. No hood or booties are required. As necessary.

Safety Glasses: NIOSH approved.

Hard Hat: NIOSH approved.

ATTACHMENT 8

STANDARD OPERATING PROCEDURES (SOPs)

100 State Street, Suite 600 Montpelier, Vermont 05602 (802) 229-4600 SOP-JC0-007 (3/89) Rev. 3/90, 11/90, 6/94, 3/96 Page 1 of 3

Standard Operating Procedure For Chain-of-Custody Records

INTRODUCTION

The chain-of-custody record allows for the tracking of possession and handling of individual samples from the time of field collection through laboratory analysis. All samples released from field operations shall be accompanied by a Chain-of-Custody Form (Attachment JCO-007-1). This is done to insure the legal integrity of the sample materials collected. Every effort shall be made to keep as few people as possible in the chain of sample possession.

PROCEDURE

- 1. A completed Chain-of-Custody Form shall accompany each set of samples released from the study site. The Chain-of-Custody Form for all samples shall include the following information:
 - a. Signature of Sampler
 - b. Client/Project name
 - c. Project Location
 - d. Field Logbook Number (e.g. page no. in field book)
 - e. Sample Number, Identification
 - f. Date and time of sample collection
 - g. Type of Sample (Air, water, soil, etc.)
 - h. Analysis requested
 - i. Preservative Added (Remarks section)
 - j. Source of the Sample (Remarks section)
 - k. Chain-of-Custody Tape Number
 - 1. Inclusive Dates of Possession
 - m. Signatures of persons involved in chain of possession
 - n. Name of person the analytical results are to the attention of (in lower right corner of the form).
- 2. The Chain-of-Custody Form is designed in quadruplicate. Each of the individual four sheets is a different color. Along the bottom of each sheet are the instructions describing who gets which copy. These instructions are as follows:

100 State Street, Suite 600 Montpelier, Vermont 05602 (802) 229-4600

White Copy:Original sheet to accompany sample to the lab and returned to The
Johnson Company.Yellow Copy:Laboratory CopyPink Copy:Transporter Copy (optional)Orange Copy:Sampler Copy

Therefore, after the Chain-of-Custody Form has been completely filled out, the sampler signs the initial "Relinquished by" along with date and time and obtains the signature of the next person (i.e. transporter) in the chain-of-custody (in the initial "Received by" box along with date and time. The sampler then tears off the back (orange) copy for his records. Then the transporter delivers the samples to the analytical lab, he signs the second "Relinquished by" box along with date and time, and a laboratory representative signs the second "Received by" box along with the date and time. At this point, the transporter has the option of retaining the Pink copy for his records.

Instructions shall be given to the laboratory regarding their responsibilities in returning the top sheet (white copy) to The Johnson Company with the lab results. This sheet contains all sample information and original signatures. The lab should retain the yellow copy for their records.

If the sampler his- or herself delivers the samples to the laboratory, then the sampler should make certain the receiving party at the lab signs in the proper space, i.e., "Received for Laboratory".

- 3. The Chain-of-Custody form shall be completed in legible hand writing with indelible ink, with all the appropriate information completed. Once completed, the form is either:
 - a. placed in a plastic-wrap and included with the samples in the cooler, or;
 - b. fixed in an envelope taped securely in top of the cooler or plastic packing slip container (if available). This method allows for signatures to be included with each transfer of custody. This method is mandatory in the event a non-commercial courier is utilized to transport samples.
- 4. The sample container shall be sealed with chain-of-custody tape, containing the designation, date, and sampler's signature. The custody tape is especially important when shipping the container via overnight courier such as Federal Express and United Parcel Service.

100 State Street, Suite 600 Montpelier, Vermont 05602 (802) 229-4600 **SOP-JC0-007** (3/89) Rev. 3/90, 11/90, 6/94, 3/96 Page 3 of 3

6 Revision Date: Author: Scientist, Engineer or Technician (r O **Reviewed:** MO Date AN Director, Quality Assurance Unit 13/96 \cap Date Approved: Vice President

JCOSOP.007

ATTACHMENT SOP-JCO-007-1

Chain-of-Custody Form (following page)

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Standard Operating Procedures for Soil Sampling for Volatile Organic Compounds

INTRODUCTION

The purpose of this Standard Operating Procedure is to provide instruction for the collection and preservation of solid materials (e.g., soils, sediments, and sludge) for analysis of the potential presence of volatile organic compounds (VOCs).

EQUIPMENT AND SUPPLIES

- Pre-weighed VOA vial with screw cap and Teflon septum containing appropriate sample preservation solution (methanol or sodium bisulfate see EPA Method 5035A for further discussion)
- Sample collection device for minimally disturbed delivery of sample, such as:
 - Encore[™] sampler
 - Terra CoreTM sampler
 - Purge-and-trap soil sampler
 - o Disposable plastic syringe with barrel cut-off and smaller than vial opening
- If project specific work plan(s) specify, portable balance and calibration weights (balance should have accuracy to weigh to 0.01 grams)
- Chain of custody records and custody seals
- Sample collection documentation (sample labels, sampling worksheets, logbooks)

PROCEDURE

- A. Using an appropriate sample collection device (see above), collect approximately 5g of sample as soon as possible after the surface of the soil or other material has been exposed to the atmosphere, generally within a few minutes at most. To the extent practical, samples should be obtained from undisturbed portions of the solid material.
- B. Using the sample collection device, add the approximately 5g of sample to the sample vial containing the preservative solution.
- C. Wipe any soil off the vial threads and immediately seal the vial with the septum and screw cap.
- D. If project specific work plan(s) specify, use portable balance to weigh the sealed vial containing the sample (after noting either the laboratory-indicated weight, or determining the tare weight of the vial in the field) to ensure that 5.0 ± 0.5 grams of sample was added.
- E. Label sample and indicate type of preservative solution.
- F. Sign and affix custody seal across cap of vial.
- G. Store sample at 4 °C plus or minus 2°C.
- H. If project specific work plan(s) specify, replicate samples should be collected wherever possible. This enables the laboratory additional sample(s) for re-analysis, if necessary. Replicate samples should be taken as quickly as possible from the same stratum and within the closest proximity to the location of the parent sample possible
- I. A separate aliquot of soil should be collected for screening purposes and moisture content determination if required by the laboratory. This aliquot should NOT contain sample preservation solution.

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REFERENCES:

USEPA Method 5035A Closed System Purge-And-Trap and Extraction for Volatile Organics in Soil and Waste Samples, Draft Revision 1, July, 2002

Author:	Pronda Kayy Scientist, Engineer or Technician	Date: 7/2/07
Reviewed:	Quality Assurance Unit	Date:6/30/07
Approved:	M Chell	Date: 7/6/07

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Standard Operating Procedure for Calibration and Operation of the MiniRAE 3000 Portable Handheld VOC Photo-Ionization Detector

INTRODUCTION

Photo-ionization detectors are instruments commonly used to check for presence of volatile organic vapors in air. Measurements are used for Health and Safety as well as investigative purposes. This Standard Operating Procedure addresses use and operation of the MiniRAE 3000 photo-ionization detector. All photo-ionization detectors (PIDs) operate on the same basic principle. A fan or pump pulls air into a chamber that is bathed in ultra-violet light. This light excites the electrons of the outer shell of the atoms of the organic molecule. The energy required to remove the outermost electrons from the molecule is called the ionization potential (IP) and is specific for any compound or atomic species (Cartier, 1989). These ions pass through a detector that measures the energy level of the gas. The more organic molecules present, the more ions, and the more energy detected. The reading is displayed on an analog meter in units of parts per million by volume of calibration gas.

These units have individual limitations of the linear detection range and for field conditions over which they will operate. The ability to detect a chemical depends on the ability to ionize it. Therefore the IP of a chemical to be detected must be compared to the energy generated by the ultra-violet (UV) lamp of the instrument. PIDs will typically detect compounds with IPs lower than the energy of the PID lamp. The energy of lamps available are 9.8, 10.6, and 11.7 eV (electron volts).

EQUIPMENT AND SUPPLIES

MiniRAE 3000 equipped with appropriate gas discharge lamp

100 ppm Isobutylene span gas canister with a flow500 cc/min flow-limiting regulator OR a >500 cc/min regulator and a T-connection that allows excess flow to escape OR a Tedlar bag
Instrument logbook
Field calibration forms
External filter

PROCEDURE

A. <u>General Considerations</u>

<u>Weather</u>: The MiniRAE 3000 has limited function capabilities in damp and extreme cold conditions. Detector specifications include a temperature range of -4° F to 113° F and a humidity range from 0% to 95%. In atmospheres outside of these ranges, the instrument may produce erroneous readings. Care should be taken to avoid exposure to damp atmospheres, if possible. In damp conditions the moisture trap should be inserted onto the probe tip to prevent moisture from entering the unit. Operation of the MiniRAE 3000 with the moisture trap will require longer retention times to elapse before making a reading. The extra time required will depend upon a number of variables and cannot be quantified.

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Extreme cold can cause the fan not to operate. Keep the MiniRAE 3000 in a dry, warm, secure station whenever the instrument is not in use.

<u>Personnel Safety</u>: The MiniRAE 3000 is Intrinsically Safe for use in Class I, Division I Groups A, B, C, D (i.e., environments where the following types of explosive gases, vapors, and liquids are present at all times: acetylene, hydrogen, ether, and hydrocarbons/fuels/solvents). **DO NOT CHARGE THE INSTRUMENT OR CHANGE THE BATTERY IN EXPLOSIVE ENVIRONMENTS.** The MiniRAE 3000 will not indicate low oxygen atmospheres or the presence of explosive gases that cannot be ionized and is not to be used in place of a Multi-gas Indicator (SOP-JCO-031).

B. MiniRAE 3000 Photo-Ionization Detector Operation, Maintenance, and Calibration

The operation, maintenance and calibration of the MiniRAE 3000 instrument is discussed in detail in the instruction manual, which is kept with the instrument. This manual shall be read and reviewed prior to operating the instrument. The general guidelines for the use of the instrument are discussed below.

B.1. Instrument Check

- 1. The operational status of the MiniRAE 3000 should be checked while in the office. The RAE systems logo should appear after pressing and holding the [MODE] key. Once startup and self-test procedures are complete, the instrument will show a numerical reading with icons on the display screen. A calibration icon will display if calibration is required either due to a lamp change, sensor replacement, change of calibration gas type, or if more than 30 days have elapsed since the last calibration.
- 2. Press the flashlight key to ensure that the built-in flashlight turns on.
- 3. Hold a xylene-containing marker, such as a Sharpie®, in front of the detection probe. The instrument is operational if there is a visible sensor reading.
- 4. The MiniRAE 3000 may have residual contamination from previous use. Once the Sharpie® marker is drawn away from the detection probe, check the MiniRAE 3000 screen. The screen should return to "0.00 ppm" or a reasonable background concentration (0.00 ppm to 1.5 ppm) without fluctuations. If the display fluctuates between "0.00 ppm" and reading larger than a typical background level, report the condition to the Senior Environmental Technician.
- 5. Calibration may not be necessary if a calibration check sequence proves accurate to a span gas. With the MiniRAE 3000 on, connect the instrument to the span gas cylinder or a Tedlar bag filled with span gas. If the response is +/- 2%, calibration may not be needed. Record this procedure and results in your field book along with the background reading. If calibration is required, follow the steps provided in B.2, below.
- 6. Press and hold the [MODE] key for five seconds to turn the lamp and pump off.
- <u>B.2. Standard Two-Point Calibration Procedure</u> To occur at "background location" on subject site (e.g., upwind, in a dry area, away from equipment operating at the site).

A two-point calibration uses a zero ("fresh" air) air and a span gas of known concentration.

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"Fresh" air is clean, dry air without organic impurities and an oxygen value of 20.9 percent. The zero calibration can be bypassed by selecting "Span Calib" in the calibration menu. The default span gas is 100 ppm isobutylene (isobutene). 1. Press and hold the [MODE] and the [N/-] buttons until the Password screen appears (no password is required). Press [Mode] to enter calibration. 2. Press [Y/+] to begin zero (fresh air) calibration, selecting the highlighted "Zero Calib". Press [Y/+] to start the calibration process; the message "Please apply zero gas" is 3. displayed. 4. Connect the instrument to a "fresh" air source such as a zero gas cylinder or Tedlar bag, or place the instrument in background locations at the Site. 5. Turn on the zero calibration gas if necessary, press [Y/+] to start calibration. 6. Zero calibration occurs over a 30-second period; the message "Zeroing..." is displayed until zero calibration is complete. The message "Zeroing is done! Reading = 0.0 ppm" will then be displayed. 7. The screen will return to the calibration menu; press [Y/+] to enter Span Calibration. The name of the default span gas, "Isobutene Span = 100 ppm", will appear. 8. Connect the instrument to a cylinder of the span gas with a 500 cc/min flow-limiting regulator, to a Tedlar bag filled with the gas, or to a >500 cc/min regulator attached to tubing with a T-connection that will allow excess gas to escape. 9. Press [Y/+] to initiate span gas calibration. Calibration occurs over a 30-second period; the message "Calibrating..." will be displayed until span gas calibration is complete. The message "Span 1 is done! Reading = ###.# ppm" will then be displayed where the displayed number "###.#" should be 100.0 ppm or very close to this value. 10. Record this value in both the instrument log book and on the field calibration forms. Press [MODE]; the message "Updating settings..." is displayed until the screen returns to 11. the main display and begins or resumes monitoring. See the MiniRAE 3000 User's Guide for instructions to conduct a three-point calibration. B.3. Operation Consult the site specific Health and Safety Plan (HASP), become familiar with its 1. stipulations, particularly the permissible exposure limits, before performing any field work. 2. ALARM SETTING. Set the alarm (a loud buzzer and/or red flashing LED) to the action level appropriate for upgrading personal protective equipment as stated in the HASP. This is accomplished by the following: Press the [MODE] and [N/-] keys. a. Press [N/-] twice to cycle to the Alarm Setting menu; press [Y/+] to b. select Alarm Settings. The alarm settings are comprised of High Alarm, Low Alarm, STEL Alarm, TWA Alarm, Alarm Type, and Buzzer & Light. Press the [N/-] to scroll through the Alarm Limit menu until the display c. shows the limit to be changed. Press [Y/+] to select the alarm type to be changed. d. Press [Y/+] to increase each digit's value; press [N/-] to scroll to the e. next digit.

f. Press [MODE] when all digits are entered.

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		g. Press $[Y/+]$ to save the changes, or press $[N/-]$ to undo the changes are
		return to the previous settings.
		h. When alarm types have been changed or bypassed, press [MODE] to
		return to the Programming Menu.
	3.	MAXIMUM CONCENTRATION. Peak readings are recorded when the instrument is
		running in Hygiene Mode (the default mode that provides basic functionality). This
		reading is displayed by pressing [N/-] from the main screen displaying current detections.
		Continuing to press [N/-] will allow the user to scroll through the other instrument
		settings and data (such as the date, time, temperature, span gas settings and lamp settings)
		before returning to the main screen.
	4.	BATTERY INDICATOR. When the instrument's battery is fully charged, a battery icon
		shows a full battery and does not flash. A fully charged battery will fun the instrument for
		16 nours. when the battery is low, the battery icon will blink and the instrument will here once and flack every minute to indicate that the machine should be turned off within
		10 minutes. To charge, turn the instrument off by holding the [MODE] button for 5
		seconds. Reconnect the instrument to its cradle and connect the cradle to a wall electrical
		outlet via an AC/DC adapter. The instrument will lock in place and the LED in the cradle
		will glow The charging time is less than 8 hours for a fully discharged battery
	5.	FIELD WORK.
		a. Enter the work area from the "background location", frequently viewing
		the display to monitor breathing space readings.
		b. Conduct the tasks required according to the appropriate protocols (in
		accord with approved Health and Safety and/or work plans) frequently
		observing breathing zone readings and recording them in the job
		specific field book, along with the time and location of the reading.
		c. In the event of erratic operations of the PID, periodically confirm that
		the instrument is holding its calibration by connecting the span gas
		canister or filled Tedlar bag to the MiniRAE 3000 as described in
		Section B.2 and note the concentration reading. Note this calibration
		confirmation in the instrument log book and in the job specific field
		book.
C.	Records	<u>}</u>
	1.	Records shall be kept of the use and calibration of the instrument and maintained in a
		permanent file.
	2.	Any anomalies or equipment damages should be immediately reported, via written report
		memorandum, to the Senior Environmental Technician.

D. <u>Decontamination</u>

- 1. Wipe the outside of the instrument case, display, straps and cables that are attached to the instrument with a clean, soft, dry cloth.
- 2. TAKE CARE TO KEEP WATER FROM ENTERING THE TIP ASSEMBLY OF THE INSTRUMENT.

REFERENCES

Cartier and Associates, 1989, General Safety and Health Provisions, OSHA 1910.120, Accompanying

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loose-leaf course text, pp IX-14.

Rae Systems, 2007, <u>MiniRAE 3000 User's Guide</u>, Revision A, accessed at <u>http://www.raesystems.com/~raedocs/manuals/MiniRAE3000 manual v4.pdf</u>. November 2007.

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