File on eDOCs Yes No
Site Name Sunclair Refinery
Site No. 902003
County Allegany
Town Wellsville
Foilable Yes No
File Name Documents / Reports
Scanned & eDOC

report. HW902603. 1991-03. Remedial Investigation Vol 3 of 4.

REMEDIAL INVESTIGATION REPORT

FOR THE

SINCLAIR REFINERY SITE
Wellsville, New York

VOLUME III OF IV
APPENDICES F - J

PREPARED FOR

ARCO

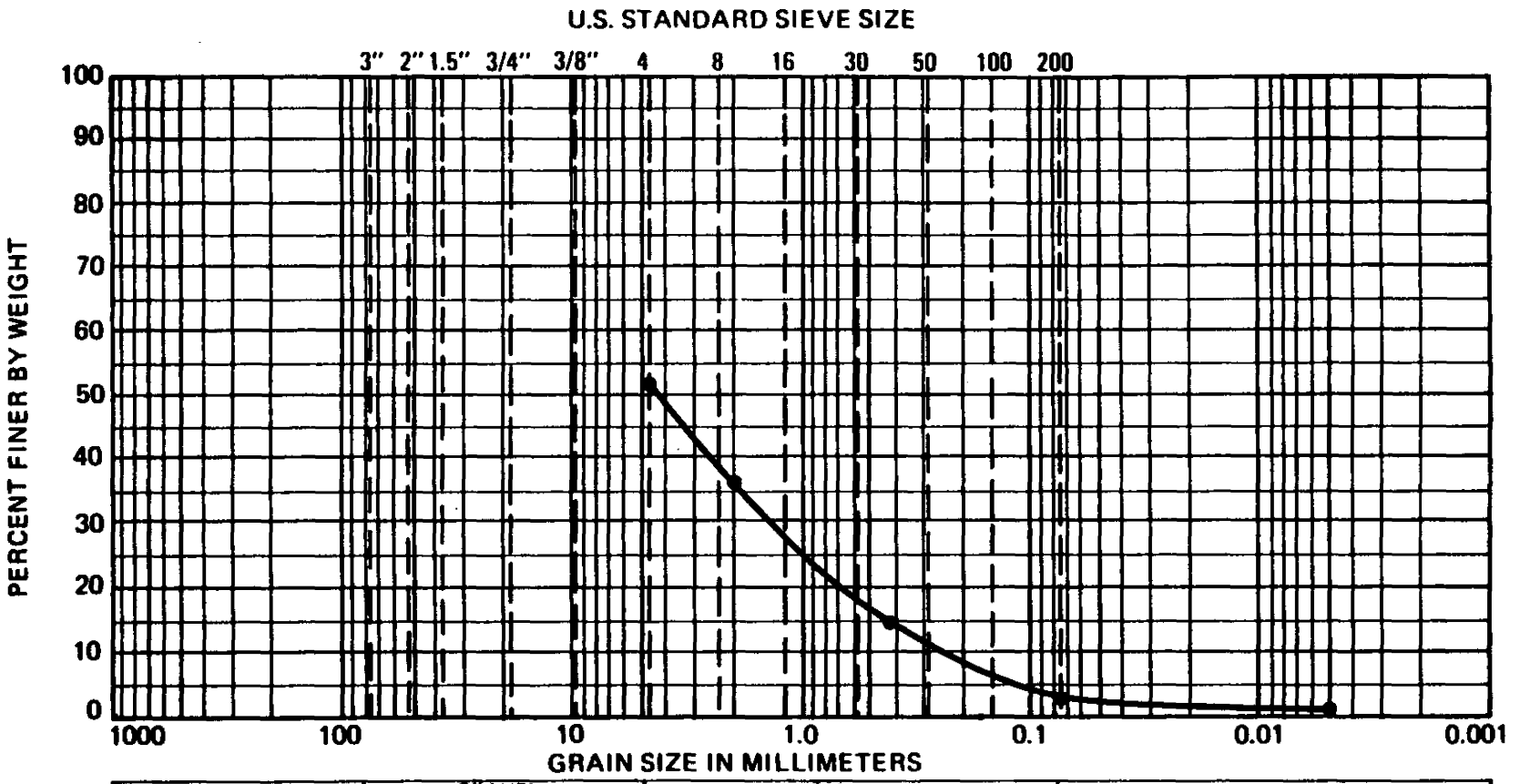
BY

EBASCO

An ENSERCH® Engineering and Construction Company

MARCH 1991

Appendix F
Grain Size Analyses

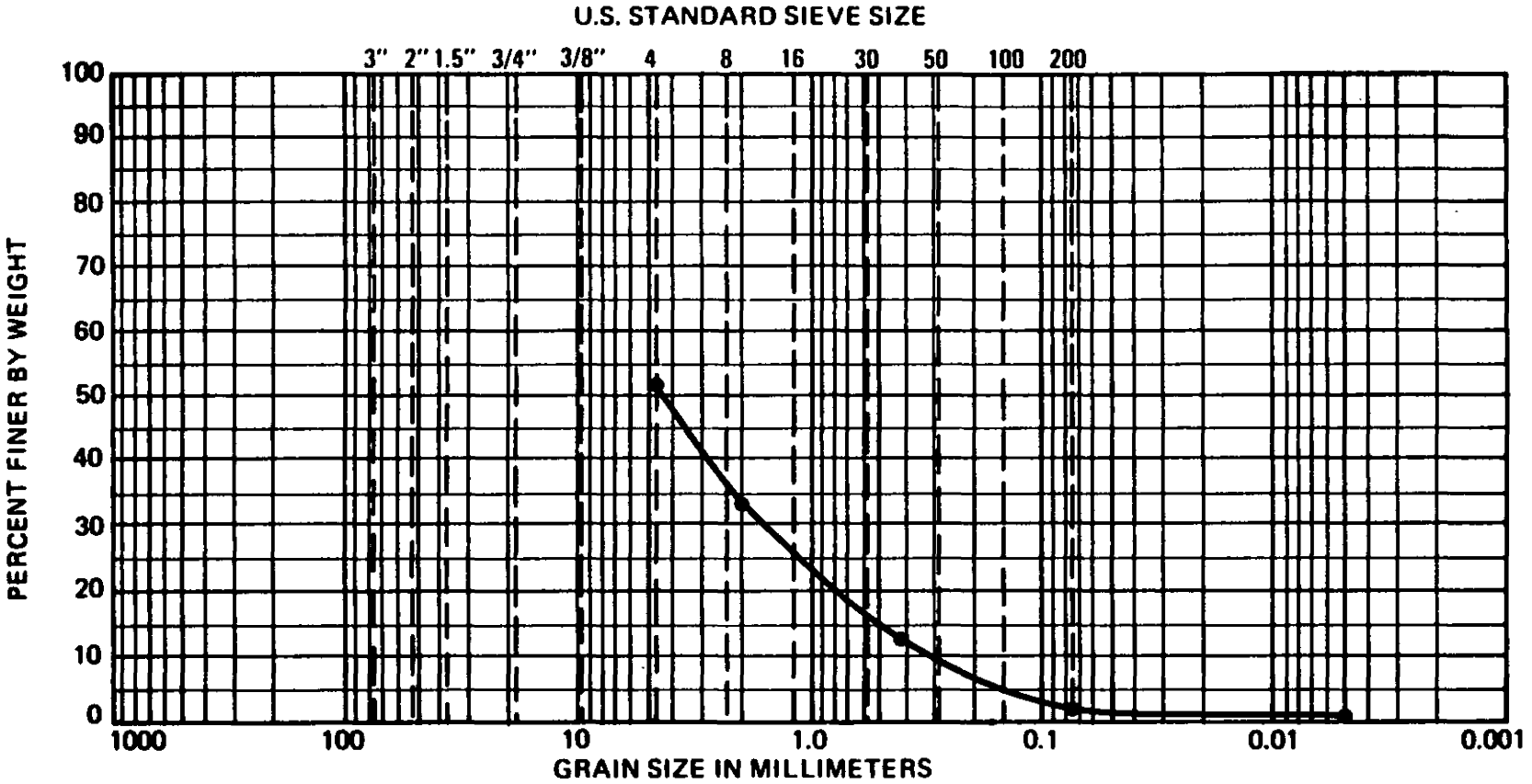


	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		GW-GP					

GRADATION CURVE

SAMPLE SR-RS15-01

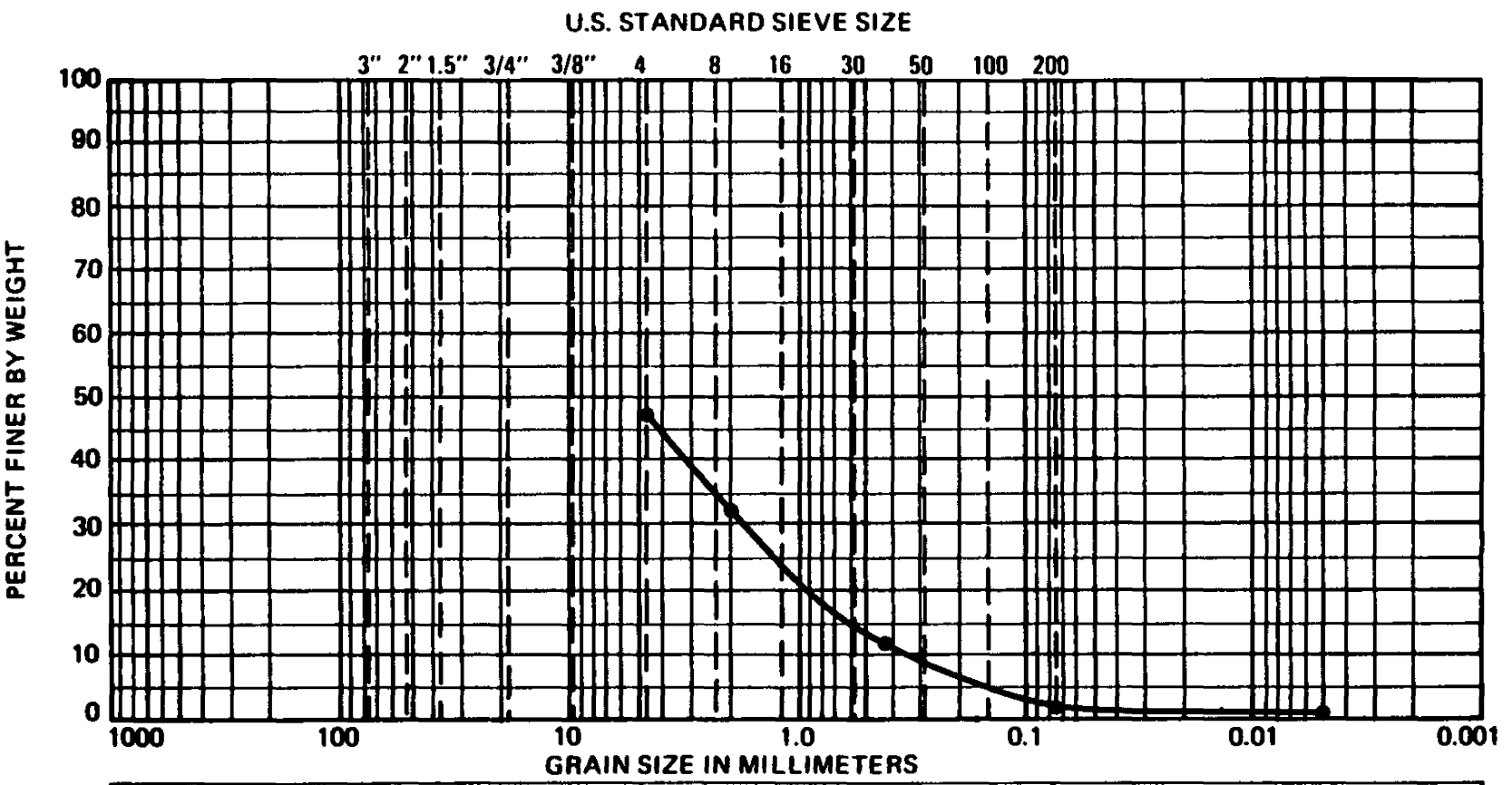
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		GW-GP					

GRADATION CURVE

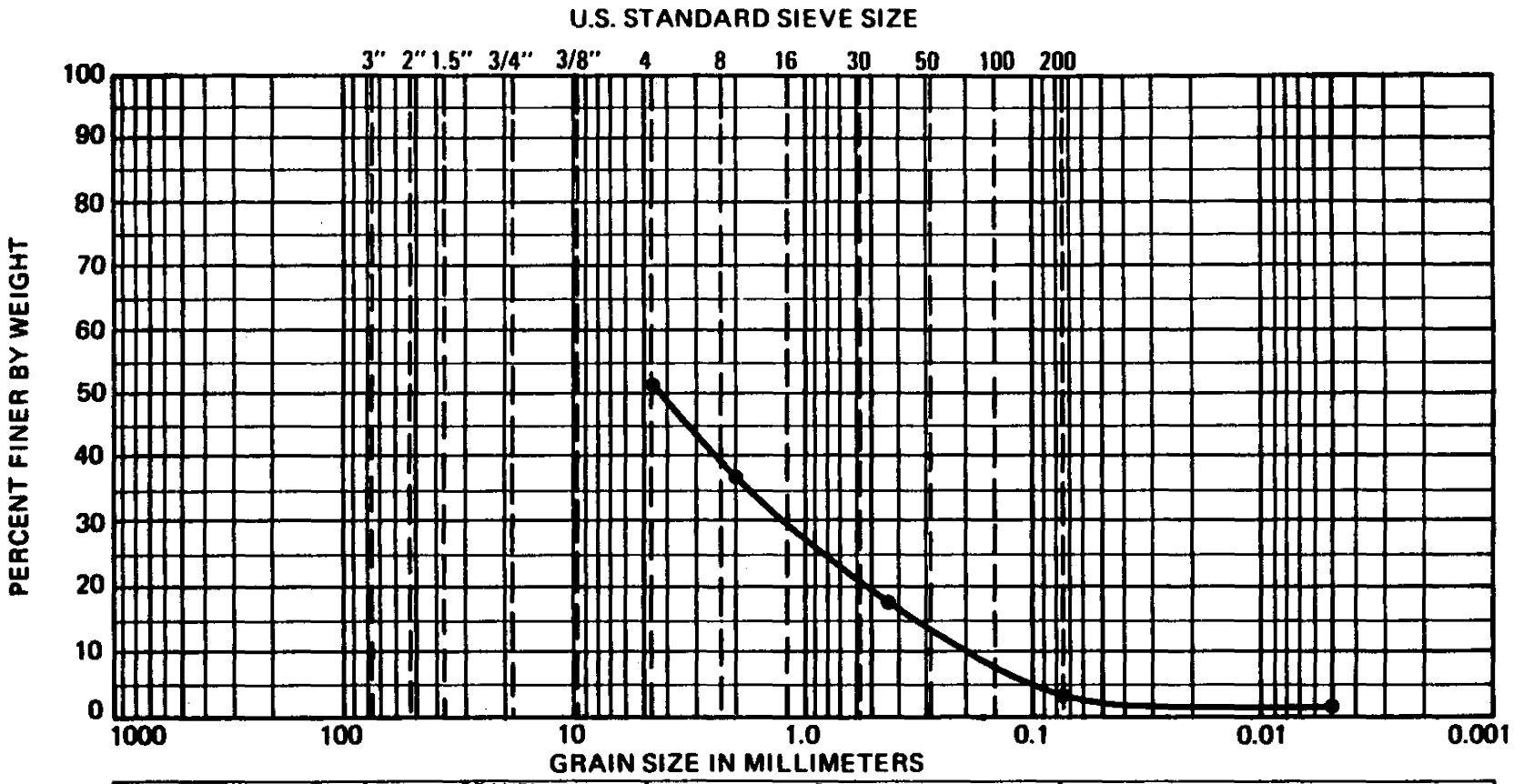
SAMPLE SR-RS16-01
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		GW-GP					

GRADATION CURVE

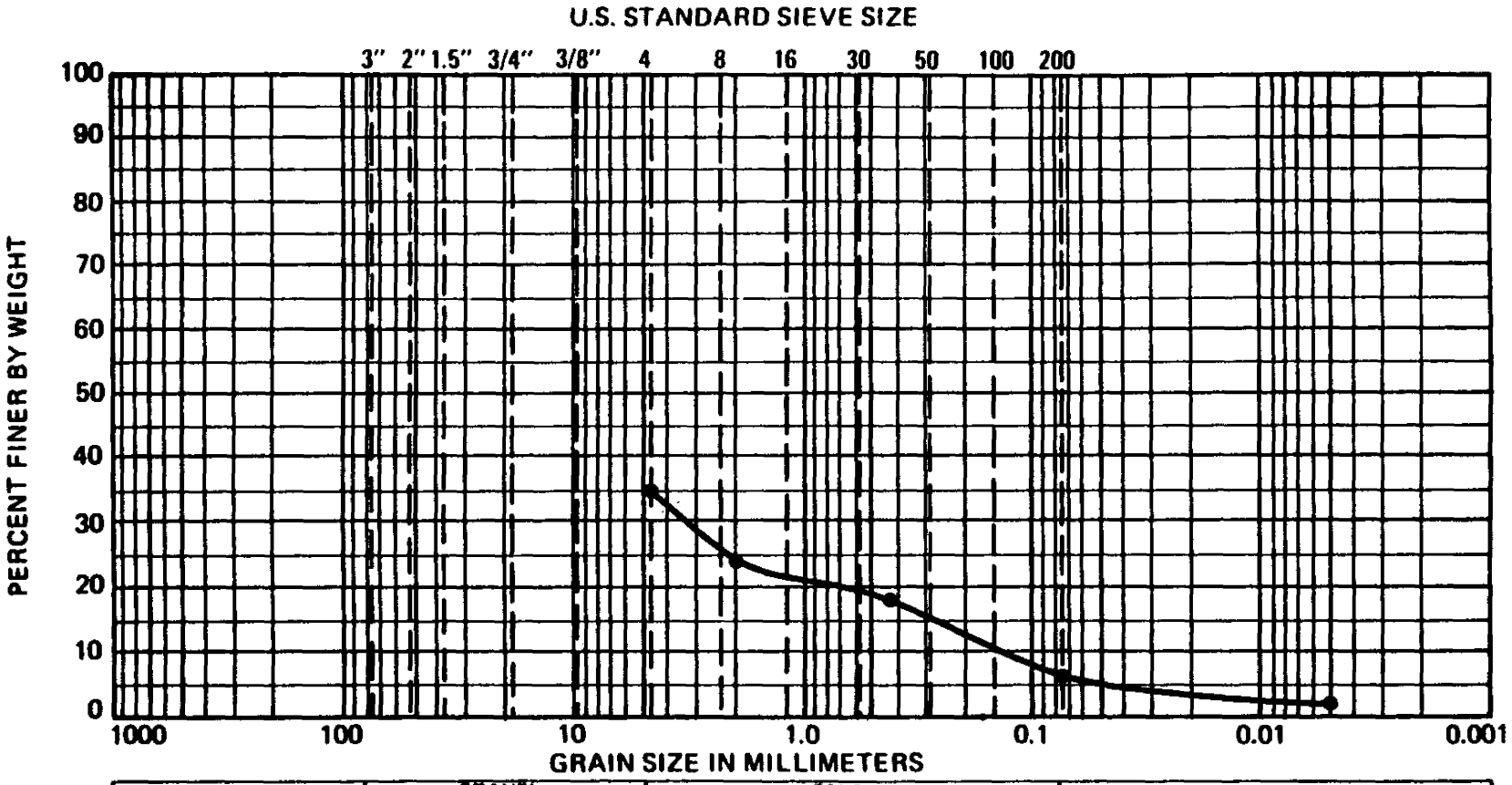
SAMPLE SR-RS16-01D
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		GW-SW					

GRADATION CURVE

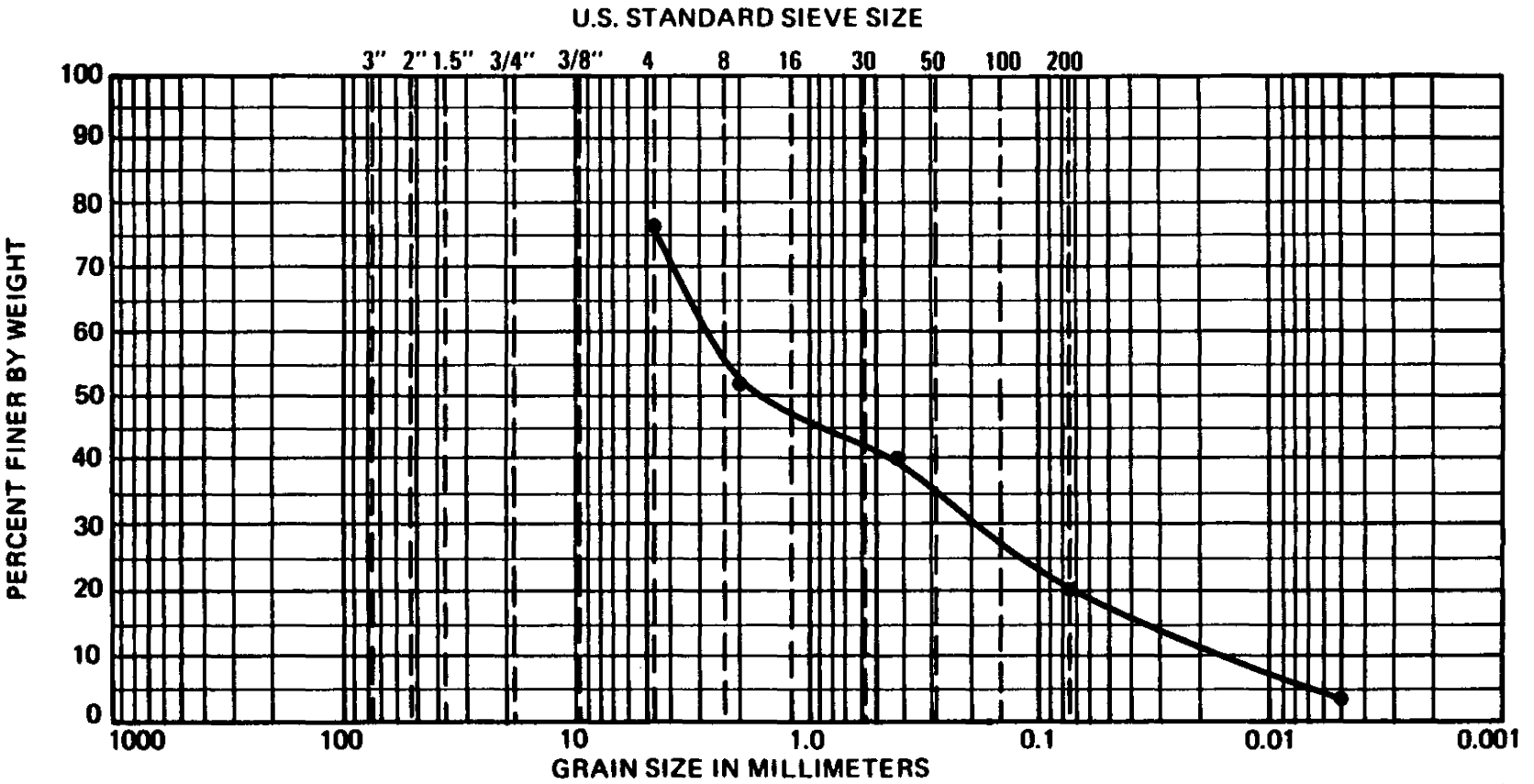
SAMPLE SR-RS17-01
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	8'-10'		GW-GP					

GRADATION CURVE

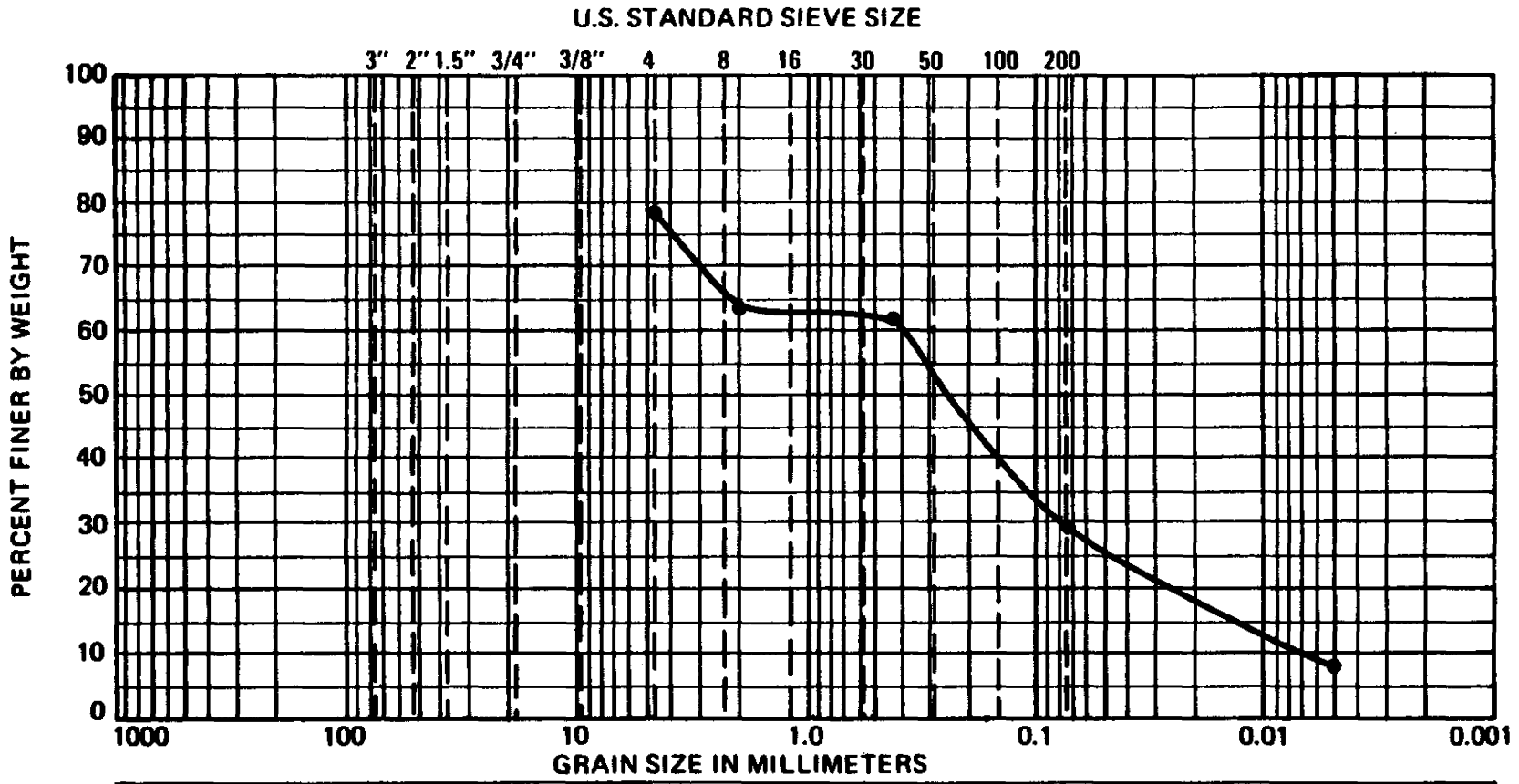
SAMPLE SR-AB52-03
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		SW					

GRADATION CURVE

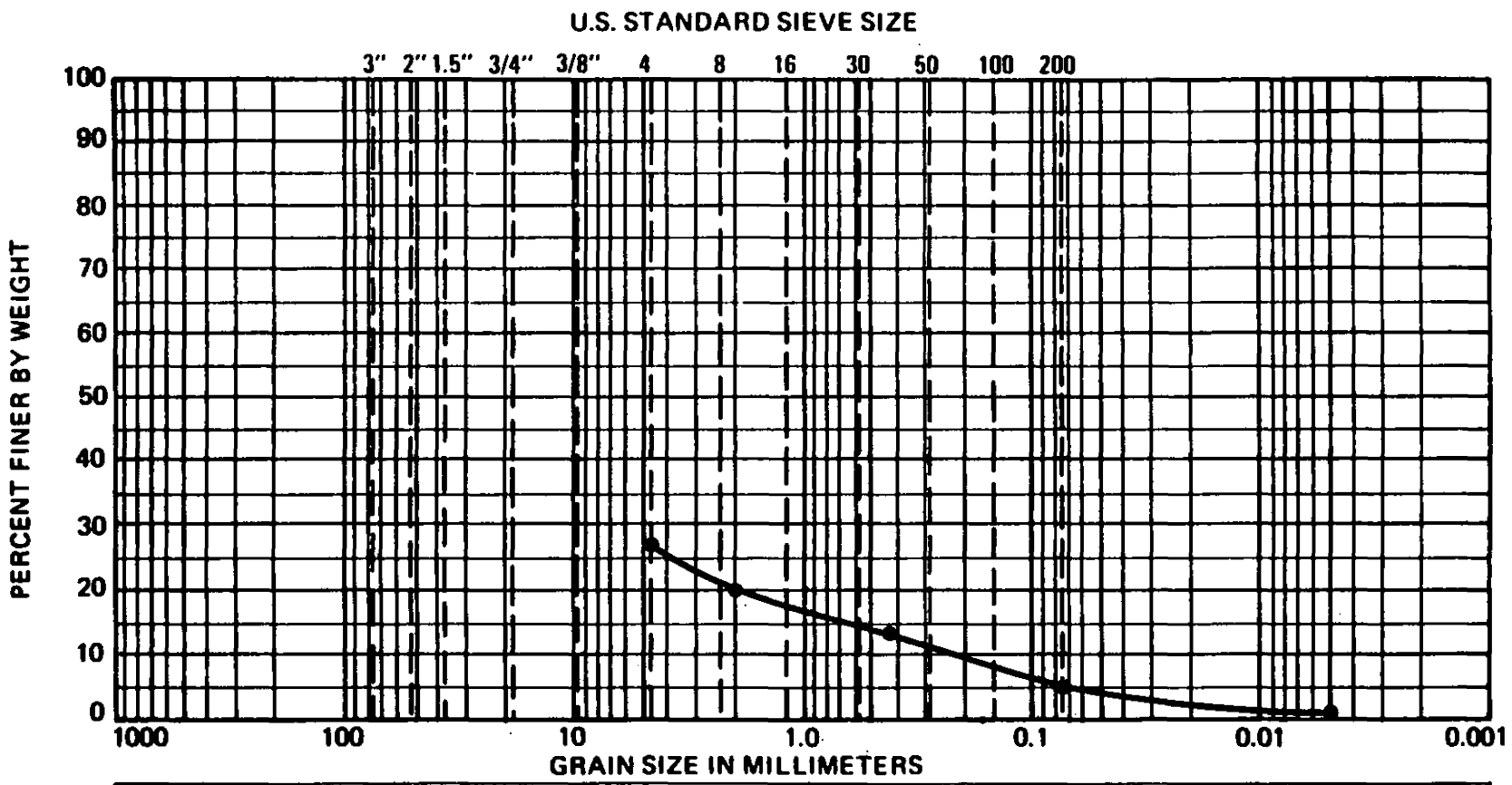
SAMPLE SR-AB56-01
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	2'-4'		SP					

GRADATION CURVE

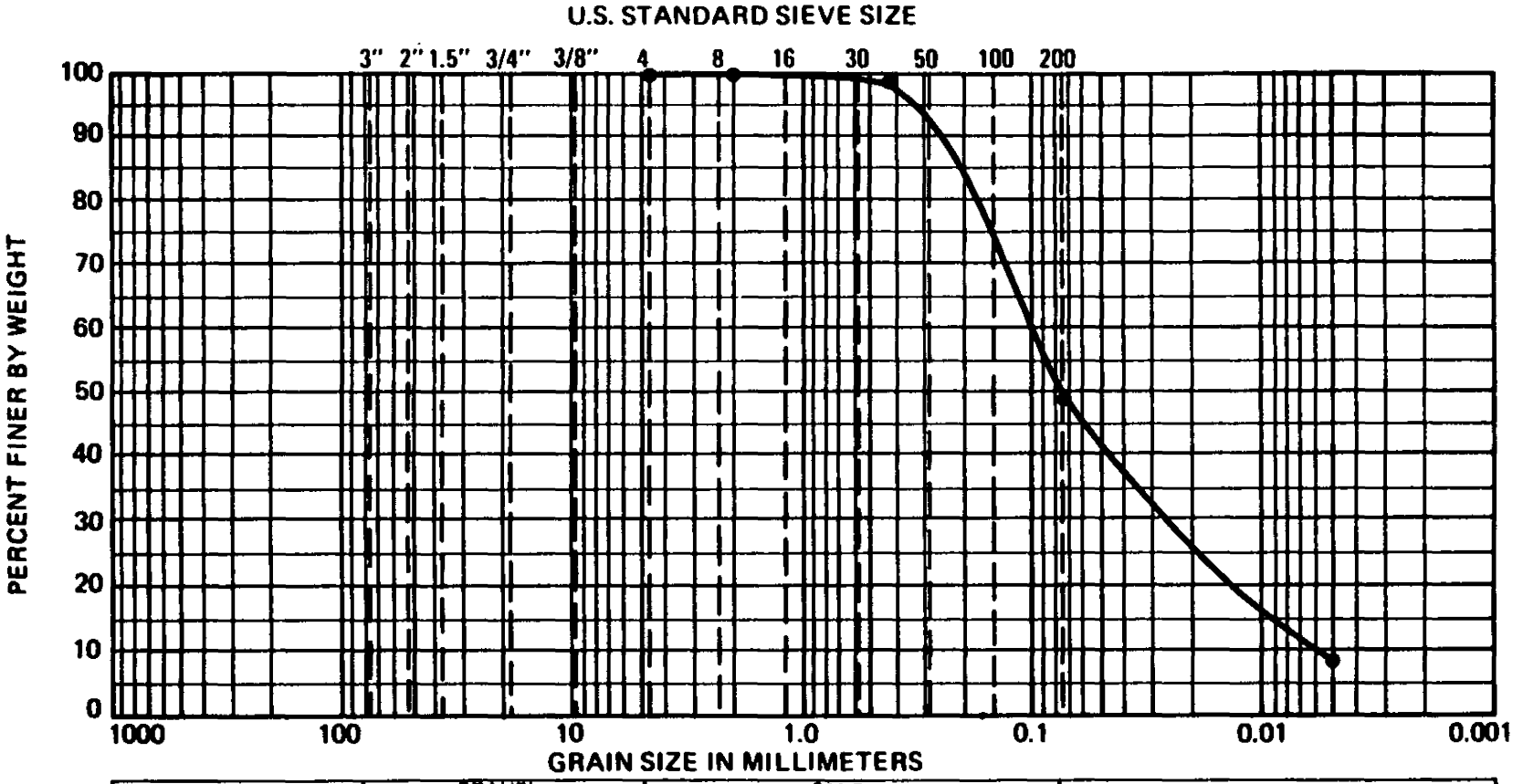
SAMPLE SR-AB56-02
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		GW-GP					

GRADATION CURVE

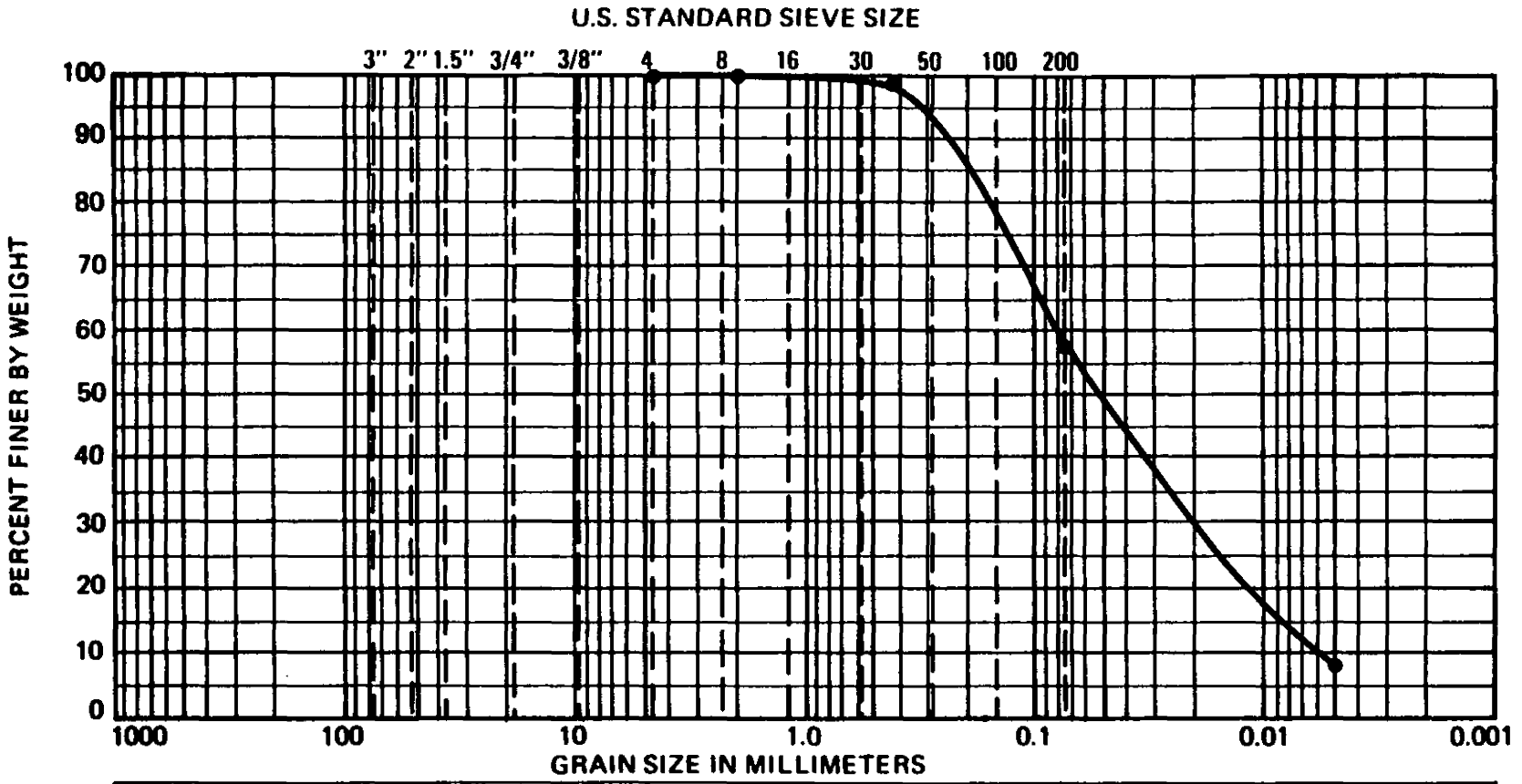
SAMPLE SR-AB67-01
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION	NAT. W C	LL	PL	PI	
	0-6"	SM					

GRADATION CURVE

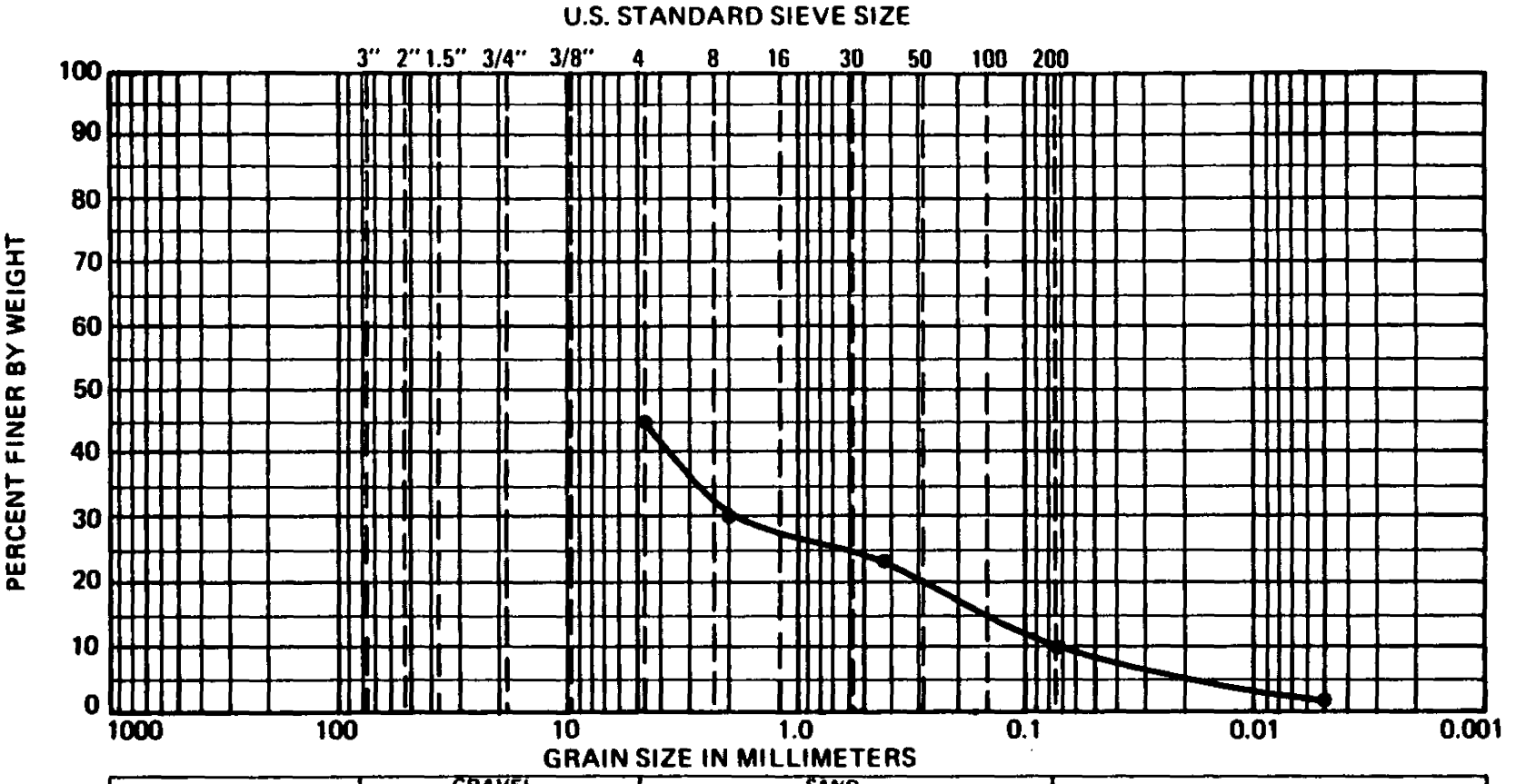
SAMPLE SR-AB66-01D
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION		NAT. W C	LL	PL	PI	
	0-6"		SM					

GRADATION CURVE

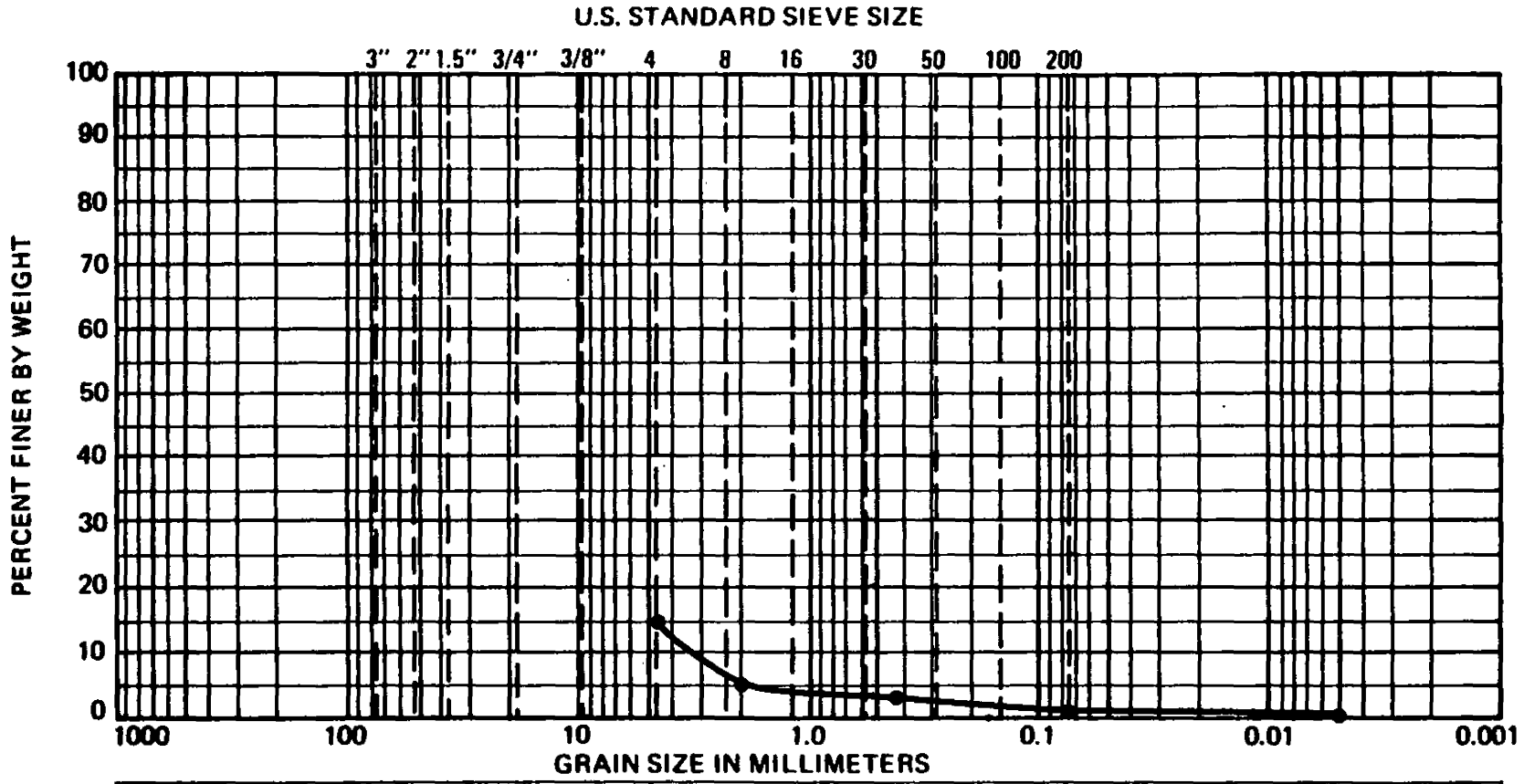
SAMPLE SR-AB66-01
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION	NAT. W C	LL	PL	PI	
	8'-10'	GW-GW					

GRADATION CURVE

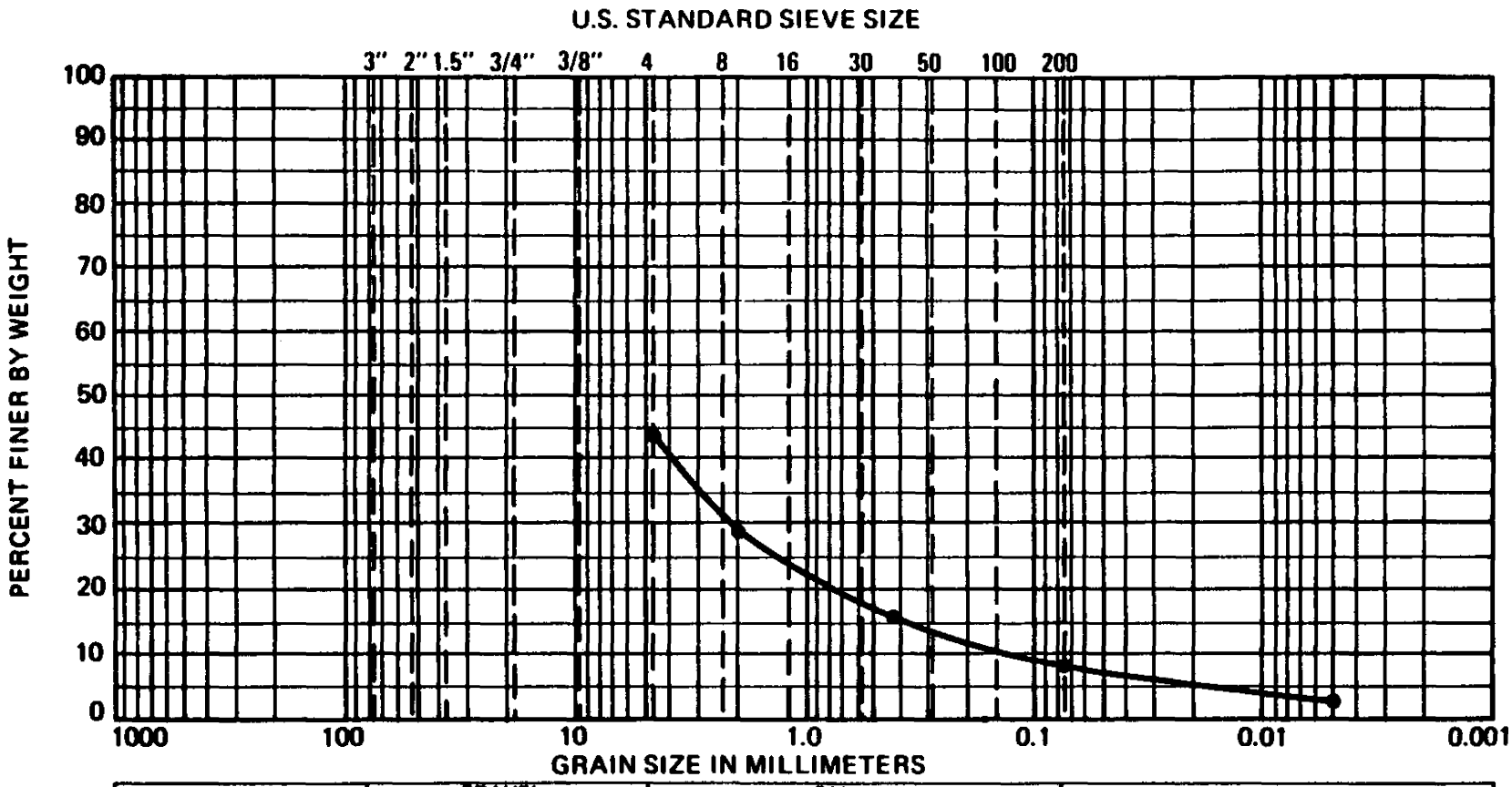
SAMPLE SR-AB56-03
SINCLAIR REFINERY SITE



	DEPTH	CLASSIFICATION	NAT. W C	LL	PL	PI	
	0-6"	GW-GP					

GRADATION CURVE

SAMPLE SR-AB68-01
SINCLAIR REFINERY SITE

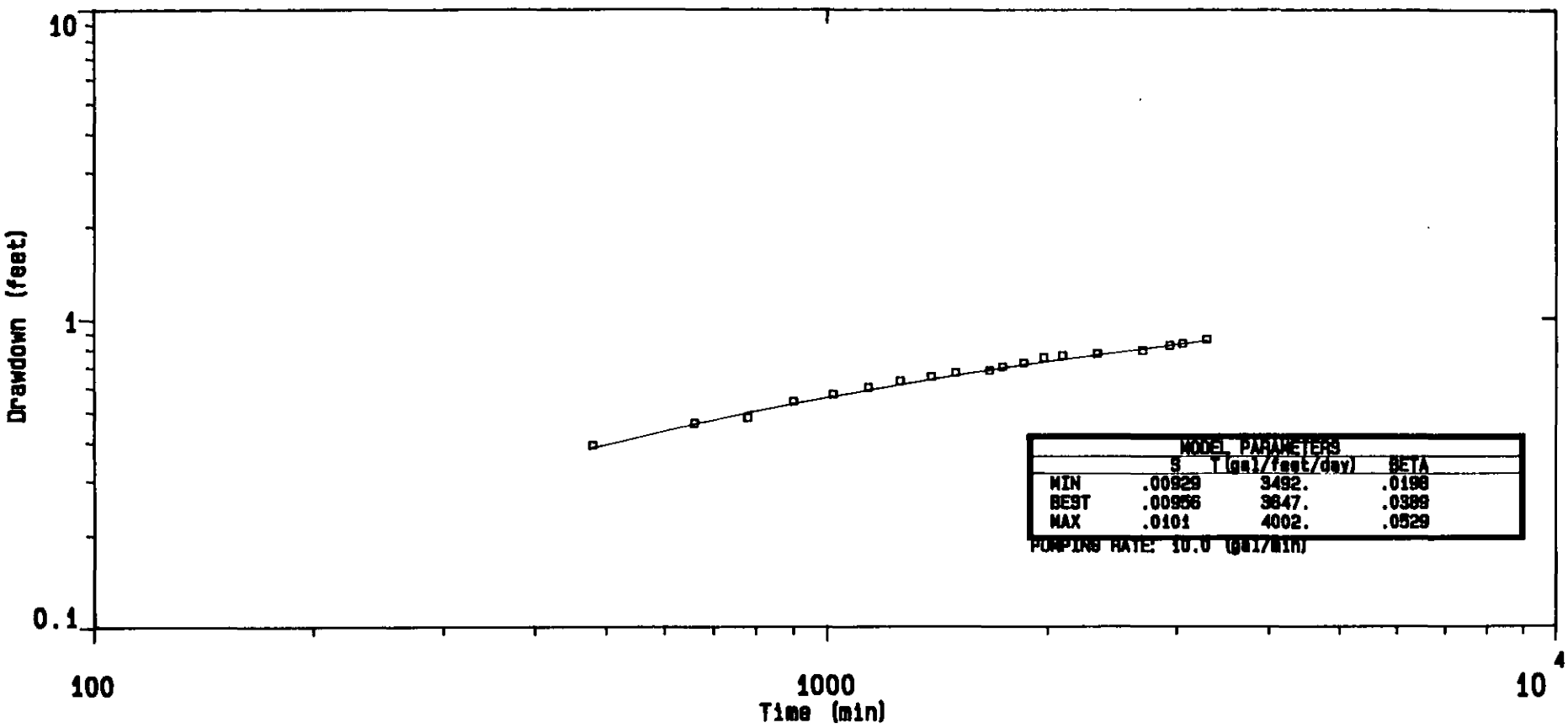


	DEPTH	CLASSIFICATION	NAT. W C	LL	PL	PI	
	8'-10'	GW-SW					

GRADATION CURVE

SAMPLE SR-AB94-03
SINCLAIR REFINERY SITE

Appendix G
Pumping Test Records



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 25.0 Depth: 25.0 feet

Pumping Well: MWP57 Distance: 107.00 feet

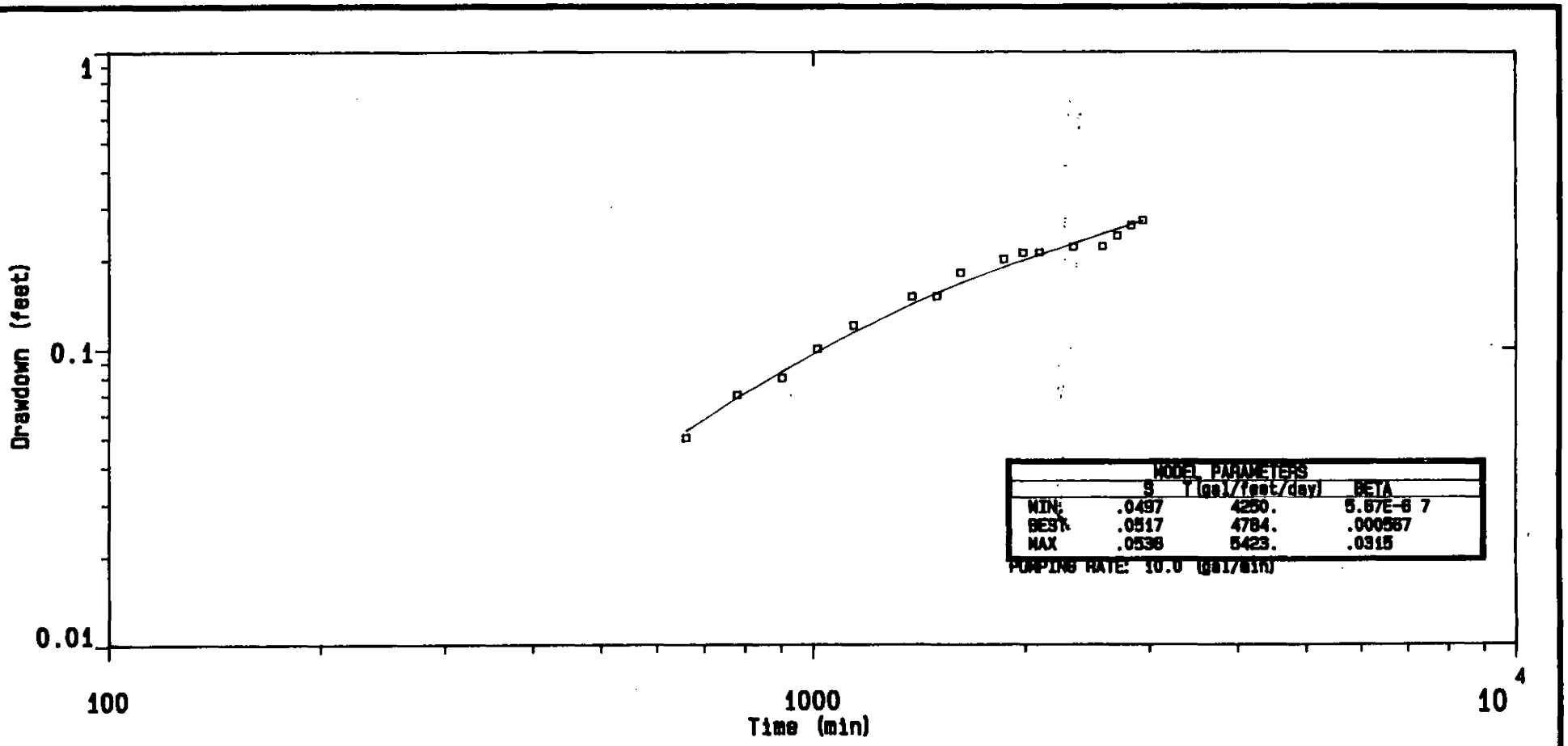
Screen: Base: 20.0 Top: 10.0 feet

RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK

ALLEGANY COUNTY

Date: 04-MAR-87 | Well No.: MWP02



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 26.0 Depth: 26.0 feet

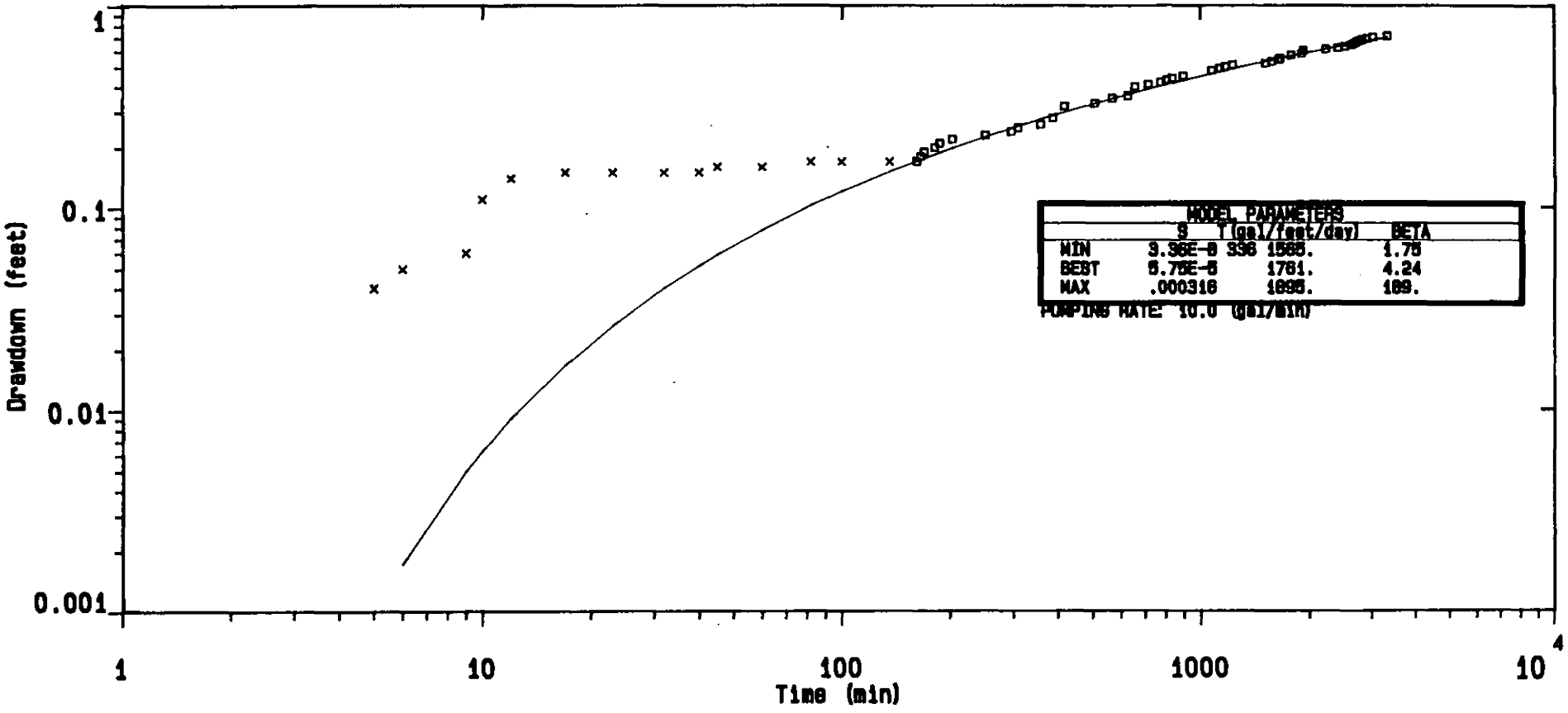
Pumping Well: MWP57 Distance: 150.00feet

Screen: Base: 24.0 Top: 9.00 feet

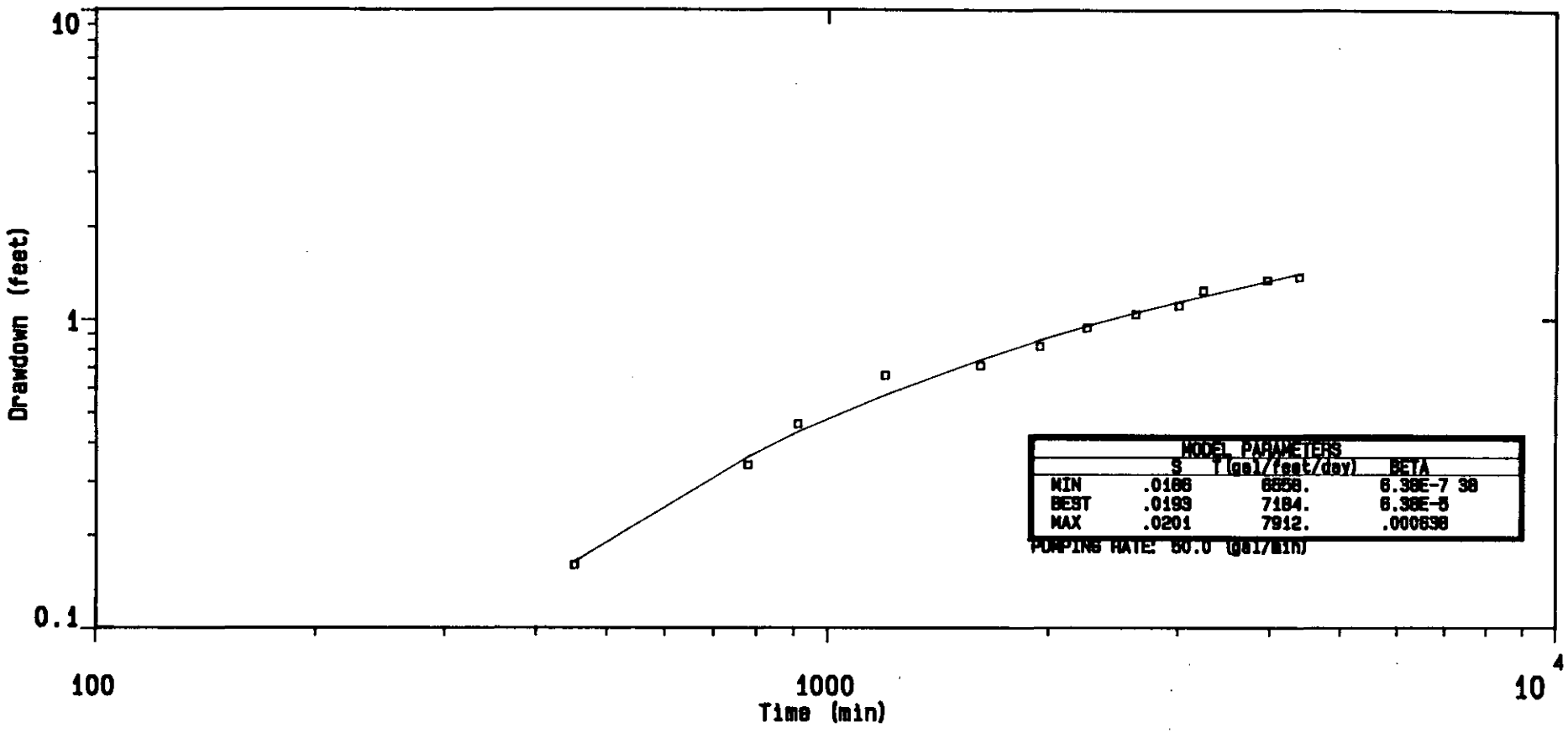
RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK
ALLEGANY COUNTY

Date: 04-MAR-87 Well No.: MWP10



for: ARCO SINCLAIR REFINERY	RI/FS - SITE CHARACTERIZATION
by: EBASCO Services Inc.	WELLSVILLE, NEW YORK ALLEGANY COUNTY
Aquifer: GLACIAL DEPOSITS Thickness: 15.0 Depth: 25.0 feet Pumping Well: MWP57 Distance: 155.0 feet Screen: Base: 25.0 Top: 15.0 feet	Date: 04-MAR-87 | Well No.: MWP25



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 32.0 Depth: 32.0 feet

Pumping Well: MWP56 Distance:253.9 feet

Screen: Base: 23.0 Top: 13.0 feet

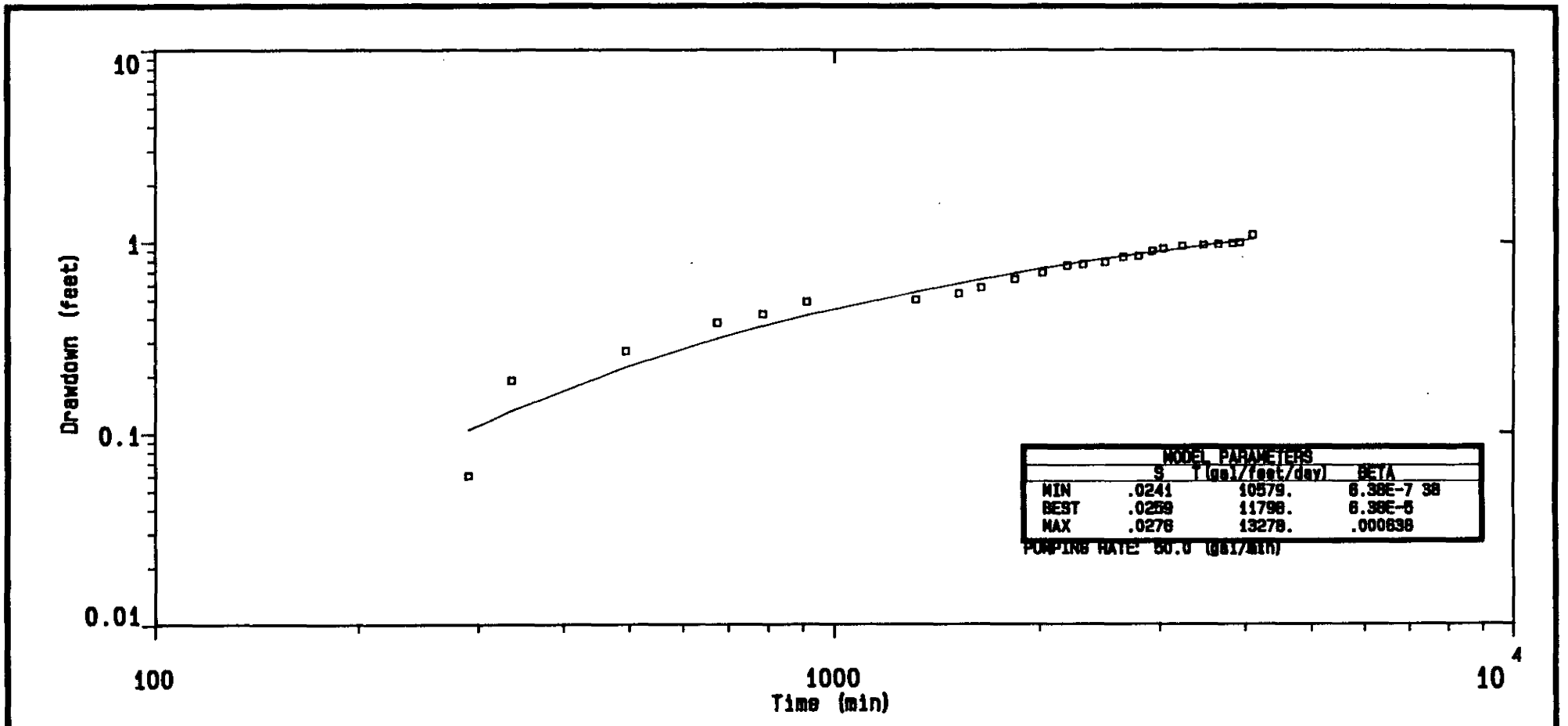
RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK

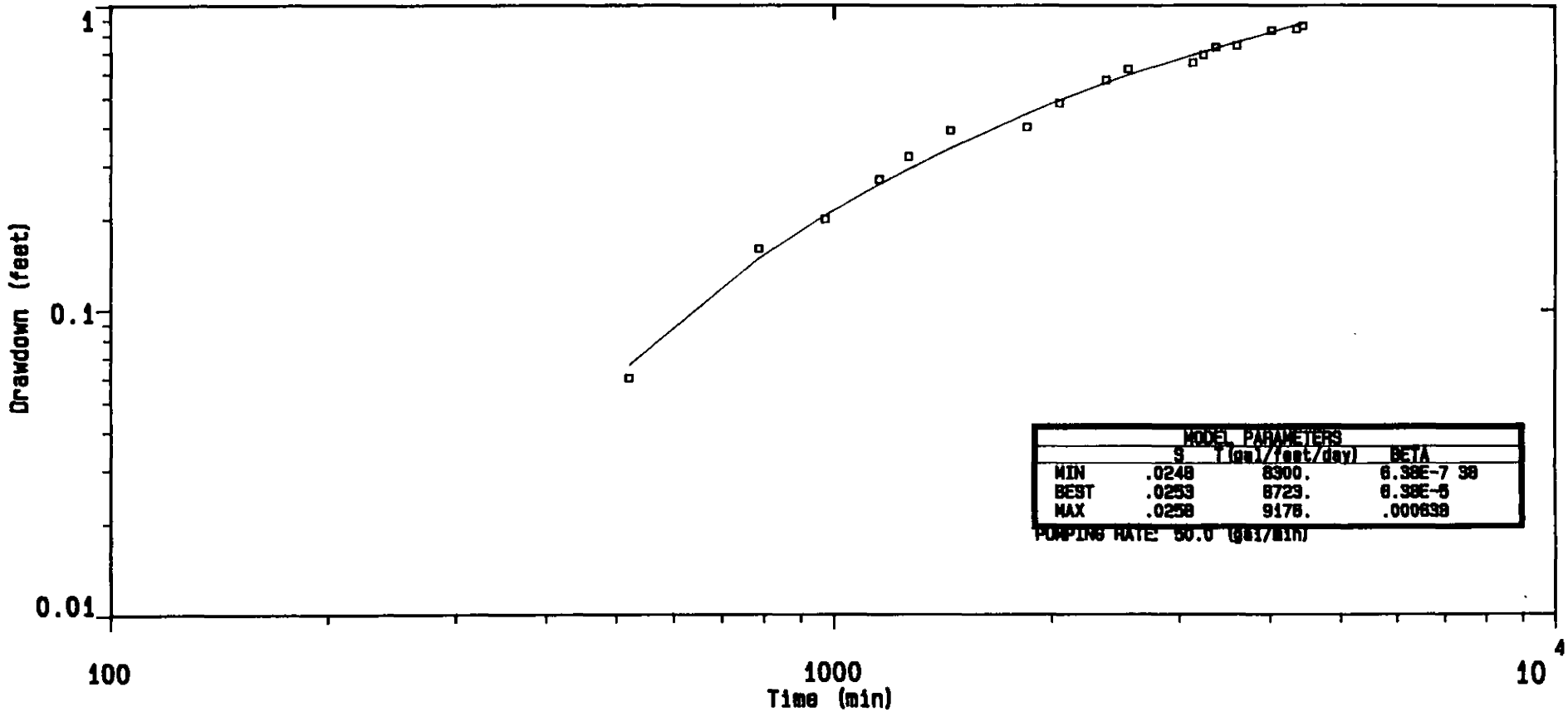
ALLEGANY COUNTY

Date: 19-FEB-87

Well No.: MWP30



for: ARCO SINCLAIR REFINERY	RI/FS - SITE CHARACTERIZATION
by: EBASCO Services Inc.	WELLSVILLE, NEW YORK ALLEGANY COUNTY
Aquifer: GLACIAL DEPOSITS Thickness: 25.0 Depth: 25.0 feet Pumping Well: MWP56 Distance: 222.4 feet Screen: Base: 25.0 Top: 15.0 feet	Date: 19-FEB-87 | Well No.: MWP29



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 32.0 Depth: 32.0 feet

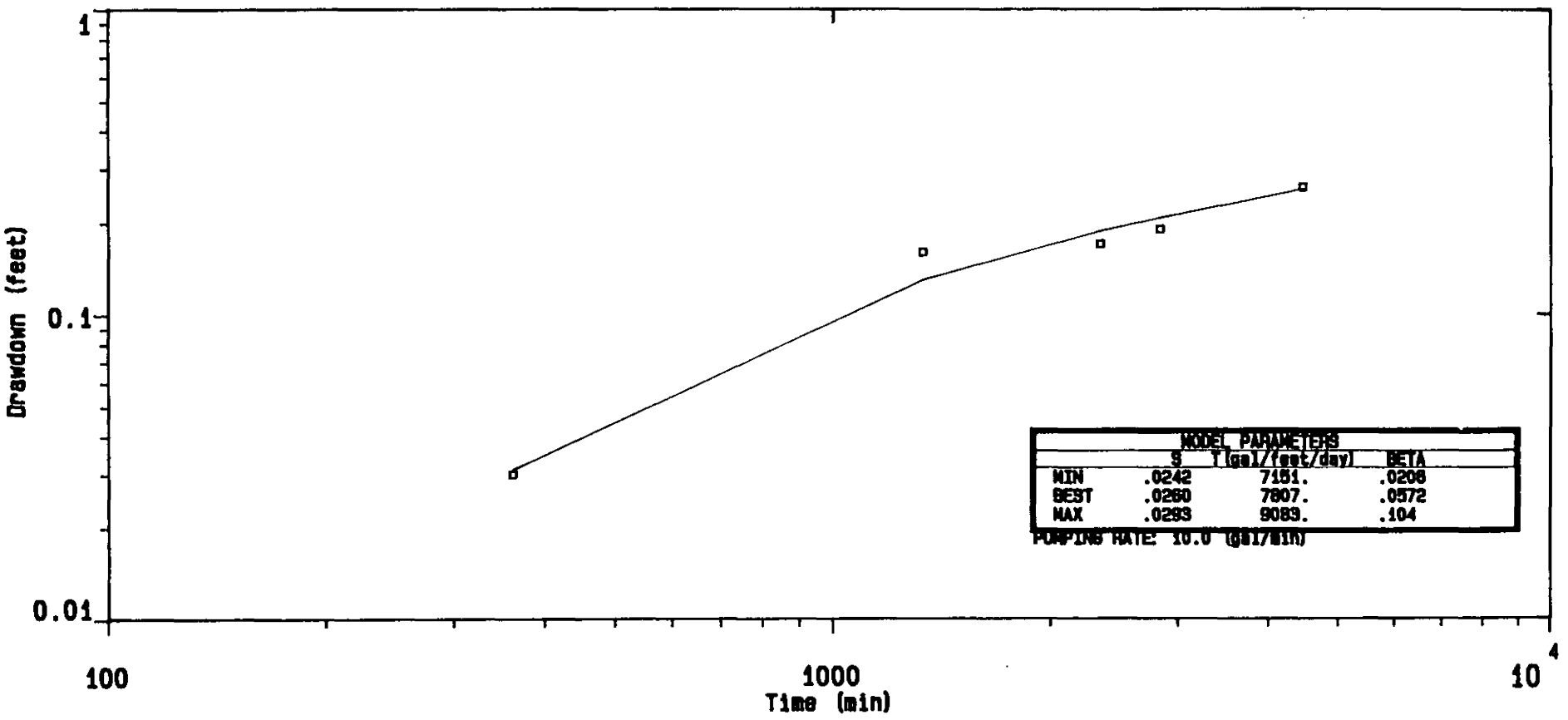
Pumping Well: MWP56 Distance: 314.3 feet

Screen: Base: 25.0 Top: 15.0 feet

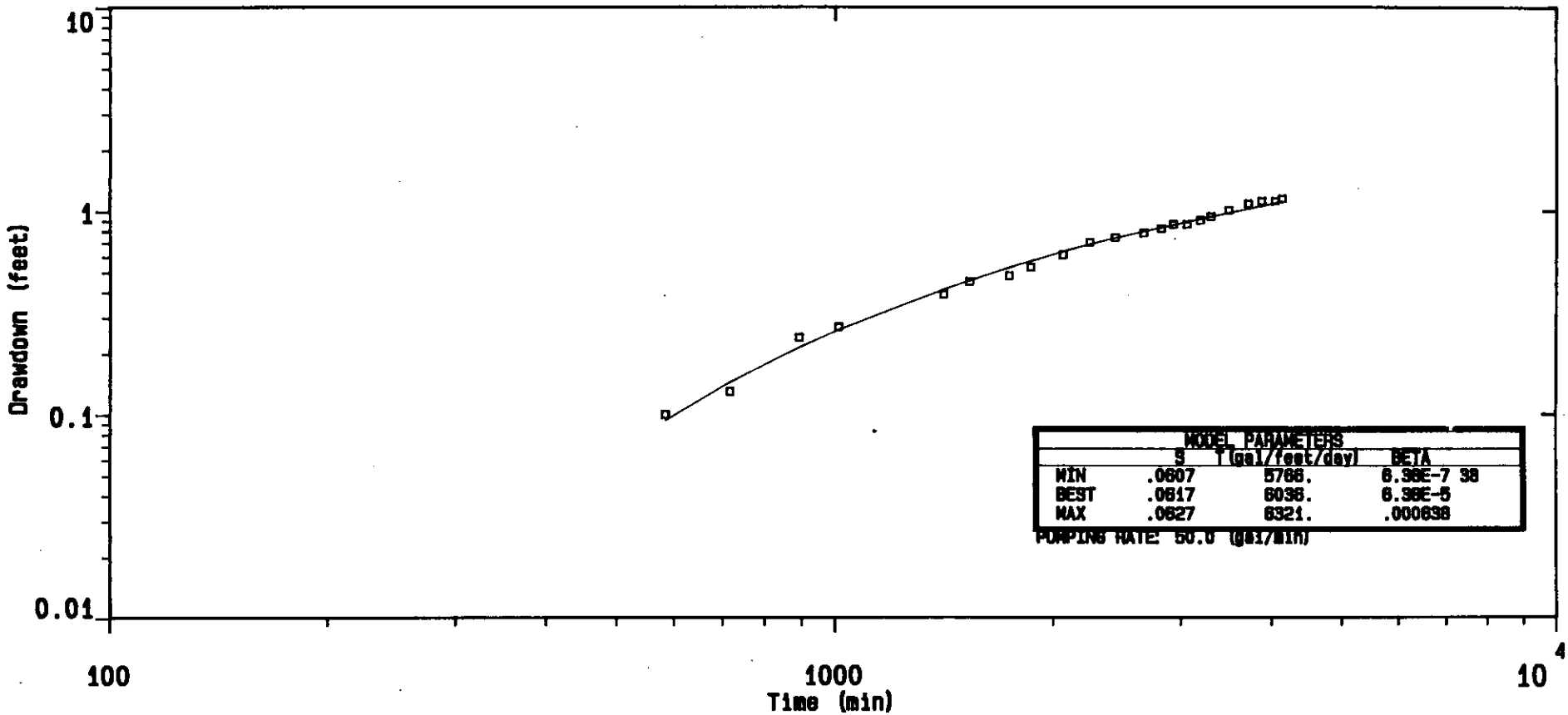
RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK
ALLEGANY COUNTY

Date: 19-FEB-87 | Well No.: MWP31



for: ARCO SINCLAIR REFINERY	RI/FS - SITE CHARACTERIZATION
by: EBASCO Services Inc.	WELLSVILLE, NEW YORK ALLEGANY COUNTY
Aquifer: GLACIAL DEPOSITS Thickness: 25.0 Depth: 12.0 feet Pumping Well: MWP57 Distance: 195.00 feet Screen: Base: 12.0 Top: 7.00 feet	Date: 04-MAR-87 | Well No.: MWP49



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 25.0 Depth: 17.0 feet

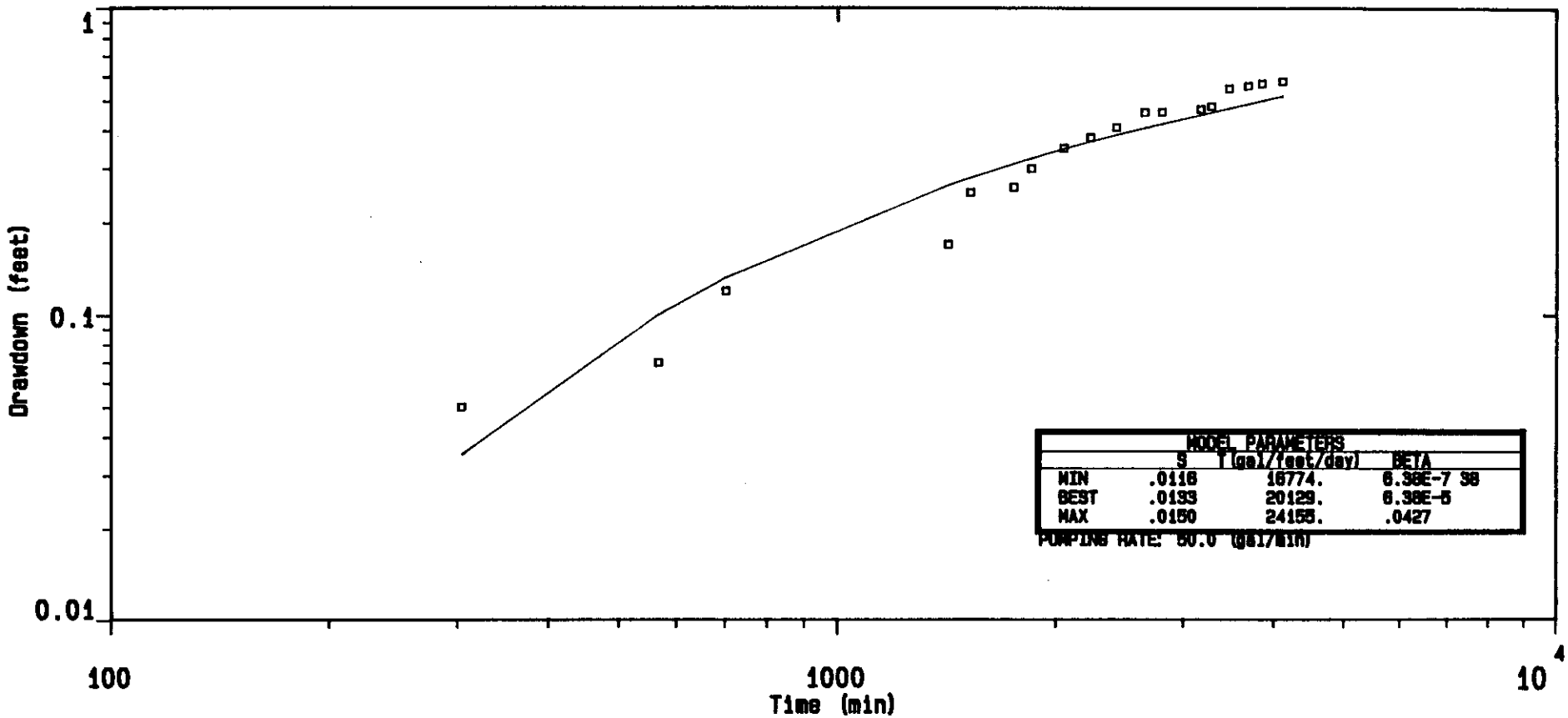
Pumping Well: MWP56 Distance: 178.4 feet

Screen: Base: 11.0 Top: 6.00 feet

RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK
ALLEGANY COUNTY

Date: 19-FEB-87 | Well No.: MWP51



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 32.0 Depth: 12.0 feet

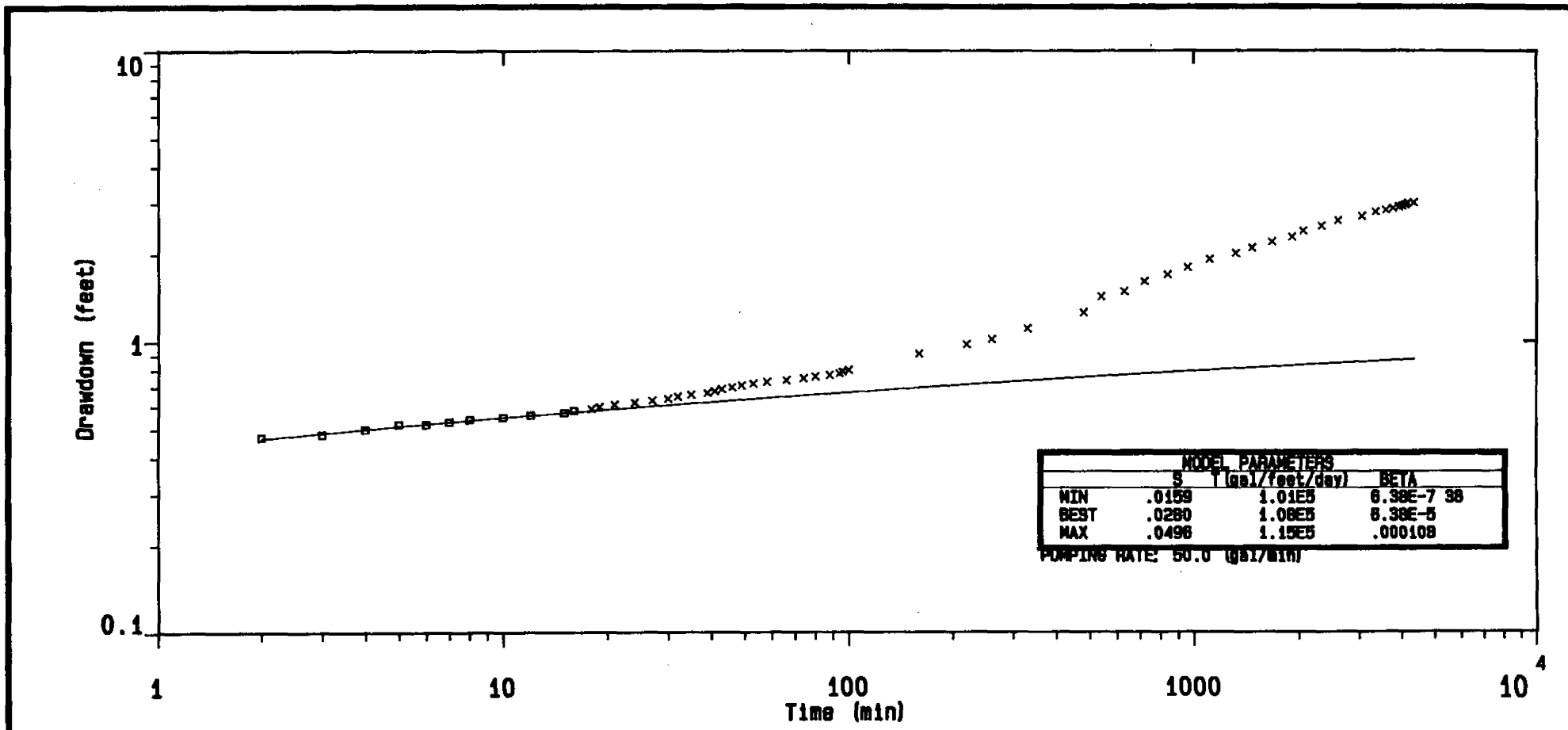
Pumping Well: MWP56 Distance: 481.2 feet

Screen: Base: 8.50 Top: 3.00 feet

RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK
ALLEGANY COUNTY

Date: 19-FEB-87 | Well No.: MWP53



for: ARCO SINCLAIR REFINERY

by: EBASCO Services Inc.

Aquifer: GLACIAL DEPOSITS

Thickness: 25.0 Depth: 30.0 feet

Screen: Base: 25.0 Top: 4.00 feet

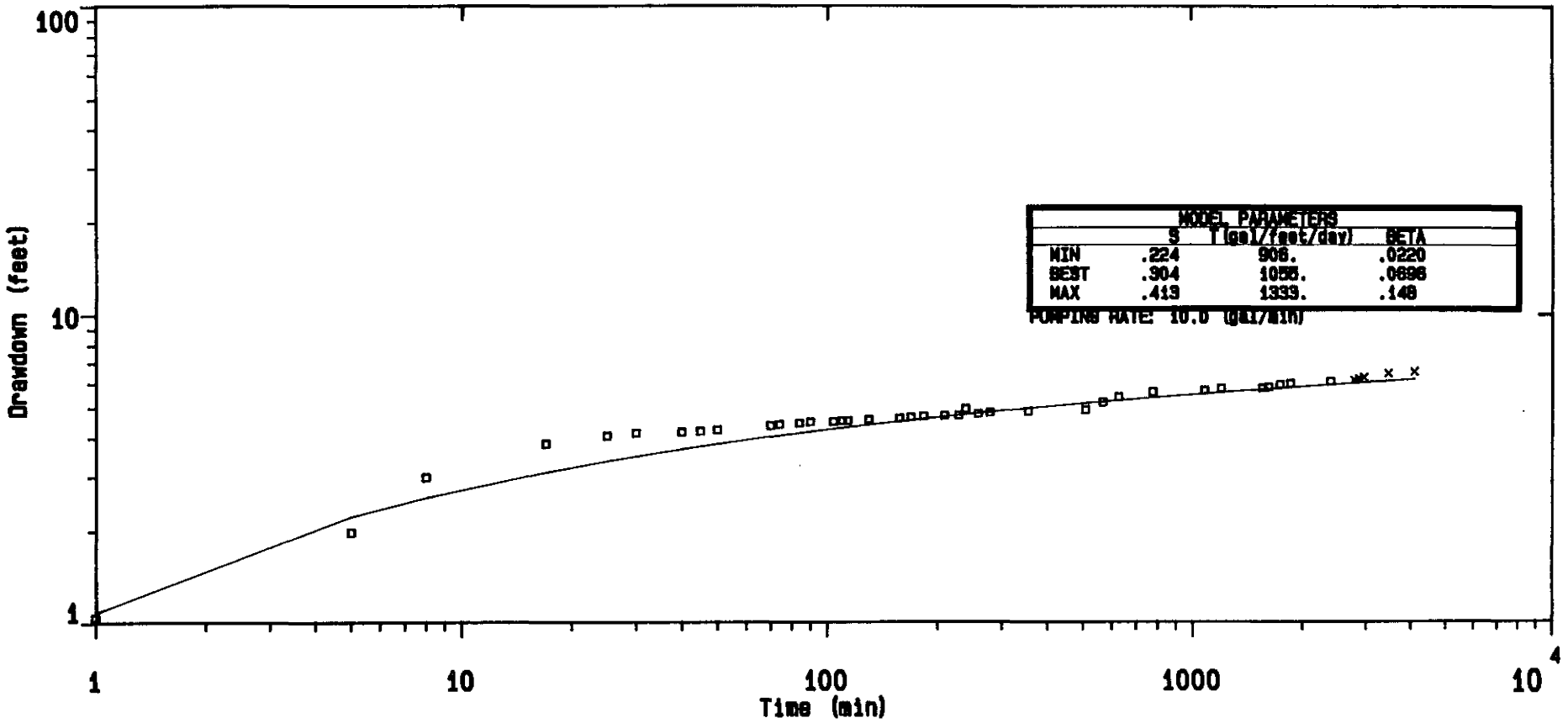
Well Radius 6 in. Casing Radius 3 in.

RI/FS - SITE CHARACTERIZATION

WELLSVILLE, NEW YORK

ALLEGANY COUNTY

Date: 19-FEB-87 | Well No.: MWP56



for: ARCO SINCLAIR REFINERY	RI/FS - SITE CHARACTERIZATION
by: EBASCO Services Inc.	WELLSVILLE, NEW YORK ALLEGANY COUNTY
Aquifer: GLACIAL DEPOSITS Thickness: 30.0 Depth: 30.0 feet Screen: Base: 25.0 Top: 5.00 feet Well Radius 6 in. Casing Radius 3 in.	Date: 04-MAR-87 Well No.: MWP57

Appendix H
Data Validation Reports Phase IIB

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 1-3

Samples: Soil - SRAB 4703, SRAB 4801, SRAB 4802, SRAB 5503, SRAB 6401, SRAB 6402, SRAB 6403, SRAB 6501, SRAB 6502, SRAB 6503, SRAB 4701, SRAB 4702, SRAB 5501, SRAB 5502, SRAB 4501, SRAB 4502, SRAB 4503, SRTP 0101, SRTP 0104, SRTP 0201, SRAB 6101, SRAB 6102, SRAB 6103, SRAB 4803.

Aqueous - SRFB 01, SRFB 02, SRFB 03.

Twenty-four soil and three aqueous samples analyzed for total metals were validate following current EPA Region II procedures. The following information was used to validate the analytical results.

- o sample hold time before analysis
- o initial and continual calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o lab control sample
- o method of standard addition analysis
- o serial dilution

The validated data are included in the original package, all additional attachments define the QC evaluation.

0120K

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continual Calibration

All initial and continuing calibrations were within QC limits.

Method Blank Contamination

All method blanks were within QC requirements.

Field Blank Contamination

The following field blanks contained contamination which exceeded to the IDL by more than two times.

SRFB01 - Ba, Ca, Mg, Na, Zn.
SRFB02 - Al, Ba, Ca, Fe, Mg, Mn, Na, Zn.
SRFB03 - Ba, Ca, Mg, Na.

Action:

(1) Sodium was rejected for the following samples: SRAB 4703, SRAB 4801, SRAB 4802, SRAB 5503, SRAB 6401, SRAB 6402, SRAB 6403, SRAB 6501, SRAB 6502, SRAB 6503, SRAB 4701, SRAB 4702, SRAB 5501, SRAB 5502, SRAB 4501, SRAB 4502, SRAB 4503, STRP 01011, STRP 0104, SRT 0201, SRAB 6101, SRAB 6102, SRAB 6103, SRAB 4803.

ICP Interference Check

All analytes meet ICP interference check parameters.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for the following elements Antimony, Arsenic, Selenium, Manganese, Copper, and Mercury.

Action:

(1) Antimony, Arsenic, Selenium, and Manganese were marked estimated "J" for samples SRAB 6401, SRAB 6402, SRAB 6403, SRAB 6501, SRAB 6502, SRAB 6503, SRTP 0201, SRAB 4701, SRAB 4702, SRAB 4703, SRAB 5501, SRAB 5502, SRAB 5503, SRAB 4501, SRAB 4502, SRAB 4503, SRAB 6101, SRAB 6102, SRAB 6103, SRAB 4801, SRAB 4802, SRAB 4803, SRTP 0101, SRTP 0104.

Lab Duplicate Analysis

Lab duplicate analysis for the following sample elements were outside of control limits, Mercury, and Calcium.

Action:

Mercury and Calcium were rejected in the following samples: SRAB 6401, SRAB 6402, SRAB 6403, SRAB 6501, SRAB 6502, SRAB 6503, SRTP 0201, SRAB 4701, SRAB 4702, SRAB 4703, SRAB 5501, SRAB 5502, SRAB 5503, SRAB 4501, SRAB 4502, SRAB 4503, SRAB 6101, SRAB 6102, SRAB 6103, SRAB 4801, SRAB 4802, SRAB 4803, SRTP 0101, SRTP 0104.

Lab Control Sample

All lab control sample elements meet QC criteria.

Method of Standard Addition Analysis

Method of Standard Addition results for arsenic samples SRAB 6102 and SRAB 6101 were outside of QC limits.

Action:

Samples were already marked estimated so action was not required.

Serial Dilution Analyses

Serial dilution results were outside of control limits for the following sample elements chromium, copper, vanadium, and sodium.

Action:

(1) Chromium, copper, and vanadium were marked estimated "J" in the following samples SRAB 6401, SRAB 6402, SRAB 6403, SRAB 6501, SRAB 6502, SRAB 6503, SRTP 0201, SRAB 4701, SRAB 4702, SRAB 4203, SRAB 5501, SRAB 5502, SRAB 5503, SRAB 4501, SRAB 4502, SRAB 4503, SRAB 6101, SRAB 6102, SRAB 6103, SRAB 4801, SRAB 4802, SRAB 4803, SRTP 0101, SRTP 0104.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 4-5

Samples: Soil - SRAB 5701, SRAB 5702, SRAB 5703, SRAB 01, SRAB 02, SRAB 03, SRRS 1501, SRRS 1601, SRTP 0204, SRRS 1701, SLTP 0602, SRRS 1601D, SRAB 5701D.

Aqueous - SRFB 01, SRFB 04, SRFB 05, SRDI 01.

Thirteen soil and four aqueous samples analyzed for total metals were validated following current EPA Region III procedures. The following information was used to validate the analytical results:

- o sample hold time before analysis
- o initial and continual calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o field duplicate analysis
- o lab control sample
- o method of standard addition analysis
- o serial dilution

The validated data are included in th original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continual Calibration

All initial and continual calibrations were within QC limits.

Method Blank Contamination

All method blanks were within QC limits

Field Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRFB04 - Al, Ba, Ca, Cr, Fe, Mg, Mn, Hg, Na, Zn.
SRFB05 - Ca, Fe, Mg, Hg, Na, Zn.
SRDI01 - Ba, Ca, Na, Zn.
SRFB01 - Ba, Ca, Fe, Mg, Na, Zn.

Action:

(1) Chromium, mercury, sodium, zinc, and calcium were rejected in the following samples:

Chromium - SRAB 5701, SRAB 5701D, SRAB 5702, SRAB 5703, SRAB 5801, SRAB 5802, SRAB 5803, SRTP 0204.

Mercury - SRAB 5701, SRAB 5701D, SRAB 5702, SRAB 5801, SRAB 5803, SRTP 0204, SLTP 0602.

Sodium - RAB 5701, SRAB 5701D, SRAB 5702, SRAB 5703, SRAB 5801, SRAB 5802, SRAB 5803, SRTP 0204, SRRS 1501, SRSR 1601, SRSR 1601D, SRRS 1701.

Zinc - SRAB 5701, SRAB 5701D, SRAB 5703, SRAB 5801, SRAB 5803.

Calcium - SRAB 5702.

ICP Interference Check

All elements meet ICP interference check parameters.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for the following elements, antimony, lead selenium.

Action:

(1) Antimony, lead, and selenium were marked estimated "J" in the following samples.

Antimony, lead, selenium - SRAB 5701, SRAB 5701D, SRAB 5702, SRAB 5703, SRAB 5801, SRAB 5802, SRAB 5803, SRTP 0204, SRSR 1501, SRRS 1601, SRRS 1601D, SRSR 1701.

Lead, Selenium - SLTP 0602.

Lab Duplicate Analysis

All elements meet lab duplicate analysis criteria.

Method of Standard Addition

All samples ran under Method of Standard addition meet QC criteria.

Serial Dilution

Zinc was outside of Serial Dilution analysis control limits.

Action:

All associated samples had already been marked estimated "E" by the laboratory so no action was required.

Comments:

The following transcription errors were found in the package.

Lead - SRSR 1501

Percent solids - SRRS 1501

Action:

Values were corrected by reviewer.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 6-7

Samples: Soil - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5301, SRAB 5301D, SRAB 5302, SRAB 5303, SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5601, SRAB 5602, SRAB 5603, SLTP 1302, SLTP 1302D.

Aqueous - SRSW 4601,S RSW 4701, SRSW 4801, SRSW 4901, SRSW 5001, SRSW 5001D, SRSW 5101, SRFB 06, SRFB 07, SRFB 08, SRFW 5201, SRFW 5301, SRFW 5401.

Sixteen soil and thirteen aqueous samples analyzed for total metals were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- o sample hold time before analysis
- o initial and continual calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o field duplicate
- o lab control sample
- o method of standard addition analysis
- o serial dilution

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continual Calibration

All initial and continuing calibrations were within QC limits.

Method Blank Contamination

All method blanks were within QC requirements.

Field Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRFB 06 - Ca, Mg.
SRFB 07 - Ai, Ba, Ca, Cr, Fe, Mg, Mn, Ni, K, Na, Zn.
SRFB 08 - Ba, Fe, Mg, Zn.

Action:

(1) Zinc, chromium, nickel, potassium, and sodium were rejected in the following samples.

Zinc - SRSW 4901, SRSWS 5001D, SRSW 5101, SRFW 5301, SRFW 5401.

Chromium - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5031, SRAB 5301D, SRAB 5302, SRAB 5303, SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5501, SRAB 5502, SRAB 5503, SLTP 1302, SLTP 1302D.

Nickel - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5031, SRAB 5301D, SRAB 5302, SRAB 5303, SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5501, SRAB 5502, SRAB 5503.

Potassium - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5301, SRAB 5301D, SRAB 5303, SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5501, SRAB 5502, SRAB 5503.

Sodium - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5301, SRAB 5301D, SRAB 5302, SRAB 5303, SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5501, SRAB 5502, SRAB 5503.

ICP Interference Check

All elements meet ICP interference check parameters.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for Mercury, Aluminum, Antimony, and Selenium.

Action:

(1) Mercury and Thallium were marked estimated "J" in the following samples.

Mercury, Thallium - SRSW 4601, SRSW 4701, SRSW 4801, SRSW 4901, SRSW 5001, SRSW 5001D, SRSW 5101, SRFB 06, SRFB 07, SRFB 08, SRFW 5201, SRFW 5301, SRFW 5401.

(2) Antimony and Selenium were marked estimated "J" in the following samples.

Antimony, Selenium - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5301, SRAB 5301D, SRAB 5302, SRAB 5303,SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5501, SRAB 5502, SRAB 5503.

(3) Selenium was marked estimated "J" in the following samples.

(4) Mercury was marked estimated "J" in the following samples.

Mercury - SRAB 5401, SRAB 5501.

(5) Mercury would have been qualified estimated "J" for the following samples; however, it was qualified for other criteria.

Mercury - SRAB 5301, SRAB 5301D.

Lab Duplicate Analysis

All elements meet lab duplicate analysis QC criteria.

Field Duplicate Analysis

Iron, Mercury, and Arsenic were outside of field duplicate analysis criteria limits.

Action:

(1) Iron was reject for samples SRSW 5001, SRSW 5001D.
(2) Mercury was rejected for samples SRAB 5301, SRAB 5301D.
(3) Arsenic was rejected for samples SLTP 1302, SLTP 1302D.

Lab Control Sample

All elements were within lab control sample QC limits.

Method of Standard Addition

Arsenic did not meet QC method of standard addition criteria for sample SRTP 0902, SLTP 1302.

Action:

(1) Arsenic was marked estimated "J" for sample SRTP 0902.

(2) Arsenic would have been qualified estimated "J" for sample SLTPB 02; however, it was qualified for other criteria, so action was not required.

Serial Dilution

Vanadium was outside of serial dilution analysis control limits.

Action:

Vanadium was marked estimated "J" in the following samples.

Vanadium - SRTP 0902, SRAB 4901, SRAB 4902, SRAB 4903, SRAB 5301, SRAB 53010D, SRAB 5302, SRAB 5303, SRAB 5401, SRAB 5402, SRAB 5403, SRAB 5501, SRAB 5502, SRAB 5503.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 8

Samples: Soil - SRAB 9402, SRAB 5001, SRAB 5002, SRAB 5003, SRAB 6001, SRAB 6002, SRAB 6003, SRAB 9401, SRAB 9403, SRAB 6201, SRAB 6202, SRAB 6203, SRAB 6801, SRAB 6802, SRAB 6003, SLTP 1502, SRTP 1602.

Aqueous - SRFB 09, SRFB 10

Seventeen soil and two aqueous samples analyzed for total metals were validate following current EPA Region II procedures. The following information was used to validate the analytical results.

- o sample hold time before analysis
- o initial and continual calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o lab controls sample
- o method of standard addition analysis
- o serial dilution

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continual Calibration

All initial and continuing calibration were within QC limits.

Method Blank Contamination

All method blanks were within QC requirements.

Field Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRFB09 - Ba, Ca, Fe, Mg, Mn, Na.
SRFB10 - Ba, Ca, Mg, Na.

Action:

Sodium was rejected in the following samples.
Sodium - SRAB9402, SRAB 5001, SRAB 5002,SRAB 5003, SRAB 6001, SRAB 6002, SRAB 6003, SRAB 9401, SRAB 9403, SRAB 6201, SRAB 6202, SRAB 6203, SRAB 6801, SRAB 6802, SRAB 6803.

ICP Interference Check

All elements meet ICP interference check parameters.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for Antimony, Arsenic, Selenium, Lead, and Manganese.

Action:

(1) Antimony, arsenic, selenium, lead, and manganese estimated "J" in the following samples.

Antimony, Arsenic, Selenium - SRAB 9402, SRAB 5001, SRAB 5002, SRAB 5003, SRAB 6001, SRAB 6002, SRAB 6003, SRAB 9401, SRAB 9403, SRAB 6201, SRAB 6202, SRAB 6203, SRAB 6801, SRAB 6800, SRAB 6803.

(2) Arsenic and Selenium were marked estimated "J" in the following samples.

Arsenic, Selenium - SLTP 1502, SRTP 1602.

(3) Lead was marked estimated "J" in the following samples.

Lead - SRAB 9402, SRAB 5001, SRAB 5002, SRAB 5003, SRAB 6002, SRAB 6003, SRAB 6202, SRAB 6203, SRAB 6801, SRAB 6802, SRAB 6803, SLTP 1502, SLTP 1602.

(4) Manganese was marked estimated "J" in the following samples.

Manganese - SRAB 9402, SRAB 5001, SRAB 5002, SRAB 5003, SRAB 6001, SRAB 6002, SRAB 6003, SRAB 9401, SRAB 9403, SRAB 6201, SRAB 6202, SRAB 6203, SRAB 6801, SRAB 6802, SRAB 6803.

Lab Duplicate Analysis

All elements meet lab duplicate analysis QC criteria.

Lab Control Sample

All elements were within lab control sample QC limits.

Method of Standard Addition

All samples meet QC method of standard addition criteria.

Serial Dilution Analyses

Maganesium and vanadium did not meet QC serial dilution requirements.

Action:

(1) Magnesium was marked estimated "J" in the following samples

Magnesium - SRFB 09, SRFB 10.

(2) Vanadium was marked estimated "J" in the following samples. Vanadium - SRAB 9402, SRAB 5001, SRAB 5002, SRAB 5003, SRAB 6001, SRAB 6002, SRAB 6003, SRAB 9401, SRAB 9403, SRAB 6201, SRAB 6202, SRAB 6203, SRAB 6801, SRAB 6802, SRAB 6803.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 9-10

Samples: Soil - SRAB 5102, SRAB 4601, SRAB 4601D, SRAB 4602, SRAB 4603, SRAB 5101, SRAB 5102D, SRAB 5103, SRAB 5201, SRAB 5202, SRAB 5203, SRAB 9501, SRAB 9502, SLTP 1802, SRMWB 6401, SRMWB 6402, SLAB 8302. Aqueous - SRFB 11, SRFB 12, SRB 13, SRFB 14, SRDI 02

Seventeen soil and five aqueous samples analyzed for total metals were validated following current EPA Region II procedures. The following information was used to validate the analytical results.

- o sample hold time before analysis
- o initial and continual calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o field duplicate
- o lab control sample
- o method of standard addition analyses
- o serial dilution

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continuing Calibration

All initial and continuing calibration were within QC limits.

Method Blank Contamination

All method blanks were within QC requirements.

Field Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRAB12 - Ba, Ca, Fe, Mg, Mn, Na, Zn.
SRDI02 - Ba, Ca, Mg, Na.
SRFB13 - Ai, Ba, Ca, Fe, Mg, Na, Zn.
SRFB14 - Ba, Ca, Fe, Mg, Ni, Na, Zn.

Action:

(1) Sodium and nickel were rejected in the following samples.

Sodium - SRAB 5201, SRAB 5202, SRAB 5203, SRAB 9501, SRAB 9502, SRMWB 6401, SRMWB 6402. Nickel - SRMWB 6401, SRMWB 6402.

ICP Interference Check

All elements meet ICP interference check parameters.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for antimony and arsenic.

Action:

(1) Antimony and arsenic - SRAB 4601, SRAB 4601D, SRAB 4602, SRAB 4603, SRAB 5101, SRAB 5102, SRAB 5102D, SRAB 5103, SRAB 5201, SRAB 5202, SRAB 5203, SRAB 9501, SRAB 9502, SRMWB 6401, SRMWB 6402.

(2) Arsenic was marked estimated "J" in the following samples. Arsenic - SLTP 1802, SLAB 8302.

Lab Duplicate Analysis

All elements meet lab duplicate analysis QC criteria.

Field Duplicate Analysis

Calcium was outside of field duplicate analysis criteria limits.

Action:

Calcium was rejected in the following samples. Calcium - SRAB 5102, SRAB 5102D.

Lab Control Sample

All elements were within lab control sample QC limits.

Method of Standard Addition

All sample elements ran under method of standard addition meet QC criteria.

Serial Dilution

Calcium, Copper, and potassium did not meet QC serial dilution criteria.

Action:

(1) Calcium were marked estimated "J" in the following samples.

Calcium - SRFB 12, SRFB 13, SRFB 14, SRDI 02.

(2) Copper and Potassium were marked estimated "J" in the following samples.

Copper, Potassium - SRAB 4601, SRAB 4601D, SRAB 4602, SRAB 4603, SRAB 5101, SRAB 5102, SRAB 5102D, SRAB 5103, SRAB 5201, SRAB 5202, SRAB 5203, SRAB 9501, SRAB 9502, SRMWB 6401, SRMWB 6402.

(3) Arsenic was marked estimated "J" in the following samples.

Arsenic - SLTP 1802, SLAB 8302.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 12-15

Samples: Soil - SRAB 6601, SRAB 6601D, SRAB 6602, SRAB 6603, SRAB 6701, SRAB 6702, SRAB 6703, SLAB 8801, SLAB 8403, SLAB 8603, SLAB 9001, SLAB 7903, SLAB 7903D, SLAB 8002. Aqueous - SLPS01, SLPS02, SLPS63, SRFB16, SRFB17, SRFB18, SRFB20, SRFB21.

Fourteen soil and light aqueous samples analyzed for total metals were validated following current EPA Region II procedures. The following information was used to validate the analytical results.

- o sample hold time before analysis
- o initial and continuing calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o field duplicate
- o lab control sample
- o method of standard addition analysis
- o serial dilution
- o dissolved/total analysis

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continual Calibration

All initial and continual calibration were within QC limits.

Method Blank Contamination

All method blanks were within QC requirements.

Field Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRFB16 - Ca, Fe, Mg, Na.
SRFB17 - Ai,Ca, Fe, Mg, Mn, Na.
SRFB18 - Zn
SRFB20 - none
SRFB21 - ZN

Action:

(1) Sodium was rejected in the following samples.

Sodium - SRAB 6601, SRAB 6601D, SRAB 6602, SRDB 6603, SRAB 6701, SRAB 6702, SRAB 6703.

ICP Interference Check

All elements meet ICP interference check parameters.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for Antimony, Selenium, and Manganese.

Action:

(1) Antimony and Selenium were marked estimated "J" in the following samples.

Antimony and Selenium - SRAB 6601, SRAB 6601D, SRAB 6602, SRAB 6603, SRAB 6701, SRAB 6702, SRAB 6703.

(2) Selenium was marked estimated "J" in the following samples. Selenium - SLAB 8801, SLAB 8403, SLAB 8603, SLAB 9001, SLAB 9001, SLAB 7903, SLAB 7903D, SLAB 8002.

(3) Manganese was marked estimated "J" in the following samples, Manganese - SRAB 6601, SRAB 6601D, SRAB 6602, SRAB 6603, SRAB 6701, SRAB 6702, SRAB 6703.

Lab Duplicate Analysis

Calcium and magnesium were outside of QC limits for lab duplicate analysis.

Action:

Calcium and maganesium were rejected in the following samples.

Calcium, magnesium - SRAB 6601, SRAB 6601D, SRAB 6602, SRAB 6603, SRAB 6701, SRAB 6702, SRAB 6703.

Field Duplicate Analysis

All elements were within QC limits for field duplicate analysis.

Lab Control Sample

All elements were within lab control sample QC limits.

Method of Standard Addition

Arsenic for sample SRAB 6701 did not meet QC criteria for method of standard addition.

Action:

(1) Arsenic was marked estimated "J" in the following samples.
Arsenic - SRAB 6701.

Serial Dilution

Barium, Vandaium, and Sodium did not meet QC serial dilution criteria.

Action:

(1) Barium was marked estimated "J" in the following samples.

Barium - SLAPS01, SLAPS02, SLAPS03, SRFB16, SRFB17.

(2) Vanadium was marked estimated "J" in the following samples.

Vandaium - SRAB 6601, SRAB 6601D, SRAB 6602, SRAB 6603, SRAB 6604, SRAB 6702, SRAB 6703.

(3) Sodium was marked estimated "J" in the following samples:

Sodium - SRAB 6601, SRAB 6601D, SRAB 6602, SRAB 6603, SRAB 6701, SRB 6702, SRAB 6703.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SDG: 16-17

Samples: Soil - SRAB 10101, SRAB 5902, SRAB 5903, SRAB 6301, SRAB 5901, SRAB 6302, SRTP 3402, SRTP 3404.
Water - SRFB 22, SRFB 23, SRGW 3502, SRFB 24, SRFB 25, SRGW 0702, SRGW 3302.

Eight soil and seven aqueous samples analyzed for total metals were validated following current EPA Region II procedures. The following information was used to validate the analytical results.

- o sample hold time before analysis
- o initial and continual calibration
- o method blank contamination
- o field blank contamination
- o ICP Interference check
- o spike sample recovery
- o lab duplicate
- o method of standard addition analysis
- o serial dilution

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continual Calibration

All initial and continual calibrations were within QC limits.

Method Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRFB22 - Al, Ba, Ca, Cr, Fe, Mg, Mn, Na, Zn.
SRFB23 - Ba, Ca, Na, Zn.
SRFB34 - Ca, Fe, Mg, Na, Zn.
SRFB25 - Ba, Ca, Fe, Mg, Mn, Na, Zn.

Action:

(1) Chromium was rejected in the following samples. Chromium - SRAB 10101.

(2) Sodium was rejected in the following samples. Sodium - SRAB 10101, SRAB 5902, SRAB 5903, SRAB 6301, SRAB 5901, SRAB 6302, SRTP 3402, SRTP 3404.

(3) Zinc was rejected in the following samples. Zinc - SRAB 5903.

ICP Interference Check

All elements meet ICP interference check parameter.

Spike Sample Recovery

Spike sample recoveries were outside of control limits for selenium, thallium, antimony, arsenic, manganese, and zinc.

Action:

(1) Selenium and Thallium were marked estimated "J" in the following samples.

Action: (Cont'd)

Selenium, Thallium - SRFB 22, SRFB 23, SRGW 3502, SRFB 24, SRFB 25, SRGW 0702,SRGW 3302.

(2) Antimony, arsenic, manganese, thallium and zinc were marked estimated "J" in the following samples. Antimony, arsenic, manganese, thallium, zinc - SRAB 10101, SRAB 5902, SRAB 6301, SRAB 5901,SRAB 6302, SRTP 3402, SRTP 3404.

(3) Antimony, arsenic, manganese, and thallium were marked estimated "J" in the following samples. Antimony, arsenic, manganese, thallium - SRAB 5903.

Lab Duplicate Analysis

Cadmium and calcium were outside of QC limits for lab duplicate analysis.

Action:

(1) Cadmium and Calcium were rejected in the following samples. Cadmium, calcium - SRAB 10101, SRAB 5902, SRAB 5903, SRAB 6301, SRAB 5901, SRAB 6302, SRTP 3402, SRTP 3404.

Lab Control Sample

All elements were within lab control sample QC limits.

Method of Standard Addition

Arsenic for sample SRAB 10101 did not meet method of standard addition QC criteria.

Action:

(1) Arsenic for sample SPAB 10101 already was qualified estimated "J" for other criteria so further action was not required.

Serial Dilution

Magnesium, sodium, and zinc did not meet QC serial dilution criteria.

Action:

(1) Magnesium, sodium, and zinc were marked estimated "J" in the following samples.

Magnesium, sodium, zinc - SRFB 22, SRFB 23, SRGW 3502, SRFB 25, SRGW 0702, SRGW 3302.

Dissolved Total Analyses

Dissolved analytes exceeded total by more than 50% for zinc in sample SRFB24.

Action:

(1) Zinc was rejected in the following samples Zinc - SRFB24.

ARCO SINCLAIR REFINERY

VALIDATION OF INORGANIC SAMPLES

Laboratory: Versar

SD6: 18-19

Samples: Soil - SRTP 3704, SRTP 3702, SRTP 3004, SRTP 3504, SRTP 3504D, SRTP 3501, SRTP 3502.
Aqueous - SRGW 6302, SRGW 5502, SRGW 3202, SRDI 03, SRFB 29, SRFB 28, SRGW 1602, SRGW 1602D, SRFB 27, SRFB 26

Seven soil and ten aqueous samples analyzed for total metals were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- o sample hold time before analysis
- o initial and continuing calibration
- o method blank contamination
- o field blank contamination
- o ICP interference check
- o spike sample recovery
- o lab duplicate
- o field duplicate
- o lab control sample
- o method of standard addition analysis
- o serial dilution
- o dissolved/total analysis

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

All samples were performed within required holding time criteria.

Initial and Continued Calibration

All initial and continuing calibration were within QC limits.

Method Blank Contamination

All method blanks were within QC requirements.

Field Blank Contamination

The following field blanks contained contamination which exceeded the IDL by more than two times.

SRDI03 - Ca, Mg, Na
SRDB29 - Ca, Na
SRFB27 - Ba, Ca, Mg, Na
SRFB26 - Ca, Na
SRFB28 - Ca, Na

Action:

(1) Sodium was rejected in the following samples Sodium - SRTP 3704, SRTP 3202, SRTP 3604, SRTP 3501, SRTP 3504, SRTP 3504D, SRTP 3502.

ICP Interference Check

All elements meet ICP interference check parameters.

Spike Sample Recovery

Spike sample results were ran on a sample taken several days previously. This is in violation of EPA Region II procedures.

Action:

The following sample elements were marked estimated "J".

SRTP 3704 - Sb, As, Be, Cd, Cr, Co, Hs, Ni, Se, Ag, Ti.
SRTP 3702 - Sb, Be, Cd, Co, Hg, Ni, Se, Ag, Ti.
SRTP 3604 - Sb, Be, Cd, Co, Ni, Se, Ag, Ti.
SRTP 3501 - Sb, As, Be, Cd, Cr, Co, Hg, Ni, Se, Ag.
SRGW 6302 - Sb, As, Be, Cd, Co, Hg, Ni, Se, Ag, Ti, Ve.
SRGW 5502 - Sb, Be, Cd, Co, Hg, Ni, Se, Ag, Ti.
SRGW 3202 - Sb, Be, Cd, Co, Hg, Se, Ag, Ti.
SRDI 03 - Ai, Sb, As, Ba, Be, Cd, Cr, Co, Cv, Fe, Pb, Mn, Hg, Ni, Se, Ag, Ti, Vi, Zn.
SRFB 29 - Ai, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ti, Vi, Zn.
SRFB 28 - Ai, Sb, As, Ba, Be, Cd, Cr, Co, Cv, Fe, Pb, Mn, Hg, Ni, Se, As, Ti, Vi, Zn.
SRTP 3504 - Sb, As, Be, Cd, Co, Hg, Se,As, Ti.
SRTP 3504D - Sb, As, Be, Cd, Co, Hg, Ni, Se, Ag, Ti.
SRTP 3502 - Sb, Be, Cd, Co, Hg, Ni, Se, Ag, Ti.
SRGW 1602 - Sb, As, Be, Cd, Co, Hg, Ni, Se, Ag, Ti.
SRGW 1602D - Sb, Be, Cd, Co, Hg, Ni, Se, Ag, Ti, Vi.
SRFB 27 - Ai, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pn, Mn, Hg, Ni, Se, Ag, Ti, Vi, Zn.
SRFB 26 - Ai, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Ti, V, Zn.

Lab Duplicate Analysis

Lab duplicate analysis was performed ona sample taken several days previously, not from a sample from this batch. This is a violation of EPA Region II procedures.

Action:

All effected samples were qualified estimated "J" for other criteria so further action was not required.

Field Duplicate Analysis

All elements analyzed in field duplicate analyses meet QC requirements.

Lab Control Sample

All elements met lab control analyses criteria.

Method of Standard Addition Analyses

All sample elements ran under method of standard addition meet QC criteria.

Serial Dilution Analyses

Serial dilution analysis was performed on a sample ran several days previously, from a different batch. This is a direct violation of EPA Region II procedures.

Action:

(1) The following sample elements were marked estimated "J".

SRTP 3704 - Ai, Ba, Ca, Cu, Fe, Pb, Mg, Mn, V, Zn.
SRTP 3702 - Ai, As, Ba, Ca, Cr, Cu, Fe, Ph, Mg, Mn, V, Zn.
SRTP 3604 - Ai, As, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Hg, V, Zn.
SRTP 3501 - Ai, Ba, Ca, Cu, Fe, Ph, Mg, Mn, Vi, Zn.
SRGW 6302 - Ai, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Na, Zn.
SRGW 5502 - Ai, As, Be, Ca, Cr, Cu, Fe, Pb, Mg, Mn, K, Na, V, Zn.
SRGW 3202 - Ai, As, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Ni, K, Na, V, Zn.

Action: (Cont'd)

SRTP 3504 - Al, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, V, Zn.
SRTP 3504D - Al, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, V, Zn.
SRTP 3502 - Al, As, Ba, Ca, Cu, Fe, Pb, Mg, Mn, V, Zn.
SRGW 1602 - Al, Ba, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Na, V, Zn.
SRGW 1602D - Al, As, Bn, Ca, Cr, Cu, Fe, Pb, Mg, Mn, Na, Zn.
SRFB 27 - Ca.
SRFB 26 - Ca.

Dissolved/Total Analyte Analysis

All sample elements meet dissolved vs. total analyte criteria.

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 2, 3, 4

Samples: Soil - TP02-01, TP01-01, TP01-04, TP02-04
Aqueous - FB-03, FB-05

Five soil and two aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
RSD greater than 30%	acetone 33'-dichlorobenzidine 4-nitroaniline
%D greater than 25%	methylene chloride acetone carbon disulfide vinyl acetate 4-nitroaniline diethyl phthalate benzyl alcohol 33'-dichlorobenzidine bis(2-chloroisopropyl)ether benzoic acid 4 nitrophenol

Action:

(1) 2-butanone was qualified with an "R" (unusable) for low RRF in SR-FB-03, SR-FB-05, SR-FB-05DL, SRTP-01-01, SR-TP-02-01, SR-TP-02-04. This analyte was qualified with a "J" (estimate) in SR-TP-01-04 for the same reason.

(2) Acetone was qualified with a "J" (estimate) for excessive RSD in FB-03, FB-05.

(3) Acetone was qualified with a "J" (estimate) in SR-TP-02-04 for excessive %D. Di-ethyl phthalate was qualified with a "J" in SR-TP-01-01 and SR-TP-02-01 for excessive %D.

Surrogate Recovery

In the VOA and BNA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

One soil and one aqueous sample were used for an MS/MSD analysis. There were several non-compliant values but no action was required.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

One VOA blank exhibited contamination with methylene chloride and one VOA blank contained both methylene chloride and acetone. The BNA blank exhibited contamination with bis(2-ethylhexyl) phthalate, diethyl phthalate and numerous TICs.

Action:

(1) Diethyl phthalate was qualified with a "u" for method blank contamination in samples SR-TP-01-01, SR-TP-01-04 and SR-TP-02-04.

(2) Six TIC analytes (scan numbers 228, 309, 881, 962, 1581, and 1830) were qualified with an "R" (unusable) in samples SR-TP-01-01 and SR-TP-01-04 for blank contamination. TIC scan 276 was also qualified with an "R" in sample SR-TP-01-04 for the same reaon.

Field Blank Contamination

Acetone and methylene chloride were detected in both field blanks. One field blank contained bis(2-ethylhexyl) phthalate and numerous TICs.

Action: (1) Acetone was qualified with a "U" for field blank contamination in SR-TP-01-01, SR-TP-01-04 and SR-TP-02-04

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality except for one BNA initial calibration (10/24/87; 20 ng standard) which exhibited a large early eluting hump. Although this could affect proper peak integration there were no apparent discrepancies as compared to the associated standard analyses.

Calculations

All checked calculations were correct within rounding errors except for benzo(k)fluoranthene in sample SR-TP-02-04. Reviewer corrected the value.

General Comments

(1) Laboratory analyzed a smaller volume of FB-05 for VOAs which was corrected for in the calculation and contributed to the large concentrations reported.

(2) The VOA method blanks contained siloxane, which is a compound that is used to treat glass-lined injection parts and other surfaces in the instrument to reduce reactive surfaces. This should not be considered field related contamination.

(3) Dichloromethane was identified as a TIC in sample FB-03(BNA) but should not be reported as a sample constituents since it is a synonym for methylene chloride which is a TCL VOA analyte.

(4) All the soil samples exhibited "alkane humps" in the chromatograms which are due to alkane and alkene series contaminants. This are shown in the lengthy lists of TIC, as "unknown hydrocarbons."

(5) Reviewer recommends to generate "hybrid forms I's" for sample pair FB-05/FB05DL. Sample was diluted to obtain methylene chloride in calibration range.

(6) Benzo(b) fluoranthene and benzo(k) fluoranthene eluted very closely and required manual integration by the GC/MS operator.

Prepared by: John H. Samuelian Date: 12-22-88

9346b

ORGANICS: TABLE OF HOLDING TIMES

Site: Arco Sinclair

Case: N/A Batch 2, 3 + 4

Lab: Versar

all data in ug/L and ug/Kg

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SR-PB-03	ag	VOA	10-26	10-27	→	11-4	9	0→0		
2			BNA	10-26	10-27	10-27	11-7	11	0→0		
3			PP	—	—	—					
4	SR-TP02-01	sol	VOA	10-26	10-27	11-3	11-3	8			
5			BNA	10-26	10-27	11-2	11-7	7			
6			PP	—	—	—					
7	SR-TP1-01	sol	VOA	10-25	10-27	→	11/2	8			
8			BNA	10-25	10-27	11-2	11-8	8			
9			PP	—	—	—					
10	SR-TP1-04	sol	VOA	10-25	10-27	11-2	11-2	8			
11			BNA	10-25	10-27	11-2	11-8	8			
12			PP	—	—	—					
13											
14	SR-PB-05	ag	VOA	10-28	10-28	11-4	11-4	7	0→0		
15			BNA	10-28	10-28	10-31	11-10	3			
16			PP	—	—	—					
17	SR-TP01-04	sol	VOA	10-26	10-28	→	11-4	9			
18			BNA	10-26	10-28	11-2	11-7	7			
19			PP	—	—	—					
20											
21	SR-FBLUSDL	ag	VOA	10-28	10-28	11-4	11-4	7			
22											
23											
24											
25											
26											
27											
28											
29											
30											
31											

Attachment 1

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 5 and 6

Samples: Soil - SRRS1501, SRRS1601, SRRS1601D, SRRS1701, SLTP0602, SRTP0902

Aqueous - SRDI01, SRFB06, SRSW4901, SRSW5001, SRSW5001D, SRSW5101

Six soil six aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times except for the BNA analysis of samples SRRS1601RE and SRSW5001RE which were held for 14 and 15 days, respectively. The analyte results in these samples were qualified with a "J" (estimate).

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is

assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
	33'-dichlorobenzidine
RSD greater than 30%	acetone
	33'-dichlorobenzidine
	4-methylbenzaldehyde
	benzoic acid
	3-nitroaniline
%D greater than 25%	p-xylene
	acetone
	di-ethyl phthalate
	4-nitroaniline
	benzoic acid
	2,4-nitrophenol
	4-nitrophenol
	33'-dichlorobenzindine
	benzo(k)fluoranthene
	4-bromophenylphenylether
	hexachlorobenzene
	octadecane
	3-nitroaniline

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRDI01, SRFB06, SRTP0602, SRTPO902, SRSW4901DL, SRSW4901, SRSW5001, SRSW5001D, SRTB01, SRSW5101

(2) 33'-dichlorobenzidine was qualified with an "R" (unusuable) for low RRF in RS1601RE

(3) Acetone was qualified with a "J" (estimate) for excessive %RSD in SRDI01, SRFB06, SRSW4901, SRSW4901DL, SRSW5001D, SRSW5101, SRTB01

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant. In the BNA analyses, the following surrogate recoveries were less than the lower QC limit: nitrobenzene (SRRS1601, SRSW4901), 2-fluorophenol (SRRS1601, SRSW4901, SRSW5001, SRSW5001RE), and 246-tribromophenol (SRSW5001)

Action:

All acid extractable analytes (phenols and acids) were qualified with a "J" (estimate) for low acid surrogate recovery in sample SRSW5001.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

One soil and one aqueous sample were used for an MS/MSD analysis. There were several non-compliant values but no action was required.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

Two (of six) VOA blanks exhibited contamination with methylene chloride; three of the blanks contained TICS. One BNA blank exhibited contamination with bis(2-ethylhexyl) phthalate, and one with diethyl phthalate. Most BNA blanks contained TICs.

Action:

(1) Methylene chloride was qualified with a "U" for blank contamination in sample SRSW5001.

(2) Bis(2 ethylhexyl)phthalate was qualified with a "U" for blank contamination in SRRS1601RE.

(3) Seven "unknown" TIC analytes (scan numbers 229, 275, 310, 881, 962, 1581, 1830) were qualified with an "R" (unusable) in samples SRRS1501 and SRRS1601D. Two of these TICs (scan numbers 881, 902) were qualified with an "R" in sample SRRS1601, and three of these TICs (scan numbers 229, 275, 1581) were qualified with an "R" in sample SRRS1701, for the same reasons.

One TIC (Scan 388) was also qualified with an "R" for blank contamination in sample SRRS1601RE.

(4) Reviewer was unable to reject three TICs qualified with a "B" in sample SRTP0902 since the quantifications exceeded the 10X rejection level. However, it should be noted that these three analytes were constituents of the method blank.

Field and Water Blank Contamination

Acetone, benzene and toluene were detected in the field blank. The water blank contained methylene chloride, acetone, chloroform, benzene and bis(2 ethylhexyl)phthalate. TICs were

identified in the BNA extracts only. One field blank contained bis(2-ethylhexyl) phthalate and numerous TICs.

Action:
1) Methylene chloride was qualified with a "U" in sample SRTP0902 for water blank contamination.

2) Acetone ws qualified with a "U" for field blank contamination in samples SRSW4901, SRSW4901DL, SRSW5001, SRSW5001D, SRSW5101

3) Benzene was qualified with a "U" due to field blank contamination in samples SRSW5001D, SRSW5001 and SRSW5101.

4) Toluene was qualified with a "U" due to field blank contamination in samples SRSW5001D and SRSW5001.

5) Bis (2 ethylhexyl) phthalate was qualified with a "U" due to water blank contamination in samples SRSW5001D and SRTP0902.

6) A TIC analyte (RT 31.05 min) was qualified with an "R" due to field blank contamination in samples SRSW4901, SRSW5001 and SRSW5001D

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality except for one BNA initial calibration (10/24/87; 20 ng standard) which exhibited a large early eluting hump. Although this could affect proper peak integration there were no apparent discrepancies as compared to the associated standard analyses.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Many soil samples exhibited "alkane humps" in the chromatograms which are due to alkane and alkene series contaminants. These are shown in the lengthy lists of TIC, as "unknown hydrocarbons."

(2) Reviewer recommends to generate "hybrid forms I's" for sample pair SRSW4901. Sample was diluted to obtain acetone in calibration range.

(3) Two BNA samples were re-extracted, presumably to obtain complaint surrogate recoveries. Reviewer recommends the following:

SRSW5001/SRSW5001RE pair-use SRSW5001 since it had a shorter hold time.

SRSW1601/SRSW1601RE pair-use SRSW1601 since it had a shorter hold time.

(4) This SDG contained additional VOA and BNA analytes which were calibrated.

(5) Reviewer deleted the "X" qualifier from benzene and toluene in SRSW4901, and ethylbenzene and xylene from SRSW5001D. This is not a proper QC qualifier.

Prepared by: John H. Samuelian Date: 1-4-89

9401b

ORGANICS: TABLE OF HOLDING TIMES

Site: Ambler

Case: ———

Lab: Versar

Batch 516

HT soils - 10d VOA, 14d BNA

All data 1987

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SR-D1-01	S	VOA	10-28	10-31	→	11-4	7	P→P		
2			BNA	10-28	10-31	11-3	11-10	6			
3	SR-RS-15-01	S	VOA	10-28	—	—	—	—			
4			BNA	10-28	10-31	11-2	11-8	5			
5	SR-RS-11-01	S	VOA	10-28	—	—	—	—			
6			BNA	10-28	10-31	11-2	11-8	5			
7	SR-RS-16-01D	S	VOA	10-28	—	—	—	—			
8			BNA	10-28	10-31	11-2	11-8	5			
9	SR-RS-17-01	S	VOA	10-28	—	—	—	—			
10			BNA	10-28	10-31	11-2	11-8	5			
11	SL-TP-06-02	S	VOA	10-28	10-31	→	11-8				
12			BNA	10-28							
13											
14	SR-FS-06	A	VOA	10-31	11-1	→	11-4	5			
15			BNA	10-31	11-1	11-3	11-10	4			
16	SR-SW-44-01	A	VOA	10-31	11-1	→	11-7	7			
17			BNA	10-31	11-1	11-3	11-10	4			
18	SR-SW-50-01	A	VOA	10-31	11-1	→	11-7	7			
19			BNA	10-31	11-1	11-3	11-10	4			
20	SR-SW-D-01D	A	VOA	10-31	11-1	→	11-8	8			
21			BNA	10-31	11-1	11-3	11-10	4			
22	SR-SW-51-01	A	VOA	10-31	—	—	—	—			
23			BNA	10-31	11-1	11-3	11-10	4			
24	SR-TP-01-02	S	VOA	10-31	11-1	→	11-9	9			
25			BNA	10-31	11-1	11-8	11-19	8			
26											
27	SR-TB-01	A	VOA	10-31	11-1	→	11-9	9			
28											
29	[illegible]	A	BNA	[illegible]	[illegible]	11-3	[illegible]	8			
30											
31	SR-RS-16-01	A	BNA	10-28	10-31	11-11	11-17	(14)			
	SRSW-50-01	A	BNA	10-31	11-1	11-14	11-22	(15)	V		

Attachment 1

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 7 and 8

Samples: Soil - SRTP1302, SRTP1302D, SRAB6801, SRAB6802, SRAB6803, SLTP1502, SLTP1602
Aqueous - SRFB08, SRTB02, SRSW5201, SRSW5301, SRSW5401, SRFB09, SRFB10

Seven soil and seven aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times except for the BNA analysis of sample SRSW5201RE which was held for 22 days. The analyte results in these samples were qualified with a "J" (estimate).

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is

assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
RSD greater than 30%	acetone 4- methyl-1-pentane 113-trimethylcyclohexane 4,6-dinitro-2-methylephenol 4-methylbenzaldehyde benzoic acid 3-nitroaniline
%D greater than 25%	p-xylene acetone 4-nitroaniline benzoic acid 2,4-dinitrophenol 4-nitrophenol 33'-dichlorobenzindine benzo(k)fluoranthene 3-nitroaniline hexachlorocyclopentadiene bis(2chloro-isopropyl)ether 2-nitroaniline pentachlorophenol n-nitroso-disphenylamine

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRSW5401, SRSW5301, SRTP1302, SLTP1502, SRTP1602, SRAB6801, SRAB6802, SRAB6803, SRTB02, SRFB08, SRFB09, SSRFB10,SRSW5201.

(2) 4-methyl-1-pentanol was qualified with an "R" (unusable) for low RRF in SRFB08

(3) 123-trimethylcyclohexane was qualified with an "R" (unusable) for low RRF in SRFB08

(4) Acetone was qualified with a "J" (estimate for excessive % RSD in SRTB02, SRSW5201, SRSW5301, SRSW5401

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant. In the BNA analyses, the following surrogate recoveries were less than the lower QC limit: 2-florophenol (SRSW5201, SRSW5201RE), and 246-tribromophenol (SRSW5201u)

Action:

All acid extractable analytes (phenols and acids) were qualified with a "R" (estimate) for low acid surrogate recovery in sample SRSW5201.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

There were no MS/MSD analyses in this package.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the six VOA blanks exhibited contamination with TCL analytes; two VOA blanks contained a TIC. Two BNA blanks exhibited contamination with bis(2-ethylhexyl) phthalate. Two of the BNA blanks contained TICs (4-methyl-4-hydroxypentanone and unknowns).

Action:

(1) 4-methyl-4-hydroxy-2-pentanone was qualified with a "U" for blank contamination in SRTP1302, SRTP1302D, SRTP1502 and SRTP1602.

(2) Three TICs (RT4.83 min, 5.82 min, 6.52) were qualified with an "R" in SRAB6801. Two of these (RT 4.83 min, 5.82 min) were also qualified with an "R" in SRAB6802.

Field and Trip Blank Contamination

Acetone and methylene chloride were detected in the trip blank. The field blanks contained methylene chloride, acetone, chloroform, benzene and 4-methyl-4hydroxy-2pentanone. No TICs were identified.

Action: 1) Methylene chloride was qualified with a "U" in samples SRSW5301 and SRSW5401 for field blank contamination.

2) Acetone was qualified with a "U" for trip blank contamination in samples SRSW5301 and SRSW5401

3) Benzene was qualified with a "U" due to field blank contamination in sample SRAB6801

4) Acetone was qualified with a "U" for field blank contamination in samples SRAB6801, SRAB6803

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) One BNA sample was re-extracted, presumably to obtain complaint surrogate recoveries. Reviewer recommends the following:

SRSW5201/SRSW5201RE pair-use SRSW5201 since it had a shorter hold time.

(2) This SDG contained additional VOA and BNA analytes which were calibrated.

(3) Reviewer deleted the "X" qualifier in sample TP1502. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

Prepared by: John H. Samuelian Date: 12 January 1989

9425b

ORGANICS:

TABLE OF HOLDING TIMES AND EXCEEDANCES Batch 7+8

SITE: ARCO Sinclair
CASE: —
LAB: Versar

ONLY 47 -- 10d VOA, 10d BNA

All dates 1988

		SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
(FB)	1	SRFB08	aq	VOA	11-1	11-2-88	11-9	11-9	8	p→e		
	2			BNA	↓	11-2-88	11-9	11-17	8			
	3			PP/Pest	↓	11-2-88						
(TB)	4	SRTB 02	aq	VOA	10-31	11-2-88	11-8	11-8	8			
	5	SR TP1302	SOIL	VOA	10-31	11-2-88	11-8	11-8	8			
	6			BNA	↓	↓	11-9	11-16	9			
	7			PP/Pest	↓	↓						
	8	SR TP11RD	SOIL	VOA	11-1	11-2-88	—	—	—			
	9			BNA	↓	↓	11-9	11-16	8			
	10			PP/Pest	↓	↓						
	11	SRSW5201	aq	VOA	10-31	11-2-88	11-8	11-8	8			
	12			BNA	↓	↓	11-5	11-16	5			
	13			PP/Pest	↓	↓						
	14	SRSW5301	aq	VOA	10-31	11-2-88	11-8	11-8	8			
	15			BNA	↓	↓	11-5	11-16	5			
	16			PP/Pest	↓	↓						
	17	SRSW5401	aq	VOA	11-1	11-2-88	11-8	11-8	7			
	18			BNA	↓	↓	11-5	11-16	4			
	19			PP/Pest	↓	↓						
	20											
(FB)	21	SRFB09	aq	VOA	11-2	11-3-88	11-9	11-9	7			
	22			BNA	↓	↓	11-5	11-16	3			
	23			PP/Pest	↓	↓						
(FB)	24	SRFB10	aq	VOA	11-2	11-3-88	11-9	11-9	7			
	25			BNA	↓	↓	11-5	11-16	3			
	26			PP/Pest	↓	↓						
	27	SR A06F-01	SOIL	VOA	11-1	11-3-88	11-10	11-10	9			
	28			BNA	↓	↓	11-8	11-15	7			
	29			PP/Pest	↓	↓						
	30	SRA06P-02	SOIL	VOA	11-1	11-3-88	11-9	11-17	8			
	31			BNA	↓	↓	11-8	11-15	7			
				PP/Pest	↓	↓						

rough draft

ORGANICS:

Batch 718

SITE: ARCO Sinclair

CASE: —

LAB: Vendor

TABLE OF HOLDING TIMES AND EXCEEDANCES

All data this

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SRAB66-03	SOIL	VOA	11-1	11-3-88	11-9	11-9	8			
2			BNA	↓	↓	11-8	11-15	7			
3			P/Pest	↓	↓						
4	SL TP1502	SOIL	VOA	11-1	11-3-88	11-8	11-8	7			
5			BNA	↓	↓	11-9	11-16	8			
6			P/Pest	↓	↓						
7	SL TP 1602	SOIL	VOA	11-2	11-3-88	11-3	11-3	1			
8			BNA	↓	↓	11-9	11-16	7			
9			P/Pest	↓	↓						
10											
11											
12	SRSWS201RE	aq	BNA	10-31	11-2	11-22	11-23	(22)			
13											
14											
15											
16											
17											
18											
19											
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24											
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26											
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30											
31											

ATTACHMENT E

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 9 and 10

Samples: Soil - SLAB8702, SLAB8703, SRMWB6401, SRMWB6402, SLAB8201, SLAB8202, SRTP1802, SRTP1802D, SLAB8301, SLAB8302
Aqueous - SRFB11, SRFB12, SRFB13, SRFB14, SRDI02

Ten soil and five aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- o sample hold time before analysis
- o instrument tune
- o initial and continuing calibration
- o surrogate recoveries
- o internal standard areas
- o MS/MSD analysis
- o analysis sequence
- o method blank contamination
- o field and trip blank contamination
- o ion spectra match
- o chromatogram quality
- o calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA were performed within holding times. Three BNA samples (SRMWB6401, SRMWB6402, SLAB8201) exceeded hold time by 1-day; no action was taken. Sample SLTP1802 exceeded the hold time by 2-days.

Action: All analyte results in sample SLTP1802 were qualified with a "J".

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05: 2-butanone

RSD greater than 30%	acetone 4-methyl-1-pentanol 4-methyl benzaldehyde heptadecane octadecane eicosane
%D greater than 25%	p-xylene bromomethane 111-trichloroethane benzoic acid 24 dinitrophenol 4-nitroaniline benzo(k)fluoranthane

Action:

(1) 2-butanone was qualified with an "R" (unusable) for low RRF in SRFB11, SRFB12, SRFB13, SRFB14, SRFB14DL, SRDI02, SRFI02DL, SLTP1802, SLTP1802D, SLAB8702, SLAB8703, SRMWB6401, SRMWB6402, SLAB8201, SLAB8202, SLAB8301, SLAB8302

(2) 4-methyl-1-pentanol was qualified with an "R" for low RRF in SRFB11, SRFB12

(3) 113-trimethylcyclohexane was qualified with an "R" for low RRF in SRFB11, SRFB12

(4) p-xylene was qualified with a "J" (estimate) for excessive %D in SLAB8702, SLAB8703, SLAB8201, SLAB8301

(5) heptadecane was qualified with a "J" for excessive %D in SLAB8702, SLAB8703

(6) octadecane was qualified with a "J" for excessive %D in SLAB8702, SLAB8703

Surrogate Recovery

In the VOA analysis, toluene-d8 recovery was high in two samples. In the BNA analyses, nitrobenzene recoveries were high in two samples but no action was required.

Action: All VOA analyte results (except for 2 butanone) were qualified with a "J" for noncompliant surrogate recovery in SRMWB8401 and SRMWB 6401 RE.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

No MS/MSD analyses were performed.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

One VOA blank exhibited contamination with methylene chloride and one VOA blank contained acetone. Two BNA blank exhibited contamination with 4-methyl-4-hydroxy-2-pentanone and numerous TICs.

Action:

(1) methylene chloride was qualified with a "U" for method blank contamination in SLAB8702, SLAB8703.

(2) 4-methyl-4-hydroxy-2-pentanone was qualified with a "U" in SLTP1802 and SLAB8201.

(3) The following TICs were qualified with an "R" in samples SRMWB6401 and SRMWB8402 - RT 2.65, 3.45, 3.57, 3.68, 5.03, 16, 26.45, 30.65.

Field Blank Contamination

Acetone and methylene chloride, chloroform and benzene were detected in the field blanks. Two field blank contained 4-methyl 4-hydroxy-2-pentanone, the remaining blanks contain numerous TICs.

Action:

(1) Methylene chloride was qualified with a "U" in the following samples SLTP1802, SLAB8201, SLAB8202, SLAB8302

Ion Spectra Match

All ion spectra correctly matched the standard spectrum except for 4-methyl-1-pentanol in samples SLAB8201, SLAB8301; results were changed to non-detect.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Review deleted "T" or "X" qualifier from analytes present. Laboratory applied when ion spectra match between sample and standard was not complete. However, the relative peak heights were within the 20% criteria and hence were acceptable.

(2) Reviewer deleted dichloromethane TIC from BNA analyses, this is a synonym for methylene chloride, which is a VOA TCL analyte.

(3) Reviewer applied a "J" qualifier to 2 methylnaphthalene in certain samples since ion spectra match was questionable.

(4) Laboratory failed to provide a resubmittal for calibration/tune. However, Reviewer was able to identify the samples that were associated with each calibration based upon laboratories raw QC sheets.

Prepared by: John H. Samuelian Date: 4-6-89

0163K

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 11 and 12

Samples: Soil - SLAB8101, SLAB8102, SRAB6601, SRAB6601D, SRAB6602, SRAB6603, SRAB6701, SRAB702, SRAB6703, SLAB8101, SLB8102
Aqueous - SRFB15, SRFB16, SRFB17, SRTB03, SLPS01, SLPS02, SLPS03

Eleven soil and seven aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times. The VOA analysis of samples SRAB6601, SRAB6602, SRAB6701, and SRAB6702 were held for eleven days (1-day beyond hold time). It is the reviewers opinion that this minor excedance will not affect the date quality.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
RSD greater than 30%	acetone 4- methyl-1-pentane 113-trimethylcyclohexane 4-methylbenzaldehyde heptadecane octadecane eicosane benzo(k)fluoranthene
%D greater than 25%	p-xylene acetone 4-nitroaniline 2,4-dinitrophenol 3-nitroaniline fluorene 4,6-dinitro-2-methylphenol hexachlorobenzene pyrene 4 methyl-4-hydroxy-2-pentanone

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRFB15, SRFB15DL, SRFB16, SRFB17, SRFB17DL, SRTB03, SLPS01, SLPS02, SLPS03, SRAB6601, SRAB6601D, SRAB6602, SRAB6603, SRAB6701, SRAB6702, SRAB6703, SRAB8102, SRAB8101

(2) Heptadecane was qualified with a "J" (estimate) for excessive %RSD in SLAB8101

(3) Octadecane was qualified with a "J" (estimate) for excessive %RSD in SLAB8101

(4) Acetone was qualified with a "J" for excessive %D in SRFB16, SRFB16DL, SLP503

(5) p-xylene was qualified with a "J" for excessive %D in SRAB8101

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant except for toluene-d8 in SRAB6703. In the BNA analyses, the following surrogate recoveries were less than the lower QC limit: 2-fluorobiphenyl (SLP501) and nitrobenzene (SLAB8101)

Action:

All VOA analytes (except 2-butanone) qualified with a "J" (estimate) for low VOA surrogate recovery in sample SRAB6703.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

There were no MS/MSD analyses in this package.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the six VOA blanks exhibited contamination with TCL analytes; two VOA blanks contained a TIC. One BNA blank exhibited contamination with bis(2-ethylhexyl) phthalate. Two of the BNA blanks contained TICs (trimethyl hexane, an ethanone derivative, and unknowns).

Action:

(1) bis(2-ethylhexyl)phthalate was qualified with a "U" for method blank contamination in samples SRAB6601, SRAB6601D, SRAB6602, SRAB6603, SRAB6701, SRAB6703

(2) Several TIC analytes were qualified. Trimethylhexane was qualified with a "R" (unusable) in SRAB6603, SRAB6701, SRAB6703. Ethanone derivative was qualified with an "R" in SRAB6601D, SRAB6602, SRAB6601, SRAB6701, SRAB702, SRAB6703. An unknown ketone (RT 4.37 min) was qualified with an "R" in SRAB6601D, SRAB6602, SRAB6603, SRAB6701, SRAB6702, SRAB6703. An unknown (RT 3.1 min) was qualified with an "R" in SRAB6603, SRAB6701, SRAB6702, SRAB6703. Dichlorodifluoromethane was qualified with an "R" in samples SRAB601, SRAB6603.

Field and Trip Blank Contamination

Acetone and methylene chloride were detected in the trip blank. The field blanks contained methylene chloride, acetone, chloroform, benzene and 4-methyl-4hydroxy-2pentanone. No TICs were identified.

Action: 1) Methylene chloride was qualified with a "U" in samples SLPS02, and SLPS03 for field blank contamination

2) Acetone was qualified with a "U" for field blank contamination in samples SLP503, SRAB6603, SRAB6701

3) Benzene was qualified with a "U" due to field blank contamination in samples SLPS01 and SLPS02

4) Two TICs (RT 2.0 and 2.7 min) were qualified with an "R" due to field blank contamination in samples SLPS01, SLPS02, SLPS03

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Two VOA samples (SRFB15 and SRFB17) and one BNA sample (SLAB8101) required dilutions so that targetted analyte concentrations would fall within the calibration range. Reviewer recommends that "hybrid" form I's be generated from the initial and diluted analyses. The appropriate values are shown on the Form I's.

(2) This SDG contained additional VOA and BNA analytes which were calibrated.

(3) Reviewer deleted the "T" qualifier in VOA sample TP1502. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

ORGANICS: TABLE OF HOLDING TIMES

Site: Arco

Case: Batch 11412

Lab: [illegible]

p 1 of 2

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SRFB-15	[illegible]	VOA	11-7-88	11-8	11-9	11-14	2	a → e		
2			BNA			11-9	11-18	2			
3	SCABB101	S	VOA	11-7-88	11-8						
4			BNA		11-8	11-10	11-[illegible]	3			
5	SCABB102	S	VOA	11-7-88	11-8						
6			BNA								
7											
8	SRFB16	[illegible]	VOA	11-8	11-9	11-18	11-[illegible]	10			
9			BNA			11-14	11-30	6			
10	SRFB17	[illegible]	VOA	11-8	11-9	11-18	11-[illegible]	10			
11			BNA			11-14	11-30	6			
12	SR7603	[illegible]	VOA	11-8	11-9	11-18	11-18	10			
13	SCPS01	[illegible]	VOA	11-7	11-9	11-18	11-18	11			
14			BNA		11-9	11-14	11-30	7			
15	SCPS02	[illegible]	VOA	11-7	11-9	11-18	11-18	11			
16			BNA		11-9	11-14	11-30	7			
17	SCPS03	[illegible]	VOA	11-7	11-9	11-18	11-18	11			
18			BNA		11-9	11-14	11-30	7			
19	SRAB1601	S	VOA	11-8	11-9	11-16	11-[illegible]	8			
20			BNA		11-9	11-17	12-1	9			
21	SRAB1601D	S	VOA	11-8	11-9	11-19	11-19	11			
22			BNA		11-9	11-17	12-1	9			
23	SRFS502	S	VOA	11-8	11-9	11-19	11-19	11			
24			BNA		11-9	11-17	12-1	9			
25	SRAB1603	S	VOA	11-8	11-9	11-19	11-19	11			
26			BNA		11-9	11-17	12-1	9			
27	SRAB0701	S	VOA	11-7	11-9	11-19	11-19	11			
28			BNA		11-9	11-17	12-1	9			
29	SRAB0702	S	VOA	11-7	11-9	11-19	11-19	11			
30			BNA		11-9	11-17	12-1	9			
31											

Attachment 1

(4) Elevated concentrations of VOA analytes in field blanks is due partially to the lower water volumes purged.

(5) Reviewer deleted siloxane TICs whenever present. Siloxane is an instrument contaminant.

Prepared by: John H. Samuelian Date: 1-16-89

9462b

ORGANICS: TABLE OF HOLDING TIMES

Site: Onan

Case: Bo-Ac?, 11/12

Lab:

p 2 of 2

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SRAB6703	S	VOA	11-8	11-9				P→R		
2			BNA		11-9	11-17	12-1	9			
3	SRABB101	S	VOA	11-7	11-9	11-16	11-16	9			
4			BNA								
5	SLABF102	S	VOA	11-7	11-9	11-16	11-16	9			
6			BNA								
7											
8	SRFB15DL	A	VOA	11-7	11-8	11-17	11-7	10 [illegible]			
9	SRFB17DL	A	VOA	11-8	11-9	11-18	11-18	10 [illegible]			
10											
11											
12											
13											
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ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 13

Samples: Soil - SLAB8402, SLAB8403, SLAB8501, SLAB8502, SLAB8801
Aqueous - SRFB18

Seven soil and seven aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant. Reviewer corrected one Form V for incorrectly labelled sample.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone 4-methyl-1-pentanol 1,2,3-trimethylcyclohexane
RSD greater than 30%	4-methylbenzaldehyde benzoic acid 33'-dichlorobenzidine benzo(k)fluoranthane
%D greater than 25%	p-xylene acetone 4-nitroaniline 3-nitroaniline 4,6-dinitro-2-methylphenol hexachlorobenzene

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRFB18, SLAB8402, SLAB8403, SLAB8501, SLAB8502, SLAB8801.

(2) 4-methyl-1-pentanol was qualified with an "R" (unusable) for low RRF in SRFB18.

(3) 123-trimethylcyclohexane was qualified with an "R" (unusable) for low RRF in SRFB18.

(4) p-xylene was qualified with a "J" in SLAB8402 for excessive %D.

Surrogate Recovery

In the VOA and BNA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

An MS/MSD analysis was performed on the soils. All recoveries were acceptable.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the seven VOA blanks exhibited contamination with TCL analytes. One BNA blank exhibited contamination with bis(2-ethyl- hexyl) phthalate. Two of the BNA blanks contained 4-methyl-4- hydroxypentanone. The medium level BNA blank contained three siloxane TICs.

Action:

(1) 4-methyl-4-hydroxy-2-pentanone was qualified with a "U" for blank contamination in SLAB8502.

Field and Trip Blank Contamination

Acetone and methylene chloride were detected in the trip blank. The field blanks contained methylene chloride, acetone, chloroform, benzene, bis(2-ethyl-hexyl) phthalate and 4-methyl-4hydroxy-2pentanone. No TICs were identified.

Action: 1) bis(2-ethylhexyl) phthalate was qualified with a "U" due to field blank contamination in samples SLAB8801, SLAB8502.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum except for 1-ethyl-4-methylcyclohexane in SLAB8501; Reviewer qualified results with "N" (for "presumptive identification") since match with standard spectra was not complete. 22-dimethyl-3-hexene was considered a false positive in sample SLAB8402; Reviewer changed results to non-detect.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors except for transcription errors for pentadecane, hexadecane, heptadecane, octadecane, eicosane and docasane in SLAB8801 and SLAB8502, and trimethylnaphthalene in SLAB8402.

General Comments

(1) Sample SLAB8402 required dilution to obtain the concentrations of two trimethylbenzene congeners within the calibrated range. Reviewer recommends that "hybrid" Form I's be generated combining the results of the original and diluted results. The appropriate analytes are marked on the Form I's.

(2) This SDG contained additional VOA and BNA analytes which were calibrated.

(3) Reviewer deleted the "T" qualifier from ethylbenzene in samples SLAB8402 and SLAB8501. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

(4) Laboratory failed to report presence of 4-methyl-4hydroxy-2-pentanone in one BNA blank on blank summary sheet.

Prepared by: John H. Samuelian Date: 1-17-89

9463b

Batch 13

ORGANICS:

TABLE OF HOLDING TIME EXCEEDANCES

Site
Case: 64835
Lab: Versar

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SREB18	Water	VOA	11/9/88	11/10/88	11/17/88	11/17/88	8	0 → 0		
2	SLAB8402	Soil	VOA	11/9/88	11/10/88	11/16/88	11/16/88	7			
3	SLAB8403	"	VOA	11/9/88	11/10/88	11/17/88	11/17/88	8			
4	SLAB8501	"	"	11/9/88	11/10/88	11/17/88	11/17/88	8			
5	SLAB8503	"	"	11/9/88	11/10/88	11/17/88	11/17/88	8			
6	SLAB8801	"	"	11/9/88	11/10/88	11/16/88	11/16/88	7			
7											
8											
9	SRFB1F	aq	BNA	11/9	11/10	11-14	11-30	5			
10	SLAB5402				11/15	11/16	11/30	7			
11	SLAB8403				11-15	11-16	11-30	7			
12	SLAB8501				11-10	11-16	11-30	7			
13	SLAB8502				11-10	11-17	12-1	8			
14	SLAB8801				11-15	11-17	12-1	8			
15											
16	SLAB5402DL	aq	BNA	11-9	11-15	11-16	12-1	7			
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ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 14 and 15

Samples: Soil - SLAB8602, SLAB8603, SLAB9001, SRRS1501, SRRS1701, SLAB7902, SLAB7903, SLAB903D, SLAB8001, SLAB8002, SRRS1601, SRRS1601D
Aqueous - SRFB20, SRFB21, SLPS01

Twelve soil and three aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone 4 methyl-1-pentane 123-trimethylcyclohexane
RSD greater than 30%	None
%D greater than 25%	4 methylbenzaldehyde benzo(k)fluoranthene benzoic acid 46 dinitro-2-methylphenol p-xylene 3-nitroaniline 26-dinitrotoluene hexachlorobenzene 4-nitroaniline 33'-dichlorobenzidine

Action:

(1) 2-butanone was qualified with an "R" (unusable) for low RRF in SRFB20, SLAB8602, SLAB8603, SLAB9001, SRRS1501, SRRS1701, SRFB21, SRRS1601, SRRS1601D, SLAB7902, SLAB703, SLAB7903D, SLAB8001.

(2) 4-methyl-1-pentane was qualified with an "R" for low RRF in SRFB20, SRFB21.

(3) 123-trimethylcyclohexane was qualified with an "R" for low RRF in SRFB20, SRFB21.

(4) p-xylene was qualified with a "J" for excess %D in SLAB8602, SLAB7902.

Surrogate Recovery

In the VOA and BNA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

One soil and one aqueous sample were used for an MS/MSD analysis. There were several non-compliant values but no action was required.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of VOA blanks exhibited contamination. Two BNA blank exhibited contamination with 4 methyl 4 hydroxy 2 pentanone and one with bis(2-ethylhexyl) phthalate.

Action:

No action was required.

Field Blank Contamination

Acetone, chloroform, 4 methyl 4 hydroxy-2-pentanone and bis(2-ethylhexyl) phthalate were detected in the field blanks.

Action: No action was required.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum except for 1-ethyl-4-methyl cyclohexane in samples SLAB8602, SLAB7902, SLAB7902D, SLAB7903, SLAB8001 and SLAB8002. Reviewer qualified these results with "N" (for presumptive identification).

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Laboratory made a transcription error, all samples listed as -R515- were actually -RS15-.

(2) Reviewer deleted "T" qualifier from the following analytes in the samples shown, hits were acceptable: m/p-xylene (SLAB7902), ethylbenzene (SLAB7902), methylcyclohexane and 1-ethyl-4-methyl-cyclohexane (SLAB 7903, SLAB8001), m-xylene (SLAB8001).

(3) Laboratory did not provide calibration/tune summaries as requested but Reviewer was able to track samples to calibrations using laboratory raw data sheets.

Prepared by: John H. Samuelian Date: 4-6-89

0161K

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

LABORATORY: Versar

SDG: Batch 16

SAMPLES: Soil - SRAB1010, SRAB10101 B.E.

Aqueous - SRFB22, SRFB23, SRTB04, SRGW3402, SRGW3402DL, SRGW3502, SRGW3502DLI, SRGW3562DL

Two soil and eight aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- o sample hold time before analysis
- o instrument tune
- o initial and continuing calibration
- o surrogate recoveries
- o internal standard areas
- o MS/MSD analysis
- o analysis sequence
- o method blank contamination
- o field and trip blank contamination
- o ion spectra match
- o chromatogram quality
- o calculations.

The validated data are included in the original package, all additional attachments define the QA evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times, with the exception of VOA sample SRAB101RE, SR-GWB402DL, SR-GW35-02DL2.

Action: (1) all analytes were marked estimated "J" with the exception of 2-butanone which was rejected for other criteria.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing

calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05 -	3,3'-dichlorobenzidine 2-butanone
RSD greater than 30% -	Acetone Benzo(k)Fluoranthene 4-Nitroaniline Benzyl Alcohol bit(2-Chloroisopropyl) 4-Chloroaniline 3,3'-Dichlorobenzedine
%D Greater than 25% -	4-Nitrophenol bis-(2-Chloroisopropyl) 3-Nitroaniline 4-Bromophenyl-Phenyleth Hexachlorobenzene vinyl acetate acetone 2-butanone bromoform Chloromethane 1,1-Dichloroethane 1,1,2,2-tetrachloroethane

Surrogate Recovery

In the VOA and BNA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

No MS/MSD analysis was performed for this set per contractual agreements.

Method Blank Contamination

Two TIC analytes were found in one of the VOA method blanks. Numerous TICs were found in the BNA fracton method blanks.

Batch 16 (Cont'd)

Field Blank Contamination

Acetone and chloroform were found in both of the VOA field blanks as well as in the trip blank. Bis(2-ethylhexyl)phthalate was found in the BNA blanks along with numerous TICs.

Action: (1) Bis(2-ethylhexyl)phthalate was qualified with a "V" for field blank contamination in sample SR-GW3502.
(2) Three TIC analytes (scan numbers 87, R.T.507 and 6.55) in samples SRAB10101 and SRAB3601RE.

Ion Spectra Match

TIC analytes O-(2-Methylpropyl hydroylamine and 3-methylpentanone were rejected in sample SR-GW34-02 because ion spectra's did not match the standard.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors except for benzo(k)fluoranthene in sample SR-TP-02-04. Reviewer corrected the value.

General Comments

VOA samples SR-GW-3402, SR-GW-3402D2, SR-GW-3502, SR-GW-3402DLI, SR-GW-3502DL2 were diluted to bring certain compounds within instrument detection ranges. Sample SR-AB10101, SRAB101RE was reanalyzed. It is recommended to use a hybrid of the values circled for these samples.

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 17

Samples: Soil - SRTP3402, SRTP3404
Aqueous - SRFB24, SRFB25, SRGW0702, SRGW3302

Two soil and four aqueous samples analyzed for TCL BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All BNA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05	3,3'-Dichlorobenzidine
RSD greater than 30%	Benzo(k)fluoranthene 3-Nitroaniline 4-Nitroaniline
%D greater than 25%	4-Nitrophenol bis(2-chlorisopropyl) 3-Nitroaniline 4-Bromophenyl-phenylether Hexachlorobenzene bis(2-ethylhexyl)phthalate

Action:

(1) 3,3'-Dichlorobenzidine was qualified with an "R" (unusable) for low RRF in SRGW0702, SRGW3302.

Surrogate Recovery

In the BNA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

MS/MSD analysis was not performed for this deliverable group.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

One of the two method blank contained diethylphthalate and both method blanks contained numerous TICs.

Action:

(1) Diethylphthalate was qualified with a "U" for method blank contamination in samples SRTP3402.

(2) Fifteen TIC analytes (retention times 5.22, 6.72, 16.70, 18.10, 23.68, 25.95, 28.63, 30.73 sample STRP3402) (5.20, 6.72, 18.10, 23.72, 25.98, 28.67, 32.75 sample SRTP3404) were qualified with an "R" (unusable) in samples SRTP3402 and SRTP3404.

Field Blank Contamination

Bis(2-ethylhexyl)phthalate was detected in both field blanks along with numerous TICs.

Action:

(1) Bis(2-ethylhexyl)phthalate was qualified with a "U" for field blank contamination in SRGW3302, SRTP3402, SRTP3404.

(2) Six TIC analytes (retention times 3.60, 4.80, 5.93 sample SRGW0702) (4.78, 5.92, 27.63 sample SRGW3302) were qualified with an "R" (unusable) in samples SRGW0702 and SRGW3302 for field blank contamination.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

Prepared by: John H. Samuelian Date: 4-6-89

0177K

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 18

Samples: Soil - SRTP 3501, SRTP 3504, SRTP 3504D
Aqueous - SRTB06, SRGW3602, SRGW1602, SRFB26, SRFB27

Three soil and six aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and BNA analyses were performed within holding times. The VOA Re-analyses exceeded the hold time by 1-day. It is the Reviewers opinion that this has no effect on data quality.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone 33'-dichlorobenzidine
RSD greater than 30%	chloromethane benzo(k)fluoranthene 4-Nitroaniline benzyl alcohol bis(2 chloroisopropyl)ether 33'-dichlorobenzidine
%D greater than 25%	1,1-dichloroethane 12-dichloroethane Bromoform 1122-tetrachloroethene 4 bromophenyl phenylether hexachlorbenzene bis(2 ethyhexyl) phthalate bis(2-chloroisopropyl)ether 4 nitrophenol

Action:

(1) 2 butanone was qualified with an "R" for low RRF in SRFB26, SRFB 26RE, SRFB26, SRFB27RE, SREW3602, JRGW3602RC, SRGW1602, SRGW1602D, SRGW1602DRE, SRTP3501, SRTP3504, SRTP3504D.

(2) 33'-dichlorobenzidine was qualified with an "R" for low RRF in SRFB26, SRFB27, SRGW1602, SRGW1602D.

(3) bis(2 ethylhexyl)phthalate was qualified with a "J" for noncompliant %D in SRFB26, SRFB27.

Surrogate Recovery

In the BNA analyses except for 2 fluorphenol in SRGW1602D (no action required) analyses, all surrogate recoveries were compliant. Six VOA samples (SRFB26, SRGB27, SRGW3602, SRGW1602, SRFW1602D, SRTB06) had one or more surrogates and of the QC limits so that the samples were re-extracted (see General Comments)

Action:

(1) All VOA analytes (except for 2 butanone) were qualified with a "J" for noncompliant surrogate recovery in SRFB26, SRFB27, SRGW3602, SRGW3602RE, SRGW1602, SRGW1602D, SRGW1602DRE, SRTB06.

(2) The surrogate recoveries in the following VOA samples were just outside of QC limits so no action was required - SRFB26RE, SRFB27RE, SRGW1602RE.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

No MS/MSD analysis was performed on these samples.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

The two VOA blanks exhibited contamination with a TIC (freon) only. One BNA blank exhibited contamination with diethyl phthalate; are BNA blanks had numerous TICs.

Action:

(1) The TICs shown were qualified with an "R" for method blank contamination in SRGW1602 (RT 3.10), SRTP 3504 (RT 5.07, 16.5, 17.9, 23.5, 25.75, 28.43, 32.5), SRTP 3504 (RT 5.07, 6.0, 16.5, 17.9, 23.5, 25.75, 28.43, 32.5), SRTP 3504D (RT 5.07, 16.5, 17.9, 28.43, 32.5, 6.6).

Field and Trip Blank Contamination

Chloroform and freon TICs were detected in the field and trip blanks. Both field blanks contained bis(2-ethylhexyl) phthalate and TICs.

Action:

(1) Bis(2 ethylhexyl) phthalate was qualified with a "U" for field blank contamination in SRTP 3501, SRTP 3504, SRTP 3504D.

(2) Freon (a VOA TIC) was qualified with an "R" for field blank contamination in SRGW 1602RE, SRGW1602DRE..

(3) The following BNA TIC's were qualified with a "R" for field blank contamination in SRGW1802 (RT 4.8, 5.9) and SRGW1602D (RT 4.8, 5.9).

Ion Spectra Match

Some problems were noted in the ion spectra matching. No ion spectra were provided for vinyl acetate, benzene, 4 methyl 2 pentanone, 1122-tetrachloroethane, toluene and chlorobenzene in SRGW 3602, and methylene chloride and chloroform in SRTB06, due to instrument problems; Reviewer placed an "N" qualifier (for "presumptive identification") with these analytes in these samples.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors

General Comments

(1) Several VOA samples required re-extraction to obtain compliant surrogate recoveries. Reviewer recommends that only the re-extracted samples be reported since these had better and/or compliant surrogate recoveries.

(2) Reviewer deleted "T" qualifier from benzene SRGW3602RE, hit was acceptable.

(3) Reviewer deleted "T" qualifier from 1122-tetrachloroethane and chlorobenzene in SRGW1602D and replaced with "N" (presumptive identification) since ion spectra match was out of QC requirements (i.e., greater than 20% relative peak height, but similar peak pattern).

(4) Reviewer requested resumbittal from the laboratory (a method Blank Summary - Form IV) but this was never received. However, Reviewer was able to associate samples to blank based upon analysis time and date.

Prepared by: John H. Samuelian Date: 4-6-89

0166K

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 19

Samples: Aqueous - SRFB28, SRFB29, SRDI03, SRGW3202, SRGW5502, SRGW6302
Soil - SRT3601, SRTP3604, SRTP3702, SRTP3704

Eight aqueous samples analyzed for TCL VOA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All BNA analyses were performed within holding times except for SRGW5502RE. Three VOA samples (SRGW5502RE, SRGW3702RE and SRGW6305) exceeded the hold time.

Action: (1) All VOA analytes (except for 2 butanone) were qualified with a "J" in SRGW5502RE, SRGW3702RE and SRGW6302
(2) All BNA analytes (except for 4-nithoaniline) were qualified with a "J" in SRGW5502RE

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
	33'-dichlorobenzidine
% RSD greater than 30%	chloromethane
	benzo(k)fluoranthene
%D greater than 25%	acetone
	chloromethane
	11-dichloroethane
	12-dichloroethane
	bromoform
	1122-tetrachloroethane
	12-dichloroethene
	3 nitroaniline
	33'-dichlorobenzidine
	4 nitroaniline
	carbon disulfide
	2 hexanone

Action:

(1) 2 butanone was qualified with an "R" for Low RRF in SRFB28, SRFB29, SRDI03, SRGW5502, SRGW5502RE, SRGW3202RE, SRGW6302, SRTB07, SRTP3601, SRTP3604, SRTP3702, SRTP3704
(2) Carbon disulifde was qualified with a "J" for noncompliant %D in SRGW6302
(3) 33'-dichloro/benzidine was qualified with an "R" for low RRF in SRFB28, SRFB29, SRDI03, SRGW3202, SRGW6302, SRTP3603, SRTP3604, SRTP3702, SRTP3704
(4) 4 nitroaniline was qualified with an "R" for excessive (>100%) %D in SRGW5502RE

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant. Two acid surrogates in sample SRGW5502 were non compliant and less than 10%

Action: All acid extractable analytes (n=15) were qualified with an "R" (if non-detect) or "J" (if a hit) in sample SRGW5502.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

An MS/MSD analysis was performed, all criteria were acceptable.

Analysis Sequence

The VOA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the seven VOA blanks exhibited contamination with TCL analytes but all contained a freon TIC. None of the BNA blanks contained TCL BNA analyutes, but did have numerous TICs.

Action:

(1) The TICs shown in parantheses were qualified with an "R" for method blank contamination in SRGW3202(RT5.88,4.77m), SRGW6302 (RT 5.88, 4.77 m)

Field and Trip Blank Contamination

Chloroform and a freon TIC were detected in the field blanks. bis(2-ethylhexyl)phthalate was detected in one field blank, but both field blanks contained numberous BNA TICs.

Action:
1) Bis(2 ethylhexyl)phthalate was qualified with a "U" for field blank contamination in samples SRGW3202, SRGW5502, SRTP3704
2) The TICs shown in parentheses were qualified with an "R" for field blank contamination in samples SRGW3202 (RT 3.57m, 22.57m), SRGW6302(RT 22.57m), SRFW5502 (RT 22.57m)

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Reviewer deleted "T" qualifier from acetone, benzene and ethylbenzene in SRGW5502RE, ion spectra match was acceptable.
(2) No ion spectra were provided for the VOA analysis of sample SRGW5502 due to instrument (see case_narrative).
(3) Reviewer deleted "X" qualifier from phenanthrene in sample SRTP3702, ion spectra match was acceptable.
(4) VOA sample SRGW5502 required re-extraction, reviewer recommends that the results for SRGW5502RE be reported only since all the QC support data was available.
(5) BNA sample SRGW5502 required re-extraction, reviewer recommends that the results from SRGW5502 be reported since it was analyzed within the hold time and the poor acid surrogate recovery does not affect the analyte results.

Prepared by: John H. Samuelian Date: 4-7-89

0169K

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 20 and 21 (BNA only)

Samples: Aqueous - SRGW1002, SRFB30, SRGW0902, SRGW5002, SRGW2702, SRGW270LD, SRGW5302, SRFB31

Eleven soil and seven aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1.

Instrument Tune

The GC/MS was tuned with DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05: 33'-dichlorobenzidine

RSD greater than 30% benzo(k)fluoranthene

%D greater than 25%

3-nitroaniline
4 nitrophenol
butylbenzyl phthalate
33'-dichlorobenzidine
benzo(b)fluoranthene

Action:

No Action was required.

Surrogate Recovery

In the BNA analyses, all surrogate recoveries were compliant except for tribromo phenol in SRGW2702DL.

Action:

No Action was required.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

There were no MS/MSD analyses in this package.

Analysis Sequence

The BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

The BNA blank exhibited contamination with bis(2-ethylhexyl) phthalate and two TICs.

Action:

(1) bis(2-ethylhexyl)phthalate was qualified with a "U" for method blank contamination in samples SRGW1002, SRFW5002 and SRGW5302

(2) The TIC at RT 4.8 min was qualified with a "R" (unusable) in SRGW1002 and SRGW0902. An unknown (RT 5.9) was qualified with an "R" in SRGW1002 and SRGW0902.

Field Blank Contamination

The field blanks contained bis(2-ethylhexyl) phthalate and TICs.

Action: 1) Bis(2-ethylhexyl) phthalate was qualified with a "U" in samples SRGW0902 and SRGW2702 for field blank contamiantion

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Two BNA samples (SRGW2702 and SRGW2702D) required dilutions so that targetted analyte concentrations would fall within the calibration range. Reviewer recommends that "hybrid" form I's be generated from the initial and diluted analyses. The appropriate values are shown on the Form I's.

(2) Reviewer deleted the "X" qualifier from phenanthrenein BNA sample SRGW5002. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

(3) The analyte results for 4-methylbenzaldehyde were qualified with an "R" (unusable) in samples SRGW5002 and SRGW2702 since it had not been calibrated for.

Prepared by: John H. Samuelian Date: 2-9-89

9651b

ORGANICS: TABLE OF HOLDING TIMES

Site: Arco Sinclair Pj

Case: SDG Batch 22 V[illegible]

Lab: Vensar

all dates 1988

o2:

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SRGW0102	aq	VOA	(11-29)	12-1-88	12-11	12-11	13	<14		
2	GW0302			11-30		12-11	12-11	12			
3	GW1102			11-30		12-11	12-11	12			
4	GW2502			11-29		12-11	12-11	13			
5	GW3102			11-29		12-11	12-11	13			
6	GW6502			11-30		12-11	12-11	12			
7	GW11DUP302			11-30		12-11	12-11	12			
8	MH0101			11-29		12-11	12-11	13			
9	FB32			11-29		12-11	12-11	13			
10	TB11			11-29		12-11	12-11	13			
11	DI04			11-30		12-11	12-11	12			
12											
13	DI04DL	aq	VOA	11-30	12-1	12-11	12-11	12			
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Attachment 1

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 20 (VOA only)

Samples: Aqueous - SRFB20, SRGW1002, SRGW8702, SRTB08, SRGW1002SVMS

Five aqueous samples (one sample was filtered) analyzed for TCL VOA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
RSD greater than 30%	None
%D greater than 25%	chloromethane dibromochloromethane 1,1,2-trichloroethane 2 hexanone

Action:

(1) 2-butanone was qualified with an "R" (unusable) for low RRF in SRFB30, SRTB08, SRTB08RE, SRGW1002, SRGW1002SVMS, SRGW5702.

Surrogate Recovery

In the VOA analyses of three samples toluene-d8 and bromofluorobenzene surrogates exceeded QC Units.

Action: (1) All analyte results (except 2 butanone) were qualified with a "J" for excessive surrogate recovery in SRGW1002SVMS, SRTB08, SRTB08RE

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

No MS/MSD analyses were performed.

Analysis Sequence

The VOA and BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the method blanks exhibited contamination.

Field Blank Contamination

Acetone was detected in both the field and trip blanks.

Action: (1) No action was required.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Reviewer deleted "T" qualifier from acetone in sample SRTB08, ion spectra was acceptable.

(2) SVMS identifies filtered sample.

Prepared by: John H. Samuelian Date: 4-6-89

0164K

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 21 (VOA only)

Samples: Aqueous - SRGW2702, SRGW2702D, SRGW5002, SRGW5302, SRGW0902, SRFB31, SRTB09, SRTB10

Eight aqueous samples analyzed for TCL VOA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation. Note that two samples (SRGW5302, SRGW0902) were centrifuged for an additional volatile analysis. These samples have the additional identifier of SVMS.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA and analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA) ~~and DFTPP (BNA)~~. All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RRF less than 0.05:	2-butanone
%D greater than 25%	p-xylene acetone vinyl acetate chloromethane chloroethane 4 methyl-2-pentanone 1122-tetrachloroethane carbon disulfide trans-1,2-dichloroethene bromodichloromethane dibronochloroethane 2-hexanone styrene

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRFB31, SRTB09, SRTB10, SRGW2702, SRGW2702D, SRGW5002, SRGW0902, SRGW5302SVMS, SRGW5002, SRGW5302, SRGW0902SVMS

(2) Acetone was qualified with an "R" for excessive %D (greater than 100%) in SRGW2702

(3) Acetone was qualified with a "J" for excessive %D in samples SRGW5302, SRGW0902, SRGW302SVMS, SRGW0902SVMS

(4) Xylene was qualified with a "J" for excessive %D in samples SRGW0902, SRGW5302SVMS, SRGW0902SVMS

(5) Carbon disulfide was qualified with a "J" for excessive %D in sample SRGW0902SVMS

(6) The "E" qualifier was deleted from benzene, ethylbenzene and total xylene in sample from SRGW5302 and replaced with "J"; reported values should be considered estimates because the concentrations exceeded the calibration range

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

There were no MS/MSD analyses in this package.

Analysis Sequence

The VOA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

Four of the six VOA blanks exhibited no contamination with TCL analytes; two VOA blanks contained methylene chloride and one VOA blank also contained acetone.

Action:

No action was taken for method blank contamination.

Field and Trip Blank Contamination

Acetone, methylene chloride, chloroform and toulene were detected in the trip blanks. The field blank contained methylene chloride, acetone, toulene, benzene and ethylbenzene. Trichlorofluoromethane was identified as a TIC in one trip blank.

Action:

1) Acetone was qualified with a "U" for field blank contamination in samples SRGW2702D, SRGW0902, SRGW0902SVMS

2) Acetone was qualified with a "U" for trip blank contamination in samples SRGW5002, SRGW05302 and SRGW5302SVMS

3) Methylene chloride was qualified with a "U" for trip blank contamination in samples SRGW5002 and SRGW5302

Ion Spectra Match

All ion spectra correctly matched the standard spectrum except for 1122-tetrachloroethane in sample SRGW2702D and the TIC scan at 461 in sample SRGW2702D. The TIC was changed to "unknown and the TCL result was changed to non-detect.

Chromatogram Quality

All VOA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) These samples were to be originally analyzed at lower detection limits, but, due to higher levels of TCL analytes, all but the QA blanks were analyzed at regular CRDLS

(2) Reviewer deleted the "T" qualifier in VOA samples SRFB31, SRTB09, SRGW5002, SRGW5302, SRGWS302SVMS. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

Prepared by: John H. Samuelian Date: 4-4-89

9700b

ORGANICS: TABLE OF HOLDING TIMES

Site: Ours Station

Case: [illegible] 21

Lab: Versar

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SRGW2702	aq	VOA	11-14	11-14-88	12-9	12-9	11	0→e/A		
2	GW2702D			11-14		12-7	12-7	9			
3	GW5002			11-16		12-7	12-7	12			
4	GW5302			11-16		12-8	12-8	11			
5	GW0902			11-14		12-9	12-9	11			
6	FB31			11-29		12-7	12-7	9			
7	TB09			11-18		12-7	12-7	10			
8	TB10			11-29		12-7	12-7	9			
9											
10	GW5302SUMS	aq	VOA	11-28	11-29-88	12-9	12-9	12	0→e/A		
11	GW0902SUMS	aq	VOA	11-29	11-29-88	12-9	12-9	11			
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ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batches 22 and 23 (BNA only)

Samples: Aqueous - SRMW0102, SRGW0302, SRGW6502, SRGW1102, SRGW2802, SRGW3102, SRMH0101, SRGWDB4302, SRDI04, SRFB32, SRGW5402, SRFB33

Twelve aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All BNA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RSD greater than 30%	3 nitroaniline pentachlorophenol
%D greater than 25%	3-nitroaniline 33'-dichlorobenzidine benzyl alcohol

Action:

No action was required.

Surrogate Recovery

All surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

There were no MS/MSD analyses in this package.

Analysis Sequence

The BNA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

The BNA blank exhibited contamination with di-ethylphthalate.

Action:

(1) di-ethyl phthalate was qualified with a "U" for method blank contamination in sample SRGW1102

Field and Trip Blank Contamination

None of the blanks exhibited contamination with TCL analysis. One field blank (SRFB33) contained an unknown TIC.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum, except for naphthalene in sample SRGW5402. The ion spectra may have had interference with naphthalene-d8 (internal standard). Reviewer qualified result with "N" (for presumptive identification).

Chromatogram Quality

All BNA chromatograms were of acceptable quality. Alkane soils were noted in several samples.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Reviewer recommends that 1122-tetrachloroethane not be reported as a TIC constituent in samples SRGW6502, SRGW1102 and SRGW2802. This is a TCL VOA analyte.

(2) Laboratory did not provide time/calibration summaries as requested. However, reviewer was able to identify calibrations and sample groups based upon laboratory raw data sheets.

Prepared by: John H. Samuelian Date: 4-6-89

9650b

ORGANICS: TABLE OF HOLDING TIMES

Site: Oacus Sinclair

Case: SDG # 22123 BNA

Lab: Versar

.QED A[illegible] [illegible]

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	MN0102	S: aq	BNA	11-29	12-1	12-6	12-22	8			
2			P/P								
3	MN3302		BNA	11-30	12-1	12-6	12-23	7			
4			P/P								
5	MN1502		BNA	11-30	12-1	12-6	12-22	7			
6			P/P								
7	MN1102		BNA	11-30	12-1	12-6	12-22	7			
8			P/P								
9	MN2802		BNA	11-29	12-1	12-6	12-12	8			
10			P/P								
11	MN3102		BNA	11-29	12-1	12-6	12-23	8			
12			P/P								
13	MH0101		BNA	11-29	12-1	12-6	12-23	8			
14			P/P								
15	GWDG402		BNA	11-30	12-1	12-6	12-23	7			
16			P/P								
17	DI-4		BNA	11-30	12-1	12-6	12-27	7			
18			P/P								
19	FB32		BNA	11-29	12-1	12-6	12-27	8			
20			P/P								
21	MN1402		BNA	12-2							
22			P/P								
23	FB33			12-1	12-3	12-6	12-17	5			
24											
25											
26											
27											
28											
29											
30											
31											

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 22 (VOA only)

Samples: Aqueous - SRGW2802, SRGW3102, SRFB32, SRTB11, SRMW0102, SRMH0101, SRGW0302, SRGW1102, SRFW6502, SRGWDC4302, SRDI04

Eleven aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA) and DFTPP (BNA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The

following analytes were non-compliant:

RRF less than 0.05:	2-butanone
RSD greater than 30%	acetone vinyl acetate trans-1,3-dichloropropene
%D greater than 25%	acetone 2-butanone 111-trichloroethane carbon tetrochloride 4 methyl-2-pentanone 2 hexanone 1122-tetrachloroethane chloromethane

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRMW0102, SRGW0302, SRGW1102, SRGW6502, SRGWDB4302, SRFB32, SRTB11, SRDIO4, SRDI04DL

(2) Acetone was qualified with a "J" for excessive %RSD in sample SRGW1102

(3) Acetone was qualified with a "J" for excessive %D in SKFB32, SRDIO4, SRMW0102, SRGW1102, SRFW6502, SRGWDB4302

(4) Acetone was qualified with an "R" for excessive %D in SRTB11, SRDIO4DL, SRGW0302

(5) 2-hexanone was qualified with an "R" for excessive %D in SRFB32, SRTB11, SRDIO4, SRDI0YDL, SRMW0102, SRGW0302, SRGW1102, SRGW6502, SRDB4302

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

An MS/MSD analysis was performed on one sample. There was a minor exceedance of QC criteria. No action was required.

Analysis Sequence

The VOA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the six VOA blanks exhibited contamination with TCL analytes but did contain TICs (dichlorodifluoromethane and unknown).

Action:

(1) Dichlorodifluoromethane (a TIC) was qualified with an "R" for blank contamination in sample SRMH0101.

Field, Trip and Water Blank Contamination

Acetone and chloroform (plus 3 TICs) were detected in the field blank. The trip blank contained chloroform. The water blank contained acetone, chloroform, tetrachloroethene and methylene chloride.

Action: 1) Acetone was qualified with a "U" for field blank contamination in samples SRMW0102 and SRGW3102

2) Acetone was qualified with a "U" for water blank contamination in samples SRGW1101, SRGWDB4302

3) Tetrachloroethene was qualified with a "U" for water blank contamination in samples SRGW6502

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) One VOA sample (SRDIO4) required dilution so that targetted analyte concentrations would fall within the calibration range. Reviewer recommends that "hybrid" form I's be generated from the initial and diluted analyses. The appropriate values are shown on the Form I's.

(2) Reviewer deleted the "T" qualifier for benzene in sample SRGW1102, and ethylbenzene and xylene in sample SRGW3102. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

Prepared by: John H. Samuelian Date: 4-6-89

John H. Samuelian

9649b

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

Laboratory: Versar

SDG: Batch 23 (VOA only)

Samples: Aqueous - SRTB12, SRFB33, SRGW2502, SRGW5102, SRGW5202, SRGW5402

Six aqueous samples analyzed for TCL VOA and BNA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The

following analytes were non-compliant:

RRF less than 0.05:	2-butanone
RSD greater than 30%	acetone 2-butanone
%D greater than 25%	chloromethane 2-butanone 1122-tetrachloroethane

Action:

(1) 2 butanone was qualified with an "R" (unusable) for low RRF in SRTB12, SRFB33, SRGW2502, SRGW5102, SRGW5202, SRGW5402

(2) Acetone was qualified with a "J" (estimate) for excessive %RSD in samples SRGW2502 and SRGW5102

Surrogate Recovery

In the VOA analyses, all surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analyses

There was an MS/MSD analysis in this package. The relative percent difference for 11-dichloroethene exceeded the QC criteria, and the laboratory was unable to properly quantitate the MS results for chlorobenzene. No action was required.

Analysis Sequence

The VOA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the three VOA blanks exhibited contamination with TCL analytes.

Action:

None required.

Field and Trip Blank Contamination

Both the trip and field blanks exhibited contamination with methylene chloride, acetone and chloroform.

Action: No action was taken.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA and BNA chromatograms were of acceptable quality.

Calculations

All checked calculations were correct within rounding errors.

General Comments

(1) Reviewer deleted the "T" qualifier in VOA samples SRGW5102 and SRGW5402. Laboratory applied this qualifier to identify an analyte which did not meet all ion match criteria. It is the reviewers opinion that the match was acceptable.

(2) Reviewer was unable to reject the results for acetone in several samples since the field and trip blanks were collected on different days. The Data User should note that the acetone results may have been contributed by lab contamination.

Prepared by: John H. Samuelian Date: 2-9-89

9702b

ORGANICS: TABLE OF HOLDING TIMES

Site: Arco

Case: Redk 23 VOA only

Lab: VOST

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SRTB 12	GW	VOA	12-1-88	12-3-88	12-12-88	12-12-88	11	0-14		
2	FB33	↓	↓	12-1-88	↓	12-12-88	12-11-88	11			
3	GW2502			12-1-88		12-13-88	12-13-88	12			
4	GW5102			12-2-88		12-13-88	12-13-88	11			
5	GW5202			12-2-88		12-12-88	12-12-88	10			
6	GW5402	↓	↓	12-2-88	↓	12-12-88	12-11-88	10			
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Attachment 1.

ARCO SINCLAIR REFINERY
VALIDATION OF ORGANIC SAMPLES

LABORATORY: Versor
SDG: Batch 24
SAMPLES: Soil - SRMWD6603
Aqueous - SRFB50, SRTB69

One soil and two aqueous samples analyzed for TCL VOA compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA analyses were performed within holding times.

Instrument Tune

The GC/MS was tuned with BFB (VOA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

%D greater than 25% Tetrachloroethene

Action:

None required

Surrogate Recovery

All VOA surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analysis

All VOA MS/MSD recoveries and Relative Percent Difference (% RPD) were within QC limits.

Analysis Sequence

VOA analyses were run within 12 hours of instrument tune.

Method Blank Contamination

None of the three VOA blanks exhibited contamination with TCL or TIC analytes.

Field and Trip Blank Contamination

Chloroform and three TICs were found in the field blank 1) Unknown Scan number 72, 2) Unknown scan numbers 319, 3) Dimethoxydimethylsilane scan numbers 406

The trip blank contained Chloroform.

Action: All effected data had already been qualified with a "U" so no action was required.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

Chromatograms quality was acceptable in all samples.

Calculations

All checked calculations were correct.

General Comments

(1) TIC Ethyl Ester Acetic acid was changed to an unknown for sample SRFBSO due to being a false positive.

ARCO SINCLAIR REFINERY

VALIDATION OF ORGANIC SAMPLES

LABORATORY: Versor

SDG: Batch 25

SAMPLES: Aqueous - SRFB51, SRDI01, SRTB60, SRMWD6601, SRMWD6601D

Four aqueous samples analyzed for TCL, VOA organic compounds were validated following current EPA Region II procedures. The following information was used to validate the analytical results:

- sample hold time before analysis
- instrument tune
- initial and continuing calibration
- surrogate recoveries
- internal standard areas
- MS/MSD analysis
- analysis sequence
- method blank contamination
- field and trip blank contamination
- ion spectra match
- chromatogram quality
- calculations.

The validated data are included in the original package, all additional attachments define the QC evaluation.

Sample Hold Time Before Analysis

The holding time summary is shown in Attachment 1. All VOA analyses were performed within holding times.

Batch 25 (Cont'd)

Instrument Tune

The GC/MS was tuned with BFB (VOA). All QC criteria were compliant.

Initial and Continuing Calibration

In the initial calibration, the relative response factors (RRFs) and relative standard deviations (RSDs) of each analyte is assessed. In the continuing calibration, the RRF and percent difference of the RRFs (%D) of each analyte is assessed. The following analytes were non-compliant:

RSD greater than 30%	Vinyl Acetate
%D greater than 25%	Vinyl Acetate

Surrogate Recovery

All VOA surrogate recoveries were compliant.

Internal Standard Areas

This package did not contain an internal standard summary because the deliverables list did not require it. Therefore, no evaluation of internal standard areas was performed.

MS/MSD Analysis

There were no MS/MSD analyses in this package.

Analysis Sequence

The VOA analyses was run within 12 hours of instrument tune.

Batch 25 (Cont'd)

Method Blank Contamination

One of the VOA blanks exhibited contamination with Methylene Chloride and Acetone.

Action: (1) Acetone was qualified with a "U" for method blank contamination in samples SRMWD6601, SRMWD66010.

Field and Trip Blank Contamination

Acetone was detected in the field and deionized Water blank. One TIC was found in the Field blank, two ITCs in the DI, and one TIC in the Trip Blank.

Action: All effected data had already been qualified with a "U" so no action was required.

Ion Spectra Match

All ion spectra correctly matched the standard spectrum.

Chromatogram Quality

All VOA chromatograms were acceptable quality.

Calculations

All checked calculations were correct.

Appendix I
Data Validation Reports Phase IIA

ENSECO DATA ANALYSIS

Validation of Organic Samples

Laboratory: Enseco

Samples:		
(12)	Volatile -	SS201, SS202, SS203, MWC182, MWC181, GW17, MWD451, MWD452, MWD453, MWC231, MWC141, MWD431.
(19)	Semivolatile -	SS201, SS202, SS203, MWC182, MWC181, GW17, MWD451, MWD452, MWD453, SS204, MWC231, MWC141, MWC151, MWD191, MWD421, MWD422, MWD423, MWD431, MWD441.
(10)	Pesticide -	SS201, SS202, SS203, MWC182, MWC181, GW17, MWD451, MWD452, MWD453, SS204.

Twelve volatile, nineteen semivolatile, and ten pesticide/PCB samples were analyzed following current EPA Region II procedures. The following information was used to validate the analytical results.

- o Sample hold time before analyses
- o Instrument tune
- o Initial and continual calibration
- o Surrogate recoveries
- o Internal standard areas
- o MS/MSD analysis
- o Analysis sequence
- o Method blank contamination
- o ion spectra match
- o Chromatogram quality

All data are acceptable except where noted below. Overall lab performance was acceptable. The following shortcomings were noted.

Surrogate Recoveries

Surrogate summary results for a number of samples were not included with the data package.

Blank Contamination

No semivolatile or pesticide method blanks were given for this case. No field blanks were analyzed for any of the three fractions. There were few hits in this package so blank analysis is not as important, however, the user should be cautious of any hits of common contaminants (i.e. methylene chloride and acetone).

Initial and Continual Calibration

Initial and continual calibration results were generally good with only a few exceptions.

Chromatogram Performance

Several detected peaks were crossed out with no explanation by the laboratory.

Holding Time

Several samples were analyzed outside of holding time requirements.

Pesticide Standard Summary

All of the four standard analytes evaluated in the pesticide section were outside QC limits for linearity check. Several percent differences on the confirmation column were above QC limits (20%).

Conclusion

Data is acceptable but should be evaluated in conjunction with current Ebasco data. If these results are not in unision with Ebasco data they should be rejected. In addition the following actions were required.

1) Sample SS201 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

2) Sample SS203 (Semivolatile) TIC Hexzadecanoicacid was rejected because mass spectra results were inconclusive.

3) Sample MWC-18-1 (Semivolatile) TIC 1-decene, 3,4-dimethyl was rejected because mass spectra results were inconclusive.

4) Sample MWC-18-1 (Volatile) TIC 3 hexene-2,2,dimethyl was rejected because mass spectra results were inconclusive.

5) Sample GW17 (Semivolatile) TICs propylcyclohexane and hexadecanoic acid were rejected because mass spectra results were inconclusive.

6) Sample MWD-45-1 (Volatile) Vinyl acetate was rejected because of low continual calibration response.

7) Sample MLWD-45-2 (Volatile) Vinyl acetate was rejected because of low continual calibration response.

8) Sample MWD-45-2 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

9) Sample MWD-45-3 (Volatile) Vinyl acetate was rejected because of low continual calibration response factor.

10) Sample MWC-14-1 (Volatile) All analytes were rejected because of gross holding time exceedance.

ORGANICS:

TABLE OF HOLDING TIME EXCEEDANCES

Site: _____

Case: _____

Lab: _____

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	MWD-45-3	Soil	VOA		4/16/85	4/23/85	4/23/85	7			
2			BNA		4/16/85	4/17/85	4/24/85	1,12			
3			PIPCB		4/16/85	4/16/85	5/18/85	0,32			
4											
5	SS-204	Soil	BNA		4/16/85	4/17/85	4/29/85	1,12			
6			PIPCB		4/16/85	4/16/85	5/3/85	0,17			
7											
8	MWC-13-1	Soil	VOA		4/18/85	4/22/85	4/22/85	4			
9			BNA		4/18/85	4/18/85	4/30/85	1,12			
10					4/17/85	4/18/85	5/18/85	1,30			
11											
12	MWC-14-1	Soil	VOA		4/23/85	5/24/85	5/24/85	36			
13			BNA			4/17/85	5/2/85	,15			
14											
15	MWS-15-1	Soil	BNA			4/17/85	5/6/85	,19			
16											
17	MWD-14-1	Soil	BNA			4/17/85	5/6/85	,19			
18											
19	MWD-42-1	Soil	BNA		4/23/85	4/24/85	5/2/85	1,8			
20											
21	MWD-42-2	Soil	BNA		4/23/85	4/24/85	4/30/85	1,6			
22											
23	MWD-42-3	Soil	BNA		4/23/85	4/24/85	5/7/85	1,11			
24											
25	MWD-43-1	Soil	VOA		4/18/85	4/23/85	4/23/85	5			
26			BNA		4/18/85	4/24/85	4/30/85	6,6			
27											
28	MWD-44-1	Soil	BNA		4/23/85	4/24/85	5/2/85	2,8			
29											
30											
31											

ORGANICS: TABLE OF HOLDING TIMES

Site: _____

Case: _____

Lab: _____

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	SS201	Soil	VOA		4/15/85	4/22/85	4/22/85	7			
2			BNA		4/15/85	4/17/85	4/30/85	2,13			
3			PIPCB		4/15/85	4/15/85	6/3/85	0,49)			
4											
5	SS202	Soil	VOA		4/15/85	4/22/85	4/22/85	7			
6			BNA		4/15/85	4/17/85	5/2/85	2,15			
7			PIPCB		4/15/85	4/15/85	5/18/85	0,33			
8											
9	SS203	Soil	VOA		4/15/85	4/22/85	4/22/85	7			
10			BNA		4/15/85	4/17/85	4/29/85	2,12			
11			PIPCB		4/15/85	4/15/85	5/18/85	0,33			
12											
13	MWC18-2	Soil	VOA		4/15/85	4/22/85	4/22/85	7			
14			BNA		4/15/85	4/17/85	4/29/85	2,12			
15			PIPCB		4/15/85	4/15/85	5/18/85	0,33			
16											
17	MWC-18-1	Soil	VOA		4/15/85	4/22/85	4/22/85	7			
18			BNA		4/15/85	4/17/85	4/29/85	2,12			
19			PIPCB		4/15/85	4/15/85	5/18/85	0,33			
20											
21	GW-17	Water	VOA		4/16/85	4/24/85	4/24/85	8			
22			BNA		4/16/85	4/17/85	5/2/85	1,15			
23			PIPCB		4/16/85	4/16/85	5/18/85	0,33			
24											
25	MWD-45-1	Soil	~~VOA~~		4/16/85	4/23/85	4/23/85	7			
26			BNA		4/16/85	4/17/85	4/24/85	1,12			
27			PIPCB		4/16/85	4/16/85	5/3/85	0,17			
28											
29	MWD-45-2	Soil	VOA		4/16/85	4/23/85	4/23/85	7			
30			BNA		4/16/85	4/17/85	4/24/85	1,12			
31			PIPCB		4/16/85	4/16/85	6/3/85	0,48			

ENSECO DATA ANALYSIS

Validation of Organic Samples

Laboratory: Enseco

Samples:

Volatile - (29) MWC14, MW16, MW13, MWD45, MW21, MWC23, MW19, MWP43, MW204, MW482, MW481, MWC15, MW20, MWC24, MWD24, MWD42, MWD44, MWC18, MWD441, MWD191, MW131, MW132, MW161, MW241, MWD421, MWD423, MWC151, MW202, MW203.

Semivolatile - (23) MWC14, MW16, MW13 MWD45, MW21, MWC23, MW19, MWD43, MW204, MW482, MW481, MWC15, MW20, MWC24, MWD421, MWD44, MWC18, MW131, MW132, MW161, MW241, MW202, MW203.

Pesticide/PCB - (14) MWC14, MWD45, MW21, MWC23, MW19, MWD43, MW20, MWC24, MWD42, MWC18, MWD441, MWD191, MW132, MW241.

Twenty nine volatile, twenty three semivolatile, and fourteen pesticide/PCB samples were analyzed following current EPA Region II procedures. The following information was used to validate the analytical results.

- Sample hold time before analysis
- Instrument tune
- Initial and continual calibration
- Surrogate recoveries
- Internal Standard areas
- MS/MSD analysis
- Analysis sequence
- Method blank contamination
- Ion spectra match
- Chromatogram quality

Enseco Data Analysis of Organic Samples

All data are acceptable except where noted below. Overall lab performance was poor. The following shortcomings were noted.

Surrogate Recoveries

All samples meet Region II requirements for surrogate recoveries with the exception of sample MW-20-2, however, since no analytes were detected in this sample action was not required. Where as most samples meet QC requirements (no more than one surrogate per fraction can be outside of control limits) many surrogate recoveries were grossly outside of this range, particularly for pesticides.

Blank Contamination

No semivolatile or pesticide method blanks were given for this case. No field blanks were analyzed for any of the three fractions. There were very few hits in this package so blank analysis is not as important, however, the user should be cautious of any hits of common contaminants (i.e. acetone and methylene chloride).

Initial and Continual Calibration

Initial calibration results were good, however, numerous continual calibration percent differences were outside of control limits.

Chromatogram Performance

The chromatogram baseline for many samples was unstable. In addition numerous detected peaks were crossed out with no explanation by the laboratory. In addition a number of standards had poor baseline stability.

Mass Spectra Match

A number of sample analytes were rejected because the sample mass spectra was inconclusive.

Holding Time

Numerous samples were analyzed outside of holding time requirements.

Pesticide Standards Summary

None of the four standard analytes evaluated in the pesticide section were within QC requirements for linearity check (below 10% RSD). In addition all percent differences on the confirmation column were above QC limits (20%).

Conclusion

Since few hits were detected in any of the samples a number of laboratory shortcomings can be overlooked, however, these data should be evaluated in conjunction with current Ebasco data. If these results are not in unison with Ebasco data they should be rejected. In addition the following actions were required.

1) Sample MWD-44-1 (Pesticide) All values were rejected because of gross holding time exceedance.

2) Sample MWD-19-1 (Pesticide) All values were rejected because of gross holding time exceedance.

3) Sample MWD-19-1 (Volatile) 2-Butanone was rejected because of a low response factor during continual calibration.

4) Sample MW-13-2 (Volatile) Methylene Chloride was marked estimated "J" because continual calibration percent difference exceeded 25%.

5) Sample MW13-2 (Pesticide) All values were rejected because of gross holding time exceedance.

6) Sample MW13-2 (Semivolatile) Hexadecanoic Acid was rejected because it was determined to be a false positive.

7) Sample MW16-1 (Volatile) Methylene Chloride was marked estimated "J" because continual calibration percent difference was higher than 25%.

8) Sample MWC-24-2 (Pesticide) All values were rejected because of gross holding time exceedance.

9) Sample MW-20-3 (Volatile) Acetone was marked estimated "J" because continual calibration percent difference exceeded 25%.

10) Sample MW-48-1 (Volatile) A) 2-Butanone and vinyl acetate were rejected because of low continual response factors, B) All other analytes were marked estimated "J" because of holding time exceedance.

11) Sample MW-20 (Semivolatile) A) Di-n-Octyl Phthalate was rejected because of gross exceedance of continual calibration differences, B) bis (2-ethylhexyl) phthalate was marked estimated "J" because of exceedance of continual calibration percent difference.

12) Sample MW-20 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

13) Sample MWC-24 (Semivolatile) bis(2-ethylhexyl) phthalate was marked estimated "J" because continual calibration percent difference exceeded 25%.

14) Sample MWC-24 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

15) Sample MWD-42 (Semivolatile) A) bis (2-ethylhexyl) phthalate was marked estimated "J" because of exceedance of continual calibration percent difference, B) di-n-ocytl phthalate was rejected because of gross exceedance of continual calibration percent difference.

16) Sample MWD-42 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

17) Sample MWD-44 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

18) Sample MWD-44 (Semivolatile) bis (2-ethylhexyl) phthalate was marked estimated "J" because continual calibration percent difference was greater than 25%.

19) Sample MWC-18 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

20) Sample MWC-18 (Semivolatile) bis (2-ethylhexyl) phthalate was marked estimated "J" because continual calibration percent difference exceeded 25%.

21) Sample MWC-18 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

22) Sample MWC-14 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

23) Sample MWC-14 (Semivolatile) bis (2-ethylhexyl) phthalate was marked estimated "J" because continual calibration percent difference was greater than 25%.

24) Sample MWC-18 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

25) Sample MW-16 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

26) Sample MW-16 (Semivolatile) bis (2-ethylhexyl) phthalate was marked estimated "J" because of exceedance of continual calibration percent difference.

27) Sample MW-13 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

28) Sample MWD-45 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

29) Sample MWD-45 (Semivoltile) bis (2-ehtylhexyl) phthalate was marked estimated "J" because continual calibration percent difference exceeded 25%.

30) Sample MWD-45 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

31) Sample MW-21 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

32) Sample MW-21 (Semivolatile) A) bis (2-ethylhexyl) phthalate was marked estimated "J" because continual calibration percent difference was greater than 25%. B) di-n-octyl phthalate was rejected because of gross exceedance of continual calibration percent difference.

33) Sample MW-21 (Pesticide) All values were marked estimated "J" because of holding time exceedance.

34) Sample MWC-23 (Volatile) All sample analytes were marked estimated "J" because of holding time exceedance.

35) Sample MWC-23 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

36) Sample MW-19 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

37) Sample MW-19 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

38) Sample MWD-43 (Volatile) All analytes were marked estimated "J" because of holding time exceedance.

39) Sample MWD-43 (Semivolatile) AO diethylphthalate and bis (2-ethylhexyl) phthalate were marked estimated "J" because of exceedance of continual calibration percent difference. B) TIC compound 2-pentanone, 4-hydroxy 1-4methyl was rejected because it was reviewed as a false positive.

40) Sample MWD-43 (Pesticide) All analytes were marked estimated "J" because of holding time exceedance.

ORGANICS:

TABLE OF HOLDING TIMES AND EXCEEDANCES

SITE: _____

CASE: _____

LAB: _____

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	MWC-14	Water	VOA		5/2/85	5/30/85	5/31/85	(28)			
2			BNA		5/2/85	5/4/85	5/23/85	2,19			
3			PIPCB		5/2/85	5/4/85	6/19/85	2,(46)			
4											
5	MW-16	Water	VOA		5/2/85	5/30/85	5/30/85	(28)			
6			BNA		5/2/85	5/4/85	5/23/85	2,19			
7											
8	MW-13	Water	VOA		5/2/85	5/30/85	5/30/85	28			
9			BNA		5/2/85	5/4/85	5/23/85	2,19			
10											
11	MWD-45	Water	VOA		5/2/85	5/30/85	5/30/85	(28)			
12			BNA		5/2/85		5/23/85	? ?			
13			PIPCB		5/2/85	5/4/85	6/19/85	2,(46)			
14											
15	MW-21	Water	VOA		5/2/85	5/30/85	5/30/85	(28)			
16			BNA		5/2/85		5/23/85	? ?			
17			PIPCB		5/2/85	5/4/85	6/19/85	2,(46)			
18											
19	MWC-23	Water	VOA		5/2/85	5/30/85	5/30/85	(28)			
20			BNA		5/2/85		5/23/85	? ?			
21			PIPCB		5/2/85	5/4/85	6/19/85	2,(46)			
22											
23	MW-19	Water	VOA		5/2/85	5/30/85	5/30/85	(28)			
24			BNA		5/2/85		5/23/85	? ?			
25			PIPCB		5/2/85	5/4/85	6/19/85	2,(46)			
26											
27	MWD-43	Water	VOA		5/2/85	5/30/85	5/30/85	(28)			
28			BNA		5/2/85		5/24/85	? ?			
29			PIPCB		5/2/85	5/4/85	6/19/85	2,(46)			
30											
31											

ORGANICS: TABLE OF HOLDING TIMES

Site: _____

Case: _____

Lab: _____

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	MWDH-1	Soil	VOA		4/19/85	4/24/85	4/24/85	10			
2			P/PCB		4/19/85	4/24/85	6/19/85	5,56			
3											
4	MWD-19-1	Soil	VOA		4/19/85	5/1/85	5/1/85	12			
5			P/PCB		4/19/85	4/24/85	6/19/85	5,56			
6											
7	MW-13-1	Soil	VOA		4/25/85	5/2/85	5/2/85	7			
8			BNA		4/25/85		5/6/85	11			
9											
10	MW-13-2	Soil	VOA		4/25/85	5/3/85	5/3/85	8			
11			BNA		4/25/85	5/2/85	5/2/85	7,0			
12			P/PCB		4/25/85	4/27/85	6/19/85	2,53			
13											
14	MW-16-1	Soil	VOA		4/25/85	5/3/85	5/3/85	8			
15			BNA		4/25/85	5/9/85	5/17/85	14,8			
16											
17	MW-24-1	Soil	VOA		4/25/85	5/3/85	5/3/85	8			
18			BNA			5/7/85	5/7/85				
19			P/PCB		4/25/85	4/27/85	6/19/85	2,53			
20											
21	MWD-4D-1	Soil	VOA		4/23/85	5/2/85	5/2/85	9			
22											
23	MWD-4S-3	Soil	VOA		4/23/85	5/2/85	5/2/85	9			
24											
25	MWC-15-1	Soil	VOA		4/23/85	5/2/85	5/2/85	9			
26											
27	MW-20-2	Soil	VOA		4/24/85	5/2/85	5/2/85	8			
28		"	BNA		4/24/85	5/6/85	5/6/85	12,0			
29											
30	MW-20-3	Soil	VOA		4/24/85	5/2/85	5/2/85	8			
31			BNA		4/24/85	4/30/85	4/30/85	6,0			

ORGANICS:

TABLE OF HOLDING TIMES AND EXCEEDANCES

SITE: _____

CASE: _____

LAB: _____

	SAMPLE	MATRIX	FRACTION	DATE SAMPLED	DATE LAB RECEIVED	DATE EXTRACTED	DATE ANALYZED	HOLDING TIME	CRITERIA	CCC?	MB?
1	MW-20-4	Soil	VOA		4/24/85	5/2/85	5/3/85	8			
2			BNA			5/2/85	5/2/85	8,0			
3											
4	MW-48-2	Soil	VOA		4/24/85	5/2/85	5/2/85	8			
5			BNA		4/24/85	5/2/85	5/7/85	13,0			
6											
7	MW-48-1	Soil	VOA		4/24/85	5/10/85	5/10/85	16			
8			BNA		4/24/85	4/30/85	4/30/85	6,0			
9											
10	MWC-15	Water	VOA		5/2/85	5/14/85	5/14/85	12			
11			BNA		5/2/85	5/4/85	5/23/85	2,19			
12											
13	MW-30	Water	VOA		5/2/85	5/14/85	5/14/85	12			
14			BNA		5/2/85	5/4/85	5/23/85	2,19			
15			PIPCB		5/2/85	5/4/85	6/19/85	2,46			
16											
17	MWC-24	Water	VOA		5/2/85	5/14/85	5/14/85	12			
18			BNA		5/2/85	5/4/85	5/23/85	2,19			
19			PIPCB		5/2/85	5/4/85	6/19/85	2,46			
20											
21	MWP-42	Water	VOA		5/2/85	5/14/85	5/14/85	12			
22			BNA		5/2/85	5/4/85	5/23/85	2,19			
23			PIPCB		5/2/85	5/4/85	6/19/85	2,46			
24											
25	MWD-44	Water	VOA		5/2/85	5/30/85	5/30/85	28			
26			BNA		5/2/85	5/4/85	5/23/85	2,19			
27											
28	MWC-18	Water	VOA		5/2/85	5/30/85	5/30/85	28			
29			BNA		5/2/85	5/4/85	5/23/85	2,19			
30			PIPCB		5/2/85	5/4/85	6/19/85	2,46			
31											

INORGANIC DATA REVIEW SUMMARY

INORGANIC CASE NUMBER 1 (Nanco Labs)

Samples MWD-47 Soil
MWCB-62 Water
MWCB-63 Water
MWB-61 Water
MWB-63 Water

Inorganic Case number 1 consisted of one soil and four water samples. All samples were analyzed for fourteen elements and phenol. The fourteen elements analyzed were Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Lead Cyanide, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc. All samples were validated using EPA Standard Operating Procedure guidelines.

In general the results, after Ebasco QA review, for the four water samples were acceptable. Beryllium, Selenium, Thallium and Zinc, were marked as estimated due to low matrix spike recoveries.

Most of the results for the soil sample,, MWD-47, were either marked estimated or rejected after Ebasco QA review. In all eight of the fifteen elements were marked estimated and two rejected due to failure to meet EPA Standard Operating Procedures criteria. Antimony, Arsenic, Copper, Selenium, Cyanide, and Phenol were marked estimated due to low matrix spike recoveries. Lead was marked estimated due to high matrix spike recoveries. Nickel was marked estimated because of low results from the Laboratory Control Sample. Chromium and Silver were both rejected because the difference between the sample and lab duplicate exceeded two times the Contact Required Detection limit.

A more detailed explanation of the results is attached.

Inorganic - Samples MWD-47 (S), MWCB-62 (W), MWCB-63 (W), MWB-61 (W), MWB-63 (W).

8238b

Sample MWD-47 Soil

Element	Value	Action Taken	Reason
Antimony	12U	Marked Estimated	Spike Recovery (27.4%) 1B
Arsenic	5	Marked Estimate	Spike Recovery (45.3%) 1B
Chromium	2U	Reject "*"	Lab Duplicate Difference 2A
Copper	15	Marked Estimated	Spike Recovery (66.4%) 1B
Lead	6	Marked Estimated	Spike Recovery (150%) 1C
Nickel	16	Marked Estimated	Lab Control Sample (75%) 1B
Selenium	1V	Marked Estimated	Spike Recovery (0%) 1B
Silver	2V	Rejected	Lab Duplicate Difference 2A
Cyanide	0.1U	Marked Estimated	Spike Recovery (741%) 1B
Phenol	0.1U	Marked Estimated	Spike Recovery (12.8%) 1B

"*" in addition the Lab Control Sample for Chromium was outside of control limits and would have been marked estimated if not rejected for other QA/QC Criteria.

Sample MWCB-62 Water

Element	Value	Action Taken	Reason
Beryllium	2.0U	Marked Estimated	Spike Recovery (64%) 1A
Selenium	5.0U	Marked Estimated	Spike Recovery (73%) 1A
Thallium	5.0U	Marked Estimated	Spike Recovery (66.6%) 1A
Zinc	182.0	Marked Estimated	Spike Recovery (66%) 1A

Sample MWCB-41 Water

Element	Value	Action Taken	Reason
Beryllium	2.0U	Marked Estimated	Spike Recovery (64%) 1A
Selenium	5.0U	Marked Estimated	Spike Recovery (73%) 1A
Thallium	5.0U	Marked Estimated	Spike Recovery (66.6%) 1A
Zinc	4665.0	Marked Estimated	Spike Recovery (66%) 1A

Sample MWB-63 Water

Element	Value	Action Taken	Reason
Beryllium	2.0U	Marked Estimated	Spike Recovery (64%) 1A
Selenium	5.0U	Marked Estimated	Spike Recovery (73%) 1A
Thallium	5.0U	Marked Estimated	Spike Recovery (66.6%) 1A
Zinc	4665.0	Marked Estimated	Spike Recovery (66%) 1A

In addition the following QA/QC Samples were rejected.

Sample Spike Recovery ES 6562 3A

Lab Control Sample 3A

Lead 100.4 rejected - Coefficient of Correlation for M.S.A. less than 0.990%

In addition to this data reviewer (user?) should be aware of the following short comings concerning this package.

Explanation of Rejection Criteria

1. Spike Sample Recoveries are used to test to see how accurate a sample result is. A known amount of concentration is added to the sample value and it is rerun. To obtain the percentage recovery subtract the result obtained from the second analysis which contained added spike concentration from the first analysis which was strictly the sample that you divide by the amount of spike added.

$$\frac{\text{Spike Sample Results} - \text{Sample Results}}{\text{Spike Added}} = \% \text{ Spike Sample Recovery}$$

   a. If the percent recovery for a soil sample is less than 75% all associated data is to e marked as estimated.

   b. If the percentage recovery for a soil sampdle is between 125-150% associated data not flagged with a "U" is to be marked estimated.

2. Lab duplicates are used to test accuracy of repeatability. A sample is rerun and the results obtained are compared to the 1st run.

   a. If the difference between the sample and duplicate for a soil sample is greater than two times the contract required detection limit all associated data is to be rejected.

3. The Coefficient of Correlation is used to measure how accurately M.S.A. results are to known concentrations of given levels, M.S.A. analysis is required for all furnace data if spike recoveries are less than 85% or greater than 115%.

   a. If the Coefficient of Correlation for the M.S.A. analysis is less than 0.990 all associated data is to be rejected.

4. Initial Calibration ensures that the instrument is capable of producing acceptable quantitative data. Variations from 100% will cause sample readings to be high or low accordingly.

   a. If initial Calibration is less than 50% or greater than 150% all associated data is to be rejected.

INORGANIC CASE NUMBER 2

Analysis of inorganic case number two consisted of eighteen soil samples. Nine samples were tested for thirteen elements (Antimony, Arsenic, Beryllium, Cadmium, Chromium, Copper, Leach, Mercury, Nickel, Selenium, Silver, Thallium, and Zinc), the remaining nine samples were tested in addition for Cyanide and Phenol for a total of fifteen elements/compounds.

All EPA Standard Operating Procedure QA tests were performed and the laboratory took all of the appropriate required actions. Where as the laboratory followed all of the EPA contract required actions, the results of their 'QA Criteria' were less than favorable.

Antimony, Arsenic, Beryllium, Cadmium, Nickel, Selenium, Thallium, and Zinc were marked estimated for all eighteen samples due to low matrix spike recoveries. Cyanide was marked estimated due to low matrix spike recovery for the nine samples it was analyzed in. In addition, the matrix spike recovery for Chromium was low but it was not marked estimated due to being rejected for other QA Criteria.

Chromium was rejected for all samples because the difference between the sample and laboratory duplicate was greater than two times the contract detection limit.

Lead was rejected for all samples for which it was detected with ICAP (SS-27, SS-28, SS-29, SS-30, SS-31, MWDB-43, and AB-40) because the initial calibration was high.

Lead was rejected for samples (SS-35, MWB-63, AB-41, AB-37). The values were obtained by Method of Standard Addition and the resulting Coefficient of Correlations were low.

Samples SS-27 - 13 Elements

SS-28

SS-29

SS-30

SS-31

SS-32

SS-33

SS-34

SS-35

Samples MWCB-62 - 15 Elements/Compounds

MW-B-61

MWCB-42

MWB-63

AB-38

AB-41

AB-37

AB-43

AB-40

8238b

ORGANIC SAMPLES - MWD-47 (S), MWCB-62 (W), MWB-73 (W), MWCB-62 (W), MWB-61 (W)

Sample MWD-47 - Soil

Volatile -

Methylene Chloride	-	Was marked estimated because the Percent Relative Standard Deviation for the Continual Calibration exceeded 25.0% (49.91%) and the value was detected.
Semivolatile	-	OK
Pesticide	-	OK

Sample MWCB-62 - Soil

Volatile -

Methylene Chloride	-	Was rejected due to Method Blank Contamination. Percent RSD also exceeded 25.00% (52.79%) and would have been marked estimated, if not previously rejected.
Semivolatile	-	Tentatively identified compound - Ethlene, Tetrachloro was rejected due to Method Blank Contamination.
Pesticide	-	OK

Sample MWB-63 - Water

Volatile -

Methylene Chloride	-	Was rejected due to Method Blank Contamination. Percent RSD also exceeded 25.00% (52.79%) and would have been marked estimated if not previously rejected.
Semivolatile	-	Tentatively Identified Compound - Ethene, Tetrachloro - was rejected to to Method Blank Contamination.
Pesticide	-	OK

Sample MWCB-42 - Water

Volatile -

Methylene Chloride and Acetone	-	Were rejected due to Method Blank Contamination. The Percent RSD in Continual Calibration also exceeded 25.00% (51.16%) and would have been marked estimated if not previously rejected.
Semivolatile	-	Tentatively Identified Compound - Ethene, Tetrachloro - was rejected to to Method Blank Contamination.
Pesticide	-	OK

Sample MWCB-61 - Water

Volatile -

Methylene Chloride and Acetone	-	Were rejected due to Method Blank Contamination. The Percent RSD in continuing Calibration also exceeded 25.00% (51.16%) and would have been marked estimated if not previously rejected.
Acetone	-	Was marked estimated because the Percent RSD in continual Calibration exceeded 25.00% (29.99%) and the value was detected.
Semivolatile	-	OK
Pesticide	-	OK

In evaluating the data the reviewer should be aware of the following shortcomings concerning this package.

1. Matrix Spikes were not included in this package and therefore, could not be evaluated.

2. Response Factor percent Relative Standard Deviation was poor for all Volatile and Semivolatile Continual Calibrations.

3. Internal Standard Area Summary (Form VIIIKs) were missing for all Volatile and Semivolatile Samples and thus could not be evaluated.

Where the above information is important due to the circumstances of the situation the reviewer feels the data is acceptable as is.

Sample MWB-63 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected*	Lab Duplicate	2A
Lead	Rejected	Initial Calibration (2.81%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (54.2%)	1B

Sample AB-38 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected*	Lab Duplicate	2A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (54.2%)	1B

Sample MWB-61 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (54.2%)	1B

Sample MWCB-42 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (54.2%)	1B

Sample SS-35 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected*	Lab Duplicate*	3A
Lead	Rejected	Correlation Coefficient	
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample MWCB-62 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-31 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-32 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-33 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1A
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-28 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-29 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-30 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-34 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected*	Lab Duplicate	2A
Nickel	Marked Estimated	Spike Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample AB-37 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected*	Lab Duplicate	2A
Lead	Rejected	Initial Calibration (281%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spiked Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample AB-41 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected*	Lab Duplicate	2A
Lead	Rejected	Initial Calibration (281%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spiked Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample MWDB-43 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spiked Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample AB-40 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spiked Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Sample SS-27 - Soil

Element	Action Taken	Reason	Code
Antimony	Marked Estimated	Spike Recovery (0%)	1B
Arsenic	Marked Estimated	Spike Recovery (0%)	1B
Beryllium	Marked Estimated	Spike Recovery (74%)	1B
Cadmium	Marked Estimated	Spike Recovery (58%)	1B
Chromium	Rejected	Lab Duplicate*	2A
Lead	Rejected	Initial Calibration (281%)	4A
Cyanide	Marked Estimated	Spike Recovery (0%)	1B
Nickel	Marked Estimated	Spiked Recovery (53.4%)	1B
Selenium	Marked Estimated	Spike Recovery (50%)	1B
Thallium	Marked Estimated	Spike Recovery (69.6%)	1B
Zinc	Marked Estimated	Spike Recovery (59.2%)	1B

Appendix J
Deep Aquifer Study

NOTE: This sampling program was conducted in accordance with the procedures defined in the Field Sampling and Analysis Plan (FSAP) for the site approved by EPA in October 1988. However, EPA did not perform direct oversight of the September 1990 portion of the sampling effort.

Sinclair Refinery Site
Deep Aquifer

A "deep aquifer" has been described in the RI reports prepared by SMC Martin and Ebasco for the Sinclair Refinery Site. The deep aquifer refers to a sandy layer encountered in five boreholes (AB-39 MWD-42, MWD-47, MWD-49 and MWD-66) at the site, below the laterally continuous clay layer which is present beneath the entire site (See Figure 3-5, attached, all figures are from the Ebasco RI report). The available geologic data at the site have not shown the sandy layer (deep aquifer) to be laterally continuous. In fact, the deep aquifer appears to be limited in areal extent to an area along South Brooklyn Avenue (less than 3×10^6 ft^2 as compared to the total site area of approximately 5×10^6 ft^2) and other isolated pockets of sandy material. While deep borings close to South Brooklyn Avenue (Figure 3-9) generally encountered the deep aquifer as shown on cross section C-C' (Figure 3-12), deep borings closer to the river generally did not encounter the deep aquifer at depths of up to 126 feet (Figures 3-10 and 3-13). In fact, many of the "deep" wells at the site are actually completed in clay units since no deep aquifer was encountered.

An upward hydraulic gradient is present at the site, based on data from wells completed near each other in the shallow aquifer and either the deep sand layer or deep in the clay layer. Several sets of wells were compared, as shown on Table 1 and in each case the wells exhibited piezometric head differences of 6.1 to 18 feet in the upward direction. These differences show that the limited groundwater flow which would occur through the clay is from the deep zones, toward the shallow aquifer.

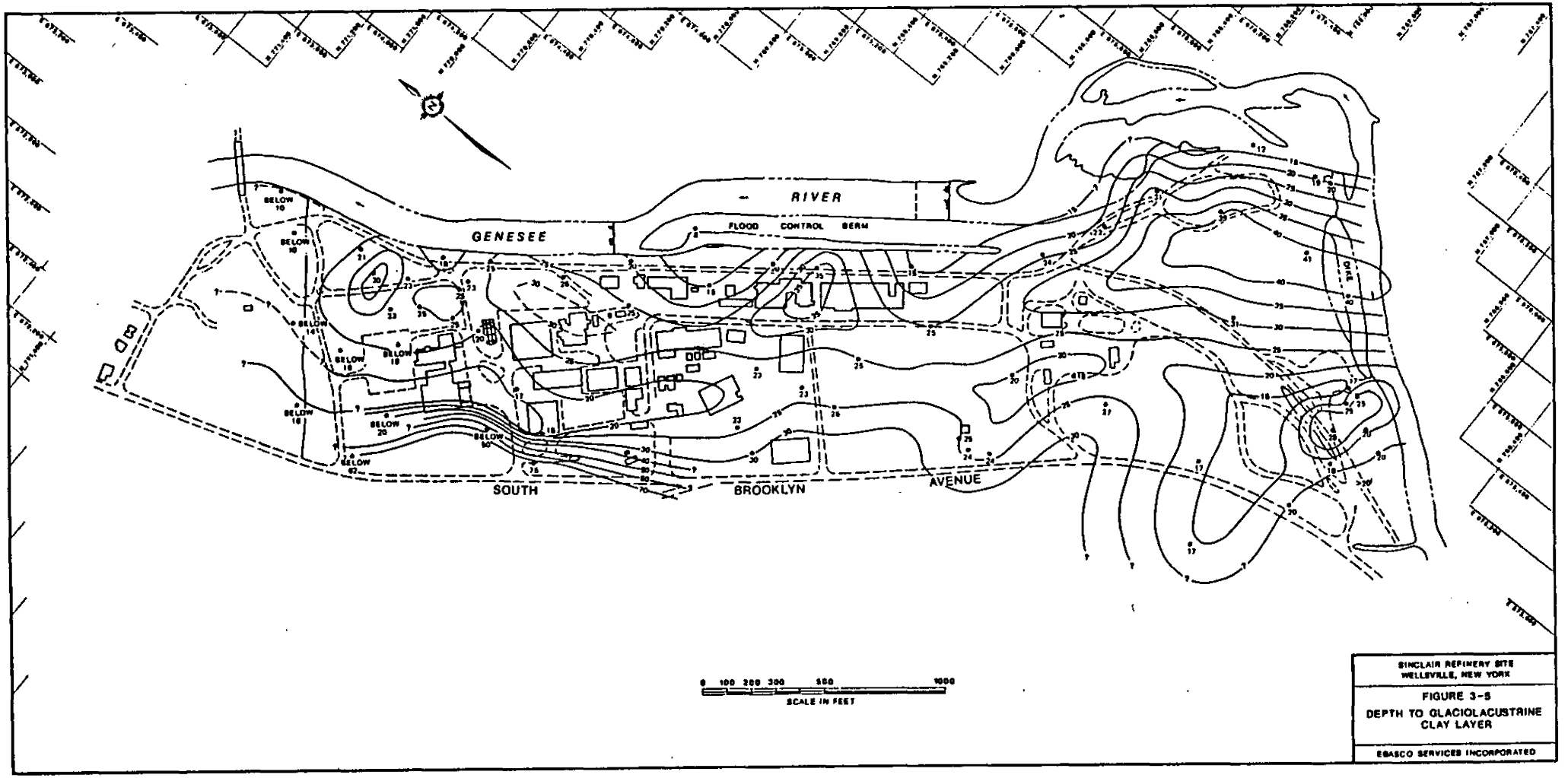
Chemical data from four deep wells are shown on Table 2 including two sets of data from wells MWD-47 and MWD-66 and one set of data from wells MWD-48 and MWD-49. Wells MWD-47 and MWD-48 are both completed in clay layers with limited well yields. In these wells BNAs and VOCs were both detected during the 1986 sampling. The slow rate at which water enters the wells impeded well development. The presence of BNAs and VOCs in samples from the wells may have represented residual contamination introduced during drilling since the wells could not be thoroughly developed to remove contaminated drill cuttings. This

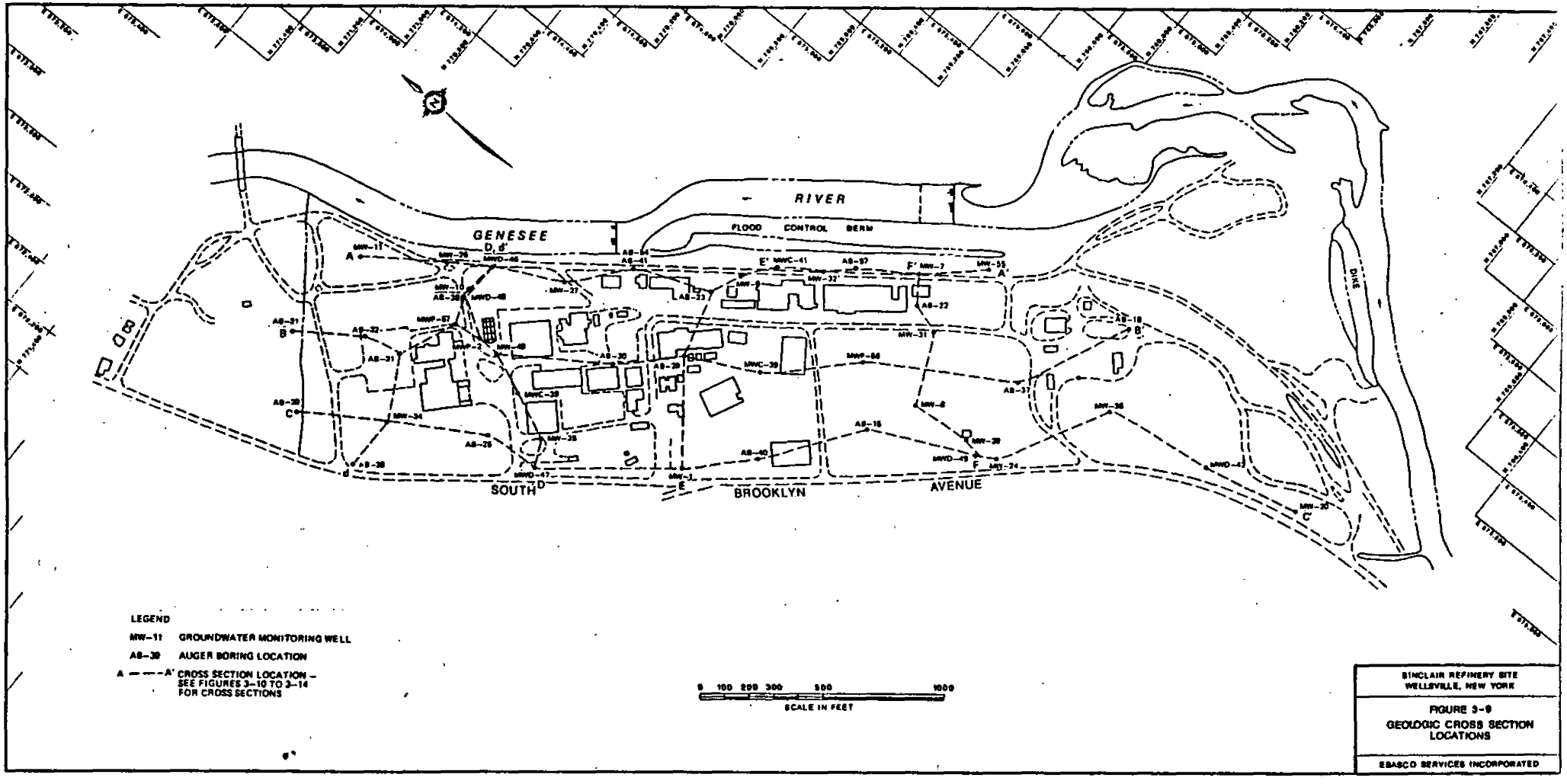
contrasts to data from wells MWD-66 and MWD-49, which were completed in sandier soils. No VOCs or BNAs were detected in well MWD-49, and only small quantities of VOCs (less than 30 ug/l total volatile organics, and none above SDWA MCLs or NYSDEC Groundwater Standards) were detected in well MWD-66 in the original sampling.

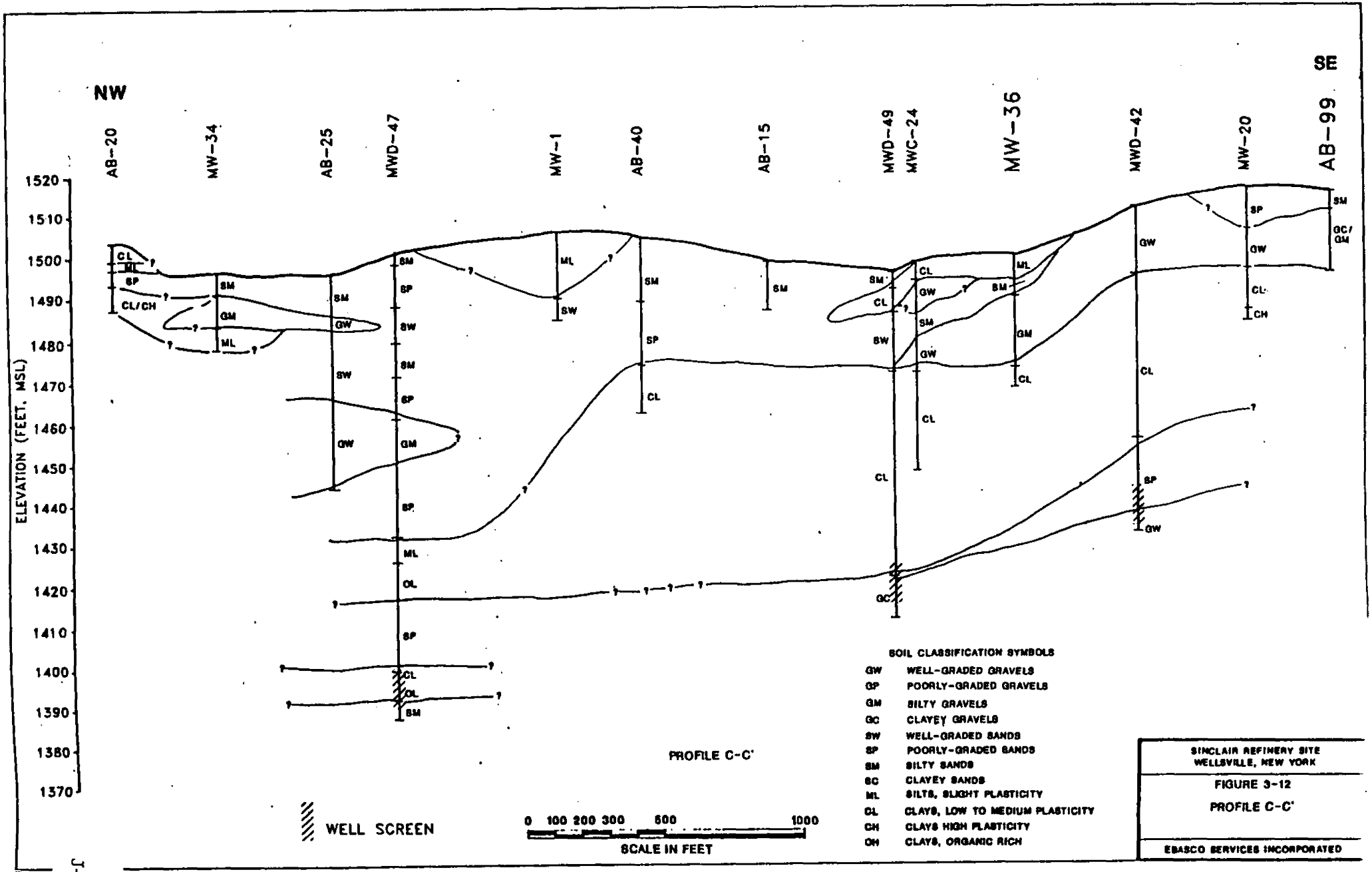
Upon resampling of MWD-47 and MWD-66 in September, 1990, no VOCs were detected in MWD-66 completed in the sandy zone, while the levels in MWD-47 had decreased from 1000 ppb to 35 ppb of xylene with other VOCs no longer detected. Well MWD-47, is one of the wells completed in a clay layer.

MWD-47 and MWD-66 are installed adjacent to each other, and MWD-47 is completed in a deeper zone than MWD-66. It is unlikely that contamination could migrate from the shallow aquifer to MWD-47, without being detected in MWD-66. The fact that contamination is present in MWD-47, but not in MWD-66 is consistent with the idea that the contamination in MWD-47 was introduced during the drilling program and is not indicative of deep aquifer contamination.

The information presented above demonstrates the presence of an upward hydraulic gradient at the site. A laterally continuous clay layer at least 30 feet thick is present beneath the entire site and the underlying deep aquifer appears to be limited to an area along the western portion of the site and other isolated pockets of sandy material. The analytical data indicate a reduction in contaminant concentration over time and concentrations are below SDWA MCLs and NYSDEC Groundwater Standards. Based on all of these factors and data it has been determined that the deep aquifer has not been significantly impacted.


RIVER
GENESEE
FLOOD CONTROL BERM
DIKE
SOUTH
BROOKLYN
AVENUE
SCALE IN FEET
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK
FIGURE 3-5
DEPTH TO GLACIOLACUSTRINE CLAY LAYER
EBASCO SERVICES INCORPORATED


RIVER
GENESEE
FLOOD CONTROL BERM
DIKE
SOUTH
BROOKLYN
AVENUE
LEGEND
MW-11 GROUNDWATER MONITORING WELL
AB-39 AUGER BORING LOCATION
A ——— A' CROSS SECTION LOCATION – SEE FIGURES 3-10 TO 3-14 FOR CROSS SECTIONS
0 100 200 300 500 1000
SCALE IN FEET
SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK
FIGURE 3-9
GEOLOGIC CROSS SECTION LOCATIONS
ESASCO SERVICES INCORPORATED

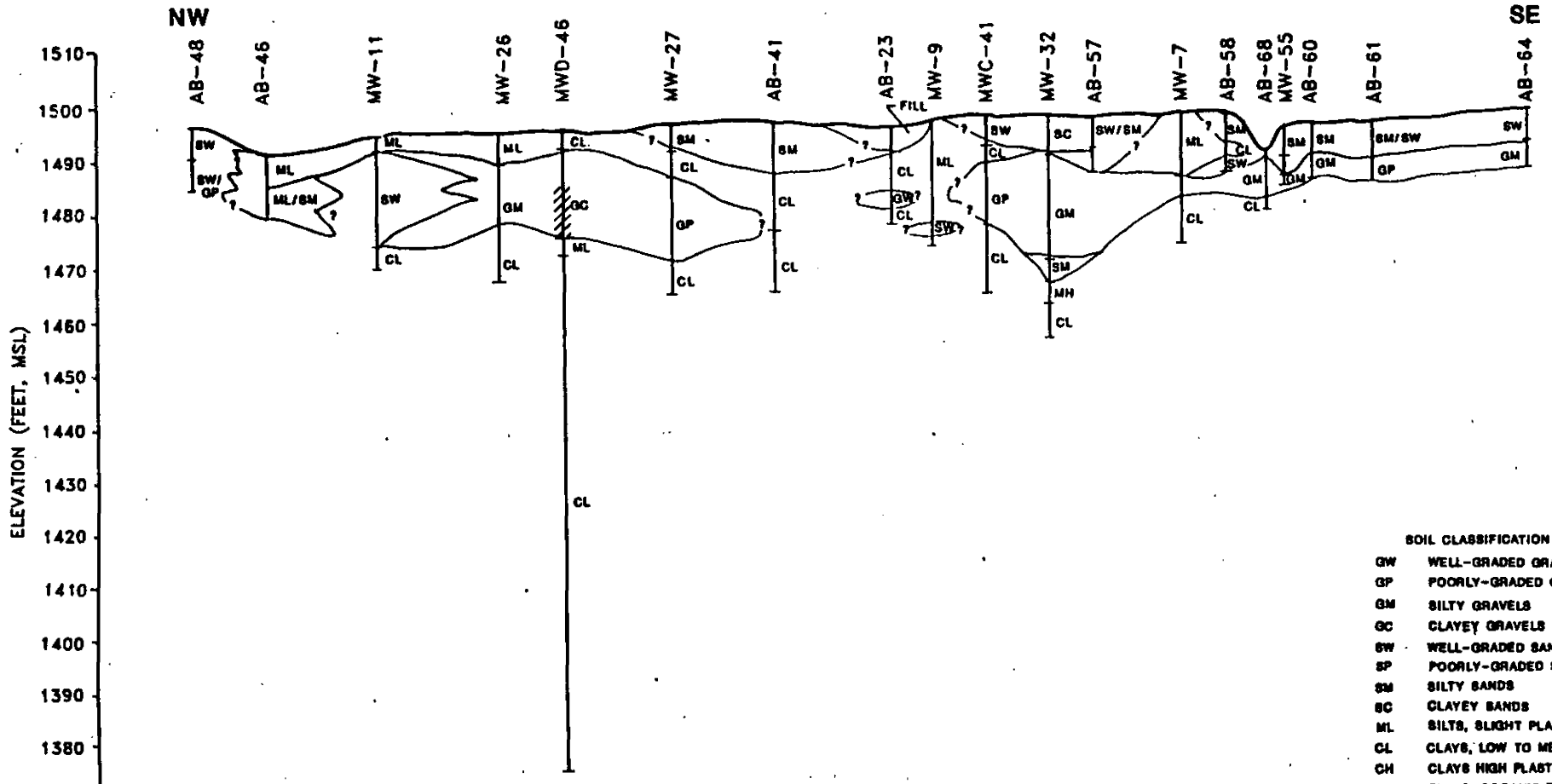


SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

FIGURE 3-12

PROFILE C-C'

EBASCO SERVICES INCORPORATED

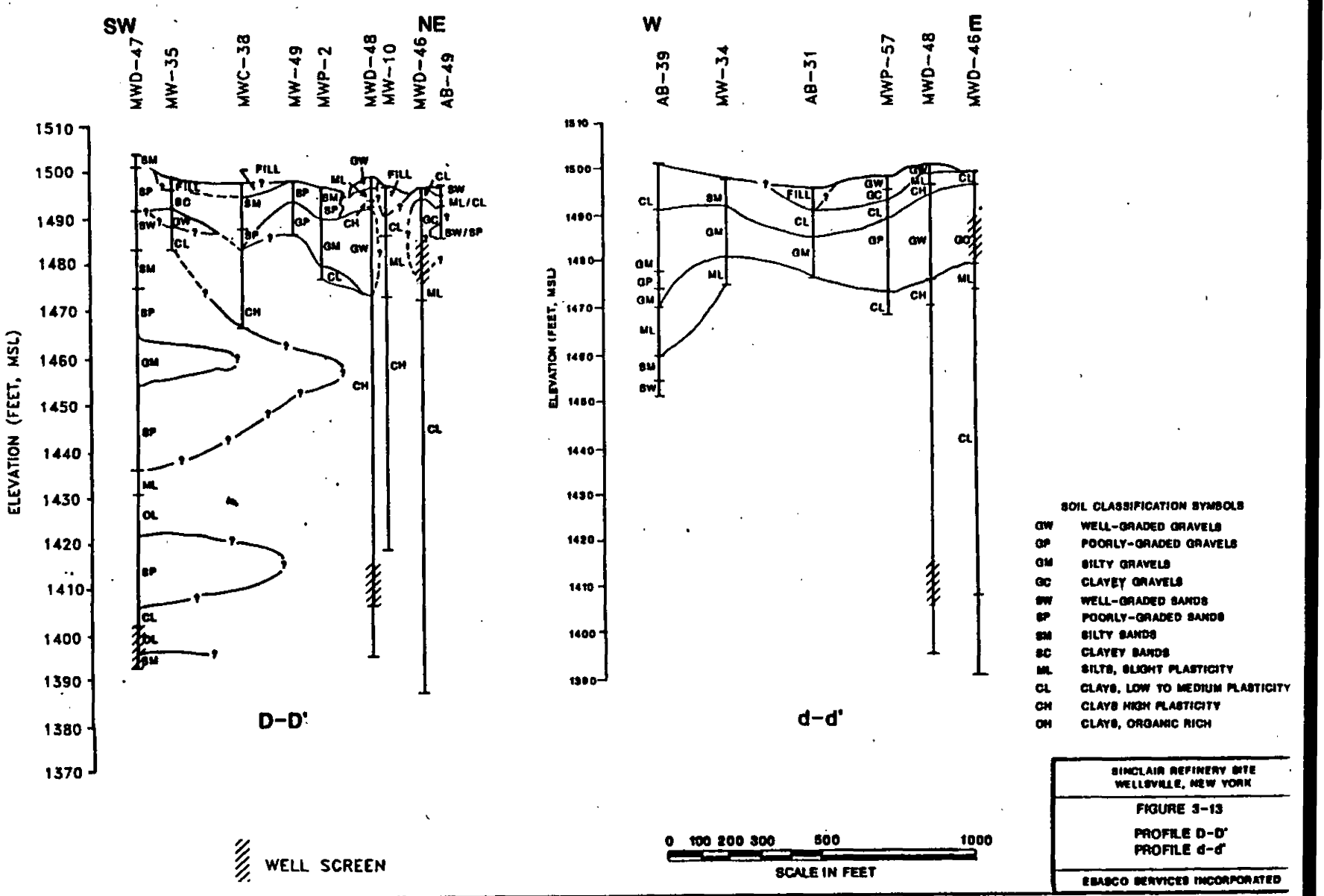


SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

FIGURE 3-10

PROFILE A-A'

EBASCO SERVICES INCORPORATED



SINCLAIR REFINERY SITE
WELLSVILLE, NEW YORK

FIGURE 3-13

PROFILE D-D'
PROFILE d-d'

EBASCO SERVICES INCORPORATED

TABLE 1

Piezometric Surface Differences
Shallow and Deep Wells

Deep Well	Water Level	Shallow Well	Water Level	ΔH
MWD-45	1498.23	MW-65	1492.04	6.1 ↑
MWD-45	1498.23	MW-16	1491.41	6.2 ↑
MWD-47	1503.93 (TOC)	MW-35	1490.33	13.6 ↑
MWD-66	1503.82 (TOC)	MW-52	1492.93	10.89 ↑
MWD-48	1501.65	MW-10	1483.65	18.0 ↑
MWD-48	1501.65	MWP-57	1484.66	16.99 ↑

TOC = Flowing Well, Water Level is Top Of Casing

TABLE 2

"Deep" Well Groundwater Data
(ug/l)

	MWD-47 (1)		MWD-66 (2)		MWD-48 (1)	MWD-49 (2)
	12/86	9/90	1/89	9/90	12/86	12/86
Compounds Detected						
Total xylene	1000	35	17.5 (3)	ND	ND	ND
Toluene	36		6 (4)	ND	ND	ND
Acetone	89C	ND	6JB (5)	ND	ND	ND
Ethylbenzene	36	ND	ND	ND	ND	ND
Trans-1, 2-Dichloroethene	ND	ND	ND	ND	1.5E	ND
Benzene	ND	ND	ND	ND	5.9E	ND
Chloroform	ND	ND	ND	ND	0.7E	ND
Napthalene	28	NA	NA	NA	2.7E	ND
4-Chloroaniline	28	NA	NA	NA	ND	ND
2-Methylnaphthalene	33	NA	NA	NA	11	ND
Benzo(a)pyrene	ND	NA	NA	NA	10	ND
Di-ni-Octyl Phthalate	ND	NA	NA	NA	3.1E	ND

(1) Completed in Clay
(2) Completed in Sand and Gravel
(3) Average of Duplicates, 15 and 20 ppb
(4) Duplicates of ND and 6 ppb
(5) Duplicates of 5 and 6 ppb
ND - Not Detected
NA - Not Analyzed
E - Estimated
C/B - Blank Contamination

DEEP WELL SAMPLING PROGRAM

SINCLAIR REFINERY SITE

WELLSVILLE, NEW YORK

Based on discussions between ARCO and EPA at the September 13, 1990 project meeting, and as directed by ARCO, Ebasco sampled several deep aquifer monitoring wells both on-site and off-site in the vicinity of the Sinclair Refinery site. This letter report summarizes the results of the sampling program.

On September 20, 1990, Ebasco collected groundwater samples from the following locations:

Sample	Location
SR-GW-01	ABB/CE Preheater (shallow well, tap in pumphouse)
SR-GW-02	ABB/CE Preheater (deep well, tap in pumphouse)
SR-GW-03	Residential (Laughlin home, tap before filter)
SR-GW-04	Schoolbus Garage (bathroom sink tap)
SR-GW-47	MWD-47 (Refinery area well, installed by SMC Martin in November, 1986)
SR-GW-66	MWD-66 (Refinery area well, installed by Ebasco in December, 1988)

Additional details pertaining to each of these wells are provided in Table 1.

The samples were collected in accordance with the procedures defined in the Field Sampling and Analysis Plan (FSAP) for the site approved by EPA in October 1988. Tap samples were obtained after flushing for at least 15 minutes and well samples were collected after bailing for about 2 hours. Quality assurance samples (i.e., matrix spike/matrix spike duplicate, field blank and trip blank) were also collected.

Each sample was analyzed following EPA CLP Protocol for Target Compound List (TCL) volatile organic compounds by Versar Laboratories, Incorporated, the same laboratory used during Ebasco's field investigation in 1988-1989 (Phase IIB). The analytical results are presented in Table 2. The data were validated by Ebasco using relevant sections of the EPA Region II Data Validation SOP HW-6 (Revision 6, March 1989). All sample analytical results were found to be acceptable and valid with no qualifications required.

TABLE 1

MONITORING WELL DETAILS

SAMPLE ID	LOCATION	DEPTH OF BOREHOLE	SCREENED INTERVAL	CASING	DRILLER/ YEAR	OTHER INFORMATION
SR-GW-01	ABB/CE Preheater, tap in pumphouse	50 ft. (shallow well)	10 ft (from 40-50ft), gravel and sand	Double cased; 8 in. ID to 42 ft 7 in, 12 in. OD to 40 ft 9 in	Ehmke Well Drillers, around 1950	Facility Well No. 2, used for drinking water after chlorination. Submersible pump. Sampled as additional shallow background well.
SR-GW-02	ABB/CE Preheater, tap in underground pumphouse accessible by manhole	233 ft. (below well pit floor)	Unknown, shale bedrock	6 in. dia.	Ehmke Well Drillers, 1950	Facility Well No. 1, used for drinking water after chlorination. Submersible pump.
SR-GW-03	Residential (Laughlin home, tap before filter)	365 ft.	Unknown, probably bedrock	6 in. dia.	Howard LaBar, 1946/47	Provides drinking water for 4 homes. Residents report complaints about "septic" smell. Hydro pneumatic pump tank and Culligan automatic water conditioner.
SR-GW-04	Schoolbus Garage (bathroom sink tap)	146 ft.	Bottom of screen at 100 ft, probably bedrock	6 1/4 in. dia.	1940's	Well located in crawl space behind storage room. Provides water for drinking, showers, washing buses, etc.
SR-GW-47	MWD-47 (Refinery area well)	110 ft.	10 ft (from 100-110 ft), silty clay to silty sand	2 in. dia.	Empire, 1986	Installed during SMC Martin's Phase IIa field investigation. Difficult to develop due to low yield.
SR-GW-66	MWD-66 (Refinery area well)	110 ft.	10 ft (from 82.1-92.1 ft), sands and gravels	Double-cased; 2 in. ID to 92.1 ft, 6 in. OD to 74 ft	Earth Dimensions, 1988	Installed during Ebasco's Phase IIb field investigation as replacement deep well for MWD-47. Flowing (artesian) well, located about 50 ft from MWD-47.

TABLE 2

ANALYTICAL RESULTS FOR GROUNDWATER SAMPLES COLLECTED 9/20/90
CONCENTRATIONS IN ug/l (ppb)

COMPOUND	SR-GW-01	SR-GW-02	SR-GW-03	SR-GW-04	SR-GW-47	SR-GW-66	FIELD BLANK	TRIP BLANK
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	ND	ND	ND	ND	ND	ND	90 B	ND
Carbon disulfide	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethene (total)	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND
Total xylenes	ND	ND	ND	ND	35	ND	ND	ND

NOTES: ND = NOT DETECTED
B = POSSIBLE/PROBABLE BLANK CONTAMINATION

Only the refinery area deep well installed by SMC Martin, MWD-47, had any volatile organic compounds present with a concentration of 35 ppb of total xylenes. The previous time this well was sampled (Phase IIa) it contained 1000 ppb total xylenes, 50 ppb toluene and 36 ppb ethylbenzene. As stated in the Remedial Investigation Report submitted to EPA by ARCO in May 1990, these contaminant levels were likely the result of cross-contamination between the shallow and deep aquifer caused by well construction. The present level of total xylenes may be remnants of the original well construction cross-contamination or may be due to leakage through or along the outside of the galvanized casing, resulting in cross-contamination between the two aquifer systems.

When MWD-66, the replacement deep well installed by Ebasco, was sampled during Phase IIb it contained 17 ppb total xylenes and 4 ppb toluene. No volatile organic compounds were detected in this round of sampling indicating the dissipation of low levels of contamination which were probably introduced during installation despite more stringent well construction techniques than those used for MWD-47.

Table 3 presents the groundwater quality standards presented in this Feasibility Study Report. The level of total xylenes (35 ppb) measured in MWD-47 is below the New York State Department of Environmental Conservation (NYSDEC) groundwater quality standards guidance value of 50 ppb.

TABLE 3

SDWA MCLs AND NYSDEC GW QUALITY STANDARDS

Compound	SDWA MCLs (ppb)	NYSDEC GW Stds[1] (ppb)
Total Xylenes	NA	50 (G)
Toluene	2,000	50 (G)
Ethylbenzene	NA	50 (G)

Notes:

(G) = Guidance Value
NA = Not Applicable