

MAR 16 1994

ENGINEERING • PLANNING • DEVELOPMENT • MANAGEMENT



R-13260P1
March 11, 1994

Mr. Paul Carpenter
Blue Flame Gas Company
Route 14
South Barre, VT 05670

SUBJECT: Site Investigations - Blue Flame Gas Site, Route 14, South Barre, VT (Site ID #93-1464)

Dear Mr. Carpenter:

We have completed the installation and sampling of the four groundwater monitoring wells installed at the Blue Flame Gas Company site located on Route 14 in South Barre, Vermont in accordance with the scope of service submitted to you on October 11, 1993 and subsequently modified to address the state review of the proposed work plan. The results are summarized below.

Project Background

An underground storage tank was removed from the site on September 15, 1993 by Lee's Oil Service, Inc. The site assessment was completed by representatives of DuFresne-Henry, Inc. and the report was filed with the state on September 16, 1993. In summary, the report indicated that there was evidence of contaminated soil within the top several feet of the excavation, a weathered gasoline odor was present, and HNU PID-101 readings up to 100 ppm were recorded during soil screening. No groundwater was encountered in the excavation. About 20 cubic yards of soil were excavated and stockpiled. No further excavation was completed because of the proximity of the adjoining property line. The excavation was filled with clean fill. Because of the levels of contamination present, the report recommended a petroleum sites investigation.

The tank was a 1250 gallon underground gasoline storage tank which only contained about 26 gallons of liquid when it was cleaned. The tank condition was fair to good and there was no evidence of tank perforations. According to the site owner, the tank had been out of service at least fifteen years.

On September 27, 1993 the Agency of Natural Resources (ANR) Hazardous Materials Management Division (HMMD) Sites Management Section (SMS) issued a letter which contained their recommended work plan for the site investigation. DuBois & King, Inc. was retained by Blue Flame Gas to provide the required services. A copy of the proposed scope of services was forwarded to the ANR-HMMD-SMS for review and approval.

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On November 16, 1994, the ANR-HMMD-SMS responded to the scope of service and requested that additional monitoring wells be installed at the site if groundwater contamination were detected. The required changes were incorporated into a revised work plan which was issued to the state on December 9, 1993. This work plan was formally approved by the ANR-HMMD-SMS on December 28, 1993.

On February 7, through February 11, 1994, four groundwater monitoring wells were installed by Green Mountain Boring Company, Inc. on the site in accordance with the approved work plan. On February 17, 1994 the wells were surveyed in for horizontal and vertical control, and on February 18, 1994, the groundwater monitoring wells were sampled and water elevations measured. This report transmits the results of the field investigations and laboratory analysis.

Groundwater Monitoring Well Installation

Four groundwater monitoring wells were installed using hollow stem auger boring methods. Split spoon samples were collected every five feet and screened using the HNU PID-101 with a 10.2 ev. lamp. The results of the borehole soil screening are summarized in Table 1. The sample which had the highest HNU reading in the borehole was placed in a VOC vial and sent to the lab for analysis. The split spoon sample was washed and decontaminated between samples. The auger sections were not washed since the wells were drilled from the lowest expected zones of contamination towards the hottest zones, since contamination detected in the earlier holes was insignificant, and since the augers were to be aired out at the site overnight to disperse any volatile compounds which may have come in contact with them.

Groundwater monitoring well MW-3 was installed on February 7, 1994 to a depth of forty feet. The well was intended to be a downgradient monitoring well at the furthest property line to detect contaminant migration and to provide an estimation of groundwater flow gradient. Water was first encountered at around 35 feet. The soils consisted of fine to coarse sand deposits with some gravel layers and cobbles mixed in.

Groundwater monitoring well MW-2 was installed on February 9, 1994 to a depth of forty feet. The well was intended to be a downgradient monitoring well located just to the north of the former underground storage tank location to provide an indication of the horizontal extent of any subsurface contamination. Water was first encountered at around 35 feet. The soils consisted of fine to medium sand deposits with some gravel layers and cobbles mixed in. There were also a few zones of finer sands and silts.

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Groundwater monitoring well MW-4 was installed on February 10, 1994 to a depth of forty feet. The well was intended to be a downgradient monitoring well located just to the west of the former underground storage tank location to provide an indication of the horizontal extent of any subsurface contamination, and to make a judgement as to whether the former UST location was impacting water quality moving off-site. Water was first encountered at around 35 feet. The soils consisted of fine to medium sand deposits with some gravel layers and cobbles mixed in. There were also a few zones of finer sands and silts.

Groundwater monitoring well MW-4 was installed on February 11, 1994 to a depth of forty feet using a hollow stem auger. The well was intended to be a downgradient monitoring well located just to the west of the former underground storage tank location to provide an indication of the horizontal extent of any subsurface contamination, and to make a judgement as to whether the former UST location was impacting water quality moving off-site. Water was first encountered at around 35 feet. The soils consisted of fine to medium sand deposits with some gravel layers and cobbles mixed in. There were also a few zones of finer sands and silts.

Table 1
Borehole Soil Screening Results

Depth of sample (feet)	MW-1 (ppm)	MW-2 (ppm)	MW-3 (ppm)	MW-4 (ppm)
5 to 7	118	3	30 Note 4	1
10 to 12	Note 1	3 Note 2	1 Note 2	0.3
15 to 17	600 Note 2	1	0.2	2.1 Note 2
20 to 22	70	Note 3	0.2	1.8
25 to 27	38	1.2	0.2	1.2
30 to 32	12	Note 3	0.2	Note 3
35 to 37	4	0.8	0.2	Note 3

- Note 1: HNU malfunctioned due to cold. Moved inside and recalibrated.
- Note 2: Soil Sample collected and sent to laboratory for analysis.
- Note 3: Unable to recover sample due to hard-packed, cobbly soils.
- Note 4: Sample contaminated due to WD-40 sprayed on split spoon at assembly.



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Groundwater Flow Characteristics

The groundwater elevations were measured in each of the wells during sampling. There were some inconsistencies noted which will be confirmed during the next round of sampling. In general, however, the groundwater flow direction appears to be generally westward with an average gradient of 0.2 feet/100 feet. Because of the narrowness of the site, the groundwater monitoring wells were installed to provide downgradient contaminant migration detection, and not to necessarily facilitate the development of a site groundwater contour map. The measurements are consistent with the general topography of the site (i.e. higher ridges located to the east of the site, and the Stevens Branch lying roughly 300 feet to the west of the site).

Laboratory Soils Sampling and Analysis

Four soil samples, one from each of the groundwater monitoring well boring locations were collected and analyzed in the laboratory using EPA Method 8020. Only the sample at the former location of the UST showed significant contamination (30,500 ppm of Xylenes). Other BTEX components may have been present in this sample but the detection limits were much higher (500 ppb) for this method than usual due to the sample dilutions necessary to quantify the major peak. The laboratory technicians also noted later eluting peaks that appeared to be in a fuel oil type pattern. None of the other samples had detectable contamination. The laboratory result sheets for the samples are included at the end of this report.

The presence of xylenes in a higher concentration could be expected since the site has been out of use for over fifteen years. The other BTEX components typically have a higher volatility (leading to evaporation and air dispersion) and a higher solubility (leading to dissolution into the groundwater and transport away from the soil contamination location).

Laboratory Groundwater Sampling and Analysis

Monitoring well MW-1 (in the location of the former UST) showed a groundwater concentration of xylenes at 8 ppb. This is consistent with the type of residual soil contamination present at this location. MW-4 (located immediately downgradient of the UST location) showed low levels of Benzene (2 ppm), Toluene (3 ppm), Ethylbenzene (3 ppm) and Xylenes (9 ppm). The other two downgradient monitoring wells were clean. The detected levels are below the groundwater quality standards. The laboratory result sheets for the samples are included at the end of this report.

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Identification of Sensitive Receptors

The general migration of the contamination appears to be limited to the dissolved components in the groundwater table. This transport pathway favors a generally westward or northwestward migration towards the Stevens Branch which is assumed to be the local discharge point for the groundwater table in this area. The depth of the zone of significant soil contamination appears to be limited to about ten to 15 feet below the surface at the immediate location of the former UST. There is evidence of a decreasing gradient of concentration from this depth to the groundwater table (located about 30 to 35 feet below grade). There are several tighter soil lenses which were encountered during boring which may be slowing the downward migration of the BTEX components. The net result of the limited zone of soil contamination, the substantial depth of soil between this zone and the groundwater table, and the age of the release (greater than fifteen years ago) have contributed to lower levels of dissolved contamination migrating off site.

The basement air space of the immediately adjacent residence was screened with the HNU PID-101 and no readings above background were detected. No further basement screening was completed since the result on the nearest structure that could be impacted was negative.

Private drinking water wells, surface waters, and public drinking water sources were identified and mapped on the USGS map which is attached to this report. The route 14 corridor is serviced by municipal drinking water from Barre and therefore there are no private wells located immediately downgradient of the site. The majority of the wells and the four identified public water supplies are located upgradient of the site (to the east/southeast/northeast) or appear to be hydraulically separated by the Stevens Branch river to the west. The measured levels of contamination at the site indicate that there is little or no expected impact on the Stevens Branch or other adjacent water courses.

During the installation of the MW-1 at the former UST location, a strong odor was noted around the drill rig. The borehole showed increased HNU readings, but readings taken in the breathing zone were less than 5 ppm. It appears that the zone of soil contamination is at or near where the base of the tank used to be, and it is unlikely that the levels of contamination noted at the site pose a significant hazard to on-site employees or visitors due to casual contact.

Conclusions

We have drawn the following conclusions from the data available in the state files and the recently collected field and laboratory data:

1. There is a zone of residual soil contamination present at the former UST location. This zone appears to extend from about 5 to 15 feet below grade and corresponds roughly to where the expected buried tank would have been placed.

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2. The gasoline contamination at the UST location is old. This is confirmed by the "weathered" smell noted during the tank removal process, and the presence of predominantly xylenes at the soil contamination zone. From this data it is reasonable to conclude that much of the previous release has volatilized or migrated slowly through the base soils.
3. The former UST location has impacted the groundwater quality migrating off site onto the adjacent residential property. At the present time this impact is below those allowed in the drinking water quality standards, and therefore remedial action is warranted.
4. The ultimate receptor of migrating contamination appears to be the Stevens Branch (located about 300 feet west of the site). However, the furthestmost monitoring well does not have any contamination present in it and this would indicate that the former releases of gasoline may not have been significant, and may have been localized at the immediate tank area.
5. There are no sensitive receptors (private or public drinking water sources, other surface waters, or residential dwelling spaces) that can be impacted, or have been impacted by the site.
6. The likelihood of personnel contact or exposure to contamination at the former UST location is minimal unless further excavation of the site takes place.

Recommendations

Based on the findings of fact and the conclusions drawn above, DuBois & King, Inc. has the following recommendations relative to this site:

1. We do not recommend any site remediation. The residual soil contamination is minimal and appears to be attenuated over time by natural volatilization and dissolution into the groundwater at levels which do not exceed acceptable standards.
2. We recommend two further rounds of groundwater monitoring. One round should be completed in April 1994 and a second round in October 1994. These rounds will allow further historic information regarding the levels of contamination to be collected and a final judgement to be made regarding future site status.
3. We recommend that the contaminated soils stockpile be screened in April 1994 in order to allow a work plan for any treatment and/or disposal to be prepared. This could not be completed as part of the current work effort since the stockpile was covered by snow and ice and could not be sampled without affecting the integrity of the polyencapsulation.

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Limitations

The opinions expressed in this report are based on the site conditions and the data obtained by DuBois & King, Inc. on the dates noted in this report, and on the information available publicly in the ANR-HMMD-SMS files for the site. Furthermore, the field data is valid only at the depths and locations indicated; they are not intended to be a guarantee that these conditions and data will not change in the future, or that they will not change at different depths and locations. Should additional information become available of a relevant public health or environmental nature, or if conditions change, DuBois & King, Inc. would request to review this data, reserving the right to re-evaluate or amend any opinions made in this report.

We appreciate the opportunity to be of service to Blue Flame Gas Company in their site evaluation and monitoring programs. We would appreciate your review and comment on this report. If it is acceptable, please contact us so that we can forward an additional copy to the state for their review and information. If you have any questions, please feel free to contact myself or Valerie Giguere.

Very truly yours,

DuBOIS & KING, INC.

Russell W. Rohloff, P.E.
Project Manager

Attachments



Green Mountain Boring Co., Inc.

R. D. 2 - BARRE, VERMONT 05641

SHEET 1 OF 4
 DATE 2/07/94
 HOLE NO. MW-3
 LINE & STA. _____
 OFFSET None

TO DuBois and King ADDRESS Randolph, VT
 PROJECT NAME Blue Flame Gas LOCATION So. Barre, VT
 REPORT SENT TO DuBois and King Inc. PROJ. NO. _____
 SAMPLES SENT TO DuBois and King Inc. OUR JOB NO. 94-14

GROUND WATER OBSERVATIONS At <u>35'</u> at <u>0</u> Hours At _____ at _____ Hours	CASING SAMPLER CORE BAR. Type <u>AUGERS SPLIT SPOON</u> Size I. D. <u>4.25" 1 1/8"</u> Hammer Wt. <u>140#</u> Hammer Fall <u>30"</u>	SURFACE ELEV. _____ DATE STARTED <u>2/07/94</u> DATE COMPL. <u>2/07/94</u> BORING FOREMAN <u>R. Finkle</u> INSPECTOR _____ SOILS ENGR. <u>V. Giguere</u>
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LOCATION OF BORING: As shown on map

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From	To					No.	Pen	Rec.
				0-6	6-12	12-18						
		<u>5' - 7'</u>	<u>Dry</u>	<u>17</u>	<u>14</u>	<u>14</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>1</u>	<u>24"</u>	<u>18"</u>	
		<u>10' - 12'</u>	<u>Dry</u>	<u>8</u>	<u>10</u>	<u>13</u>	<u>Dry</u>	<u>Fine/medium sand</u>	<u>2</u>	<u>24"</u>	<u>19"</u>	
		<u>15' - 17'</u>	<u>Dry</u>	<u>8</u>	<u>13</u>	<u>32</u>	<u>Dry</u>	<u>Fine/medium sand to fine/coarse sand with stones</u>	<u>3</u>	<u>24"</u>	<u>20"</u>	
		<u>20' - 22'</u>	<u>Dry</u>	<u>12</u>	<u>20</u>	<u>21</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>4</u>	<u>24"</u>	<u>18"</u>	
		<u>25' - 27'</u>	<u>Dry</u>	<u>33</u>	<u>32</u>	<u>21</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>5</u>	<u>24"</u>	<u>17"</u>	
		<u>30' - 32'</u>	<u>Dry</u>	<u>20</u>	<u>22</u>	<u>24</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>6</u>	<u>24"</u>	<u>18"</u>	
		<u>35' - 37'</u>	<u>Dry</u>	<u>24</u>	<u>34</u>	<u>34</u>	<u>Wet</u>	<u>Fine/coarse sand with stones</u>	<u>7</u>	<u>24"</u>	<u>16"</u>	
Drilled to 40' with augers - Set well at 38'												
Materials Used: 10' X 2" X .010 Screen 28' X 2" riser 1 bottom cone cap 1 top locking wing cap 4 bags sand 1 bag bentonite chips 1 bag portland cement 4' X 10" sona tube 1-5' X 4.5" steel casing 1-8" Morris Industries 8" X 12" Skirt manhole cover 1 dolphin lock												

GROUND SURFACE TO <u>40'</u> Sample Type D = Dry C = Cored W = Washed UP = Undisturbed Piston TP = Test Pit A = Auger V = Vane Test UT = Undisturbed Thinwall	USED <u>4.25"</u> AUGERS: THEN <u>Installed well</u> 140 lb. Wt. x 30" fall an 2" O. D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50 + Very Dense	Cohesive Consistency 0-4 Soft 30 + Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff	SUMMARY: Earth Boring <u>40'</u> Rock Coring Samples <u>7</u> HOLE NO. <u>MW-3</u>
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Green Mountain Boring Co., Inc.

R. D. 2 - BARRE, VERMONT 05641

SHEET 2 OF 4
 DATE 2/09/94 OF MW-2
 HOLE NO. _____
 LINE & STA. _____
 OFFSET None

TO DuBois and King ADDRESS Randolph, VT
 PROJECT NAME Blue Flame Gas LOCATION So. Barre, VT
 REPORT SENT TO DuBois and King Inc. PROJ. NO. _____
 SAMPLES SENT TO DuBois and King Inc. OUR JOB NO. 94-14

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	SURFACE ELEV.		
AI <u>35'</u>	at <u>0</u>	Hours	Type AUGERS	SPLIT SPOON	.....	DATE STARTED	<u>2/09/94</u>	
AI	at	Hours	Size I. D. <u>4.25"</u>	<u>1 3/8"</u>	.....	DATE COMPL.	<u>2/09/94</u>	
			Hammer Wt.	<u>140#</u>	.....	BORING FOREMAN	<u>R. Finkle</u>	
			Hammer Fall	<u>30"</u>	.....	INSPECTOR	<u>V. Giguere</u>	
						SOILS ENGR.	<u>V. Giguere</u>	

LOCATION OF BORING: As shown on map

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen	Rec.
		<u>5' - 7'</u>	<u>Dry</u>	<u>9</u>	<u>9</u>	<u>9</u>	<u>Dry</u>		<u>Fine/medium sand with stones</u>	<u>1</u>	<u>24"</u>	<u>17"</u>
		<u>10' - 12'</u>	<u>Dry</u>	<u>8</u>	<u>10</u>	<u>14</u>	<u>Dry</u>		<u>Fine/medium sand with stones</u>	<u>2</u>	<u>24"</u>	<u>15"</u>
		<u>15' - 17'</u>	<u>Dry</u>	<u>16</u>	<u>23</u>	<u>33</u>	<u>Dry</u>		<u>Fine silty sand to fine/medium sand with stones</u>	<u>3</u>	<u>24"</u>	<u>19"</u>
		<u>20' - 22'</u>	<u>Dry</u>	<u>100/2"</u>					<u>(No recovery)</u>			
		<u>25' - 27'</u>	<u>Dry</u>	<u>100/4"</u>			<u>Dry</u>		<u>Silty sand with stones</u>	<u>4</u>	<u>4"</u>	<u>4"</u>
		<u>30' - 32'</u>	<u>Dry</u>	<u>100/1"</u>					<u>(No recovery)</u>			
		<u>35' - 37'</u>	<u>Dry</u>	<u>21</u>	<u>28</u>	<u>33</u>	<u>Wet</u>		<u>Fine/coarse sand with stones</u>	<u>5</u>	<u>24"</u>	<u>10"</u>
									<u>Drilled to 40' with augers - Installed well</u>			
									<u>Materials Used:</u>			
									<u>70' X 2" X .070 Screen</u>			
									<u>30' X 2" riser</u>			
									<u>1 bottom cone cap</u>			
									<u>1 top locking wing cap</u>			
									<u>3 bags sand</u>			
									<u>3/4 bag bentonite</u>			
									<u>1 bag portland cement</u>			
									<u>1=5' X 4.5" steel casing</u>			
									<u>4' X 10" sona tube</u>			
									<u>1 #80 manhole</u>			
									<u>1 dolphin lock</u>			

GROUND SURFACE TO <u>40'</u>		USED <u>4.25"</u> AUGERS: THEN <u>Installed well</u>	SUMMARY:	
Sample Type	Proportions Used	Cohesionless Density	Cohesive Consistency	Earth Boring <u>40'</u>
D = Dry C = Cored W = Washed	trace 0 to 10%	0-10 Loose	0-4 Soft 30 + Hard	Rock Coring
UP = Undisturbed Piston	little 10 to 20%	10-30 Med. Dense	4-8 M/Stiff	Samples <u>5</u>
TP = Test Pit A = Auger V = Vane Test	some 20 to 35%	30-50 Dense	8-15 Stiff	
UT = Undisturbed Thinwall	and 35 to 50%	50 + Very Dense	15-30 V-Stiff	
				HOLE NO. <u>MW-2</u>

Green Mountain Boring Co., Inc.

R. D. 2 - BARRE, VERMONT 05641

SHEET 3 OF 4
 DATE 2/10/94 MW-4
 HOLE NO.
 LINE & STA.
 OFFSET None

TO DuBois and King ADDRESS Randolph, VT
 PROJECT NAME Blue Flame Gas LOCATION So. Barre, VT
 REPORT SENT TO DuBois and King Inc. PROJ. NO.
 SAMPLES SENT TO DuBois and King Inc. OUR JOB NO. 94-14

GROUND WATER OBSERVATIONS At <u>35'</u> at <u>24</u> Hours At at Hours	CASING SAMPLER CORE BAR. Type <u>AUGERS SPLIT SPOON</u> Size I. D. <u>4.25" 1 3/8"</u> Hammer Wt. <u>140#</u> Hammer Fall <u>30"</u>	SURFACE ELEV. <u>2/10/94</u> DATE STARTED <u>2/10/94</u> DATE COMPL. BORING FOREMAN <u>R. Finkle</u> INSPECTOR SOILS ENGR. <u>V. Giguere</u>
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LOCATION OF BORING: As shown on map

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				0-6	6-12	12-18				No.	Pen	Rec.
		<u>5' - 7'</u>	<u>Dry</u>	<u>2</u>	<u>2</u>	<u>3</u>	<u>Dry</u>	<u>Fine/medium sand</u>	<u>1</u>	<u>24"</u>	<u>15"</u>	
		<u>10' - 12'</u>	<u>Dry</u>	<u>3</u>	<u>5</u>	<u>5</u>	<u>Dry</u>	<u>Fine/medium sand</u>	<u>2</u>	<u>24"</u>	<u>18"</u>	
		<u>15' - 17'</u>	<u>Dry</u>	<u>12</u>	<u>20</u>	<u>25</u>	<u>Dry</u>	<u>Fine/medium sand with stones</u>	<u>3</u>	<u>24"</u>	<u>20"</u>	
		<u>20' - 22'</u>	<u>Dry</u>	<u>20</u>	<u>25</u>	<u>28</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>4</u>	<u>24"</u>	<u>18"</u>	
		<u>25' - 27'</u>	<u>Dry</u>	<u>33</u>	<u>53</u>	<u>41</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>5</u>	<u>24"</u>	<u>20"</u>	
		<u>30' - 32'</u>	<u>Dry</u>	<u>28</u>	<u>48</u>	<u>73</u>	<u>Dry</u>	<u>Silty sand with stones</u>	<u>6</u>	<u>24"</u>	<u>19"</u>	
Drilled to 40' with augers - Installed well Materials Used: 10' X 2" X .010 screen 29'6" X 2" riser 1 bottom cone cap 1 top wing locking cap 4 1/2 bags sand 3/4 bag bentonite 4' X 10" song tube 1-5' X 4.5" steel casing 1 bag portland cement 1 #80 manhole 1 dolphin lock												

GROUND SURFACE TO <u>40'</u>	USED <u>4.25" AUGERS:</u> THEN <u>Installed well</u>	140 lb. Wt. x 30" fall an 2" O. D. Sampler Cohesionless Density 0-10 Loose 10-30 Med. Dense 30-50 Dense 50 + Very Dense
Sample Type D=Dry C=Cored W=Washed UP=Undisturbed Piston TP=Test Pit A=Auger V=Vane Test UT=Undisturbed Thinwall	Proportions Used trace 0 to 10% little 10 to 20% some 20 to 35% and 35 to 50%	Cohesive Consistency 0-4 Soft 30 + Hard 4-8 M/Stiff 8-15 Stiff 15-30 V-Stiff
		SUMMARY: Earth Boring <u>40'</u> Rock Coring Samples <u>6</u>
		HOLE NO. <u>MW-4</u>

Green Mountain Boring Co., Inc.

R. D. 2 - BARRE, VERMONT 05641

SHEET 4 OF 4
 DATE 2/11/94
 HOLE NO. MW-1
 LINE & STA. _____
 OFFSET None

TO DuBois and King ADDRESS Randolph, VT
 PROJECT NAME Blue Flame Gas LOCATION So. Barre, VT
 REPORT SENT TO DuBois and King Inc. PROJ. NO. _____
 SAMPLES SENT TO DuBois and King Inc. OUR JOB NO. 94-14

GROUND WATER OBSERVATIONS			CASING	SAMPLER	CORE BAR.	SURFACE ELEV.		
A1	<u>35'</u>	at <u>0</u> Hours	Type	AUGERS	SPLIT SPOON	DATE STARTED	<u>2/11/94</u>	
			Size I. D.	<u>4.25"</u>	<u>1 3/8"</u>	DATE COMPL.	<u>2/11/94</u>	
			Hammer Wt.		<u>140#</u>	BORING FOREMAN	<u>R. Finkle</u>	
A1		at _____ Hours	Hammer Fall		<u>30"</u>	INSPECTOR	_____	
						SOILS ENGR.	<u>V. Giguere</u>	

LOCATION OF BORING: As shown on map

DEPTH	Casing Blows per foot	Sample Depths From - To	Type of Sample	Blows per 6" on Sampler			Moisture Density or Consist.	Strata Change Elev.	SOIL IDENTIFICATION Remarks include color, gradation, Type of soil etc. Rock-color, type, condition, hardness, Drilling time, seams and etc.	SAMPLE		
				From	To					No.	Pen	Rec.
				0-6	6-12	12-18						
		<u>5'-7'</u>	<u>Dry</u>	<u>3</u>	<u>2</u>	<u>2</u>	<u>Dry</u>	<u>Fine/coarse sand</u>	<u>1</u>	<u>24"</u>	<u>17"</u>	
		<u>10'-12'</u>	<u>Dry</u>	<u>21</u>	<u>12</u>	<u>11</u>	<u>Dry</u>	<u>Silty sand with stones</u>	<u>2</u>	<u>24"</u>	<u>14"</u>	
		<u>15'-17'</u>	<u>Dry</u>	<u>100</u>				<u>Silty sand with stones</u>	<u>3</u>	<u>6"</u>	<u>3"</u>	
		<u>20'-22'</u>	<u>Dry</u>	<u>37</u>	<u>21</u>	<u>18</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>4</u>	<u>24"</u>	<u>15"</u>	
		<u>25'-27'</u>	<u>Dry</u>	<u>17</u>	<u>20</u>	<u>30</u>	<u>Dry</u>	<u>Fine/coarse sand with stones</u>	<u>5</u>	<u>24"</u>	<u>18"</u>	
		<u>30'-32'</u>	<u>Dry</u>	<u>11</u>	<u>18</u>	<u>21</u>	<u>Dry</u>	<u>Fine/medium sand</u>	<u>6</u>	<u>24"</u>	<u>20"</u>	
		<u>35'-37'</u>	<u>Dry</u>	<u>10</u>	<u>13</u>	<u>14</u>	<u>Wet</u>	<u>Fine/coarse sand</u>	<u>7</u>	<u>24"</u>	<u>19"</u>	
								<u>Drilled to 40' with augers</u>				
								<u>Drilled to 40' with augers - Installed well</u>				
								<u>Materials Used:</u>				
								<u>10' X 2" X .010 screen</u>				
								<u>29'6" X 2" Riser</u>				
								<u>1 bottom slip cap</u>				
								<u>1 top locking wing cap</u>				
								<u>7 bags sand</u>				
								<u>3/4 bag bentonite</u>				
								<u>3' X 10" sona tube</u>				
								<u>1-5' X 4.5" steel casing</u>				
								<u>1 bag portland cement</u>				
								<u>1 #80 manhole</u>				
								<u>1 dolphin lock</u>				

GROUND SURFACE TO <u>40'</u>	USED <u>4.25"</u> AUGERS:	THEN <u>Installed well</u>	SUMMARY:
Sample Type	Proportions Used	140 lb. Wt. x 30" fall an 2" O. D. Sampler	Earth Boring <u>40'</u>
D=Dry C=Cored W=Washed	trace 0 to 10%	Cohesionless Density	Rock Coring
UP=Undisturbed Piston	little 10 to 20%	0-10 Loose	Samples <u>7</u>
TP=Test Pit A=Auger V=Vane Test	some 20 to 35%	10-30 Med. Dense	
UT=Undisturbed Thinwall	and 35 to 50%	30-50 Dense	
		50+ Very Dense	
		Cohesive Consistency	
		0-4 Soft 30+ Hard	
		4-8 M/Stiff	
		8-15 Stiff	
		15-30 V-Stiff	
			HOLE NO. <u>MW-1</u>



P.O. Box 339
 Randolph, Vermont 05060-0339
 (802) 728-6313

LABORATORY REPORT

CLIENT: DuBois and King
 ADDRESS: P.O. Box 339
 Randolph, Vermont 05060
 SITE: Blue Flame Gas Co., Barre, Vermont
 ATTENTION: ~~Valerie Giguere~~

soils

LABORATORY NO: 4-0223
 PROJECT NO: 80439
 DATE OF SAMPLE: 2/7-10/94
 DATE OF RECEIPT: 2/14/94
 DATE OF ANALYSIS: 2/14-15/94
 DATE OF REPORT: 2/28/94

Results

Results expressed in micrograms per kilogram, (ug/kg) as dry weight.

PARAMETER	MW-1	MW-2	MW-3	MW-4
Methyl Tertiary Butyl Ether	<500	BPQL	BPQL	BPQL
Benzene	<500	BPQL	BPQL	BPQL
Toluene	<500	BPQL	BPQL	BPQL
Ethylbenzene	<500	BPQL	BPQL	BPQL
Total Xylenes	30500	BPQL	BPQL	BPQL
BTEX	30500	BPQL	BPQL	BPQL
Chlorobenzene	<500	BPQL	BPQL	BPQL
1,2-Dichlorobenzene	<500	BPQL	BPQL	BPQL
1,3-Dichlorobenzene	<500	BPQL	BPQL	BPQL
1,4-Dichlorobenzene	<500	BPQL	BPQL	BPQL
Surrogate Percent Recovery	107%	88%	89%	91%

EPA Method 8020.

BPQL = Below Practical Quantitation Limit; 1 ppb.

Note: Many late eluting peaks in a Fuel Oil pattern were found in MW-1.

Respectfully submitted,

SCITEST, INC

Roderick J. Lamothe
 Roderick J. Lamothe
 Laboratory Director



P.O. Box 339
Randolph, Vermont 05060-0339
(802) 728-6313

LABORATORY REPORT

CLIENT: Dubois & King
ADDRESS: P.O. Box 339
Randolph, VT 05060

LABORATORY NO: 4-0271
PROJECT NO: 80439
DATE OF SAMPLE: 2/18/94
DATE OF RECEIPT: 2/18/94
DATE OF REPORT: 2/28/94

SITE: Blue Flame Gas Co., Barre, Vermont
ATTN: ~~Valerie Giguere~~

water

RESULTS

(Expressed in micrograms per liter (ug/L))

PARAMETER	MW-1	MW-2	MW-3	MW-4	Trip Blank
Methyl Tertiary Butyl Ether	BPQL	BPQL	BPQL	BPQL	BPQL
Benzene	BPQL	BPQL	BPQL	2	BPQL
Toluene	BPQL	BPQL	BPQL	3	BPQL
Ethylbenzene	BPQL	BPQL	BPQL	3	BPQL
Total Xylenes	8	BPQL	BPQL	9	BPQL
BTEX	8	BPQL	BPQL	17	BPQL
Chlorobenzene	BPQL	BPQL	BPQL	BPQL	BPQL
1,2-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	BPQL
1,3-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	BPQL
1,4-Dichlorobenzene	BPQL	BPQL	BPQL	BPQL	BPQL
Percent Surrogate Recovery	94%	97%	96%	96%	98%

EPA Method 8020.

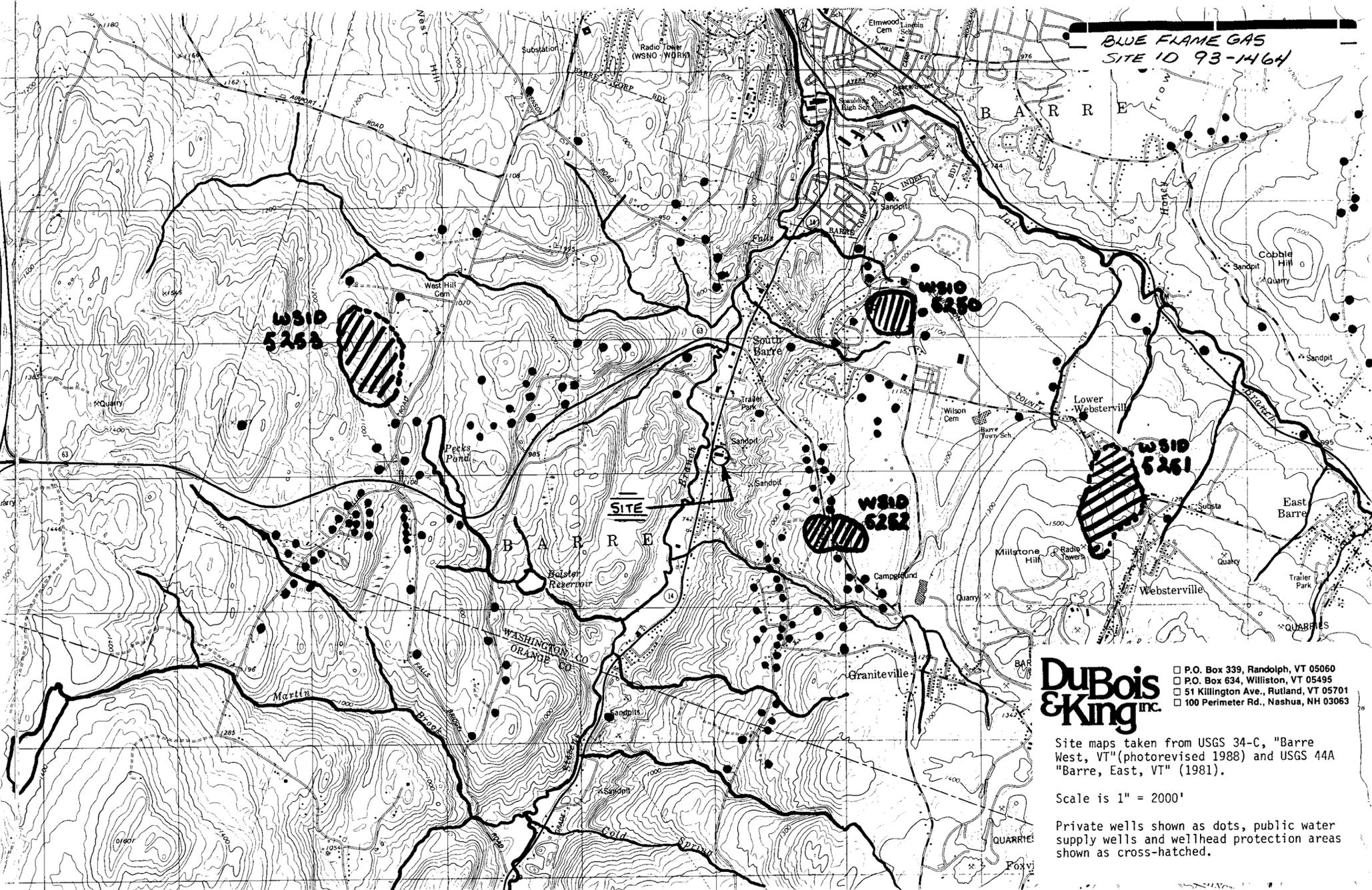
BPQL = Below Practical Quantitation Limit; 1 ppb.

Respectfully submitted,

SCITEST INC.

Roderick J. Lamothe
Roderick J. Lamothe
Laboratory Director

BLUE FLAME GAS
SITE ID 93-1464



DuBois & King Inc.

- P.O. Box 339, Randolph, VT 05060
- P.O. Box 634, Williston, VT 05495
- 51 Killington Ave., Rutland, VT 05701
- 100 Perimeter Rd., Nashua, NH 03063

Site maps taken from USGS 34-C, "Barre West, VT" (photorevised 1988) and USGS 44A "Barre, East, VT" (1981).

Scale is 1" = 2000'

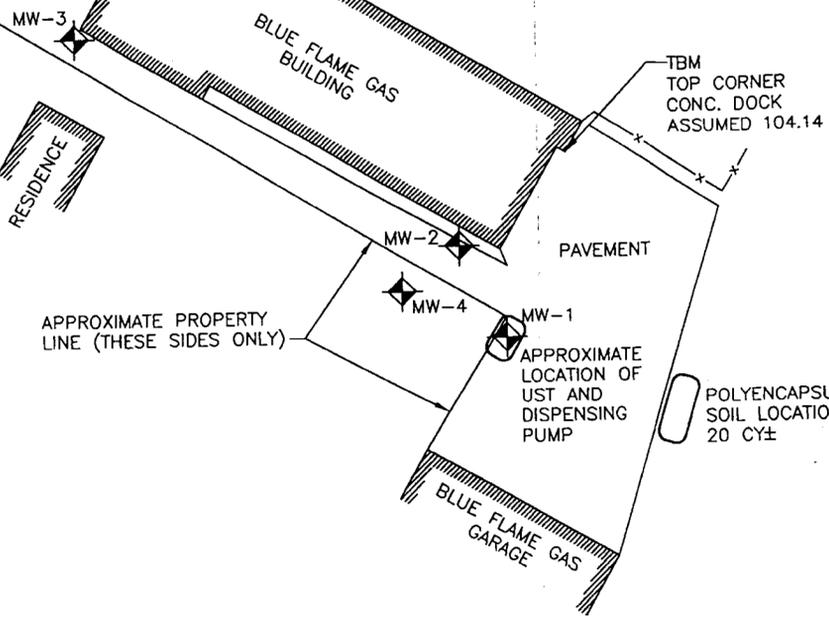
Private wells shown as dots, public water supply wells and wellhead protection areas shown as cross-hatched.

TO STEVENS
BRANCH 300±

COMMERCIAL PROPERTIES

ROUTE 14

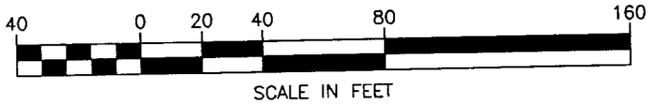
RESIDENCE AND
BARRE ANIMAL
HOSPITAL



GROUND WATER MONITORING WELL DATA

MW ID	TOP OF PVC CASING	SITE G.W. ELEVATION
MW-1	99.28	66.23 (?)
MW-2	99.20	66.50
MW-3	97.75	66.15
MW-4	100.52	66.42

WELLS INSTALLED BY GREEN MOUNTAIN BORING COMPANY, INC. FEBRUARY 7 TO 11, 1994
WATER ELEVATION DATA FROM 2/18/94



<p>engineering planning management development</p>	BLUEFLAME GAS BARRE, VERMONT	<table border="1"> <tr> <td>DRAWN BY</td> <td>DATE</td> </tr> <tr> <td>RWB</td> <td>MARCH 1994</td> </tr> <tr> <td>CHECKED BY</td> <td>PROJECT NO.</td> </tr> <tr> <td>RWR</td> <td>R13260P1</td> </tr> <tr> <td>PROJECT ENG.</td> <td>DRAWN BY</td> </tr> <tr> <td>VKG</td> <td>-</td> </tr> </table>	DRAWN BY	DATE	RWB	MARCH 1994	CHECKED BY	PROJECT NO.	RWR	R13260P1	PROJECT ENG.	DRAWN BY	VKG	-
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SITE PLAN	EXHIBIT 1													