SUBSURFACE INVESTIGATION REPORT

For

JOSEPH SMITH MEMORIAL VISITOR CENTER
Dairy Hill Road
South Royalton, Vermont

SECOR Project No. T0081-037-02

Submitted by:
SECOR International Incorporated
4001 South 700 East, Suite 250
Salt Lake City, Utah 84107-2178

to

The Church of Jesus Christ of Latter-Day Saints
50 North Temple Street
Salt Lake City, Utah 84150

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Prepared by:

Mark D. Loucks, P.G.
Associate Hydrogeologist

Reviewed by:

Russell D. Hamblin, R.G.
Principal Geologist

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1.0 INTRODUCTION

This report summarizes the results of a Subsurface Investigation (SI) conducted by SECOR International Incorporated (*SECOR*) on March 5, 1997, on behalf of the Church of Jesus Christ of Latter-Day Saints (LDS Church) at the Joseph Smith Memorial Visitors Center (subject site). The subject site is located on Dairy Hill Road, approximately 2 miles northeast of the town of South Royalton, Windsor County, Vermont. In January 7, 1997, the Sites Management Section (SMS) of the Vermont Department of Environmental Conservation (DEC), Waste Management Division (WMD) submitted a written request to further assess the lateral and vertical extent of petroleum hydrocarbons in soil and potentially in shallow groundwater as a result of releases from two underground storage tanks (USTs) at the subject site.

In response to this request, ten boreholes and were installed and sampled as part of this investigation. Six soil samples and one groundwater sample were collected and submitted for laboratory analyses.

1.1 Site Location and Surface Features

The Joseph Smith Memorial Visitors Center at the subject site is located approximately 2,000 feet northeast of Dairy Hill Road, approximately 2 miles north-northeast of the town of South Royalton, Vermont. The subject site is approximately 6 miles northwest of the town of Sharon, Vermont. Geographically, the subject site is approximately 43° 49' 50" North Latitude and approximately 72° 28' 30" West Longitude. The location of the subject site is shown on Figure 1.

The subject site consists of approximately 450 acres of rural land, owned by the LDS Church since 1905. The main structures on the subject site consist of the following:

- An LDS Church meetinghouse for the South Royalton Ward, built in approximately 1960, located at the east end of the subject property.
- A Maintenance Shop (MS) and associated storage buildings, built in 1960 (with recent additions as late as 1994), located in the central part of the subject property.
- An Administration/Residence (AR) building, built in 1960, located in the central part of the subject property.
- The Visitors Center (VC), built in 1960, located at the west end of the subject site.

Figure 2 shows the main structures at the subject site.

According to the Sharon, Vermont U.S. Geological Survey (USGS) 7.5-Minute Quadrangle (1981, photoinspected in 1983), the subject site is at an approximate elevation of 1,190 feet above mean sea level (MSL). The topography in the vicinity of the west side of the subject site slopes to the west-northwest, toward McIntosh Pond, which is located approximately 3,000 feet to the west. The east side of the subject site slopes to the east, towards Whitewater Brook, which is located approximately 1,000 feet to the east. As shown on Figure 2, a firewater pond is located southeast of the MS building and the AR building. White River is located approximately 2 ½-miles south of the subject property.

Local land use in the vicinity of the subject site is a mixture of rural residential and light agricultural. The adjoining properties are as follows:

- Immediately to the north, south, and east of the subject property is vacant undeveloped forested land owned by the LDS Church.

- Adjacent to the west property boundary is the LDS Church South Royalton Ward meetinghouse building and Dairy Hill Road. Across Dairy Hill Road, areas to the west, northwest, and southwest of the subject property are predominantly rural residential and agricultural properties.

1.2 Previous Investigation

On November 8, 1996, *SECOR* submitted a UST Removal and Preliminary Site Investigation Report to the LDS Church and Vermont SMS. This report summarized UST closure activities and associated soil and groundwater sample analytical results during the removal of three steel, single-wall 1,000-gallon heating oil USTs at the subject site. The USTs were removed on October 15 and 16, 1996, one from each of three separate on-site locations: the MS, VC, and AR buildings. The MS UST was installed in 1978 and the VC and AR USTs were each installed in 1960. Each of the three USTs was replaced with a new 1,000-gallon double-wall steel/fiberglass UST and associated double-wall piping and overfill/spill protection equipment.

During the UST removal activities, no evidence of hydrocarbon contamination was observed in the soil beneath the MS UST. However, evidence of hydrocarbons was observed in the soil beneath the VC and AR USTs, including hydrocarbon odors, soil discoloration, and elevated photoionization detector readings in soil removed from the UST excavations. Groundwater was encountered in the AR and VC UST excavations at depths of approximately 7.5 and 8.5 feet below ground surface (bgs), respectively. A hydrocarbon sheen was observed on the surface of the water in the bottoms of these two excavations; however, there was no measurable free-phase hydrocarbons identified.

Prior to installation of the new USTs, samples were collected from each of the three UST excavations. These samples included one soil sample from the MS UST excavation, five soil samples and one groundwater sample from the VC UST excavation, and two soil samples and one groundwater sample from the AR UST excavation. The groundwater sample and additional soil samples were collected from the VC and AR UST excavations, based on evidence of hydrocarbon-impacted soil and groundwater.

Approximately 15 cubic yards of hydrocarbon-impacted soil were removed from the bottom of the VC UST excavation, and approximately 1 cubic yard of hydrocarbon-impacted soil was removed from the bottom of the AR UST excavation. The VC UST excavation was extended to a maximum depth of approximately 9 feet bgs, and the maximum depth of the AR UST excavation was approximately 8 feet bgs.

The results of the analyses identified no detectable levels of total petroleum hydrocarbons (TPH) or benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds in the soil sample collected from the bottom of the MS UST excavation. Elevated concentrations of TPH were detected in soil and groundwater samples collected from the VC and AR UST excavations. Relatively low concentrations of ethylbenzene and total xylenes were detected in only one soil sample collected from the VC UST excavation. In addition, relatively low concentrations of toluene, ethylbenzene and total xylenes were detected in the groundwater sample collected from the VC excavation, and only total xylenes were detected at relatively low concentrations in the groundwater sample collected from the AR UST excavation. No BTEX concentrations were detected in groundwater samples from either the AR or VC UST excavation above respective Federal Drinking Water Standards or Maximum Contaminant Levels (MCLs).

The excavated VC UST soils were transported to a vacant unpaved parking area at the subject site located northwest of the MS, stored on a polyethylene liner, and covered with a sheet of polyethylene in compliance with DEC requirements. The soils excavated from the AR UST area were placed in two DOT-approved 55-

gallon drums and stored adjacent to the VC UST soil stockpile. Since no field evidence of hydrocarbons was indicated in the MS UST excavation, no additional soils were excavated and no additional soil samples were collected. On November 27, 1996, the hydrocarbon-impacted soils removed from the VC and AR UST excavations were transported off-site by North Country Environmental, of Barre, Vermont to Environmental Soil Management, Incorporated (ESMI) in Loudon, New Hampshire and treated via thermal desorption and disposed by ESMI.

Details of the October 1996 UST investigation activities are included in *SECOR*'s November 8, 1996 UST Removal and Preliminary Site Investigation Report. *SECOR* is not aware of any other previous environmental investigations conducted at the subject site.

1.3 Investigation Objectives and Scope of Work

SECOR was retained by the LDS Church to conduct this SI to further evaluate soil and shallow groundwater conditions as related to hydrocarbon impacts identified during the UST removal activities. On February 6, 1997, *SECOR* submitted a *"Revised Work Plan for Subsurface Investigation"* to the LDS Church and Vermont SMS, based on SMS's January 7, 1997 request for the work plan.

Based on *SECOR*'s work plan, the primary objectives of the SI were to:

- Determine the degree and extent of soil contamination at the subject site, particularly outside of the UST areas.
- Assess shallow groundwater conditions in the vicinity of each UST area, if contaminated soils are encountered, supplementing groundwater data generated during the October 1996 UST investigation.
- Reevaluate potential receptors, based on results of the additional subsurface investigation.
- Develop a plan as appropriate, to evaluate remediation alternatives or additional monitoring activities to address soil and/or groundwater contamination at the site.

To accomplish these objectives, the following activities were performed:

- Soil samples were collected from ten boreholes during drilling activities (six of these samples were submitted for analysis, and a groundwater sample was collected from one boreholes through a temporary piezometer.
- A portable Photovac Model-2020 Air Monitor photoionization detector (PID) was used as a field screening tool to monitor for the presence of hydrocarbon gases. Headspace readings were performed on soil samples collected during the drilling to aid in the selection of samples for laboratory analyses. Field screening also consisted of visual and olfactory examinations of the soil.
- Soil and groundwater samples were analyzed by an independent analytical laboratory to determine the presence and concentrations of petroleum hydrocarbon constituents.

Several changes were made to this subsurface investigation compared to the scope of work proposed in the "*Revised Workplan for Subsurface Investigation*" (submitted February 6, 1997). Changes in the scope of work were due to the following:

- Encountering bedrock at shallower depths than anticipated.

- With the exception of one borehole, shallow groundwater was not encountered during the investigation.

- The spacing between the newly installed USTs and the buildings and underground utilities was limited and drilling in some locations was not feasible.

Scope of work changes consisted of reductions in the number of boreholes drilled (ten instead of twelve), the number of soil samples submitted to the laboratory (six instead of twelve), and the number of monitoring wells installed and sampled (one instead of eight). The reasons for each of these deviations are discussed in more detail in Section 2.0 of this report. The site regulator, Mr. Andrew Shively of the SMS-DEC-WMD, approved each of these changes while in the field on March 5, 1997.

2.0 INVESTIGATION FIELDWORK

The field investigation was conducted on March 5, 1997. The field investigation included the drilling of ten boreholes (including B-1 through B-3, B-5 through B-8, and B-10 through B-12), soil and groundwater sample collection, monitoring well installation (B-5/MW-5), well development, and collection of water level data from the monitoring well. A detailed explanation of field methods used during this investigation is presented in Appendix A.

Prior to beginning the field investigation, a site-specific Health and Safety Plan (HSP) was prepared describing the potential chemical and physical hazards that may be encountered during the proposed activities. The HSP was prepared and reviewed in accordance with all applicable State and Federal requirements. On the first day of the field investigation, an on-site safety meeting was conducted by the *SECOR* geologist for all site personnel to discuss the scope of work and present the main contents of the HSP. A copy of the HSP was kept on site during the entire field investigation. Also prior to the field investigation, a request was placed with Dig Safe of Vermont to conduct an underground utility survey in the vicinity of the site.

As reported in Section 1.3 several changes to the scope of work as proposed in the approved work plan were made during this field investigation. The following is a description of the changes made and the rationale for making these changes. All changes were approved by Mr. Andrew Shively of the SMS-DEC-WMD during the field investigation.

- Boreholes B-4 and B-9 were not drilled due to concerns with underground utilities, which may have been encountered at these locations, based on the Dig Safe survey. In addition, during discussions with Mr. Albert Rice, on-site Facilities Maintenance Engineer, it was indicated that proposed borehole B-4 and B-9 were in areas where there were several underground utilities, and it would not safe to drill in those locations.

- During the field investigation, no evidence of hydrocarbon-impacted soils were encountered in any of the boreholes drilled at the AR and VC; including detectable PID readings or visual and olfactory indications of hydrocarbons. Based on these observations, indicating a lack of evidence of hydrocarbon-impacted soil at each tank location, Mr. Shively (Vermont SMS-DEC-WMD) specified that only three soil samples (analyzed only for TPH) from each tank site would be required. As a result, only six soil samples were submitted for laboratory analysis for TPH analysis using EPA method 8015, Modified for gasoline. The February 6, 1997 work plan outlined that 12 soil samples would be collected and analyzed for TPH and BTEX.

- Since water was only encountered in one of the ten boreholes, one monitoring well was installed, instead of the six that were specified in the February 6, 1997 work plan. This monitoring well (MW-5) is located at borehole B-5.

2.1 Drilling and Soil Sampling

Ten boreholes, including B-1 through B-3, B-5 through B-8, and B-10 through B-12, were installed at the VC and AR on March 5, 1997. One borehole, B-5, was completed as a 1-inch diameter groundwater monitoring well (MW-5) to a depth of approximately 8 feet bgs. Approximate borehole and monitoring well locations at the VC and AR sites are shown on Figures 3 and 4, respectively.

Drilling was conducted using the Geoprobe® drilling technique for all ten boreholes. Each borehole was drilled with a truck-mounted Geoprobe® drilling rig, which was operated by Twin State Environmental of Richmond, Vermont. For each borehole location, soil lithology was logged by a *SECOR* geologist during drilling. Lithologic descriptions are included on the borehole and well construction logs in Appendix B.

Soil samples from each borehole were collected continuously from ground surface to the underlying bedrock using a 1½-inch out side diameter (OD) Kansas core barrel lined with a clear, butylacetate sleeve. Borehole depths ranged from 2 to 8 feet deep. Soil samples were divided for field screening and for subsequent laboratory analyses. Field screening methods included headspace testing with the PID and visual and olfactory inspection for evidence of hydrocarbon impact. All soil samples were transferred from the sampler liners into 8-ounce glass jars, labeled, placed in zip-closure plastic baggies, logged, and placed immediately on ice in an insulated cooler for transport to Scitest Laboratory Services in Randolph, Vermont. Scitest is an approved analytical laboratory by the state of Vermont to perform all of the required analyses for petroleum hydrocarbon affected media. EPA protocols for sample management, including chain-of-custody, were observed at each stage of the project.

2.2 Monitoring Well Construction

Monitoring well, MW-5, was constructed by pushing the 1-inch diameter prepack well screen and casing to the bottom of borehole B-5. The well screen (5-foot length and 0.02 inch slot) and casing were constructed of schedule 40 PVC. The well was constructed so that the well screen straddled the water table. The filter pack sand was pre-installed as part of the prepack. The remaining annular space was filled with hydrated bentonite to approximately 1.0 foot bgs. The top of the well was completed with a concrete seal and surface grade well vault. The well was secured with a locking expansion plug.

2.3 Well Development

Well development activities were conducted on March 5, 1997. Well development was conducted to remove sediment accumulated inside the well, decrease the overall turbidity of the well water, and increase the hydraulic efficiency of the well. The well was developed by hand using ¾-inch OD polyethylene tubing equipped with a bottom check valve inserted to the bottom of the well and slowly agitated up and down to remove water and sediments. Approximately 5 well casing volumes (1.5 gallons) of water were removed during development.

2.4 Groundwater Sampling

Groundwater samples were collected from monitoring well MW-5 and from a domestic well located northwest of the AR building. Prior to sampling, a minimum of three well casing volumes was purged from MW-5 using ¾-inch OD tubing and approximately two gallons of groundwater was purged from the domestic well by opening a tap located near the well.

Static water level was allowed to recharge to 80 percent of the initial water level prior to sampling at well MW-5. At the domestic well, the tap discharge was decreased to only a few milliliters per second prior to sampling. The location of the domestic well is shown on Figures 2 and 4. The groundwater sampling data sheets are presented in Appendix C.

Purging and sampling at MW-5 was completed using a dedicated ¾-inch OD polyethylene tubing, equipped with a bottom check value. Groundwater was collected in the tubing by slowly agitating it up and down inside the well.

Groundwater from the tubing at MW-5 or at the tap near the domestic well was discharged into two 40-milliliter volatile organic analysis (VOA) vials and one 1-liter amber bottle furnished by the project laboratory. The VOA vials were filled in order to allow for zero headspace to minimize the loss of the volatile hydrocarbon fraction.

3.0 SITE GEOLOGY AND HYDROGEOLOGY

The subject site is located in west-central Vermont in Ordovician age metamorphic terrain. According to the *Geology of the Hanover, New Hampshire Quadrangle,* (John B. Lyons, 1958), former volcanic rocks in the vicinity of the subject site were metamorphosed during the (Ordovician) Taconic Orogeny. This publication also indicated that these rocks generally consist of tan to gray quartz mica schists and micaceous quartzite belonging to the Ordovician-age Gile Mountain Formation. Outcrops of the Meetinghouse Slate Member are also common in the area. Several ledge-forming outcrops of these units were observed at the subject site during *SECOR*'s site investigation.

Surficial soils at the subject site are approximately 2 to 8 feet deep in the vicinity of the AR and VC buildings. The soils reported in this subsurface investigation consists of dark brown, well graded sand with fragments of the underlying schist bedrock. In previous investigations silty sands and sandy silts with 5 to 10 % mica content were also encountered. The Unified Soil Classification (USC) designations for the soils encountered at the site are SW, SM, and ML. Highly weathered mica schist bedrock lies beneath the soil cover.

Shallow groundwater was only encountered in borehole MW-5 at a depth of approximately 6 feet bgs. The shallow groundwater is unconfined groundwater that apparently recharges in near-surface soils and migrates into interbedded soil/bedrock zones and in zones of near-surface, highly weathered bedrock.

Water is supplied to the subject site is serviced by three wells. The locations of the three wells are shown on Figure 2. These wells include a 510-foot well, located approximately 100 feet southeast of the VC building; a 240 feet deep well, located approximately 35 feet northwest of the AR building; and a 270 feet deep well, located approximately 15 feet southeast of the MS building.

4.0 ANALYTICAL PROGRAM AND RESULTS

The analytical programs and results of soil and groundwater samples collected during this investigation are presented and summarized in this section. A copy of the analytical reports and chain-of-custody documents are included in Appendix D.

4.1 Soil Sample Analytical Program

One soil sample collected from six of the ten boreholes was submitted for laboratory analysis. Three samples each were selected from VC and AR areas of investigation, respectively. Selection of the samples was based on field observations and screening. These samples were submitted to Scitest Laboratory Services under chain-of-custody procedures and analyzed for, TPH by EPA Method 8015 (Modified for gasoline).

4.2 Soil Sample Results

The results of all soil samples indicated that hydrocarbons have not impacted the soils surrounding either UST site. All results were below the method detection limits (MDLs) for the TPH Method 8015 analysis. The soil analytical results are summarized in Table 1.

4.3 Groundwater Sample Analytical Program

Two groundwater samples were collected and analyzed for BTEX by EPA Method 602 and TPH by EPA Method 8015 Modified for gasoline. One sample was collected at MW-5 and a second sample was collected from a domestic water well, located approximately 35 feet northwest of the AR building. The domestic well sample was labeled TAP.

4.4 Groundwater Sample Results

No hydrocarbon compounds were detected in MW-5 and TAP groundwater samples. Groundwater sample analytical results are summarized in Table 2.

Table 1. Soil Sample Analytical Results Summary
Joseph Smith Memorial
March 5, 1997

Soil Sample Location	Sample Depth (feet, bgs[a])	TPH Gasoline[b] (mg/kg)	BTEX Analysis[c] (mg/kg)			
B-1	6-7	<0.1[d]	NA[e]	NA	NA	NA
B-2	3-3.5	<0.1	NA	NA	NA	NA
B-6	3-4	<0.1	NA	NA	NA	NA
B-8	0.5-2	<0.1	NA	NA	NA	NA
B-11	4-5	<0.1	NA	NA	NA	NA
B-12	4.5-5.5	<0.1	NA	NA	NA	NA

a bgs = below ground surface
b TPH -Gasoline = total petroleum hydrocarbons as gasoline by EPA Method 8015, Modified. Method detection limit (MDL) is 0.1 milligrams per kilogram (mg/kg).
c No samples were analyzed by this method.
d < symbol denotes that compound was not detected at or above the MDL.
e NA = not analyzed.

Samples analyzed by Scitest Laboratory Services of Randolph, Vermont.

Table 2. Groundwater Sample Analytical Results Summary
Joseph Smith Memorial
March 5, 1997

Sample Location	Sample ID No.	TPH-Gasoline[a] (mg/L)	BTEX Analysis[b] (μg/L)			
			Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-5	7	<0.1[c]	<2	<2	<2	<6
TAP	8	<0.1	<2	<2	<2	<6

a TPH - Gasoline = total petroleum hydrocarbons as gasoline by EPA Method 8015, Modified. Method detection limit (MDL) is 0.1 milligrams per liter (mg/L).
b BTEX analysis by EPA Method 602. MDL of 2 micrograms per liter (μg/L).
c < symbol denotes that compound was not detected at or above the MDL.

5.0 WASTE DISPOSAL

The soil cuttings generated during the drilling activities from the newly installed boreholes and the groundwater monitoring well were stock piled on the ground at the project site. Less than one cubic foot of soil was generated during the drilling operations. Because the soil cuttings did not indicate the presence of any contamination the cuttings were placed back inside of each borehole and any residual soil was spread on the ground.

Two gallons of purge water was generated during the sampling at the AR domestic well and only 1.5 gallons of purge water was generated during the development and sampling of MW-5. Since the purge water from both locations did not exhibit any sheen or odor indicating the presence of significant amounts of hydrocarbons, it was discarded on the ground in the vicinity of the well.

6.0 SUMMARY AND RECOMMENDATIONS

SECOR performed a Subsurface Investigation at the Joseph Smith Memorial Visitors Center located on Dairy Hill Road, approximately 2 miles northeast of the town of South Royalton, Windsor County, Vermont. The purpose of this investigation was to assess the nature and extent of hydrocarbon impacts to subsurface soil and shallow groundwater at the subject site. The following is a summary of findings and conclusions based on the results of the study.

6.1 Summary of Findings

The summary of findings include:

- Ten boreholes (B-1 through B-3, B-5 through B-8, and B-10 through B-12) were installed as part of the investigation. Soil samples were collected from each borehole and field screened for hydrocarbons using a PID and visual and olfactory observation. Six soil and two groundwater samples were submitted for laboratory analyses.

- The soils encountered during the investigation consist of a dark brown, well graded sand underlain by weathered schistose bedrock. The soil cover ranged from 2 to 8 feet in thickness.

- The groundwater was detected in only one of the ten boreholes at a depth of approximately 6 feet bgs.

- Based on field screening, none of the soil or groundwater samples collected during this investigation exhibited any evidence hydrocarbon impact.

- No hydrocarbon compounds were identified in any of the six soil samples and two groundwater samples submitted for analysis.

6.2 Conclusions and Recommendations

- Based on the results of this investigation, including field and analytical data, subsurface soils and shallow groundwater surrounding the two UST locations under investigation have not been impacted by hydrocarbon contamination.

- Based on the findings of this investigation and the completion of initial remedial activities, *SECOR* recommends no additional investigations or remedial activities with respect to the VC and AR USTs at the subject site. This recommendation for no further action is based on the following rationale:

  - There are no hydrocarbons detections in the soils samples collected from the VC and AR UST areas.

  - There are no hydrocarbons detections in shallow groundwater sample collected from well MW-5 adjacent to the VC UST site.

  - During the UST removals in October 1996, the main sources of contamination (old USTs and most of the hydrocarbon-impacted soils) were removed from the UST sites.

7.0 STANDARD LIMITATIONS

The observations, interpretations, and recommendations presented in this report are based on the assumption that the site conditions do not vary from those found during the course of the investigation to date at the project site. If any variations are encountered during any additional investigations or excavations for this project, *SECOR* should be notified so that supplemental interpretations can be made. The observations and interpretations of this report are intended only for the individual drilling sites and the sampling conditions described, and must not be extended to adjacent areas.

The findings of this report are valid for the dates and under the conditions of the drilling, observations, and testing. However, changes in the conditions of the subject property or neighboring properties, or changes in applicable standards can occur with the passage of time, whether they result from natural processes, legislation, or the broadening of knowledge. Accordingly, the observations and findings presented in this report may be invalidated by changes outside of our control.

This report has been prepared for use by the LDS Church in their evaluation of subsurface hydrocarbons located adjacent to the VC and AR buildings at the Joseph Smith Memorial, South Royalton, Vermont. The report is not intended for use by others and the information contained herein is not applicable to other sites.

The data reported herein are based on the sampling of ten exploratory boreholes one of which was completed as groundwater monitoring well at the subject property.

Within the limitations of scope, schedule, and budget, *SECOR's* services have been executed in accordance with generally accepted practices in this area at the time that the report was prepared. No other conditions, expressed or implied, should be understood.

APPENDIX A
FIELD METHODS AND PROCEDURES

APPENDIX A
FIELD METHODS AND PROCEDURES

Drilling

Drilling was conducted using the Geoprobe® techniques for each of the ten boreholes. Each borehole was drilled with a truck-mounted Geoprobe®. All down-hole equipment were decontaminated before use in each borehole to minimize the potential for cross-contamination between boreholes. The drilling and drill equipment were provided by Twin State Environmental Corporation, of Richmond, Vermont.

An underground utility search and on-site survey were conducted at the site by the local utility companies and *SECOR* personnel prior to drilling at each chosen location.

During drilling, a field log was compiled for each borehole by the geologist on site. Information recorded at each corresponding depth included descriptions of the soil color, texture, grain size, and moisture content. Soil types were classified approximately based on the Unified Soil Classification System. Additional information recorded on each log included the sample number and sample interval. In an effort to minimize cross-contamination between boreholes, all equipment was steam-cleaned following drilling of each borehole. Borehole logs are included in Appendix B.

The soil cuttings generated during the drilling activities and development/purge water from the newly installed borehole and groundwater monitoring wells were stockpiled on the ground at the subject site. Water and soil disposal was not necessary during this investigation, as all purge water and soil cuttings generated during this investigation did not appear to exhibit any evidence of hydrocarbon contamination.

Soil Sampling and Field Screening Procedures

Soil samples were collected for laboratory analyses continuously from approximately 0 to 8 feet bgs using a Kansas core barrel assembly. Samples were collected for lithologic descriptions at lithology changes or other soil aspect changes. For the specified sample interval, the sampler was driven into undisturbed soil.

The soil in the sampler was segregated and prepared for field screening, lithologic characterization, and possible laboratory analysis. The bottom-most portion of the sample was generally used for lithologic description and field screening for evidence of hydrocarbons, the middle portion of the sample was prepared for possible laboratory analysis, and the top-most portion of the sample was described lithologically and logged on the borehole record.

The middle portion of the sample was removed from the sampler and promptly transferred in to 8-ounce laboratory-clean glass jars with Teflon-lined lids. The samples were labeled, stored individually in zipper-sealed plastic baggies, and placed in an ice-filled cooler, at a maximum of 4° Celsius for transport to the laboratory. Sample handling was designed to minimize dissipation and degradation of the volatile-fraction organic compounds. Each sample jar was clearly labeled with the project and borehole number, sample interval, and date. EPA-recommended protocols for sample management, including chain-of-custody, were observed at each stage of the project.

In an effort to minimize cross-contamination between samples, the core barrel was cleaned before reassembly. All components of the sampler were decontaminated by initially rinsing with tap water, washing with a non-phosphorous soap, an additional tap water rinse, and then a final deionized water rinse. After the decontamination process, all sampler parts were air dried and reassembled.

Soil samples were screened in the field for relative concentration of hydrocarbon vapors using a PhotoVac® MicroTip® photoionization detector (PID). Field instruments such as the PID are useful for evaluating relative concentrations of volatilized hydrocarbons, but do not measure levels of hydrocarbon concentrations with the precision of laboratory analysis. Field screening also included visual and olfactory observations of potential hydrocarbon contamination.

Groundwater Monitoring Well Construction

Boreholes completed as monitoring wells were advanced to a depth of approximately 8 feet bgs. The groundwater monitoring wells at the project site were constructed of 1-inch diameter, polyvinyl chloride (PVC) screen and casing. The well screen consisted of 5-foot sections of slotted PVC, with 0.020-inch-wide slots, placed bottom of the borehole and designed to straddle the water table. The remainder of the well casing, from the top of the screened portion to the ground surface, was non-slotted (or blank) casing. Casing joints were flush-threaded, using no glues, chemical cements, or solvents to join the casing sections. The top of each well casing was covered with a locking cap, and the bottom of each well was constructed with a 6-inch long threaded end-plug, which acts as a sump to catch residual well sediment.

The annulus of the borehole around the well casing was sand packed using a prepack screen from the total depth of the borehole to approximately 12 inches above the top of the well screen, with 10-20 sieve size silica sand. A hydrated bentonite seal, approximately 2 feet thick, was placed above the sand to prevent infiltration of surface liquids around the well casing. A concrete surface completion was installed to stabilize the upper section of the well and to secure the protective casing. The wells were completed with flush to the ground aluminum wellhead cover installed in an two feet in diameter concrete pad. This surface finish is designed and installed to protect the wellhead. Graphic representations of well construction are shown on the Borehole and Well Construction Logs, included in Appendix B.

Well Development

Prior to sampling, monitoring well MW-5 was developed by removing approximately five well-casing-volumes of water. This development procedure is intended to provide for groundwater samples which are representative of ambient groundwater conditions, to remove fine-grained sediment from the formation and from the filter pack, and to increase the hydraulic efficiency of the well. The monitoring well was developed using a ¾-inch OD polyethylene tubing equipped with a check value at the bottom. The tubing was slowly agitated up and down inside the well to remove the groundwater and sediment from the well. All development fluids were contained in a 5-gallon bucket.

Groundwater Sampling

Groundwater samples were collected from MW-5 and a domestic well located just northwest of the AR building. Subjective field observations of groundwater quality were made by collecting samples prior to or at the beginning of purging each well. Samples were collected for field observations by collecting discharge water from the tubing or tap. The samples were examined for floating product, sheen, and emulsion.

Following the subjective observations approximately five well volumes were removed at MW-5 and approximately two gallons of water was purged from the domestic well. The static water level at MW-5 was allow to recharge to 80 percent or greater prior to sampling while at the domestic well, the discharge at the tap was decreased to only a few milliliters per second prior to sampling. Water discharged from tubing or tap was collected into two 40-milliliter VOA vials and one 1-liter amber bottle, which were furnished by the project

laboratory. Both samples were collected with no headspace, following appropriate volatile sampling procedures. Following collection of groundwater samples, the containers were appropriately labeled and stored in a cooler, as stated in the soil sampling procedures section.

Submittal of Laboratory Samples

Soil and groundwater samples were delivered to Scitest Laboratory Inc. in Randolph, Vermont, in an insulated cooler with ice. Samples were collected, preserved, and submitted to the project laboratory under chain-of-custody procedures. Copies of the chain-of-custody documents are included in Appendix D.

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-1**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 7.0' BGS**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				5			5	
				0			0	
		0			Well graded SAND, dark brown; coarse to fine, sample grades to very coarse Sand with depth, slightly moist between 6.5–7' bgs	SW		
		0		5			5	
					Boring terminated at 7.0 feet below ground surface.			
				10			10	
				15			15	
				20			20	
				25			25	

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: LD037081

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-2**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 3.5' BGS**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				5			5	
		0		0	Well graded SAND, dark brown; coarse to fine, fragments of schist at 3–3.5' bgs	SW	0	
		0		5	Boring terminated at 3.5 feet below ground surface.		5	
				10			10	
				15			15	
				20			20	
				25			25	

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis
Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts
Gradational Contact
Contact Located Approximately
Contact
Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: LDQ3707L

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-3**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 4.0' BGS**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				0			0
		0			Well graded SAND, dark brown; coarse to fine, dry, wood fragments, fragments of schist at 3.5–4' bgs	SW	
		0		5	Boring terminated at 4.0 feet below ground surface.		5
				10			10
				15			15
				20			20
				25			25

Well Construction Schematic

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite

10/20 Colorado Silica Sand

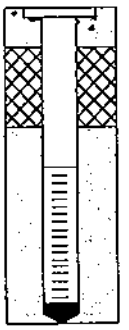
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

OWG: L003705L

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-5**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 8.0' BGS**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				5			5	
				0	Well graded SAND, dark brown; coarse to fine, fragmets of schist at 7–8 bgs, saturated at 7–8' bgs	SW	0	
		0						
		0		5			5	
		0		▽				
					Boring terminated at 8.0 feet below ground surface. Groundwater encountered at 7'			
				10			10	
				15			15	
				20			20	
				25			25	



Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

▽ Groundwater Level at Time of Drilling
▼ Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: L0037091

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-6**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 4.0' BGS**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				0			0	
		0			Well graded SAND, dark brown; coarse to fine, fragments of schist at 3.5–4' bgs	SW		
		0		5	Boring terminated at 4.0 feet below ground surface.		5	
				10			10	
				15			15	
				20			20	
				25			25	

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite

10/20 Colorado Silica Sand

2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: LD0371DL

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-7**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97 0822** FINISH **3/5/97 0850** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 3' BGS**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
	0-2	0		0	Well graded SAND, dark brown; coarse to fine, fragements of schist	SW	0	
	2-3	0		3	Boring terminated at 3.0 feet below ground surface.			

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite

10/20 Colorado Silica Sand

2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: L0037021

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-8**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 2' BGS**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification
				0	Well graded SAND, dark brown; coarse to fine, fragements of schist	SW
		0				
		0			Boring terminated at 2.0 feet below ground surface.	

Depth Below Surface, feet: 0, 5, 10, 15, 20, 25

Well Construction Schematic

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis
Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts
Gradational Contact
Contact Located Approximately
Contact
Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: L003703L

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-10**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 4.0' BGS**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				5			5	
				0			0	
		0			Well graded SAND, dark brown; coarse to fine, fragments of schist at 3-4' bgs	SW		
		0		5	Boring terminated at 4.0 feet below ground surface.		5	
				10			10	
				15			15	
				20			20	
				25			25	

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis
Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts
Gradational Contact
Contact Located Approximately
Contact
Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: LD037060

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-11**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97 0745** FINISH **3/5/97 0822** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 5' BGS**

Penetration Results Blows 6"/6"/6"	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet	Well Construction Schematic
				0	Well graded SAND, dark brown; coorse to fine	SW	0	
		0			Same as above			
		0		5	Well graded SAND, dark brown, coorse to fine, fragements of schist, slightly damp		5	
		0			Boring terminated at 5.0 feet below ground surface.			

10
15
20
25

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: LD037G1L

SECOR
International Incorporated

FACILITY **LDS - JOSEPH SMITHMEMORIAL** JOB # **T0081-037-02** BORING/WELL **B-12**
LOCATION **DAIRY HILL RD, SOUTH ROYALTON, VERMONT** SURFACE ELEVATION **NA**
START **3/5/97** FINISH **3/5/97** CASING TOP ELEVATION **NA**
LOGGED BY **KRIS GILSON** MONITORING DEVICE **PHOTOVAC MODEL 2020 (PID)**
SUBCONTRACTOR AND EQUIPMENT **TWIN STATE ENVIRONMENTAL; GEOPROBE**
COMMENTS **REFUSAL IN BEDROCK AT 5.5' BGS**

Penetration Results (Blows 6"/6"/6")	Sample Depth Interval, feet	PID Reading	Sheen	Depth Below Surface, feet	Lithologic Description	Unified Soil Classification	Depth Below Surface, feet
				5			5
				0			0
		0			Well graded SAND, dark brown; coorse to fine, frogements of schist at 4-5' bgs, dry, mottled, mica rich	SW	
		0		5			5
					Boring terminated at 5.5 feet below ground surface.		
				10			10
				15			15
				20			20
				25			25

Well Construction Schematic

Field Screen/Lithologic Description Sample
Preserved Sample
No Recovery
* Sample Submitted for Laboratory Analysis

Groundwater Level at Time of Drilling
Static Groundwater Level
SD Sheen Detected
NS No Sheen Detected
NT Not Tested
(2.5Y 4/2) Munsell (1990) Soil Color Charts

Gradational Contact
Contact Located Approximately
Contact

Concrete
Bentonite
10/20 Colorado Silica Sand
2" PVC Blank Casing
2" PVC Screen Casing (0.010 slots)
End Cap

DWG: LD03704L

APPENDIX C
GROUNDWATER SAMPLING DATA SHEETS

SECOR

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GROUNDWATER SAMPLING FORM

Location: LDS Church - Vermont
Client:
JOB#: T0081-037-02
Sampling Round #: 1

MW No.	MW-5				
Date	5/5/97				
Time					
Sampled By	KG/SM				
Depth to GW	~7'				
Depth to Bottom	8'				
Meas. Point (Elevation)	—				
Meas. Device	tape				
Vol. in MW	—				
Purge Device	tubing				
Vol. of Purge Device	—				
Vol. Purged	~1.5 gal.				
Recharge Rate	mod.				
Samp. Device	tubing				
Decon Method	none				
No. of Samples/Type of Analyses	2-40 ml. VOA 1-1L Amber				
Sample Preservation	HCl - VOC H_2SO_4 - TPH				
Sample Filtered/Unfiltered	N | N				
Permeability Test Performed	—				
Field Screening	visual/ olfactory				
Color	silty				
Clarity (TSS)	turbid				
Odor	none				
NAPL/DNAPL	none				

Comments: I believe driller took water measurements approx. ½ hour after MW installation and water had risen to ~6' below grade.

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International Incorporated

GROUNDWATER SAMPLING FORM

Location: LDS Church S. Royalton, VT
Client:
JOB#: 10081-037-02
Sampling Round #:

MW No.	TAP				
Date	2/5/97				
Time					
Sampled By	KCarson				
Depth to GW	—				
Depth to Bottom	—				
Meas. Point (Elevation)	—				
Meas. Device	—				
Vol. in MW					
Purge Device					
Vol. of Purge Device					
Vol. Purged	1.5-2 gal.				
Recharge Rate	—				
Samp. Device	tap				
Decon Method	none				
No. of Samples/Type of Analyses					
Sample Preservation	none				
Sample Filtered/Unfiltered	unfil.				
Permeability Test Performed	—				
Field Screening					
Color	clear				
Clarity (TSS)	turbid				
Odor	none				
NAPL/DNAPL					

Comments: tap water sample from drinking water well at Admin/Residence Building.

APPENDIX D
LABORATORY ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY DOCUMENTS

ANALYTICAL REPORT

Project Name: Joseph Smith Visitor Center, Royalton, VT
Project No.: 090141

Work Order No.: 9703-00635

Sample Desc.: B12
Sample Nos: 6

Sample Date: 3/05/97
Collection Time: 0:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Non-halogenated volatiles	EPA 8015			JPM	3/14/97
FID TPH as gasoline	GC-FID	< 100	ug/kg	JPM	3/14/97

Sample Desc.: MW 5
Sample Nos: 7

Sample Date: 3/05/97
Collection Time: 0:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Non-halogenated volatiles	EPA 8015			JPM	3/14/97
FID TPH as gasoline	GC-FID	< 100	ug/L	JPM	3/14/97
Aromatic Volatile Organics	EPA 8020/602			JPM	3/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Benzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Toluene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Surrogate: 8020				JPM	3/12/97
***Bromofluorobenzene-8020		100	% Recovery	JPM	3/12/97

NOTE: One large unknown peak noted, possible acetone

Sample Desc.: Tap
Sample Nos: 8

Sample Date: 3/05/97
Collection Time: 0:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Non-halogenated volatiles	EPA 8015			JPM	3/14/97
FID TPH as gasoline	GC-FID	< 100	ug/L	JPM	3/14/97
Aromatic Volatile Organics	EPA 8020/602			JPM	3/12/97
Methyl Tertiary Butyl Ether	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Benzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Toluene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Ethyl Benzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Total Xylenes	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
Chlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
1,2-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
1,3-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97
1,4-Dichlorobenzene	EPA 602/8020	BPQL	ug/L	JPM	3/12/97

ANALYTICAL REPORT

Project Name: Joseph Smith Visitor Center, Royalton, VT
Project No.: 090141

Work Order No.: 9703-00635

Sample Desc.: Tap
Sample Nos: 8
Sample Date: 3/05/97
Collection Time: 0:00

Test Performed	Method	Results	Units	Analyst	Analysis Date
Surrogate: 8020				JPM	3/12/97
***Bromofluorobenzene-8020		100	% Recovery	JPM	3/12/97

Authorized by: Fredrick Pramoth

SCITEST
LABORATORY SERVICES

Scitest, Inc.
P.O. Box 339
Route 66 Professional Center, Randolph, VT 05060
Phone: (802)728-6313 Fax: (802)728-6044

Sample Logged in By: _____
Anomaly Sheet: Y____ N____

Preservative Check:
Temperature Check:

Client: SECOR International, Inc.
Address: 4001 South 700 East, Suite 250
Salt Lake City, UT 84107

Contact Russ Hamblin
Phone No:

Customer Nos: 90141
Project: M-1507
Job Template:

Date requested:
Date shipped:
Date scheduled: 03/06/97

CHAIN OF CUSTODY

	Date	Time		Date	Time
Sampled by:* Kris Gilson			Print Name Here:*		
Relinquished by: Kris Gilson	3/5/97	4:05pm	Accepted by:		
Relinquished by:			Received by Scitest: [signature]	3/5/97	4:05

Sample No:	Sample Description	Sample Date	Sample Time	Matrix	Preservative	Container Material	Container Volume	Containers per Sample	Parameters
1	B1	3/5/97	a.m. p.m.	Soil	Ref	G	250ml	1	EPA 8015 (TPH)
2	B2	3/5/97	a.m. p.m.	Soil				1	EPA 8015 (TPH)
3	B6	3/5/97	a.m. p.m.	Soil				1	EPA 8015 (TPH)
4	B8	3/5/97	a.m. p.m.	Soil				1	EPA 8015 (TPH)
5	B11	3/5/97	a.m. p.m.	Soil				1	EPA 8015 (TPH)
6	B12	3/5/97	a.m. p.m.	Soil				1	EPA 8015 (TPH)

SAMPLES MUST REACH THE LAB within _____ of sampling time to meet all holding times.

Parameters are correct as listed Client Initial: _____*
Please fill in ALL areas marked with an asterisk (*). Thank you.
Additional instruction if applicable are attached.

Scitest Work Order:

SECOR International, Page 2

Sample No:	Sample Description	Sample Date	Sample Time	Matrix	Preservative	Container Material	Container Volume	Containers per Sample	Parameters
7	MW-5	3/5/97	a.m. p.m.	GW	HCl H_2SO_4		2 1L	40 ml 1	EPA 8015 (TPH) 8020
8	TAP	3/5/97	a.m. p.m.	DW	HCl H_2SO_4		40 ml 1L	2 1	EPA 8015 (TPH) EPA 8020
9	MW-5		a.m. p.m.						EPA 8020
10			a.m. p.m.						EPA 8020

5/7/97 @ 12:25

No Figures ?
in SI -

Russ Hamblin.

Will Fax ASAP