Report of Quarterly Groundwater Monitoring Third Quarter 1997

ST ID 470 PE

Prepared for:
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Property No. 4826
Broadway Volkswagen

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QST Project No. 6595214

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This report has been prepared by QST Environmental Inc. for the exclusive use of CORE Resource, Inc., as it pertains to their site located at 2740 Broadway Avenue in Oakland, California. Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to professional advice in this report.

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ESE PROJECT NO. 6595214

1.0 Introduction

This report describes the events and presents the findings of system operation and groundwater monitoring for the period October through December 1997 conducted by QST Environmental Inc. (QST) at CORE Resource, Inc., Broadway Volkswagen, 2740 Broadway, Oakland. The purpose of this work was to conduct quarterly groundwater monitoring and to operate and maintain a dual-phase extraction and treatment system operating at the site. The following report presents the procedures and methods used during this monitoring event for groundwater monitoring, and the results and conclusions drawn from the monitoring during the months of October through December 1997.

1.1 Work Performed

To complete the objectives for this groundwater monitoring and system operation and maintenance, QST performed the following tasks:

- Collected water samples from the treatment system influent, midpoint and effluent;
- Analyzed treatment system samples for benzene, toluene, ethylbenzene and xylenes (BTEX), Methyl tert-Butyl Ether (MTBE) and total petroleum hydrocarbons as gasoline (TPH-G);
- Monitored system influent, midpoint and effluent concentrations with a photoionization detector (PID);
- Measured groundwater levels and collected groundwater samples from three monitoring wells;
- Analyzed the groundwater samples for BTEX, MTBE and TPH-G;
- Evaluated all field and analytical data and prepared a report of findings for all monitoring this period.

1.2 Site Description

The site is located on the southeast corner of the intersection of Broadway Avenue and 28th Street in Oakland, California (Figure 1) in a predominantly commercial area. The Broadway Volkswagen automobile dealership currently occupies the site and consists of a three-story steel-reinforced concrete building, multiple service bays and a showroom (Figure 2). Numerous automobile dealerships and maintenance shops are in operation in the immediate area. Numerous underground service utilities are present within the right-of-way of 28th Street immediately adjacent to the site.

The site is at an approximate elevation of approximately 30 feet above mean sea level (amsl) in an area of moderately sloping topography (U.S.G.S., 1980).

1.3 Geology/Hydrogeology

The site is situated on an alluviated highland portion of Oakland and is topographically characterized by a gentle southeasterly slope toward Lake Merritt which lies approximately 2,000 feet south of the site. Soil borings drilled to depths of approximately 30 feet below ground surface indicated that the subsurface consists of clay, silty clay, sandy clay, silt, sandy silt, and sand. A predominant sand layer, approximately two feet thick is present beneath the site at approximately 11 to 17 feet below ground surface and is sloping in a general northwesterly direction.

Regional groundwater appears to flow in a predominantly southeasterly direction. Local groundwater flow under the site appears to deviate from the regional groundwater flow in a more northeasterly direction. Confined groundwater beneath the site has been observed at depths of 11 to 17 feet below ground surface with observed elevations between 16 to 23 feet amsl. Recent measurements of groundwater elevations are shown in Table 1.

1.4 Project Background

During August 1988, two underground storage tanks (USTs), one 500-gallon waste oil UST and one 3,000-gallon gasoline UST, were removed from an area at the northeast side of the site along 28th Street (Figure 2). Soil samples collected during the removal of these

(from 3 sites within this parcel)

28th, Broadway + 27th

USTs were reported to contain detectable concentrations of TPH-g and BTEX (SEMCO, 1989). Soil samples collected from soil borings SB-3 and SB-4, drilled subsequent to the tank removal also contained detectable concentrations of TPH-g and BTEX (ESE, 1991a).

Boring logs for four additional groundwater monitoring wells (MW-1, MW-3, MW-4, MW-5, and MW-6) installed by QST at the site indicate the presence of clay sediments with perched, moist to wet sand beds at depths ranging between 11 to 17 feet below grade (ESE, 1991a; ESE, 1991b). QST installed wells MW-1 and MW-3 to a depth of approximately 20 feet below grade and screened both over the lithological interval containing the perched sand beds and initial groundwater level. QST identified one two-foot thick perched sand bed in wells MW-5 and MW-6 at depths of 17 and 11 feet, respectively (ESE, 1991b). The sand bed was observed to have an apparent dip toward the west. Clay sediments above and immediately below the sand beds were observed to be dry.

Soil samples collected from the sand beds in borings MW-5 and MW-6 were noted to have a fuel odor and detectable volatile organic compound (VOC) concentrations as determined using a PID. However, QST did not observe a fuel odor or detect VOCs with a PID in samples of clay collected above and below the sand bed in these borings. No detectable concentrations of halogenated VOCs (HVOCs) have been reported to occur in soil samples collected from the sand and clay sediments at the site.

The analytical results of soil samples collected at this site indicate the petroleum hydrocarbon affected soil beneath the site is limited to the immediate area surrounding the former UST locations.

A sandy clay aquifer was intersected beneath the clay unit containing the perched sand beds at a depth of approximately 22 to 23 feet below grade in wells MW-4, MW-5, and MW-6. Monitoring well MW-4 was installed to a depth of 25 feet below grade and wells MW-5 and MW-6 were installed to a depth of 20 feet below grade. Water levels in these wells were observed to rise approximately 12 to 14 feet when the sandy clay aquifer was penetrated suggesting some confining pressures. These three wells were screened over the interval containing the sandy clay aquifer as well as the perched sand beds.

Detectable concentrations of TPH-G, BTEX, and HVOCs including trichloroethylene (TCE), tetrachloroethylene (PCE), and 1,2-Dichloroethane (DCA) have been reported to occur in some groundwater samples collected from various site wells since May 13, 1991 (ESE, 1991a; ESE, 1991b; ESE, 1992; ESE, 1993). Historically, the highest concentrations of TPH-G and BTEX have been reported to occur in groundwater samples collected from well MW-4, located west and hydraulically downgradient of the former UST area. Well MW-2 is selectively screened to recharge with water from the perched sand beds. The highest concentrations of HVOCs have been reported to occur in groundwater samples collected from wells screened into the deeper, semi-confined aquifer (MW-4, MW-5, and MW-6). Contours of TCE concentration in groundwater indicate an offsite source of TCE located to the north of the UST area. QST concluded that groundwater in the semi-confined aquifer containing TCE was crossing and impacting the upper perched sand beds at the site by upwardly migrating through the monitoring wells completed in the shallower sand beds (ESE, 1993).

Background research by QST (ESE, 1991a) indicates that several sites surrounding the CORE property handled petroleum hydrocarbons and solvents containing HVOCs. In addition, numerous unauthorized releases at other properties have been documented by the ACHCSA and the RWQCB - San Francisco Bay Region (ESE, 1991a).

Wells MW-1, MW-3 and MW-5 were abandoned in March 1994. The ACHCSA recommended that one additional well be installed further west of MW-3 to try and define the TPH-G plume in the downgradient direction (ACHCSA, 1993). Well MW-7 was installed for this purpose (ESE 1994).

QST performed a soil vapor extraction test in 1994 and aquifer testing in 1995 to determine feasibility for a remediation system. The results of these tests were reported in the Remedial Action Plan (RAP) dated August 25, 1995 (ESE 1995). The RAP was approved by the ACHCSA in September 1995. A dual phase extraction and treatment system was constructed in late 1995 and early 1996. The vapor phase of the system was put into operation in February 1996 and the groundwater phase in April 1996.

2.0 Quarterly Groundwater Monitoring Activities

2.1 Groundwater Monitoring Procedures

2.1.1 Groundwater Level Measurements

QST measured the depth to groundwater in MW-1, MW-3 and MW-7 during the fourth quarter with respect to the surveyed elevation datum at the top of each well casing. The water level measurements were collected using an electronic water level sounder on October 7, 1997.

2.1.2 Groundwater Monitoring Well Sampling

On October 7, 1997 QST staff collected groundwater samples from MW-1, MW-3 and MW-7. Prior to collection of the groundwater samples, a minimum of three well-casing volumes of groundwater were purged from each well. During the well purging process the pH, conductivity, and temperature of the groundwater were periodically monitored for stabilization to ensure the collection of samples representative of the aquifer surrounding each well.

Groundwater samples were obtained from the wells by lowering a new disposable bailer into each well. The groundwater was then decanted from the bailers into laboratory supplied 40-milliliter glass vials containing hydrochloric acid (a preservative). Three vials were collected for each well. The sample vials were then sealed with a Teflon-lined cap, labeled, placed on ice in a cooler and transported under chain-of-custody to Curtis and Tompkins Laboratory in Berkeley, California.

2.2 Groundwater Monitoring and Sampling Results

2.2.1 Groundwater Levels and Flow

Depth to groundwater ranged from 10.38 feet below ground surface (bgs) in MW-1 to 11.82 ft bgs in MW-7. Depth to water measurements are summarized in Table 1.

2.2.2 Groundwater Monitoring Well Sampling

Samples were taken from MW-1, MW-3 and MW-7 and analyzed for TPH as gasoline by EPA Method 8015M and BTEX\MTBE by EPA Method 8020. Samples MW-1, MW-3 and MW-7 were all below detection limits for BTEX, MTBE and TPH-G. Benzene and TPH-g concentrations at each well are shown in Figure 3. These analytical results are presented in Appendix A and summarized in Table 2. The results indicate that groundwater hydrocarbon concentrations are being reduced following remediation system startup.

3.0 Treatment System Monitoring and Operation

3.1 Groundwater Extraction and Treatment

The groundwater extraction and treatment system was put into operation in April 1996, after receiving a permit to discharge from the East Bay Municipal Utility District (EBMUD). A 7-1/2 horsepower positive displacement blower extracts vapors from wells MW-3, VW-1, VW-2 and VW-3. Groundwater is extracted by becoming entrained in the air stream flowing from the vapor extraction wells. The entrained groundwater passes through the system piping into the moisture knockout pot. The water is pumped by a transfer pump to two 200-pound carbon vessels for treatment. The treated groundwater is discharged to the sanitary sewer.

In May 1997, the system was shutdown due to complications associated with the moisture knockout pot. On May 30,1997, EnviroSupply Service Inc. found float level switches inside the moisture knockout pot to be in the wrong position. The system was rewired, the float level position was corrected, and a test run was conducted. During June 1997, QST was unable to maintain system operations due to mechanical shutdowns. On July 22,1997, EnviroSupply Service Inc. determined that float level wiring in the moisture knockout pot had been repaired incorrectly. The switches were repaired and the system was restarted. Periodic readings were taken from the flow totalizer to determine the volume of water discharged to the sanitary sewer. These readings are presented in Table 3. As of October 7, 1997, 16,234 gallons have been discharged since system operation began.

Influent, midpoint and effluent samples have been collected periodically during system operation. The samples were collected from sample ports on the system into laboratory supplied 40-milliliter glass vials containing hydrochloric acid (a preservative). Four vials were collected for each sample location. The sample vials were then sealed with a Teflon-lined cap, labeled, placed on ice in a cooler and transported under chain-of-custody to Curtis and Tompkins Laboratory.

Influent, midpoint and effluent samples were sampled on August 19, 1997 and analyzed for TPH-g and BTEX\MTBE by EPA Methods 8015M and 8020, respectively. In the influent sample, MTBE was below detection limits, TPH-g was detected at a concentration of 4,300 μg/L, benzene at a concentration of 730 μg/L, toluene at a concentration of 870

μg/L, ethylbenzene at a concentration of 88 μg/L and xylenes at a concentration of 440 μg/L. All midpoint and effluent concentrations of MTBE, TPH-g and BTEX were below detection limits. Analytical results are included in Appendix A and summarized in Table 4.

3.2 Vapor Extraction and Treatment

The vapor phase extraction and treatment system was put into operation in February 1995 after receiving a permit from the Bay Area Air Quality Management District (BAAQMD). The extracted vapors are routed to two 1,000-pound vapor phase carbon vessels for treatment. Influent and effluent vapor samples were collected on July 23, 1997 and analyzed for TPH-g by EPA Method 8015M and BTEX by EPA Method 8020. All influent and effluent concentrations of TPH-g and BTEX were below detection limits. The influent, midpoint and effluent vapor concentrations were monitored regularly using a PID. PID measurements are summarized in Table 5.

4.0 Summary

- The vapor phase of the dual phase extraction and treatment system was put into operation in February 1996 and the groundwater phase in April 1996.

- Influent and effluent vapor samples were collected on July 23, 1997 and analyzed for TPH-g by EPA Method 8015M and BTEX by EPA Method 8020. All influent and effluent concentrations of TPH-g and BTEX were below detection limits.

- Fourth quarter groundwater sampling and monitoring was conducted on October 7, 1997. QST staff collected groundwater samples from MW-1, MW-3 and MW-7.

- Depth to water ranged from 10.38 ft bgs in MW-1 to 11.82 ft bgs in MW-7.

- Sample results from MW-1, MW-3 and MW-7 were all below detection limits for BTEX, MTBE and TPH-G.

- Periodic readings were taken from the flow totalizer to determine the volume of water discharged to the sanitary sewer. As of October 7, 1997, 16,234 gallons have been treated and discharged.

- All groundwater treatment system effluent concentrations of both BTEX, MTBE and TPH-g were below detection limits.

5.0 Conclusions and Recommendations

QST, on behalf of Core Resourse, Inc., respectfully requests that the Alameda County Health Care Services Agency consider LUFT site closure due to the following:

- TPH-G and BTEX concentrations in wells MW-1, MW-3, and MW-7 were below laboratory reporting limits, have steadily decreased during past quarterly monitoring events.

- All influent and effluent vapor concentrations of TPH-G and BTEX were below laboratory reporting limits.

- Analytical results from this monitoring period show that MTBE was below the laboratory reporting limit.

6.0 References

County of Alameda Health Care Services Agency (ACHCSA), 1993. Unpublished Letter Response to Recommendations in August 3, 1993 Environmental Science & Engineering, Inc. Report of Quarterly Activities at Vorelco Property No. 4826, Broadway Volkswagen, 2740 Broadway, Oakland, California; September 23, 1993.

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_____, 1991b. Unpublished Report of Quarterly Activities at Vorelco Property No. 4826, Broadway Volkswagen, 2740 Broadway, Oakland, California; November 12, 1991.

_____, 1992. Unpublished Report of Quarterly Activities at Vorelco Property No. 4826, Broadway Volkswagen, 2740 Broadway, Oakland, California; December 3, 1992.

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_____, 1995. Report of Findings Soil Vapor Extraction Test, CORE Resource Property No. 4826, Broadway Volkswagen, 2740 Broadway, Oakland, California; January 27, 1995.

SEMCO, Inc., 1989. Unpublished Report of Underground Storage Tank Removal at Vorelco Property No. 4826, Broadway Volkswagen, 2740 Broadway, Oakland, California; February 3, 1989.

State of California Department of Water Resources (DWR), 1981. Water Well Standards: State of California. DWR Bull. 74-81; December, 1981.

TABLE 1
GROUND WATER ELEVATION DATA
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Well Number	Date	Top of Well Casing Elevation (feet above MSL)	Depth to Ground Water from Top of Casing (feet)	Ground Water Elevation (feet above MSL)
MW-1	1/29/89	29.22	7.50	21.72
	2/6/89		9.00	20.22
	3/13/89		8.50	20.72
	5/13/91		12.60	16.62
	10/18/91		10.11	19.11
	10/27/92		9.63	19.59
	7/13/93		6.26	22.96
	6/27/96		6.25	22.97
	9/19/96		10.46	18.76
	12/13/96		5.85	23.37
	10/7/97		10.38	18.84
MW-3	1/29/89	30.00	11.70	18.30
	2/6/89		11.00	19.00
	3/13/89		10.70	19.30
	5/13/91		10.56	19.44
	10/18/91		10.21	19.79
	10/27/92		10.81	19.19
	7/13/93		9.64	20.36
	6/28/96		NM	NA
	9/19/96		11.22	18.78
	12/13/96		9.55	20.45
	12/13/96		11.14	18.86
MW-4*	1/29/89	29.70	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		11.20	18.50
	10/18/91		9.55	20.15
	10/27/92		9.21	20.49
	7/13/93		8.32	21.38

Notes:
MSL - Mean Sea Level
* - Well abandonded on 3/16/94
NM - Not Measured
NA - Not Applicable

TABLE 1
GROUND WATER ELEVATION DATA
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Well Number	Date	Top of Well Casing Elevation (feet above MSL)	Depth to Ground Water from Top of Casing (feet)	Ground Water Elevation (feet above MSL)
MW-5	1/29/89	30.50	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		NM	NA
	10/18/91		-19.23	19.23
	10/27/92		#REF!	19.26
	7/13/93		#REF!	20.29
MW-6*	1/29/89	29.19	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		NM	NA
	10/18/91		10.21	18.98
	10/27/92		9.78	19.41
	7/13/93		8.50	20.69
MW-7	1/29/89	Top of well casing not surveyed to date.	NM	NA
	2/6/89		NM	NA
	3/13/89		NM	NA
	5/13/91		NM	NA
	10/18/91		NM	NA
	10/27/92		NM	NA
	7/13/93		NM	NA
	6/27/96		9.70	--
	9/19/96		11.92	--
	12/13/96		10.13	--
	12/13/96		11.82	--

Notes:
MSL - Mean Sea Level
* - Well abandonded on 3/16/94
NM - Not Measured
NA - Not Applicable

TABLE 2
Summary of Analytical Results of Ground Water Samples
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Well Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-G	MTBE
		concentrations (ug/L)					
MW-1	1/21/89	53	13	1.4	8.2	ND	NA
	5/16/91	ND	ND	ND	1.1	130	NA
	10/18/91	ND	ND	ND	ND	ND	NA
	10/27/91	ND	ND	ND	ND	ND	NA
	7/13/93	ND	ND	ND	ND	ND	NA
	6/27/96	ND	ND	ND	ND	ND	NA
	9/19/96	ND	ND	ND	ND	ND	NA
	12/13/96	ND	ND	ND	ND	ND	NA
	10/7/97	ND	ND	ND	ND	ND	ND
MW-3	1/21/89	9,600	8,200	1,800	6,200	32,000	NA
	5/16/91	7,800	12,000	1,200	4,000	81,000	NA
	10/18/91	9,400	8,600	750	3,300	73,000	NA
	10/27/91	7,100	4,900	970	3,500	37,000	NA
	7/13/93	8,100	6,200	8,100	4,400	41,000	NA
	6/28/96	120	75	6.2	47	370	NA
	9/25/96	6,000	2,700	450	2,180	15,000	NA
	12/13/96	30	10	2	7.4	ND	NA
DUP	12/13/96	21	7	1	4.9	ND	NA
	10/7/97	ND	ND	ND	ND	ND	ND
DUP	10/7/97	21	7	1.1	4.9	ND	5.7
MW-4*	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	160	690	250	1,100	13,000	NA
CLOSED	10/18/91	11.0	11.0	ND	15	ND	NA
	10/27/91	6.4	2.8	1.2	6.2	180	NA
	7/13/93	36	4.4	1.8	5.3	320	NA
MW-5*	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	NA	NA	NA	NA	NA	NA
CLOSED	10/18/91	3,500	530	670	1,100	16,000	NA
	10/27/91	ND	ND	ND	ND	87	NA
	7/13/93	ND	ND	ND	ND	90	NA

both from [redacted] well

Notes:
TPH-G - Total Petroleum Hydrocarbons as gasoline
MTBE - Methyl tert-Butyl Ether
ug/L - micrograms per liter
ND - Not detected at or above detection limits
NA - Not Analyzed
DUP - duplicate sample
* - Wells abandoned on 3/16/94

TABLE 2 (continued)
Summary of Analytical Results of Ground Water Samples
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Well Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-G	MTBE
		concentrations (ug/L)					
MW-6*	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	NA	NA	NA	NA	NA	NA
CLOSED	10/18/91	640	2,700	1,100	4,500	28,000	NA
	10/27/91	48	130	55	230	1,300	NA
	7/13/93	5.1	30	30	230	1,100	NA
MW-7	1/21/89	NA	NA	NA	NA	NA	NA
	5/16/91	NA	NA	NA	NA	NA	NA
	10/18/91	NA	NA	NA	NA	NA	NA
	10/27/91	NA	NA	NA	NA	NA	NA
	7/13/93	NA	NA	NA	NA	NA	NA
	6/27/96	ND	ND	ND	ND	ND	NA
	9/19/96	ND	ND	ND	ND	67	NA
	12/13/96	ND	ND	ND	ND	ND	NA
	10/7/97	ND	ND	ND	ND	ND	ND

Notes:

TPH-G - Total Petroleum Hydrocarbons as gasoline

MTBE - Methyl tert-Butyl Ether

ug/L - micrograms per liter

ND - Not detected at or above detection limits

NA - Not Analyzed

DUP - duplicate sample

* - Wells abandoned on 3/16/94

TABLE 3
Ground Water System Flow Totalizer Readings
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Date	Totalizer Reading (gallons)
4/19/96	2800
4/30/96	3494
5/6/96	4080
5/21/96	4433
5/30/96	4493
7/22/96	4790
8/19/96	5780
9/9/96	8070
9/19/96	9810
10/8/96	9854
10/24/96	9894
11/15/96	11,597
12/13/96	14,217
1/15/97	14,320
2/15/97	14,634
3/14/97	14,634
4/22/97	14,930
6/3/97	15,110
7/10/97	15,830
7/17/97	15,960
7/23/97	15,960
10/8/97	16,234
10/24/97	16,234

TABLE 4
Summary of Analytical Results of Ground Water Treatment System
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Sample Point	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-G	MTBE
		concentrations (ug/L)					
Influent	5/30/96	--	--	--	--	390	--
	6/27/95	--	--	--	--	86	--
	9/19/96	--	--	--	--	71	--
	12/13/96	1	1.2	ND	2.2	81	--
	1/15/97	6.4	26	4.2	59	360	ND
	7/17/97	140	170	22	111	1300	ND
	8/19/97	730	870	88	440	4300	ND
Midpoint	5/30/96	--	--	--	--	ND	--
	6/27/96	--	--	--	--	ND	--
	9/19/96	--	--	--	--	61	--
	12/13/96	ND	ND	ND	ND	ND	--
	1/15/97	ND	ND	ND	ND	ND	ND
	7/17/97	ND	ND	ND	ND	ND	ND
	8/19/97	ND	ND	ND	ND	ND	ND
Effluent	5/30/96	ND	ND	ND	ND	--	ND
	6/27/96	ND	ND	ND	ND	--	ND
	9/19/96	ND	ND	ND	ND	--	ND
	12/13/96	ND	ND	ND	ND	ND	--
	1/15/97	ND	ND	ND	ND	ND	ND
	7/17/97	ND	ND	ND	ND	ND	ND
	8/19/97	ND	ND	ND	ND	ND	ND

Notes:
TPH-G - Total Petroleum Hydrocarbons as gasoline
MTBE - Methyl tert-Butyl Ether
ug/L - micrograms per liter
-- - Not analyzed for this constituent
ND - Not detected at or above the laboratory reporting limit

TABLE 5
Vapor Concentrations - Vapor Phase Treatment System
CORE Resource, Inc.
2740 Broadway
Oakland, CA

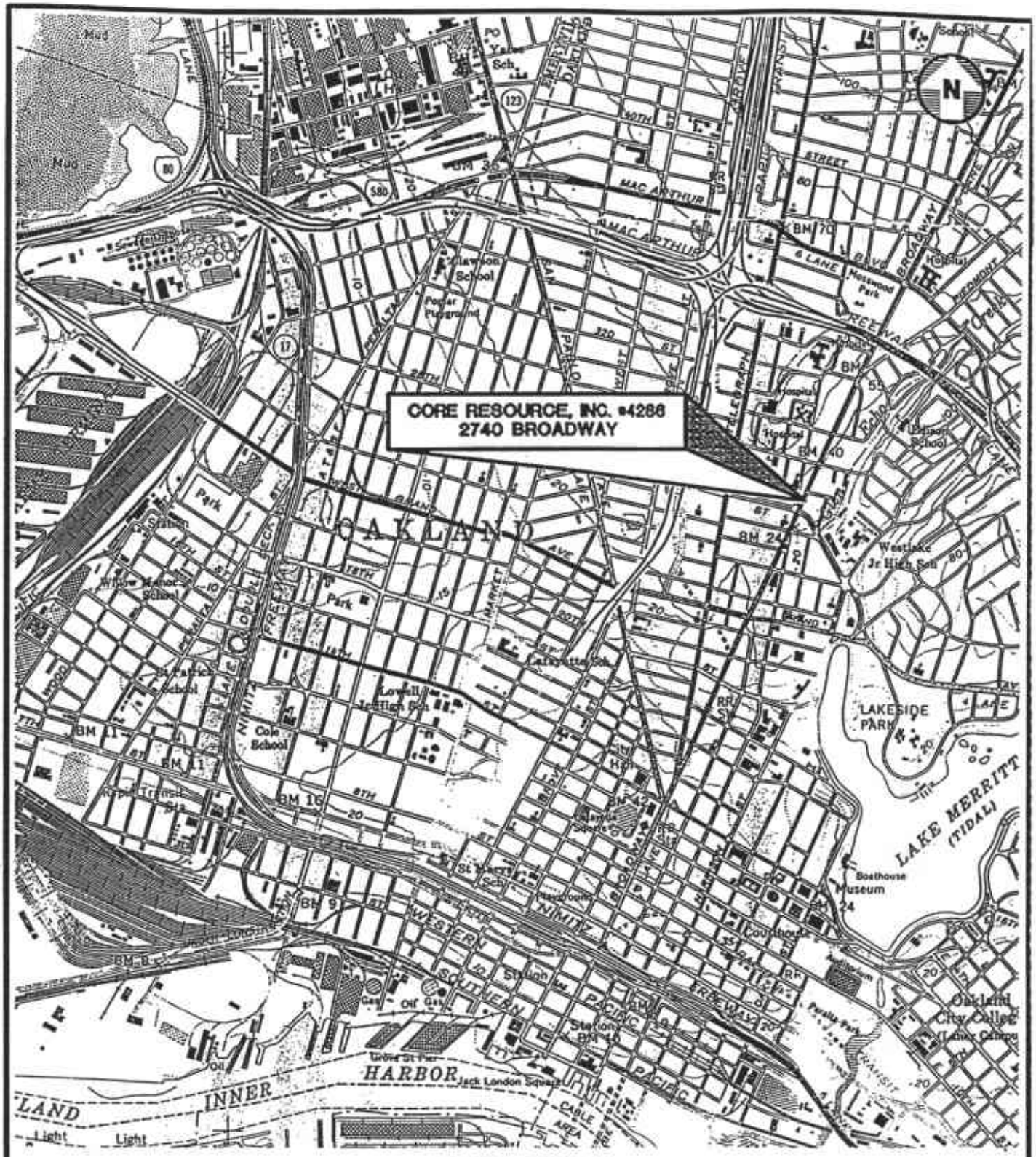
Date Sampled	Influent (ppm)	Midpoint (ppm)	Effluent (ppm)
2/29/96	54.6	0.0	0.0
3/22/96	23.3	0.0	0.0
4/19/96	126	0.0	0.0
4/30/96	120	0.0	0.0
5/3/96	55.7	0.0	0.0
5/21/96	120	0.0	0.0
5/30/96	118	0.0	0.0
7/22/96	230	0.0	0.0
8/19/96	5	4.0	0.0
9/4/96	120	0.0	0.0
9/9/96	76	0.0	0.0
10/8/96	35.7	1.5	0.0
10/24/96	25.5	0.3	0.0
11/15/96	16.5	4.5	5.6
12/13/96	15.8	3.7	2.8
1/16/97	13.5	3.6	4.2
1/24/97	15.8	3.7	2.8
1/27/97	16.5	4.5	5.6
2/4/97	14.2	4.2	3.7
2/13/97	13.8	4.2	5.0
2/20/97	14.8	5.0	4.1
3/10/97	12.6	1.8	2.0
4/22/97	13.2	4.0	5.1
6/3/97	14.2	4.1	5.0
7/10/97	12.8	3.6	4.0
7/17/97	12.6	3.2	3.0
7/23/97	12.4	2.0	2.2
7/29/97	12.2	1.8	2.0
10/8/97	14.8	0.0	0.0
10/24/97	14.2	0.0	0.0

Notes:
PID - photo ionization detector
ppm - parts per million, vapor-phase total hydrocarbon concentrations measured with a PID

TABLE 6
Summary of Analytical Results of Vapor Samples
CORE Resource, Inc.
2740 Broadway
Oakland, CA

Sample Point	Date Sampled	Benzene	Toluene	Ethylbenzene	Xylenes	TPH-g
		All results reported in milligrams per cubic meter				
Influent	5/30/96	ND	ND	ND	ND	ND
	9/25/96	3.6	8.5	1.6	2	78
	7/23/97	ND	ND	ND	ND	--
Effluent	7/23/97	ND	ND	ND	ND	--

Notes:
TPH-g - Total Petroleum Hydrocarbons as gasoline
BTEX - Benzene, toluene, ethylbenzene and xylenes
ND - Not detected at or above the reporting limit



SCALE 1:24,000

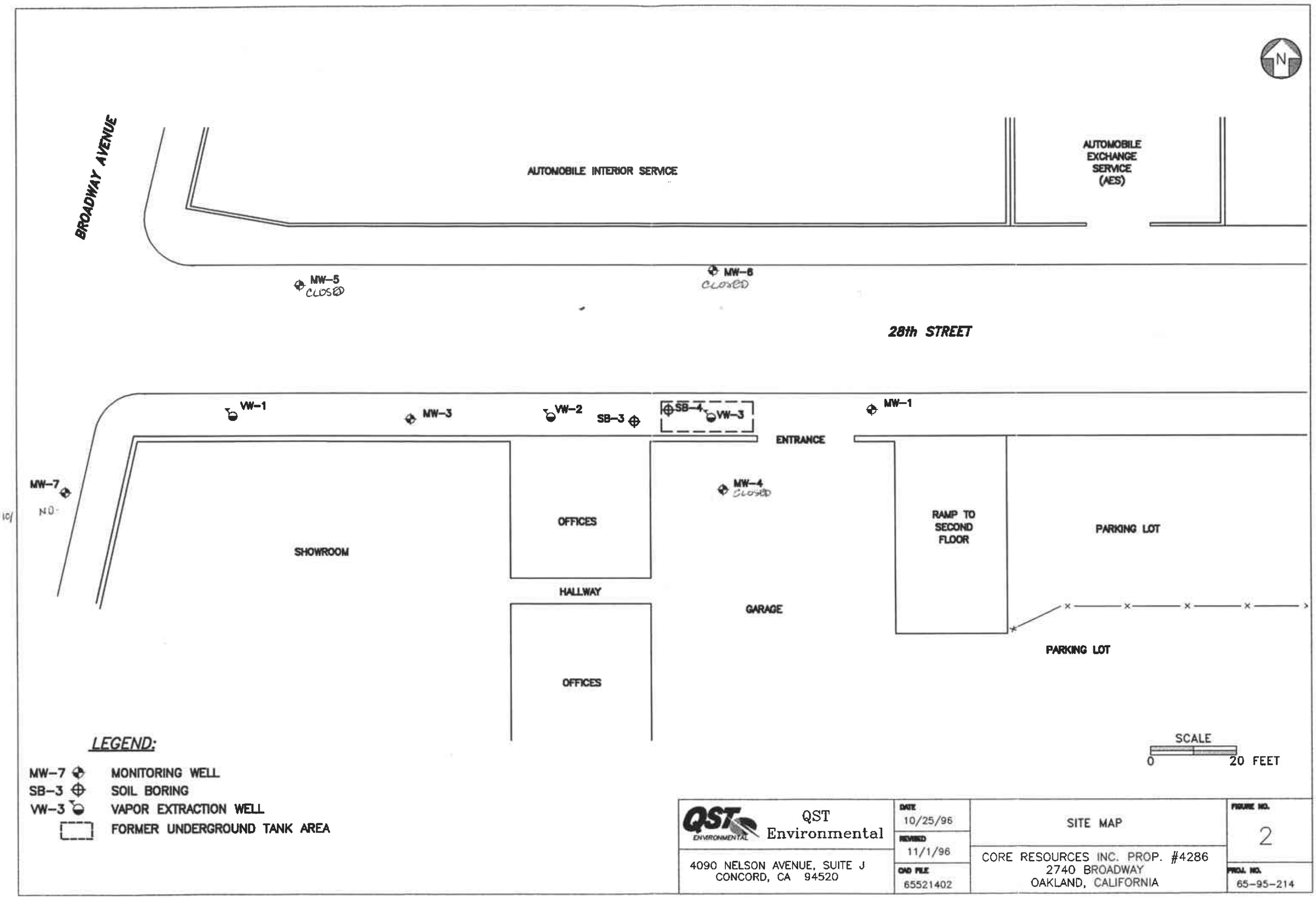
1 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

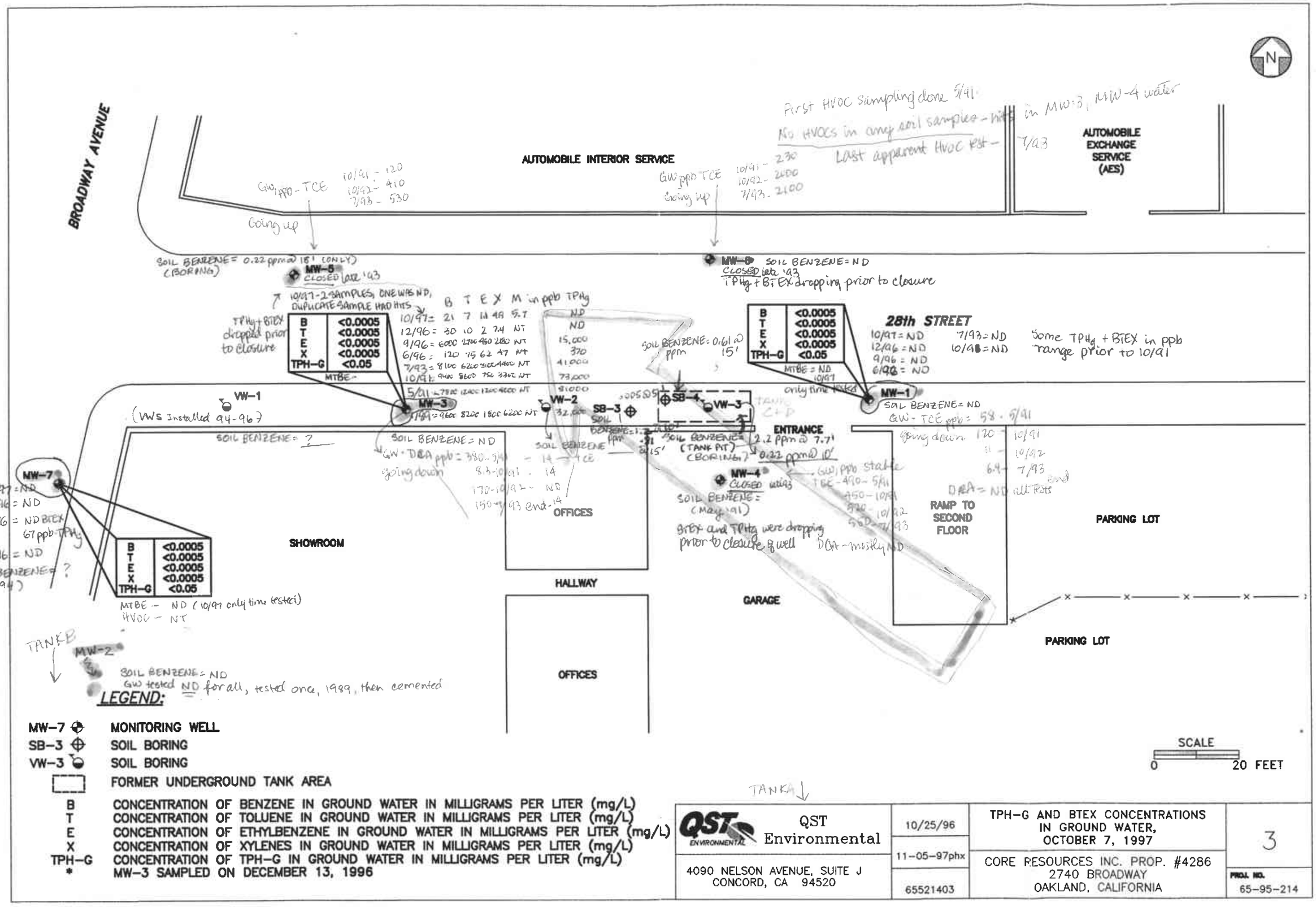
1 .5 0 1 KILOMETER

ADAPTED FROM U.S.G.S. OAKLAND WEST 7.5 MINUTE TOPOGRAPHIC QUADRANGLE, 1959, PHOTOREVISED 1980.

Environmental Science & Engineering, Inc. A Dames & Moore Company	DATE 8/93 REVISED 5/23/95	VICINITY MAP	FIGURE NO. 1
4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	CAD FILE 50931001	CORE RESOURCE, INC. PROPERTY #4286 2740 BROADWAY OAKLAND, CALIFORNIA	PROJ. NO. 6-93-5093



QST Environmental 4090 NELSON AVENUE, SUITE J CONCORD, CA 94520	DATE 10/25/96 REVISED 11/1/96 CAD FILE 65521402	SITE MAP CORE RESOURCES INC. PROP. #4286 2740 BROADWAY OAKLAND, CALIFORNIA	FIGURE NO. 2 PROJ. NO. 65-95-214



LEGEND:

MW-7 ⊕	MONITORING WELL
SB-3 ⊕	SOIL BORING
VW-3 ◒	SOIL BORING
▭	FORMER UNDERGROUND TANK AREA
B	CONCENTRATION OF BENZENE IN GROUND WATER IN MILLIGRAMS PER LITER (mg/L)
T	CONCENTRATION OF TOLUENE IN GROUND WATER IN MILLIGRAMS PER LITER (mg/L)
E	CONCENTRATION OF ETHYLBENZENE IN GROUND WATER IN MILLIGRAMS PER LITER (mg/L)
X	CONCENTRATION OF XYLENES IN GROUND WATER IN MILLIGRAMS PER LITER (mg/L)
TPH-G	CONCENTRATION OF TPH-G IN GROUND WATER IN MILLIGRAMS PER LITER (mg/L)
*	MW-3 SAMPLED ON DECEMBER 13, 1996

QST ENVIRONMENTAL
QST Environmental
4090 NELSON AVENUE, SUITE J
CONCORD, CA 94520

10/25/96
11-05-97phx
65521403

TPH-G AND BTEX CONCENTRATIONS IN GROUND WATER, OCTOBER 7, 1997

CORE RESOURCES INC. PROP. #4286
2740 BROADWAY
OAKLAND, CALIFORNIA

3

PROJ. NO. 65-95-214

65-95-214
Core

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

QST-Environmental
4090 Nelson Avenue
Suite J
Concord, CA 94520

Date: 15-OCT-97
Lab Job Number: 130941
Project ID: 6595214
Location: Core

Reviewed by: _____

Reviewed by: _____

TVH-Total Volatile Hydrocarbons

Client: QST-Environmental
Project#: 6595214
Location: Core

Analysis Method: TVH
Prep Method: EPA 5030

Sample #	Client ID	Batch #	Sampled	Extracted	Analyzed	Moisture
130941-001	MW-1	36866	10/07/97	10/13/97	10/13/97	
130941-002	MW-3	36866	10/07/97	10/13/97	10/13/97	
130941-003	MW-7	36866	10/07/97	10/13/97	10/13/97	
130941-004	DUP	36866	10/07/97	10/13/97	10/13/97	

Matrix: Water

Analyte	Units	130941-001	130941-002	130941-003	130941-004
Diln Fac:		1	1	1	1
Gasoline C7-C12	ug/L	<50	<50	<50	<50
Surrogate					
Bromofluorobenzene	%REC	116	113	114	115

Lab #: 130941

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: QST-Environmental
Project#: 6595214
Location: Core

Analysis Method: TVH
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 36866
Units: ug/L
Diln Fac: 1

Prep Date: 10/13/97
Analysis Date: 10/13/97

MB Lab ID: QC56374

Analyte	Result	
Gasoline C7-C12	<50	
Surrogate	**%Rec**	**Recovery Limits**
Bromofluorobenzene	104	70-122

Lab #: 130941

BATCH QC REPORT

Curtis & Tompkins, Ltd.

TVH-Total Volatile Hydrocarbons

Client: QST-Environmental
Project#: 6595214
Location: Core

Analysis Method: TVH
Prep Method: EPA 5030

BLANK SPIKE/BLANK SPIKE DUPLICATE

Matrix: Water
Batch#: 36866
Units: ug/L
Diln Fac: 1

Prep Date: 10/14/97
Analysis Date: 10/14/97

BS Lab ID: QC56375

Analyte	Spike Added	BS	%Rec #	Limits
Gasoline C7-C12	2000	2023	101	80-120

Surrogate	%Rec	Limits
Bromofluorobenzene	114	70-122

BSD Lab ID: QC56376

Analyte	Spike Added	BSD	%Rec #	Limits	RPD #	Limit
Gasoline C7-C12	2000	2018	101	80-120	0	35

Surrogate	%Rec	Limits
Bromofluorobenzene	111	70-122

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
RPD: 0 out of 1 outside limits
Spike Recovery: 0 out of 2 outside limits

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	QST-Environmental	Analysis Method:	EPA 8260
Project#:	6595214	Prep Method:	EPA 5030
Location:	Core		

Field ID:	MW-1	Sampled:	10/07/97
Lab ID:	130941-001	Received:	10/08/97
Matrix:	Water	Extracted:	10/13/97
Batch#:	36840	Analyzed:	10/13/97
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Recovery	Recovery Limits
Toluene-d8	101	92-107
Bromofluorobenzene	95	80-121
1,2-Dichloroethane-d4	94	87-121

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	QST-Environmental	Analysis Method:	EPA 8260
Project#:	6595214	Prep Method:	EPA 5030
Location:	Core		

Field ID:	MW-3	Sampled:	10/07/97
Lab ID:	130941-002	Received:	10/08/97
Matrix:	Water	Extracted:	10/13/97
Batch#:	36840	Analyzed:	10/13/97
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Recovery	Recovery Limits
Toluene-d8	102	92-107
Bromofluorobenzene	93	80-121
1,2-Dichloroethane-d4	94	87-121

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	QST-Environmental	Analysis Method:	EPA 8260
Project#:	6595214	Prep Method:	EPA 5030
Location:	Core		

Field ID:	MW-7	Sampled:	10/07/97
Lab ID:	130941-003	Received:	10/08/97
Matrix:	Water	Extracted:	10/13/97
Batch#:	36840	Analyzed:	10/13/97
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Recovery	Recovery Limits
Toluene-d8	101	92-107
Bromofluorobenzene	94	80-121
1,2-Dichloroethane-d4	95	87-121

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	QST-Environmental	Analysis Method:	EPA 8260
Project#:	6595214	Prep Method:	EPA 5030
Location:	Core		

Field ID:	DUP	Sampled:	10/07/97
Lab ID:	130941-004	Received:	10/08/97
Matrix:	Water	Extracted:	10/13/97
Batch#:	36840	Analyzed:	10/13/97
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	5.7	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Recovery	Recovery Limits
Toluene-d8	103	92-107
Bromofluorobenzene	94	80-121
1,2-Dichloroethane-d4	94	87-121

Aromatic Volatile Organics
EPA 8020 Analyte List

Client:	QST-Environmental	Analysis Method:	EPA 8260
Project#:	6595214	Prep Method:	EPA 5030
Location:	Core		
Field ID:	TRIP	Sampled:	10/07/97
Lab ID:	130941-005	Received:	10/08/97
Matrix:	Water	Extracted:	10/13/97
Batch#:	36840	Analyzed:	10/13/97
Units:	ug/L		
Diln Fac:	1		

Analyte	Result	Reporting Limit
MTBE	6.2	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Recovery	Recovery Limits
Toluene-d8	104	92-107
Bromofluorobenzene	94	80-121
1,2-Dichloroethane-d4	93	87-121

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client: QST-Environmental
Project#: 6595214
Location: Core

Analysis Method: EPA 8260
Prep Method: EPA 5030

METHOD BLANK

Matrix: Water
Batch#: 36840
Units: ug/L
Diln Fac: 1

Prep Date: 10/13/97
Analysis Date: 10/13/97

MB Lab ID: QC56276

Analyte	Result	Reporting Limit
MTBE	ND	2.0
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%Rec	Recovery Limits
Toluene-d8	101	92-107
Bromofluorobenzene	95	80-121
1,2-Dichloroethane-d4	90	87-121

Lab #: 130941

BATCH QC REPORT

Curtis & Tompkins Ltd.

Purgeable Aromatics by GC/MS
EPA 8020 Analyte List

Client:	QST-Environmental	Analysis Method:	EPA 8260
Project#:	6595214	Prep Method:	EPA 5030
Location:	Core		

LABORATORY CONTROL SAMPLE

Matrix:	Water	Prep Date:	10/13/97
Batch#:	36840	Analysis Date:	10/13/97
Units:	ug/L		
Diln Fac:	1		

LCS Lab ID: QC56275

Analyte	Result	Spike Added	%Rec #	Limits
Benzene	52.15	50	104	86-116
Toluene	54.91	50	110	83-118

Surrogate	%Rec	Limits
Toluene-d8	101	92-107
Bromofluorobenzene	92	80-121
1,2-Dichloroethane-d4	96	87-121

Column to be used to flag recovery and RPD values with an asterisk
* Values outside of QC limits
Spike Recovery: 0 out of 2 outside limits

CHAIN OF CUSTODY RECORD

DATE 10/7/97 PAGE 1 OF 1

PROJECT NAME CORE RESOURCES, INC.

ADDRESS 2740 BROADWAY
OAKLAND, CA

PROJECT NO. 6595214

SAMPLED BY M. RAPAPORT

LAB NAME Curtis & Tompkins

Environmental Science & Engineering, Inc.
A CH2MHILL Company
4090 Nelson Avenue
Suite J
Concord, CA 94520
Phone (510) 685-4053
Fax (510) 685-5323

SAMPLE #	DATE	TIME	LOCATION	ANALYSES TO BE PERFORMED: TPH-G (EPA 5030)	ANALYSES TO BE PERFORMED: BTEX/MTBE (EPA 8020)	MATRIX	NUMBER OF CONTAINERS	REMARKS (CONTAINER, SIZE, ETC.)
MW-1	10/7/97	1200	OAKLAND	X	X	H_2O	4	4 VOA's W/HCl PRES
MW-3	10/7/97	1330	OAKLAND	X	X	H_2O	4	↓
MW-M	10/7/97	1300	OAKLAND	X	X	H_2O	4	
DUP	10/7/97	-	OAKLAND	X	X	H_2O	4	
TRIP	10/7/97	-	OAKLAND		X	H_2O	1	1 VOA LABORATORY PREPARED W/HCl

TOTAL NUMBER OF CONTAINERS

RELINQUISHED BY: (signature)	RECEIVED BY: (signature)	date	time
1.	STORAGE:	10/7/97	1330
2. STORAGE:		10/8/97	1405
3.	AT:	10/8/97	1305
4.			
5.			

REPORT RESULTS TO: M. RAPAPORT

SPECIAL SHIPMENT REQUIREMENTS: JCH

SAMPLE RECEIPT

CHAIN OF CUSTODY SEALS	
REC'D GOOD CONDTN/COLD	
CONFORMS TO RECORD	

INSTRUCTIONS TO LABORATORY (handling, analyses, storage, etc.):

STANDARD TAT