

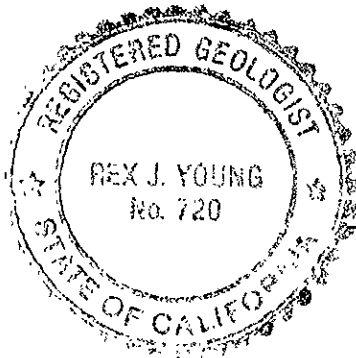
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**MALIBU GRAND PRIX  
8000 South Coliseum Way  
Oakland, California**

**QUARTERLY GROUNDWATER REPORT  
4TH QUARTER**

Report Prepared for  
Malibu Grand Prix  
7301 Topanga Canyon Boulevard, Suite 300  
Canoga Park, California 91303

by  
RESNA Industries Inc.

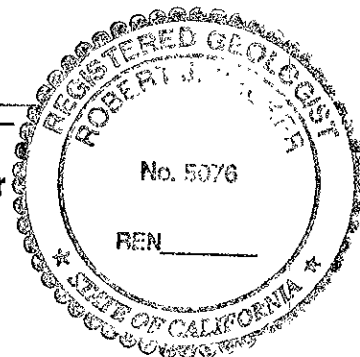


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**EXECUTIVE SUMMARY**

*Ground water monitoring wells at the Race Track and at the Castle sites were sounded for depth and sampled on December 1 and 2, 1992. Water table elevation in the monitoring well MW-1, adjacent to the boat pond, has not lowered since the removal of the water from the pond during the first week of July, 1992. As noted in previous reports, some of the monitoring wells down gradient from the former tank locations are inconsistent with regard to showing ground water impaction by gasoline. The water and sludge in the ditches north and west of the site were sampled and analyzed; they show no impact from gasoline in the effluent groundwater from the Malibu Grand Prix site.*

## **1.0 INTRODUCTION**

RESNA has performed Fourth Quarter, 1992, monitoring of the groundwater and adjacent drainage ditches at the Malibu Grand Prix Race Track and Castle areas, 8000 South Coliseum Way, Oakland, California (Plate 1). This report reviews the past history of the site, gives the results of the analysis of water and sludge samples, and interpretation of findings.

## **2.0 BACKGROUND**

Malibu Grand Prix (MGP) operates two adjacent amusement park facilities, a Racetrack for midget cars and a Fun Center with miniature golf and batting cages on leased property at 8000 South Coliseum Way, Oakland (Plates 1 & 2). Prior to 1989 the MGP facility maintained two 6,000 gallon underground storage tanks containing marine mix gasoline. The tanks were located in the parking lots adjacent to the MGP Castle and Race Track. The tanks were removed on March 29, 1989 and February 1, 1990 respectively. Closure reports were submitted to the Alameda County Department of Environmental Health with all relevant waste manifests and analysis results. On June 29, 1989 a letter from Alameda County was sent to Malibu Grand Prix Corp. requiring an initial site investigation to determine the extent of soil and groundwater contamination present at the MGP Castle while a verbal request was issued for an assessment at the Race Track at the time of the removal. The site assessment at the Castle began on September 21, 1989 and a report was issued on November 15, 1989 recommending further work. The assessment work at the Race Track, and the continued assessment at the Castle began on June 12, 1990. Monitoring Wells 1 through 10 were sampled July 17, 1991. Four additional monitoring wells (MWs) at the Castle and four additional MWs at the Race Track were constructed on August 27-30, 1991. All monitoring wells, MW-1 through -18, were sampled October 9, 10, 11, 1991, for water analyses and pump tests and slug tests were performed on selected wells. A report of ground water monitoring was submitted in January, 1992, which included recommendations to eliminate two on-site ground water recharge areas, conduct further assessment of impacted soil, and perform ground water monitoring on a quarterly basis until a plan for remediation is developed.

## **3.0 PROCEDURES**

The stabilized water depth was measured in each well with an electrical measuring tape and the depths were recorded on site prior to sampling. During sampling, which followed depth measurement, the wells were purged of three well volumes of water with a bailer and submersible electric pump. A split sample (two simultaneous samples) was taken with a disposable bailer following purging of each well. Samples were labeled and chilled for transporting a State certified laboratory under chain of custody. Purged water was stored on site in marked containers. Refer to Appendix B for descriptions of the sampling procedures.

## **4.0 FINDINGS**

### **4.1 Monitoring Wells Water Samples Analyses**

Water samples collected from the ground water monitoring wells were analyzed for benzene, toluene, ethyl-benzene and xylenes plus total petroleum hydrocarbons as

**GROUNDWATER MONITORING  
REPORT – 4TH QUARTER**

**MALIBU GRAND PRIX – OAKLAND**

gasoline (BTEX-TPHg). Lines of equal concentrations of TPHg are shown on Plate 2; benzene concentrations are contoured on Plate 3.

Some of the groundwater monitoring wells alternate from clean, to impacted, to clean again with each successive monitoring event. MW-7, which was previously clean, is now reported to contain gasoline impacted water while previously impacted MW-16 is now clean. Tidal influences from the ditches adjacent to the site and inhomogenities in the underlying fill material are possible reasons for the variations in the shape of the ground water plumes.

Analyses results are presented in Table 1. Laboratory reports are located in Appendix A.

**TABLE 1  
MALIBU GRAND PRIX - OAKLAND, CALIFORNIA  
WATER SAMPLE ANALYSIS RESULTS, ppb**

Well #	Date	Benzene	Toluene	Ethly- benzene	Total Xylenes	TPHg
MW-1	09/22/89	410	1800	1100	7100	35000
	06/14/90	.66	<.05	1.3	2.3	210
	07/17/91	<.05	.06	<.05	<.05	270
	10/09/91	<.05	<.05	<.05	<.05	370
	08/05/92	<0.5	<0.5	<0.5	<0.5	600
	12/02/92	<0.5	<0.5	<0.5	<0.5	190
MW-2	09/22/89	<.05	<.05	<.05	<.05	<50
	06/14/90	<.05	<.05	<.05	<.05	<50
	07/17/91	<.05	<.05	<.05	<.05	<50
	10/09/91	<.05	<.05	<.05	<.05	<50
	08/05/92	<0.5	<0.5	<0.5	<0.5	<50
	12/01/92	<0.5	<0.5	<0.5	<0.5	<50
MW-3	09/22/89	1.2	<.05	<.05	<.05	<50
	06/14/90	0.90	4	<.05	<.05	<50
	07/17/91	3.8	<.05	<.05	<.05	<50
	10/10/91	<.05	<.05	<.05	<.05	<50
	08/05/92	9.7	1.4	1.0	0.9	110
	12/02/92	1.3	<.05	<.05	0.84	<50
MW-4	09/22/89	410	430	78	324	4000
	06/14/90	200	3.7	1.2	9.5	660
	07/17/91	49	4.3	1.5	38	1100
	duplicate 07/17/91	45	2.7	1.0	33	1000
	10/09/91	0.8	<.05	<.05	<.05	88
	08/05/92	11	8.9	2.4	4.7	5800
	12/02/92	6.5	4.3	0.6	1.4	1500

**GROUNDWATER MONITORING  
REPORT - 4TH QUARTER**

**MALIBU GRAND PRIX - OAKLAND**

**TABLE 1 - CONTINUED  
MALIBU GRAND PRIX - OAKLAND, CALIFORNIA  
WATER SAMPLE ANALYSIS RESULTS, ppb**

Well #	Date	Benzene	Toluene	Ethly- benzene	Total Xylenes	TPHg
MW-5	06/14/90	<.05	<.05	<.05	<.05	<50
	07/17/91	<.05	<.05	<.05	<.05	<50
	10/09/91	<.05	<.05	<.05	<.05	110
	08/05/92	<0.5	<0.5	2.0	0.9	210
	12/02/92	<0.5	<0.5	<0.5	<0.5	<50
MW-6	06/14/90	73	<.05	17	29.7	1800
	07/17/91	7.4	<.05	<.05	5.6	1200
	10/09/91	<.05	<.05	<.05	<.05	<50
	08/05/92	1.4	<0.5	12	4.1	1900
	12/01/92	<0.5	<0.5	2.5	1.3	140
MW-7	06/14/90	0.84	<.05	1.2	1.8	58
	07/17/91	12	1.7	4.7	3.8	120
	10/09/91	<.05	<.05	<.05	<.05	<50
	08/05/92	<0.5	<0.5	0.6	<0.5	<50
	12/01/92	0.9	<0.5	<0.5	<0.5	<50
MW-8	06/14/90	680	36	150	1060	13000
	07/17/91	330	1.8	1.7	3.6	1300
	10/10/91	3.1	0.6	0.7	<.05	76
	duplicate 10/10/91	3.2	0.6	0.7	<.05	72
	08/05/92	35	1.2	0.6	2.4	1700
MW-9	12/02/92	5.5	0.9	<0.5	1.8	450
	06/14/90	12	0.78	4.5	2.54	3200
	07/17/91	3.4	<.05	<.05	<.05	87
	10/10/91	1.8	<.05	<.05	<.05	100
	08/05/92	1.7	<0.5	<0.5	1.3	150
MW-10	12/02/92	1.3	<0.5	<0.5	<0.5	62
	06/14/90	20	.69	4.3	7.7	400
	07/17/91	4.2	<.05	<.05	<.05	290
	10/10/91	<.05	<.05	<.05	<.05	90
	08/05/92	<0.5	<0.5	<0.5	<0.5	790
MW-11	12/02/92	<0.5	<0.5	<0.5	<0.5	85
	10/09/91	<.05	1.2	1.0	6.4	430
	08/05/92	<0.5	<0.5	3.2	3.2	580
MW-12	12/01/92	<0.5	<0.5	2.2	1.5	140
	10/09/91	<.05	2.6	0.8	5.1	1500
	08/05/92	<0.5	<0.5	9.1	1.1	53
	12/01/92	<0.5	<0.5	<0.5	<0.5	<50

**TABLE 1 - CONTINUED  
MALIBU GRAND PRIX - OAKLAND, CALIFORNIA  
WATER SAMPLE ANALYSIS RESULTS, ppb**

Well #	Date	Benzene	Toluene	Ethly- benzene	Total Xylenes	TPHg
MW-13 duplicate	10/09/91	<.05	0.9	0.6	3.0	720
	08/05/92	<.05	2.7	<.05	0.69	1400
	08/05/92	<.05	3.0	<.05	0.7	1100
	12/01/92	<.05	2.9	<.05	0.9	670
MW-14 hydropunch	08/27/91	<.05	<.05	<.05	<.05	<50
	10/09/91	<.05	<.05	<.05	0.9	<50
	08/05/92	<.05	<.05	<.05	<.05	<50
	12/01/92	<.05	<.05	<.05	<.05	<50
MW-15	10/10/91	<.05	<.05	<.05	<.05	<50
	08/05/92	0.8	<.05	<.05	<.05	<50
	12/02/92	<.05	<.05	<.05	<.05	<50
MW-16	10/09/91	<.05	<.05	<.05	<.05	78
	08/05/92	<.05	<.05	<.05	<.05	<50
	12/02/92	<.05	<.05	<.05	<.05	<50
MW-17	10/09/91	<.05	<.05	<.05	<.05	<50
	08/05/92	<.05	<.05	<.05	<.05	<50
	12/02/92	<.05	<.05	<.05	<.05	<50
MW-18	10/09/91	<.05	<.05	<.05	<.05	<50
	08/05/92	<.05	<.05	<.05	<.05	<50
	12/02/92	<.05	<.05	<.05	<.05	<50

**4.2 Drainage Ditch Water and Sludge Samples Analyses**

None of the water samples or sludge samples from the ditches were reported to contain any benzene or TPHg greater than the method detection limits used (same as for the groundwater well samples). Sludge samples were reported ND for all gasoline constituents. All water from the north ditch (Plate 4) collected at low tide and all water collected at high tide contained low concentrations of toluene and xylenes. Using the data from this sampling event, it may be concluded that there is a source of toluene and xylene contamination from the Bay side (west) of the site at high tide and there is also a source for toluene and xylene contamination from the Oakland Hills (east) side of the site at low tide in the north ditch. Groundwater effluent from the site into the west ditch has no apparent impact on the water or bottom-sludge quality. If there is ground water effluent from the site into the north ditch, it has no apparent effect on water or bottom-sludge quality. Results of analyses of ditch samples are presented in Table 2.

**TABLE 2**

**MALIBU GRAND PRIX - OAKLAND, CALIFORNIA  
DITCH SAMPLES ANALYSIS RESULTS, ppb**

Sample Name	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPHg
WU-LO	<0.5	<0.5	<0.5	<0.5	<50
<i>Sludge</i> WD-LO	<0.5	<0.5	<0.5	<0.5	<50
NU-LO	<0.5	1.3	<0.5	2.7	<50
<i>Sludge</i> ND-LO	<0.5	1.3	<0.5	2.4	<50
WU-HI	<0.5	0.9	<0.5	1.8	<50
NU-HI	<0.5	0.8	<0.5	0.8	<50
HI-Y	<0.5	0.6	<0.5	1.1	<50

High tide and low tide water samples were collected from the ditches adjacent to the west and north sides of the site (Plate 4). Water samples and sludge samples were collected from the west ditch at a place south of, and a place north of, the area where the plumes of impacted water from the former tank locations might be entering the ditch. Assuming the possibility of groundwater entry into the north ditch from the site, water samples and sludge samples were collected from east of the race track area and west of the race track area. Water samples were taken shortly before high tide, while the water was still flowing away from the Bay. Water samples and mud samples were collected shortly before low tide, while the water was still flowing out toward the Bay.

Rationale for sample locations:

West Ditch samples:

- WU-LO - Water flowing north, before low tide, upstream of groundwater from site.
- WU-HI - Water flowing south, before high tide, downstream of groundwater from site.
- WD-LO - Water flowing north, before low tide, downstream of groundwater from site.
- WU and WD - Bottom sludge exposed at low tide.



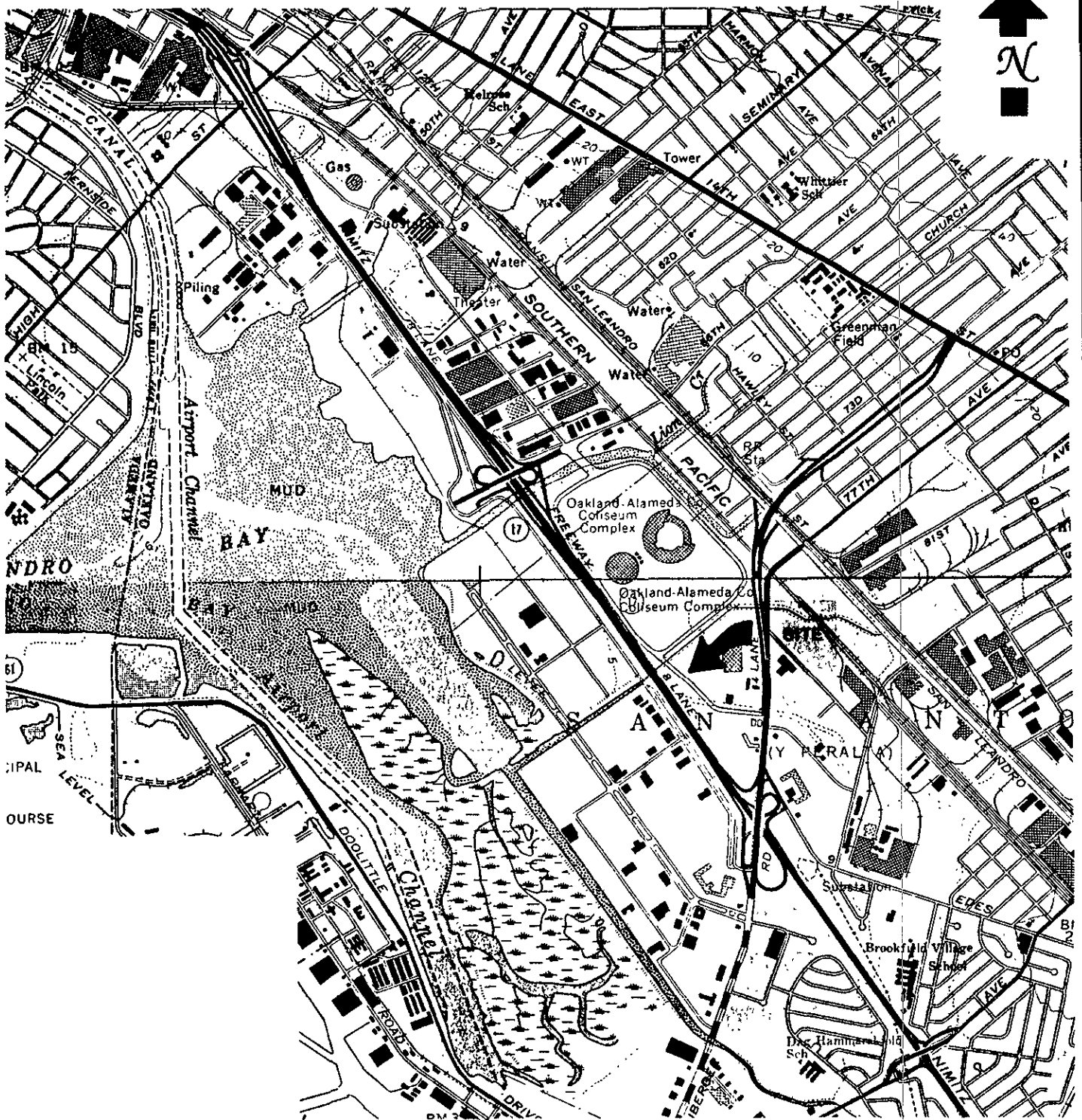
North Ditch samples:

- NU-LO - Water flowing west, before low tide, upstream of groundwater from site.
- NU-HI - Water flowing east, before high tide, downstream of groundwater from site.
- ND-LO - Water flowing west, before low tide, downstream of groundwater from site.
- NU and ND - Bottom sludge exposed at low tide.

**4.3 Contours on Top of Water Table**

Contours on Top of Water Table and tables of elevation and depth to water in the wells at the Race Track and Castle areas, measured December 1 and 2 of 1992, are presented in Plate 5. The wells in the Castle parking lot were measured early in the afternoon of December 1 while those in the Race Track lot were measured late in the afternoon of December 2. Since the sampling times and the times of the tide in the Bay were not correlated, the contours of elevations cannot be connected between the parking lots, as they were when using the data collected in August, 1992.

The boat pond has been drained since late July, 1992, but the water elevation in MW-1, nearest the pond, has remained abnormally high — three feet higher than nearby MW-4 (Plate 4). Since the boat pond was known to leak a considerable amount each day, the groundwater recharge is coming from a source large enough to completely mask the recharge effect of the water leaking from the boat pond. The groundwater elevation in MW-16, in the Race Track lot, is consistently low, but the difference in elevation is small and could be caused by an error in the survey of the well-heads.



**RESNA**

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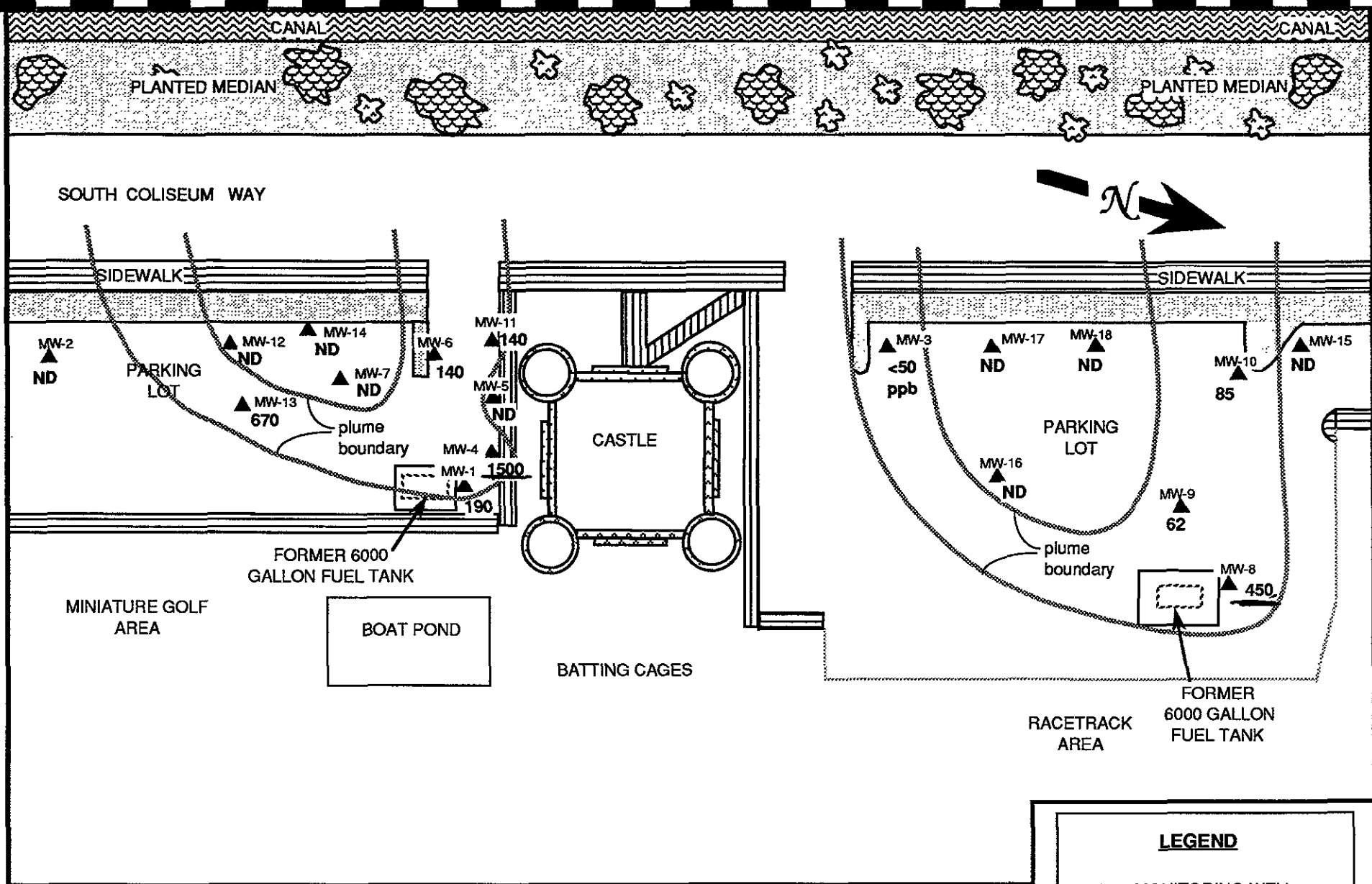
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PROJECT NUMBER: 2481-4

**MALIBU GRAND PRIX**  
8000 South Coliseum Way  
Oakland, California

**LOCATION MAP**

**PLATE**

**1**



**RESNA**  
Working to Restore Nature

DATE: 12/30/92  
PROJECT NUMBER: 2481-42

**MALIBU GRAND PRIX**  
8000 SOUTH COLISEUM WAY  
OAKLAND, CALIFORNIA

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GROUNDWATER PLUME CONCENTRATIONS  
TPHg, ppb 12/2/92

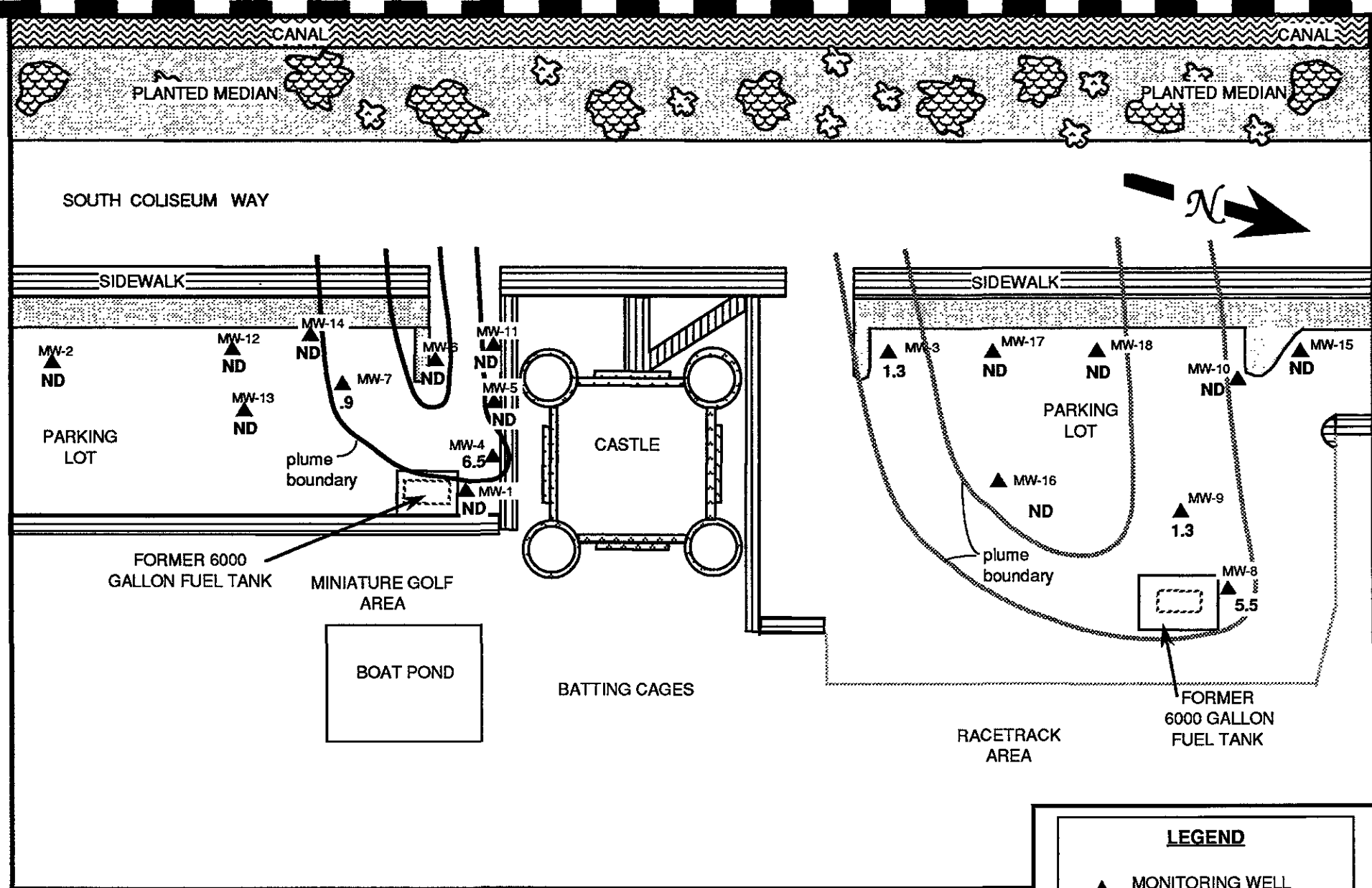
PLATE  
**2**

**LEGEND**

▲ MONITORING WELL LOCATION

---

**SCALE**  
ONE INCH = 50 FEET



**RESNA**  
Working to Restore Nature

DATE: 12/30/92  
PROJECT NUMBER: 2481-42

**MALIBU GRAND PRIX**  
8000 SOUTH COLISEUM WAY  
OAKLAND, CALIFORNIA

**GROUNDWATER PLUME CONCENTRATIONS**  
BENZENE, ppb      DEC 1-2, 1992

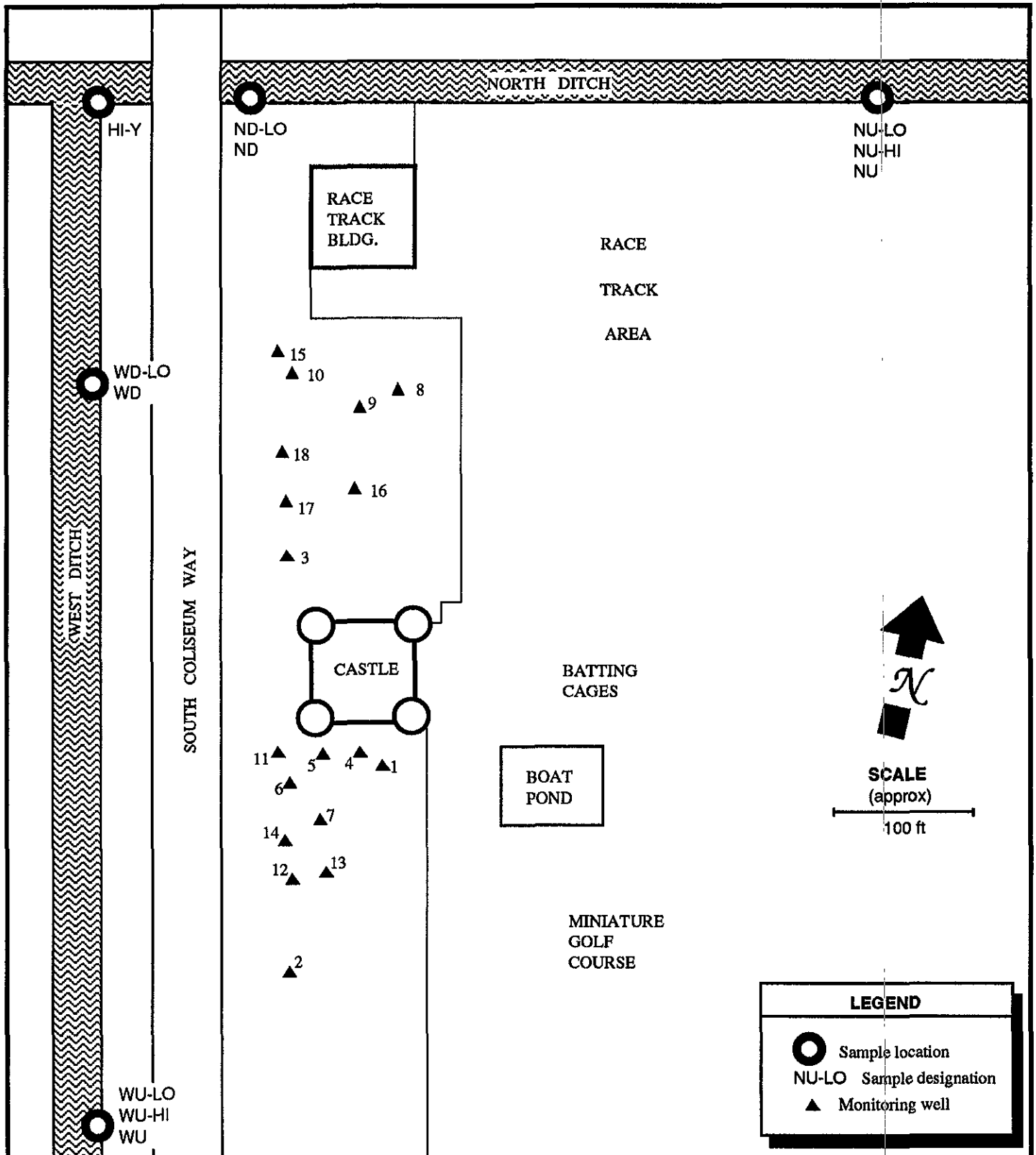
PLATE  
**3**

**LEGEND**

▲ MONITORING WELL LOCATION

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**SCALE**  
ONE INCH = 50 FEET



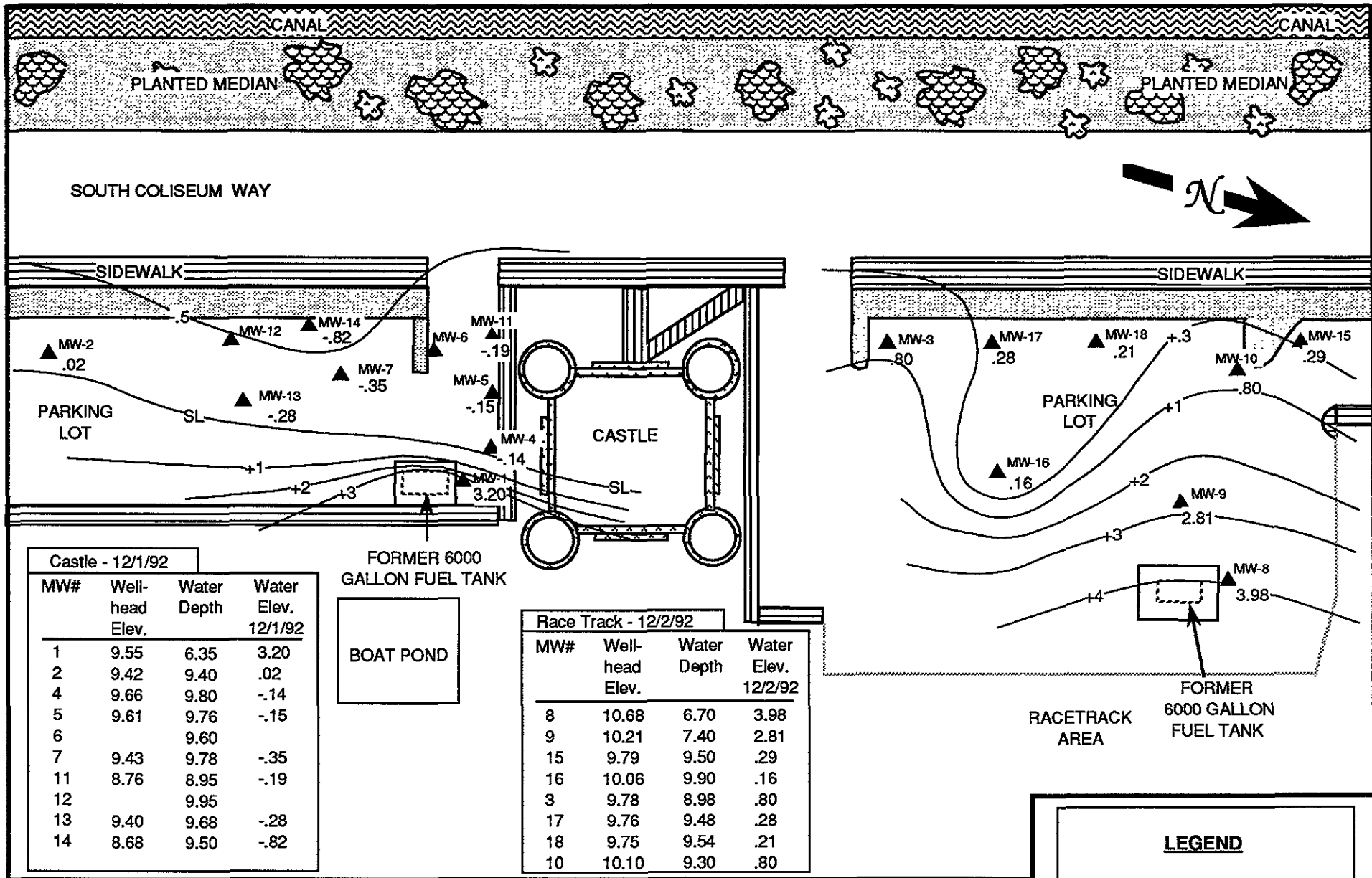
**RESNA**  
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DATE: 1-11-93  
PROJECT NUMBER: B2481-42

**MALIBU GRAND PRIX**  
8000 SO. COLISEUM WAY  
OAKLAND, CALIFORNIA

**PLOT PLAN**  
DITCH SAMPLE LOCATIONS

**PLATE**  
**4**



Castle - 12/1/92

MW#	Well-head Elev.	Water Depth	Water Elev. 12/1/92
1	9.55	6.35	3.20
2	9.42	9.40	.02
4	9.66	9.80	-.14
5	9.61	9.76	-.15
6		9.60	
7	9.43	9.78	-.35
11	8.76	8.95	-.19
12		8.95	
13	9.40	9.68	-.28
14	8.68	9.50	-.82

FORMER 6000 GALLON FUEL TANK

BOAT POND

Race Track - 12/2/92

MW#	Well-head Elev.	Water Depth	Water Elev. 12/2/92
8	10.68	6.70	3.98
9	10.21	7.40	2.81
15	9.79	9.50	.29
16	10.06	9.90	.16
3	9.78	8.98	.80
17	9.76	9.48	.28
18	9.75	9.54	.21
10	10.10	9.30	.80

RACETRACK AREA

FORMER 6000 GALLON FUEL TANK

**LEGEND**

▲ MONITORING WELL LOCATIONS

---

**SCALE**

ONE INCH = 50 FEET

**RESNA**

*Working to Restore Nature*

DATE: 9-24-92  
PROJECT NUMBER: 2481-42

**MALIBU GRAND PRIX**

8000 SOUTH COLISEUM WAY  
OAKLAND, CALIFORNIA

---

**TOP OF WATER TABLE  
CONTOURS OF COMPOSITE DATA**

PLATE

**5**

**A P P E N D I X A**

**Laboratory Results and Chain of Custody**



### CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

195792

PROJECT NO. <b>B2481-42</b>		PROJECT NAME/SITE						ANALYSIS REQUESTED															P.O. #. <b>A4481</b>		
SAMPLERS (SIGN) <b>Rex Young</b>		(PRINT) <b>REX YOUNG</b>						NO. CONTAINERS	SAMPLE TYPE																REMARKS
SAMPLE IDENTIFICATION	DATE	TIME	COMP	GRAB	PRES. USED	ICED	BTEX (802/8020)			TPH <sub>g</sub> (8015)	TPH <sub>d</sub> (8015)	TOG 418.1/5520	801/8010	824/8240	825/8270										
✓ MW-1	12/1/92	0915		✓	HCL		W	✓	✓												W1212046				
✓ MW-2	12/1/92	1650		✓	"		W	✓	✓												047				
✓ MW-3	12/2/92	1705		✓	"		W	✓	✓												048				
✓ MW-4	12/2/92	0910		✓	"		W	✓	✓												049				
✓ MW-5	12/2/92	0905		✓	"		W	✓	✓												050				
✓ MW-6	12/1	1719		✓	"		W	✓	✓												051				
✓ MW-7	12/1	1713		✓	"		W	✓	✓												052				
✓ MW-8	12/2	1738		✓	"		W	✓	✓												053				
✓ MW-9	12/2	1745		✓	"		W	✓	✓												054				
✓ MW-10	12/2	1725		✓	"		W	✓	✓												055				
✓ MW-11	12/1	1723		✓	"		W	✓	✓												056				
✓ MW-12	12/1	1702		✓	"		W	✓	✓												057				
✓ MW-13	12/1	1656		✓	"		W	✓	✓												058				
✓ MW-14	12/1	1708		✓	"		W	✓	✓												059				
✓ MW-15	12/2	1730		✓	"		W	✓	✓												060				

RELINQUISHED BY: <b>Rex Young</b>	DATE 12/3/92	TIME 0830	RECEIVED BY:	LABORATORY: RESNA	PLEASE SEND RESULTS TO: Rex Young RESNA 1500 So Union Ave Bakerfield 93307
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	REQUESTED TURNAROUND TIME: normal	
RELINQUISHED BY:	DATE	TIME	RECEIVED BY: <b>Anthony Mena</b>	RECEIPT CONDITION: good	PROJECT MANAGER: Rex Young





### CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

PROJECT NO. B2481-42		PROJECT NAME/SITE						ANALYSIS REQUESTED													P.O. #: A4481						
SAMPLERS <i>Rex Young</i> (SIGN) / (PRINT) REX YOUNG		DATE		TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	BTX (802/8020) TPHg (8015) TPHd (8015) TOG 418.1/5520 801/8010 824/8240 825/8270													REMARKS			
SAMPLE IDENTIFICATION		DATE	TIME	COMP	GRAB	PRES. USED	ICED	NO. CONTAINERS	SAMPLE TYPE	REMARKS																	
✓	MW-16	12/2/92	1752			HCl			W	✓	✓																W/2/2061
✓	MW-17	12/2	1712			"			W	✓	✓																062
✓	MW-18	12/2	1718			"			W	✓	✓																063
✓	WU-L0	12/2	1100			none			W	✓	✓																064
✓	WD-L0	12/2	1115			none			W	✓	✓																065
✓	<del>NU</del> -L0	12/2	1145			none			W	✓	✓																066
✓	ND-L0	12/2	1155			none			W	✓	✓																067
✓	<del>WU</del>	12/2	1100						S	✓	✓																S/2/2068
✓	WD	12/2	1115						S	✓	✓																069
✓	NU	12/2	1145						S	✓	✓																070
✓	ND	12/2	1155						S	✓	✓																071
✓	WU-H1	12/2	1650						W	✓	✓																W/2/2072
✓	NU-H1	12/2	1710						W	✓	✓																073
✓	HI-Y	12/2	1740						W	✓	✓																074
																											W/2/2075

RELINQUISHED BY: <i>Rex Young</i>	DATE 12/3/92	TIME 0830	RECEIVED BY:	LABORATORY: RESNA	PLEASE SEND RESULTS TO: <i>Rex Young RESNA 1500 So Union Ave Bakersfield 93307</i>
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	REQUESTED TURNAROUND TIME: normal	
RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	RECEIPT CONDITION: good	
RELINQUISHED BY:	DATE 12/3/92	TIME 0830	RECEIVED BY LABORATORY: <i>Anthony</i>	PROJECT MANAGER <i>Rex Young</i>	

**ANALYSIS REPORT**

1020lab.frm

Attention: Mr. Rex Young  
RESNA  
1500 South Union Ave.  
Bakersfield, CA 93307  
Project: 19514-L, Project B2481-42

Date Sampled: 12-1/2-92  
Date Received: 12-03-92  
BTEX Analyzed: 12-4/7-92  
TPHg Analyzed: 12-4/7-92  
TPHd Analyzed: NR  
Matrix: Water

	Benzene ppb	Toluene ppb	Ethyl- benzene ppb	Total Xylenes ppb	TPHg ppb	TPHd ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	50

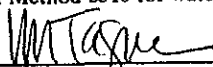
**SAMPLE**  
Laboratory Identification

MW-1 W1212046	ND	ND	ND	ND	190	NR
MW-2 W1212047	ND	ND	ND	ND	ND	NR
MW-3 W1212048	1.3	ND	ND	0.84	ND	NR
MW-4 W1212049	6.5	4.3	0.6	1.4	1500	NR
MW-5 W1212050	ND	ND	ND	ND	ND	NR

ppb = parts per billion =  $\mu\text{g/L}$  = micrograms per liter.  
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.  
NR = Analysis not requested.

**ANALYTICAL PROCEDURES**

**BTEX**- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.  
**TPHg**-Total petroleum hydrocarbons as gasoline (low-to-medium boiling points) are measured by extraction using EPA Method 5030, followed by analysis using modified EPA Method 8015, which utilizes a GC equipped with an FID.  
**TPHd**-Total petroleum hydrocarbons as diesel (high boiling points) are measured by extraction using EPA Method 3550 for soils and EPA Method 3510 for water, followed by modified EPA Method 8015 with direct sample injection into a GC equipped with an FID.

  
\_\_\_\_\_  
Laboratory Representative

December 11, 1992  
\_\_\_\_\_  
Date Reported

RESNA ENVIRONMENTAL LABORATORY IS CERTIFIED BY THE STATE OF CALIFORNIA  
DEPARTMENT OF HEALTH SERVICES AS A HAZARDOUS WASTE TESTING LABORATORY  
(Certification No. 1211)

42501 Albrae Street • Fremont, CA 94538 • Phone: (510) 623-0775 • (800) 247-5223 • FAX: (510) 651-8754

**ANALYSIS REPORT**

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RESNA  
1500 South Union Ave.  
Bakersfield, CA 93307  
Project: 19514-L, Project B2481-42

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TPHg Analyzed: 12-4/7-92  
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Matrix: Water

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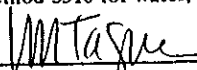
**SAMPLE**  
Laboratory Identification

MW-6 W1212051	ND	ND	2.5	1.3	140	NR
MW-7 W1212052	0.9	ND	ND	ND	ND	NR
MW-8 W1212053	5.5	0.9	ND	1.8	450	NR
MW-9 W1212054	1.3	ND	ND	ND	62	NR
MW-10 W1212055	ND	ND	ND	ND	85	NR

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**ANALYSIS REPORT**

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Attention: Mr. Rex Young  
RESNA  
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Bakersfield, CA 93307  
Project: 19514-L, Project B2481-42

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TPHd Analyzed: NR  
Matrix: Water

	Benzene ppb	Toluene ppb	Ethyl- benzene ppb	Total Xylenes ppb	TPHg ppb	TPHd ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	50

**SAMPLE**  
Laboratory Identification

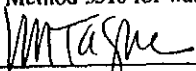
MW-11 W1212056	ND	ND	2.2	1.5	140	NR
MW-12 W1212057	ND	ND	ND	ND	ND*	NR
MW-13 W1212058	ND	2.9	ND	0.9	670	NR
MW-14 W1212059	ND	ND	ND	ND	ND	NR
MW-15 W1212060	ND	ND	ND	ND	ND*	NR

ppb = parts per billion = µg/L = micrograms per liter.  
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\* Chromatogram contains a discrete peak that elutes before benzene.

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Laboratory Representative

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1500 South Union Ave.  
Bakersfield, CA 93307  
Project: 19514-L, Project B2481-42

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TPHg Analyzed: 12-4/7-92  
TPHd Analyzed: NR  
Matrix: Water

	Benzene ppb	Toluene ppb	Ethyl- benzene ppb	Total Xylenes ppb	TPHg ppb	TPHd ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	50

**SAMPLE**  
Laboratory Identification

MW-16 W1212061	ND	ND	ND	ND	ND	NR
MW-17 W1212062	ND	ND	ND	ND	ND	NR
MW-18 W1212063	ND	ND	ND	ND	ND	NR
WU-LO W1212064	ND	ND	ND	ND	ND	NR
WD-LO W1212065	ND	ND	ND	ND	ND	NR

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**ANALYSIS REPORT**

1020lab.frm

Attention: Mr. Rex Young  
RESNA  
1500 South Union Ave.  
Bakersfield, CA 93307  
Project: 19514-L, Project B2481-42

Date Sampled: 12-1/2-92  
Date Received: 12-03-92  
BTEX Analyzed: 12-4/7-92  
TPHg Analyzed: 12-4/7-92  
TPHd Analyzed: NR  
Matrix: Water

	Benzene ppb	Toluene ppb	Ethyl- benzene ppb	Total Xylenes ppb	TPHg ppb	TPHd ppb
Detection Limit:	0.5	0.5	0.5	0.5	50	50

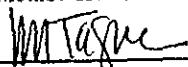
**SAMPLE**  
Laboratory Identification

NU-LO W1212066	ND	1.3	ND	2.7	ND	NR
ND-LO W1212067	ND	1.3	ND	2.4	ND	NR
WU-HI W1212072	ND	0.9	ND	1.8	ND	NR
NU-HI W1212073	ND	0.8	ND	0.8	ND	NR
HI-Y W1212074	ND	0.6	ND	1.1	ND	NR

ppb = parts per billion = µg/L = micrograms per liter.  
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.  
NR = Analysis not requested.

**ANALYTICAL PROCEDURES**

**BTEX**-- Benzene, toluene, ethylbenzene, and total xylene isomers (BTEX) are measured by extraction using EPA Method 5030 followed by analysis using EPA Method 8020/602, which utilizes a gas chromatograph (GC) equipped with a photoionization detector (PID) and a flame-ionization detector (FID) in series.  
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Laboratory Representative

December 11, 1992  
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**ANALYSIS REPORT**

1020lab.frm

Attention: Mr. Rex Young  
RESNA  
1500 South Union Ave.  
Bakersfield, CA 93307  
Project: 19514-L, Project B2481-42

Date Sampled: 12-02-92  
Date Received: 12-03-92  
BTEX Analyzed: 12-08-92  
TPHg Analyzed: 12-08-92  
TPHd Analyzed: NR  
Matrix: Soil

	Benzene	Toluene	Ethyl- benzene	Total Xylenes	TPHg	TPHd
	<u>ppm</u>	<u>ppm</u>	<u>ppm</u>	<u>ppm</u>	<u>ppm</u>	<u>ppm</u>
Detection Limit:	0.005	0.005	0.005	0.005	1.0	1.0


**SAMPLE**  
Laboratory Identification

WU S1212068	ND	ND	ND	ND	ND	NR
WD S1212069	ND	ND	ND	ND	ND	NR
NU S1212070	ND	ND	ND	ND	ND	NR
ND S1212071	ND	ND	ND	ND	ND	NR

ppm = parts per million = mg/kg = milligrams per kilogram.  
ND = Not detected. Compound(s) may be present at concentrations below the detection limit.  
NR = Analysis not requested.

**ANALYTICAL PROCEDURES**

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Laboratory Representative

December 11, 1992  
Date Reported

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(Certification No. 153)

42501 Albrae Street • Fremont, CA 94538 • Phone: (510) 623-0775 • (800) 247-5223 • FAX: (510) 651-8754

**APPENDIX B**  
**Sampling Protocol**



1500 So. Union Avenue  
Bakersfield, California 93307  
Phone: (805) 835-7700  
FAX: (805) 835-7717

**RESNA INDUSTRIES INC.  
1500 SOUTH UNION AVENUE  
BAKERSFIELD, CALIFORNIA 93307**

**SAMPLING PROTOCOL  
QUALITY ASSURANCE & QUALITY CONTROL**

**(QAQC)**

**Revised April 1991**

# SAMPLING PROTOCOL - QUALITY ASSURANCE AND QUALITY CONTROL

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# **SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL**

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RESNA Industries Inc. (RESNA) has adopted the following Site Investigation Quality Assurance/Quality Control (QA/QC) program intended to facilitate the acquisition of accurate and reliable data. Environmental data gathered during the investigation shall be collected and analyzed following procedures prescribed in the Quality Control Program. A Quality Assurance Program has been established to assure that the Quality Control Program is effective. Both programs are necessary to provide accurate data and documentation for investigations and laboratory analyses. The following field and laboratory procedures shall be implemented to ensure that QA/QC objectives are met.

## **1.0 RECORDING OF FIELD DATA**

All information pertinent to the field investigation shall be kept in a field log book. In addition, boring log and chain-of-custody comprise the field documents in which all of the pertinent information about bore hole soil samples are recorded. Information to be documented includes at least the following:

- Sample number.
- Locations of sample collection.
- Soil boring or well numbers, as applicable.
- Depths at which samples were obtained.
- Names of collectors.
- Dates and times of collection.
- Purpose of sample.
- Sample distribution (e.g., laboratory, archive, etc.).
- Field observations.
- Field measurements (e.g., PID readings, pH, conductivity, water levels).
- Other data records (e.g., development log, soil sampling report, well log, etc.).

## **2.0 SAMPLE CONTAINERS**

Groundwater samples shall be placed in containers supplied by RESNA or an analytical laboratory. Table 1 summarizes the required sample containers.

Soil samples shall be collected in either 8-ounce widemouth glass jars with screw-on caps lined with teflon or in brass or stainless steel tubes (Table 1). Screw-on caps for the tubes shall be fitted with teflon liners. Tubes shall be tightly capped and sealed with integrity tape.

## **3.0 QUALITY CONTROL OF WATER SAMPLES**

A QC program independent from the laboratory's program shall be maintained. The program entails submittals of travel blanks, duplicates, and field blanks to a certified laboratory. No spiked samples shall be supplied from the field; the laboratory in-house QC program shall include analysis of spiked samples. Field blanks shall be assigned independent sample numbers and made indistinguishable from non quality control samples.

## **SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL**

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### **3.1 Travel Blanks**

When sampling groundwater, travel blanks shall be used to detect the introduction of contaminants during transportation from the field to the laboratory. The travel blanks shall be provided by RESNA or the analytical laboratory. They shall be taken to the field and accompany the collected groundwater samples to the laboratory for analysis. The blanks shall consist of deionized water or analytically confirmed organic-free water. The blank is numbered, packaged, and sealed in the same manner as the other samples.

### **3.2 Duplicates**

Five percent (1 in 20) or one (1) per sampling set, whichever is more, shall be submitted to the laboratory for analysis as duplicates. Therefore, if a job site has one (1) and up to twenty (20) wells to be sampled, one (1) duplicate shall be analyzed. If twenty-one (21) wells are to be sampled then two (2) duplicates shall be analyzed. The duplicate is acquired by filling two sample bottles from the same well bailer. If more than one bailer volume is required, each bailer volume shall be split between containers. The duplicates shall be labeled as duplicate without identifying the actual well location either on the chain-of-custody or on the actual sample. The actual well location of the duplicate shall be noted in the field log book.

### **3.3 Field Blanks**

Field blanks shall be prepared and submitted to the analytical laboratory for analysis on the same frequency stated for duplicates. A field blank shall be acquired by sampling the deionized water used to rinse the sampling bailer in between sample points.

### **3.4 Sample Preservation**

Sample containers shall be pre-cooled and transported to the site in coolers. All samples shall be preserved as indicated on Table 1 and placed in coolers immediately after collection. Sealed chemical ice shall be used in the coolers to maintain samples at a temperature of 4 degrees celsius. A high level recording thermometer shall accompany the samples during transport conditions.

## **4.0 GROUNDWATER SAMPLING PROTOCOL**

Immediately prior to sampling, the depth to water (DTW) in the well shall be recorded. If there is free product in the well, the thickness of product on top of the groundwater shall be measured using an interface probe.

If free product is detected, analysis of groundwater at the interface for dissolved product shall not be conducted. A product sample shall be collected for source identification. If all free product cannot be removed, an interval-specific sampling device may be utilized to collect a sample from below the

## **SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL**

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zone of free product. The well shall be purged until indicator parameters (temperature, conductivity and pH) are stabilized. This shall entail the removal of at least four well-casing volumes by bailing or pumping. The criteria for determining well-casing volumes and temporary storage of purged water is outlined in Section 9.0, (Well Development Protocol). The indicator parameter measurements shall be taken both before and after purging of each well-casing volume. Once the well is purged and indicator parameters have stabilized, a sample may be collected after the water level has reached 80 percent of its initial elevation. Where water level recovery is slow, the sample may be collected after stabilization is achieved and enough water is present to fill sample containers.

Cross contamination from transferring pumps (or bailers) from well to well shall be avoided by utilizing dedicated equipment. Where this is not feasible, thorough cleaning of equipment shall be performed between sampling rounds. Sampling shall proceed from the least contaminated to the most contaminated well, if that information is available before sample collection, or if it is indicated by field evidence. Where several types of analysis shall be performed for a given well, individual samples shall be collected in the following order:

1. Volatile organics
2. Purgeable organics
3. Purgeable organic halogens
4. Total organics
5. Total organic halogens
6. Extractable organics
7. Total metals
8. Dissolved metals
9. Phenols
10. Cyanide

The specific analytical methods to be utilized for the common volatile/semi-volatile analyses are shown on Table 2.

Duplicate samples shall be transferred to vials or containers that meet Regional Board specifications (Table 1). Groundwater from the bailer shall be transferred to the sample container by allowing the fluid to flow slowly along the sides of the vessel. All containers shall be filled above the top of the opening to form a positive meniscus. No head space should be present in the sample container once it is sealed. After the vial is capped it should be inverted to check for air bubbles. If bubbles are present the sample should be discarded and replaced. If it is not possible to collect a sample without air bubbles, the problem shall be noted in the field log book.

### **5.0 CHAIN-OF-CUSTODY PROCEDURES**

#### **5.1 Sample Labels**

Each sample container shall be labeled prior to filling to prevent misidentification. The label shall contain at least the following information:

## **SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL**

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- Sample number which uniquely identifies the sample
- Project title or number
- Location of sample collection
- Soil boring or well number, as applicable
- Name of collector
- Date and time of collection

### **5.2 Chain-of-Custody Record and Sample Analysis Request Form**

A chain-of-custody record for each container or sample shall be used to track possession of the samples from the time they were collected in the field until the time they are analyzed in the laboratory.

The chain-of-custody record shall contain the following information:

1. Site name or project number
2. Signature of collector
3. Date and time of collection
4. Sample identification number(s)
5. Number of containers in sample set
6. Description of sample and container(s)
7. Name and signature of persons, and the companies or agencies they represent, who are involved in the chain-of-custody
8. Inclusive dates and times of possession
9. Type of analysis requested

### **5.3 Delivery of Samples to Laboratory**

Samples shall be delivered to the laboratory on a daily basis. Samples shall be maintained at approximately 4 degrees celsius for shipping. Shipping containers shall be sealed with security tape to assure sample integrity during shipping. Delivered samples shall be accompanied by a chain-of-custody record. The laboratory shall note on the chain-of-custody that samples were properly preserved and security tape was intact upon arrival.

## **6.0 SAMPLING AND DRILLING EQUIPMENT DECONTAMINATION**

Prior to arriving at the sampling site, all sampling equipment shall be cleaned with laboratory grade detergent (Alconox or equivalent) and rinsed twice with tap water. This procedure shall also be carried out on-site before sampling of any additional monitoring wells.

All decontamination shall be conducted on an impermeable surface and all decontamination effluent shall be contained. All surfaces of the equipment shall be thoroughly decontaminated using a steam cleaner. The equipment shall be placed on a drying rack for air drying. The water used for decontamination shall be stored in containers certified for hazardous materials storage and disposed of in an approved manner.

# SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL

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## 7.0 FIELD EQUIPMENT CALIBRATION AND MAINTENANCE

The following measuring equipment may be used during the Site Investigation and/or sample collection. Calibration procedures and frequency are listed for each piece.

Soil Borings and Well Dimensions - Steel and coated cloth tape. Calibration: none.

Water Level Measurements in Wells - Water Sensing tape. Calibration: Manufacturer supplied temperature correction shall be applied as applicable for field conditions. Electrical well sounders.

Total Organic Vapors - Foxboro OVA, flame ionization detector (FID). Calibration: Daily field calibration using manufacturer recommended procedures.

Organic Vapors - Photovac, photoionization detector (PID). Calibration: Daily field calibration using an isobutylene standard as per manufacturer instructions.

Groundwater pH Measurement - Digital pH meter. Calibration: Standard pH solutions of 4, 7, and 10 shall be utilized for daily field calibration according to manufacturer instructions.

Electrical Conductivity - Electrical conductivity meter. Calibration: Factory-calibrated annually and periodically calibrated against laboratory prepared standard calibration solution.

Water Temperature - Alcohol or digital thermometers. Calibration: Factory-calibrated once.

Combustible Gas/Oxygen - Gastech LEL, combustible gas/oxygen meter calibration: Factory calibrated, field calibrated monthly, zeroed daily according to manufacturer's instructions.

Miscellaneous Measuring Devices - Calibration procedures for any other measuring device used shall be documented at the request of the regulatory authority.

All equipment shall be checked before use and replaced as necessary. Instrument manuals and an instrument log book shall accompany equipment into the field. Any calibrations, repairs or related information shall be recorded in the log book.

## 8.0 GROUNDWATER MONITORING PROTOCOL

Monitoring of depth to water and free product thickness within wells at the site shall be conducted using an interface probe or conductivity meter. For consistency, all measurements shall be taken from

## **SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL**

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the north side of the wellhead at the survey mark. To assess potential infiltration of fine-grained sediments, total well depth shall also be sounded.

Newly installed wells shall be allowed to stabilize for 24 hours after development prior to free product inspection. A clean bailer or sampler shall be used for visual inspection of the groundwater in order to note sheens (difficult to detect with the interface probe), odors, microbial action and sediments.

To reduce the potential for cross contamination between wells, the monitoring shall take place in order from the least to the most contaminated, if known. Wells containing free product shall be monitored last. Between each well monitoring, the equipment shall be decontaminated.

Water level data collected from the wells shall be used to develop a groundwater contour map for the project site. Groundwater flow shall be estimated to be perpendicular to equipotential lines drawn on the map.

### **9.0 WELL DEVELOPMENT PROTOCOL**

Groundwater monitoring wells shall be surged and developed prior to setting the surface seal. Approximately 3 to 5 times the volume of water in the casing shall be withdrawn if possible. Casing volumes shall be calculated in the following manner:

#### **Volume of Schedule 40 PVC Pipe**

Diameter (inches)	I.D. (inches)	Volume (gal/linear ft.)
2	2.067	0.17
4	4.026	0.66

If the aquifer is slow to recharge, development shall continue until recharge is too slow to practically continue. The volume of water produced, versus time, shall be recorded.

All withdrawn groundwater shall be stored on-site in 55-gallon waste drums unless permission is granted by the appropriate regulatory agency to discharge the water to the ground surface or sanitary sewer. Drummed water shall be labeled with the source of the water to help ensure appropriate disposal based on contamination levels.

### **10.0 QUALITY CONTROL OF SOIL SAMPLES**

#### **10.1 Travel Blanks**

Travel blanks shall not be used for soil sample transportation due to problems associated with obtaining a blank material.



### **10.2 Duplicates**

The effort to collect duplicate soil samples from a bore hole may be compromised by variations of soil texture. This shall be minimized by selecting a duplicate sample location as near as possible to the actual sample. In a split-spoon sampler the lowest tube shall be a duplicate when needed. The middle tube shall be the actual sample. All soil sample tubes shall be marked to show from which end the tube is to be sampled. The ends, where the two sample tubes joined shall be marked. The laboratory shall be instructed to sample the marked end. The upper tube shall be used for soil characterization.

The frequency with which soil duplicates are taken shall be at a minimum five (5) percent (1 in 20). In bore-holes the samples are best collected below the five foot depth in zones of either low or no transition.

When sampling soil piles or tank pits the top inch or two shall be removed before sampling. Efforts shall be made to avoid areas where soil texture changes. Fill the sample jar completely full avoiding any unnecessary head space in the sample jar.

Duplicate soil samples shall be labeled as duplicate without any other identification. A record of its actual sampling point shall be kept in the field log book.

### **10.3 Field Blanks**

A soil field-blank from a bore hole would be best sampled from the top of the bore hole i.e. the first sample depth (not to be greater than five feet) and only if there is no indication of contaminants. The blank should be labeled as to the boring number, depth, and B for blank. For example, a blank obtained from soil boring number two (2), at a depth of five feet would be labeled as SB2-5B. The frequency of blanks may differ than that of duplicates, but when possible they shall be of the same frequency, five (5) percent (1 in 20).

A blank from a soil pile or tank pit shall be taken from the surface material only. It shall be taken in a zone where no contamination is indicated.

## **11.0 SOIL SAMPLING PROTOCOL**

### **11.1 Sample Collection During Drilling Activities**

A proposal shall be submitted to the lead Regulatory Authority with proposed boring/sampling locations. The exact location and number of borings at each site shall be determined in the field by the Project Geologist/Engineer.

Prior to arriving at the sample site, the drill rig/augers shall be steam cleaned and all sample equipment shall be cleaned. Cleaning between samples shall be conducted on-site on all sampling equipment.

## **SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL**

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Soil samples shall be obtained using a California modified split-spoon sampler containing three, six inch long, two inch diameter brass tubes. The sampler shall be driven 18 inches ahead of the hollow stem auger by a 140-pound hammer with a 30-inch drop in accordance with American Society for Testing and Materials (ASTM Method D 1586-84) for split-barrel sampling of soil and (ASTM Method D 1587-83) for thin-walled tube sampling of soils. The blows required to drive the sampler each six-inch interval shall be recorded on the boring log. The sampler shall be removed from the boring and opened to reveal the brass tubes. The middle tube shall be covered with teflon and plastic end caps, taped, labeled, and placed into a cooler containing frozen chemical. A high level temperature recording thermometer shall accompany sample shipments to ensure proper temperature maintenance. The samples shall be delivered to a state certified laboratory, with a chain-of-custody, following all protocols, within 48 hours of sampling.

Soil in the uppermost brass tube shall be described according to ASTM standard practice for physical description and identification of soils (ASTM Method D 2488-84). Stratigraphic, genetic and other data/interpretations shall also be recorded on a log prepared for each boring/well. The second sample tube may be used with the lowermost tube for preparation of duplicates.

Soil samples shall be collected at five foot intervals, at significant changes in lithology and intervals of obvious contamination in order to develop a complete profile of soil contamination.

### **11.2 Sample Collection During Tank Removal**

Soil samples shall be collected as soon as possible after removal of the tank. Where feasible, all preparations for soil sampling shall be made prior to tank removal. Soil samples collected from a backhoe bucket or directly from the excavation floor shall be collected in glass sampling jar with a Teflon lined screw cap. When sampling, the jar should be filled with soil as completely as possible.

### **11.3 Sampling from Soil Piles or Shallow Soil Pits**

Soil samples shall be collected and transported from excavated material in the manner described in the previous section, however, a backhoe shall not be utilized. If composite samples are collected, four sample jars shall be collected for every 50 cubic yards of material to be sampled unless otherwise specified by the lead regulatory agency. The samples shall be composited by the state certified analytical laboratory personnel prior to testing.

# SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL

**TABLE 1**  
**Sample Containers, Holding Times and Preservation**

Parameter	Matrix	Container	Holding Time	Preservation
<b>Total Petroleum Hydrocarbons</b>	Soil	3" stainless steel or brass cylinder	14 days <sup>1</sup> 40 days <sup>3</sup>	4°C
	Water	(2) 40ml glass vial teflon-faced silicon septum	7 days <sup>1</sup> 14 days <sup>2</sup>	4°C, HCl to pH 2
<b>Benzene Toluene Xylene Ethylbenzene</b>	Soil	3" stainless steel or brass cylinder	14 days <sup>1</sup>	4°C
	Water	(2) 40ml glass vial teflon-faced silicon septum	7 days <sup>1</sup> 14 days <sup>2</sup>	4°C, HCl to pH 2
<b>Purgeable Hydrocarbon</b>	Soil	3" stainless steel or brass cylinder	14 days <sup>1</sup>	4°C
	Water	(2) 40ml glass vial teflon-faced silicon septum	7 days <sup>1</sup> 14 days <sup>2</sup>	4°C, HCl to pH 2
<b>Organiclead</b>	Soil	3" stainless steel or brass cylinder	14 days <sup>1</sup>	4°C
	Water	(2) 40ml glass vial teflon-faced silicon septum	14 days <sup>1</sup>	4°C
<b>Ethylene Dibromide</b>	Soil	3" stainless steel or brass cylinder	14 days <sup>3</sup>	4°C
	Water	(2) 40ml glass vial teflon-faced silicon septum	14 days <sup>1</sup>	4°C
<b>Polynuclear Aromatic Hydrocarbons</b>	Soil	8 oz. wide mouth glass with teflon seal	14 days <sup>2</sup> 40 days <sup>3</sup>	4°C
	Water	1000 ml amber glass with teflon seal	7 days <sup>1</sup> 40 days <sup>3</sup>	4°C

**Notes:**

- 1 Maximum holding time for sample (sample must be extracted within this time or analyze if extraction is not required).
- 2 Maximum holding time for sample if preserved with HCl,  
**Caution:** HCl is a strong acid, avoid eye and skin contact
- 3 Maximum holding time for extract (sample must be analyzed within this time)

# SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL

**TABLE 1**  
**Sample Containers, Holding Times and Preservation**

Parameter	Matrix	Container	Holding Time	Preservation
<b>Poly-Chlorinated Biphenyls</b>	Soil	8 oz. wide mouth glass with teflon seal	7 days <sup>1</sup> 40 days <sup>3</sup>	4°C
	Water	1000 ml amber glass with teflon seal	7 days <sup>1</sup> 40 days <sup>3</sup>	4°C
<b>Total Metals</b>	Soil	3" stainless steel or brass cylinder	6 months	
	Water	1000 ml plastic	6 months	pH < 2 HNO <sub>3</sub>
<b>Dissolved Metals</b>	Water	1000 ml plastic .45 Micron Filtration	6 months	pH < 2 HNO <sub>3</sub>
<b>Pesticides</b>	Soil	3" stainless steel or brass cylinder	14 days <sup>3</sup>	4°C
	Water	1000 ml amber glass	7 days <sup>1</sup> 40 days <sup>3</sup>	4°C

**Notes:**

- 1 Maximum holding time for sample (sample must be extracted within this time or analyze if extraction is not required).
- 2 Maximum holding time for sample if preserved with HCl,  
**Caution:** HCl is a strong acid, avoid eye and skin contact
- 3 Maximum holding time for extract (sample must be analyzed within this time)

## SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL

**TABLE 2**

**Laboratory Test Methodology  
Underground Tank Sites**

Type Hydrocarbon	Soil Analysis		Water Analysis	
<b>Unknown Fuel</b>	TPH-G	GCFID(5030)	TPH-G	GCFID(5030)
	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Leaded Gas</b>	TPH-G	GCFID(5030)	TPH-G	GCFID(5030)
	BTX&E	8020 or 8240	BTX&E	602 or 624
	-----Optional-----			
	TEL	DHS-LUFT	TEL	DHS-LUFT
	EDB	DHS-AB1803	EDB	DHS-AB1803
<b>Unleaded Gas</b>	TPH-G	GCFID(5030)	TPH-G	GCFID(5030)
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Diesel</b>	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Jet Fuel</b>	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Kerosene</b>	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Fuel Oil</b>	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Chlorinated Solvents</b>	Cl HC	8010 or 8240	Cl HC	601 or 624
	BTX&E	8020 or 8240	BTX&E	602 or 624
<b>Non Chlorinated Solvents</b>	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	TX&E	602 or 624
<b>Waste Oil or Unknown</b>	TPH-G	GCFID(5030)	TPH-G	GCFID(5030)
	TPH-D	GCFID(3550)	TPH-D	GCFID(3510)
	BTX&E	8020 or 8240	BTX&E	602 or 624
	O & G	418.1	O & G	418.1
	Cl HC	8010 or 8240	Cl HC	601 or 624
<b>Metals:</b> Cadmium (Cd) Chromium (Cr) Lead (Pb) Zinc (Zn)	ICAP or AA		ICAP or AA	
Polychlorinated Biphenyls (PCB) Polynuclear Aromatic (PNA) (PCP)	8270		8270	

# SAMPLING PROTOCOL-QUALITY ASSURANCE AND QUALITY CONTROL

## TABLE 3

### ABBREVIATIONS

<b>TPH-G</b>	=	Total Petroleum Hydrocarbon as Gasoline
<b>TPH-D</b>	=	Total Petroleum Hydrocarbon as Diesel
<b>BTX&amp;E</b>	=	Benzene, Toluene, Xylenes, & Ethylbenzene
<b>GCFID</b>	=	Gas Chromatograph with a Flame Ionization Detector
<b>Cl HC</b>	=	Chlorinated Hydrocarbons
<b>ICAP</b>	=	Inductively Coupled Argon Plasma
<b>AA</b>	=	Atomic Absorption
<b>O&amp;G</b>	=	Oil & Grease
<b>DHS</b>	=	Department of Health Services
<b>AB1803</b>	=	Assembly Bill 1803
<b>418.1</b>	=	EPA Method for Total Recoverable Petroleum Hydrocarbons
<b>601</b>	=	EPA Method for Volatile Halogenated Organics
<b>602</b>	=	EPA Method for Volatile Aromatics
<b>624</b>	=	EPA Method for Purgeables Halogenated & Aromatics
<b>3510</b>	=	EPA Method Extraction by Liquid-Liquid Separatory Funnel
<b>3550</b>	=	EPA Method Extraction by Sonication
<b>5030</b>	=	EPA Method Extraction by Purge and Trap
<b>8010</b>	=	EPA Method for Halogenated Volatile Organics
<b>8015</b>	=	EPA Method for Nonhalogenated Volatile Organics
<b>8020</b>	=	EPA Method for Aromatic Volatile Organics
<b>8240</b>	=	EPA Method for Volatile Organics/Mass Spectrometry
<b>8270</b>	=	EPA Method for Semivolatile Organic/Capillary Column