



# TWIN STATE ENVIRONMENTAL CORP.

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DEC 21 1994

December 20, 1994

Mr. Jason Feingold  
State of Vermont  
Sites Management Section  
103 South Main Street / West Office  
Waterbury, Vermont 05671-0404

**RE: Subsurface Investigation Report  
Grace United Methodist Church - Essex Junction, Vermont  
SMS Site No. 94-1639  
TSEC Project No. 94-132**

Dear Mr. Feingold:

## 1.0 INTRODUCTION

The following presents Twin State Environmental Corporation's (TSEC's) Subsurface Investigation Report for the Grace United Methodist Church site (see Site Location Map, **Figure 1**). This investigation was requested by the Vermont Agency of Natural Resources, Sites Management Section (SMS), to address petroleum contamination discovered during closure activities of a 1,000-gallon No. 2 fuel oil underground storage tank (UST). The activities conducted are in accordance with TSEC's task outline in our "Underground Storage Tank Removal Report" dated June 20, 1994. In response to the SMS' request, the objective of this site investigation is to determine the extent and degree of contamination associated with a release related to the aforementioned UST.

## 2.0 PREVIOUS WORK

A tank pull was conducted under the direction of TSEC on June 10, 1994 in order to remove one (1) 1,000-gallon No. 2 fuel oil tank located proximate to the northwestern corner of the church building.

During the tank excavation, severe pitting was noted on the exterior surfaces of the tank; however, no holes could be found. The lower half of the outside of the tank was covered with oil, and soils surrounding the tank were also stained with oil. Groundwater was flowing into the excavation at approximately five (5) feet below ground surface. Approximately 24 cubic yards of petroleum contaminated soil were removed and polyencapsulated on site. An observation well, OW-1, was installed in the former tank cavity. A groundwater quality sample was collected for laboratory analysis on June 20, 1994 for volatile organic compounds (VOCs) and total petroleum hydrocarbons (TPH). Further information on this tank pull is available in TSEC's "UST Removal Report" referenced above.

## 3.0 SCOPE OF WORK

The following activities were conducted as part of TSEC's site investigation. A copy of TSEC's Standard Operating Procedures (SOP) is included as **Attachment 1**.

### 3.1 Soil Boring Survey

In order to determine the degree and extent of soil contamination, a soil boring survey was conducted in the immediate vicinity of the tank excavation. Site features including boring locations are presented on **Figure 2**.

Soil borings in the vicinity of the tank excavation were conducted by Tri State Drilling and Boring of West Burke, Vermont with oversight provided by TSEC. A total of four (4) soil borings were advanced using a truck mounted drill rig equipped with 4.25-inch hollow stem augers. Split spoon soil samples were collected at five (5) foot intervals to depths ranging from eight to twelve feet (8-12') below ground surface.

Soils encountered at each boring location were screened both visually and with the use of a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp for the presence of volatile organic compounds (VOCs). The soils were screened using standard headspace techniques. The PID was calibrated to detect vapors relative to isobutylene, a benzene equivalent. The soils were logged using conventional soil classification techniques.

### 3.2 Monitoring Well Installations

In order to evaluate the overburden aquifer for the presence of contamination, a groundwater monitoring well was installed in each of the soil borings advanced with the drill rig. These borings/monitoring wells were positioned to allow for the determination of groundwater flow direction as well as the horizontal hydraulic gradient. TS-1 is located east and upgradient from the former UST cavity; TS-2 is located south and downgradient of the former UST cavity; TS-3 is located northeast and crossgradient of the former UST cavity; and TS-4 is the furthest downgradient well situated west of the former tank area.

Each monitoring well was constructed of 2-inch diameter Schedule 40 PVC pipe. The well screen consisted of a five to seven foot (5-7') section of 0.010-inch machine slotted PVC. The annulus surrounding each well was backfilled with clean filter sand to a depth approximately one (1) foot above the top of the well screen. A 1-foot bentonite seal was placed above the sand pack. The wells were completed at the ground surface with a flush mounted protective casing cemented in place.

### 3.3 Monitoring Well Sampling

One (1) water quality sample was collected from the observation well, OW-1 (installed in the UST cavity during the UST removal), on June 20, 1994. The sample was submitted to ChemServe Environmental Analysts (ChemServe) of Milford, New Hampshire for the analytical determination of VOCs per USEPA Method 8020 and TPH via USEPA Modified Method 8100.

Water quality samples were collected from each of the four (4) monitoring wells and OW-1. The wells were sampled on October 26, 1994 for analysis of VOCs per USEPA Method 8020 and TPH via USEPA Modified Method 8100. For QA/QC purposes, this sampling event included one (1) trip blank and one (1) duplicate sample. All groundwater samples were analyzed by ChemServe.

### 3.4 Site Survey

In order to generate a site plan and groundwater contour map, pertinent features of the site including monitoring wells and drainage swales were surveyed by TSEC for location and elevation on October 26, 1994. These data were incorporated into a Site Plan (**Figure 2**).

### 3.5 Stockpiled Soil Sampling

The estimated 24 cubic yards of petroleum contaminated soil generated during the UST removal and stockpiled on-site were sampled by TSEC on August 18, 1994 to characterize the soils for disposal. The composite sample was submitted to ChemServe for the analytical determination of the New Hampshire Virgin Petroleum Contaminated Soil (NHVPCS) parameters. These analyses include corrosivity (EPA Method 9045), flashpoint (EPA Method 1010), PCBs/Pesticides (EPA Method 8080), reactive cyanide (SW846 Ch. 7.3.3.2), reactive sulfide (SW846 Ch. 7.3.4.1), semi-volatile organics (EPA Method 8270), TCLP metals (EPA Method 1311/6010), TCLP herbicides (EPA Method 1311/8150), TPH (EPA Modified Method 8100), and volatile organics (EPA Method 8260).

On September 8, 1994, TSEC returned to the site and monitored the stockpiled soil for the presence of VOCs with a PID.

## 4.0 RESULTS

### 4.1 Soil Boring/Monitoring Well Results

Soils in the site vicinity generally consisted of gray to brown silt or sand overlying clay. Field screening of the soils collected from each of the boring/monitoring well locations exhibited VOC concentrations similar to background levels, that is, not detected. In addition, no visual signs of petroleum contamination were noted at these locations. **Figure 2** depicts the monitoring well locations. TSEC soil boring logs/monitoring well construction diagrams are presented in **Attachment 2**, and the driller's logs are found in **Attachment 3**.

### 4.2 Groundwater Flow Direction

Groundwater across the site was determined to flow from the northeast to the southwest. Based on the groundwater contours, the horizontal hydraulic gradient was 0.025 ft/ft on October 26, 1994. A groundwater elevation summary table for data collected on October 26, 1994 is presented in **Table 1**, and the groundwater contour map is presented in **Figure 3**.

### 4.3 Groundwater Quality

The analytical results for the water quality sample collected from the observation well, OW-1 (installed in the tank cavity during the UST removal), on June 20, 1994 were submitted to the SMS in a letter report dated July 25, 1994. This report is provided as **Attachment 4**. The total concentration of benzene, toluene, ethylbenzene, and xylenes compounds was 47 ug/l, and the TPH concentration was 235 mg/l.

All four (4) monitoring wells, namely TS-1, TS-2, TS-3, and TS-4, and OW-1 were found to be free from detectable concentrations of VOCs analyzed in accordance with EPA Method 8020 compounds during the October 26, 1994 sampling round. All wells were also reported to be free of detectable levels of TPH analyzed in accordance with EPA Modified Method 8100. The QA/QC samples were also reported to be free from detectable concentrations of the compounds tested. The laboratory report for this sampling is presented in **Attachment 5**.

#### 4.4 Stockpiled Soil Sampling

The results of the NHVPCS sampling of August 18, 1994 of the stockpiled soil indicated that all standards for asphalt batching were met. Additionally, no VOCs or TPH were identified above method detection limits. The laboratory analytical report is provided in **Attachment 6**.

Field screening PID readings of two (2) composite samples collected from the northern and southern portions of the stockpiled soils on September 8, 1994 detected VOC concentrations of 5.2 parts per million volume (ppmv) and 5.5 ppmv, respectively.

Based on the monitoring results discussed above, TSEC obtained verbal permission from Mr. Richard Spiese of the SMS on September 8, 1994 to re-locate the stockpiled soils to R.J. Weston's St. Dennis Pit in Jericho, Vermont. Permission was granted contingent on TSEC returning to the St. Dennis Pit in the Spring of 1995 to monitor the stockpiled soil for VOCs with a PID. The soil was re-located and polyencapsulated at the St. Dennis Pit that same day.

#### 5.0 **CONCLUSIONS**

- The groundwater quality results from the on-site monitoring and observation wells from October 26, 1994 indicate that petroleum contamination was not detected in the recently installed monitoring wells.
- Petroleum contaminated soil from the UST excavation, the source of any subsurface contamination, has been initially characterized and removed from the site. The soil is currently stockpiled and polyencapsulated at R.J. Weston's St. Dennis Pit in Jericho, Vermont. The soil will be monitored for VOCs via PID readings in the Spring of 1995.

#### 6.0 **RECOMMENDATIONS**

Based on the results of this investigation, TSEC recommends that this site be considered for a "Sites Management Activity Completed" (SMAC) designation.

A letter report will be submitted following the Spring 1995 PID survey of the stockpiled soils at the St. Dennis Pit.

If you have any further questions or comments regarding this report, please feel free to contact me at our office.

Sincerely,

TWIN STATE ENVIRONMENTAL CORPORATION



Maria C. Dunn  
Geologist

encl.

cc: Mr Robert Blake, GUMC

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**TABLE**

**TABLE 1**

Water Level Summary Table  
Grace United Methodist Church  
Essex Junction, Vermont

October 26, 1994

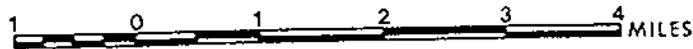
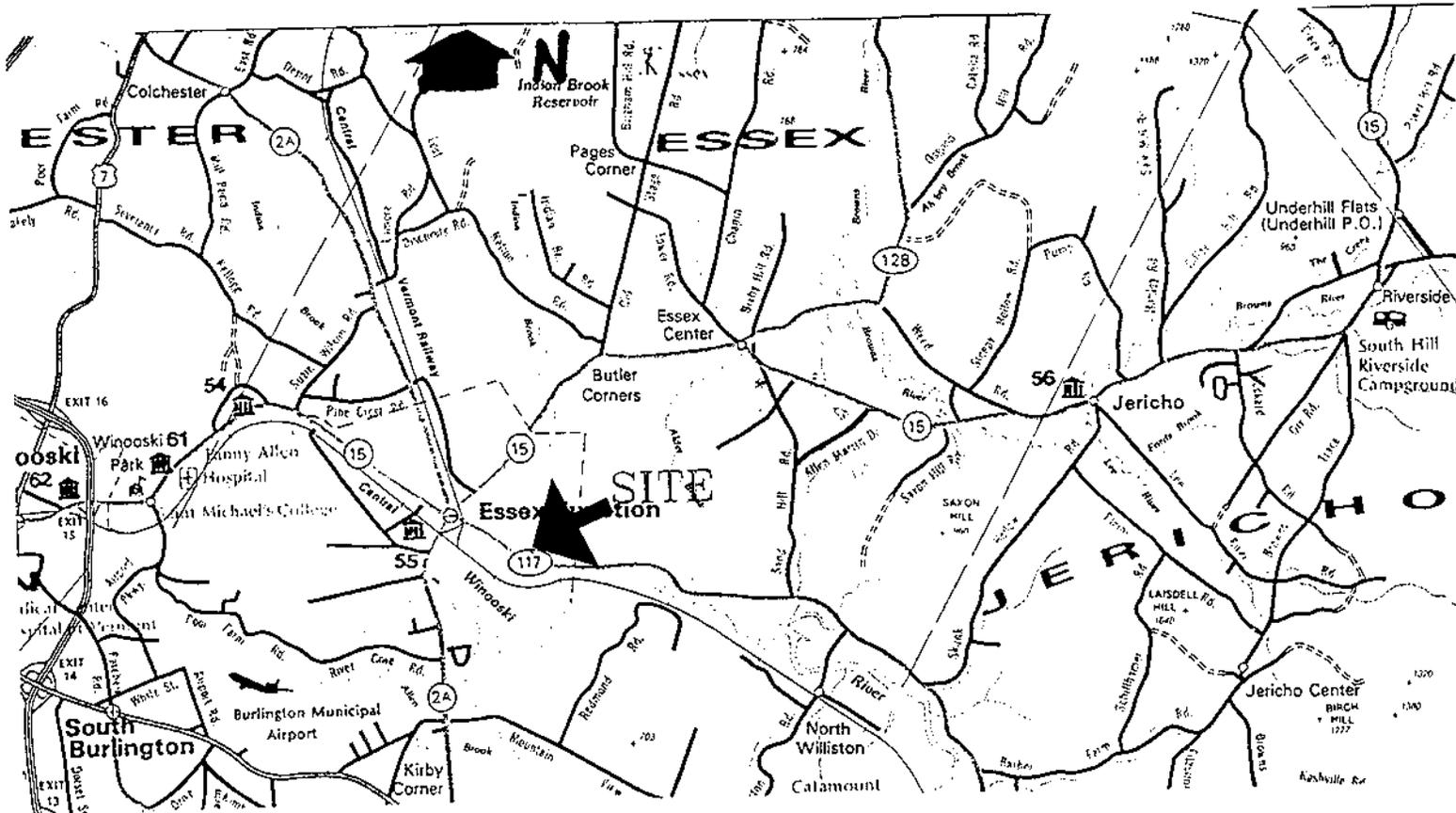
Well No.	Elevation Top of PVC (ft)	Depth to Water (ft)	Water Table Elevation (ft)
TS-1	100.03	4.87	95.16
TS-2	99.07	4.95	94.12
TS-3	97.80	3.24	94.56
TS-4	97.12	3.55	93.57
OW-1	--	4.36	--

Notes:

- All elevations are relative to an on-site benchmark assigned an elevation of 100 feet.
- OW-1 was not surveyed; therefore, this well was not used in determining groundwater flow direction.

m5/gumctabl.doc

**FIGURES**



Source: The Vermont Road Atlas.

kjb:41321.skd

Project No: 94-132	Designed By:	TWIN STATE ENVIRONMENTAL CORP. 1A Hurstington Rd. P.O. Box 718 Richmond, Vermont (802) 434-3350	FIGURE 1 SITE LOCATION MAP Grace United Methodist Church Essex Junction, Vermont
	Checked By:		
	Approved By:		
	Drawn By: md		
	Scale: none		
Date: 12/05/94			

WETLAND



TS-4

UNPAVED DRIVE/PARKING AREA  
TO ROUTE 117 (MAPLE ST.)

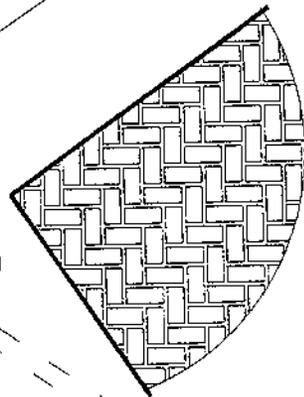
WALKWAY

TS-3  
DRAINAGE SWALE

OW-1  
FOUNDER JUST  
FOUNDER

TS-2

TS-1



CHURCH BLDG.



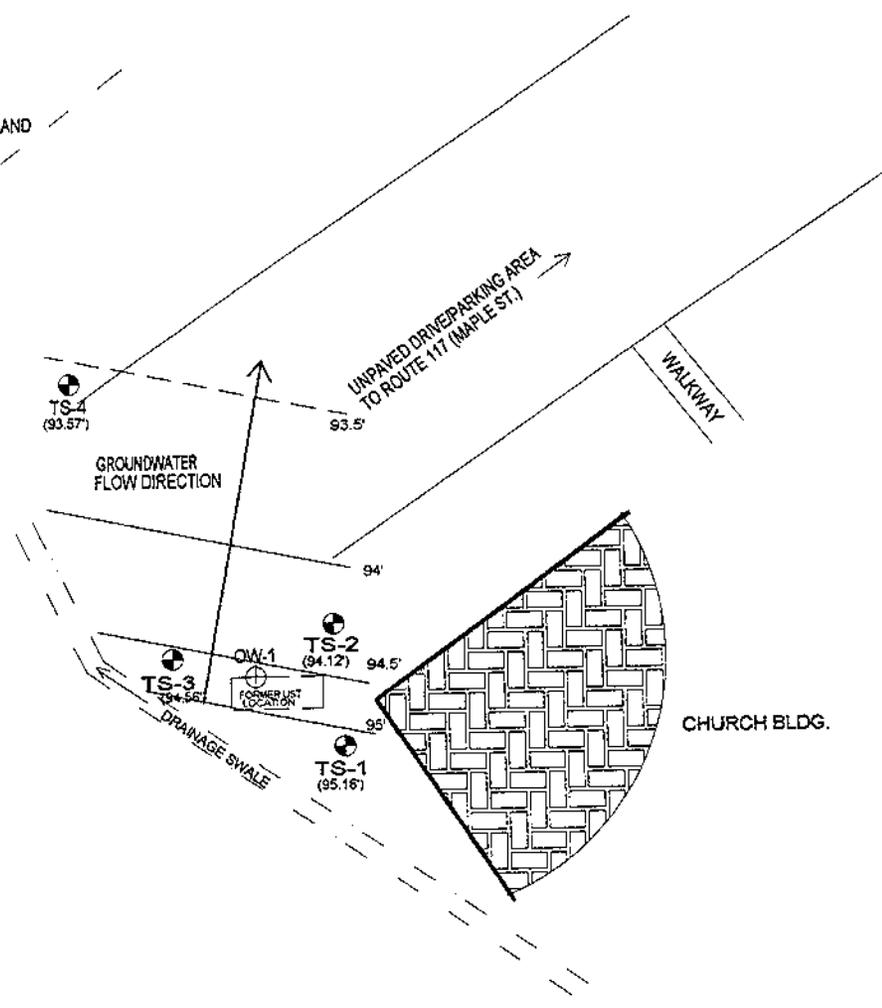
- TS-1 MONITORING WELL
- ⊕ OW-1 OBSERVATION WELL

OW-1 LOCATION APPROXIMATED

asf/gmcl/sk

Project No: 94-132	Designed By:	TWIN STATE ENVIRONMENTAL CORP. 1A Huntington Rd. P.O. Box 719 Richmond, Vermont (802) 434-3350	FIGURE 2 SITE PLAN  Grace United Methodist Church Essex Junction, Vermont
	Checked By:		
	Approved By:		
	Drawn By: mcd		
	Scale: 1" = 40'		
Date: 12/8/94			

WETLAND



**LEGEND**

-  TS-1 MONITORING WELL
-  OW-1 OBSERVATION WELL
-  95' GROUNDWATER CONTOUR
-  (95.16') GROUNDWATER ELEVATION
-  OW-1 LOCATION APPROXIMATED

GROUNDWATER ELEVATIONS RELATIVE TO A TEMPORARY ON-SITE BENCHMARK.  
 GROUNDWATER ELEVATION DATA COLLECTED BY TSEC ON 10/26/94.



zsf4jprcl.sht

Project No: 94-132	Designed By:
	Checked By:
	Approved By:
	Drawn By: mcd
	Date: 12/8/94

TWIN STATE ENVIRONMENTAL CORP.  
 1A Huntington Rd.  
 P.O. Box 719  
 Richmond, Vermont  
 (802) 434-3360

**FIGURE 3**  
**GROUNDWATER CONTOURS**  
 Grace United Methodist Church  
 Essex Junction, Vermont

**ATTACHMENT 1**

## A. STANDARD OPERATING PROCEDURES

### HOLLOW STEM AUGER TEST BORING METHODOLOGY

- The lead auger is attached to the drill head. In order to assist in cutting the borehole, auger teeth are located at the tip of the lead auger. The auger is advanced into the ground by a combination of rotation and downward pressure.
- During advancement, a removable center plug or split spoon sampler is attached to the drill rods and placed in the bottom of the lead auger to prevent soil materials from entering the hollow stem. When a required depth is reached, the center plug can be removed and representative samples obtained by passing a sampling tool through the hollow stem auger and out the bottom.
- Split spoon soil samples of materials encountered will be obtained at 5-foot intervals or as directed by the field geologist. The split spoon sampler will have a 2-inch outside diameter and a minimum inside length of 18 inches.
- Standard penetration tests as described below will be performed to facilitate the determination of the relative resistance of the various strata. The sampler will be driven with a 140-pound hammer falling 30 inches. The number of blows for each consecutive 6 inches of penetration of the sampler will be recorded on the boring log.
- Split spoon samples will be screened in the field for volatile organic compounds (VOCs) using a Thermo Environmental Instruments Model 580B Organic Vapor Meter, or equivalent photoionization detector (PID). Soils will be screened using either standard headspace methodology or through the collection of ambient PID readings.
- The boring logs will be completed according to either the Unified Soil Classification System (USCS) or the Burmister Soil Classification System (as appropriate) and will also depict the well construction details.
- Once the augers have reached the desired depth and a sample has been collected, drilling will continue. The center plug will be replaced in the bottom of the lead auger and an additional auger flight will be attached.
- When drilling below the water table, sands may run up into the center of the augers when the center plug is removed. These problems may be overcome by removing all downhole tools very slowly or by introducing water into the auger or both simultaneously.
- Drill cuttings and/or fluids that are found through field screening to be contaminated will be containerized, analyzed for chemical contaminants, and disposed of appropriately. In some cases, accumulated wastes may require manifesting and disposal as hazardous waste.

## B. STANDARD OPERATING PROCEDURES

### MONITORING WELL INSTALLATION METHODOLOGY

- Monitoring wells will be installed in the test borings which encounter groundwater.
- Unless specified otherwise, monitoring wells will be constructed using 2-inch Schedule 40 flush joint threaded PVC riser pipe and 0.010 or 0.020 slotted PVC well screen. The monitoring well will typically be screened from 5-10 feet below the observed depth to groundwater (water table) to 3-5 feet above the water table in order to monitor for free petroleum product.
- The annulus between the well screen and the borehole will be backfilled with a clean Ottawa-type filter sand, or equivalent, extending approximately 2 feet above the screened zone.
- An approximate 2-foot bentonite seal will be placed above the sand pack to hydraulically isolate the screened zone.
- The remainder of the annulus will be backfilled with clean sand or uncontaminated test boring cuttings to approximately 1 foot below the ground surface.
- A flush-mounted water-tight curb box or steel guardpipe will be installed at the ground surface and secured with concrete to protect the monitoring well. Each monitoring well will be fitted with a 2-inch locking J-plug and padlock.
- Well construction is subject to change due to field conditions encountered during drilling.
- Monitoring wells will be developed to remove any drilling fluids or fine particulates introduced into the formation during drilling and/or installation. In addition, well development is performed to hydraulically connect the aquifer and the well after installation allowing for more accurate determinations of water levels, aquifer parameters, and chemical constituents. Well development will be achieved through surge and purge techniques.
- TSEC will survey the relative elevations of the top of the well casing for each monitoring well installed. Monitoring well elevations will be referenced to an arbitrary datum established at the site. Water level elevations in the site monitoring wells will be measured with an MMC oil-water interface probe, or equivalent, to assess hydraulic gradient and groundwater flow direction.

## C. STANDARD OPERATING PROCEDURES

### GROUNDWATER SAMPLING METHODOLOGY

- Groundwater samples will be collected from each monitoring well installed on the site.
- Before collecting the monitoring well samples, TSEC will record the static groundwater level within the well and check for a free product layer using an electronic interface probe. Groundwater samples will not be collected from monitoring wells where floating product is detected. A minimum of three (3) well volumes of water will be purged from the monitoring well using a peristaltic pump with dedicated polyethylene tubing and/or a dedicated, disposable teflon bailer prior to sampling.
- As appropriate, samples will be preserved by raising or lowering the pH to a value appropriate for the designated analysis. The typical preservatives that are used for sample preservation include nitric acid, hydrochloric acid, sodium hydroxide, and ice. VOC sample containers will be preserved with acid prior to placement of the sample to reduce the amount of sample volatilization. VOC samples will be collected in 40-ml glass vials fitted with teflon caps with no headspace (bubbles). All samples will be stored in a cooler on ice for shipment to the laboratory.
- All sample containers will be supplied by the laboratory. Sample labels will be filled out in indelible ink and include date and time of collection, sample location, and analysis to be performed.
- A record of activities relating to the collection of samples will be maintained in the site field log book. This information will include the names of the sampling personnel, the date, sample location, sampling methodology, and a detailed description of any apparent characteristics of the sample.
- Chain-of-Custody (COC) procedures will be implemented to ensure that the sample is traceable from the time of collection through receipt by the laboratory. COC procedures will be initiated in the field at the time of sample collection. COC forms including the signatures of the relinquisher(s) and the receiver, the date, time, and any pertinent remarks are filled out and sent along with the samples to the laboratory.

## D. STANDARD OPERATING PROCEDURES

### FIELD SCREENING METHODOLOGY

- Field screening shall include headspace analysis performed with a ThermoEnvironmental Instruments Model 580B organic vapor meter (OVM) equipped with a 10.2 eV photoionization detector. The OVM will be calibrated prior to use in the field to respond to within 5% of a known isobutylene concentration according to the manufacturer's instructions. The date and time of calibration will be recorded in the site field book.
- Prior to any screening the electronics of the OVM will be allowed to warm up for a period of 10-15 minutes. After that period the response of the OVM will be checked against a known VOC source such as a fuel tank or organic base marker.
- Soil samples for field screening will be collected in a clean glass mason jar, half-filled, and sealed with aluminum foil. The sample will be warmed and shaken to encourage volatilization of VOCs into the jar headspace. After a period of approximately 10 minutes, the probe will be inserted through the aluminum foil. The highest concentration will be recorded to the nearest 0.1 parts per million. If required, soil samples for analytical analyses will be collected according to standard protocol.

## **E. STANDARD OPERATING PROCEDURES**

### **DECONTAMINATION METHODOLOGY**

- Sampling equipment and heavy equipment will be decontaminated before use at the site and between each sampling location in order to minimize the introduction of artificial contaminants into samples, cross-contamination between samples, and transport of contaminants to other areas of the site or off site.
- Sampling equipment will be decontaminated with a low phosphate detergent and tap water wash followed by a tap water rinse, and bottled water rinse. Depending on the type of contamination present, if any, decontamination may include a solvent rinse such as acetone, hexane, methanol, or methylene chloride. If a solvent is included in the decontamination procedure, the sampling equipment will be allowed to air dry and an additional bottled water rinse will be included.
- Heavy equipment such as the drill rig including vehicle wheels and tracks, drive head, auger flights (inside and out), rods, casing, rock corers, or any other equipment which will be inserted into the borehole will be decontaminated by steam cleaning. Those parts of the drill rig that do not come into contact with the well installation or sampling equipment will be cleaned as necessary between borings. Decontamination will be performed adjacent to soil boring location or at a designated area selected by the field representative.

**ATTACHMENT 2**

MONITORING WELL/SOIL BORING LOG

WELL/BORING NO. TS-1  
 PROJECT NAME/NO. GUMC / 94-132  
 INSTALL DATE AUGUST 18, 1994  
 TSEC REP KEN BISCEGLIO  
 DRILLING CO. TRI-STATE DRILLING  
 DRILLING METHOD 4.25" HSA 2'x2" SPLIT SPOON

TOTAL DEPTH OF HOLE 12'  
 DEPTH TO WATER \_\_\_\_\_  
 SCREEN DIA. 2" DEPTH 3-10'  
 SCREEN TYPE & SIZE MACHINE SLOTTED PVC, 0.010"  
 RISER TYPE SCHEDULE 40 PVC  
 RISER DIA. 2" DEPTH 0-3'  
 GUARD TYPE ROAD BOX

DEPTH IN FEET	WELL PROFILE	WELL NOTES	PID (PPM)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
1		0.5'				
2						
3		3.0'				
4						
5			HS = 0	1.2'	5-7' Olive gray SILT, soft, med. stiff, damp.	
6						
7						
8						
9						
10			HS = 0	2.0'	10-12' Blue gray CLAY, med. stiff, damp.	
11						
12						
13					End of Boring @ 12'	
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

GRANULAR SOILS

BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DENSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED

TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

WELL/BORING LOCATION:

MONITORING WELL/SOIL BORING LOG

WELL/BORING NO. TS-2  
 PROJECT NAME/NO. GUMC / 94-132  
 INSTALL DATE AUGUST 18, 1994  
 TSEC REP. KEN BISCEGLIO  
 DRILLING CO. TRI-STATE DRILLING  
 DRILLING METHOD 4.25" HSA 2'x2" SPLIT SPOON

TOTAL DEPTH OF HOLE 12'  
 DEPTH TO WATER \_\_\_\_\_  
 SCREEN DIA. 2" DEPTH 3-10'  
 SCREEN TYPE & SIZE MACHINE SLOTTED PVC, 0.010"  
 RISER TYPE SCHEDULE 40 PVC  
 RISER DIA. 2" DEPTH 0-3'  
 GUARD TYPE ROAD BOX

DEPTH IN FEET	WELL PROFILE	WELL NOTES	PID (PPM)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
1		0.5'				
2						
3		3.0'				
4						
5			HS = 0	1.5'	5-7' Olive gray interbedded with olive brown SILT, soft, med. stiff, damp.	
6						
7						
8						
9						
10			HS = 0	2.0'	10-12' Gray CLAY, med. stiff, damp.	
11						
12						
13					End of Boring @ 12'	
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

GRANULAR SOILS

BLOWS/FT	DENSITY
0-4	V.LOOSE
4-10	LOOSE
10-30	M.DENSE
30-50	DCNSE
>50	V.DENSE

COHESIVE SOILS

BLOWS/FT	DENSITY
<2	V.SOFT
2-4	SOFT
4-8	M.STIFF
8-15	STIFF
15-30	V.STIFF
>30	HARD

PROPORTIONS USED

TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

WELL/BORING LOCATION:

MONITORING WELL/SOIL BORING LOG

WELL/BORING NO. TS-3  
 PROJECT NAME/NO. GUMC / 94-132  
 INSTALL DATE AUGUST 18, 1994  
 TSEC REP. KEN BISCEGLIO  
 DRILLING CO. TRI-STATE DRILLING  
 DRILLING METHOD 4.25" HSA 2'x2" SPLIT SPOON

TOTAL DEPTH OF HOLE 11'  
 DEPTH TO WATER \_\_\_\_\_  
 SCREEN DIA. 2" DEPTH 3-9'  
 SCREEN TYPE & SIZE MACHINE SLOTTED PVC, 0.010"  
 RISER TYPE SCHEDULE 40 PVC  
 RISER DIA. 2" DEPTH 0-3'  
 GUARD TYPE ROAD BOX

DEPTH IN FEET	WELL PROFILE	WELL NOTES	PID (PPM)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
1		0.5'				
2						
3		3.0'				
4			HS = 0	1.8'	4-6' Olive gray CLAY interbedded with olive brown soft silty CLAY, damp.	
5						
6						
7						
8						
9			HS = 0	2.0'	9-11' Blue gray CLAY, med. stiff, damp.	
10						
11						
12					End of Boring @ 11'	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

GRANULAR SOILS		COHESIVE SOILS		PROPORTIONS USED	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	TRACE	0-10%
0-4	V.LOOSE	<2	V.SOFT	LITTLE	10-20%
4-10	LOOSE	2-4	SOFT	SOME	20-35%
10-30	M.DENSE	4-8	M.STIFF	AND	35-50%
30-50	DENSE	8-15	STIFF		
>50	V.DENSE	15-30	V.STIFF		
		>30	HARD		

WELL/BORING LOCATION: \_\_\_\_\_

AS#14/GUMCOW3.SKD

MONITORING WELL/SOIL BORING LOG

WELL/BORING NO. TS-4  
 PROJECT NAME/NO. GUMC / 94-132  
 INSTALL DATE AUGUST 18, 1994  
 TSEC REP. KEN BISCEGLIO  
 DRILLING CO. TRI-STATE DRILLING  
 DRILLING METHOD 4.25" HSA 2'x2" SPLIT SPOON

TOTAL DEPTH OF HOLE 11'  
 DEPTH TO WATER \_\_\_\_\_  
 SCREEN DIA. 2" DEPTH 3-9'  
 SCREEN TYPE & SIZE MACHINE SLOTTED PVC, 0.010"  
 RISER TYPE SCHEDULE 40 PVC  
 RISER DIA. 2" DEPTH 0-3'  
 GUARD TYPE ROAD BOX

DEPTH IN FEET	WELL PROFILE	WELL NOTES	PID (PPM)	BLOWS/6" AND RECOVERY	SOIL DESCRIPTION AND NOTES	LEGEND
1		0.5'				
2						
3		3.0'				
4			HS = 0	1.9'	4.5-6.5' Blue gray & orange brown CLAY, trace peat, med. stiff, dry.	
5						
6						
7						
8						
9						
10			HS = 0	1.8'	9.5-11.5' Olive gray & red CLAY, trace orange brown silt, soft, damp.	
11						
12					End of Boring @ 11.5'	
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

GRANULAR SOILS		COHESIVE SOILS		PROPORTIONS USED	
BLOWS/FT	DENSITY	BLOWS/FT	DENSITY	TRACE	0-10%
0-4	V.LOOSE	<2	V.SOFT	LITTLE	10-20%
4-10	LOOSE	2-4	SOFT	SOME	20-35%
10-30	M.DENSE	4-8	M.STIFF	AND	35-50%
30-50	DENSE	8-15	STIFF		
>50	V.DENSE	15-30	V.STIFF		
		>30	HARD		

WELL/BORING LOCATION:

**ATTACHMENT 3**

SOIL PROBE LOG

Page 1 of 4

TS # 1

Grace United Methodist

Essex Jct., VT

TRI STATE  
DRILLING & BORING, INC.

RFD #2, Box 113 West Burke, VT 05871  
(802) 467-3123

		SAMPLER	SOIL
TYPE	HSA	Continuous	Saturated
SIZE	2"	SS	Wet
HAMMER	140#		Moist
FALL	30"		Damp
			Slightly Damp

DATE STARTED: 08/18/94

DATE COMPLETED: 08/18/94

FOOTAGE		DRILLER'S NOTES & COMMENTS
DEPTH	BLOW COUNTS REC	

6 12 18 24

0.5-7' ..... 2 | 3 | 4 | 6 | 1.2'

0-8' Brown moist silt.

10-12' ..... 6 | 2 | 2 | 5 | 2.0'

8-12' Gray moist clay silt layers.

Bottom 12.0'.

Screen 10' to 3' below GS.  
Riser 3' to GS.  
Sand 10' to 2' below GS.  
Hole plug 2' to 1' below GS.  
Backfill 1' to 0.5' below GS.  
Cement 0.5' to GS.

Client: Grace United Methodist  
Job Location: Essex Jct., VT  
Engineer: Twin State Environment  
Richmond, VT  
Inspector: Ken Bisceglia #94-132

Driller: Ray Silfillan  
Helper: Sean Hogan  
Materials: 7' screen, 3' riser,  
1 cap, 1 locking plug, 2 sand,  
1/2 hole plug, 1 road box.

SOIL PROBE LOG

Page 2 of 4

TS # 2

Grace United Methodist

Essex Jct., VT

TRI STATE

DRILLING & BORING, INC.

RFD #2, Box 113 West Burke, VT 05871

(802) 467-3123

		SAMPLER	SOIL
		Continuous	Saturated
TYPE	HSA	SS	Wet
SIZE	2"		Moist
HAMMER	140#		Damp
FALL	30"		Slightly Damp

DATE STARTED: 08/18/94

DATE COMPLETED: 08/18/94

FOOTAGE

DEPTH BLOW COUNTS REC

DRILLER'S NOTES & COMMENTS

6 12 18 24

5-7' 4 5 6 15 1.5'

0-8' Brown moist silt.

10-12' 6 5 5 6 2.0'

8-12' Gray moist clay, silt layers, fine to coarse sand lens.

Bottom 12.0'.

Screen 10' to 3' below GS.  
 Riser 3' to GS.  
 Sand 10' to 2' below GS.  
 Hole plug 2' to 1' below GS.  
 Backfill 1' to 0.5' below GS.  
 Cement 0.5' to GS.

Client: Grace United Methodist  
 Job Location: Essex Jct., VT  
 Engineer: Twin State Environment  
 Richmond, VT  
 Inspector: Ken Bisceglia #94-132

Driller: Ray Silfillan  
 Helper: Sean Hogan  
 Materials: 7' screen, 3' riser,  
 1 cap, 1 locking plug, 2 sand,  
 1/2 hole plug, 1 road box.

SOIL PROBE LOG

Page 3 of 4

TS # 3

Grace United Methodist

Essex Jct., VT

TRI STATE  
DRILLING & BORING, INC.

RFD #2, Box 113 West Burke, VT 05871  
(802) 467-3123

		SAMPLER	SOIL
		Continuous	Saturated
TYPE	HSA	SS	Wet
SIZE	2"		Moist
HAMMER	140#		Damp
FALL	30"		Slightly Damp

DATE STARTED: 08/18/94

DATE COMPLETED: 08/18/94

FOOTAGE		DRILLER'S NOTES & COMMENTS
DEPTH	BLOW COUNTS	REC

6 12 18 24

0-3' Brown wet fine to coarse sand.

3-8' Brown moist silt and clay.

8-11' Gray moist clay.

Bottom 11.0'.

Screen 9' to 3' below GS.  
Riser 3' to GS.  
Sand 9' to 2' below GS.  
Hole plug 2' to 1' below GS.  
Backfill 1' to 0.5' below GS.  
Cement 0.5' to GS.

Client: Grace United Methodist  
Job Location: Essex Jct., VT  
Engineer: Twin State Environment  
Richmond, VT  
Inspector: Ken Bisceglia #94-132

Driller: Ray Gilfillan  
Helper: Sean Hogan  
Materials: 6' screen, 3' riser,  
1 cap, 1 locking plug, 2.5 sand,  
1/2 hole plug, 1 road box.

SOIL PROBE LOG

Page 4 of 4  
 TS # 4  
 Grace United Methodist  
 Essex Jct., VT

TRI STATE  
 DRILLING & BORING, INC.  
 RFD #2, Box 113 West Burke, VT 05871  
 (802) 467-3123

		SAMPLER	SOIL
		Continuous	Saturated
TYPE	HSA	SS	Wet
SIZE	2"		Moist
HAMMER	140#		Damp
FALL	30"		Slightly Damp

DATE STARTED: 08/18/94

DATE COMPLETED: 08/18/94

FOOTAGE

DEPTH BLOW COUNTS REC

DRILLER'S NOTES & COMMENTS

6 12 18 24

0-3' Brown moist silt and fine to coarse sand.

3-8.5' Brown moist silt and clay.

8.5-11.5' Brown moist clay.

Bottom 11.5'.

Screen 9' to 3' below GS.  
 Riser 3' to GS.  
 Sand 9' to 2' below GS.  
 Hole plug 2' to 1' below GS.  
 Backfill 1' to 0.5' below GS.  
 Cement 0.5' to GS.

Client: Grace United Methodist  
 Job Location: Essex Jct., VT  
 Engineer: Twin State Environment  
 Richmond, VT  
 Inspector: Ken Bisceglia #94-132

Driller: Ray Gilfillan  
 Helper: Sean Hogan  
 Materials: 6' screen, 3' riser,  
 1 cap, 1 locking plug, 2.5 sand,  
 1 hole plug, 1 road box.

**ATTACHMENT 4**



# TWIN STATE ENVIRONMENTAL CORP.

P.O. Box 719, Commercial Park, 1A Huntington Road, Richmond, VT 05477

Tel.: (802) 434-3350 • Fax (802) 434-4478

July 25, 1994

Mr. Ted Unkles  
State of Vermont  
Hazardous Materials Management Division  
103 South Main St./West Office  
Waterbury, Vermont 05671-0404

RE: Groundwater Quality  
Grace United Methodist Church  
TSEC Project No. 94-131

Dear Mr. Unkles,

Twin State Environmental Corporation (TSEC) has prepared this letter to up date the Hazardous Materials Management Division of the analytical results of the one (1) groundwater sample collected at the above referenced site. As noted in our "Underground Storage Tank Removal Report" dated June 20, 1994, one (1) groundwater monitoring well was installed in the backfill of the excavation. The sample was collected from this well and submitted to ChemServe Environmental Analysts of Milford, New Hampshire for the determination of volatile organic compounds by USEPA Method 8020 and total petroleum hydrocarbons (TPH) by USEPA Method 8100 as fuel constituents. These results are tabulated below, the laboratory analytical report is provided as an Attachment to this letter.

Sample ID	Benzene (ug/l)	Toluene (ug/l)	Ethylbenzene (ug/l)	Xylenes (ug/l)	Total BTEX (ug/l)	MTBE (ug/l)	TPH (mg/l)
MW-1	BDL	2	1	44	47	BDL	235

BDL-indicates below detection level

Based on the above results, the concentrations of benzene, toluene, ethylbenzene, and xylenes fall below the Vermont Groundwater Enforcement Standards for those parameters. In addition, the concentration of MTBE is below the Vermont Health Advisory.

TSEC has submitted a work plan as part of our "Underground Storage Tank Removal Report" dated June 20, 1994. Upon written approval, TSEC will excute those tasks outlined in that report.

If you have any questions or comments, please contact our office.

Sincerely,

TWIN STATE ENVIRONMENTAL CORPORATION

*Maria C. Dunn*

Maria C. Dunn  
Geologist

encl.

cc: Reverend Lawrence Curtis, GUMC

ATTACHMENT



317 Elm Street  
Milford, N.H. 03055  
(603) 673-5440  
FAX (603) 673-0366

Ms. Maria Dunn  
Twin State  
Environmental Corp  
PO Box 719  
Richmond, VT

GUMC  
94 - 13  
Essex, VT

JUL 12 REC'D

Laboratory # F27-94-06  
Control # 10583

VOLATILE ORGANIC ANALYSIS  
EPA METHOD 8020

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP

LAB#: F27-94-06

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-13

SAMPLE IDENTITY: MW-1

CONTROL#: 10583

DATE SAMPLED: 6/20/94

RECD: 6/27/94

DATE ANALYZED: 6/30/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND	CONCENTRATION (UG/L)	DETECTION LIMIT MULTIPLIER: (UG/L) X 1
BENZENE	BDL	1
METHYL-TERTIARY-BUTYL ETHER	BDL	1
TOLUENE	2	1
ETHYLBENZENE	1	1
TOTAL XYLENES	44	1

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_

*Cy*

TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP

LAB#: F27-94-06

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-13

SAMPLE IDENTITY: MW-1

CONTROL#: 10583

DATE SAMPLED: 6/20/94

REC'D: 6/27/94

DATE ANALYZED: 6/28/94

DATE EXTRACTED: 6/27/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION

DETECTION LIMIT MULTIPLIER:

(MG/L)

(MG/L) X 25

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

235

0.1

SURROGATE  
M-TERPHENYL

PERCENT RECOVERY

ACCEPTANCE LIMITS

98%

60-120%

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_



VOLATILE ORGANIC ANALYSIS  
EPA METHOD 8020

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP

LAB#: F27-94-06

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-13

SAMPLE IDENTITY: SS-1

CONTROL#: 10583

DATE SAMPLED: 6/20/94

REC'D: 6/27/94

DATE ANALYZED: 6/30/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND	CONCENTRATION (UG/L)	DETECTION LIMIT MULTIPLIER: (UG/L) X 1
BENZENE	BDL	1
METHYL-TERTIARY-BUTYL ETHER	BDL	1
TOLUENE	BDL	1
ETHYLBENZENE	BDL	1
TOTAL XYLENES	BDL	1

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_



TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP

LAB#: F27-94-06

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-13

SAMPLE IDENTITY: SS-1

CONTROL#: 10583

DATE SAMPLED: 6/20/94

REC'D: 6/27/94

DATE ANALYZED: 6/30/94

DATE EXTRACTED: 6/27/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION  
(MG/L)  
BDL

DETECTION LIMIT MULTIPLIER:  
(MG/L) X 25  
0.1

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

SURROGATE  
M-TERPHENYL

PERCENT RECOVERY  
89%

ACCEPTANCE LIMITS  
60-120%

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_



**SPIKE RECOVERY FORM  
 EPA METHOD 8020**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP

LAB#: F27-94-06

SAMPLE LOCATION: GUMC ESSEX, VT

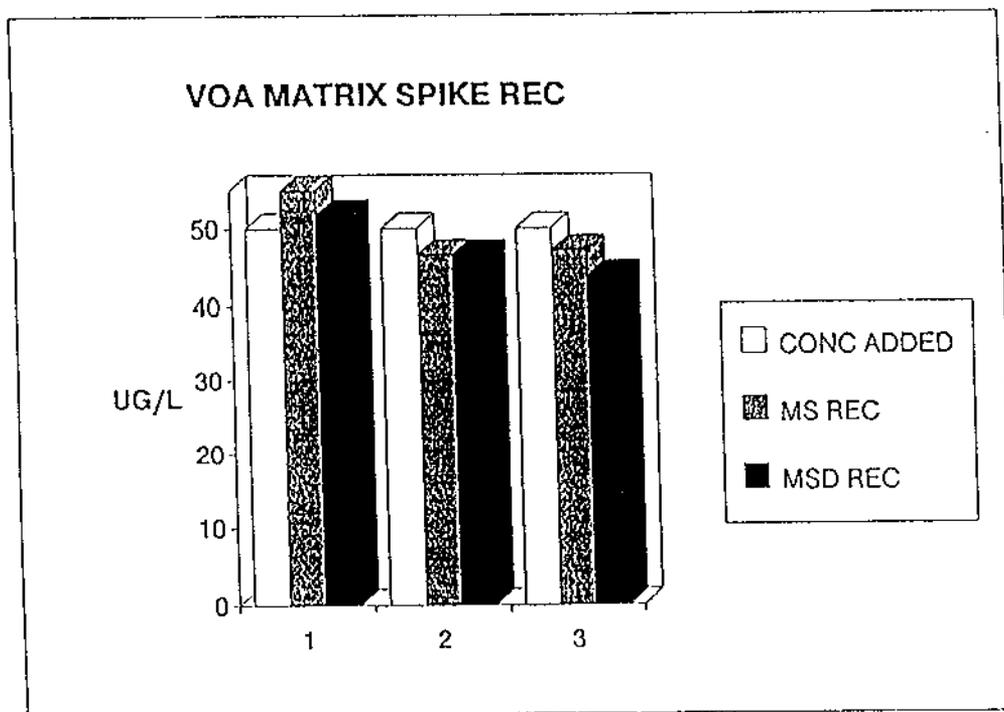
JOB#: 94-13

SAMPLE IDENTITY: QC SPIKES / 10037+10038

CONTROL#: 10583

DATE ANALYZED: 6/30/94

COMPOUND	CONC ADDED UG/L	AMT REC UG/L	DUP AMT REC UG/L	%REC	DUP % REC	%DIFF
BENZENE	50	55.14	51.8	110%	104%	7%
TOLUENE	50	46.66	46.55	93%	93%	0%
CHLOROBENZENE	50	47.15	43.85	94%	88%	7%



CONTROL LIMITS +/- 25%



The State of New Hampshire  
Department of Environmental Services

**CERTIFICATE OF APPROVAL**  
**Wastewater Analysis**

Issued to  
Chemserve, Inc.

Located at  
Elm Street, Milford, NH

Under the provisions of the Regulations in Env-C300  
for the following analyses:

FULL CERTIFICATION: Total Coliform by Membrane Filtration, Fecal Coliform by Membrane Filtration, ICP Metals, Mercury, pH, TDS, Total Hardness, Calcium, Magnesium, Sodium, Potassium, Total Alkalinity, Chloride, Sulfate, Ammonia, Nitrate-N, Orthophosphate, TKN, Total Phosphorus, COD, BOD, Total Cyanide, Non-Filterable Residue, Total Phenolics, PCBs in Water, PCBs in Oil, Pesticides, and Volatile Organics.

PROVISIONAL CERTIFICATION: Specific Conductance, and Fluoride.

REPLACES CERTIFICATE #100893-B

CERTIFICATE NUMBER: 100893-C

DATE OF ISSUE: February 11, 1994

EXPIRATION DATE: December 2, 1994

*Charles N. Myers*  
Certifying Officer

The State of New Hampshire  
Department of Environmental Services

**CERTIFICATE OF APPROVAL**  
**Drinking Water Analysis**

Issued to  
Chemserve, Inc.

Located at  
Elm Street, Milford, NH

Under the provisions of the Regulations in Env-C300  
for the following analyses:

FULL CERTIFICATION: Total Coliform by Membrane Filtration, Fecal Coliform by Membrane Filtration, Colilert-MPN, Metals by Graphite Furnace, Metals by ICP, Nitrate-N, Nitrite-N, Residual Free Chlorine, Turbidity, Total Filterable Residue, Calcium, pH, Alkalinity, Corrosivity, Sodium, Sulfate, Total Cyanide, Trihalomethanes, Volatile Organics, and Vinyl Chloride.

PROVISIONAL CERTIFICATION: Mercury, Fluoride, Base/Neutrals, DBCP, and EDB.

CERTIFICATE NUMBER: 100893-A

DATE OF ISSUE: December 3, 1993

EXPIRATION DATE: December 2, 1994

*Charles N. Myers*  
Certifying Officer

**ATTACHMENT 5**

November 7, 1994

NOV 10 1994

Ms. Maria Dunn.  
Twin State Environmental Corp.  
P O Box 719  
Richmond VT 05477

**Job Name** : Grace United Methodist Church  
**Job Number** : 94-132  
**Location** : Essex, VT  
**Laboratory #** : K01-94-10  
**Purchase Order #** : N/A  
**Control #** : 10690

Dear Ms. Dunn,

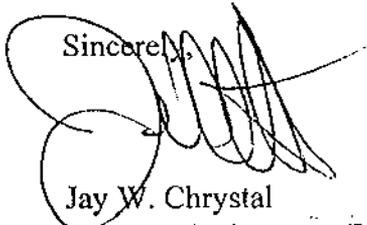
Enclosed please find the laboratory results for the above referenced samples which were received, by the Chemserve sample custodian, under chain of custody control number 10690 on November 1, 1994. Samples were collected by Maria Dunn on October 26, 1994. Any abnormalities to the samples would be noted on the enclosed chain of custody document or laboratory report form. Chemserve follows protocols for analysis corresponding to the methods referenced unless a modification is noted. Unless otherwise stated, all holding times, preservation techniques and container types are analogous with those outlined by the U.S. EPA.

A formal quality assurance/quality control QA/QC program is maintained and updated by Chemserve on a routine basis. This QA/QC manual is available upon request.

This report is not valid without a completed chain of custody with the corresponding control number attached.

If you have questions or concerns regarding this analysis, please feel free to contact me.

Sincerely,

  
Jay W. Chrystal  
President/Laboratory Director

Enclosures







TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-1

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/03/94

DATE EXTRACTED: 11/02/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION  
(MG/L)  
BDL

DETECTION LIMIT MULTIPLIER:  
(MG/L) X 1  
0.1

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

SURROGATE  
O-TERPHENYL

PERCENT RECOVERY  
75%

ACCEPTANCE LIMITS  
60-120%

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_



VOLATILE ORGANIC ANALYSIS  
EPA METHOD 8020

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-2

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/06/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION  
(UG/L)

DETECTION LIMIT MULTIPLIER:  
(UG/L) X 1

BENZENE

BDL

1

METHYL-TERTIARY-BUTYL ETHER

BDL

1

TOLUENE

BDL

1

ETHYLBENZENE

BDL

1

TOTAL XYLENES

BDL

1

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_

**TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-2

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/03/94

DATE EXTRACTED: 11/02/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

**COMPOUND**

**CONCENTRATION  
(MG/L)  
BDL**

**DETECTION LIMIT MULTIPLIER:  
(MG/L) X 1  
0.1**

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

**SURROGATE  
O-TERPHENYL**

**PERCENT RECOVERY  
61%**

**ACCEPTANCE LIMITS  
60-120%**

**BDL= BELOW DETECTION LIMIT**

CERTIFIED BY: \_\_\_\_\_

*Cy*



VOLATILE ORGANIC ANALYSIS  
EPA METHOD 8020

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-3

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/06/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION

DETECTION LIMIT MULTIPLIER:

	(UG/L)	(UG/L) X 1
BENZENE	BDL	1
METHYL-TERTIARY-BUTYL ETHER	BDL	1
TOLUENE	BDL	1
ETHYLBENZENE	BDL	1
TOTAL XYLENES	BDL	1

BDL= BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_

**TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-3

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/03/94

DATE EXTRACTED: 11/02/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

**COMPOUND**

**CONCENTRATION  
(MG/L)  
BDL**

**DETECTION LIMIT MULTIPLIER:  
(MG/L) X 1  
0.1**

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

**SURROGATE  
O-TERPHENYL**

**PERCENT RECOVERY  
63%**

**ACCEPTANCE LIMITS  
60-120%**

**BDL=BELOW DETECTION LIMIT**

CERTIFIED BY: \_\_\_\_\_





VOLATILE ORGANIC ANALYSIS  
EPA METHOD 8020

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-4

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE RECD: 11/01/94

DATE ANALYZED: 11/06/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION  
(UG/L)

DETECTION LIMIT MULTIPLIER:  
(UG/L) X 1

BENZENE

BDL

1

METHYL-TERTIARY-BUTYL ETHER

BDL

1

TOLUENE

BDL

1

ETHYLBENZENE

BDL

1

TOTAL XYLENES

BDL

1

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_



TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: TS-4

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/03/94

DATE EXTRACTED: 11/02/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION  
(MG/L)  
BDL

DETECTION LIMIT MULTIPLIER:  
(MG/L) X 1  
0.1

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

SURROGATE  
O-TERPHENYL

PERCENT RECOVERY  
66%

ACCEPTANCE LIMITS  
60-120%

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_

VOLATILE ORGANIC ANALYSIS  
EPA METHOD 8020

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: OW-1

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/07/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION

DETECTION LIMIT MULTIPLIER:

	(UG/L)	(UG/L) X 1
BENZENE	BDL	1
METHYL-TERTIARY-BUTYL ETHER	BDL	1
TOLUENE	BDL	1
ETHYLBENZENE	BDL	1
TOTAL XYLENES	BDL	1

BDL= BELOW DETECTION LIMIT

CERTIFIED BY:           *C*



TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

JOB#: 94-132

SAMPLE IDENTITY: OW-1

CONTROL#: 10690

DATE SAMPLED: 10/26/94

DATE REC'D: 11/01/94

DATE ANALYZED: 11/03/94

DATE EXTRACTED: 11/02/94

MATRIX: LIQUID

PERCENT MOISTURE: N/A

COMPOUND

CONCENTRATION  
(MG/L)  
BDL

DETECTION LIMIT MULTIPLIER:  
(MG/L) X 1  
0.1

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

SURROGATE  
O-TERPHENYL

PERCENT RECOVERY  
69%

ACCEPTANCE LIMITS  
60-120%

BDL=BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_

*Cut*

**Quality Control Data**  
**Chain of Custody Record**  
**Certification**

**SPIKE RECOVERY FORM  
EPA METHOD 8020**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: K01-94-10

SAMPLE LOCATION: GUMC ESSEX, VT

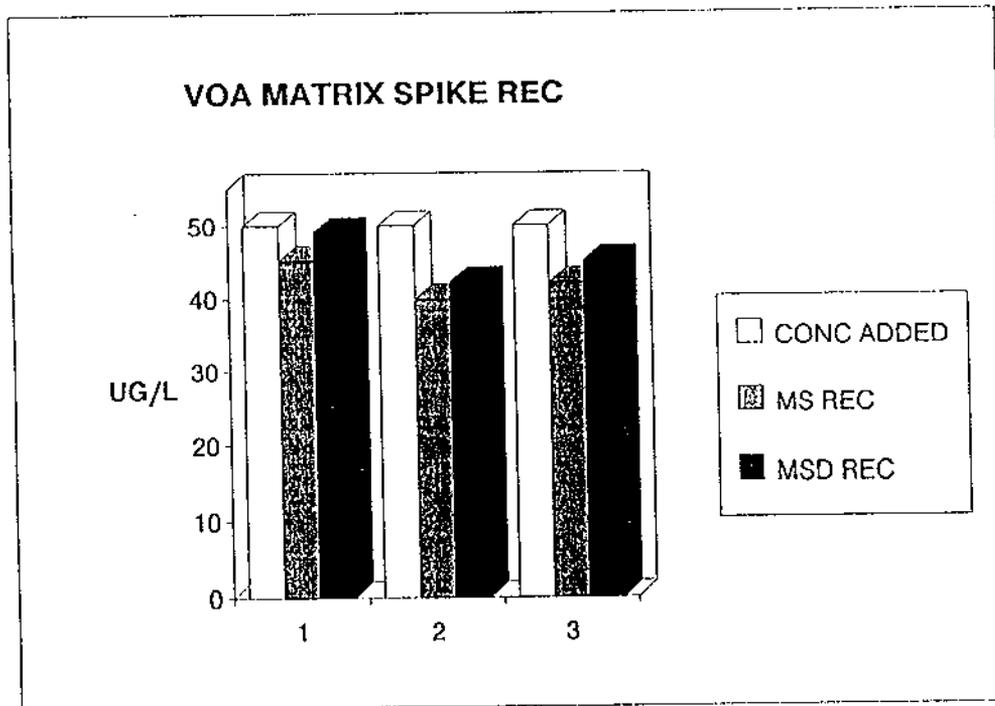
JOB#: 94-132

SAMPLE IDENTITY: QC SPIKES / 10691

CONTROL#: 10690

DATE ANALYZED: 11/06/94

COMPOUND	CONC ADDED UG/L	AMT REC UG/L	DUP AMT REC UG/L	%REC	DUP % REC	%DIFF
BENZENE	50	45.29	49.24	91%	98%	8%
TOLUENE	50	39.93	42.32	80%	85%	5%
CHLOROBENZENE	50	42.15	45.23	84%	90%	6%



CONTROL LIMITS +/- 25%



The State of New Hampshire  
Department of Environmental Services

**CERTIFICATE OF APPROVAL  
Wastewater Analysis**

Issued to  
Chemsolve, Inc.

Located at  
Elm Street, Milford, NH

*Under the provisions of the Regulations in Env-C300  
for the following analyses:*

FULL CERTIFICATION: Total Coliform by Membrane Filtration, Fecal Coliform by Membrane Filtration, ICP Metals, Metals by Graphite Furnace, Mercury, pH, TDS, Total Hardness, Calcium, Magnesium, Sodium, Potassium, Total Alkalinity, Chloride, Fluoride, Sulfate, Ammonia, Nitrate-N, Orthophosphate, TKN, Total Phosphorus, COD, BOD, Total Cyanide, Non-Filterable Residue, Total Phenolics, PCBs in Water, PCBs in Oil, Pesticides, and Volatile Organics.

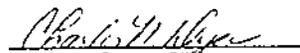
PROVISIONAL CERTIFICATION: Oil & Grease.

REPLACES CERTIFICATE #100893-E

CERTIFICATE NUMBER: 100893-F

DATE OF ISSUE: September 30, 1994

EXPIRATION DATE: December 2, 1994

  
Certifying Officer

The State of New Hampshire  
Department of Environmental Services

**CERTIFICATE OF APPROVAL  
Drinking Water Analysis**

Issued to  
Chemsolve, Inc.

Located at  
Elm Street, Milford, NH

*Under the provisions of the Regulations in Env-C300  
for the following analyses:*

FULL CERTIFICATION: Total Coliform by Membrane Filtration, Fecal Coliform by Membrane Filtration, Coli-ert-MPN, Metals by Graphite Furnace, Metals by ICP, Mercury, Nitrate-N, Nitrite-N, Turbidity, Total Filterable Residue, Calcium, Alkalinity, Sodium, Sulfate, Total Cyanide, Trihalomethanes, Volatile Organics, and Vinyl Chloride.

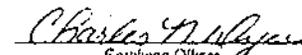
PROVISIONAL CERTIFICATION: EDB.

REPLACES CERTIFICATE #100893-A

CERTIFICATE NUMBER: 100893-D

DATE OF ISSUE: March 17, 1994

EXPIRATION DATE: December 2, 1994

  
Certifying Officer

**ATTACHMENT 6**



317 Elm Street  
Milford, N.H. 03055  
(603) 673-5440  
FAX (603) 673-0366

September 6, 1994

SEP 12 REC'D

Mr. Ken Bisceglia  
Twin State Environmental Corp.  
P O Box 719  
Richmond VT 05477

<b>Job Name</b>	: GUMC	<b>Laboratory #</b>	: H26-94-08
<b>Job Number</b>	: 94-1639	<b>Purchase Order #</b>	: N/A
<b>Location</b>	: Essex Jct., VT	<b>Control #</b>	: 10687

Dear Mr. Bisceglia,

Enclosed please find the laboratory results for the above referenced samples which were received, by the Chemserve sample custodian, under chain of custody control number 10687 on August 26, 1994. Samples were collected by Ken Bisceglia on August 18, 1994. Any abnormalities to the samples would be noted on the enclosed chain of custody document or laboratory report form. Chemserve follows protocols for analysis corresponding to the methods referenced unless a modification is noted. Unless otherwise stated, all holding times, preservation techniques and container types are analogous with those outlined by the U.S. EPA.

A formal quality assurance/quality control QA/QC program is maintained and updated by Chemserve on a routine basis. This QA/QC manual is available upon request.

This report is not valid without a completed chain of custody with the corresponding control number attached.

If you have questions or concerns regarding this analysis, please feel free to contact me.

Sincerely,

Jay W. Chrystal  
President/Laboratory Director

Enclosures



TWIN STATE ENVIRONMENTAL CORP.

LABORATORY #: H26-94-08  
CONTROL #: 10687

JOB NAME : GUMC  
JOB NUMBER: 94-1639  
LOCATION : ESSEX JCT., VT

<u>TEST PARAMETER</u>	<u>RESULTS</u>	<u>DATE COMPLETED</u>	<u>EPA METHOD #</u>	<u>DETECTION LIMIT</u>	<u>ANALYST</u>
---------------------------	----------------	---------------------------	---------------------	----------------------------	----------------

SAMPLE IDENTITY: SP-COMP

COMPOSITE

CORROSIVITY (pH)	7.00	09/01/94	9045	0-14	DR
FLASHPOINT	>165° F	09/01/94	Modified 1010	40°F	DR

REACTIVITY:

CYANIDE (mg/Kg)	<25.	08/29/94	SW846 7.3.3.2	25. (mg/Kg)	MC
SULFIDE (mg/Kg)	<50.	08/29/94	SW846 7.3.4.1	50. (mg/Kg)	MC/CL

TOXIC CHARACTERIZATION LEACHATE PROCEDURE (TCLP METHOD 1311)

ARSENIC	<0.100	09/06/94	6010	0.100	LC
BARIUM	0.444	09/06/94	6010	0.010	LC
CADMIUM	<0.010	09/06/94	6010	0.010	LC
CHROMIUM	0.012	09/06/94	6010	0.010	LC
LEAD	<0.050	09/06/94	6010	0.050	LC
MERCURY	<0.0005	09/06/94	7470	0.0005	CL
SELENIUM	<0.100	09/06/94	6010	0.100	LC
SILVER	<0.010	09/06/94	6010	0.010	LC

ALL RESULTS ARE IN (mg/L) EXCEPT AS NOTED.

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 9/01/94

COMPOUND

MATRIX: SOLID  
CONCENTRATION  
(UG/KG)

PERCENT MOISTURE: 13.75%  
DETECTION LIMIT MULTIPLIER:  
(UG/KG) X 10

BENZENE	BDL	1
BROMOBENZENE	BDL	1
BROMOCHLOROMETHANE	BDL	1
BROMODICHLOROMETHANE	BDL	1
BROMOFORM	BDL	1
BROMOMETHANE	BDL	1
CARBON TETRACHLORIDE	BDL	1
CHLOROBENZENE	BDL	1
CHLOROETHANE	BDL	1
CHLOROFORM	BDL	1
CHLOROMETHANE	BDL	1
2-CHLOROTOULENE	BDL	1
4-CHLOROTOULENE	BDL	1
DIBROMOCHLOROMETHANE	BDL	1
1,2-DIBROMO-3-CHLOROPROPANE	BDL	1
1,2-DIBROMOETHANE	BDL	1
DIBROMOETHANE	BDL	1
1,2-DICHLOROBENZENE	BDL	1
1,3-DICHLOROBENZENE	BDL	1
1,4-DICHLOROBENZENE	BDL	1
DICHLORODIFLUOROMETHANE	BDL	1
1,1-DICHLOROETHANE	BDL	1
1,2-DICHLOROETHANE	BDL	1
1,1-DICHLOROETHENE	BDL	1
CIS-1,2-DICHLOROETHENE	BDL	1
TRANS-1,2-DICHLOROETHENE	BDL	1
1,2-DICHLOROPROPANE	BDL	1
1,3-DICHLOROPROPANE	BDL	1
2,2-DICHLOROPROPANE	BDL	1
1,1-DICHLOROPROPENE	BDL	1
CIS-1,3-DICHLOROPROPENE	BDL	1
TRANS-1,3-DICHLOROPROPENE	BDL	1
ETHYLBENZENE	BDL	1
METHYLENE CHLORIDE	BDL	1
STYRENE	BDL	1
1,1,1,2-TETRACHLOROETHANE	BDL	1
1,1,2,2-TETRACHLOROETHANE	BDL	1
TETRACHLOROETHENE	BDL	1
TOLUENE	BDL	1
1,1,1-TRICHLOROETHANE	BDL	1

CONTINUED: 1 OF 2 PAGES

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

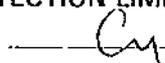
DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 9/01/94

COMPOUND	MATRIX: SOLID CONCENTRATION (UG/KG)	PERCENT MOISTURE: 13.75% DETECTION LIMIT MULTIPLIER: (UG/KG) X 10
1,1,2-TRICHLOROETHANE	BDL	1
TRICHLOROETHENE	BDL	1
TRICHLOROFLUOROMETHANE	BDL	1
1,2,3-TRICHLOROPROPANE	BDL	1
VINYL CHLORIDE	BDL	1
TOTAL XYLENES	BDL	1
METHYL-TERTIARY-BUTYL ETHER	BDL	1
CARBON DISULFIDE	BDL	1
n-BUTYLBENZENE	BDL	1
sec-BUTYLBENZENE	BDL	1
tert-BUTYLBENZENE	BDL	1
ISOPROPYLBENZENE	BDL	1
4-ISOPROPYLTOLUENE	BDL	1
n-PROPYLBENZENE	BDL	1
1,2,3-TRICHLOROBENZENE	BDL	1
1,2,4-TRICHLOROBENZENE	BDL	1
1,2,4-TRIMETHYLBENZENE	BDL	1
1,3,5-TRIMETHYLBENZENE	BDL	1
NAPHTHALENE	BDL	1
HEXACHLOROBUTADIENE	BDL	1
2-HEXANONE	BDL	10
4-METHYL-2-PENTANONE	BDL	10
2-BUTANONE	BDL	10
ACETONE	BDL	15
ACROLEIN	BDL	50
ACRYLONITRILE	BDL	50
2-CHLOROETHYL VINYL ETHER	BDL	50

SURROGATE	PERCENT RECOVERY	ACCEPTANCE LIMITS
TOLUENE-D8	95%	74-111%
4-BROMOFLUOROBENZENE	86%	77-109%
DIBROMOFLUOROMETHANE	85%	76-110%

BDL = BELOW DETECTION LIMIT  
CERTIFIED BY: 

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 8/29/94

DATE EXTRACTED: 8/26/94

MATRIX: SOLID

PERCENT MOISTURE: 13.75%

COMPOUND

CONCENTRATION  
(UG/KG)

DETECTION LIMIT MULTIPLIER:  
(UG/KG) X 50

2-Chlorophenol	BDL	10
2-Chloronaphthalene	BDL	10
4-Chlorophenyl-phenyl-ether	BDL	10
1,4-Dichlorobenzene	BDL	10
1,3-Dichlorobenzene	BDL	10
1,2-Dichlorobenzene	BDL	10
bis(2-chloroethoxy)methane	BDL	10
bis(2-chloroisopropyl)ether	BDL	10
bis(2-chloroethyl)ether	BDL	10
n-Nitroso-di-n-propylamine	BDL	10
2-Methylnaphthalene	BDL	10
2,4-Dimethylphenol	BDL	10
2,4-Dichlorophenol	BDL	10
4-Chloroaniline	BDL	10
4-Chloro-3-methylphenol	BDL	10
Hexachlorobutadiene	BDL	10
Hexachlorocyclopentadiene	BDL	10
2,4,5-Trichlorophenol	BDL	10
2,4,6-Trichlorophenol	BDL	10
2-Nitroaniline	BDL	10
Acenaphthylene	BDL	10
3-Nitroaniline	BDL	10
Acenaphthene	BDL	10
4-Nitrophenol	BDL	10
2,4-Dinitrotoluene	BDL	10
2,6-Dinitrotoluene	BDL	10
4-Nitroaniline	BDL	10
4,6-Dinitro-2-methylphenol	BDL	10
n-Nitrosodiphenylamine	BDL	10
4-Bromophenyl-phenylether	BDL	10
Hexachlorobenzene	BDL	10
Hexachloroethane	BDL	10
Pentachlorophenol	BDL	10
Phenanthrene	BDL	10
Anthracene	BDL	10
Di-n-butylphthalate	BDL	10
Fluoranthene	BDL	10
Pyrene	BDL	10
Butylbenzylphthalate	BDL	10

CONTINUED:1 OF 2 PAGES

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 8/29/94

DATE EXTRACTED: 8/26/94

MATRIX: SOLID

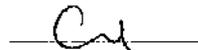
PERCENT MOISTURE: 13.75%

COMPOUND	CONCENTRATION (UG/KG)	DETECTION LIMIT MULTIPLIER: (UG/KG) X 50
Benzo[a]anthracene	BDL	10
3,3'-Dichlorobenzidene	BDL	10
Chrysene	BDL	10
bis(2-Ethylhexyl)phthalate	BDL	10
Di-n-octylphthalate	BDL	10
Dimethylphthalate	BDL	10
Diethylphthalate	BDL	10
Flourene	BDL	10
2-Methylphenol	BDL	10
4-Methylphenol	BDL	10
Phenol	BDL	10
Nitrobenzene	BDL	10
1,2,4-Trichlorobenzene	BDL	10
Dibenzofuran	BDL	10
Benzo[b]fluoranthene	BDL	10
Benzo[k]fluoranthene	BDL	10
Benzo[a]pyrene	BDL	10
Indeno[1,2,3-cd]pyrene	BDL	10
Dibenz[a,h]anthracene	BDL	10
Benzo[g,h,i]perylene	BDL	10

SURROGATE	PERCENT RECOVERY	ACCEPTANCE LIMITS
2-FLUOROPHENOL	43%	33-117%
PHENOL-D5	38%	29-113%
NITROBENZENE-D5	40%	36-120%
2-FLUOROBIPHENYL	38%	38-115%
2,4,6-TRIBROMOPHENOL	37%	19-109%
TERPHENYL-D14	49%	45-131%

BDL = BELOW DETECTION LIMIT

CERTIFIED BY:



**PESTICIDES  
 EPA METHOD 8080**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 8/31/94

DATE EXTRACTED: 8/26/94

MATRIX: SOLID

PERCENT MOISTURE: 13.75%

COMPOUND	CONCENTRATION (UG/KG)	DETECTION LIMIT MULTIPLIER: (UG/KG ) X 50
ALPHA-BHC	BDL	0.1
BETA-BHC	BDL	0.1
DELTA-BHC	BDL	0.1
HEPTACHLOR	BDL	0.1
ALDRIN	BDL	0.1
HEPTACHLOR EPOXIDE	BDL	0.1
ENDOSULFAN 1	BDL	0.1
ENDOSULFAN 2	BDL	0.1
DIELDRIN	BDL	0.1
ENDRIN	BDL	0.1
4,4'-DDE	BDL	0.1
4,4'-DDD	BDL	0.1
4,4'-DDT	BDL	0.1
TOTAL CHLORDANE	BDL	1
LINDANE	BDL	0.1
METHOXYCHLOR	BDL	1
TOXAPHENE	BDL	1

SURROGATE	PERCENT RECOVERY	ACCEPTANCE LIMITS
2,4,5,6-TETRACHLORO-M-XYLENE	67%	50-117%
DIBUTYL CHLORENDATE	94%	65-113%

BDL = BELOW DETECTION LIMIT

CERTIFIED:



PCB SCAN  
EPA METHOD 8080

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 8/31/94

DATE EXTRACTED: 8/26/94

MATRIX: SOLID

PERCENT MOISTURE: 13.75%

COMPOUND

CONCENTRATION  
(UG/KG)  
BDL

DETECTION LIMIT MULTIPLIER:  
(UG/KG ) X 50  
10

TOTAL AROCLORS

BDL = BELOW DETECTION LIMIT

CERTIFIED:



TOXIC CHARACTERIZATION LEACHATE PROCEDURE (TCLP)  
HERBICIDES  
EPA METHOD 1311/8150

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 9/06/94

DATE EXTRACTED: 8/26/94

MATRIX: SOLID

COMPOUND

CONCENTRATION  
(UG/KG)

DETECTION LIMIT MULTIPLIER:  
(UG/KG ) X 1

2,4-D  
SILVEX

BDL  
BDL

10  
10

BDL = BELOW DETECTION LIMIT

CERTIFIED:



TOTAL PETROLEUM HYDROCARBONS  
EPA MODIFIED METHOD 8100

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

JOB#: 94-1639

SAMPLE IDENTITY: SP-COMP

CONTROL#: 10687

DATE SAMPLED: 8/18/94

REC'D: 8/26/94

DATE ANALYZED: 8/30/94

DATE EXTRACTED: 8/26/94

MATRIX: SOLID

PERCENT MOISTURE: 13.75%

COMPOUND

CONCENTRATION  
(MG/KG)  
BDL

DETECTION LIMIT MULTIPLIER:  
(MG/KG) X 1  
10

TOTAL PETROLEUM  
HYDROCARBONS AS  
FUEL CONSTITUENTS

SURROGATE  
M-TERPHENYL

PERCENT RECOVERY  
79%

ACCEPTANCE LIMITS  
60-120%

BDL = BELOW DETECTION LIMIT

CERTIFIED BY: \_\_\_\_\_

**Quality Control Data**  
**Chain of Custody Record**  
**Certification**



TWIN STATE ENVIRONMENTAL CORP.

LABORATORY # : H26-94-08

CONTROL # : 10687

JOB NAME : GUMC

JOB NUMBER : 94-1639

LOCATION : ESSEX JCT., VT

INORGANIC QUALITY CONTROL INFORMATION

Chemserve minimum quality control requires matrix or duplicate analysis every ten samples analyzed. In addition, all samples are compared to a minimum of a three point calibration curve and a reagent blank. Any digestion or extraction requires a method blank or equipment blank to verify no presence of cross contamination or carry-over. Matrix spike recoveries are generally required to be within plus or minus 25%. Extensive QC data is available for this project at our facility.

**CERTIFICATION:**

I certify that all quality control measures were within specification guidelines with the exception of noted deviation. (if any)

Certified by

Michelle R. Cohen - Inorganics Supervisor

A detailed QA/QC manual is available upon request.



TWIN STATE ENVIRONMENTAL CORP.

LABORATORY # : H26-94-08

CONTROL # : 10687

JOB NAME : GUMC

JOB NUMBER : 94-1639

LOCATION : ESSEX JCT., VT

STANDARD TCLP DATA PACKAGE

MATRIX SPIKE RECOVERY FORM

SPIKE SAMPLE ID: 10687

MERCURY SPIKE ID: 9941

<u>PARAMETER</u>	<u>SPIKE CONCENTRATION</u>	<u>SAMPLE CONCENTRATION</u>	<u>SPIKE + SAMPLE CONCENTRATION</u>	<u>% RECOVERY</u>
ARSENIC	1.00	<0.100	1.032	103
BARIUM	2.00	0.444	2.397	98
CADMIUM	1.00	<0.010	0.971	97
CHROMIUM	2.00	0.012	1.831	91
LEAD	2.00	<0.050	1.789	89
MERCURY	0.0030	<0.0005	0.0030	100
SELENIUM	1.00	<0.100	0.941	94
SILVER	2.00	<0.010	1.777	89

DUPLICATE SAMPLE ID: 10687

METHOD BLANK RESULTS

DUPLICATE SAMPLE RESULTS

<u>PARAMETER</u>	<u>RESULTS</u>	<u>ORIGINAL</u>	<u>RESULTS DUPLICATE</u>	<u>RPD</u>
ARSENIC	<0.100	<0.100	<0.100	0
BARIUM	0.255	0.444	0.445	0
CADMIUM	<0.010	<0.010	<0.010	0
CHROMIUM	<0.010	0.012	0.014	15
LEAD	<0.050	<0.050	<0.050	0
MERCURY	<0.0005	<0.0005	<0.0005	0
SELENIUM	<0.100	<0.100	<0.100	0
SILVER	<0.010	<0.010	<0.010	0

VOA SPIKE RECOVERY FORM  
EPA METHOD 8260

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

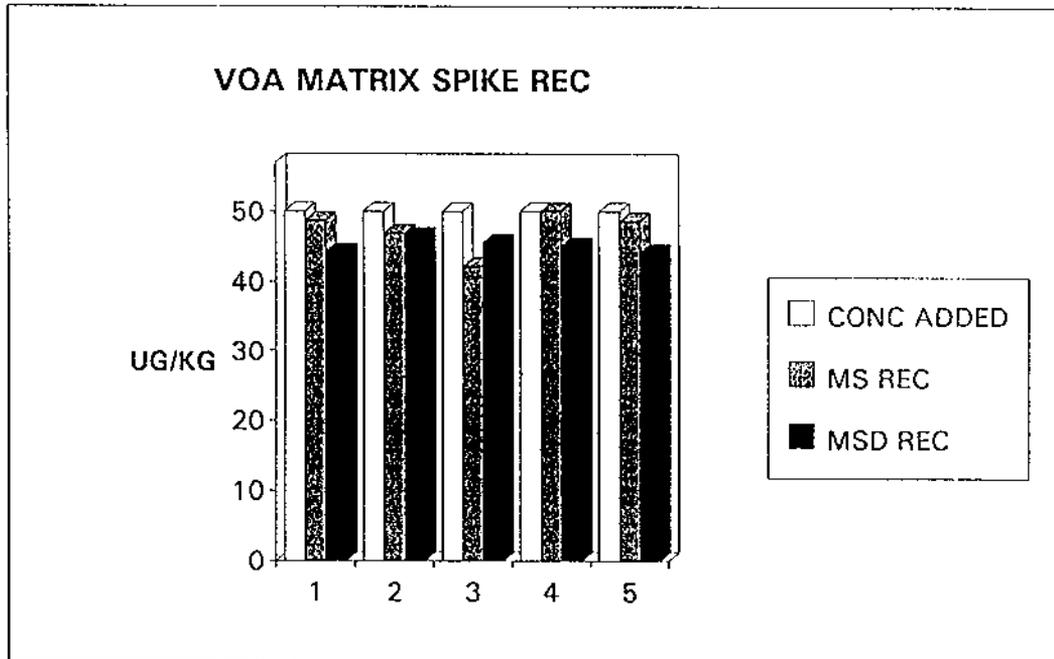
JOB#: 94-1639

SAMPLE IDENTITY: QC SPIKES/10687

CONTROL#: 10687

DATE ANALYZED: 9/01/94

COMPOUND	CONC ADDED (UG/KG)	AMT REC (UG/KG)	DUP AMT REC (UG/KG)	%REC	DUP % REC	%DIFF
1,1-DICHLOROETHENE	50	48.73	44.14	97%	88%	9%
TRICHLOROETHENE	50	46.90	46.48	94%	93%	1%
BENZENE	50	42.15	45.52	84%	91%	7%
TOLUENE	50	50.07	44.91	100%	90%	10%
CHLOROBENZENE	50	48.62	44.08	97%	88%	9%



**SPIKE RECOVERY LIMITS**  
 1,1-DICHLOROETHENE 74-113%  
 TRICHLOROETHENE 72-111%  
 BENZENE 76-115%  
 TOLUENE 75-117%  
 CHLOROBENZENE 75-112%

**BNA SPIKE RECOVERY FORM**  
**EPA METHOD 8270**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

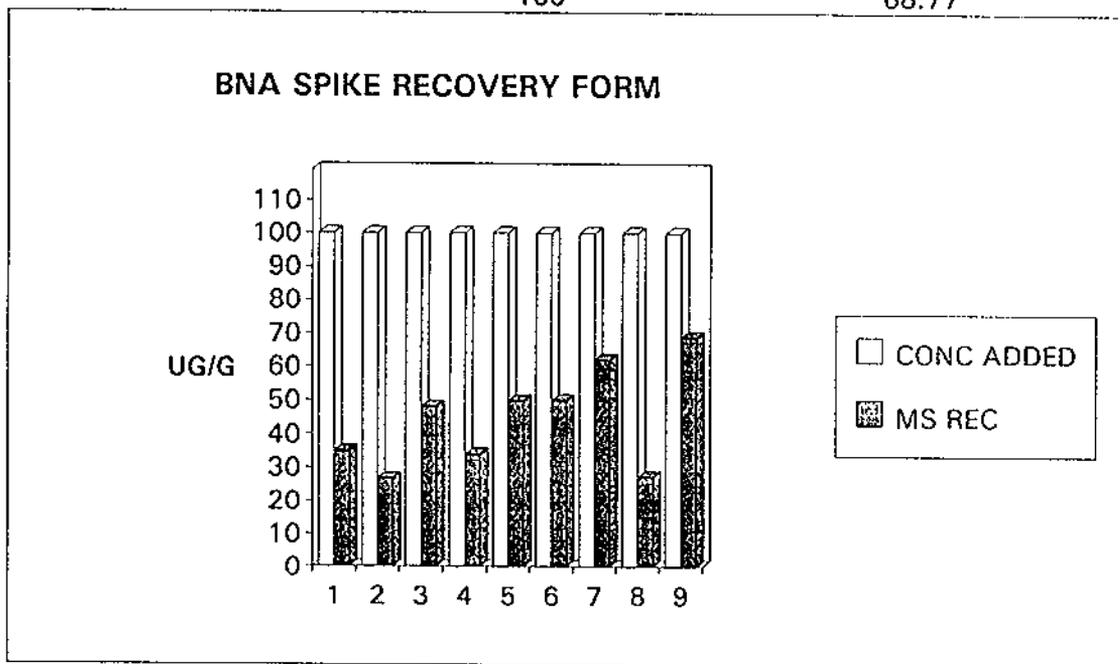
JOB#: 94-1639

SAMPLE IDENTITY: QC SPIKE/10687

CONTROL#: 10687

DATE ANALYZED: 8/29/94

COMPOUND	CONC ADDED UG/G	AMT REC UG/G	%RECOVERY
2-CHLOROPHENOL	100	34.77	35%
PHENOL	100	26.62	27%
1,4-DICHLOROBENZENE	100	48.00	48%
4-CHLORO-3-METHYLPHENOL	100	33.76	34%
ACENAPHTHENE	100	49.69	50%
4-NITROPHENOL	100	49.93	50%
2,4-DINITROTOLUENE	100	61.97	62%
PENTACHLOROPHENOL	100	27.17	27%
PYRENE	100	68.77	69%



**SPIKE RECOVERY LIMITS**

- PHENOL 26-100%
- 2-CHLOROPHENOL 25-102%
- 1,4-DICHLOROBENZENE 28-104%
- 4-CHLORO-3-METHYLPHENOL 26-103%
- ACENAPHTHENE 31-137%
- 4-NITROPHENOL 11-114%
- 2,4-DINITROTOLUENE 28-104%
- PENTACHLOROPHENOL 17-109%
- PYRENE 35-142%

**PESTICIDES  
 SPIKE RECOVERY FORM  
 EPA METHOD 8080**

CUSTOMER: TWIN STATE ENVIRONMENTAL CORP.

LAB#: H26-94-08

SAMPLE LOCATION: GUMC ESSEX JCT., VT

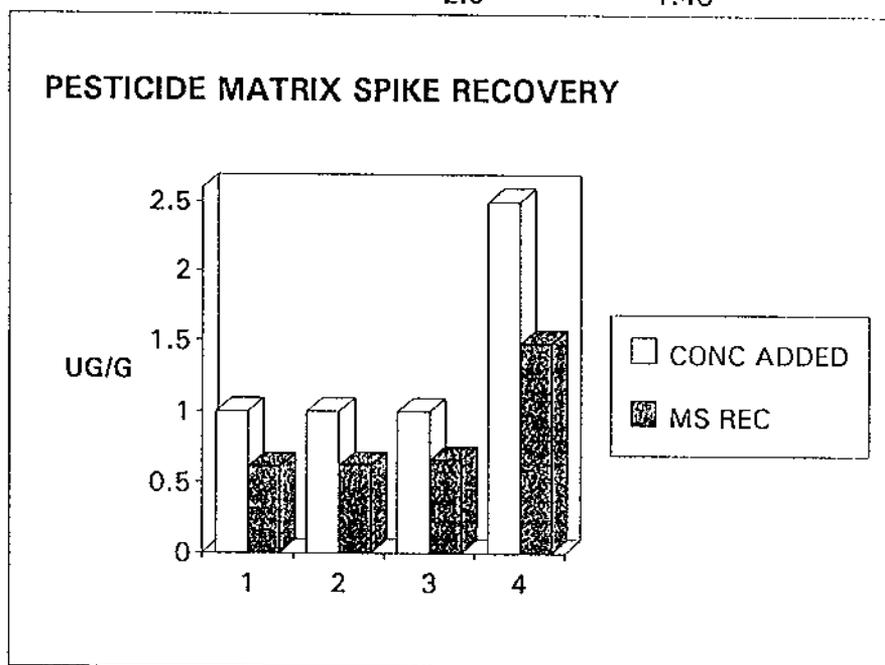
JOB#: 94-1639

SAMPLE IDENTITY: QC SPIKE/10687

CONTROL#: 10687

DATE ANALYZED: 8/31/94

COMPOUND	CONC ADDED UG/G	AMT REC UG/G	%RECOVERY
LINDANE	1	0.61	61%
HEPTACHLOR	1	0.62	62%
ALDRIN	1	0.66	66%
ENDRIN	2.5	1.48	59%



**SPIKE RECOVERY LIMITS**

LINDANE 53-109%  
 HEPTACHLOR 49-110%  
 ALDRIN 40-130%  
 ENDRIN 51-108%



The State of New Hampshire  
Department of Environmental Services

**CERTIFICATE OF APPROVAL  
Wastewater Analysis**

Issued to  
Chemsolve, Inc.

Located at  
Elm Street, Milford, NH

Under the provisions of the Regulations in Env-C300  
for the following analyses:

FULL CERTIFICATION: Total Coliform by Membrane Filtration, Fecal Coliform by Membrane Filtration, ICP Metals, Mercury, pH, TDS, Total Hardness, Calcium, Magnesium, Sodium, Potassium, Total Alkalinity, Chloride, Sulfate, Ammonia, Nitrate-N, Orthophosphate, TKN, Total Phosphorus, COD, BOD, Total Cyanide, Non-Filterable Residue, Total Phenolics, PCBs in Water, PCBs in Oil, Pesticides, and Volatile Organics.

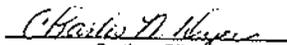
PROVISIONAL CERTIFICATION: Specific Conductance, and Fluoride.

REPLACES CERTIFICATE #100893-B

CERTIFICATE NUMBER: 100893-C

DATE OF ISSUE: February 11, 1994

EXPIRATION DATE: December 2, 1994

  
Certifying Officer

The State of New Hampshire  
Department of Environmental Services

**CERTIFICATE OF APPROVAL  
Drinking Water Analysis**

Issued to  
Chemsolve, Inc.

Located at  
Elm Street, Milford, NH

Under the provisions of the Regulations in Env-C300  
for the following analyses:

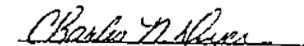
FULL CERTIFICATION: Total Coliform by Membrane Filtration, Fecal Coliform by Membrane Filtration, Coli-ert-MPN, Metals by Graphite Furnace, Metals by ICP, Nitrate-N, Nitrite-N, Residual Free Chlorine, Turbidity, Total Filterable Residue, Calcium, pH, Alkalinity, Corrosivity, Sodium, Sulfate, Total Cyanide, Trihalomethanes, Volatile Organics, and Vinyl Chloride.

PROVISIONAL CERTIFICATION: Mercury, Fluoride, Base/Neutrals, DBCP, and EDB.

CERTIFICATE NUMBER: 100893-A

DATE OF ISSUE: December 3, 1993

EXPIRATION DATE: December 2, 1994

  
Certifying Officer