Phase (check one)	Type (check one)
☒ Site Investigation ☐ Corrective Action Feasibility Investigation ☐ Corrective Action Plan ☐ Corrective Action Summary Report ☐ Operations & Monitoring Report	☐ Work Scope ☒ Technical Report ☐ PCF Reimbursement Request ☐ General Correspondence

SITE INVESTIGATION

Springfield Armory
Fairground Road
North Springfield, VT 05150

SMS Site # 94-1683

A Facility Owned By:
Vermont Department of the Army
Office of the Adjutant General
Camp Johnson
Colchester, VT 05446-3004
(802) 654-0306
Contact: Major Raymond P. Bouchard

Prepared By:
Dufresne-Henry, Inc.
Precision Park
North Springfield, VT 05150
(802) 886-2261
Contact: F. David Deane, P.E.

January 19, 1999

TABLE OF CONTENTS

EXECUTIVE SUMMARY

An initial Site Investigation has been completed at the North Springfield Armory on Fairground Road in North Springfield, Vermont. The investigation was conducted by the Vermont Department of the Army following the removal of contaminated soil in the vicinity of former underground storage tanks (USTs) and associated dispensers.

The soil contamination was found to be more extensive than anticipated. In excess of 240 tons of contaminated soil was removed from the property for off-site disposal, but not all of it was removed either laterally or to depth. This investigation focused on determining whether the groundwater at and downgradient of the former UST location has been impacted.

Six groundwater monitoring wells were installed in test borings completed on the site between November 19, 1998 and December 3, 1998. One well was located where the strongest soil contamination had been observed (source area). One well was located in the apparent upgradient direction. The other four wells were located in the apparent downgradient direction. Of those three are on the Armory Parcel, and one is located east of Fairground Road on Town of Springfield property. Soil samples were screened with a PID in the field and detailed boring logs were kept for the drilling activities.

Groundwater samples were obtained from all of the monitoring wells except MW-4 which was dry. The samples were analyzed for the presence of volatile organic hydrocarbons (VOC's) by EPA Method 8260B. The only monitoring well which contained VOC's above method detection limits was MW-2 which is located at the source area. Nine compounds indicative of gasoline were detected. Two compounds were above Vermont Groundwater Enforcement Standards; 1,3,5,-Trimethylbenzene at 12 $\mu g/\ell$ versus a standard of 4 $\mu g/\ell$ and 1,2,4-Trimethylbenzene at 30 $\mu g/\ell$ versus a standard of 5 $\mu g/\ell$. Neither Methyl-tertiary-butyl ether (MTBE) nor benzene were present. The results indicate weathered gasoline most likely released

prior to 1985. The lack of gasoline constituents above detection limits in downgradient wells indicates that the dissolved plume is confined to the immediate area of the release.

Based on two rounds of sounding, the direction of groundwater flow is steeply towards the Black River which is approximately 850' to the east. The armory and other nearby properties are on the municipal water supply system. All of the buildings on the property have slab on grade foundations. No off-site buildings exist in the downgradient direction before the river is reached. There is no evidence that potential receptors, including the Springfield water supply, have been impacted.

Based on these findings the site does not meet the SMS criteria for additional corrective actions. It is recommended that groundwater levels be sounded monthly for the next six months to better define the direction and variability of the groundwater gradient. Samples should be obtained from all of the groundwater monitoring wells during high water of the Spring of 1999. Samples should be analyzed by EPA Method 8021B, modified to include MTBE modified to include MTBE, Napthalene and Tri-methyl benzenes. The additional round of analytical data and several more sets of sounding data will be used to re-evaluate the potential for impact to the Springfield well fields, and, if necessary, a long term monitoring plan will be established. It is further recommended that the Army and the Town of Springfield share hydrogeologic information generated on their neighboring properties to allow a better understanding of the overall subsurface characteristics in the area.

SITE INVESTIGATION
SPRINGFIELD ARMORY
NORTH SPRINGFIELD, VERMONT

Introduction

The Springfield Armory is located at 224 Fairground Road in North Springfield, Vermont. A site location map is included as Appendix A.

In 1996 the U.S. Army Center for Health Promotion and Preventive Medicine (CHPPM) conducted a geohydrologic study of the facility and determined that an apparent small amount of petroleum contaminated soil existed near the former location of underground fuel storage tanks (UST's) and associated dispensers. As a result of this finding the Vermont Department of the Army (Army) undertook steps to further define its extent, and remove all of the contaminated soil from the site. The Army retained Dufresne-Henry (DH) to perform this work.

During the excavation, screening and removal process both the volume and the level of contamination were higher than anticipated. In excess of 200 cubic yards of soil was removed for offsite treatment, but the full depth and breadth of the contaminated volume was not defined.

Because the site is located in the aquifer protection area for the Town of Springfield water supply, the Army immediately undertook this Site Investigation to determine the extent and severity of the residual contamination and whether or not there had likely been an impact to the water supply.

Work and Health and Safety Plans

The original work plan for the site was for the removal of contaminated soil. That plan was transmitted to the Army by the DH letter of October 22, 1998, which is included as Appendix B along with a Health and Safety Plan prepared for the soil excavation activity.

Following the discovery that the contamination was more widespread than anticipated, it was recognized that a subsurface site investigation would be necessary. The proposed site

investigation work plan, which is included as Appendix C, was submitted to the Army on October 29, 1998. The work plan included the proposed locations of five (5) monitoring wells to assess the impact that the fuel release may have had on the surficial aquifer.

The soil excavation, proposed work plan and potential remedial actions were discussed at a meeting between the Army, DH, Town of Springfield officials and the SMS on November 4, 1998. At the request of the Town, another downgradient well on the westerly side of the Town well field was added to the Work Plan. With that addition, verbal approval of the proposed work plan was provided at the meeting. In lieu of a formal review of the site investigation work plan by the SMS, a site Investigation Expressway Notification form was completed and submitted.

A revised and expanded Health and Safety Plan for the Site Investigation activities was prepared. That plan is also included in Appendix C.

Site Description

The Springfield Armory is located at number 224 on the south side of Fairground Road in North Springfield, Vermont. Property boundaries by distance and bearing are shown on a plan entitled "Master Plan, Springfield O.M.S.#4" dated December 1, 1978. That plan was the basis for the Site Plan included as Appendix D. Planimetering of the area within boundaries shows that the entire property encompasses 4.12 acres.

The western half of the property is undeveloped and consists primarily of a steeply sloping woodland extending to the boundary with single lot residential properties in a subdivision to the west. The eastern half of the property is developed with the armory facilities, which extend 418 feet along Fairground Road.. To the south is a large parcel owned by the Town of Springfield which includes the headquarters for the Public Works Department as well as a former sand and gravel pit. A single family residential property shares the border with the Armory due north along Fairground Road.

The Town of Springfield well fields are located to east on the opposite side of Fairground Road. The well fields are about 40 feet lower in elevation, and consist of several wells developed in unconsolidated riverine deposits. The entire area devoted to the well fields extends

from several hundred feet north of the Armory to about 1,000 feet south of the Armory. It is our understanding that there are no production wells due east of the Armory property.

The Armory is served by the municipal water supply system and, currently, two on-site wastewater disposal systems, one of which is inactive. Plans are in the works for connection to the municipal wastewater system.

There are two primary structures, the armory building which includes the drill floor, classrooms and offices; and the former OMS (organizational maintenance shop) building. The armory is still actively in use. The OMS was closed in 1993, and since that time has been used for cold storage. A minor, but for the purposes of this investigation significant, structure is the POL (petroleum, oils and lubricants) shed which is a 12 foot by 16 foot building located at the toe of the slope about 70 feet north of the northwest corner of the armory building. All of the structures are slab on grade construction.

As the name implies, the POL shed is currently used for the storage of containers of petroleum, oil and lubricants, as well as a push lawnmower and a snowblower. Typically the inventory is limited to two 5 gallon cans of hydraulic oil or greases and a 5 gallon can of gasoline used for the lawnmower, snowblower or field kitchen stoves.

Several underground storage tanks (UST's) have existed on the property. These will be further discussed under Site History. The only remaining and active fuel UST is a 6,000 gallon double walled steel tank which serves the armory heating system.

The driveway and parking areas to the south and west of the armory building are bituminous pavement. The fenced equipment yard to the north of the armory building has a gravel surface and is used for the storage of a variety of military vehicles and equipment including graders, tankers, troop transports, dump trucks and excavators. No vehicle maintenance beyond application of grease and addition of hydraulic fluid is performed on site.

The developed portion of the site is level. Site soils are highly permeable so runoff is limited. That runoff which does occur flows towards Fairground Road where one or more culverts carry it beneath the roadway to discharge on the wooded slope to the west above the Town well field.

Site History

The history of the site is incompletely known. No specific investigation into the history of the site was undertaken as a part of this investigation. The following information is taken from the 1996 CHPPM report and additional data provided by the Army or on site plans.

The initial facilities on the property were constructed in 1957. Prior to that time the site was part of a gravel pit, and to our understanding was owned by the Town of Springfield. It is assumed that fuel oil UST's were installed at the time of construction of the armory and maintenance shop. Based on a sketch provided by the Army the maintenance shop tank was 6,670 gallon capacity and located to the east (Fairground Road) side of the building. The tank for the armory was located beneath the driveway near the southwest corner of the building. The first UST for vehicle fuel was reportedly a 1,000 gallon gasoline tank installed in 1961. Based on the 1978 plan this tank was located directly in front of (southeast) of the POL shed. A 2,000 gallon diesel UST was installed to the south of the POL shed in 1975. The dispensers for each of these UST's were located on the exterior easterly wall of the POL shed.

All of the above tanks were reportedly removed in 1987. No record of the condition of the tanks or subsurface conditions at the time of removal has been found. All of the tanks were replaced with double walled tanks, apparently of comparable size and in the same general location. The gasoline tank was placed on the north side of the POL shed. It is our understanding that the dispensers were not changed.

All of the UST's with the exception of the armory heating oil tank were removed in 1994. Closure documentation for those removals was not reviewed as a part of this investigation, but it is our understanding that such documentation is available, and that a small quantity (about 6 cubic yards) of soil was removed at the time of closure after which the site was considered "clean".

The 1996 CHPPM report notes that activities associated with the maintenance shop (OMS) other than vehicle fueling posed the potential for the release of hazardous materials. From 1957 until operations were ceased in 1993 vehicle maintenance was performed at this location. Floor drains in the OMS discharged to a dry well on the north side of the building. Drummed waste

materials such as solvents, waste oil and antifreeze were stored on the ground to the north of the POL shed and later in the shed itself.

The Third Quarter 1998 Update (October 9, 1998) Vermont Hazardous Waste Sites List maintained by the Hazardous Materials Management Division (HMMD) contains 26 sites in Springfield. One site not on the list, the Springfield Public Works Garage immediately to the south, is also known to exist. A site investigation of that property is in progress.

Three (3) of the sites are within a one-half mile radius of the subject property, and several more are within a one mile radius. None of the sites are judged to be upgradient of the armory, with the possible exception of some of the rumored activities on the Public Works property. The other two closest sites; the former Soucy Motors and the former Idlenot Dairy are separated from subject property by the Black River. Both of these sites were UST contamination sites and are either being monitored or considered for SMAC (site management activity complete) status.

Previous Studies

The 1996 CHPPM report has been referenced several times herein. It was undertaken to investigate the possibility that past practices on the site, particularly the drywell and UST's had caused soil contamination which could lead to groundwater contamination. Soil samples were obtained from the surface and at depths ranging from 6' to 12.5' at ten locations by direct push boring or hand auger. At the location of the original gasoline UST refusal on a probable cobble limited the deepest sample to the 5-7' depth. Soil samples were analyzed for the presence of metals, volatile organics (VOC's), semivolatile organics (SVOC's), and total petroleum hydrocarbons (TPH).

With the exception of metals concentrations judged to be at background levels, the only analytical results above detection limits indicated very low levels of residual solvent contamination at the dry well, and low (35 mg/kg) to moderate (300 mg/kg) levels of TPH as gasoline at the original gasoline UST location. The only remedial action recommended was removal of a small quantity of soil at this location to "...allay potential regulatory doubts." It was suspected that this contamination was a result of a surface spill and not a tank or piping leak.

Contaminated Soil Removal

As a result of the recommendation in the CHPPM report, in September of 1998 the Army solicited bids to remove the contaminated soil near former gasoline UST location. DH was the successful bidder, and undertook the job based on an anticipated soil volume of no more than 50 cubic yards. Our Work Plan and Health and Safety Plan for that activity are included in Appendix B.

The plan was to screen the soil with a PID (Photovac HL-2000) and remove any soil that produced a positive reading or showed visual or olfactory evidence of contamination. The contaminated soil was to be polyencapsulated in the equipment yard while samples were tested for acceptance at a treatment facility. Samples for laboratory analysis were to be obtained from the sides and bottom of the excavation to demonstrate that all of the contamination had been removed.

The excavation was undertaken on October 22, 1998, but did not proceed as planned. As detailed in the letter and memorandum contained in Appendix E, substantially more contaminated soil was encountered than expected. Though localized in area, elevated PID readings were obtained from very near the surface to a depth of 26 feet. The peak readings of 2500 ppm were obtained from samples at 11 and 12 feet, but at 26 feet, the reading was still 750 ppm. Excavation was stopped for a number of reasons including undermining of the POL shed, the volume of soil excavated had far exceeded 50 cubic yards and the contractors equipment had reached the limit of its reach. The Army was verbally notified of the findings, and the excavation was partially backfilled with clean material. The contaminated soil that had been removed was polyencapsulated near the easterly end of the equipment yard.

On October 26, 1998 samples for laboratory analysis were taken from the stockpiled soil in anticipation of offsite treatment and disposal at ESMI in Loudon, New Hampshire. To the extent they were able Eastern Analytical provided expedited analysis in order to assure that approval could be gained to move the soil as quickly as possible. Because of the remote possibility that the soil might contain other than virgin petroleum, analyses were run for RCRA 8 metals, VOC's by EPA Method 8260B, ignitability and TPH. The only detected parameters indicated a highly weathered gasoline, with a possible trace of diesel. The laboratory reports are included in Appendix E as part of the transmittal sent to ESMI on November 3, 1998. An Offsite

Treatment Request Form was completed and submitted to the SMS for their approval to transfer the soil to ESMI. A copy of the approved form is included in Appendix E.

The soil was removed from the site and transported to ESMI on November 9, 1998. A total of 243.69 tons was shipped. Copies of the weigh slips and bills of lading for each truck are included in Appendix E. As of this writing the soil is awaiting processing at ESMI in Loudon, New Hampshire. A Certificate of Treatment will be provided by ESMI when treatment by thermal processing is completed.

Monitoring Well Installation

Following the work plan included in Appendix C (6) groundwater monitoring wells were installed between November19, 1998 and December 3, 1998 by M & W Soils Engineering, Inc. of Charlestown, New Hampshire. All borings and well installations were under the field observation of Dufresne-Henry personnel. The monitoring wells are designated MW-1 through MW-6. Locations are shown on the Site Plan/Groundwater Contour Plan included as Appendix D. The drillers boring logs and DH logs and installation report are included as Appendix F.

Well MW-1 is located on the west side of the security fence near the northwest corner of the POL shed. It was installed as the upgradient, or background, well. MW-2 is located 15' east of the POL shed, at or very close to the spot where the highest levels of contamination were observed during the soil excavation. MW-3 is located 65' east of the POL shed and MW-4 is located 90' southeast of the POL shed. MW-5 is located just to the south of the security fence in the front lawn area of the armory, about 180' east of the POL shed. Finally, MW-6 is located on the westerly side of the Town well field, about 360' east of the POL shed, on a line with MW-2 and MW-5.

During boring advancement split spoon soil samples were taken at various intervals as determined by the Dufresne-Henry inspector. Samples were obtained at least once every 5 feet, except in MW-2 which was augured to 20' before continuous sampling began. All soil samples were screened for the presence of Volatile Organic Compounds (VOC's) with a Photovac HL-2000 photoionization detector (10.6 eV lamp, calibrated on-site with 99.1 ppm Isobutylene). The screening was done at ambient temperatures in the headspace of the sample jars.

MW-2 produced the only samples which had elevated PID readings ranging from a peak of 1,230 ppm at 26' to a low of 1.3 ppm from a depth of 32' - 34'. Curiously, the deepest sample from 34.75' produced a 53 ppm peak reading and had a faint weathered gasoline odor. The boring was stopped at that depth due to refusal on apparent weathered bedrock.

No soil samples were retained for laboratory analysis.

The drilling was difficult for all of the wells located on the armory property. At several locations multiple attempts were required to advance the boring past nested cobbles to a sufficient depth to reach the water table. MW-4 was particularly problematic, and could not be advanced into the prevailing water table.

Two-inch diameter PVC monitoring wells were installed in each of the borings Each well was constructed from .010" machine slotted screen. The screened interval is 5' in MW-1, 20' in MW-2, 10' in MW-3, 10' in MW-4, 20' in MW-5 and 20' in MW-6. Each well was backfilled with clean silica sand to a point above the screen and a bentonite seal installed. The wells were protected at the ground surface by grouting in watertight cast iron monitoring well boxes for wells MW-1 through MW-5, and a locking stickup steel casing for MW-6.

Monitoring Well Sampling

Dufresne-Henry monitoring wells MW-2, MW-3, MW-5 and MW-6 were sampled on December 1, 1998 following our standard protocols. MW-1 had not yet been installed and MW-4 was not sampled because it was dry. The sampling was performed by Dufresne-Henry personnel. The water level was sounded and recorded. Three well volumes were purged prior to drawing a sample. No odors were noted upon opening the wells, nor was any evidence of a sheen observed at any location. Monitoring wells MW-1 was sampled following the same protocols by Dufresne-Henry personnel on December 10, 1998. The refrigerated samples were shipped to Eastern Analytical, Inc. via overnight carrier on December 2, 1998 and December 10, 1998 for the respective rounds. Each of the samples was analyzed for VOC's by EPA Method 8260B.

VOC's above method detection limits were found only in the sample from wells MW-2. That sample contained 9 compounds indicative of weathered gasoline. Two of those compounds

were above current Vermont Groundwater Enforcement Standards; 1,3,5-Trimethylbenzene at 12 $\mu g/\ell$ versus a standard of 4 $\mu g/\ell$ and 1,2,4-Trimethylbenzene at 30 $\mu g/\ell$ versus a standard of 5 $\mu g/\ell$. No benzene or Methyl tertiary butyl ether (MTBE) were found above their respective method detection limits of 1 $\mu g/\ell$ and 10 $\mu g/\ell$.

Copies of the laboratory report are included as Appendix G.

Site Geology

Surficial geology at the site is published as glaciolacustrine sand and gravel. The material is part of the North Springfield Delta, a large scale area of deposition in glacial Lake Hitchcock at the end of the Pleistocene Epoch. The test borings at the armory corroborate the mapping, showing thick deposits of stratified sand and gravel. The material in the vicinity of MW-6 is recent alluvium in the flood plain of the Black River.

Published mapping indicates bedrock on the site is the Mount Holly Formation. The Mount Holly is generally described as fine - medium grained biotitic gneiss, that may be granitoid or schistose in places. There may be minor beds of mica schist, and quartzite, and numerous small bodies of pegmatite and gneissoid granitic rock. The age of the formation is Precambrian. No bedrock outcrops were observed in the immediate vicinity.

Site Hydrogeology

The monitoring wells were sounded on December 1, 1998 and December 9, 1998. At the time of the first sounding MW-1 had not yet been installed. A summary table of sounding data is included as Appendix H. The depth to the water table ranged from approximately 8' in MW-6 to approximately 47' in MW-5.

Based on the limited sounding data available to date, the direction of groundwater flow is generally to east toward the Black River. Because MW-4 has to date been dry, any north to south component of water table slope is difficult to determine because the other five wells are in a line form west to east. The gradient on the westerly portion of the site between MW-1 and MW-3 is very steep, in excess of 20%. From MW-3 to MW-5 it flattens to about 8%. From MW-5 to MW-6 both sets of sounding data show a slight gradient back towards the armory from

the well field. This is a preliminary indication that MW-6 may be upgradient of that portion of the well field which may receive groundwater drainage from the armory site. Additional sounding data is required to draw conclusions regarding groundwater gradients with more confidence. The site plan in Appendix D shows groundwater contours estimated from the December 9, 1998 sounding data.

Potential Receptors

The potential receptor of primary concern is the Town of Springfield municipal well fields located to the east of the armory. There are two separate well fields; Chapman Meadow and Gilchrist. Their approximate locations are shown on the location map in Appendix A.

The Gilchrist field is the closest to the armory, but is to the north, and presumably upgradient. It consists of four gravel wells which range in depth from 40' to 53.2'. The southerly most well, Gilchrist 1 is about 500' northeast of the POL shed. The distances to the other wells are; Gilchrist 2 - 650', Gilchrist 3 - 800' and Gilchrist 4 - 900'. Gilchrist 3 and 4 are those now which are now in use with a combined yield on the order of 650 GPM.

The Chapman Meadow field is located to the southeast of the armory property. Chapman 1 consists of a series of 2" to 5" driven wells approximately 28', which combined yield about 200 GPM. . The closest Chapman 1 wells are approximately 1600' from the POL shed. The Chapman 2 well is a 70' deep 24" diameter well, with the screened interval at a reported depth of 58' to 68'. This well is located about 1000' southeast of the POL shed, and yields approximately 600 GPM.

The Chapman and Gilchrist wells are the sole source of supply for the Springfield municipal system.

As a condition of the permit to operate, the municipal wells are periodically tested for a wide range of contaminants. Testing data was not specifically reviewed for this study, but it our understanding that low levels of MTBE have been detected. The source of the MTBE, has not been determined. Studies are underway to better define the potential sources of contamination (PSOC's) to the Springfield supply.

There are in excess of one hundred structures within a one-half mile radius of the site. Most are single family homes, and all are either upgradient, based on the prevailing direction of groundwater flow determined herein, or on the opposite side of the Black River to the east. All are on the municipal water supply system, or can be connected. The nearest downgradient surface water is the Black River approximately 850 feet to the northeast of the POL shed. .

The Armory building is primarily a slab on grade foundation with a small lower elevation for the furnace room. The only other nearby buildings are those of the Springfield Public Works facility. The primary garage and offices are about 500' to the south in a building with a slab on grade foundation.

Summary and Recommendations

The Springfield Armory has occupied the site for 42 years. Potentially hazardous materials have been, and continue to be, stored and used at the site. Such practices decreased significantly in 1993 and 1994 when equipment maintenance ceased in the OMS and all USTs but the Armory fuel tank were removed.

A 1996 hydrogeologic study of the facility by the U. S. Army CHPPM revealed very low levels of residual chlorinated solvent contamination associated with the OMS drywell, and a suspected small volume of petroleum contaminated soil associated with fuel dispensing activities at the POL shed. During excavation of the petroleum for offsite disposal it was discovered that the extent of the contamination was greater than expected. At a depth of 26', PID readings were 750 ppm. In excess of 240 tons of soil were removed and transported to ESMI in Loudon, New Hampshire. Analytical testing of composite soil samples from the soil that was removed confirmed that the contamination was highly weathered gasoline. The full depth and areal extent of the contamination was not defined and not all of the contaminated soil was removed from the site.

Six (6) groundwater monitoring wells were installed in November and December 1998. Five of the wells have been sampled once for VOC's. The sample from the well installed where the contaminated soil was removed was the only one containing VOC's above method detection limits. Nine compounds were detected, all indicative of weathered gasoline. Two compounds were above Vermont Groundwater Enforcement Standards; 1,3,5,-Trimethylbenzene at 12 $\mu g/\ell$

versus a standard of 4 $\mu g/\ell$ and 1,2,4-Trimethylbenzene at 30 $\mu g/\ell$ versus a standard of 5 $\mu g/\ell$. Neither Methyl-tertiary-butyl ether (MTBE) nor benzene were present.

The lack of gasoline constituents above detection limits in downgradient wells indicates that the dissolved plume is confined to the immediate area of the release. There is no evidence that groundwater contamination from the armory site has, or is likely to, impact the well fields for the Springfield Public Water Supply which are primary receptors of concern. The well fields are located to the northeast and to the southeast of the site. Based on two rounds of sounding data, the groundwater gradient from the site is slightly southeast, towards the Black River.

The armory and other nearby properties are on the municipal water supply system. All of the buildings on the property have slab on grade foundations. We are aware of no complaints of petroleum odors within the buildings. No off-site buildings exist downgradient between the armory and the Black River.

Based on these findings the site does not meet the SMS criteria for additional corrective actions. We recommend that:

1. The monitoring wells be sounded on a monthly basis to better define the direction and variability of the groundwater gradient.

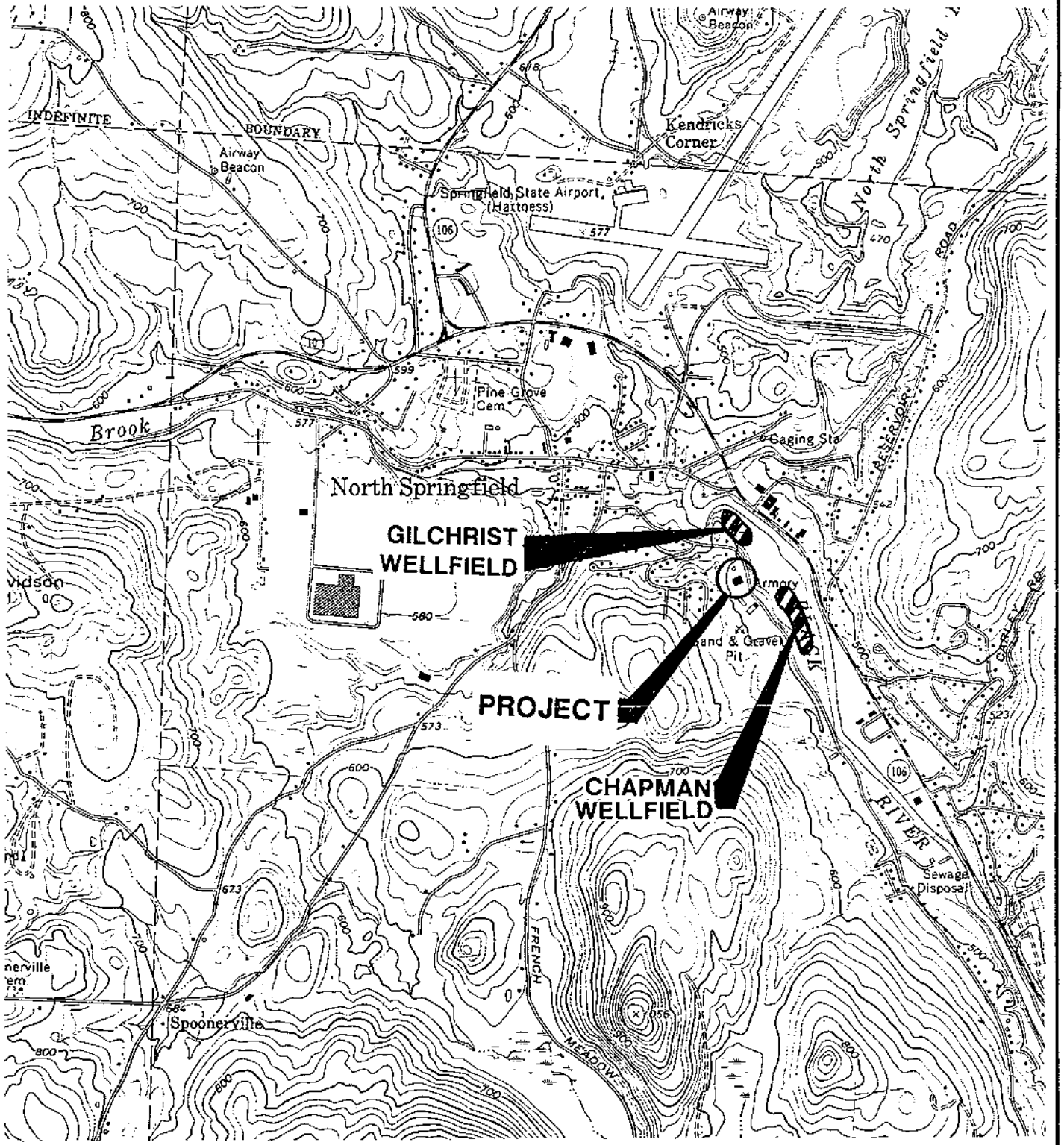
2. Samples be obtained from all of the groundwater monitoring wells in the spring of 1999, and analyzed for the presence of gasoline constituents by EPA Method 8021B modified to include MTBE, Napthalene and Trimethyl benzenes. The spring sample should coincide with high groundwater conditions.

3. The additional round analytical data and several more sets of sounding data be used to re-evaluate the potential for impact to the Springfield well fields, and, if necessary, a long term monitoring plan be established.

4. The Army and the Town of Springfield share hydrogeologic information generated on their neighboring properties to allow a better understanding of the overall subsurface characteristics in the area.

APPENDIX A

SITE LOCATION MAP



SCALE
1:24,000

TAKEN FROM A QUADRANGLE MAP FOR CHESTER, VT
FIELD CHECKED IN 1972

Dufresne-Henry, Inc.
Consulting Engineers
North Springfield, Vermont

SITE LOCATION PLAN

VERMONT NATIONAL GUARD
NORTH SPRINGFIELD ARMORY

SPRINGFIELD, VERMONT

Project No.	4080114
Proj. Mgr.	F.D.D.
Scale	AS NOTED
Date	DEC. '98
A	SLP

APPENDIX B

SOIL REMOVAL

WORK PLAN

AND

HEALTH AND SAFETY PLAN

Dufresne-Henry, Inc.
Consulting Engineers

Precision Park . North Springfield, Vermont 05150-0029 . Tel: 802.886.2261 . Fax: 802.886.2260 . E-mail: dh@d-hinc.com

October 22, 1998

Major Raymond P. Bouchard
Environmental Protection Manager
Camp Johnson
Colchester, Vermont 05446-3004

Via Fax (802) 654-0305 - 3 pages

Re: Soil Excavation, Disposal and Documentation
No. Springfield Armory
DH 4080114

Dear Major Bouchard:

Per the Agreement dated September 26, 1998 executed by Colonel Alan L. Nye, P.E., FMO, please consider this letter our informal work plan for the removal of petroleum contaminated soils at the North Springfield Armory.

As detailed in the Geohydrologic Study of the site dated September 20, 1996, a small volume of petroleum contaminated soil was identified is soil borings at location S-4, near the old gasoline UST location and just east of the POL shed. The sample obtained from a depth of 0'-1' contained 300 mg/kg of TPH-gasoline, and the sample from 5'-7' contained 35 mg/kg of TPH gasoline. Section 6.6.2 of the report provided the conclusion that the contamination was likely related to a surface spill associated with the fuel pumps, and not the former presence of the UST. Although the volume of soil was judged too small to be a threat to human health or the environment (including the Springfield water supply) it was recommended that a small volume of soil be removed to "allay potential regulatory doubts."

As detailed in our proposal of September 14, 1998, and discussed at our on-site meeting on October 6, 1998, Dufresne-Henry will prepare the informal work plan (this letter), health and safety plan, field screen soil samples, sample soils for laboratory analysis from both the stockpile and the excavation, prepare the corrective action letter report (including narrative, sketch, table of PID readings, analytical results, copies of bills of lading, copies of weigh slips and certificate of treatment from the disposal facility) and provide overall project coordination.

Gurney Brothers Excavation will excavate the soil and stockpile it on and under 6 mil poly on site. They will also load the soil onto trucks for transportation to ESMI.

ESMI of Loudon, New Hampshire will provide transportation, treatment and ultimate disposal of the contaminated soil.

Eastern Analytical, Inc. of Concord, New Hampshire will perform the required analyses for acceptance of the soil by ESMI and the confirmatory analyses on samples from the excavation.

Because the soil is in the vicinity of a former used oil storage area, the ESMI analytical requirements include VOC's RCRA 8 Metals and Ignitability in addition to the TPH necessary for certified virgin petroleum contaminated soils.

All DH and contractor personnel involved in on-site activities hold current OSHA Hazardous Waste Operation Training certification as required under 29 CFR 1910.120.

Prior to any excavation, surface soil samples will be obtained in the vicinity of the identified contamination and screened by the polybag head space method with a Photovac HL-2000 photoionization detector (PID) calibrated on site with 100 ppm isobutylene. A record will be kept of the location and level of all PID readings. The surface soil screening will be used to determine the areal extent of the excavation.

Polyethylene sheeting will be spread in an area in the area between the POL and OMS building, the exact location coordinated with Sgt Jewett or other armory personnel.

As excavation proceeds, soil will be stockpiled on the poly sheeting. Additional PID screenings will be taken at regular intervals. Excavation will proceed both vertically and laterally until PID readings are either 0 ppm or at ambient site levels.

Once excavation is completed, six soil samples will be collected from the walls of the excavation; one from each side and two from the floor. These samples will be analyzed for BTEX by EPA Method 8020, and TPH by EPA Method 8100 (modified) to confirm that all of the contaminated soil has been removed. Samples needed for the characterization for soil disposal will also be obtained from the stockpile.

The excavation will be backfilled with clean fill, compacted with the backhoe bucket.

The soil stockpile will be covered with poly, and ballasted to keep the poly in place.

Once approval is obtained from the soil disposal facility, the soil will be loaded for transportation to New Hampshire, and the poly removed from the site.

DH

Once all documentation is received, a report will be prepared documenting all on site activities, sample results, and disposal documentation.

The excavation is scheduled to proceed during the afternoon of October 22, 1998. I apologize for the short notice, and the delay in getting this work plan to you, but based on our on site meeting, I trust that it is appropriate to proceed with the project as outlined above.

Very truly yours,

DUFRESNE-HENRY, INC.

F. David Deane, P.E.
Environmental Services

FDD/dim

Enclosure

NSpfldArmworkPlan102298

TABLE OF CONTENTS

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

HEALTH AND SAFETY PLAN
FOR

SITE INVESTIGATION

(PROJECT)

(TOWN), STATE

This Health and Safety Plan applies only to Dufresne-Henry, Inc. employees.

PROPOSED ON-SITE ACTIVITIES:

Soil excavation near POL building, soil sampling, stockpiling of cnotaminated soil.

PROPOSED DATE(S) OF WORK:

October 22, 1998 and October 23, 1998

ANTICIPATED WEATHER CONDITIONS:

Sunny, 45 degrees, windy

PROPOSED SITE INVESTIGATION TEAM:

Personnel	Responsibilities
F. David Deane	Project Manager
Oscar Garcia	Site Safety Officer
Oscar Garcia	Field Team Leader (Monitoring Wells/Sampling)
	Site Representative
	ANR Representative

All Dufresne-Henry, Inc. personnel arriving or departing the Site should check in and out with the Site Safety Officer. All Dufresne-Henry activities on-Site must be cleared through the Field Team Leader or Project Manager.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

Background Information

Site Status: X Active ___ Inactive ___ Unknown

Site Description (Topography, on-site structures, vegetation, surrounding population, contaminated areas (if known)...Attach site plan)

Fenced, gravel lot used for vehicle storage and maintenance. One large garage and one small storage shed are to only buildings within the fenced area.

Site History:

Vehicle maintenance facility for United States Army.

Monitoring or Sampling Data From Previous Site work:

In project location, a peak reading of 300 mg/kg of TPH was detected. This was found at a depth of one foot.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

HAZARD REFERENCE

Waste Types:

__ Liquid _X_ Solid ___ Sludge _X_ Vapor ___ Unknown

Waste Characteristics:

___ Corrosive _X_ Ignitable ___ Radioactive

_X_ Volatile ___ Toxic ___ Reactive

___ Unknown ___ Other ___ Persistent

Specific Substances of Greatest Concern (if known):
Gasoline

Hazard Evaluation:

Task: Soil Excavation _X_ Low ___ Medium ___ High

Identification of Hazards:
Possible OHW, UGW. Open excavation

Task: Sampling _X_ Low ___ Medium ___ High

Identification of Hazards:

Task: ___ Low ___ Medium ___ High

Identification of Hazards:

Task: ___ Low ___ Medium ___ High

Identification of Hazards:

Other Physical Hazards: (weather, heavy equipment, site structures...)
Excavator, Dump Trucks, weather.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

Hazard Assessment:

OVERALL HAZARD: ___ Serious ___ Moderate _X_ Low ___ Unknown

On-Site Control

Site control is necessary to minimize potential exposure of workers to hazardous waste/materials, protect the public from the Site's chemical and physical hazards, and to facilitate work activity. The procedures to be followed involve the establishment of Site work zones, Site security, and safe work practices.

The on-Site staging area and support zone has been established at:

Outside the fenced area, behind the main building

The personal contamination reduction zone (decon area) has been established at:

At the gate into the fenced area behind the main building

During the intrusive work, the exclusion area will be defined as follows:

Inside the fenced area

The decontamination of sampling and/or heavy equipment will be conducted:

At the gate into the fenced area behind the main building

These sub-regions of on-Site control have been established in order to reduce the potential cross contamination and proliferation of contamination by potentially contaminated equipment and personal protective equipment.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

SITE ACTIVITIES

Required Personal Protective Equipment (PPE)

Task	Entry Level of Protection	Monitoring Equipment	Upgrade/Downgrade Contingency
Soil Excavation	Mod D	Photovac HL-2000 Eplosimeter 0_2 meter H_2S meter	Upgrade to Level C with PID readings over 10 ppm for 5 minutes in breathing space.
Sampling	Mod D	"	"

Note: Breathing space PID readings of 50 ppm, explosimeter readings over 25% of the LEL, O_2 deficiency or enrichment, or H_2S readings will result in shutting down the job and consulting with State officials and the client.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

Specific protective equipment for each level of protection is as follows:

Level C:
Full Face Respirator w/appropriate cartridge (Willson T45)
Chemically Resistant Suit (Tyvek®)
Outer Rubber Slush Boots
Outer Chemically Resistant Gloves
Surgical Gloves
Hard Hat
Steel Toe/Shank Work Boots

Modified Level D:
Chemically Resistant Suit (Tyvek®)
Outer Rubber Slush Boots
Outer Chemically Resistant Gloves
Surgical Gloves
Hard Hat
Steel Toe/Shank Work Boots
Safety Glasses or Face Shield

Level D:
Work Clothes
Steel Toe/Shank Work Boots
Surgical Gloves
Hard Hat

Rationale for change in level of protection:

Upgrade to Level C with PID readings of 10 ppm or more for 5 minutes in the breathing space. PID readings over 50 ppm in the breathing space, explosimeter readings of over 25% of the LEL, O_2 deficiency or enrichment, or H_2S readings will result in shutting down the job and consulting with State officials and the client.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER OR PROJECT MANAGER.

Monitoring Procedures

Site Monitoring Equipment:

- X Photovac MicroTIP (Model HL-2000, 10.6 eV lamp)
- X Explosimeter
- ___ Draeger Tube & Pump
- X 0_2 Meter
- X Other: H_2S meter

Methods and Frequency of Monitoring:

Air space and soil samples: Photovac MicroTIP HL-2000.
Air space: explosimeter/O_2 meter/H_2S meter.

Frequency: Soil samples; as obtained.
Air; not to exceed every 15 minutes.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

Decontamination and Disposal

Personnel Decontamination Procedure:

_X_ Level C: Slush boot and glove wash, slush boot and glove rinse, tape removal, outer glove removal, (cartridge change), slush boot removal, suit removal, inner glove removal.

_X_ Modified Level D: Slush boot and glove wash, slush boot and glove rinse, slush boot removal, suit removal, glove removal.

Equipment Decontamination:

Disposal Procedure for Investigation-Derived Materials:
(decon waste, disposables)

SITE OPERATING PROCEDURES/SAFETY GUIDELINES

** Always observe the buddy system. Never enter or exit site alone, and never work alone in an isolated area. Never wander off by yourself.

** Always maintain a line-of-sight.

** Practice contamination avoidance. Never sit down or kneel, never lay equipment on the ground, avoid obvious sources of contamination such as puddles, and avoid unnecessary contact with on-site objects

** No eating, drinking, or smoking outside the designated "clean" zone.

** In the event PPE is ripped or torn, work shall stop and PPE shall be removed and replaced as soon as possible.

** Be alert to any unusual changes in your own condition; never ignore warning signs. Notify Health and Safety Coordinator as to suspected exposures or accidents.

** A vehicle will be readily available exclusively for emergency use. All personnel going on-site shall be familiar with the most direct route to the nearest hospital.

** In the event of direct skin contact, the affected area shall be washed immediately with soap and water.

** Copies of the Health and Safety Plan shall be readily accessible at the command post.

** Note wind direction. Personnel shall remain upwind whenever possible during on-site activities.

** Never climb over or under refuse or obstacles. Use safety harness/safety lines when sampling lagoons, stream beds, and ravines with steep banks.

** Hands and face must be thoroughly washed before eating, drinking, etc.

** Any modifications to this safety plan MUST be approved by the Site Safety Officer.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

Special Procedures:
Confined Space Entry

X No attempt will be made to enter abandoned buildings, manholes, tanks, or any other confined areas.

___ Other:

Personnel Monitoring: (If applicable: Heat stress, frostbite, air sampling of individual breathing zone)

Monitoring of individual breathing space will be monitored by a Photovac MicroTIP HL-2000, explosimeter, and O_2 meter as outlined in monitoring procedures. Monitoring of weather related hazards will be dictated by existing conditions.

EMERGENCY SITUATIONS

The following standard emergency procedures will be used by Dufresne-Henry on-site personnel. The Site Safety Officer (SSO) shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury to Dufresne-Henry Employees in the Exclusion Zone

Upon notification of an injury to a Dufresne-Henry employee in the exclusion zone, a rescue team will enter the zone (if required) to remove the injured person to the hotline. The SSO and Project Manager should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the support zone. The SSO shall arrange for appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No Dufresne-Henry personnel shall re-enter the exclusion zone until the cause of the injury or symptoms are determined.

Personnel Injury to Dufresne-Henry Employees in the Support Zone

Upon notification of an injury to a Dufresne-Henry employee in the support zone, the Project Manager and SSO will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site Field Team Leader initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, all Dufresne-Henry personnel shall move to the decon line for further instructions. Dufresne-Henry activities on-site will cease until the added risk is removed or minimized.

Fire/Explosion

Upon notification of a fire or explosion on-site, all Dufresne-Henry personnel will assemble at the decon line. The fire department shall be alerted and all Dufresne-Henry personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure

If any Dufresne-Henry site personnel experience a failure or alteration of protective equipment that effects the protection factor, that person and his/her buddy shall immediately leave the exclusion zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure

If any other equipment on-site fails to operate properly, the Project Manager and SSO shall be notified and then determine the effect of this failure on continuing operations on-site. If the failure affects the safety of on-site Dufresne-Henry personnel or prevents the completion of the tasks, all Dufresne-Henry personnel shall leave the exclusion zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on-site emergency results in evacuation of the exclusion zone, Dufresne-Henry personnel shall not re-enter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed.
4. Dufresne-Henry personnel have been briefed on any changes in the Site Safety Plan.

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

EMERGENCY INFORMATION

AMBULANCE:		Phone:	911
HOSPITAL:		Phone:	911
POLICE:		Phone:	911
FIRE DEPARTMENT:		Phone:	911
POISON CENTER:		Phone:	911
ANR INCIDENT RESPONSE:	Office	Phone:	(802) 241 - 3888
CORPORATE:			
Dufresne-Henry N. Springfield, VT		Phone:	(802) 886 - 2261
Project Manager:	F. David Deane		

NEAREST PHONE: On site in main building

LOCATION OF ON-SITE FIRST AID KIT: On site in main building

EMERGENCY VEHICLE: Dufresne-Henry, Inc. senior member

PROJECT: North Springfield, Vermont Armory
JOB NO.: 4080114

The following individuals have read this safety document and are familiar with its contents, site conditions, and on-site safety procedures (please sign below):

Name	Company
Bruce Cox	Dufresne-Henry, Inc.
Oscar Garcia	Dufresne-Henry, Inc.
F. David Deane	Dufresne-Henry, Inc.

Copies of this SSP have been given to:

Approval Signatures:

PM _____

Div. Dir. _____

APPENDIX C

SITE INVESTIGATION

WORK PLAN

AND

HEALTH AND SAFETY PLAN

Proposed Work Plan
Site Investigation

NORTH SPRINGFIELD ARMORY
NORTH SPRINGFIELD, VERMONT

This work plan outlines the tasks to be completed for a Site Investigation at the North Springfield Armory on Fairground Road in Springfield, Vermont. This plan has been prepared as a result of observing more extensive than expected suspected gasoline contamination during a voluntary soil excavation at the site of a former gasoline UST and pump. Soil sample headspace PID readings of 2,500+ ppm were observed in the soil column within 15' of the surface, and 750 ppm at a depth of approximately 26'. The water table was not encountered to the depth of excavation. Soils consisted of gravel near the surface with very uniform medium sands at depth. Following removal of approximately 140 cubic yards of contaminated soil, the excavation was backfilled with clean material from off site.

The purpose of the investigation is to determine the existence and extent of subsurface petroleum contamination at the site. The proposed monitoring wells will be used to help ascertain the extent of a contamination plume and provide basic hydrogeologic data. Per conversations with Major Raymond P. Bouchard during the week of October 26, 1998 five (5) shallow groundwater monitoring wells will be installed at this time. The wells will be arrayed as shown on the attached site sketch. B1 will be in the assumed upgradient direction about 25' west of the excavated area. B2 will be in the center of the excavated area. B3 and B4 will be approximately 50' in the assumed downgradient direction, and about 50' apart. B5 will be in the assumed downgradient direction, about 180' away. The location of B5 may be adjusted pending findings in the upgradient wells. All field personnel are OSHA certified for hazardous site operations under 29 CFR part 1910.120.

BORINGS

It is anticipated that the borings for the monitoring wells will be completed using 4 1/4" hollow stem augers. If possible, monitoring well borings will be taken a minimum of five (5) feet into the prevailing water table. It is expected that the water table beneath the site is at a depth of between 40' and 50'. It is anticipated that well depth will not exceed 60 feet. Petroleum based pipe dope for use on drill rods, tools, or casing will not be allowed. No type of drilling mud, including polymers, will be used. Should flowing sands be encountered, clean water obtained locally will be used to increase hydraulic head. If flowing sands are particularly problematic, casing will be used. All borings and monitoring well installations will be performed by M & W Soils Engineering, Inc. of Charlestown, New Hampshire under the field supervision of Dufresne-Henry personnel.

SOIL SAMPLING

It is anticipated that with the exception of B2, split spoon samples will be taken at 5' intervals. In B2 continuous split spoon sampling will be done from a depth of 20' to the bottom of the hole. Sampling at other intervals will be a field decision of the Dufresne-Henry inspector. The split spoon sampler allows retrieval of relatively undisturbed soil samples from a known depth for classification and Volatile Organic Compound (VOC) screening. All soil samples and material from the auger flights will be screened for VOC's by headspace analysis with a Photovac HL-2000 photoionization detector (10.6 eV lamp, calibrated with Isobutylene). All soils with positive PID screening results will be polyencapsulated on site. The act of driving the sampler (Standard Penetration Test) also gives an indication of the density or degree of compaction of the soil. Representative samples from each spoon will be placed in glass jars and retained by Dufresne-Henry. These are for project records only and are not intended for chemical analysis. Detailed logs of geology, drilling data, PID readings, and monitoring well installation will be prepared for each boring. At this time it is not anticipated that analytical soil samples will be collected. Care will be taken, particularly in B2, to prevent the penetration of lower permeability soil layers which may enhance the downward migration of contamination. If such a confining layer is encountered, conditions will be noted, and appropriate measures will be taken to maintain those conditions. This may include installation of an extended bentonite seal during well construction, or abandoning the hole altogether, and sealing it with bentonite.

MONITORING WELLS

Monitoring wells will be constructed from 2", 0.010" machine slotted, threaded, flush joint, Schedule 40 PVC. Assuming no refusal, each monitoring well will consist of 20' of screen with sufficient riser to reach approximately 2" below the surface grade. The bottom of the well will be set such that approximately 10 feet of screen extends below the water table observed at the time of installation. For wells with shallow depth to the water table, the screened interval will be a decision of the Dufresne-Henry inspector. The bottom of all wells will be provided with a PVC cap or point, or a plug with an expanding gasket. The annular space between the auger and the screen will be carefully backfilled with clean silica sand to create a filter pack around the well. The filter pack will extend from the bottom of the well to approximately 2 feet above the screen. A bentonite seal will be installed above the filter pack, and the remainder of the hole will be backfilled with native soil. A more elaborate bentonite seal may be installed to replicate any confining layer encountered. A protective monitoring well box will be grouted in flush at the surface or a stick-up steel casing installed depending on the location. All wells will have removable top caps for sampling and sounding. The wells will be developed by surging and pumping. All evacuated water will be drummed on site.

DECONTAMINATION

The borings may, or may not, be completed within the zone of contamination. However, to prevent cross contamination between the borings, strict decontamination procedures will be followed. All in-ground tools and equipment will be decontaminated by steam cleaning prior to the start of work and between borings. All decontamination will be done on-site at a designated location. Within the known contaminated area, routine cleaning of equipment, such as split spoons, will use water obtained at the site or supplied by the boring contractor and a product such as ALCONOX. Disposal of spent cleaning solution will be at the site. Contaminated soil will be temporarily stored is a polyencapsulated stockpile prior to moving it off site to an approved location, pending final disposal.

WATER SAMPLING

One (1) water quality sample will be obtained from each of the Dufresne-Henry installed monitoring wells following a period of stabilization. The samples will be taken by Dufresne-Henry personnel. Samples will be obtained with disposable bailers which will be left in the wells to facilitate future sampling. All of the samples will be analyzed for VOC's by EPA Method 8260 by Eastern Analytical, Inc. of Concord, New Hampshire. Method 8260 will be used to determine whether compounds other than those associated with gasoline are present.

SITE SURVEY

The relative locations and elevations of the monitoring wells will be determined. Sufficient additional surveying will be performed to prepare an updated sketch of the site.

RECEPTOR ASSESSMENT

A receptor assessment will be conducted to identify potential receptors including nearby water supply wells and surface water. The basements of any nearby buildings, if any, will be screened with the PID as deemed necessary.

REPORTING

A report will be prepared summarizing the findings and recommendations of the investigation including the monitoring well installation, groundwater quality and overall characterization of shallow subsurface conditions, and the likely impacts on potential receptors. Conclusions and recommendations regarding the need for long term treatment and/or monitoring will be included. The report will be submitted within 30 days of the monitoring well installation.

A summary breakdown of estimated costs to complete the work will be found attached.

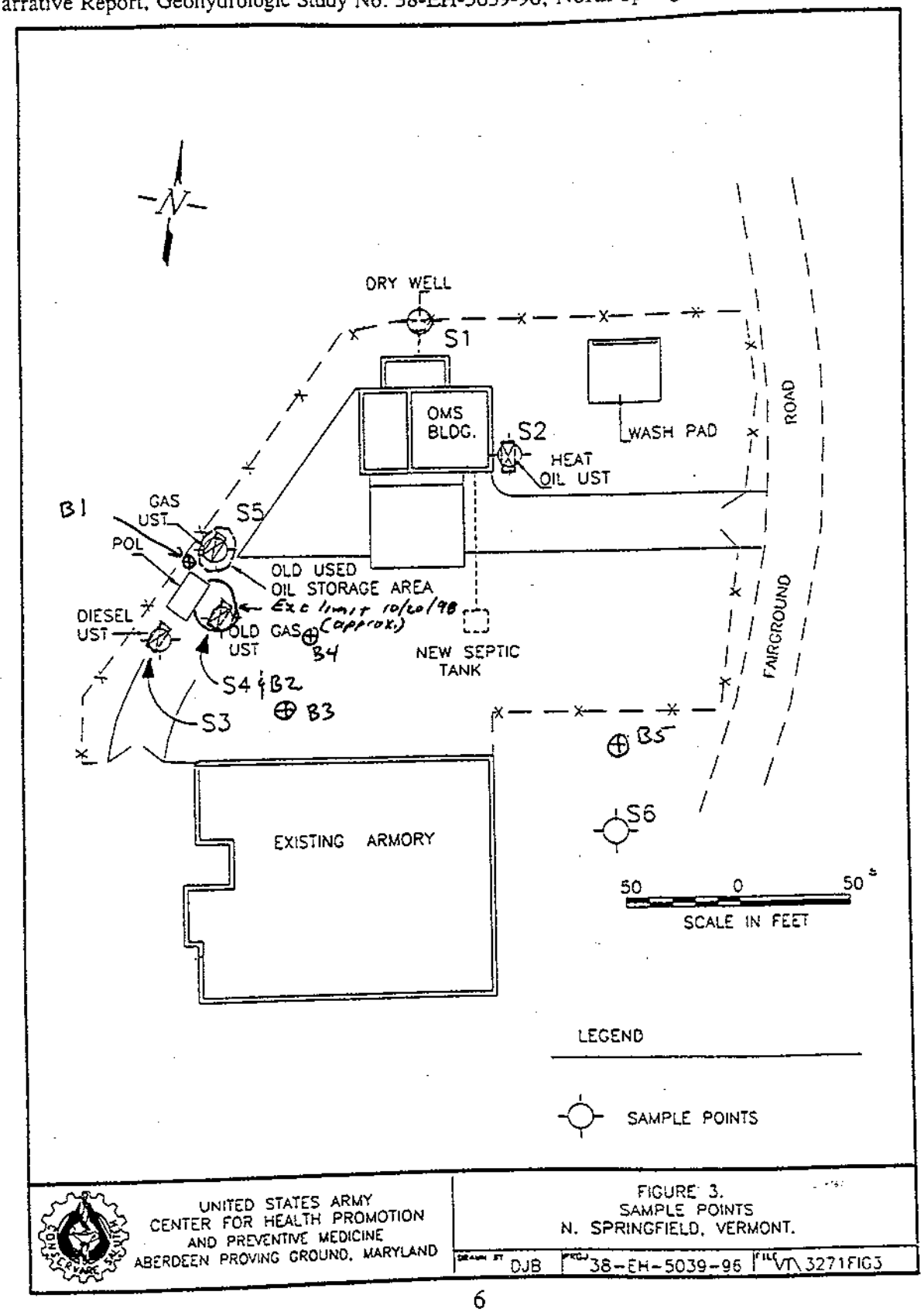

DRY WELL
S1
OMS BLDG.
S2
WASH PAD
HEAT OIL UST
ROAD
FAIRGROUND
B1
GAS UST
S5
POL
OLD USED OIL STORAGE AREA
Exc limit 10/20/98 (approx.)
DIESEL UST
OLD GAS UST
B4
NEW SEPTIC TANK
S4 & B2
B3
S3
B5
S6
EXISTING ARMORY
50 0 50
SCALE IN FEET
LEGEND
SAMPLE POINTS
UNITED STATES ARMY
CENTER FOR HEALTH PROMOTION
AND PREVENTIVE MEDICINE
ABERDEEN PROVING GROUND, MARYLAND
FIGURE 3.
SAMPLE POINTS
N. SPRINGFIELD, VERMONT.
DRAWN BY DJB
38-EH-5039-96
VT\3271FIG3

TABLE OF CONTENTS

PROJECT: NORTH SPRINGFIELD, VT ARMORY SITE INVESTIGATION
JOB NO.: 4080114

HEALTH AND SAFETY PLAN
FOR

SITE INVESTIGATION

VERMONT ARMY NATIONAL GUARD - NORTH SPRINGFIELD ARMORY

NORTH SPRINGFIELD, VERMONT

This Health and Safety Plan applies only to Dufresne-Henry, Inc. employees.

PROPOSED ON-SITE ACTIVITIES:

Installation of five (5) groundwater monitoring wells, decontamination, and groundwater sampling.

PROPOSED DATE(S) OF WORK: Wells: November 19 - 23, 1998
Sampling: Week of November 23, 1998

ANTICIPATED WEATHER CONDITIONS: temperatures in the 20's - 40's, possible snow or rain.

PROPOSED SITE INVESTIGATION TEAM:

Personnel	Responsibilities
F. David Deane	Project Manager
Bruce Cox	Site Safety Officer
Bruce Cox/Oscar Garcia	Field Team Leader (Monitoring Wells/Sampling)
Major Raymond P. Bouchard	Site Representative
Richard Spiese	ANR Representative

All Dufresne-Henry, Inc. personnel arriving or departing the Site should check in and out with the Site Safety Officer. All Dufresne-Henry activities on-Site must be cleared through the Field Team Leader or Project Manager.

PROJECT: SPRINGFIELD, VT ARMORY SITE INVESTIGATION
JOB NO.: 4080114

Background Information

Site Status: _X_ Active ___ Inactive ___ Unknown

Site Description (Topography, on-site structures, vegetation, surrounding population, contaminated areas (if known)

The Springfield Armory is located on the south side of Fairground Road. On-site utilities include underground water, sewer lines, and stormwater pipes. Overhead power lines exist. The depth to the water table is greater than 26'.

Dig Safe was contacted on 11/12/98. The site is clear after 1:00 pm on 11/16/98. The Dig Safe number is 984606413. The Town of Springfield Water and Sewer Department was contacted to mark out those utilities.

Site History:

The site history is not known at this time. The facility was constructed in 1957 and operated as a maintenance facility until 1993. Three UST's for heating oil, gasoline, and diesel fuel were replaced in 1987 with double wall UST's. The double wall UST's were removed in 1994.

Monitoring or Sampling Data From Previous Site work:

A Site Assessment Survey was conducted by the Department of the Army in July 1995. The assessment concluded that soil contamination could be present and that additional soil sampling be conducted.

A Geohydrologic Study of the site was conducted by the Department of the Army in September 1996. The study concluded that three minor releases had occurred. The excavation of 10 - 20 cubic feet of soil was recommended as a prudent measure. On July 21, 1998 one (1) 1,000 gallon gasoline UST was removed from the site. Strong gasoline odors were observed along with PID reading of 2,500+ ppm.

On October 22, 1998 approximately 100 cubic yards of gasoline contaminated soil was excavated and polyencapsulated at the site. The vertical limits of the contamination (>26') were not reached. Samples of the soil were analyzed, and all stockpiled soil removed from the site on November 9, 1998.

No other site investigations are known.

PROJECT: SPRINGFIELD, VT ARMORY SITE INVESTIGATION
JOB NO.: 4080114

HAZARD REFERENCE

Waste Types:

___ Liquid _X_ Solid (soil) ___ Sludge _X_ Vapor ___ Unknown

Waste Characteristics:

___ Corrosive _X_ Ignitable ___ Radioactive

_X_ Volatile ___ Toxic ___ Reactive

___ Unknown ___ Other ___ Persistent

Specific Substances of Greatest Concern (if known): gasoline

Hazard Evaluation:

Task: Mon. Well Install. _X_ Low ___ Medium ___ High

Identification of Hazards: gasoline

Task: Decontamination _X_ Low ___ Medium ___ High

Identification of Hazards: gasoline

Task: Sampling _X_ Low ___ Medium ___ High

Identification of Hazards: gasoline

Task: ___ Low ___ Medium ___ High

Identification of Hazards:

Other Physical Hazards: (weather, heavy equipment, site structures...)
Drill rig, weather.

PROJECT: SPRINGFIELD, VT ARMORY SITE INVESTIGATION
JOB NO.: 4080114

Hazard Assessment:

OVERALL HAZARD: ___ Serious ___ Moderate X Low ___ Unknown

On-Site Control

Site control is necessary to minimize potential exposure of workers to hazardous waste/materials, protect the public from the Site's chemical and physical hazards, and to facilitate work activity. The procedures to be followed involve the establishment of Site work zones, Site security, and safe work practices.

The on-Site staging area and support zone has been established at:

The Armory building.

The personal contamination reduction zone (decon area) has been established at:

The location of the former UST.

During the intrusive work, the exclusion area will be defined as follows:

A 15 foot radius around the drill rig.

The decontamination of sampling and/or heavy equipment will be conducted:

The location of the former UST.

These sub-regions of on-Site control have been established in order to reduce the potential cross contamination and proliferation of contamination by potentially contaminated equipment and personal protective equipment.

SITE ACTIVITIES

Required Personal Protective Equipment (PPE)

Task	Entry Level of Protection	Monitoring Equipment	Upgrade/Downgrade Contingency
Well Install.	Mod D	Photovac HL-2000 Explosimeter 0_2 meter H_2S meter	Upgrade to Level C with PID readings over 10 ppm for 5 minutes in breathing space.
Decon.	Mod D	"	"
Sampling	Mod D	"	"

Note: Breathing space PID readings of 50 ppm, explosimeter readings over 25% of the LEL, O_2 deficiency or enrichment, or H_2S readings will result in shutting down the job and consulting with State officials and the client.

Specific protective equipment for each level of protection is as follows:

Level C: Full Face Respirator w/appropriate cartridge (Willson T45)
Chemically Resistant Suit (Tyvek®)
Outer Rubber Slush Boots
Outer Chemically Resistant Gloves
Surgical Gloves
Hard Hat
Steel Toe/Shank Work Boots

Modified Level D: Chemically Resistant Suit (Tyvek®)
Outer Rubber Slush Boots
Outer Chemically Resistant Gloves
Surgical Gloves
Hard Hat
Steel Toe/Shank Work Boots
Safety Glasses or Face Shield

Level D: Work Clothes
Steel Toe/Shank Work Boots
Surgical Gloves
Hard Hat

Rationale for change in level of protection:

Upgrade to Level C with PID readings of 10 ppm or more for 5 minutes in the breathing space. PID readings over 50 ppm in the breathing space, explosimeter readings of over 25% of the LEL, O_2 deficiency or enrichment, or H_2S readings will result in shutting down the job and consulting with State officials and the client.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER OR PROJECT MANAGER.

Monitoring Procedures

Site Monitoring Equipment:

- X Photovac MicroTIP (Model HL-2000, 10.6 eV lamp)
- X Explosimeter
- ___ Draeger Tube & Pump
- ___ 0_2 Meter
- ___ Other: H_2S meter

Methods and Frequency of Monitoring:
Air space and soil samples: Photovac MicroTIP HL-2000.
Air space: explosimeter/O_2 meter/H_2S meter.

Frequency: Soil samples; as obtained.
Air; not to exceed every 15 minutes.

Decontamination and Disposal

Personnel Decontamination Procedure:

_X_ Level C: Slush boot and glove wash, slush boot and glove rinse, tape removal, outer glove removal, (cartridge change), slush boot removal, suit removal, inner glove removal.

_X_ Modified Level D: Slush boot and glove wash, slush boot and glove rinse, slush boot removal, suit removal, glove removal.

Equipment Decontamination:

The drill rig and tools will be decontaminated by steam cleaning prior to the start of work and between borings. The use of clean augers (not previously used on the job) will be permitted with washing of the bit in ALCONOX. All decontamination will be done on-site. Routine washing of split spoon samplers, etc will use water obtained at the site. Disposal of spent cleaning liquid will be on site.

Disposal Procedure for Investigation-Derived Materials:
(decon waste, disposables)

All decon waste and disposables will remain on site. Contaminated soil will be drummed on site.

SITE OPERATING PROCEDURES/SAFETY GUIDELINES

** Always observe the buddy system. Never enter or exit site alone, and never work alone in an isolated area. Never wander off by yourself.

** Always maintain a line-of-sight.

** Practice contamination avoidance. Never sit down or kneel, never lay equipment on the ground, avoid obvious sources of contamination such as puddles, and avoid unnecessary contact with on-site objects

** No eating, drinking, or smoking outside the designated "clean" zone.

** In the event PPE is ripped or torn, work shall stop and PPE shall be removed and replaced as soon as possible.

** Be alert to any unusual changes in your own condition; never ignore warning signs. Notify Health and Safety Coordinator as to suspected exposures or accidents.

** A vehicle will be readily available exclusively for emergency use. All personnel going on-site shall be familiar with the most direct route to the nearest hospital.

** In the event of direct skin contact, the affected area shall be washed immediately with soap and water.

** Copies of the Health and Safety Plan shall be readily accessible at the command post.

** Note wind direction. Personnel shall remain upwind whenever possible during on-site activities.

** Never climb over or under refuse or obstacles. Use safety harness/safety lines when sampling lagoons, stream beds, and ravines with steep banks.

** Hands and face must be thoroughly washed before eating, drinking, etc.

** Any modifications to this safety plan MUST be approved by the Site Safety Officer.

Special Procedures:
Confined Space Entry

X No attempt will be made to enter abandoned buildings, manholes, tanks, or any other confined areas.

___ Other:

Personnel Monitoring: (If applicable: Heat stress, frostbite, air sampling of individual breathing zone)

Monitoring of individual breathing space will be monitored by a Photovac MicroTIP HL-2000, explosimeter, and O_2 meter as outlined in monitoring procedures. Monitoring of weather related hazards will be dictated by existing conditions.

EMERGENCY SITUATIONS

The following standard emergency procedures will be used by Dufresne-Henry on-site personnel. The Site Safety Officer (SSO) shall be notified of any on-site emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury to Dufresne-Henry Employees in the Exclusion Zone

Upon notification of an injury to a Dufresne-Henry employee in the exclusion zone, a rescue team will enter the zone (if required) to remove the injured person to the hotline. The SSO and Project Manager should evaluate the nature of the injury, and the affected person should be decontaminated to the extent possible prior to movement to the support zone. The SSO shall arrange for appropriate first aid, and contact should be made for an ambulance and with the designated medical facility (if required). No Dufresne-Henry personnel shall re-enter the exclusion zone until the cause of the injury or symptoms are determined.

Personnel Injury to Dufresne-Henry Employees in the Support Zone

Upon notification of an injury to a Dufresne-Henry employee in the support zone, the Project Manager and SSO will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, with the on-site Field Team Leader initiating the appropriate first aid and necessary follow-up as stated above. If the injury increases the risk to others, all Dufresne-Henry personnel shall move to the decon line for further instructions. Dufresne-Henry activities on-site will cease until the added risk is removed or minimized.

Fire/Explosion

Upon notification of a fire or explosion on-site, all Dufresne-Henry personnel will assemble at the decon line. The fire department shall be alerted and all Dufresne-Henry personnel moved to a safe distance from the involved area.

Personal Protective Equipment Failure

If any Dufresne-Henry site personnel experience a failure or alteration of protective equipment that effects the protection factor, that person and his/her buddy shall immediately leave the exclusion zone. Re-entry shall not be permitted until the equipment has been repaired or replaced.

Other Equipment Failure

If any other equipment on-site fails to operate properly, the Project Manager and SSO shall be notified and then determine the effect of this failure on continuing operations on-site. If the failure affects the safety of on-site Dufresne-Henry personnel or prevents the completion of the tasks, all Dufresne-Henry personnel shall leave the exclusion zone until the situation is evaluated and appropriate actions taken.

In all situations, when an on-site emergency results in evacuation of the exclusion zone, Dufresne-Henry personnel shall not re-enter until:

1. The conditions resulting in the emergency have been corrected.
2. The hazards have been reassessed.
3. The Site Safety Plan has been reviewed.
4. Dufresne-Henry personnel have been briefed on any changes in the Site Safety Plan.

PROJECT: SPRINGFIELD, VT ARMORY SITE INVESTIGATION
JOB NO.: 4080114

EMERGENCY INFORMATION

AMBULANCE:	Springfield	Phone:	(802) 885 - 4545
HOSPITAL:	Springfield Hospital 25 Ridgewood Road Springfield, VT (see attached map)	Phone:	(802) 885 - 2151
POLICE:	Springfield	Phone:	(802) 885 - 2113
FIRE DEPARTMENT:	Springfield	Phone:	(802) 885 - 4545
POISON CENTER:		Phone:	(603) 650 - 5000
ANR INCIDENT RESPONSE:	Office	Phone:	(802) 241 - 3888
CORPORATE:			
Dufresne-Henry	N. Springfield, VT	Phone:	(802) 886 - 2261
Project Manager:	F. David Deane		Ext 431
SITE REPRESENTATIVE	Major Bouchard	Phone:	(802) 654 - 0306

NEAREST PHONE: On site

LOCATION OF ON-SITE FIRST AID KIT: On site

EMERGENCY VEHICLE:

PROJECT: SPRINGFIELD, VT ARMORY SITE INVESTIGATION
JOB NO.: 4080114

The following individuals have read this safety document and are familiar with its contents, site conditions, and on-site safety procedures (please sign below):

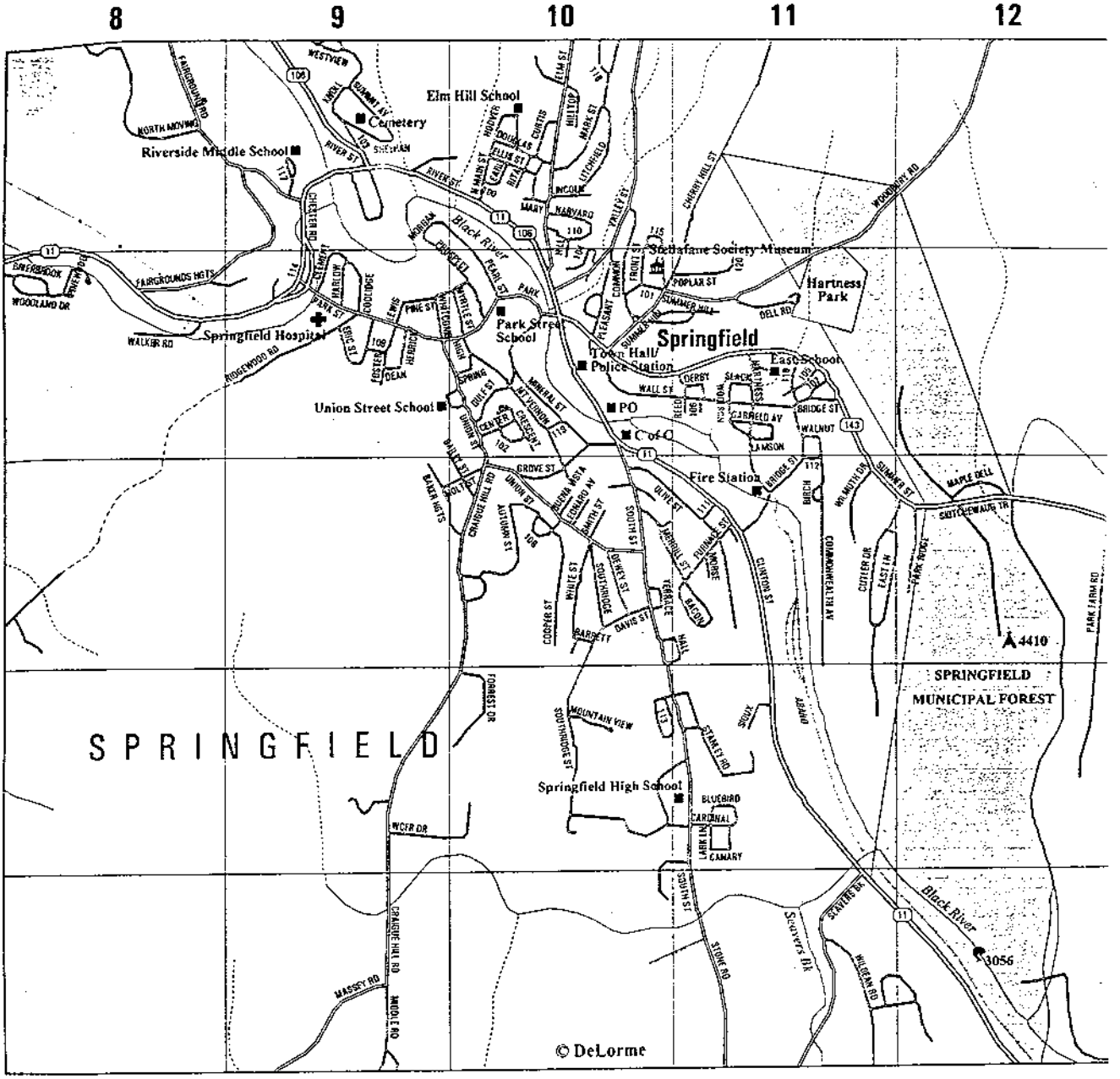
Name	Company
Bruce Cox Bruce Cox 11/19/98	Dufresne-Henry, Inc.
Oscar Garcia	Dufresne-Henry, Inc.
Myron Domingue	M & W Soils Engineering, Inc.
Michael Hitchcock	M & W Soils Engineering, Inc.
	M & W Soils Engineering, Inc.

Copies of this SSP have been given to:

Approval Signatures:

PM _____

Div. Dir. _____

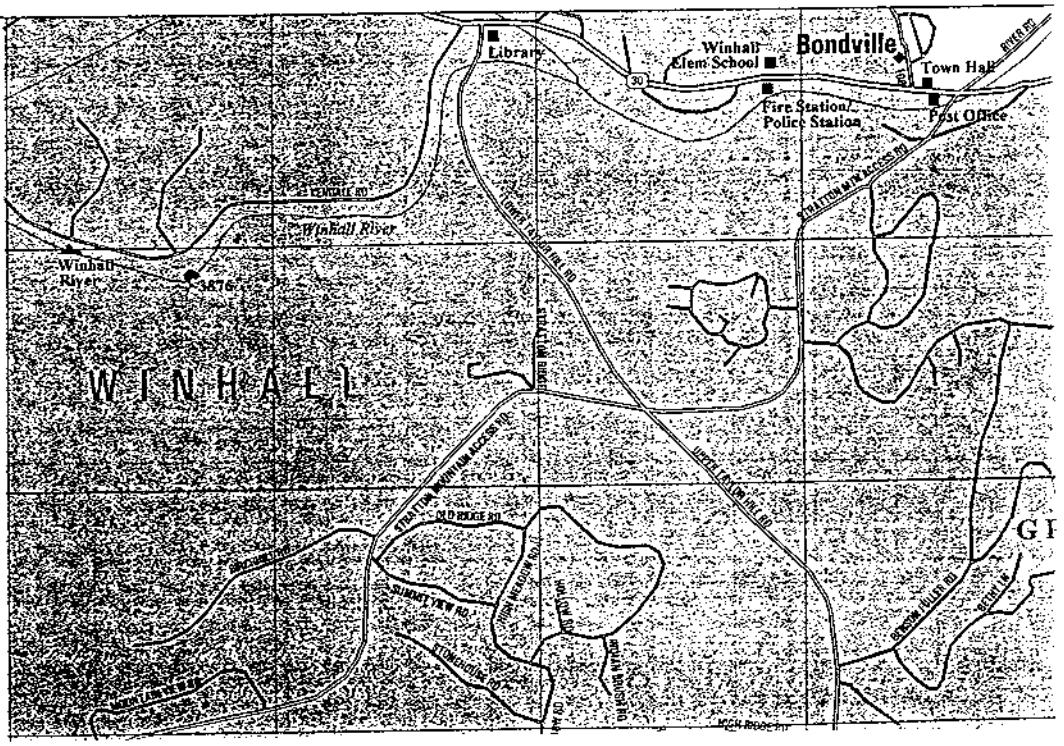


STRATTON SKI AREA

SEE PAGES 25–26

Numbers replace street names where map space is limited

ASPEN RD/100 K10	N BROOKWOOD RD J8, J9
BENSON FULLER RD G13, H12	N STRATTON RD J12
BETHY LN H12	NEARING RD J12
BETTY JOHNSON LN G12	NORTH RD K12
BIRCH GARDEN RD I12	OBERTAL RD J10
BIRCHHILL RD H9	OLD RIDGE RD H10
BLACK BEAR RD/101 K10	PEARL BUCK DR H13
BOARDMAN RD/102 K14	PIKES FALLS RD J9, K10, K12
COBBLE RIDGE RD I11	PIKES HOLLOW RD K12
CORNER ROCK RD/ 103 J9	PIPER RIDGE RD I11
CURTAIN BLUFF RD/ 104 K10	QUARTER MILE RD J9, J10
DRIFTER RD/105 K10	RIDGE CT J11
E BIRCH RD J10	RIVER RD F12
E MEADOW RD K9	ROCK RIDGE RD H11
FLOWING SPRINGS RD J9	ROUNDTREE RD I8
FREESTYLE RD/106 K9	SAPBUCKET RD I12
GRIZZLY RD K10	SAW MILL RD J9
HEMLOCK RD K10	SHATTERACK RD K10
HICKORY RD J9	STONEHOUSE RD H10
HIGH MEADOW RD H10, I11	STRATTON MOUNTAIN ACCESS RD F12, H10, I9
HIGH POINT DR J10	STRATTON RIDGE RD G10
HIGH RIDGE RD I11	STYLES BRANCH RD J10
HOLLOW RD H11	SUGARBUSH I12
INDIAN BRUSH RD H11	SUGARBUSH DR I12
INNSBROOK RD K10	SUMMIT VIEW RD H10
JAMIE LN G13	TWP HWY 21 F13
KENDALL RD F10	UPPER TAYLOR HILL RD G11, I12
LINSCOTT RD I12	VILLAGE SQ J8
LOWER TAYLOR HILL RD F10	W BRANCH RD I9
MAPLE HILL RD I10	W HILL RD F13, J9
MAPLE RIDGE RD I11	W RIDGE RD J8

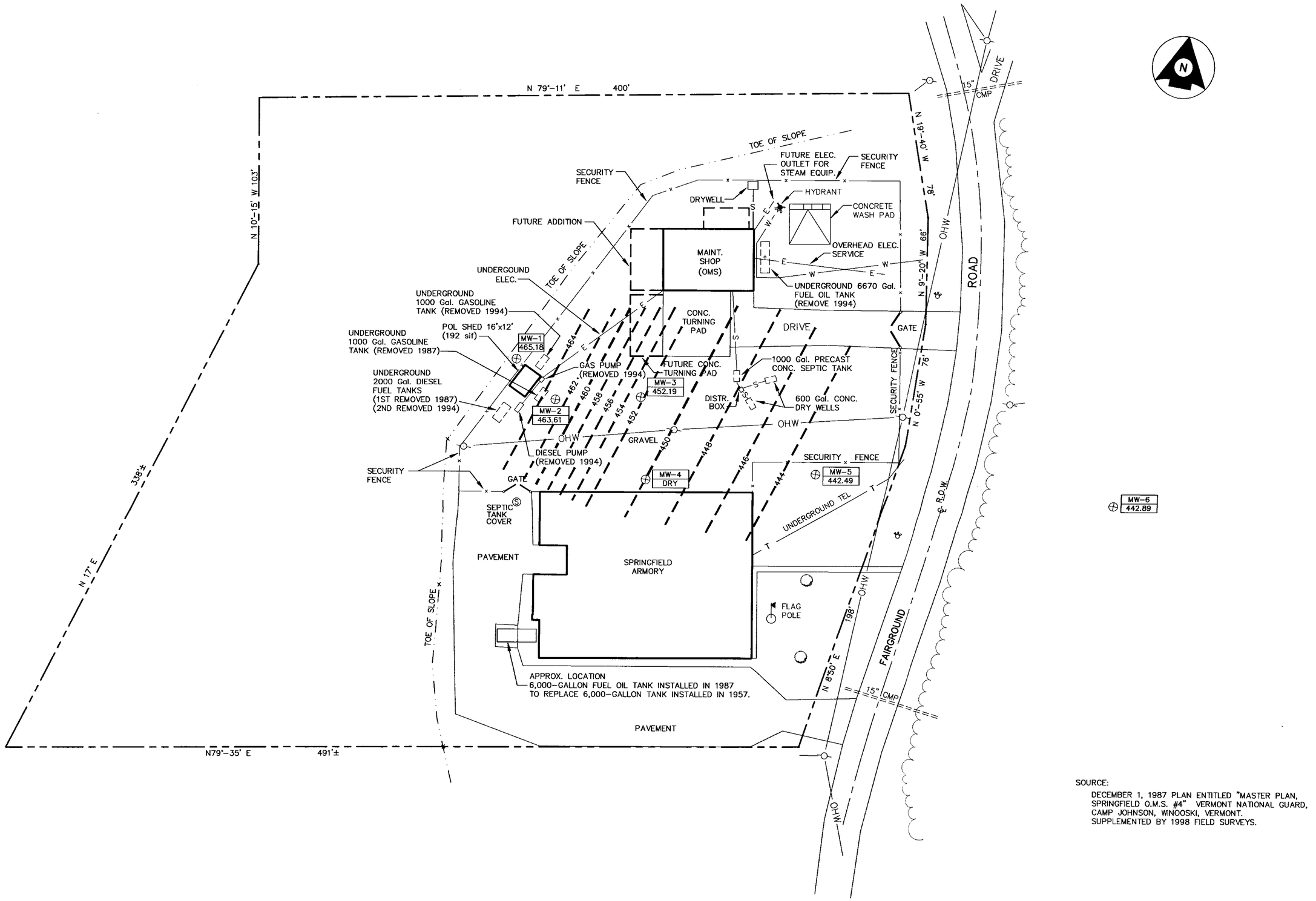


APPENDIX D

SITE PLAN

WITH

ESTIMATED GROUNDWATER CONTOURS



SOURCE:

DECEMBER 1, 1987 PLAN ENTITLED "MASTER PLAN, SPRINGFIELD O.M.S. #4" VERMONT NATIONAL GUARD, CAMP JOHNSON, WINOOSKI, VERMONT.
SUPPLEMENTED BY 1998 FIELD SURVEYS.

Dufresne-Henry
Consulting Engineers
North Springfield, Vermont
Tel. (802) 886-2261 • FAX (802) 886-2260 • www.d-hinc.com

Project No.	4080114
Proj. Manager	F.D. DEANE
Proj. Designer	
Drawn By	J.M. TANGUAY
Checked By	F.D. DEANE
Scale	1" = 40'
Approved	
Date	DEC. 1998

SPRINGFIELD O.M.S. #4
GROUNDWATER ELEVATIONS OBTAINED
ON DECEMBER 9, 1998

SPRINGFIELD ARMORY
GROUNDWATER CONTOUR PLAN

SPRINGFIELD, VERMONT

C1

Sheet of
C

APPENDIX E

SOIL REMOVAL DOCUMENTATION

Dufresne-Henry, Inc.
Consulting Engineers

Precision Park . North Springfield, Vermont 05150-0029 . Tel: 802.886.2261 . Fax: 802.886.2260 . E-mail: dh@d-hinc.com

October 26, 1998

Major Raymond P. Bouchard
Environmental Protection Manager
Camp Johnson
Colchester, Vermont 05446-3004

Via Fax (802) 654-0305 - 6 pages

Re: Soil Excavation, Disposal and Documentation
No. Springfield Armory
DH 4080114

Dear Major Bouchard:

Attached is a memorandum and supporting documentation of sampling activities undertaken October 22, 1998 at the North Springfield Armory.

As noted in the memo, Mr. Garcia called me to advise me that conditions were not as anticipated. I received his call at approximately 2:30 p.m. and subsequently called Lee Ann Goetz of your office to advise her of the situation. I asked that someone from your office who might be familiar with the project attempt to reach me at the armory. I also called the Sites Management Section (SMS) to advise them of the situation. I left a phone message for Richard Spiese, and spoke directly with Linda Elliott.

When I arrived at the site at approximately 2:45 p.m. the excavation was approximately 15 feet deep, and there was a very strong varnish like odor throughout the area of the compound. I observed the soil profile to be apparent compacted sand and gravel for several feet, underlain to about 12' by coarse bank run with cobbles up to a foot in diameter. Below that the soil column was very uniform medium to fine sand. There was staining typical of petroleum contamination evident at depth.

I reviewed Mr. Garcia's findings, and discussed how we might proceed with the contractor and one of the Armory personnel. Sargent Jewett arrived sometime thereafter and briefed him as well. We discussed the POL building and I suggested that the material in it be removed. Sgt. Jewett indicated that it could be removed today on 10/23/98.

We proceeded with the excavation, attempting to determine how deep the contamination extended prior to lateral exploration. At approximately 3:30, Ms. Goetz called the armory, and I spoke with her as well as with you. We agreed to continue excavating to see whether or not we could determine the vertical extent of the

contamination, up to a limit of approximately 100 cu yds. As noted in Mr. Garcia's memo, we ultimately reached a depth of 26'. The sample from about 24' showed a declining PID reading, but the 26' reading was up from the previous reading.

The excavation was as deep as could be made with the equipment on site, the volume of soil you and I had agreed upon as a maximum had been exceed, neither the vertical or lateral extent of the contamination had been defined, and there was significant risk of caving and loss of the POL building. I decided that the only reasonable course of action was to backfill the excavation with clean material up to a level which would minimize risk from accidental entry and additional undermining of the POL building. Gurneys brought sufficient clean fill to bring the level up to about 7' below original grade.

Samples were obtained from the stockpile today (10/26). Results should be received in approximately 10 days. We will then proceed with the off site disposal.

A cost estimate for the installation of monitoring wells and associated sampling will be forwarded to you on 10/28/98.

I trust that you have spoken with Mr. Henderson, the Springfield Public Works Director, and discussed the need for a meeting. Given our dual roles in this effort, we would like to be able to freely share technical information with the Town, once you have had a chance to review it. I believe that all involved parties share a common goal to avoid the dissemination of mis-information and to resolve this issue expeditiously and economically as possible, while assuring protection to the Town aquifer.

Very truly yours,

DUFRESNE-HENRY, INC.

F. David Deane

F. David Deane, P.E.
Environmental Services

FDD/dim

Enclosure

NSpfldArmFieldRpt102698

DH

DUFRESNE-HENRY, INC.

MEMO TO: File

FROM: Oscar D. Garcia Jr.

DATE: October 23, 1998

SUBJECT: North Springfield Armory - North Springfield, VT
DH #4080114

This report of field activities has been prepared by Dufresne-Henry, Inc. (DH). DH has been contracted by the Vermont National Guard to provide the engineering services required for contaminated soil removal, laboratory sampling, and reporting. Gurney Brothers Construction, Inc.(GB) of North Springfield, VT provided the excavation services.

On Thursday, October 22, 1998, I was at the above referenced location to provide the engineering oversight, field screening, and laboratory sampling for the removal of petroleum contaminated soil. The weather that day was sunny, windy and 45°. The photoionization detector (PID) used that day was a Photovac Micro-TIP HL-2000 which uses a 10.6 eV lamp. The Photovac was calibrated on site prior to use with Isobutylene at 100 ppm.

Work began by stripping the top six inches of soil for initial screening. The soil was placed beside the area while the initial screening was being performed. The areas of greatest concern were located at grid coordinates D-11, and D-12 as shown on the attached site sketch and table. These area produced the highest PID readings. Photographs were taken throughout the excavation process to document site conditions.

Excavation in those grid areas began. The soil removed was loaded into trucks and hauled across the yard to a location agreed upon. At roughly four feet deep, the soil conditions became much worse. There was a very strong 'varnish' odor present in the soil samples and from the excavation area. At this depth the excavation had moved from the D-11, D-12 coordinates to approximately C-12. A 377 ppm soil headspace reading was obtained at this depth. The excavation continued deeper to determine if the soil conditions improved. At a depth of ten feet, the soil produced a 2014 ppm headspace reading. The entire site had a very strong varnish odor present. There had been no lateral excavation attempted to determine the contamination limits.

The soil conditions varied throughout the excavation. Gravel was present through the first 10'- 12'. The soil then changed to coarse sand, and at full depth there was finer sand.

I telephoned David Deane, of DH, for assistance. Mr. Deane notified the Army personnel and made a site visit. Eventually, Major Raymond Bouchard was contacted and briefed of site conditions. Mr. Deane and Major Bouchard agreed to continue digging deeper to determine if

the contamination ceased, with an upper limit of roughly 100 cubic yards of contaminated soil stockpiled.

Excavation and sampling continued to a depth of twenty six feet. A soil sample obtained at that depth produced a 751 ppm reading. There continued to be a very strong varnish odor present. There was no groundwater present at this depth. The POL building was undermined and was in danger of collapsing.

Since significant contamination was still present at this depth, excavation was halted and partially backfilled with clean material hauled in by GB.

Due to the project's location relative to the Town of Springfield water shed area, the contaminated soil which had just been removed was not placed back in the excavation area. There is approximately 140 cubic yards of contaminated soil polyencapsulated on site. This soil is scheduled for laboratory sampling on Friday, October 23, 1998.

DUFRESNE-HENRY, INC.

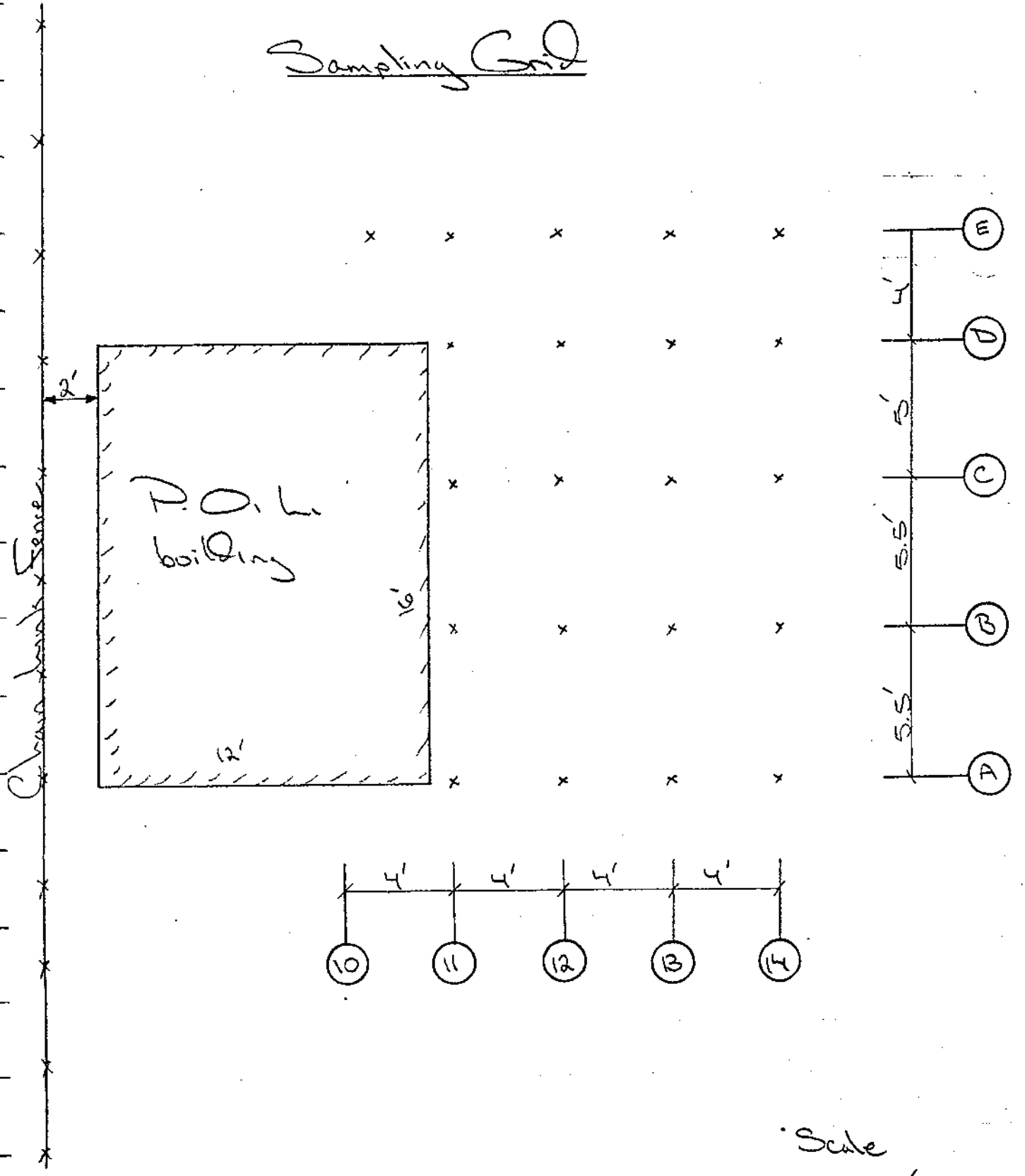
PREPARED BY DG DATE 10/22/98 PROJECT NO. 40B0114

CALCULATIONS CHECKED BY DATE SHEET NO. 1 OF 2

ASSUMPTIONS / METHODS CHECKED BY DATE

SUBJECT Armory - N. Springfield VT

Sampling Grid



Scale
1" = 5'

DUFRESNE-HENRY, INC.

PREPARED BY CDG DATE 10/22/96 PROJECT NO. 4080114

CALCULATIONS CHECKED BY _____ DATE _____ SHEET NO. 2 OF 2

ASSUMPTIONS / METHODS CHECKED BY _____ DATE _____

SUBJECT Armory – N. Springfield, VT

Field Screening Results

Grid Location	Reading (ppm)	Depth (ft)
A-11	0.7	0.5
A-12	0.7	"
A-13	0.7	"
A-14	0.6	"
B-11	0.6	"
B-	0.7	"
B-	0.8	"
B-	0.8	"
C-11	5.4	"
C-12	1.6	"
C-13	0.7	"
C-14	0.7	"
D-11	279	"
D-12	31.9	"
D-13	0.8	"
D-14	0.8	"

Grid Location	Reading (ppm)	Depth (ft)
C-12	377	4.5
D-12	2046	5.5
E-12	893	5
B+2'-13	1.8	5
E-12	0.8	6
C-12	2014	10
C-12	2500+	11
C-12	2500+	12
C-12	1873	15
C-12	1949	16
E-12	2.0	8
C-12	664	22
C-12	329	24
C-12	751	26

FAX TRANSMITTAL

URGENT

To: Major Raymond Bouchard
Fax (802) 654-0305

From: David Deane

Date: November 3, 1998

Project: N. Springfield Armory

Total Pages: 8

Please complete the second page of the Generator Waste Profile and fax my letter, the two pages of the form, and the 4 pages of analytical results to Michelle Montpetite.

FAX (802) 886-2260
Voice (802) 886-2261

Dufresne-Henry, Inc.
Precision Park
North Springfield, VT 05150

Dufresne-Henry, Inc.

Dufresne-Henry, Inc.
Consulting Engineers

Precision Park . North Springfield, Vermont 05150-0029 . Tel: 802.886.2261 . Fax: 802.886.2260 . E-mail: dh@d-hinc.com

November 3, 1998

Michelle Montpetite
ESMI
67 International Drive
Loudon, NH 03301

Via Fax (603) 783-0228 - 7 pages

RE: N. Springfield, VT Armory
Soil Disposal
DH 4080114

Dear Michelle:

Attached are a completed Generator Waste Profile and analytical results from two composite samples for RCRA 8 metals, EPA 8260, Ignitability, and 8100 Mod. The short form contract for the transportation and disposal of approximately 200 tons of soil at the site was faxed to you last week.

At your earliest convenience, please fax us written confirmation that you can accept these soils for processing. Our fax number is (802) 886-2260. We will forward your acceptance letter to Richard Spiese at the Vermont Sites Management Section to gain his approval to use your facility. Once that is received, I believe that all will be in place to proceed. All parties are anxious to complete the removal of the soils as quickly as possible.

Please feel free to call with any questions.

Very truly yours,

DUFRESNE-HENRY, INC.

David

F. David Deane, P.E.
Environmental Services

FDD/dim
Enclosures
cc Major Raymond P. Bouchard
NSpfldArmESMI110398

ESMI Generator Waste Profile

Please complete all sections of this form. Return the signed form to ESMI with copies of analytical reports, completed site history and generator certification statement, as required by Sections III and IV.

SECTION I: GENERATOR/SITE INFORMATION

Generator/Company Name:	[Vermont Army National Guard]
Address:	[Camp Johnson]
	[Colchester, VT 05446-3004]
Telephone:	[(802) 645-0306]
Site Name:	[North Springfield Armory]
Site Address:	[Fairground Road]
	[North Springfield, VT 05150]

SECTION II: REQUIRED SAMPLING/ANALYSIS PROTOCOL

Sampling
Based on the anticipated quantity of material to be shipped to ESMI, the following number of composite samples is required.

Quantity (tons)	No. of Composite Samples
≤ 4000	one sample every 200 tons
> 4000	20 plus one additional for every 500 tons

Stockpiled soils shall be sampled by removing the first 12 inches of soil at a given sample location. Each required composite sample shall be comprised of 8 grab samples. In-situ sampling shall be performed by dividing the total area to be excavated into equal sections and locating a boring or test pit as close to the center of the section as possible. Composite samples from borings shall be comprised of core samples collected at no greater than 2 foot intervals from the soil column. A duplicate sample must be sent to ESMI for all soils contaminated with **NON-VIRGIN** hydrocarbons.

Analytical Requirements
Required composite samples are to be analyzed by a New Hampshire certified laboratory. Laboratory analysis is based on submitted site histories (Section III). Minimum analyses are dictated by type of contaminant. (See the Material Analytical Requirements for details.) Note that your state may require additional analyses to characterize the site.

Environmental Soil Management, Inc.
67 International Drive, Loudon, NH 03301
800-950-7645 Customer Service (All Regions)
603-783-0228 Customer Service (Local)
603-783-0104 FAX

ESMI ENVIRONMENTAL SOIL MANAGEMENT INC.

SECTION III: SITE HISTORY INFORMATION

Analytical requirements are dependent on site history; therefore, a complete site history is required for each site. **Site histories should be submitted to ESMI prior to acceptance sampling and analyzing to avoid re-sampling.** To aid in waste characterization, all site characterization information and preliminary analytical results should be submitted to ESMI with this Generator Waste Profile. Please complete the following site history information:

1. Detail the quantity and location of the contaminated soils.
   Approximately 200 tons of sand and gravelly sand polyencapsulated after excavation from area around and beneath former gasoline UST
2. What chemical constituents have been detected in the preliminary site samples? What contaminants are suspected to be at the site?
   Gasoline with possible trace amounts of diesel and waste oil. No evidence of chlorinated compounds.
3. Have there been releases of petroleum products, PCBs, solvents, coal tar or other chemicals or wastes at the site? Describe any releases and sources of contamination, known or suspected.
   Yes. Gasoline suspected to have leaked from former UST or dispenser.
4. What are the current and historical uses of the site? What past or present industrial activities neighbor the site?
   Current use as armory, which formerly included maintenance shop. Prior to armory (30 - 40 years ago) was likely gravel pit or agricultural.

SECTION IV: GENERATOR CERTIFICATION STATEMENT

I hereby certify, to the best of my knowledge, (a) that I am a responsible official of the generator, (b) that the sampling protocol, as outlined, has been adhered to, (c) that the information [illegible] site history is correct and complete, (d) that the transport, treatment and recycling of the contaminated materials do not violate any laws or regulations of the state of origin, and (e) INITIAL ALL OF THE FOLLOWING STATEMENTS THAT ARE APPLICABLE:

[____] that the contaminated material from this site that is being sent to ESMI for treatment originated from a release of VIRGIN petroleum products and is a **non-hazardous waste.**

[____] that the contaminated material from this site that is being sent to ESMI for treatment originated from a release of a NON-VIRGIN hydrocarbon and is a **non-hazardous waste.**

[____] that the PCB contaminated material from this site that is being sent to ESMI for treatment were not impacted by a known release of PCB materials with a PCB content of 50 ppm or greater, is not a TSCA-regulated waste and is a **non-hazardous waste.**

Site Name and Address: [North Springfield Armory, Fairground Road, N. Springfield, VT]

Printed Name and Title: [_____]

Signature: [_____] Date: [_____]

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14513

Client: **Dufresne-Henry** Client Designation: **N Springfield Armory VT Army Guard**

Sample ID:	Composite#1	Composite#2	Units	Date of Analysis	Method	Analyst
Analytical Type:	Sample	Sample				
Matrix:	soil	"				
Date Sampled:	10/27/98	10/27/98				
Date Received:	10/27/98	10/27/98				
Arsenic	< 2	< 2	mg/kg	10/30/98	6010B	RTW
Barium	23	26	mg/kg	10/30/98	6010B	RTW
Cadmium	< 0.2	< 0.2	mg/kg	10/30/98	6010B	RTW
Chromium	6.4	6.8	mg/kg	10/30/98	6010B	RTW
Lead	6	7	mg/kg	10/30/98	6010B	RTW
Mercury	< 0.2	< 0.2	mg/kg	11/2/98	7471	DS
Selenium	< 2	< 2	mg/kg	10/30/98	6010B	RTW
Silver	< 0.2	< 0.2	mg/kg	10/30/98	6010B	RTW

Approved By: Tim Wilson Metals Supervisor

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14513

Client: Dufresne-Henry

Client Designation: **N Springfield Armory VT Army Guard 4080114**

Volatile Organic Compounds

Sample ID:	Composite #1	Composite #2
Matrix:	Soil	Soil
Date Received:	10/27/98	10/27/98
Units:	µg/kg	µg/kg
Date of Analysis:	11/3/98	11/3/98
Analyst:	JDS	CWC
EPA Method:	8260B	8260B
Dilution Factor:	1	5
Dichlorodifluoromethane	< 100	< 500
Chloromethane	< 100	< 500
Vinyl chloride	< 20	< 100
Bromomethane	< 10	< 50
Chloroethane	< 100	< 500
Trichlorofluoromethane	< 100	< 500
Diethyl ether	< 10	< 50
Acetone	< 500	< 2000
1,1-Dichloroethene	< 10	< 50
Methylene chloride	< 10	< 50
Carbon disulfide	< 10	< 50
Methyl-t-butyl ether(MTBE)	< 200	< 1000
trans-1,2-Dichloroethene	< 10	< 50
1,1-Dichloroethane	< 10	< 50
2-Butanone(MEK)	< 100	< 500
2,2-Dichloropropane	< 10	< 50
cis-1,2-Dichloroethene	< 10	< 50
Chloroform	< 10	< 50
Bromochloromethane	< 10	< 50
Tetrahydrofuran(THF)	< 100	< 500
1,1,1-Trichloroethane	< 10	< 50
1,1-Dichloropropene	< 10	< 50
Carbon tetrachloride	< 10	< 50
1,2-Dichloroethane	< 10	< 50
Benzene	< 10	< 50
Trichloroethene	< 10	< 50
1,2-Dichloropropane	< 10	< 50
Bromodichloromethane	< 10	< 50
Dibromomethane	< 10	< 50
4-Methyl-2-pentanone(MIBK)	< 100	< 500
cis-1,3-Dichloropropene	< 10	< 50
Toluene	< 10	< 50
trans-1,3-Dichloropropene	< 10	< 50
1,1,2-Trichloroethane	< 10	< 50
2-Hexanone	< 100	< 500

	Composite #1	Composite #2
	Soil	Soil
	10/27/98	10/27/98
	µg/kg	µg/kg
	11/3/98	11/3/98
	JDS	CWC
	8260B	8260B
	1	5
1,3-Dichloropropane	< 10	< 50
Tetrachloroethene	< 10	< 50
Dibromochloromethane	< 10	< 50
1,2-Dibromoethane	< 10	< 50
Chlorobenzene	< 10	< 50
1,1,1,2-Tetrachloroethane	< 10	< 50
Ethylbenzene	< 10	**190**
mp-Xylene	**40**	**4,700**
o-Xylene	**110**	**4,200**
Styrene	< 10	< 50
Bromoform	< 10	< 50
iso-Propylbenzene	**10**	**290**
1,1,2,2-Tetrachloroethane	< 10	< 50
1,2,3-Trichloropropane	< 10	< 50
n-Propylbenzene	**20**	**1,100**
Bromobenzene	< 10	< 50
1,3,5-Trimethylbenzene	**390**	**7,100**
2-Chlorotoluene	< 10	< 50
4-Chlorotoluene	< 10	< 50
tert-Butylbenzene	< 10	< 50
1,2,4-Trimethylbenzene	**1,600**	**23,000**
sec-Butylbenzene	**40**	**420**
p-isoPropyltoluene	**100**	**340**
1,3-Dichlorobenzene	< 10	< 50
1,4-Dichlorobenzene	< 10	< 50
n-Butylbenzene	< 10	< 50
1,2-Dichlorobenzene	< 10	< 50
1,2-Dibromo-3-chloropropane	< 10	< 50
1,2,4-Trichlorobenzene	< 10	< 50
Hexachlorobutadiene	< 10	< 50
Naphthalene	**950**	**7,000**
1,2,3-Trichlorobenzene	< 10	< 50

Approved By: Clifford Chase, Volatile Organics Supervisor 11/3/98

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14513

Client: **Dufresne-Henry** Client Designation: **N Springfield Armory VT Army Guard**

Sample ID:	Composite#1	Composite#2	Units	Date of Analysis	Method	Analyst
Analytical Type:	Sample	Sample				
Matrix:	soil	soil				
Date Sampled:	10/27/98	10/27/98				
Date Received:	10/27/98	10/27/98				
Ignitability	Pass	Pass	No Units	11/2/98	7.1.2	JB

Approved By: Lorraine Olashaw Inorganics Supervisor Lorraine Olashaw 11/2/98

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 14513

Client: **Dufresne-Henry**

Client Designation: **N Springfield Armory VT Army Guard 4080114**

Sample ID:	Composite#1	Composite#2
Analytical Type:	Sample	Sample
Matrix:	soil	soil
Date Sampled:	10/27/98	10/27/98
Date Received:	10/27/98	10/27/98
Units:	mg/kg	mg/kg
Date of Extraction/Prep:	10/28/98	10/28/98
Date of Analysis:	10/29/98	10/29/98
Analyst:	DJS	DJS
Method:	8100 Mod	8100 Mod
Dilution Factor:	1	1
TPH (C9-C40)	< 50	170
	87	250

Approved By: Timothy Schaper Organics Supervisor Timothy D. Schaper 10/30/98

VT AGENCY OF NATURAL RESOURCES - DEPARTMENT OF ENVIRONMENTAL CONSERVATION
WASTE MANAGEMENT DIVISION

OFF-SITE SOIL TREATMENT REQUEST FORM

Off-Site Location

Soil Volume/Peak PID/Avg. PID: 200 yd³/500/200
Off-Site Street Address: ESMI – Loudon NH
Contact Michelle Montecitie
Name of Land Owner: ESMI
Phone # of Land Owner: (603) 783-0228

Generator/Owner of Soil

Name: VT Dept of Army
Facility ID#, Name, and Street Address: N. Salem Armory, Fairground Rd, St. Albans
Contact: Major Daniel P. Bouchard
Phone #: (802) 654-0306

Off-Site Soil Treatment Siting Criteria Checklist

Treatment facility operates under NHDES permits.

☐ There are no bedrock drinking water supplies within 200 feet of the treatment location. N/A

☐ There are no shallow water supplies (e.g. dug wells, driven wells, etc.) within 300 feet of the treatment location. This limit may need to be extended if shallow water supplies are shown to be hydraulically downgradient. N/A

☐ There are no sensitive environments such as a stream, river, lake, pond, wildlife refuge, wetland, floodplain or other similar areas, within 100 feet of the treatment location. N/A

☑ There is adequate room to allow for treatment to occur over the necessary time frame.

☑ Public access to the treatment area has been restricted (e.g. fencing, posted).

☑ The treatment location is not in a residential area.

☐ Written approval from the landowner, if different from the soil generator, has been obtained before treatment begins. This must include written approval from the landowner granting Department of Environmental Conservation (DEC) investigators property access for the purpose of inspecting soil treatment at any reasonable time. Verbal – written to follow.

☐ The local municipality has been notified in writing of the off-site location prior to initiating any soil treatment. The soil generator must provide evidence to the Waste Management Division (WMD) that this notification has been made. If applicable, local permits should be obtained. Assume facility locally permitted to accept & process material

☐ An area map of the soil location has been submitted to the WMD. N/A

☐ The WMD has given approval to move soils to the off-site location specified above, as indicated by the WMD representative's signature below.

As the party responsible for compliance with the "Agency Guidelines for Petroleum Contaminated Soil and Debris," subchapter 6 of the "Vermont Underground Storage Tank Regulations," and applicable statutes, I hereby certify that the representations made on this form are to the best of my knowledge true and correct.

F. David Deane D-H (Rep)
Name of Owner/Operator Representative (printed)

Sr. Project Manager
Company Title

F. David Deane
Signature

11/4/98
Date

As land owner of the soil treatment location, I hereby give approval to the soil generator to treat the soil volume cited above at the above referenced location. In addition, I hereby grant property access to DEC investigators for the purpose of inspecting soil treatment at any reasonable time. Request sent ESMI if req'd.

Signature of Land Owner

Date

Richard Spiese
Signature of WMD Representative

11/4/98
Date of Approval

ENVIRONMENTAL SOIL MANAGEMENT, INC.
67 International Drive
Loudon, NH 03303
Tel: (603) 783-0228

Invoice No. : 001815
Invoice Date : 11-19-98
From : 11-09-98 To : 11-09-98

Terms : 45 DAYS NET

Customer : DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

JOB #1405S

Ticket	Date	Truck #	Generator Site	Tons	Rate	Total
118007	11-09-98	1DEY	SPRINGFIELD VT	36.04	37.00	1333.48
118008	11-09-98	GARLAND	SPRINGFIELD VT	30.37	37.00	1123.69
118010	11-09-98	THERRIAU	SPRINGFIELD VT	32.88	37.00	1216.56
118009	11-09-98	1H	SPRINGFIELD VT	32.54	37.00	1203.98
118022	11-09-98	THERRIAU	SPRINGFIELD VT	34.82	37.00	1288.34
118023	11-09-98	1H	SPRINGFIELD VT	40.98	37.00	1516.26
118024	11-09-98	GARLAND	SPRINGFIELD VT	36.06	37.00	1334.22

RECEIVED
NOV 23 1998
DUFRESNE-HENRY, INC.

Disposal Total $ 9016.53

Pay. #	Date	Comment.	Payment $

REMIT TO: E.S.M.I.
67 International Drive
Loudon, NH 03301

Total Paid $ .00
Total Int. $ .00
Total Due $ 9016.53

2% per month SERVICE CHARGE on all past due balances.

OK to PD
Post to w.o. # 408 014
@ $40/ton ⇒ $9,747.60

Pay by Dec 31

ESMI
LOUDON, NEW HAMPSHIRE

Transaction No. 118024 Time In 15:16 Time Out 15:26 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Gross: 108080 lb IN8
Tare : 035960 lb
==========
Net : 72120 lb

Net Tons : 36.06

Truck No. : GARLAND
JOHN GARLAND

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Driver :

Weigh Master:

This Shipping Order Must be legibly filled in, in Ink, in Indelible Pencil, or in Carbon and retained by the Agent.

Shipper's # BR1148

John F. Gawlas & Trucking — **Carrier** — Agent's No.

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory Nov 09, 08 from Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees, to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination, it is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee—For purposes of notification only.)

Consigned to Environmental Soil Management Inc

Destination 67 International Drive Loudon State of NH Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Cor.)	Class or Rate	Check Column
	Waste Oil Contaminated Soil **Non-Hazardous Waste for Recycling**	108080 35960 36.08	4	

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $ _____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____

(the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$ _____

John F. Gawlas — Shipper, Per _____ Tony [illegible] — ☛ Agent must detach and retain this Shipping Order and [illegible] the Original Bill of Lading.

2

Permanent post-office address of shipper,

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

LOUDON, NEW HAMPSHIRE

Transaction No. 118023 Time In 15:15 Time Out 15:22 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Truck No. : 1H
JEFF HANSON

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Gross: 114360 lb INB
Tare : 032400 lb
==========
Net : 81960 lb

Net Tons : 40.98

Driver : _____

Weigh Master:

This Shipping Order Must be legibly filled in, in ink, in indelible Pencil, or in Carbon and retained by the Agent.

Shipper's # 26487

HANSON Carrier Agent's No.

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory No. 09, 88n Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee—For purposes of notification only.)

Consigned to Environmental Soil Management Inc

Destination 67 International Drive Loudon State of NH Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Cor.)	Class or Rate	Check Column*
	Waste Oil Contaminated Soil Non-Hazardous Waste for Recycling	114360 32400 40098		

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

_____ (Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $ _____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____ (the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$ _____

Jeffrey K. H _____ Shipper, Per _____

Permanent post-office address of shipper,

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

2

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

Transaction No. 118022 Time In 15:14 Time Out 15:21 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Gross: 104300 lb INB
Tare : 034660 lb
==========
Net : 69640 lb

Truck No. : THERRIAU
THERRIAULT

Net Tons : 34.82

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Driver : _____

Weigh Master:

Job Name: SPRINGFIELD

This Shipping Order Must be legibly filled in, in ink, in indelible Pencil, or in Carbon and retained by the Agent.

Shipper's # AP5043

T. Hemmingway Trucking — **Carrier** — Agent's No.

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory 10 Nov 09 from 98 Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or route, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee—For purposes of notification only.)

Consigned to Environmental Soil Management Inc

Destination 67 International Drive Loudon State of NH Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Cor.)	Class or Rate	Check Column
	Waste Oil Contaminated Soil Non-Hazardous Waste for Recycling	104300 34660 3480	S D	

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $ _____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$ _____

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Ron T. Hemmingway Shipper, Per _____ Tony L. Rudge

Permanent post-office address of shipper, _____

Agent must detach and retain this Shipping Order and surrender the Original Bill of Lading.

2

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

LOUDON, NEW HAMPSHIRE

Transaction No. 118009 Time In 09:39 Time Out 09:49 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Gross: 097740 lb INB
Tare : 032660 lb
Net : 65080 lb

Truck No. : 1H
JEFF HANSON

Net Tons : 32.54

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Driver : _____

Weigh Master:

This Shipping Order Must be legibly filled in, in ink, in indelible Pencil, or in Carbon and retained by the Agent.

Shipper's # 26487

HANSON — Carrier — Agent's No.

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory Nov 09, 08 from Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee—For purposes of notification only.)

Consigned to Environmental Soil Management Inc

Destination 67 International Drive Loudon State of NH Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Cor.)	Class or Rate	Check Column
	Waste Oil Contaminated Soil **Non-Hazardous Waste for Recycling**	97740 32660 30540	G	

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $_____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$_____

_____ Shipper, Per _____

Permanent post-office address of shipper.

Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

2

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

ESMI
LOUDON, NEW HAMPSHIRE

Transaction No. 118010 Time In 09:40 Time Out 09:46 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Gross: 100660 lb INB
Tare : 034900 lb
==========
Net : 65760 lb

Truck No. : THERRIAU
THERRIAULT

Net Tons : 32.88

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Driver : _____

Weigh Master:

This Shipping Order must be legibly filled in, in ink, in indelible Pencil, or in Carbon and retained by the Agent.

Shipper's # FP-3078.11

Carrier

Agent's No.

RECEIVED, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory Nov 09, 98 19 from Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

Consigned to Environmental Soil Management Inc (Mail or street address of consignee—For purposes of notification only.)

67 International Drive Loudon NH

Destination _____ State of _____ Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Cor.)	Class or Rate	Check Column
	Waste Oil Contaminated Soil Non-Hazardous Waste for Recycling ESMI	100600 34900 32.88	9	

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $ _____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$ _____

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Shipper, Per _____ Tony St Cyr and must sign the Original Bill of Lading.

Agent must detach and retain this Shipping Order

2

Permanent post-office address of shipper, _____

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

Transaction No. 118008 Time In 09:28 Time Out 09:35 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Gross: 096940 lb INB
Tare : 036200 lb
==========
Net : 60740 lb

Truck No. : GARLAND
JOHN GARLAND

Net Tons : 30.37

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Driver :

Weigh Master:

John F Gaudet Trucking

Carrier Agent's No.

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory Nov 09, 98 Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination, if on its own railroad, water line, highway route or routes, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee–For purposes of notification only.)

Consigned Environmental Soil Management Inc

Destination 67 International Drive Loudon State of NH Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	*Weight (Sub. to Cor.)	Class or Rate	Check Column
	Waste Oil Contaminated Soil Non-Hazardous Waste for Recycling	96940 36200 30.37	8 7.12	

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $ _____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$ _____

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE–Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Shipper, Per _____ Agent must detach and retain this Shipping Order and must sign the Original Bill of Lading.

Permanent post-office address of shipper.

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

2

LOUDON, NEW HAMPSHIRE

Transaction No. 118007 Time In 09:27 Time Out 09:32 Date 11-09-98

Customer Name: DUFRESNE & HENRY
PRECISION PARK
DUF10 N. SPRINGFIELD VT
05150

Truck No. : 1DEY
JAMES DEYARMOND

Site : SPRINGFIELD
Address :
City : SPRINGFIEL
State : VT

Gross: 108880 lb INB
Tare : 036800 lb
==========
Net : 72080 lb

Net Tons : 36.04

Driver :

Weigh Master:

This Shipping Order Must be legibly filled in, in ink, in indelible pencil, or by typewriter and delivered by the Agent to

Shipper's # 250

James Desormeaux Trucking Carrier Agent's No.

RECEIVE, subject to the classifications and tariffs in effect on the date of the issue of this Shipping Order,

at N. Springfield Armory 19 Nov 09 98 from Springfield, VT

the property described below, in apparent good order, except as noted (contents and condition of contents of packages unknown) marked, consigned and destined as shown below, which said company (the word company being understood throughout this contract as meaning any person or corporation in possession of the property under the contract) agrees to carry to its usual place of delivery at said destination. If on its own railroad, water line, highway route or route, or within the territory of its highway operations, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed, as to each carrier of all or any of said property over all or any portion of said route to destination, and as to each party at any time interested in all or any of said property, that every service to be performed hereunder shall be subject to all the conditions not prohibited by law, whether printed or written, herein contained, including the conditions on back hereof, which are hereby agreed to by the shipper and accepted for himself and his assigns.

(Mail or street address of consignee—For purposes of notification only.)

Consigned to Environmental Soil Management Inc

Destination 67 International Drive Loudon State of NH Zip Code _____ County of _____

Routing _____ Delivering Carrier _____ Vehicle or Car Initial _____ No. _____

Collect On Delivery

$ _____ and remit to: _____

_____ Street _____ City _____ State

C. O. D. charge to be paid by { Shipper ☐ Consignee ☐

No. Packages	Description of Articles, Special Marks, and Exceptions	Weight (Sub. to Cor.)	Class or Rate	Check Column
	Waste Oil Contaminated Soil Non-Hazardous Waste for Recycling	168880 36800 36.04	9	

Subject to Section 7 of conditions, if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statements:

The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor.)

If charges are to be prepaid, write or stamp here, "TO BE PREPAID."

Received $ _____ to apply to prepayment of the charges on the property described hereon.

Agent or Cashier

Per _____
(the signature here acknowledges only the amount Prepaid.)

Charges Advanced:

$ _____

*If the shipment moves between two ports by a carrier by water, the law requires that the bill of lading shall state whether it is "carrier's or shipper's weight." NOTE—Where the rate is dependent on value, shippers are required to state specifically in writing the agreed or declared value of the property.

The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____

Shipper, Per _____ Tony Desormeaux

Permanent post-office address of shipper, _____

Agent must detach and retain this Shipping Order and forward the Original Bill of Lading. 2

(This Bill of Lading is to be signed by the shipper and agent of the carrier issuing same.)

APPENDIX F

BORING LOGS

AND

DAILY REPORTS

VERMONT NATIONAL GUARD - SPRINGFIELD ARMORY
SITE INVESTIGATION
SPRINGFIELD, VERMONT

November 19, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:00 am.
M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:00 am.
I met with Sgt. Jewett to discuss the overall work to be completed, the boring locations, and underground utilities.

MW-2

MW-2 was located within the excavation conducted on October 22, 1998. The boring was started at 8:10 am. The rig and other equipment had been steam cleaned prior to arrival on site. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking continuous split spoon samples starting at 20 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. Total depth of the boring was 34'9" with refusal on apparent bedrock. The general geologic column is sand and gravel fill to 20'±, silty sand to 30', sandy gravel to 32', and silty sand to the limit of the boring. Olfactory evidence of contamination was observed between 20' and 30'±. Odors observed were faint weathered gasoline, and a moderately strong varnish-like odor. The peak PID reading was 1,230 ppm 24' - 26' sample. The water table was encountered at approximately 27.5'. Installed a 20' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 33'10". All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 13.2'. A bentonite seal was installed from 12' - 13.2'. A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface. Due the semi-compacted nature of the area, the well was protected by a formed concrete pad containing rebar.

Materials: 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
13'8" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
450 lb of silica sand.
25 lb± of bentonite chips.
200 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.
1 55-gallon metal drum.

MW-3

MW-3 was located approximately 60' east of the excavation area. The boring was started at 10:55 am. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals until 25', where continuous sampling was begun to find the water table. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. Total depth of the boring was 41'6" with refusal on possible bedrock. The general geologic column is silt and sand to 20'±, and sandy gravel (with cobbles and boulders) to the limit of the boring. No evidence of contamination by visual or olfactory senses was observed. PID readings were typically less than 1 ppm. The water table was encountered at approximately 39'. Installed a 10' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 41'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 28'. A bentonite seal was installed from 27' - 28'. A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 10' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
30'9" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
250 lb of silica sand.
25 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

MW-4

MW-4 was located approximately 90' southeast of the excavation area, just north of the Armory building. The boring was started at 3:00 pm. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. The boring was stopped for the day at 27'. The general geologic column is silty sand (fill) to 14'±, and sandy gravel (with cobbles and boulders) to the limit of the boring. No evidence of contamination by visual or olfactory senses was observed. PID readings were less than 1 ppm. The water table was not encountered.

Visitors: Armory personnel.
Weather: Overcast, 30's - upper 40's.
Off site: 4:30 pm±.

November 20, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 7:50 am.
M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:00 am.

MW-4 (continued)

The boring was continued to refusal at 37'. The bottom 1"± may have been wet. No evidence of contamination was observed. Offset 6' to the north. Drilled with HSA to refusal at 23'. Reoccupied the original borehole, augered with 4" solid stem augers to refusal at 37'6". No evidence of the water table was observed. Installed a 10' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 37'4". All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 26'. A bentonite seal was installed from 27.2' - 28'. A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 10' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
27'2" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
200 lb of silica sand.
25 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

MW-1 (1st attempt)

An attempt was made to complete MW-1 on the northeast side of the small building by the excavation, just inside the chain link fence. The boring was started at 1:25 pm. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. Three (3) attempts were made. The deepest hole was 28'6" with refusal on probable boulders. The water table was not observed. No evidence of contamination by visual or olfactory senses was observed. PID readings were less than 1 ppm.

Visitors: Armory personnel.
Weather: Overcast am, rain pm, 40's - low 50's.
Off site: 2:30 pm±.

November 23, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:00 am.
M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:10 am.

MW-1 (1st attempt)

A brief attempt was made to advance the boring. This was unsuccessful, and the location was abandoned.

MW-5

MW-5 was located northeast of the Armory building, outside the chain link fence. The boring was started at 10:00 am±. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. Total depth of the boring was 63' with refusal on boulders or bedrock. The general geologic column is alternating sand and fine gravel to 20'±, sand to 30'±, and sandy gravel with cobbles and boulders to the limit of the boring. No evidence of contamination by visual or olfactory senses was observed. PID readings were typically less than 1 ppm, with the exception of 3.2 ppm observed in the 50' - 52' sample (at the water table). The water table was encountered at approximately 50'. Installed a 20' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 53'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 30'. A bentonite seal was installed from 28' - 30'. A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
32'9" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
200 lb of silica sand.
25 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

Visitors: Armory personnel.
Weather:
Off site: 4:45 pm.

November 24, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:00 am.
M & W Soils Engineering, Inc. - Michael Hitchcock and Chris Conant already on site
Steam cleaned all the augers and tools. Shot the elevations of the wells.

MW-6

MW-6 was located at the toe of slope, east of the Armory, and on the west side of the well field. The boring was started at 9:00 am. All water used for cleaning split spoons and other tools was obtained at the Armory. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 ppm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. Total depth of the boring was 26.5' with no refusal. The general geologic column is sand to 7'±, sandy gravel to 11'±, and sand to the limit of the boring. Apparent old ground (with wood) was observed in the bottom of the 15' - 17' sample. No evidence of contamination by visual or olfactory senses was observed. PID readings were typically less than 3 ppm. The water table was encountered at approximately 9.5'. Installed a 20' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 25'. All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 2'6". A bentonite seal was installed from 2' - 2'6". A protective steel, stick-up casing was grouted in.

Materials: 20' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
8' of 2", solid wall, threaded, flush joint, Schd 40 PVC.
250 lb of silica sand.
10 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 5' stick-up casing with padlock.

Visitors: Armory personnel.
Weather: Mostly sunny, 40's - 50's.
Off site: 1:45 pm.

December 2, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 2:45 pm.
M & W Soils Engineering, Inc. - Myron Domingue and Michael Hitchcock on site at 2:45 pm.

MW-1 (2nd attempt)

MW-1 was located outside the chain link fence, northwest of the building near the excavation. The boring was started at 3:00 pm. All water used for cleaning split spoons and other tools was obtained at the site. Drilled with 4 1/4" hollow stem augers taking split spoon samples at 5 foot intervals starting at 5 feet. All samples were screened for VOC's with a Photovac HL-2000 (10.6 eV lamp, calibrated with 100 pm Isobutylene). Representative soil samples from each split spoon were stored in clear glass jars and retained by Dufresne-Henry. No analytical soil samples were collected. The boring was stopped for the day at 22'. The general geologic column is silty and gravelly sand throughout. No evidence of contamination by visual or olfactory senses was observed. PID readings were less than 1 ppm. The water table was not encountered.

Visitors: Armory personnel.
Weather:
Off site:

December 3, 1998

Dufresne-Henry, Inc. - Bruce Cox on site at 8:00 am.
M & W Soils Engineering, Inc. - Myron Domingue, Michael Hitchcock, and Chris Conant on site at 8:05 am.

MW-1 (continued)

Continued MW-1 to refusal at 29'. The last 12" - 18" had been advanced very slowly in probable boulders. No evidence of contamination was observed. The water table was not encountered. Installed a 5' long, 2" diameter, .010" machine slotted, threaded, flush joint, Schedule 40 PVC well at 28'8". All pipe came from factory sealed plastic bags. The annular space was backfilled with clean silica sand to 14'. A bentonite seal was installed from 12' - 14'. A 6" diameter cast iron, watertight, monitoring well box was grouted in at the surface.

Materials: 5' of 2", .010" slot, threaded, flush joint, Schd 40 PVC.
24'6" of 2", solid wall, threaded, flush joint, Schd 40 PVC.
100 lb of silica sand.
25 lb± of bentonite chips.
40 lb of concrete mix.
1 2" push-on PVC cap.
1 2" expanding gasket cap.
1 6" monitoring well box.

Visitors: Armory personnel.
Weather:
Off site: 11:00 am±

BORING LOCATION MW-1 INCLINATION V BEARING DATE START/FINISH DECEMBER 2, 1998 / DECEMBER 3, 1998

CASING ID CORE SIZE TOTAL DEPTH 26.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 492.08 DEPTH TO WATER/DATE DRY FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH				
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)	PENE-TRATION (IN)	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
487.08	5.0						4" SSA	4 ½"/FB	Medium brown, silty, gravelly SAND. Dry. No odor or staining.
485.08	7.0	SS-1	2 6 7 19	2	19	24			Medium - dark gold brown, loose - medium dense, silty, gravelly SAND. Very fine - coarse grained, moderately poorly sorted sand. 10%+ non plastic fines. 20%+ fine gravel (mostly bottom 6"±). Trace of mica and mafic minerals. Dry. No odor or staining. 0.2 ppm.
482.08	10.0						4' SSA	4 ½"/FB	Probable SAND similar to above.
480.08	12.0	SS-2	8 14 12 20	2	16	24			Light brown gray, medium dense, sandy GRAVEL similar to above but with 50%+ fine gravel 1/8" - 1"+. Dry. No odor or staining. 0.1 ppm.
477.08	15.0						4" SSA	4 ½"/FB	Probable SAND and GRAVEL similar to above.
475.08	17.0	SS-3	7 12 7 6	2	22	24			Light - medium brown gray, medium dense, SAND. Very fine - very coarse grained (predominately medium - coarse grained), moderately well sorted sand of quartz and rock fragments. 10%+ non plastic fines. Trace of fine gravel. Trace of mica. 0.1 ppm.
472.08	20.0						4" SSA	4 ½"/FB	Probable SAND similar to above but getting much finer
470.08	22.0	SS-4	11 9 11 11	2	21	24			Light - medium gray, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 30%± non plastic fines. Trace of mica and mafic minerals. Dry. No odor or staining. 0.1 ppm.
467.08	25.0						4" SSA	4 ½"/FB	Probable SAND similar to above changing to GRAVEL at 24'6"±.
465.58	26.5	SS-5	5 29 42	2	12	18	12/3/98		Medium brown, dense, sandy GRAVEL. Very fine - very coarse grained (predominately fine - medium grained), poorly sorted sand. 10% - 20% non plastic fines. 50%+ gravel 1/8" - probable boulders. Dry. No odor or staining. 0.2 ppm.
463.08	29.0						4" SSA	4 ½"/FB	Probable sandy GRAVEL with cobbles and boulders similar to above.
									Refusal on SSA on probable boulder at 29'. Installed 5' of 2" dia, .010" slot, threaded, flush joint, Schd 40 PVC at 28'8". Sand backfill to 14'. Bentonite seal 12' - 14'. Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

SSA = Solid Stem Auger
FB = Finger Bit
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 491.70

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: DEC 3, 1998 PROJECT: 4080114

BORING LOCATION MW-2 | INCLINATION V | BEARING | DATE START/FINISH NOVEMBER 19, 1998 / NOVEMBER 19, 1998

CASING ID | CORE SIZE | TOTAL DEPTH 34.75 FT | DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 490.90 | DEPTH TO WATER/DATE 27.5 FT/ 11/20/98 | LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH				
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)	PENE-TRATION (IN)	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
470.90	20.0						4 1/4" HSA	8"/CCH	Medium - dark brown, SAND and GRAVEL FILL with occasional cobbles and boulders. Dry.
468.90	22.0	SS-1	18" 6 4 7	2	14	24	* Cobble		Medium - dark gold brown, loose - medium dense, silty SAND. Very fine - fine grained, well sorted sand. 20% - 30% non plastic fines. Trace of mica. Wet. Faint gasoline odor, no staining. 100 ppm peak, 80+ ppm sustained.
466.90	24.0	SS-2	12 16 28 16	2	2	24			Medium - dark gold brown, medium dense - dense, gravelly SAND similar to above, but with 20%+ rounded gravel to 1". Dry - slightly moist. No odor or staining. 2.3 ppm.
464.90	26.0	SS-3	8 6 7 8	2	20	24			24' - 24'6" Medium brown, medium dense, gravelly SAND as above. 24'6" - 26' Medium brown, medium dense, sandy GRAVEL. 50%+ fine rounded gravel 1/8" - ½". Dry. Moderate - strong varnish-like odor. 1,230 ppm peak, 550+ ppm sustained.
462.90	28.0	SS-4	14 10 14 11	2	24	24			26' - 27'4" Medium brown, medium dense, sandy GRAVEL as above. 27'4" - 28' Medium - dark brown, medium dense, sandy SILT. Very fine grained, very well sorted sand. 70%+ non plastic, inorganic fines. Saturated. Faint odor as above, no staining. 30 ppm peak, 20+ ppm sustained.
460.90	30.0	SS-5	11 4 4 5	2	20	24			28' - 28'6" Dark brown, medium dense, gravelly SAND. Very fine - very coarse grained, poorly sorted sand. Saturated. 28'6" - 30' Medium brown gray, loose, sandy SILT, similar to above, but grayer. Saturated. Faint odor as above, no staining. 21 ppm peak, 15+ ppm sustained.
458.90	32.0	SS-6	8 10 10 13	2	15	24			Medium brown gray, medium dense, sandy GRAVEL. Very fine - coarse grained, poorly sorted sand. 20%± non plastic fines. 50%+ gravel to 1". Saturated. Very faint odor as above(?). 31 ppm peak, 15+ ppm sustained.
456.90	34.0	SS-7	16 24 16 18	2	24	24			Medium brown gray, dense, silty SAND. Very fine - fine grained, well sorted sand. 20% - 30% non plastic fines. Trace of fine weathered rock fragments. Trace of mica. Saturated. No odor or staining. 1.3 ppm
456.15	34.75	SS-8	20 60"	2	9	9	* 60/3"		Medium gray brown, dense, silty SAND similar to above. Apparent weathered rock at bottom. Saturated. Faint weathered gasoline odor. 53 ppm peak, 20+ ppm sustained.
									Refusal on probable bedrock at 34'9". Installed 20' of 2" dia, .010" slot, threaded, flush joint, Schd 40

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

hSA = Hollow Stem Auger
CCH= Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 490.55

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 19, 1998 PROJECT: 4080114

BORING LOCATION MW-2 INCLINATION V BEARING DATE START/FINISH NOVEMBER 19, 1998 / NOVEMBER 19, 1998

CASING ID CORE SIZE TOTAL DEPTH 34.75 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 490.90 DEPTH TO WATER/DATE 27.5 FT/ 11/20/98 LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH				
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)	PENE-TRATION (IN)	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
									PVC at 33'10". Sand backfill to 13.2'. Bentonite seal 12' - 13.2'. Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

hSA = Hollow Stem Auger
CCH= Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 490.55

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 19, 1998 PROJECT: 4080114

BORING LOCATION MW-3 INCLINATION V BEARING DATE START/FINISH NOVEMBER 19, 1998 / NOVEMBER 19, 1998

CASING ID CORE SIZE TOTAL DEPTH 41.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 490.77 DEPTH TO WATER/DATE 39.7 FT/ 11/20/98 LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH				
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)	PENE-TRATION (IN)	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
485.77	5.0						4 1/4" HSA	8"/CCH	Medium brown, silty, gravelly SAND. Dry. No odor or staining.
483.77	7.0	SS-1	12 9 10 8	2	15	24			Medium gray, medium dense, sandy SILT. Very fine grained, well sorted sand. 70%± non plastic, inorganic fines. Occasional layers of brown, fine - medium grained sand. Moist. No odor or staining. 0.5 ppm.
480.77	10.0						4 1/4" HSA	8"/CCH	Probable SILT and SAND similar to above.
478.77	12.0	SS-2	14* 7 7 8	2	17	24	* Cobble		Light - medium brown, medium dense, silty SAND. Very fine - rarely coarse grained (predominately fine - medium grained), moderately well sorted sand. 20%+ non plastic fines. Trace of mica and mafic minerals. Dry. No odor or staining. 0.9 ppm.
475.77	15.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
473.77	17.0	SS-3	6 6 7 8	2	18	24			Alternating layers of medium gray, medium dense, sandy SILT, and medium orange brown, medium dense, silty SAND. Very fine - medium grained, moderately well sorted sand. Non - slightly plastic, inorganic fines. The sand is dry, the silt is moist. No odor or staining. 0 ppm.
470.77	20.0						4 1/4" HSA	8"/CCH	SILT and SAND similar to above, changing to gravel at 20'.
468.77	22.0	SS-4	30 20 17 20	2	10	24			Medium brown gray, dense, sandy GRAVEL. Very fine - very coarse grained (predominately fine - medium grained), poorly sorted sand. 10% - 20% non plastic fines. 50%+ rounded gravel 1/8" - 1"+. Dry. No odor or staining. 1.3 ppm.
465.77	25.0						4 1/4" HSA	8"/CCH	Probable GRAVEL as above.
463.77	27.0	SS-5	22 18 22 13	2	10	24			Medium gray, dense, sandy GRAVEL similar to above. Abundant fragments of light colored granite or gneiss. Dry. No odor or staining. 0.3 ppm.
461.77	29.0	SS-6	18 14 22 16	2	15	24			Medium gray, medium dense, sandy GRAVEL as above. Dry. No odor or staining. 0.4 ppm.
459.77	31.0	SS-7	13 9 26 36	2	10	24			Medium brown, medium dense - very dense, sandy GRAVEL. Very fine - very coarse grained (predominately fine - medium grained), poorly sorted sand of quartz and rock fragments. 10%+ non plastic fines. 50%± rounded gravel 1/8" - ½" (finer than above). Dry. No odor or staining. 0.4 ppm
		SS-8	12 15 18	2	13	24			Light - medium brown, medium dense - dense, sandy GRAVEL similar to above, but lighter brown and with a coarser gravel fraction. Dry. No odor or staining. 0.3 ppm.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 490.51

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 19, 1998 PROJECT: 4080114

BORING LOCATION MW-3 INCLINATION V BEARING DATE START/FINISH NOVEMBER 19, 1998 / NOVEMBER 19, 1998

CASING ID CORE SIZE TOTAL DEPTH 41.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 490.77 DEPTH TO WATER/DATE 39.7 FT/ 11/20/98 LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B		REC (IN)	PENE-TRATION (IN)			
457.77	33.0		17						
455.77	35.0	SS-9	12 8 12 14	2	10	24			Light - medium gray brown, medium dense, sandy GRAVEL similar to above, but with a coarser grained sand fraction. Dry. No odor or staining. 0.3 ppm.
453.77	37.0	SS-10	12 19 28 31	2	15	24			Light - medium gray brown, medium dense - dense, sandy GRAVEL as above. Dry. No odor or staining. 0.3 ppm.
451.77	39.0	SS-11	25 24 10 8	2	22	24			37' - 38' Medium brown, dense, sandy GRAVEL similar to above, but sandier. Moist. No odor or staining. 0.3 ppm 38' - 39' Medium brown, medium dense, silty SAND. Very fine grained, well sorted sand. Saturated. No odor or staining. 0.3 ppm
450.77	40.0						4 1/4" HSA	8"/CCH	Probable SAND and GRAVEL similar to above.
449.27	41.5	SS-12	18 17 38 70*	2	14	18	* 70/0"		Medium brown gray, dense - very dense, sandy GRAVEL similar to above. Saturated. No odor or staining. 0.2 ppm.
									Refusal on probable boulder or bedrock at 41'6". Installed 10' of 2", .010" slot, threaded, flush joint, Schd 40 PVC at 41". Sand backfill to 28'. Bentonite seal 27.2' - 28'. Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 490.51

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 19, 1998 PROJECT: 4080114

BORING LOCATION MW-4 INCLINATION V BEARING DATE START/FINISH NOVEMBER 19, 1998 / NOVEMBER 20, 1998

CASING ID CORE SIZE TOTAL DEPTH 37.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 489.77 DEPTH TO WATER/DATE DRY FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH				
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)	PENE-TRATION (IN)	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
484.77	5.0						4 1/4" HSA	8"/CCH	Medium brown, silty, gravelly SAND FILL. Dry.
482.77	7.0	SS-1	4 5 6 5	2	16	24			Light - medium gray brown, loose - medium dense, silty SAND FILL. Very fine grained, well sorted sand. 30%± non plastic fines. Abundant light - medium orange mottles. Slightly moist. No odor or staining. 0.2 ppm.
479.77	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
477.77	12.0	SS-2	7 7 7 6	2	18	24			Medium - dark orange gray, medium dense, sandy SILT (probable fill). Very fine grained well sorted sand. 60%+ nonplastic, inorganic fines. Orange tint may be mottling. Damp - wet. No odor or staining. 0.3 ppm (very slow to react).
474.77	15.0						4 1/4" HSA	8"/CCH	Probable SILT similar to above, changing to GRAVEL at 14'±.
472.77	17.0	SS-3	22 22 32 36	2	13	24			Light - medium gray brown, dense, silty, sandy GRAVEL. Very fine - very coarse grained (predominately very fine - medium grained), poorly sorted sand. 10%+ non plastic fines. 50%+ rounded gravel 1/8" - 1"+. Dry. No odor or staining. 0.3 ppm.
468.77	21.0						4 1/4" HSA	8"/CCH	GRAVEL as above with cobbles or boulders.
466.77	23.0	SS-4	22 20 15 14	2	17	24			Medium brown gray, medium dense - dense, sandy GRAVEL similar to above, but grayer and with coarser sand and gravel fractions. Dry. No odor or staining. 0.4 ppm.
464.77	25.0						4 1/4" HSA	8"/CCH	Probable GRAVEL as above.
462.77	27.0	SS-5	50 28 7 7	2	13	24			Medium brown, medium dense - dense, sandy GRAVEL similar to above, but brown. Much sandier bottom 12"±. Dry. No odor or staining. 0.3 ppm.
459.77	30.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above.
457.77	32.0	SS-6	9 8 8 12	2	16	24	11/20/98		Medium brown, medium dense, gravelly SAND. Very fine - very coarse grained (predominately fine - medium grained), poorly sorted sand. 10%+ non plastic fines. 30%± fine rounded gravel. Dry. No odor or staining. 0.2 ppm.
454.77	35.0						4 1/4" HSA	8"/CCH	Probable SAND and GRAVEL similar to above.
452.77	37.0	SS-7	20 30 32 50	2	9	24			Medium brown, very dense, sandy GRAVEL similar to above, but with a coarser gravel fraction. Dry - possibly moist at bottom. No odor or staining. 0.2 ppm.
452.27	37.5						4 1/4" HSA	8"/CCH	Very slow advancement.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 489.42

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 20, 1998 PROJECT: 4080114

BORING LOCATION MW-4 INCLINATION V BEARING DATE START/FINISH NOVEMBER 19, 1998 / NOVEMBER 20, 1998

CASING ID CORE SIZE TOTAL DEPTH 37.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 489.77 DEPTH TO WATER/DATE DRY FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE				LENGTH				
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B	SAMP OD (IN)	REC (IN)	PENE-TRATION (IN)	REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
									Refusal on probable boulder or bedrock at 37'6". Installed 10' of 2" dia, .010" slot, threaded, flush joint, Schd 40 PVC at 37'4". Sand backfill to 26'. Bentonite seal 25.2' - 26'. Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

hSA = Hollow Stem Auger
CCH= Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 489.42

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 20, 1998 PROJECT: 4080114

BORING LOCATION MW-5 INCLINATION V BEARING DATE START/FINISH NOVEMBER 23, 1998 / NOVEMBER 23, 1998

CASING ID CORE SIZE TOTAL DEPTH 63 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.H.)

GROUND EL (NGVD) 490.12 DEPTH TO WATER/DATE 51± FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B		REC (IN)	PENE-TRATION (IN)			
485.12	5.0						4 1/4" HSA	8"/CCH	0' - 5"± Medium - dark brown, sandy, silty, ORGANIC SOIL. 5" - 5' Light - medium brown SAND. Dry - moist.
483.12	7.0	SS-1	4 5 5 11	2	21	24			Light - medium gold brown, loose - medium dense, SAND. Very fine - occasionally medium grained, well sorted, predominately quartz sand. 20%+ non plastic fines. 10%± fine gravel. Dry. No odor or staining. 0.3 ppm.
480.12	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
478.12	12.0	SS-2	2 3 6 6	2	17	24			Light - medium brown gray, loose - medium dense, sandy SILT. Very fine grained, well sorted sand. 70%± non plastic, inorganic fines. Slightly moist. No odor or staining. 0.4 ppm.
475.12	15.0						4 1/4" HSA	8"/CCH	Probable SILT similar to above.
473.12	17.0	SS-3	8 25* 19 11	2	5	24	* Cobble		15' - 15'6" Probable sandy SILT similar to above. 15'6" - 17' Medium brown, medium dense, sandy GRAVEL. Very fine - occasionally very coarse grained (predominately very fine - medium grained), moderately well sorted sand. 10%+ non plastic fines. 60%+ gravel 1/8" - cobbles. Dry. No odor or staining. 1.0 ppm.
470.12	20.0						4 1/4" HSA	8"/CCH	Probable sandy GRAVEL similar to above, changing to SAND at 18"±.
468.12	22.0	SS-4	6 7 8 7	2	16	24			Medium brown gray, medium dense, SAND. Very fine - occasionally very coarse grained (predominately medium grained), moderately poorly sorted sand. 10% non plastic fines. 10%+ fine gravel. Dry. No odor or staining. 0.5 ppm.
465.12	25.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
463.12	27.0	SS-5	11 8 8 9	2	19	24			Medium brown gray, medium dense, SAND as above. Dry - very sightly moist at the bottom. No odor or staining. 0.6 ppm.
460.12	30.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above, becoming gravelly at 29'±
459.54	30.58	SS-6	19 44*	2	7	7	* 44/1"		Medium brown, medium dense - dense, sandy GRAVEL. Very fine - very coarse grained, poorly sorted sand. 10%+ non plastic fines. 50%+ gravel 1/8" - cobbles. Dry - slightly moist at the bottom. No odor or staining. 0.9 ppm.
455.12	35.0						4 1/4" HSA	8"/CCH	Probable GRAVEL with cobbles or boulders.
455.12	35.0		30*	2	0	0	* 30/0"		No sample recovery

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

hSA = Hollow Stem Auger
CCH= Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 489.73

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 23, 1998 PROJECT: 4080114

BORING LOCATION MW-6 INCLINATION V BEARING DATE START/FINISH NOVEMBER 24, 1998 / NOVEMBER 24, 1998

CASING ID CORE SIZE TOTAL DEPTH 26.5 FT DRILLED BY: M & W SOILS ENGINEERING, INC. (M.D.)

GROUND EL (NGVD) 451.97 DEPTH TO WATER/DATE 9.4 FT/ IMMED. LOGGED BY: B. COX

ELEV	SAMPLE			SAMP OD (IN)	LENGTH		REMARKS ON ADVANCE OF BORING	SIZE/TYPE BIT USED TO ADVANCE BORING	SOIL AND ROCK DESCRIPTION
NGVD (FT)	DEPTH (FT)	TYPE AND NO.	B		REC (IN)	PENE-TRATION (IN)			
446.97	5.0						4 1/4" HSA	8"/CCH	0' - 6" Medium - dark brown, sandy, silty, ORGANIC SOIL. 6" - 5' Medium brown and orange brown SAND. Dry - moist.
444.97	7.0	SS-1	6 7 8 10	2	16	24			Medium orange brown, medium dense, SAND. Very fine - rarely very coarse grained (predominately fine - medium grained), moderately well sorted sand. 10%+ non plastic fines. 10%± fine rounded gravel to ½". Prominent, medium - dark orange mottle at 6'±. Dry. No odor or staining. 3.0 ppm.
441.97	10.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above, becoming gravelly below 7'±.
439.97	12.0	SS-2	7 5 1 2	2	15	24			10' - 11' Medium gray brown, medium dense, sandy GRAVEL. Very fine - very coarse grained, poorly sorted, rounded, sand of quartz and rock fragments. 10% non plastic fines. Trace of mica. Saturated. No odor or staining. 2.9 ppm. 11' - 12' Medium gray, loose, SAND. Alternating layers of fine - medium and medium - coarse grained sand. 10%+ non plastic fines. Saturated. No odor or staining.
436.97	15.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
434.97	17.0	SS-3	3 4 5 6	2	13	24			Medium brown, loose - medium dense, silty SAND. Very fine - occasionally medium grained, well sorted sand. 20%+ non plastic fines. Trace of mica and mafic minerals. 1"± of organic soil with roots at bottom. Saturated. No odor or staining. 2.0 ppm.
431.97	20.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above, but getting much finer grained.
429.97	22.0	SS-4	6 4 7 8	2	20	24			Medium gray brown, medium dense, silty SAND. Very fine - fine grained, well sorted sand. 20%+ non plastic fines. Wood in upper 6". Saturated. No odor or staining. 1.0 ppm.
426.97	25.0						4 1/4" HSA	8"/CCH	Probable SAND similar to above.
425.47	26.5	SS-5	2 3 5	2	18	18			Medium gray, loose, silty SAND similar to above but grayer. Trace of mica. Saturated. No odor or staining. 1.0 ppm.
									No refusal to depth. Installed 20' of 2" dia, .010" slot, threaded, flush joint, Schd 40 PVC at 25'. Sand backfill to 2'6"'. Bentonite seal 2" - 2'6". Grouted in flush, watertight, cast iron monitoring well box.

B - Penetration resistance, Blows/6" of a 140 lb hammer falling 30 in to drive a split spoon sampler.
REC - Length of sample recovered.
SS - Split spoon sample.
U - Undisturbed samples
S - Shelby tube D - Denison
F - Fixed piston P - Pitcher
O - Osterberg
SAMP OD - Outside diameter of sampling spoon

NOTES

HSA = Hollow Stem Auger
CCH = Conical Cutter Head
ppm Refers to PID reading (10.6 eV lamp)

Top of PVC elev = 454.26

SPRINGFIELD ARMORY
SITE INVESTIGATION

SPRINGFIELD, VERMONT

DATE: NOV 24, 1998 PROJECT: 4080114

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 11/20/98
HOLE NO. MW-1
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT _____ AT _____ HOURS
AT _____ AT _____ HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/20/98
DATE COMPL. 11/20/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING SOUTHWEST OF FUEL STATION, NEXT TO FENCE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
5'	5' - 6'6"	SS	10	20				1	18"	12"
			50							
10'	10' - 10'5"	SS	65/5"		MED. DENSE TO DENSE		BROWN SANDY GRAVEL WITH COBBLES AND BOULDERS	2	5"	3"
15'	15' - 16'6"	SS	28	54				3	18"	6"
			83							
20'	20' - 21'6"	SS	21	41		20'		4	18"	14"
			57							
25'					DENSE		BROWN COARSE SAND AND FINE GRAVEL WITH COBBLES AND BOULDERS			
						28'6"				
30'							REFUSAL TO AUGERS TRIED TWO OTHER ATTEMPTS - REFUSAL EACH TIME - HOLE DRY			

GROUND SURFACE TO 28'6" USED HSA CASING THEN

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 28'6"
ROCK CORING
SAMPLES 4

HOLE NO. MW-1

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 12/2/98
HOLE NO. MW-1
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT DRY AT IMMEDIATELY HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR.
Type	FA	SS	
Size I. D.	4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 12/2/98
DATE COMPL. 12/2/98
BORING FORMAN M.D. & M.H.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING SOUTH OF FUEL STATION, AT TOE OF SLOPE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
5'	5' - 7'	SS	2	6				1	24"	19"
			7	19	MED. DENSE		BROWN MEDIUM SAND WITH COBBLES AND BOULDERS			
10'	10' - 12'	SS	8	14				2	24"	16"
			12	20		14'				
15'	15' - 17'	SS	7	12				3	24"	22"
			7	6	MED. DENSE		LIGHT GREY MEDIUM TO COARSE SANDS			
20'	20' - 22'	SS	11	9		20'		4	24"	21"
			11	11						
25'	25' - 26'6"	SS	5	29	MED. DENSE		GREY FINE SAND - TRACE OF SILT WITH COBBLES AND BOULDERS	5	18"	16"
			42			29'				
30'							REFUSAL TO AUGER - BEDROCK OR BOOULDER SET 2" PVC WELL AT 28'8" SAND TO 14' BENTONITE TO 12' **MATERIALS USED:** 5' OF 2" PVC 0.010" SLOT SCREEN 25' OF 2" PVC SOLID 10# OF BENTONITE CHIPS 100# OF SAND, 40# OF CEMENT MIX, 1 2" GRIPPER, 1 2" PVC CAP, AND 1 6" CAST IRON MANHOLE			

GROUND SURFACE TO 29' USED HSA CASING THEN

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 29'
ROCK CORING
SAMPLES 5

HOLE NO. MW-1

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 11/19/98
HOLE NO. MW-2
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT 27'3" AT 1 HOURS
AT 27'2" AT 18+ HOURS

	CASING	SAMPLER	CORE BAR
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/19/98
DATE COMPL. 11/19/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING IN EXCAVATION

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
5'										
10'					MED. DENSE		BROWN SANDY FILL WITH COBBLES AND BOULDERS			
15'										
20'	20' - 22'	SS	18	6				1	24"	14"
			4	7		21'				
	22' - 24'	SS	12	16				2	24"	6"
			28	16	MED. DENSE		BROWN FINE SAND - TRACE OF SILT WITH COBBLES			
	24' - 26'	SS	8	6				3	24"	20"
25'			7	8		25'				
	26' - 28'	SS	14	10				4	24"	24"
			14	11	MED. DENSE		BROWN COARSE SAND AND FINE GRAVELS (SLIGHT ODOR			
	28' - 30'	SS	11	4		28'	OF GASOLINE)	5	24"	20"
			4	5						
30'	30' - 32'	SS	8	10	MED. DENSE		LIGHT BROWN FINE SAND WITH SOME SILT	6	24"	15"
			10	13	WET	31'				
	32' - 34'	SS	16	24	DENSE		BROWN COARSE SAND - TRACE TO SOME FINE GRAVEL	7	24"	24"
			16	18		33'				
	34' - 34'9"	SS	20	60/3"	VERY DENSE		BROWN FINE TO MEDIUM SAND - TRACE OF SILT AND FINE	8	9"	8"
35'						34'9"	GRAVEL			
							REFUSAL TO SPLIT SPOON - REFUSAL TO AUGER			
							SET 2" PVC WELL AT 34' TOP OF WELL AT 14'			

GROUND SURFACE TO ____ USED ____ CASING THEN ____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING ____
ROCK CORING ____
SAMPLES ____
HOLE NO. MW-2

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 2 OF 2
DATE 11/19/98
HOLE NO. MW-2
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT 27'3" AT 1 HOURS
AT 27'2" AT 18+ HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/19/98
DATE COMPL. 11/19/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING IN EXCAVATION

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
							SAND TO 13'2"			
							BENTONITE TO 12'			
							MATERIALS USED:			
							20' OF 2" PVC 0.010" SLOT SCREEN			
							15' OF 2" PVC SOLID			
							25# OF BENTONITE CHIPS			
							450# OF SAND			
							200# OF CEMENT MIX			
							1 2" GRIPPER			
							1 2" PVC CAP			
							1 6" CAST IRON MANHOLE			
							1 55 GALLON DRUM AND RING COVER			

GROUND SURFACE TO 34'9" USED HSA CASING THEN DROVE SS 9"

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 34'9"
ROCK CORING
SAMPLES 8
HOLE NO. MW-2

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 11/19/98
HOLE NO. MW-3
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT 38'3" AT 16+ HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/19/98
DATE COMPL. 11/19/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING 60' WEST OF MW-4, IN PARKING LOT

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE NO.	PEN	REC
					MED. DENSE		BROWN COARSE GRAVEL			
						2'				
					MED. DENSE		BROWN FINE TO MEDIUM SANDS			
						4'				
5'	5' - 7'	SS	12	9				1	24"	16"
			10	8						
					MED. DENSE MOIST		BROWN SILTY FINE SAND			
10'	10' - 12'	SS	14	7		10'		2	24"	17"
			7	8						
15'	15' - 17'	SS	6	6	MED. DENSE		BROWN FINE TO MEDIUM SANDS - TRACE OF SILT WITH AN OCCASIONAL SILT PARTING	3	24"	18"
			7	8						
						19'				
20'	20' - 22'	SS	30	20				4	24"	10"
			17	20	DENSE		BROWN COARSE SAND WITH FINE GRAVEL			
						22'				
25'	25' - 27'	SS	22	18				5	24"	10"
			22	13	DENSE		COARSE BROWN GRAVEL WITH COBBLES AND BOULDERS			
	27' - 29'	SS	18	14				6	24"	15"
			22	16						
	29' - 31'	SS	13	9		29'		7	24"	10"
30'			26	36						
	31' - 33'	SS	12	15				8	24"	13"
			18	17						
	33' - 35'	SS	12	8				9	24"	10"
			12	14	DENSE		BROWN COARSE SAND WITH FINE GRAVEL			
35'	35' - 37'	SS	12	19				10	24"	15"
			38	31						
	37' - 39'	SS	25	24				11	24"	22"
			10	8						
						38'10"				
	40' - 41'6"	SS	18	17	MED. DENSE		SAME MATERIAL AS ABOVE	12	18"	14"

GROUND SURFACE TO USED CASING THEN

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING
ROCK CORING
SAMPLES
HOLE NO. MW-3

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 2 OF 2
DATE 11/19/98
HOLE NO. MW-3
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT 38'3" AT 16+ HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/19/98
DATE COMPL. 11/19/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING 60' WEST OF MW-4, IN PARKING LOT

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE NO.	PEN	REC
			38	70/0"	WET	41'6"	SAME MATERIAL.			
							REFUSAL TO SPLIT SPOON AND AUGERS			
45'							SET 2" PVC WELL AT 41' TOP OF WELL AT 31' SAND TO 28' BENTONITE TO 27'			
							MATERIALS USED: 10' OF 2" PVC 0.010" SLOT SCREEN 35' OF 2" PVC SOLID 25# OF BENTONITE CHIPS 250# OF SAND 40# OF CEMENT MIX 1 2" GRIPPER 1 2" PVC CAP 1 6" CAST IRON MANHOLE			

GROUND SURFACE TO 41'6" USED HSA CASING THEN DROVE SS 18"

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 41'6"
ROCK CORING
SAMPLES 12
HOLE NO. MW-3

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2
DATE 11/19/98
HOLE NO. MW-4
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT DRY AT 36+/- HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/19/98
DATE COMPL. 11/19/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING 9' WEST OF CENTER OF WEST WALL OF ARMORY BUILDING

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
					MED. DENSE	1'	BROWN FINE GRAVEL			
					MED. DENSE		BROWN MEDIUM SAND (FILL)			
5'	5' - 7'	SS	4	5				1	24"	16"
			6	5		6'				
					MED. DENSE		SILTY FINE SAND WITH SILT SEAMS			
10'	10' - 12'	SS	7	7				2	24"	14"
			7	6						
						14'				
15'	15' - 17'	SS	22	32				3	24"	20"
			32	36	DENSE		BROWN COARSE GRAVEL WITH SOME COBBLES AND BOULDERS			
20'	21' - 23'	SS	22	20				4	24"	12"
			15	14		22'				
25'	25' - 27'	SS	50	28				5	24"	10"
			7	7	DENSE		BROWN COARSE SAND AND FINE GRAVEL WITH A FEW COBBLES			
						28'6"				
30'	30' - 32'	SS	9	8				6	24"	16"
			8	12						
					MED. DENSE		BROWN COARSE SANDS - TRACE OF FINE GRAVEL			
35'	35' - 37'	SS	20	32				7	24"	9"
			34	50						
						37'6"				
							REFUSAL TO AUGERS - BEDROCK OR BOULDER			

GROUND SURFACE TO USED CASING THEN

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING
ROCK CORING
SAMPLES
HOLE NO. MW-4

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 2 OF 2
DATE 11/19/98
HOLE NO. MW-4
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT DRY AT 36+/- HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/19/98
DATE COMPL. 11/19/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING 9' WEST OF CENTER OF WEST WALL OF ARMORY BUILDING

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler	MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
						SET 2" PVC WELL AT 37'4"			
						TOP OF WELL AT 27'4"			
						SAND TO 26'			
						BENTONITE TO 25'2"			
						MATERIALS USED:			
						10' OF 2" PVC 0.010" SLOT SCREEN			
						30' OF 2" PVC SOLID			
						25# OF BENTONITE CHIPS			
						200# OF SAND			
						40# OF CEMENT MIX			
						1 2" GRIPPER			
						1 2" PVC CAP			
						1 6" CAST IRON MANHOLE			

GROUND SURFACE TO 37'6" USED HSA CASING THEN

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Tes
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler
Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 37'6"
ROCK CORING
SAMPLES 7

HOLE NO. MW-4

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 2

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

DATE 11/23/98
HOLE NO. MW-5
LINE & STA.
OFFSET

GROUND WATER OBSERVATIONS
AT 50' AT 1/2 HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/23/98
DATE COMPL. 11/23/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING FRONT LAWN OF ARMORY, NEXT TO FENCE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE NO.	PEN	REC
					LOOSE	5'	TOPSOIL			
5'	5' - 7'	SS	4	4				1	24"	16"
			5	12	MED. DENSE		BROWN FINE TO COARSE SANDS - TRACE OF COBBLES			
10'	10' - 12'	SS	2	3		10'		2	24"	21"
			6	6	MED. DENSE TO DENSE		BROWN FINE SAND - TRACE TO SOME SILT WITH A FEW COBBLES OR BOULDERS			
15'	15' - 17'	SS	8	35		14'		3	24"	14"
			19	11	MED. DENSE		BROWN MEDIUM SAND WITH COARSE GRAVEL, COBBLES AND BOULDERS			
20'	20' - 22'	SS	6	7		20'		4	24"	16"
			8	7	MED. DENSE		LIGHT BROWN COARSE SANDS			
25'	25' - 27'	SS	11	8				5	24"	21"
			8	9		28'				
30'	30' - 30'7"	SS	19	44/1"				6	7"	6"
					DENSE		BROWN FINE SAND WITH COARSE GRAVEL, COBBLES AND BOULDERS			
35'	35'	SS	80/0"					7	0"	0"

GROUND SURFACE TO ____ USED ____ CASING THEN ____

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING
ROCK CORING
SAMPLES
HOLE NO. MW-5

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 2 OF 2
DATE 11/23/98
HOLE NO. MW-5
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC.
PROJECT NAME SPRINGFIELD ARMORY
REPORT SENT TO BRUCE COX
SAMPLES RETAINED BY DUFRESNE-HENRY, INC.
ADDRESS NORTH SPRINGFIELD, VT
LOCATION NORTH SPRINGFIELD, VT
PROJ. NO.
OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT 50' AT 1/2 HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR.
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/23/98
DATE COMPL. 11/23/98
BORING FORMAN M.D., M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING FRONT LAWN OF ARMORY, NEXT TO FENCE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect.	SAMPLE NO.	PEN	REC
45'							SAME MATERIAL			
	50' - 52'	SS	28	27				8	24"	16"
50'			18	17		51'				
55'					MED. DENSE WET		BROWN MEDIUM SAND - TRACE OF SILT AND FINE GRAVEL WITH COBBLES AND SMALL BOULDERS			
60'						63'				
65'							REFUSAL TO AUGERS SET 2" PVC WELL AT 53' TOP OF WELL AT 33' SAND TO 30' BENTONITE TO 28' **MATERIALS USED:** 20' OF 2" PVC 0.010" SLOT SCREEN 35' OF 2" PVC SOLID 25# OF BENTONITE CHIPS 200# OF SAND 40# OF CEMENT MIX 1 2" GRIPPER 1 2" PVC CAP 1 6" CAST IRON MANHOLE			

GROUND SURFACE TO 63'
USED HSA CASING THEN
140 lb. wt. x 30"-fall an 2" O.D. Sampler

summary
EARTH BORING 63'
ROCK CORING
SAMPLES 8
HOLE NO. MW-5

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

M & W Soils Engineering Inc.
Main St. Charlestown, NH 03603

SHEET 1 OF 1
DATE 11/24/98
HOLE NO. MW-6
LINE & STA.
OFFSET

TO DUFRESNE-HENRY, INC. ADDRESS NORTH SPRINGFIELD, VT
PROJECT NAME SPRINGFIELD ARMORY LOCATION NORTH SPRINGFIELD, VT
REPORT SENT TO BRUCE COX PROJ. NO.
SAMPLES RETAINED BY DUFRESNE-HENRY, INC. OUR JOB NO. 7597-98

GROUND WATER OBSERVATIONS
AT 9'5" AT 1/2 HOURS
AT AT HOURS

	CASING	SAMPLER	CORE BAR
Type	HSA	SS	
Size I. D.	4 1/4"	1 1/2"	
Hammer Wt.		140#	BIT
Hammer Fall		30"	

SURFACE ELEV.
DATE STARTED 11/24/98
DATE COMPL. 11/24/98
BORING FORMAN M.H. & C.C.
INSPECTOR B. COX
SOILS ENGR.

LOCATION OF BORING ACROSS ROAD, AT TOE OF SLOPE

Depth	SAMPLE DEPTHS FROM-TO	TYPE OF SAMPLE	Blows per 6" on sampler		MOISTURE DENSITY OR CONSIST.	STRATA CHANGE ELEV.	FIELD SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, cond., hardness, Drilling time, seams and ect	SAMPLE NO.	PEN	REC
						1'6"	ORGANICS AND ROOTS			
					MED. DENSE	4'	BROWN FINE TO MEDIUM SAND			
5'	5' - 7'	SS	6	7				1	24"	16"
			8	10						
					MED. DENSE		BROWN MEDIUM TO COARSE SANDS			
10'	10' - 12'	SS	7	5				2	24"	15"
			1	2		11'				
15'	15' - 17'	SS	3	4				3	24"	13"
			5	6						
					LOOSE TO MED.					
20'	20' - 22'	SS	6	4	DENSE - WET		BROWN MEDIUM SAND WITH SOME SILT (LAYERED)	4	24"	20"
			7	8						
25'	25' - 26'6"	SS	2	3				5	18"	18"
			5			27'				
30'							NO BEDROCK TO DEPTH SET 2" PVC WELL AT 25' TOP OF WELL AT 5' SAND TO 2'6" BENTONITE TO 2' **MATERIALS USED:** 20' OF 2" PVC 0.010" SLOT SCREEN 10' OF 2" PVC SOLID 10# OF BENTONITE CHIPS 250# OF SAND 40# OF CEMENT MIX, 1 2" GRIPPER, 1 2" PVC CAP, 1 PADLOCK AND 1 5' STANDUP			

GROUND SURFACE TO 27' USED HSA CASING THEN

Sample Type
D-Dry C-Cored W-Washed
UP-Unfinished Piston
TP-Test Pit A-Auger V-Vane Test
UT-Undisturbed Thinwall

Proportions Used
trace 0 to 10%
little 10 to 20%
some 20 to 35%
and 35 to 50%

140 lb. wt. x 30"-fall an 2" O.D. Sampler

Cohesionless Density
0-10 Loose
10-30 Med. Dense
30-50 Dense
50+ Very Dense

Cohensive Consistancy
0-4 Soft 30 + Hard
4-8 M/Stiff
8-15 Stiff
15-30 V-Stiff

summary
EARTH BORING 27'
ROCK CORING
SAMPLES 5
HOLE NO. MW-6

APPENDIX G

ANALYTICAL LABORATORY REPORT

eastern analytical

professional laboratory services

Oscar Garcia
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

Subject: Laboratory Report

Eastern Analytical, Inc. ID:	15154 DUFVT
Client Identification:	VT National Guard 4080114
Date Received:	12/11/98

Dear Mr. Garcia:

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst, President

12/17/98
Date

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15154

Client: Dufresne-Henry

Client Designation: VT National Guard 4080114

Volatile Organic Compounds

Sample ID:	MW-1
Matrix:	Aqueous
Date Received:	12/11/98
Units:	µg/L
Date of Analysis:	12/15/98
Analyst:	JDS
EPA Method:	8260B

Dichlorodifluoromethane	< 5
Chloromethane	< 2
Vinyl chloride	< 2
Bromomethane	< 2
Chloroethane	< 5
Trichlorofluoromethane	< 5
Diethyl ether	< 5
Acetone	< 10
1,1-Dichloroethene	< 1
Methylene chloride	< 5
Carbon disulfide	< 5
Methyl-t-butyl ether(MTBE)	< 10
trans-1,2-Dichloroethene	< 2
1,1-Dichloroethane	< 2
2-Butanone(MEK)	< 10
2,2-Dichloropropane	< 2
cis-1,2-Dichloroethene	< 2
Chloroform	< 2
Bromochloromethane	< 2
Tetrahydrofuran(THF)	< 10
1,1,1-Trichloroethane	< 2
1,1-Dichloropropene	< 2
Carbon tetrachloride	< 2
1,2-Dichloroethane	< 2
Benzene	< 1
Trichloroethene	< 2
1,2-Dichloropropane	< 2
Bromodichloromethane	< 2
Dibromomethane	< 2
4-Methyl-2-pentanone(MIBK)	< 10
cis-1,3-Dichloropropene	< 2
Toluene	< 1
trans-1,3-Dichloropropene	< 2
1,1,2-Trichloroethane	< 2
2-Hexanone	< 10

	MW-1 Aqueous 12/11/98 µg/L 12/15/98 JDS 8260B
1,3-Dichloropropane	< 2
Tetrachloroethene	< 2
Dibromochloromethane	< 2
1,2-Dibromoethane	< 2
Chlorobenzene	< 2
1,1,1,2-Tetrachloroethane	< 2
Ethylbenzene	< 1
mp-Xylene	< 1
o-Xylene	< 1
Styrene	< 1
Bromoform	< 2
iso-Propylbenzene	< 1
1,1,2,2-Tetrachloroethane	< 2
1,2,3-Trichloropropane	< 2
n-Propylbenzene	< 1
Bromobenzene	< 1
1,3,5-Trimethylbenzene	< 1
2-Chlorotoluene	< 2
4-Chlorotoluene	< 2
tert-Butylbenzene	< 1
1,2,4-Trimethylbenzene	< 1
sec-Butylbenzene	< 1
p-isoPropyltoluene	< 1
1,3-Dichlorobenzene	< 1
1,4-Dichlorobenzene	< 1
n-Butylbenzene	< 1
1,2-Dichlorobenzene	< 1
1,2-Dibromo-3-chloropropane	< 2
1,2,4-Trichlorobenzene	< 1
Hexachlorobutadiene	< 1
Naphthalene	< 1
1,2,3-Trichlorobenzene	< 1

Approved By: Clifford Chase, Volatile Organics Supervisor 12/16/98

eastern analytical

professional laboratory services

Oscar Garcia
Dufresne-Henry
Precision Park
N.Springfield, VT 05150

Subject: Laboratory Report

Eastern Analytical, Inc. ID: 15041 DUFVT
Client Identification: Vermont National Guard 4080114
Date Received: 12/3/98

Dear Mr. Garcia:

Enclosed please find the laboratory report for the above identified project. All analyses were subjected to rigorous quality control measures to assure data accuracy. Unless otherwise stated, all holding times, preservation techniques, container types, and sample conditions adhered to EPA Protocol.

The following standard abbreviations and conventions apply throughout all Eastern Analytical, Inc. reports:

< = "less than" followed by the detection limit
TNR = Testing Not Requested
ND = None Detected, no established detection limit
BRL = Below Reporting Limits

If you have any questions regarding the results contained within, please feel free to directly contact me, the department supervisor, or the analytical chemist who performed the testing in question. Unless otherwise requested, we will dispose of the sample(s) 30 days from the sample receipt date.

We appreciate this opportunity to be of service and look forward to your continued patronage.

Sincerely,

Will Brunkhorst (WB)
Will Brunkhorst, President

12/15/98
Date

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15041

Client: Dufresne-Henry

Client Designation: Vermont National Guard 4080114

Volatile Organic Compounds

Sample ID:	MW-2	MW-3	MW-5
Matrix:	Aqueous	Aqueous	Aqueous
Date Received:	12/3/98	12/3/98	12/3/98
Units:	µg/L	µg/L	µg/L
Date of Analysis:	12/10/98	12/10/98	12/10/98
Analyst:	JDS	JDS	JDS
EPA Method:	8260B	8260B	8260B
Dichlorodifluoromethane	< 5	< 5	< 5
Chloromethane	< 2	< 2	< 2
Vinyl chloride	< 2	< 2	< 2
Bromomethane	< 2	< 2	< 2
Chloroethane	< 5	< 5	< 5
Trichlorofluoromethane	< 5	< 5	< 5
Diethyl ether	< 5	< 5	< 5
Acetone	< 10	< 10	< 10
1,1-Dichloroethene	< 1	< 1	< 1
Methylene chloride	< 5	< 5	< 5
Carbon disulfide	< 5	< 5	< 5
Methyl-t-butyl ether(MTBE)	< 10	< 10	< 10
trans-1,2-Dichloroethene	< 2	< 2	< 2
1,1-Dichloroethane	< 2	< 2	< 2
2-Butanone(MEK)	< 10	< 10	< 10
2,2-Dichloropropane	< 2	< 2	< 2
cis-1,2-Dichloroethene	< 2	< 2	< 2
Chloroform	< 2	< 2	< 2
Bromochloromethane	< 2	< 2	< 2
Tetrahydrofuran(THF)	< 10	< 10	< 10
1,1,1-Trichloroethane	< 2	< 2	< 2
1,1-Dichloropropene	< 2	< 2	< 2
Carbon tetrachloride	< 2	< 2	< 2
1,2-Dichloroethane	< 2	< 2	< 2
Benzene	< 1	< 1	< 1
Trichloroethene	< 2	< 2	< 2
1,2-Dichloropropane	< 2	< 2	< 2
Bromodichloromethane	< 2	< 2	< 2
Dibromomethane	< 2	< 2	< 2
4-Methyl-2-pentanone(MIBK)	< 10	< 10	< 10
cis-1,3-Dichloropropene	< 2	< 2	< 2
Toluene	18	< 1	< 1
trans-1,3-Dichloropropene	< 2	< 2	< 2
1,1,2-Trichloroethane	< 2	< 2	< 2
2-Hexanone	< 10	< 10	< 10

	MW-2	MW-3	MW-5
	Aqueous	Aqueous	Aqueous
	12/3/98	12/3/98	12/3/98
	µg/L	µg/L	µg/L
	12/10/98	12/10/98	12/10/98
	JDS	JDS	JDS
	8260B	8260B	8260B
1,3-Dichloropropane	< 2	< 2	< 2
Tetrachloroethene	< 2	< 2	< 2
Dibromochloromethane	< 2	< 2	< 2
1,2-Dibromoethane	< 2	< 2	< 2
Chlorobenzene	< 2	< 2	< 2
1,1,1,2-Tetrachloroethane	< 2	< 2	< 2
Ethylbenzene	5	< 1	< 1
mp-Xylene	74	< 1	< 1
o-Xylene	36	< 1	< 1
Styrene	< 1	< 1	< 1
Bromoform	< 2	< 2	< 2
iso-Propylbenzene	< 1	< 1	< 1
1,1,2,2-Tetrachloroethane	< 2	< 2	< 2
1,2,3-Trichloropropane	< 2	< 2	< 2
n-Propylbenzene	2	< 1	< 1
Bromobenzene	< 1	< 1	< 1
1,3,5-Trimethylbenzene	12	< 1	< 1
2-Chlorotoluene	< 2	< 2	< 2
4-Chlorotoluene	< 2	< 2	< 2
tert-Butylbenzene	< 1	< 1	< 1
1,2,4-Trimethylbenzene	30	< 1	< 1
sec-Butylbenzene	< 1	< 1	< 1
p-isoPropyltoluene	1	< 1	< 1
1,3-Dichlorobenzene	< 1	< 1	< 1
1,4-Dichlorobenzene	< 1	< 1	< 1
n-Butylbenzene	< 1	< 1	< 1
1,2-Dichlorobenzene	< 1	< 1	< 1
1,2-Dibromo-3-chloropropane	< 2	< 2	< 2
1,2,4-Trichlorobenzene	< 1	< 1	< 1
Hexachlorobutadiene	< 1	< 1	< 1
Naphthalene	2	< 1	< 1
1,2,3-Trichlorobenzene	< 1	< 1	< 1

Approved By: Clifford Chase, Volatile Organics Supervisor 12/15/98

LABORATORY REPORT

Eastern Analytical, Inc. ID#: 15041

Client: Dufresne-Henry

Client Designation: Vermont National Guard 4080114

Volatile Organic Compounds

Sample ID:	MW-6		MW-6
Matrix:	Aqueous		Aqueous
Date Received:	12/3/98		12/3/98
Units:	µg/L		µg/L
Date of Analysis:	12/10/98		12/10/98
Analyst:	JDS		JDS
EPA Method:	8260B		8260B
Dichlorodifluoromethane	< 5	1,3-Dichloropropane	< 2
Chloromethane	< 2	Tetrachloroethene	< 2
Vinyl chloride	< 2	Dibromochloromethane	< 2
Bromomethane	< 2	1,2-Dibromoethane	< 2
Chloroethane	< 5	Chlorobenzene	< 2
Trichlorofluoromethane	< 5	1,1,1,2-Tetrachloroethane	< 2
Diethyl ether	< 5	Ethylbenzene	< 1
Acetone	< 10	mp-Xylene	< 1
1,1-Dichloroethene	< 1	o-Xylene	< 1
Methylene chloride	< 5	Styrene	< 1
Carbon disulfide	< 5	Bromoform	< 2
Methyl-t-butyl ether(MTBE)	< 10	iso-Propylbenzene	< 1
trans-1,2-Dichloroethene	< 2	1,1,2,2-Tetrachloroethane	< 2
1,1-Dichloroethane	< 2	1,2,3-Trichloropropane	< 2
2-Butanone(MEK)	< 10	n-Propylbenzene	< 1
2,2-Dichloropropane	< 2	Bromobenzene	< 1
cis-1,2-Dichloroethene	< 2	1,3,5-Trimethylbenzene	< 1
Chloroform	< 2	2-Chlorotoluene	< 2
Bromochloromethane	< 2	4-Chlorotoluene	< 2
Tetrahydrofuran(THF)	< 10	tert-Butylbenzene	< 1
1,1,1-Trichloroethane	< 2	1,2,4-Trimethylbenzene	< 1
1,1-Dichloropropene	< 2	sec-Butylbenzene	< 1
Carbon tetrachloride	< 2	p-isoPropyltoluene	< 1
1,2-Dichloroethane	< 2	1,3-Dichlorobenzene	< 1
Benzene	< 1	1,4-Dichlorobenzene	< 1
Trichloroethene	< 2	n-Butylbenzene	< 1
1,2-Dichloropropane	< 2	1,2-Dichlorobenzene	< 1
Bromodichloromethane	< 2	1,2-Dibromo-3-chloropropane	< 2
Dibromomethane	< 2	1,2,4-Trichlorobenzene	< 1
4-Methyl-2-pentanone(MIBK)	< 10	Hexachlorobutadiene	< 1
cis-1,3-Dichloropropene	< 2	Naphthalene	< 1
Toluene	< 1	1,2,3-Trichlorobenzene	< 1
trans-1,3-Dichloropropene	< 2		
1,1,2-Trichloroethane	< 2		
2-Hexanone	< 10		

Approved By: Clifford Chase, Volatile Organics Supervisor 12/15/98

APPENDIX H

GROUNDWATER SOUNDING DATA

NORTH SPRINGFIELD ARMORY - NORTH SPRINGFIELD, VERMONT

Groundwater Elevation Summary

Location	Elevation of PVC	Water Elevation											
		12/01/98	12/09/98										
MW-1	Bot. @ 463.6 491.70	NOT INST.	465.18										
MW-2	Bot. @ 456.8 490.55	463.57	463.61										
MW-3	Bot. @ 449.5 490.51	452.20	452.19										
MW-4	Bot. @ 452.8 489.42	DRY	DRY										
MW-5	Bot. @ 437.3 489.73	442.67	442.49										
MW-6	Bot. @ 427.3 454.26	442.87	442.72										

zip tape\enviro\spfld\armory