

3315 Almaden Expressway, Suite 34  
San Jose, CA 95118  
Phone: (408) 264-7723  
FAX: (408) 264-2435

August 18, 1993  
0811BCHA.4494

Mr. Barney Chan  
Alameda County Health Care Services Agency  
80 Swan Way, Room 200  
Oakland, California 94624

Subject: Response to Your Letter Dated May 24, 1993 Concerning the Report of Findings Underground Gasoline Tank Removal and Replacement at ARCO Station 4494, 566 Hegenberger Road, Oakland, California.

Mr. Chan:

On behalf of Arco Products Company (ARCO) this letter is written in response to your letter dated May 24, 1993 (Attachment A) concerning the Report of Findings Underground Gasoline Tank Removal and Replacement (Tank Report) at ARCO Station 4494, 566 Hegenberger Road, Oakland, California. The following paragraphs specifically address ARCO's response to Items 1 through 4 of your letter.

ARCO Responses

1. The "hydrocarbon fingerprinting analyses data" you requested in Item 1 of your letter (Attachment A) was submitted to your office in May 1993 as "Appendix H - Fingerprint Analytical Reports" of the Report of Findings Underground Gasoline Tank Removal and Replacement. These analyses were performed by Core Laboratories in Long Beach, California and ARCO Petroleum Products Company Laboratory in Carson, California. Copies of the analytical reports are included in Attachment B of this letter.

The second comment in Item 1 of your letter requested that your office be informed how any release from the former tanks will be distinguished from that of the black hydrocarbon product. RESNA does not anticipate it will be necessary to distinguish the released gasoline from the black hydrocarbon product because 1) source removal

Response Letter  
ARCO Station 4494, Oakland, California

August 18, 1993  
69038.13

of gasoline impacted soil occurred on December 17 and 18, 1992 and 2) a slurry wall has been constructed to mitigate the flow of black hydrocarbon product into the former tank pit.

- 1) ARCO conducted a remedial excavation of gasoline impacted soils, subsequent to discovery of a release of gasoline hydrocarbons from the former underground storage tanks. Laboratory results of soil samples collected from the former gasoline tank pit to verify removal of impacted soil indicated TPHg concentrations ranging from 2 parts per million (ppm) to 33 ppm (RESNA, May 17, 1993).
- 2) ARCO has constructed a slurry wall as a barrier between the storm drain backfill and the former tank pit backfill. The slurry wall is located along the northeastern portion of the former tank pit parallel to the storm drain to mitigate the flow of black hydrocarbon product into the backfilled former tank pit.

However, if the black hydrocarbon product needs to be distinguished from the gasoline, both compounds have separate characteristics and can be identified by field observations and laboratory analyses. The black hydrocarbon product is characterized as a hydrocarbon compound that is significantly heavier than the gasoline generated from the former tanks and physically appears black. The following three paragraphs explain the results of laboratory analyses of the black hydrocarbon product collected from a "grab" water sample.

As stated in RESNA's Tank Report, the black hydrocarbon product observed seeping into the northeastern corner of the former tank pit during remedial excavation activities appears to have migrated from an offsite source through the sand and gravel trench backfill material of a 6-foot-diameter storm drain. The black hydrocarbon product was visibly different than the gasoline impacted soils observed in the field. It appeared that the black hydrocarbon product was ponding on groundwater in the bottom of the tank pit. As requested by your office, a "grab" water sample was collected from the bottom of the tank pit and submitted for analyses. ARCO submitted a split "grab" water samples TP-2s and TP-2b to Core Laboratories and ARCO's Laboratory for fingerprinting analyses.

As presented in Core Laboratories analytical report, the simulated distillation test method used on split sample TP-2s, collected from the former tank pit, identified the black hydrocarbon compound as being heavier than gasoline. According to Greg Cook of Core Laboratories (personal communication, August 1993), the initial

Response Letter  
ARCO Station 4494, Oakland, California

August 18, 1993  
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boiling point for the black hydrocarbon compound was 200 degrees Fahrenheit, which is significantly higher than the typical gasoline initial boiling point of 90 to 100 degrees Fahrenheit (Attachment C). Core Laboratories Sample 930006-1 Distillation Profile included in the Tank Report and attached as Attachment B, includes a graph showing the Percent Evaporated versus Temperature for the subject compound. As seen in the graph, the black hydrocarbon compound (sample 930006-1) initially evaporates at temperatures equivalent to Jet-A fuel and #2 diesel fuel. After reaching a temperature of approximately 500 degrees Fahrenheit, the compound begins to simulate a profile more equivalent to motor oil.

Based on the results generated at ARCO's laboratory, the black hydrocarbon product (split sample TP-2S) did not resemble any of ARCO's finished products.

Additionally, laboratory results of soil samples collected from boring B-1, drilled in the immediate vicinity of the former waste oil tank (removed in December 1989), indicated Oil and Grease concentrations attenuating with depth to levels below laboratory detection limits.

Based on the above fingerprinting analytical results and field activities, gasoline hydrocarbons released from the former tanks appears to have been remediated during tank removal operations and does not appear to be present in the "grab" water sample collected from the bottom of the former tank pit.

2. As discussed in our telephone conversation on June 30, 1993 and RESNA's Follow-up letter dated July 13, 1993 (Attachment D), ARCO will not replace MW-2 but instead will use monitoring wells MW-5 and MW-6 to evaluate groundwater downgradient of the former tank pit.
3. Recovery well RW-1 will be monitored on a monthly basis for the presence of free product. If during the monitoring period free product is detected, ARCO will implement procedures to remove the free product at that time.
4. RESNA recommended this site for alternative points of compliance based on the following:
  - Based on site specific subsurface data from previous environmental investigations at the site and published geologic literature the site is underlain by water bearing soils that typically produce low yielding wells. The subject

Response Letter  
ARCO Station 4494, Oakland, California

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site is located along the eastern margin of San Francisco Bay within the East Bay Plain. The site and vicinity were formerly occupied by shallow tidal marshes, and a channelized tidal slough is still located directly west of the site, across Hegenberger Road. Helley and others (1979) mapped the earth materials underlying the site area as being Holocene bay mud estuarine deposits composed of unconsolidated, water-saturated, dark plastic clay and silty clay rich in organic materials, with local lenses and stringers of well-sorted silt, fine sand, and peat. These estuarine materials, known locally as Bay Mud, were deposited primarily in brackish- to salt-water marshes along the margins and beneath the waters of San Francisco Bay during interglacial periods before and after the Wisconsin Glaciation in late Pleistocene time (Goldman, 1969).

The Bay Mud acts as a barrier to the vertical movement of salt water from San Francisco Bay into the older alluvium. The Bay Mud is generally water-saturated because most of it lies below the water table. However, it is not considered as a useable source of groundwater to wells because of its low permeability and because it is believed to contain mostly salt water (Hickenbottom and Muir, June 1988).

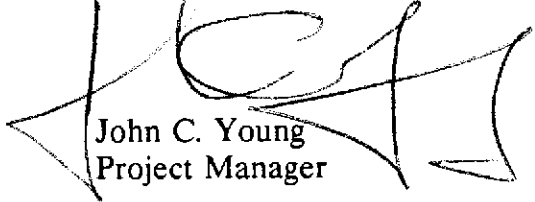
- Source removal was conducted during tank removal and replacement operations. The former tanks and product lines were removed in December 1992. Gasoline impacted soil was excavated and removed from the site during remedial activities.
- Analytical results of groundwater samples from groundwater monitoring wells located upgradient, crossgradient and downgradient of the former tank pit and product lines indicated TPHg and BTEX concentrations were less than laboratory detection limits.
- Because typical Bay Muds possess low permeability and when saturated produce low yielding wells remedial technologies such as pump-and-treat, vapor extraction and air sparging do not appear to be feasible at this site.
- RESNA recommends that quarterly groundwater monitoring continue to evaluate TPHg and BTEX concentrations across the site.

Response Letter  
ARCO Station 4494, Oakland, California

August 18, 1993  
69038.13

If you have any questions or comments concerning this matter, please contact us at (408) 264-7723.

Sincerely,  
RESNA Industries Inc.

  
John C. Young  
Project Manager

cc: Mr. Michael Whelan, ARCO Products Company  
Mr. Britt Johnson, ACHCSA

encl: References

- Attachment A - Letter from the ACHCSA to ARCO dated May 24, 1993
- Attachment B - Fingerprint Analyses Reports
- Attachment C - Core Laboratory Facsimile
- Attachment D - RESNA Follow-up Letter to ACHCSA dated July 13, 1993

## REFERENCES

- Goldman, Harold B. 1969. Geology of San Francisco Bay, Alameda County, California. California Division of Mines and Geology Special Report 97, pgs. 9 - 27.
- Helley, E. S., K. R. Lajoie, W. E. Spangle, and M. L. Blair. 1979. Flatland Deposits of the San Francisco Bay Region, California, U.S. Geological Survey Professional Paper 943.
- Hickenbottom, Kelvin, and Muir, Kenneth. June 1988. Geohydrology and Groundwater Quality Overview of the East Bay Plain Area, Alameda County, California. Alameda County Flood Control and Water Conservation District Report 205 (J).
- RESNA. May 17, 1993. Report of Findings Underground Gasoline-Storage Tank Removal and Replacement at ARCO Station 4494, 566 Hegenberger Road in Oakland, California. RESNA Report 69038.13.

**ATTACHMENT A**

**LETTER FROM THE ACHCSA TO ARCO  
(DATED MAY 24, 1993)**

ALAMEDA COUNTY  
HEALTH CARE SERVICES  
AGENCY

DAVID J. KEARS, Agency Director



MAY 1993

RAFAT A. SHARID, ASST. AGENCY DIRECTOR

May 24, 1993  
StID # 3854

DEPARTMENT OF ENVIRONMENTAL HEALTH  
State Water Resources Control Board  
Division of Clean Water Programs  
1000 Lakeside Drive, 3rd Floor  
1000 Lakeside Drive, Room 300  
Oakland, CA 94621  
(510) 871-4530

Mr. Michael Whelan  
ARCO Products Company  
P.O. Box 5811  
San Mateo, CA 94402

**Re: Comment on May 17, 1993 Report of Findings Underground  
Gasoline Tank Removal and Replacement at 566 Hegenberger  
Rd., Oakland CA 94621**

Dear Mr. Whelan:

Our office has received and reviewed the above referenced report as prepared by Resna for ARCO. We would like to comment on the conclusions and recommendations which follow the text of the report.

1. The last point of the Conclusion section states that the black hydrocarbon product does not resemble any of ARCO's finished products. Please provide the "hydrocarbon fingerprinting analyses data" which documents this conclusion. Please also inform our office how any release from the former tanks (TPHg and BTEX) will be distinguished from that of the black hydrocarbon product.
2. The first point of the Recommendations states that MW-2, the decommissioned well, will be replaced with a 4-inch well in the area of this former well. Please insure that this well is installed into native soils as oppose to backfilled materials.
3. The second point of the Recommendations refers to RW-1, the recovery well installed between the slurry wall and the storm drain. Please verify that in addition to monitoring for the presence of the black hydrocarbon on a monthly basis, you will also take steps to remove all free product at the same time.
4. The third point of the Recommendations states that this site may qualify for alternate points of compliance. Please verify that the conditions necessary for this remedial approach exist at this site ie low yielding soils exist, alternate or best available technologies are inappropriate or not cost-effective and that an acceptable plan for containing and managing the remaining contamination exists. (It is acknowledged that adequate source removal has already been done). Given the previous groundwater gradient determined for this site, additional well(s) may be appropriate at compliance points on-site to monitor any groundwater impact from the former dispenser islands.

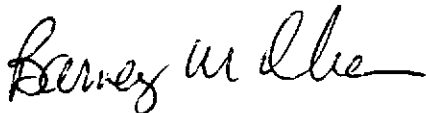


Mr. Michael Whelan  
StID #3854  
566 Hegenberger Rd.  
May 24, 1993  
Page 2.

Please provide written comment to the above items to our office. This may be included in separate letter or included as a signed letter attached to your next quarterly monitoring report for this site.

You may contact me at (510) 271-4530 if you have any questions.

Sincerely,



Barney M. Chan  
Hazardous Materials Specialist

cc: G. Jensen, Alameda County District Attorney Office  
R. Hiatt, RWQCB  
J. Young, RESNA, 3315 Almaden Expressway, Suite 34, San  
Jose, CA 95118  
E. Howell, files

3-566Heg

**ATTACHMENT B**  
**FINGERPRINT ANALYSES REPORTS**

**APPENDIX H**  
**FINGERPRINT ANALYTICAL REPORTS**





# CORE LABORATORIES

CORE LABORATORIES  
ANALYTICAL REPORT

Job Number: 930006

Prepared For:

RESNA Company  
Robert D. Campbell  
3315 Almaden Expressway, Suite 34  
San Jose, CA 95118

Date: 01/05/93

  
\_\_\_\_\_  
Signature

1/5/93  
\_\_\_\_\_  
Date:

Name: Ryan S. Nakatani

Core Laboratories - Long Beach  
3700 Cherry Avenue  
Long Beach, CA 90807

Title: Laboratory Supervisor



# CORE LABORATORIES

## LABORATORY TESTS RESULTS

01/05/93

JOB NUMBER: 930006

CUSTOMER: RESNA Company

ATTN: Robert D. Campbell

CLIENT I.D.....: TP-25  
 DATE SAMPLED.....: 12/28/92  
 TIME SAMPLED.....: 07:00  
 WORK DESCRIPTION...: TP-25

LABORATORY I.D....: 930006-0001  
 DATE RECEIVED....: 12/31/92  
 TIME RECEIVED....: :  
 REMARKS.....: 3 - 40 ml vials

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Simulated Distillation, Distillate		*1		ASTM D-2887	01/05/93	FA
IBP	215	1	Deg F	ASTM D-2887		
1 % Off	238	1	Deg F	ASTM D-2887		
2 % Off	279	1	Deg F	ASTM D-2887		
3 % Off	299	1	Deg F	ASTM D-2887		
4 % Off	320	1	Deg F	ASTM D-2887		
5 % Off	327	1	Deg F	ASTM D-2887		
6 % Off	333	1	Deg F	ASTM D-2887		
7 % Off	341	1	Deg F	ASTM D-2887		
8 % Off	352	1	Deg F	ASTM D-2887		
9 % Off	359	1	Deg F	ASTM D-2887		
10 % Off	363	1	Deg F	ASTM D-2887		
11 % Off	368	1	Deg F	ASTM D-2887		
12 % Off	372	1	Deg F	ASTM D-2887		
13 % Off	378	1	Deg F	ASTM D-2887		
14 % Off	384	1	Deg F	ASTM D-2887		
15 % Off	387	1	Deg F	ASTM D-2887		
16 % Off	391	1	Deg F	ASTM D-2887		
17 % Off	393	1	Deg F	ASTM D-2887		
18 % Off	396	1	Deg F	ASTM D-2887		
19 % Off	399	1	Deg F	ASTM D-2887		
20 % Off	401	1	Deg F	ASTM D-2887		
21 % Off	404	1	Deg F	ASTM D-2887		
22 % Off	406	1	Deg F	ASTM D-2887		
23 % Off	409	1	Deg F	ASTM D-2887		
24 % Off	412	1	Deg F	ASTM D-2887		
25 % Off	416	1	Deg F	ASTM D-2887		
26 % Off	420	1	Deg F	ASTM D-2887		
27 % Off	424	1	Deg F	ASTM D-2887		
28 % Off	428	1	Deg F	ASTM D-2887		
29 % Off	432	1	Deg F	ASTM D-2887		
30 % Off	435	1	Deg F	ASTM D-2887		
31 % Off	437	1	Deg F	ASTM D-2887		
32 % Off	440	1	Deg F	ASTM D-2887		
33 % Off	442	1	Deg F	ASTM D-2887		
34 % Off	445	1	Deg F	ASTM D-2887		
35 % Off	449	1	Deg F	ASTM D-2887		
36 % Off	456	1	Deg F	ASTM D-2887		
37 % Off	465	1	Deg F	ASTM D-2887		
38 % Off	474	1	Deg F	ASTM D-2887		
39 % Off	480	1	Deg F	ASTM D-2887		
40 % Off	485	1	Deg F	ASTM D-2887		
41 % Off	495	1	Deg F	ASTM D-2887		
42 % Off	509	1	Deg F	ASTM D-2887		

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The information contained in this report is based upon observations and computer calculations. The information is confidential and its use for any other purpose is prohibited. Core Laboratories, Inc. does not assume any responsibility for the accuracy of the information presented. Core Laboratories, Inc. does not assume any responsibility for the accuracy of the information presented. Core Laboratories, Inc. does not assume any responsibility for the accuracy of the information presented.



# CORE LABORATORIES

## LABORATORY TESTS RESULTS 01/05/93

JOB NUMBER: 930006

CUSTOMER: RESNA Company

ATTN: Robert D. Campbell

CLIENT I.D.....: TP-25  
 DATE SAMPLED.....: 12/28/92  
 TIME SAMPLED.....: 07:00  
 WORK DESCRIPTION...: TP-25

LABORATORY I.D....: 930006-0001  
 DATE RECEIVED....: 12/31/92  
 TIME RECEIVED....: :  
 REMARKS.....: 3 - 40 ml vials

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
43 % Off	520	1	Deg F	ASTM D-2887		
44 % Off	532	1	Deg F	ASTM D-2887		
45 % Off	544	1	Deg F	ASTM D-2887		
46 % Off	560	1	Deg F	ASTM D-2887		
47 % Off	573	1	Deg F	ASTM D-2887		
48 % Off	589	1	Deg F	ASTM D-2887		
49 % Off	605	1	Deg F	ASTM D-2887		
50 % Off	622	1	Deg F	ASTM D-2887		
Simulated Distillation, Continued		*1		ASTM D-2887	01/05/93	FA
51 % Off	640	1	Deg F	ASTM D-2887		
52 % Off	657	1	Deg F	ASTM D-2887		
53 % Off	678	1	Deg F	ASTM D-2887		
54 % Off	700	1	Deg F	ASTM D-2887		
55 % Off	723	1	Deg F	ASTM D-2887		
56 % Off	743	1	Deg F	ASTM D-2887		
57 % Off	762	1	Deg F	ASTM D-2887		
58 % Off	778	1	Deg F	ASTM D-2887		
59 % Off	792	1	Deg F	ASTM D-2887		
60 % Off	804	1	Deg F	ASTM D-2887		
61 % Off	815	1	Deg F	ASTM D-2887		
62 % Off	825	1	Deg F	ASTM D-2887		
63 % Off	835	1	Deg F	ASTM D-2887		
64 % Off	845	1	Deg F	ASTM D-2887		
65 % Off	854	1	Deg F	ASTM D-2887		
66 % Off	864	1	Deg F	ASTM D-2887		
67 % Off	873	1	Deg F	ASTM D-2887		
68 % Off	881	1	Deg F	ASTM D-2887		
69 % Off	890	1	Deg F	ASTM D-2887		
70 % Off	898	1	Deg F	ASTM D-2887		
71 % Off	905	1	Deg F	ASTM D-2887		
72 % Off	913	1	Deg F	ASTM D-2887		
73 % Off	920	1	Deg F	ASTM D-2887		
74 % Off	927	1	Deg F	ASTM D-2887		
75 % Off	930	1	Deg F	ASTM D-2887		
76 % Off	932	1	Deg F	ASTM D-2887		
77 % Off	934	1	Deg F	ASTM D-2887		
78 % Off	936	1	Deg F	ASTM D-2887		
79 % Off	938	1	Deg F	ASTM D-2887		
80 % Off	939	1	Deg F	ASTM D-2887		
81 % Off	941	1	Deg F	ASTM D-2887		
82 % Off	943	1	Deg F	ASTM D-2887		
83 % Off	945	1	Deg F	ASTM D-2887		
84 % Off	947	1	Deg F	ASTM D-2887		

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# CORE LABORATORIES

## LABORATORY TESTS RESULTS 01/05/93

JOB NUMBER: 930006

CUSTOMER: RESNA Company

ATTN: Robert D. Campbell

CLIENT I.D.....: TP-25  
 DATE SAMPLED.....: 12/28/92  
 TIME SAMPLED.....: 07:00  
 WORK DESCRIPTION...: TP-25

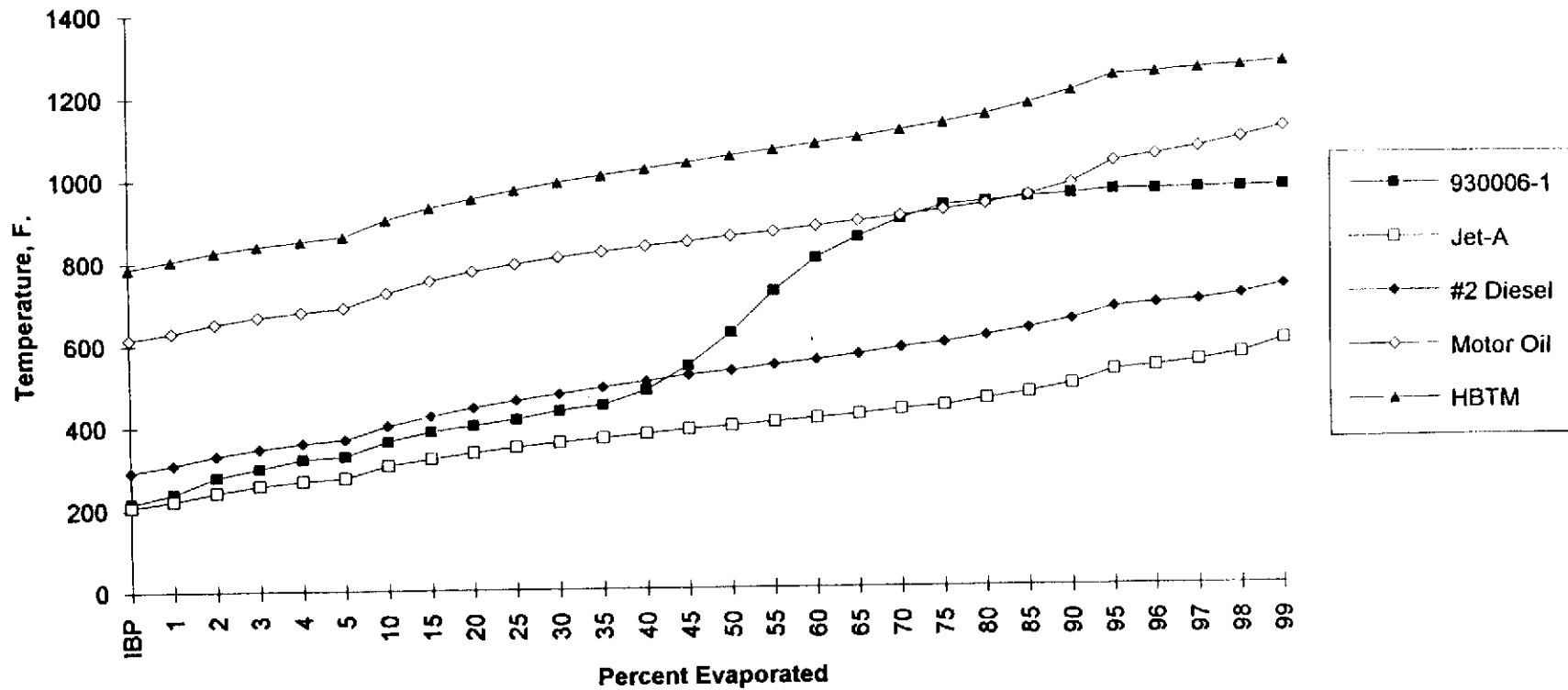
LABORATORY I.D....: 930006-0001  
 DATE RECEIVED.....: 12/31/92  
 TIME RECEIVED.....: :  
 REMARKS.....: 3 - 40 ml vials

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
85 % Off	949	1	Deg F	ASTM D-2887		
86 % Off	950	1	Deg F	ASTM D-2887		
87 % Off	952	1	Deg F	ASTM D-2887		
88 % Off	954	1	Deg F	ASTM D-2887		
89 % Off	956	1	Deg F	ASTM D-2887		
90 % Off	957	1	Deg F	ASTM D-2887		
91 % Off	959	1	Deg F	ASTM D-2887		
92 % Off	960	1	Deg F	ASTM D-2887		
93 % Off	962	1	Deg F	ASTM D-2887		
94 % Off	964	1	Deg F	ASTM D-2887		
95 % Off	966	1	Deg F	ASTM D-2887		
96 % Off	967	1	Deg F	ASTM D-2887		
97 % Off	969	1	Deg F	ASTM D-2887		
98 % Off	971	1	Deg F	ASTM D-2887		
99 % Off	973	1	Deg F	ASTM D-2887		
FBP	974	1	Deg F	ASTM D-2887		

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 (310) 595-8401



## Sample 930006-1 Distillation Profile





# CORE LABORATORIES

## QUALITY ASSURANCE REPORT 01/05/93

JOB NUMBER: 930006

CUSTOMER: RESNA Company

ATTN: Robert D. Campbell

Simulated Distillation, Distillate

DATE ANALYZED: 01/05/93

TIME ANALYZED: 11:46

METHOD: ASTM D-2887

QC NUMBER: 936850

### B L A N K S

TEST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Simulated Distillation ASTM D-2887	Reagent	CS2	1	<1	1	Vol. %

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The analysis results shown in this report are based upon observations and material supplied to the laboratory. It is exclusive and confidential. Use of this report has been made. The interpretation of the results represent the quality of the material analyzed. Core Laboratories, however, assumes no responsibility for any errors or omissions in the analysis or representations, express or implied, as to the productivity or other operations of the material analyzed. This report shall not be reproduced, except in its entirety, without the written authority of Core Laboratories.



# CORE LABORATORIES

## QUALITY ASSURANCE REPORT 01/05/93

JOB NUMBER: 930006

CUSTOMER: RESNA Company

ATTN: Robert D. Campbell

Simulated Distillation, Distillate

DATE ANALYZED: 01/05/93

TIME ANALYZED: 11:46

METHOD: ASTM D-2887

QC NUMBER: 936850

### REFERENCE STANDARDS

TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	TRUE VALUE	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
Simulated Distillation ASTM D-2887	Reference	RGO #1	1	241	238	101	1	Vol. %

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QUALITY ASSURANCE FOOTER  
01/05/93

Analyses performed in accordance with ASTM Testing Procedures.

Samples retained for thirty days after report submission. After thirty days, samples are disposed in accordance with Core Laboratories' Disposal Policy. Samples will be retained longer with prior arrangement. Storage fees may apply.

The acceptance criteria for duplicate analyses are the applicable ASTM Repeatability Statements.

The "Time Analyzed" in the QA Report refers to the start time of the analytical batch. It may not reflect the actual analysis time. The "Date Analyzed" reflects the actual analysis date.

3700 Cherry Avenue  
Long Beach, CA 90807  
(310) 595-8401





Date: January 6, 1993

Subject: Analysis of Monitoring Well Samples  
SS#4494, Oakland, CA

From/Location: Lynn M. Lane  
LAR, AS  
310/816-8673

RECORDED JAN 08 1993

To/Location: M. Whelan  
SM  
ARCO Net 571-2449

cc: J.M. DeJovine  
J.A. Jaecker  
A.V. Nowak  
D.C. Tong  
R.Campbell, Resna Industries

3 samples from 1 Well were received on January 4, 1993. They were placed in a cold room and maintained at 38 F until removed for analysis. The samples were identified as follows:

1. TP-2B, 1
2. TP-2B, 2
3. TP-2B, 3

A Simulated Distillation by Gas Chromatography was performed on the samples. All are predominantly weathered gasolines. TP-2B 1 had 34% percent of the product boiling outside of the normal gasoline range. TP-2B 2 and TP-2B 3 had 17% and 15% respectively outside of the normal range. The contaminants do not resemble any of our finished hydrocarbon products.

If you have any questions concerning these analyses, please call. The original copies of the Simulated Distillation Reports are attached to this report. Due to limited sample storage capabilities, all of these samples will be discarded 60 days from issue of this report unless otherwise requested.

\*\*\* SIMULATED DISTILLATION REPORT \*\*\*

T6-2B

\*\*\*\*\*  
 \* Sample Name: well 1, station 4494 Operator Initials:  
 \* Date: 01-01-1993 10:45:24 Method:1:OCSIMD DATA FILE: H:WELL111.PTS  
 \* Interface: 7 Cycle#: 1 Channel#: 0 Vial#: N.A.  
 \* Starting Peak Width: 10 Threshold: 10

\*\*\*\*\*  
 Starting Delay: 0.00 Ending Retention Time: 32.00  
 Calibration file: i:ocsimd.SCL Date printed:01-01-1993 Time printed 12:34:52

ASTM D 2887 Method

Percent Off Table

Baseline from: 0.47 to 31.81  
 Process from: 0.47 to 31.81  
 Total Area: 12374959  
 Slope : -3.25678  
 Increment : 1

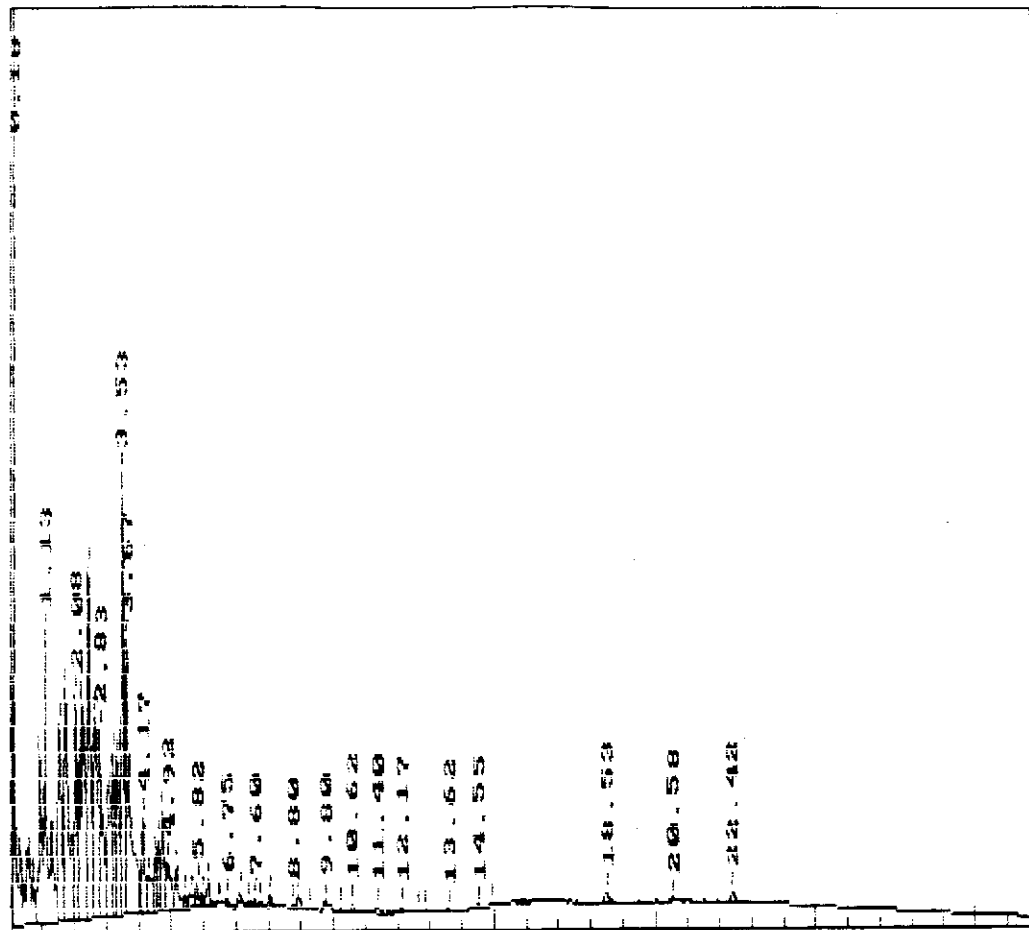
% OFF	Ret. Time	Temp
IBP	0.59	218.4
1.00	0.64	223.7
2.00	0.94	254.7
3.00	0.99	260.2
4.00	1.07	268.2
5.00	1.13	274.3
6.00	1.15	276.7
7.00	1.28	290.8
8.00	1.35	298.2
9.00	1.53	311.8
10.00	1.56	314.2
11.00	1.60	316.5
12.00	1.64	319.2
13.00	1.73	325.2
14.00	1.76	327.3
15.00	1.79	329.5
16.00	1.82	331.5
17.00	1.88	335.8
18.00	1.97	342.3
19.00	2.05	347.3
20.00	2.08	349.2
21.00	2.12	352.2
22.00	2.18	356.2
23.00	2.22	359.3
24.00	2.26	361.9
25.00	2.29	363.8
26.00	2.33	366.3
27.00	2.36	368.5
28.00	2.41	371.8
29.00	2.45	374.7
30.00	2.47	376.2
31.00	2.49	377.4
32.00	2.51	378.9
33.00	2.54	381.2
34.00	2.60	385.0
35.00	2.64	387.8
36.00	2.67	389.9
37.00	2.71	393.0

40.00	2.33	400.7
41.00	2.38	404.2
42.00	2.95	409.0
43.00	3.06	416.2
44.00	3.11	419.5
45.00	3.15	421.8
46.00	3.21	423.8
47.00	3.25	425.1
48.00	3.31	427.0
49.00	3.35	428.4
50.00	3.40	430.1
51.00	3.47	432.4
52.00	3.51	433.6
53.00	3.52	434.1
54.00	3.54	434.5
55.00	3.55	435.0
56.00	3.57	435.6
57.00	3.61	437.0
58.00	3.64	438.1
59.00	3.66	438.8
60.00	3.69	439.7
61.00	3.74	441.3
62.00	3.81	443.7
63.00	3.92	447.2
64.00	4.06	451.8
65.00	4.16	455.2
66.00	4.30	459.9
67.00	4.50	466.5
68.00	4.62	470.5
69.00	4.73	474.1
70.00	4.80	476.4
71.00	4.96	481.7
72.00	5.19	489.2
73.00	5.70	504.9
74.00	6.15	518.8
75.00	7.12	548.5
76.00	8.11	576.9
77.00	14.19	752.3
78.00	15.43	786.2
79.00	16.09	804.1
80.00	16.66	819.6
81.00	17.20	834.5
82.00	17.80	851.2
83.00	18.44	868.8
84.00	18.91	881.4
85.00	19.53	897.6
86.00	20.10	912.5
87.00	20.61	925.8
88.00	21.09	938.2
89.00	21.60	951.0
90.00	22.09	963.6
91.00	22.51	974.1
92.00	23.02	986.4
93.00	23.52	998.6
94.00	24.08	1011.9
95.00	24.71	1026.8
96.00	25.40	1043.1
97.00	26.23	1062.4
98.00	27.21	1084.4
99.00	28.44	1111.5
FBP	29.30	1130.6

WARNING--END POINT BEYOND THE SCOPE OF D2887



Data File = H:WELL111.PTS Printed on 01-01-1993 at 12:34:11  
Start time: 0.00 min. Stop time: 32.00 min. Offset: 0 mv.  
Low Value: 10082 uv High Value: 351286 uv Scale factor: 1.0

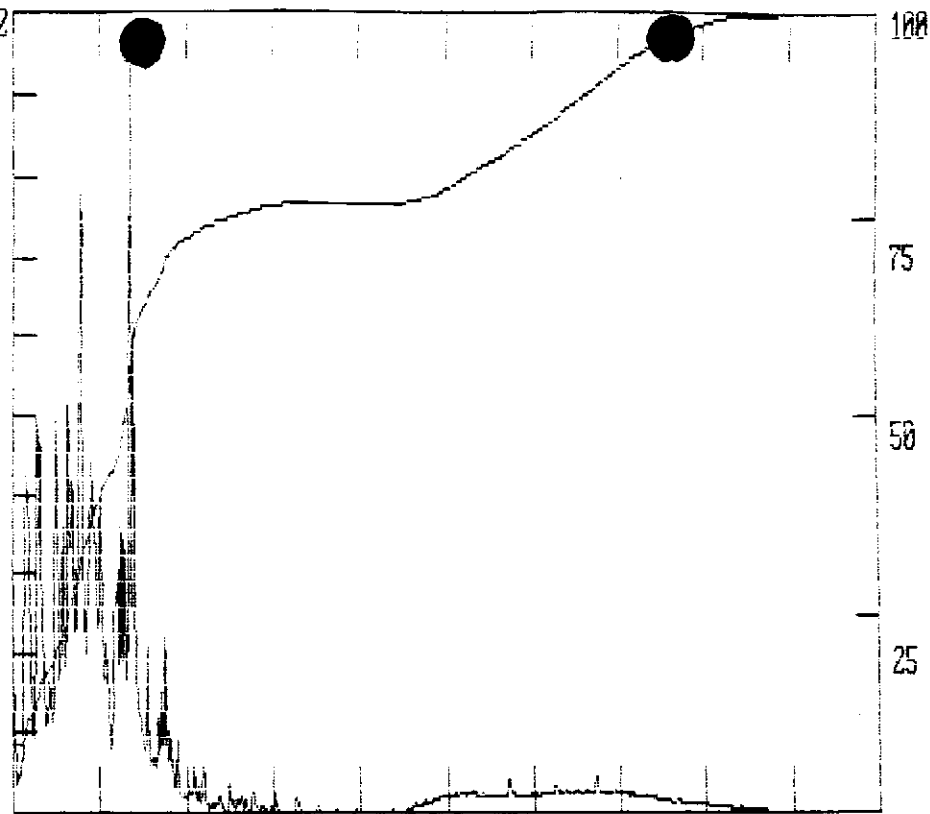


Area

temperature vs. area-cum%

Cum %

1.282



Temp

300 400 500 600 700 800 900 1000 1100 1200 1300

\*\*\* SIMULATED DISTILLATION REPORT \*\*\*

TP-2B

\*\*\*\*\*

\* Sample Name: well 2, station **449K** Operator Initials:  
 \* Date: 01-01-1993 11:34:06 Method: I:OCSIMD DATA FILE: H:WELL22.PTS  
 \* Interface: 7 Cycle#: 2 Channel#: 0 Vial#: N.A.  
 \* Starting Peak Width: 10 Threshold: 10

\*\*\*\*\*

Starting Delay: 0.00 Ending Retention Time: 32.00  
 Calibration file: i:ocsimd.SCL Date printed: 01-01-1993 Time printed 12:31:21

ASTM D 2887 Method  
 Percent Off Table

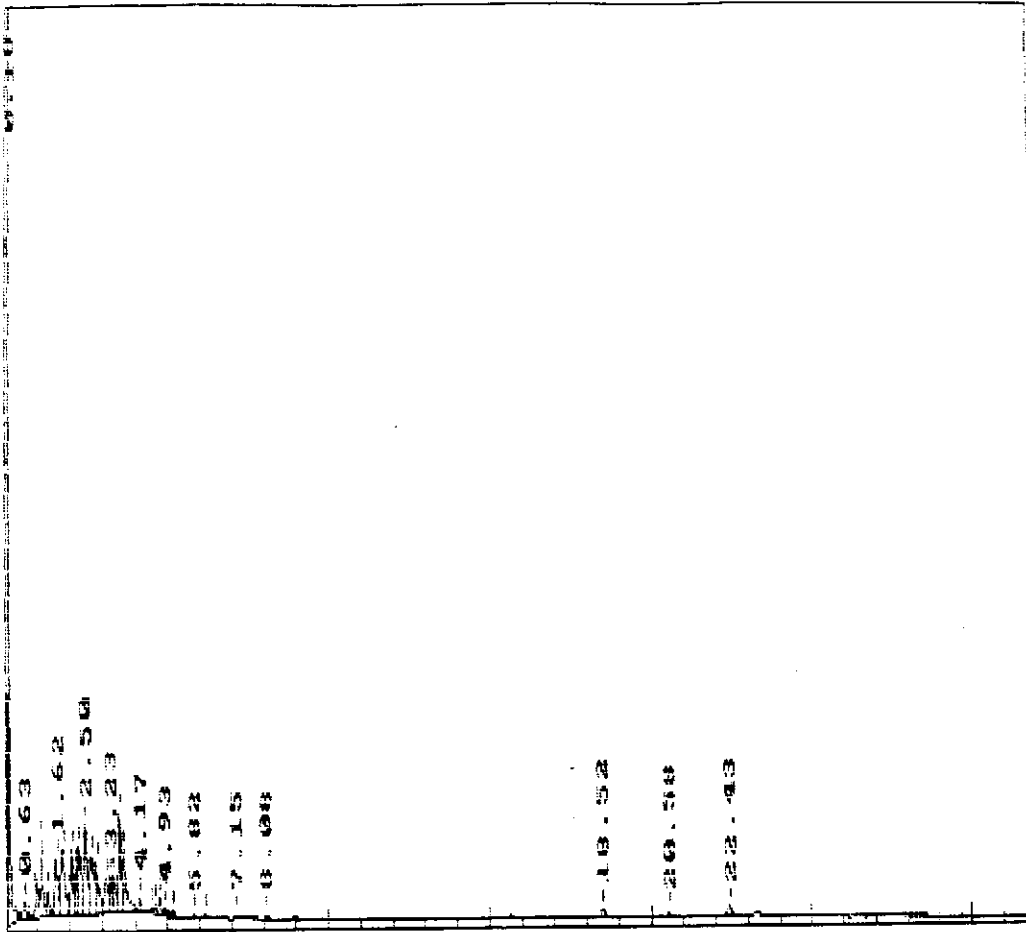
Baseline from: 0.47 to 31.81  
 Process from: 0.47 to 31.81  
 Total Area: 3104260  
 Slope : -1.27858  
 Increment : 1

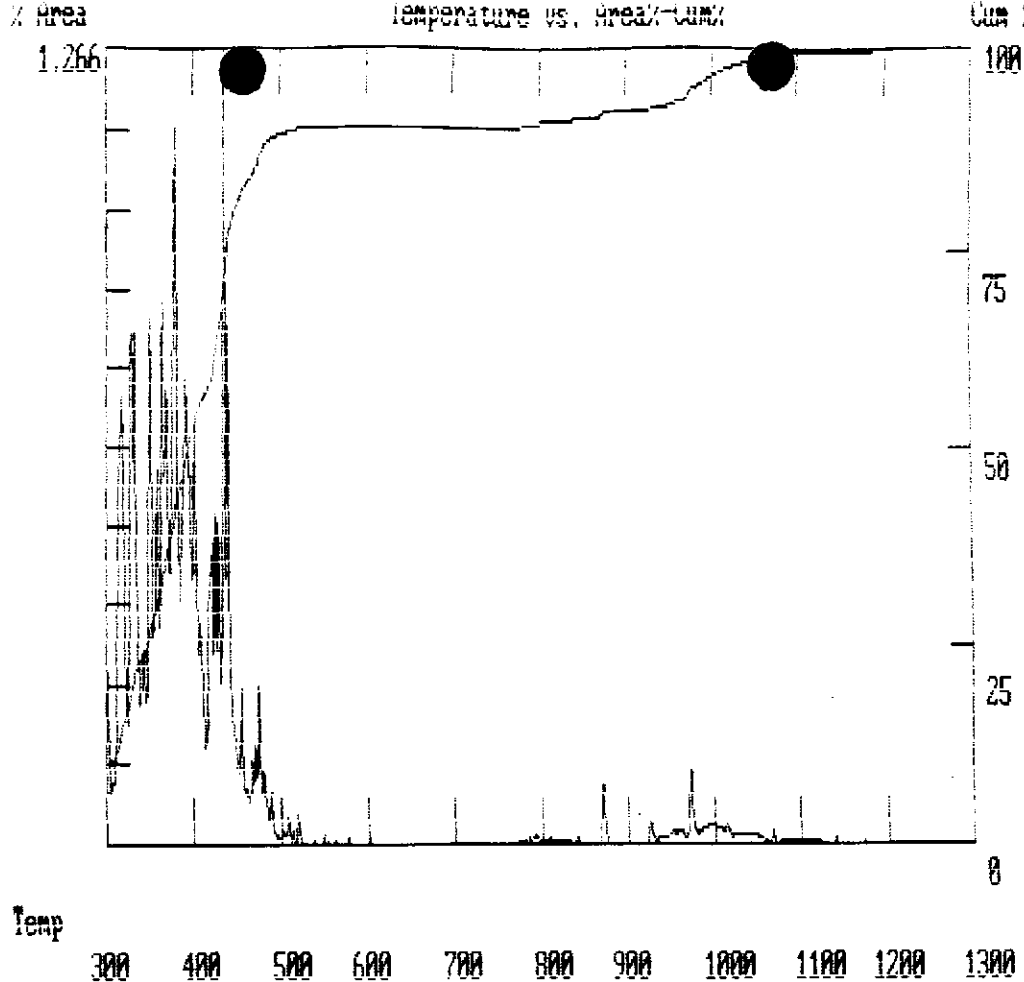
% OFF	Ret. Time	Temp
IBP	0.60	219.4
1.00	0.64	224.1
2.00	0.92	253.3
3.00	0.98	258.9
4.00	1.04	265.3
5.00	1.09	271.0
6.00	1.13	274.8
7.00	1.15	276.7
8.00	1.22	284.2
9.00	1.31	293.6
10.00	1.36	299.1
11.00	1.51	310.3
12.00	1.55	313.3
13.00	1.58	315.0
14.00	1.60	316.7
15.00	1.63	318.4
16.00	1.67	321.8
17.00	1.73	325.8
18.00	1.75	327.2
19.00	1.78	328.8
20.00	1.80	330.4
21.00	1.82	331.9
22.00	1.86	334.3
23.00	1.92	338.6
24.00	1.98	342.7
25.00	2.04	346.7
26.00	2.07	348.4
27.00	2.09	349.9
28.00	2.12	352.1
29.00	2.17	355.3
30.00	2.20	357.4
31.00	2.24	360.1
32.00	2.26	361.9
33.00	2.28	363.2
34.00	2.31	365.0
35.00	2.33	366.7
36.00	2.36	368.3
37.00	2.38	370.0

37.00	2.47	376.3
40.00	2.49	377.4
41.00	2.50	378.4
42.00	2.52	379.7
43.00	2.55	381.5
44.00	2.59	384.1
45.00	2.62	386.4
46.00	2.65	388.4
47.00	2.67	389.9
48.00	2.70	391.6
49.00	2.72	393.5
50.00	2.75	395.5
51.00	2.79	398.1
52.00	2.82	400.1
53.00	2.85	402.0
54.00	2.90	405.3
55.00	2.95	408.8
56.00	3.03	414.7
57.00	3.08	417.9
58.00	3.12	420.5
59.00	3.16	422.0
60.00	3.21	423.7
61.00	3.24	424.8
62.00	3.28	426.2
63.00	3.33	427.7
64.00	3.36	428.8
65.00	3.41	430.4
66.00	3.47	432.4
67.00	3.51	433.6
68.00	3.52	434.2
69.00	3.54	434.6
70.00	3.55	435.1
71.00	3.57	435.6
72.00	3.60	436.6
73.00	3.63	437.8
74.00	3.66	438.6
75.00	3.68	439.3
76.00	3.70	440.2
77.00	3.75	441.6
78.00	3.81	443.6
79.00	3.90	446.5
80.00	4.00	450.1
81.00	4.13	454.4
82.00	4.23	457.5
83.00	4.43	464.2
84.00	4.60	469.8
85.00	4.72	473.9
86.00	4.80	476.4
87.00	4.96	481.8
88.00	5.23	490.7
89.00	6.17	519.6
90.00	16.31	810.1
91.00	18.59	872.7
92.00	21.55	949.8
93.00	22.37	970.8
94.00	22.60	976.4
95.00	23.29	993.0
96.00	23.88	1007.2
97.00	24.82	1029.3
98.00	26.29	1063.9
99.00	27.67	1094.6
FBP		

WARNING--END POINT BEYOND THE SCOPE OF D2887

Data File = H:WELL22.PTS Printed on 01-01-1993 at 12:30:41  
Start time: 0.00 min. Stop time: 32.00 min. Offset: 0 mv.  
Low Value: 10080 uv High Value: 357791 uv Scale factor: 1.0





\*\*\* SIMULATED DISTILLATION REPORT \*\*\*

TB2B

\*\*\*\*\*

\* Sample Name: well 3, station 4494 Operator Initials:  
 \* Date: 01-01-1993 12:22:27 Method:OCSIMD DATA FILE: H:WELL33.PTS  
 \* Interface: 7 Cycle#: 3 Channel#: 0 Vial#: N.A.  
 \* Starting Peak Width: 10 Threshold: 10

\*\*\*\*\*

Starting Delay: 0.00 Ending Retention Time: 32.00  
 Calibration file: i:ocsimd.SCL Date printed:01-01-1993 Time printed 12:55:23

ASTM D 2887 Method

Percent Off Table

Baseline from: 0.47 to 31.81  
 Process from: 0.47 to 31.81  
 Total Area: 13913458  
 Slope : -6.67783  
 Increment : 1

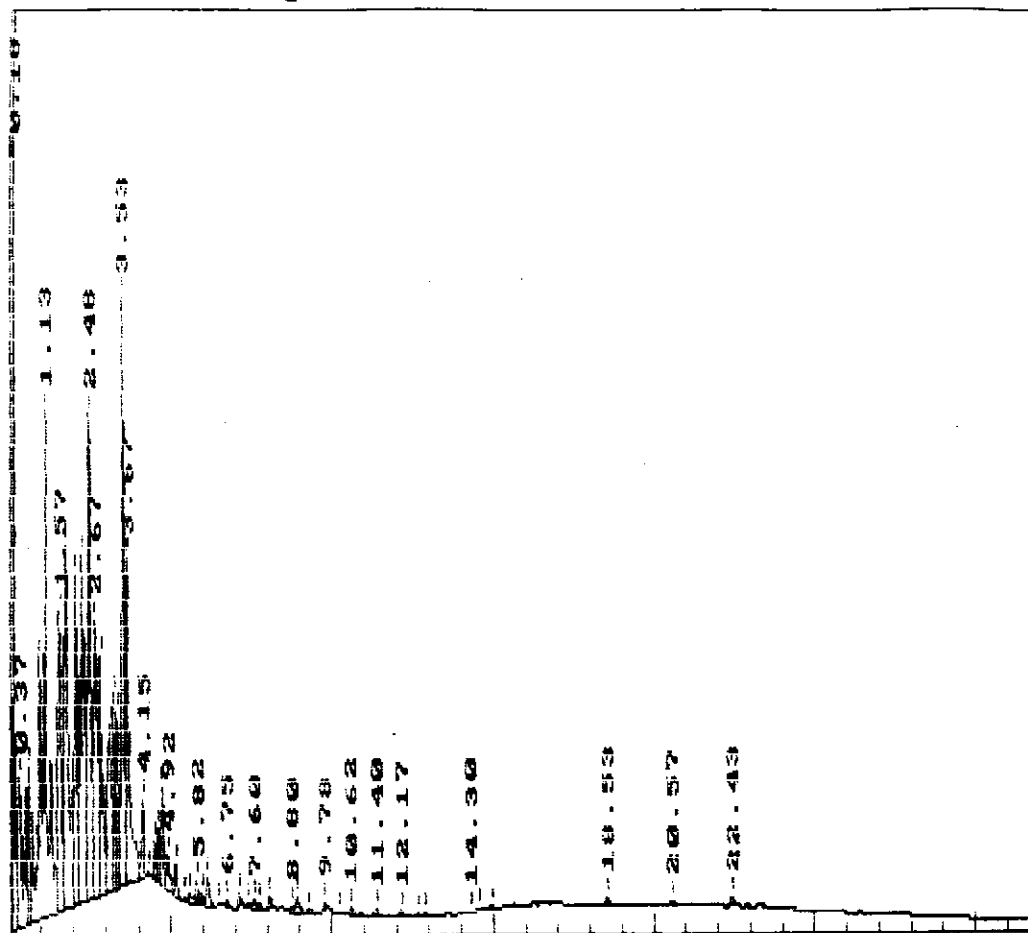
% OFF	Ret. Time	Temp
IBP	0.56	215.4
1.00	0.60	219.6
2.00	0.72	232.0
3.00	0.92	253.3
4.00	0.96	257.2
5.00	1.00	261.7
6.00	1.06	267.6
7.00	1.11	272.9
8.00	1.13	274.5
9.00	1.14	276.3
10.00	1.23	285.5
11.00	1.31	293.5
12.00	1.36	298.8
13.00	1.52	311.1
14.00	1.55	313.0
15.00	1.57	314.4
16.00	1.59	316.0
17.00	1.61	317.6
18.00	1.66	320.8
19.00	1.72	325.2
20.00	1.74	326.6
21.00	1.77	328.0
22.00	1.79	329.6
23.00	1.81	331.0
24.00	1.84	333.2
25.00	1.91	338.0
26.00	1.98	342.4
27.00	2.04	346.5
28.00	2.06	348.0
29.00	2.08	349.4
30.00	2.11	351.8
31.00	2.16	355.1
32.00	2.19	357.1
33.00	2.23	360.0
34.00	2.26	361.5
35.00	2.28	362.8
36.00	2.30	364.6
37.00	2.33	366.4

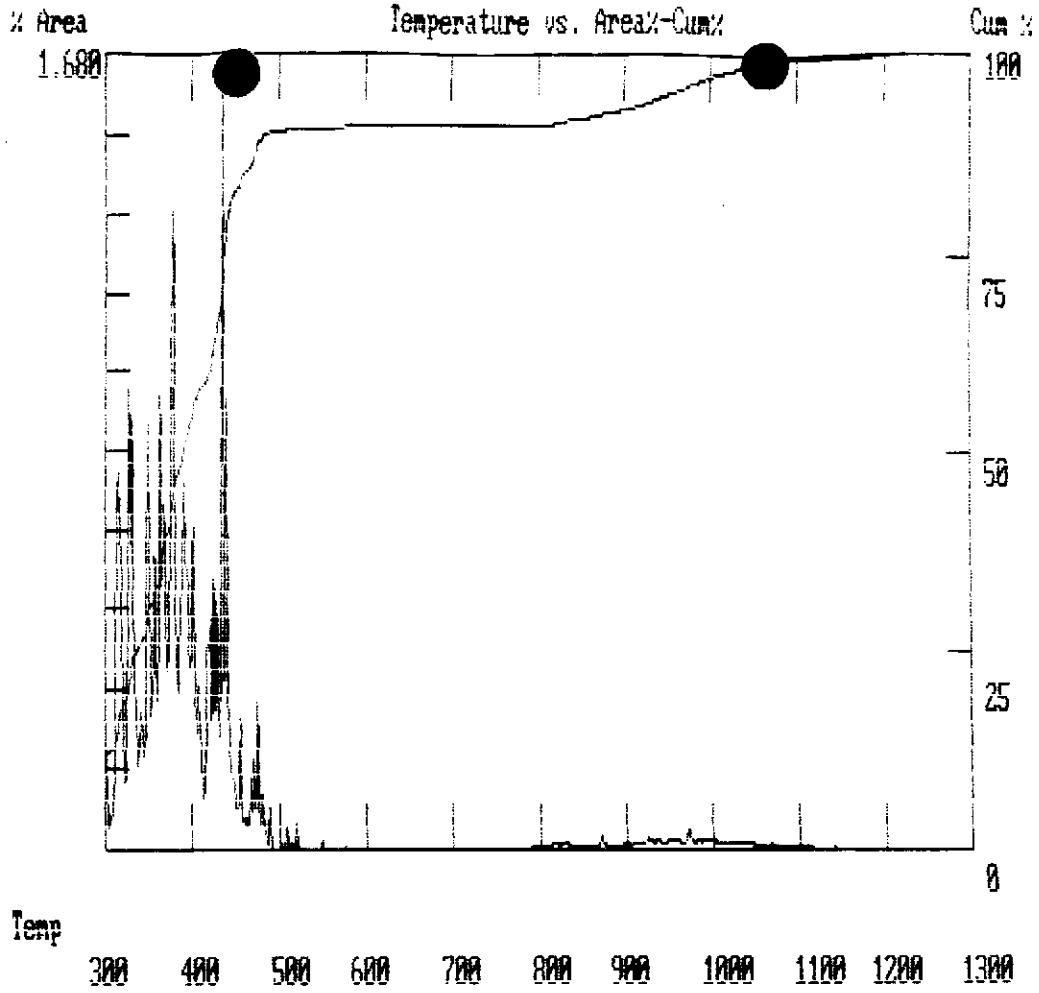
40.00	2.42	372.3
41.00	2.45	374.7
42.00	2.46	375.7
43.00	2.48	376.6
44.00	2.49	377.5
45.00	2.51	378.8
46.00	2.53	380.5
47.00	2.58	383.4
48.00	2.61	386.0
49.00	2.64	388.0
50.00	2.67	389.5
51.00	2.69	391.2
52.00	2.72	393.2
53.00	2.75	395.3
54.00	2.79	398.1
55.00	2.82	400.0
56.00	2.85	402.0
57.00	2.91	405.8
58.00	2.97	410.2
59.00	3.06	416.2
60.00	3.10	418.9
61.00	3.13	421.2
62.00	3.18	422.8
63.00	3.22	424.1
64.00	3.25	425.2
65.00	3.31	427.0
66.00	3.34	428.1
67.00	3.38	429.4
68.00	3.44	431.4
69.00	3.49	433.0
70.00	3.51	433.6
71.00	3.52	434.0
72.00	3.53	434.3
73.00	3.54	434.7
74.00	3.55	435.1
75.00	3.57	435.8
76.00	3.62	437.2
77.00	3.64	438.0
78.00	3.66	438.6
79.00	3.68	439.3
80.00	3.72	440.5
81.00	3.78	442.5
82.00	3.87	445.8
83.00	4.00	450.0
84.00	4.14	454.6
85.00	4.27	459.0
86.00	4.51	467.0
87.00	4.63	471.0
88.00	4.74	474.5
89.00	4.85	478.2
90.00	5.14	487.8
91.00	16.04	802.8
92.00	17.90	853.9
93.00	19.61	899.6
94.00	20.75	929.5
95.00	21.71	953.8
96.00	22.50	973.9
97.00	23.42	996.0
98.00	24.50	1021.8
99.00	26.11	1059.6
FBP	27.38	1088.2

WARNING--END POINT BEYOND THE SCOPE OF D2887



Well 3. st Processed: 01-01-1993 12:54:28, segment 3, cycle 3  
RAW DATA SAVED IN FILE H:WELL33.PTS  
Areas, times, and heights stored in: H:WELL33.ATB  
Data File = H:WELL33.PTS Printed on 01-01-1993 at 12:54:42  
Start time: 0.00 min. Stop time: 32.00 min. Offset: 0 mv.  
Low Value: 10111 uv High Value: 375035 uv Scale factor: 1.0





**ATTACHMENT C**  
**CORE LABORATORY FACSIMILE**

TELECOMMUNICATIONS FORM

Number of pages (including cover page): 3

DATE: 8/13 1993

TO : John Young

FAX#: (408) 264-2435

FROM: Greg Cook

All analytical reports, interpretations or information faxed by CORE LABORATORIES to its Customers are preliminary data only. Due to the problems that can occur with the transmission of data via Fax, CORE LABORATORIES will not guarantee or assume any responsibility for the following transmitted data.

MESSAGE/COMMENTS: \_\_\_\_\_

John,

The initial boiling point is not listed on this spec sheet because it is not considered a spec. point by law. However it typically initiates ~~at~~ between 90-100° F.

- Greg

If you have any question or you did not receive all pages noted, please call us at:  
(310) 595-8401, (310) 595-8402, (310) 595-8403, (310) 595-8404. FAX #: (310) 427-5174  
CORE LABORATORIES, 3700 Cherry Avenue, Long Beach, CA 90807-4392



# CORE LABORATORIES

## GASOLINE SPECIFICATIONS

Lead Content, g/gal, max	0.050
Copper strip corrosion, 3 hrs @ 122 deg F, max	#1
Existent gum, mg/100ml, max	5
Total Sulfur, ppm-wt, max	1000(a)
Oxidation Stability, minutes, min	240

VOLATILITY CLASS (b)	A	B	C	D	E
D-86 Distillation, deg F					
10% evaporated, max	158	149	140	131	122
50% evaporated, min	170	170	170	170	170
50% evaporated, max	250	245	240	235	230
90% evaporated, max	374	374	365	365	365
Final boiling point, max	437	437	437	437	437
Residue, vol%, max	2	2	2	2	2
Temperature at which the Vapor/Liquid Ratio is 20, deg F	140	133	124	116	105
Reid Vapor Pressure, psi	9.0(c)	10.0	11.5	13.5	15.0

### Octane Ratings:

The EPA has set a minimum octane requirement of 87 for unleaded fuels currently marketed. However, waivers granted by the EPA allow for an octane rating as low as 84 in some mountain areas. There are no specifications for octanes above the EPA minimum; marketers set the grades and octane rating based on their perception of the technical and competitive needs of the market. Typically, in California, you would find three grades of unleaded with the following octanes:

GRADE	OCTANE
Regular unleaded	87
Mid-grade unleaded	89
Premium unleaded	91 or 92

(a) In California the maximum sulfur content allowed in unleaded gasoline is 300 ppm-wt

(b) The letter designations represent volatility classes which are based on geographic locations (see chart attached)

(c) A Reid Vapor Pressure maximum limit of 8.0 psi is currently in effect for most areas of California. This is supposed to drop to 7.0 psi in 1993. In both California and Nevada there is a 1.0 psi waiver allowed for fuels containing ethanol.

Effective date July 2, 1992

**SCHEDULE OF SEASONAL AND GEOGRAPHICAL VOLATILITY CLASSES**

**STATE**

**California**

North Coast

South Coast

Southeast

Interior

	J	F	M	A	M	J	J	A	S	O	N	D
North Coast	E/D	D	D	D/C	C	C/B	B	B	B	B/C	C/D	D/E
South Coast	D	D	C/B	A	A	A	A	A	A	A	B/C	D
Southeast	D	D/C	C/B	B	B/A	A	A	A	A	A/B	B/C	C/D
Interior	E/D	D	D	D/C	C/B	B	B	B	B	B/C	C/D	D/E

**Nevada**

N 38 deg. Latitude

S 38 deg. Latitude

N 38 deg. Latitude	E	E/D	D	D/C	C/B	B	B	B	B	B/C	C/D	D/E
S 38 deg. Latitude	D	D/C	C/B	B	B/A	A	A	A	A	A/B	B/C	C/D

Effective date July 2, 1992

**ATTACHMENT D**

**RESNA FOLLOW-UP LETTER TO ACHSCA  
(DATED JULY 13, 1993)**

3315 Almaden Expressway, Suite 34  
San Jose, CA 95118  
Phone: (408) 264-7723  
FAX: (408) 264-2435

July 13, 1993  
0709BCHA.4494

Mr. Barney Chan  
Alameda County Health Care Services Agency  
80 Swan Way, Room 200  
Oakland, California 94624

Subject: Follow-Up to Telephone Conversation Concerning Replacement of Monitoring Well MW-2 at ARCO Station 4494, 566 Hegenberger Road, Oakland, California.

Mr. Chan:

This letter is written as follow-up to our telephone conversation of June 30, 1993, concerning replacement of monitoring well MW-2 at the above-referenced site. A brief chronology which led to our June 30, 1993 telephone conversation is described below.

As stated in RESNA's Report of Findings Underground Gasoline Tank Removal and Replacement, dated May 17, 1993, RESNA recommended that decommissioned monitoring well MW-2 be replaced with a four-inch diameter monitoring well in the approximate vicinity of well MW-2. In a letter dated May 24, 1993 from the Alameda County Health Care Services Agency (ACHCSA), you requested that the new well be installed in native soils as opposed to backfill materials.

RESNA contacted Mr. Walt Or of Golden West Contractors Builders & Consultants (Golden West), who is the foreman for construction activities at the subject site, and discussed the installation of the replacement well. Mr Or indicated that in order to install a monitoring well in native soils, the well would have to be located offsite. RESNA then contacted ACHCSA to inform you of our intentions of replacing the well.

Per our telephone conversation on June 30, 1993, you stated that it does not seem necessary to replace well MW-2 with a new well. You stated that if a new well would be placed in backfill materials as opposed to native soils, no apparent beneficial use would be gained from the new well. RESNA informed you that, in order to replace the well into native soils



**RESNA**

*Working to Restore Nature*

Follow-Up to Telephone Conversation  
ARCO Station 4494, Oakland, California

July 13, 1993


69038.13

the well would have to be placed offsite. Additionally, two monitoring wells (MW-5, MW-6) are already located in native soils offsite and down-gradient of the former tank pit.

In summary, as a result of our telephone conversation, RESNA will not replace decommissioned well MW-2 with a four-inch monitoring well. Monitoring wells MW-5 and MW-6 will currently serve as down-gradient monitoring wells.

If you have any questions or comments concerning this matter, please contact us at (408) 264-7723.

Sincerely,  
RESNA Industries Inc.



John C. Young  
Project Manager

cc: Mr. Michael Whelan, ARCO Products Company  
Mr. Britt Johnson, ACHCSA