

File Name: 9

QA-SULPHORHODAMINE B

Created: 12:58 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

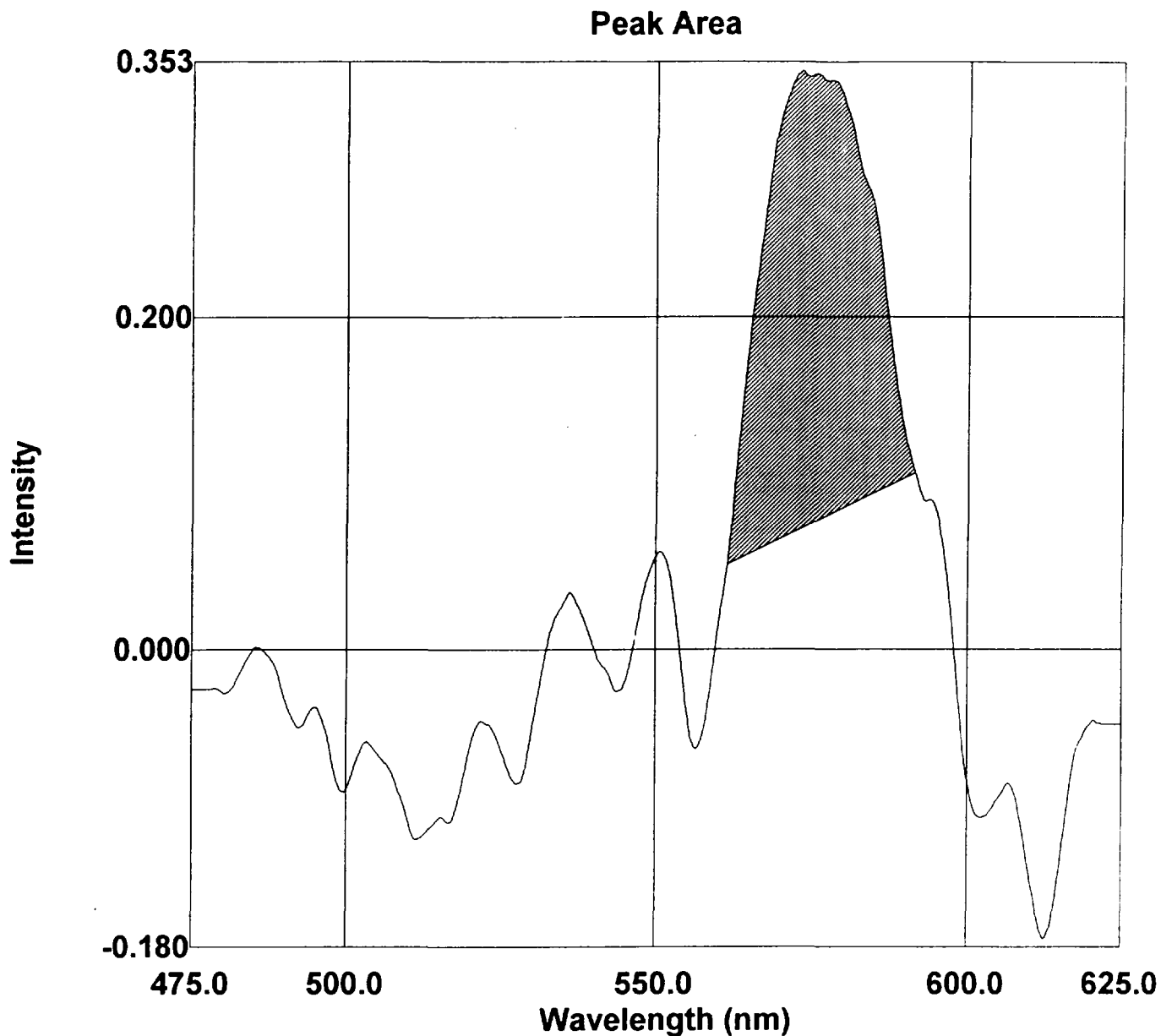
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 01 -- 10/9/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



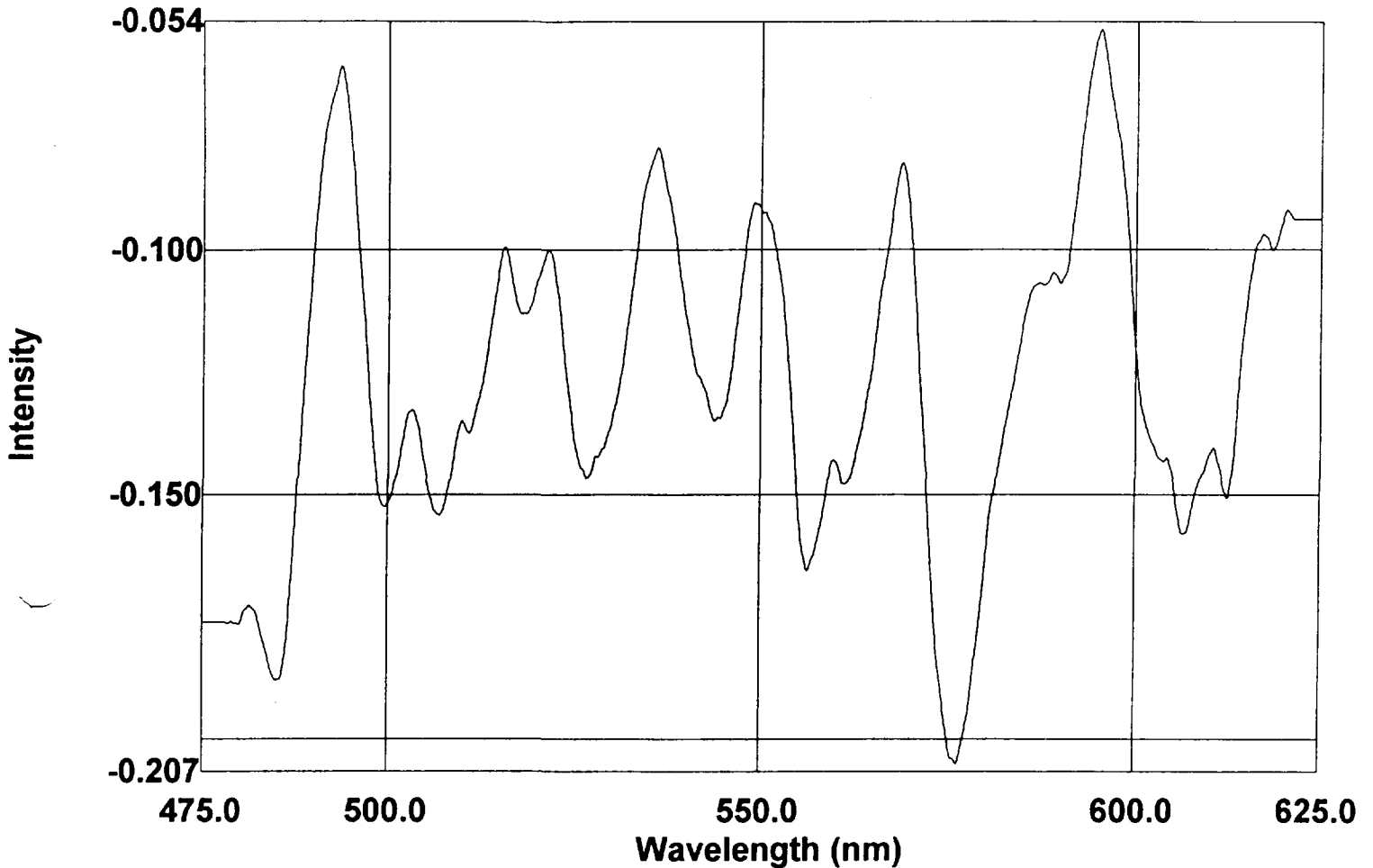
File Name: 9
QA-SULPHORHODAMINE B

Created: 12:58 10/28/96
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

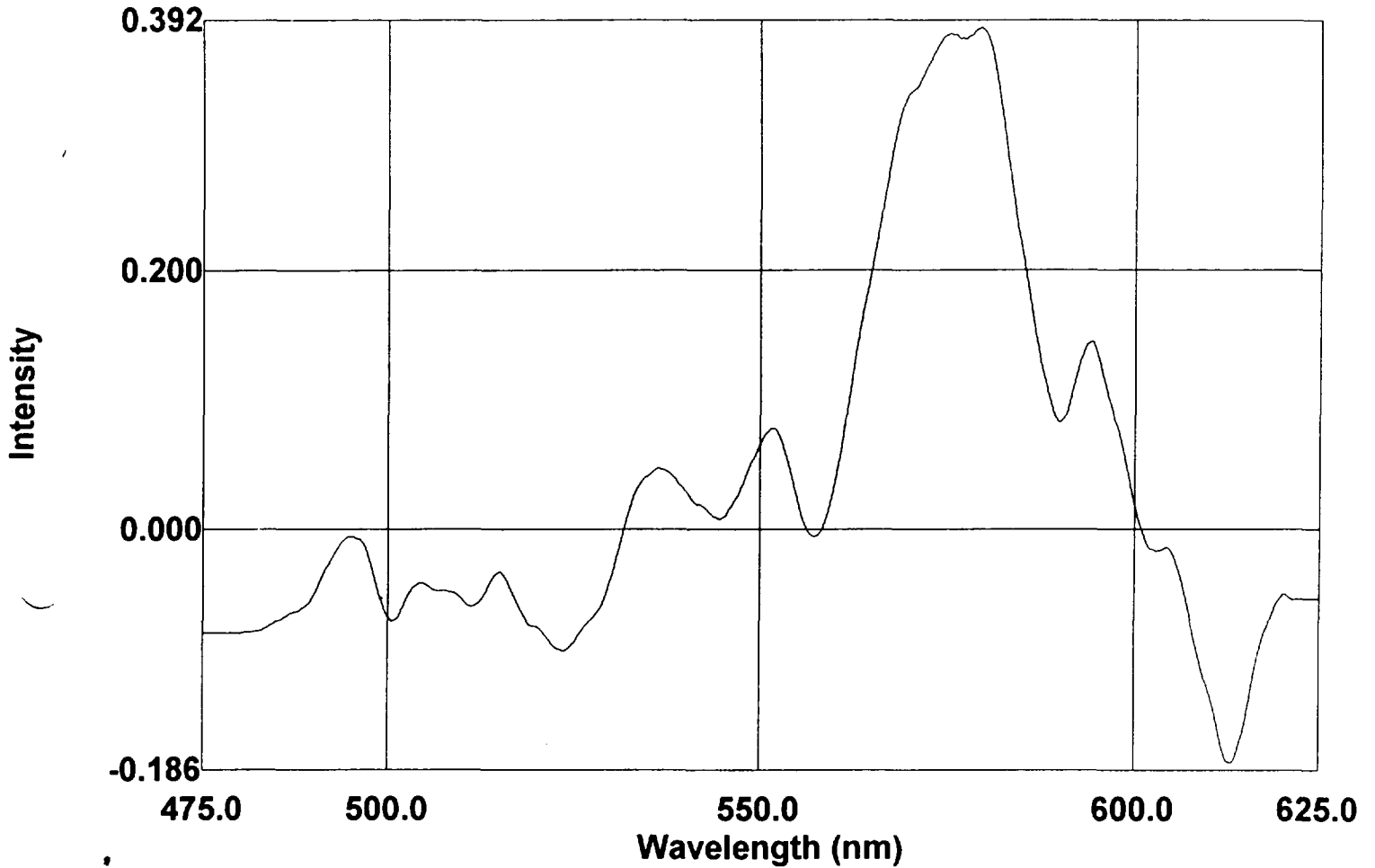
Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	5.417	1.065



File Name: 1
 QA-ELUENT
 Created: 13:01 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
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 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034
 SET 02 -- 10/16/96
 Samples Analyzed by:
 J. Kevin Patrick
 Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

reated: 13:02 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

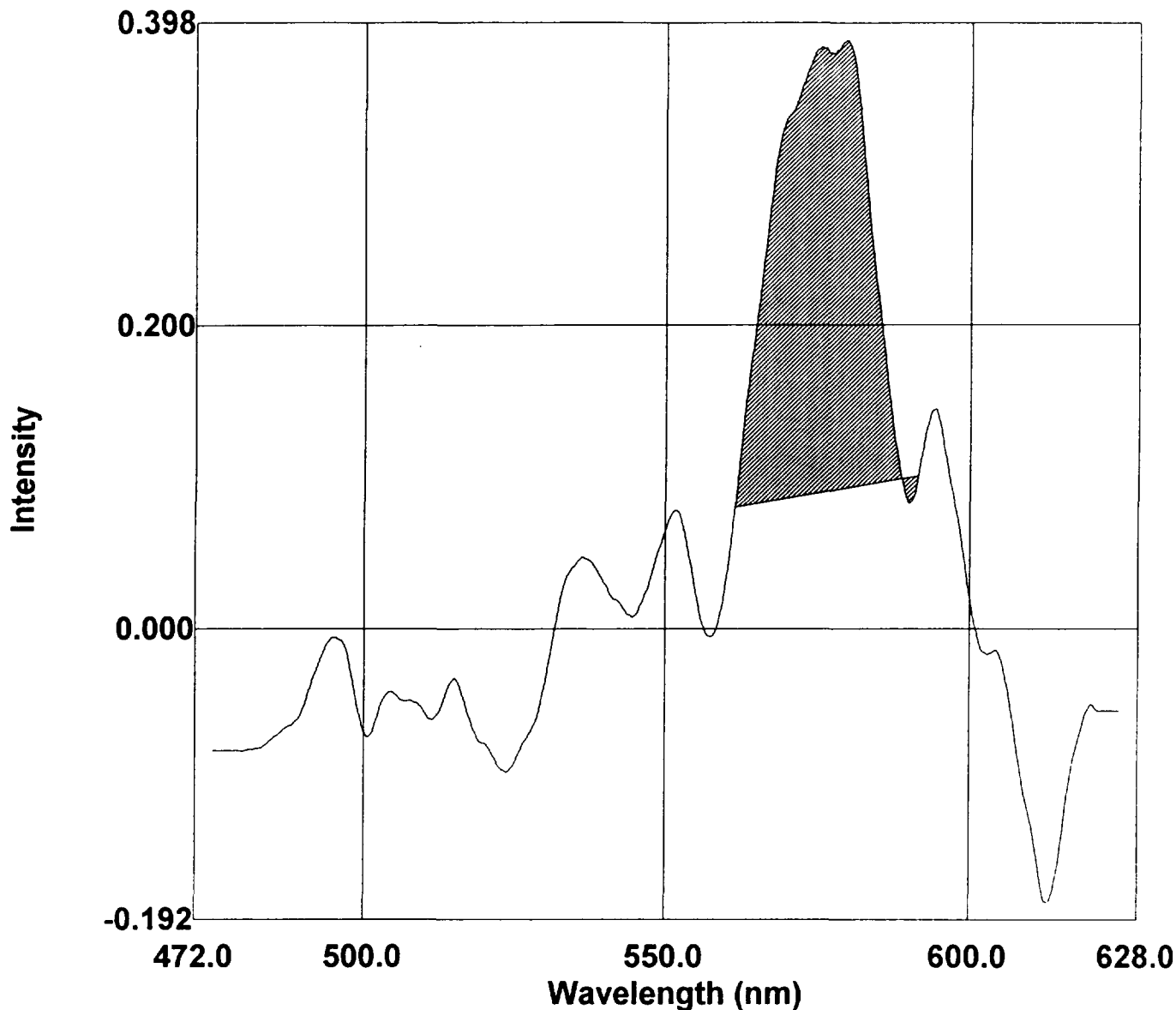
Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



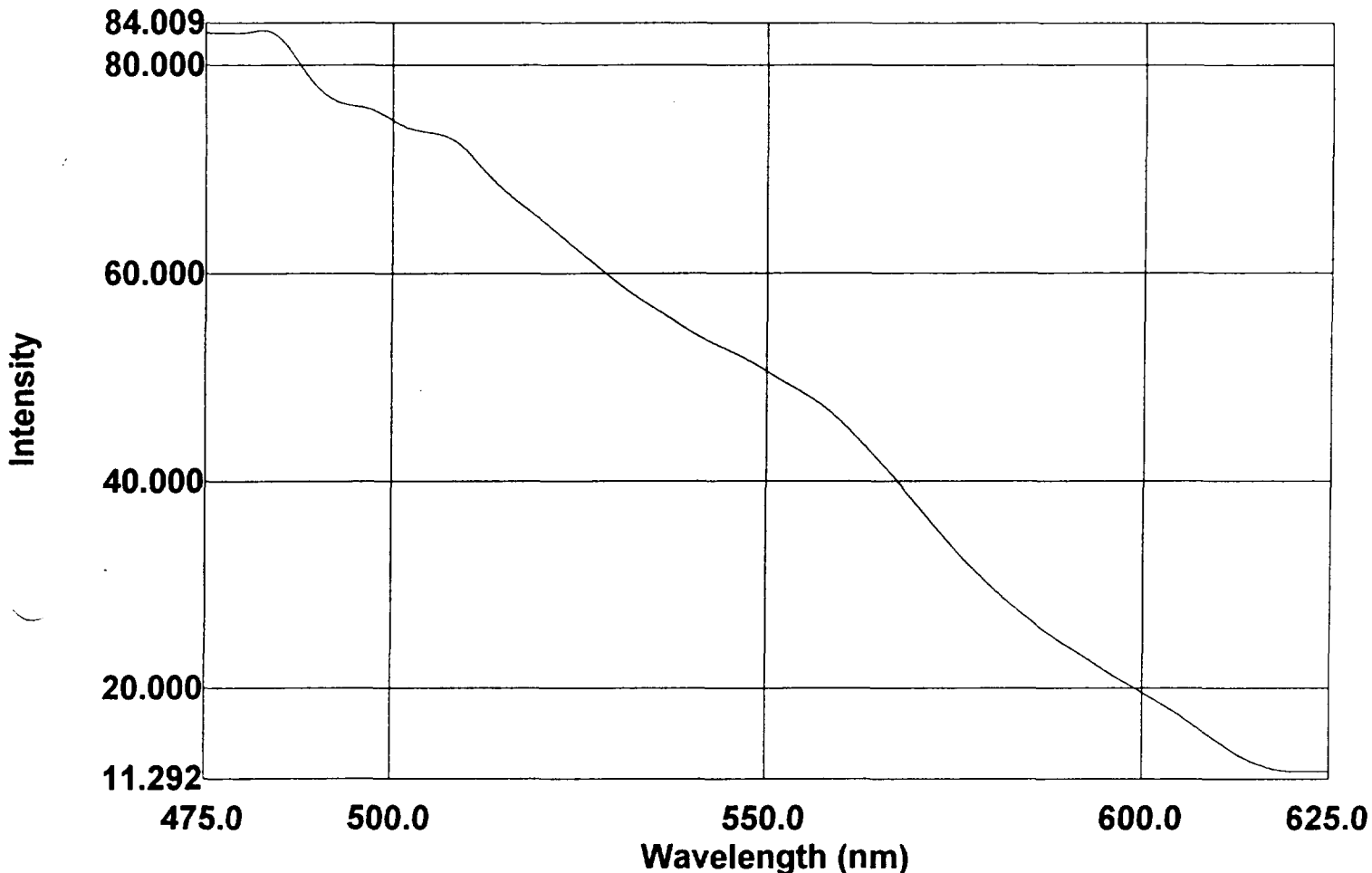
File Name: 2
QA-SULPHORHODAMINE B

Created: 13:02 10/28/96
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	5.192	1.021



File Name: 3

CW 6 EP

Created: 13:03 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

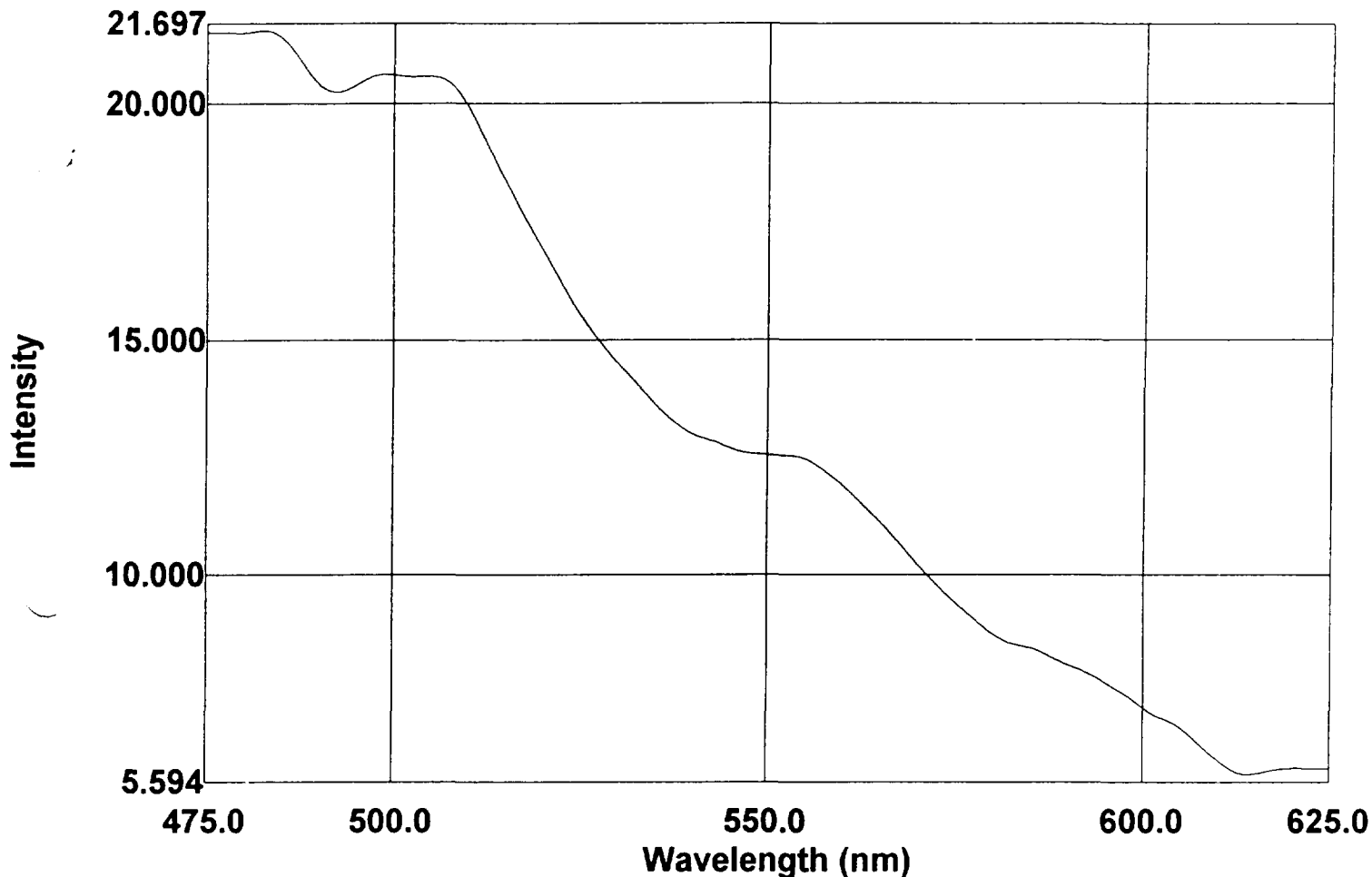
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4
 CW 19 EP
 Created: 13:04 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

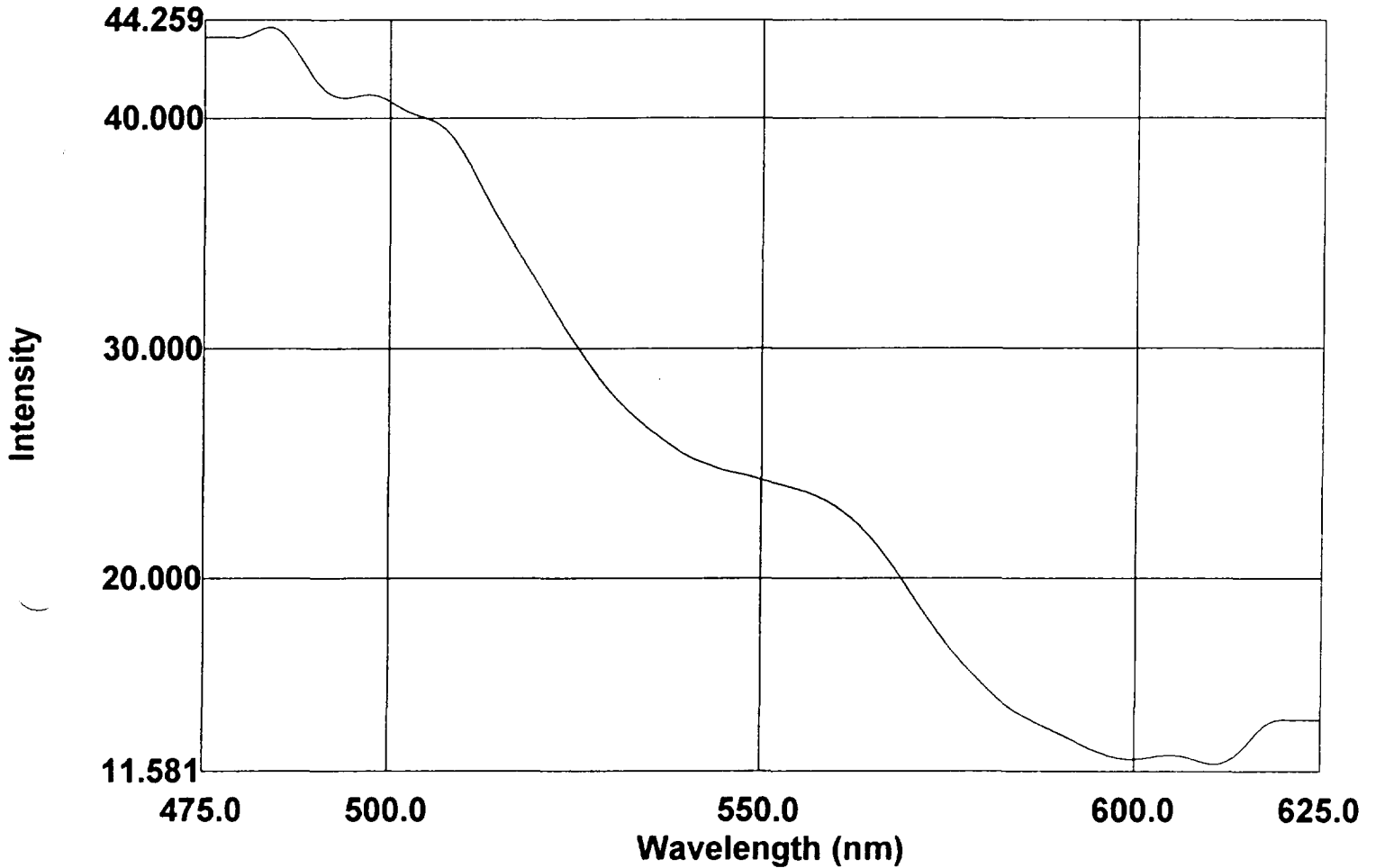
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5
 CW 31 EP
 Created: 13:05 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

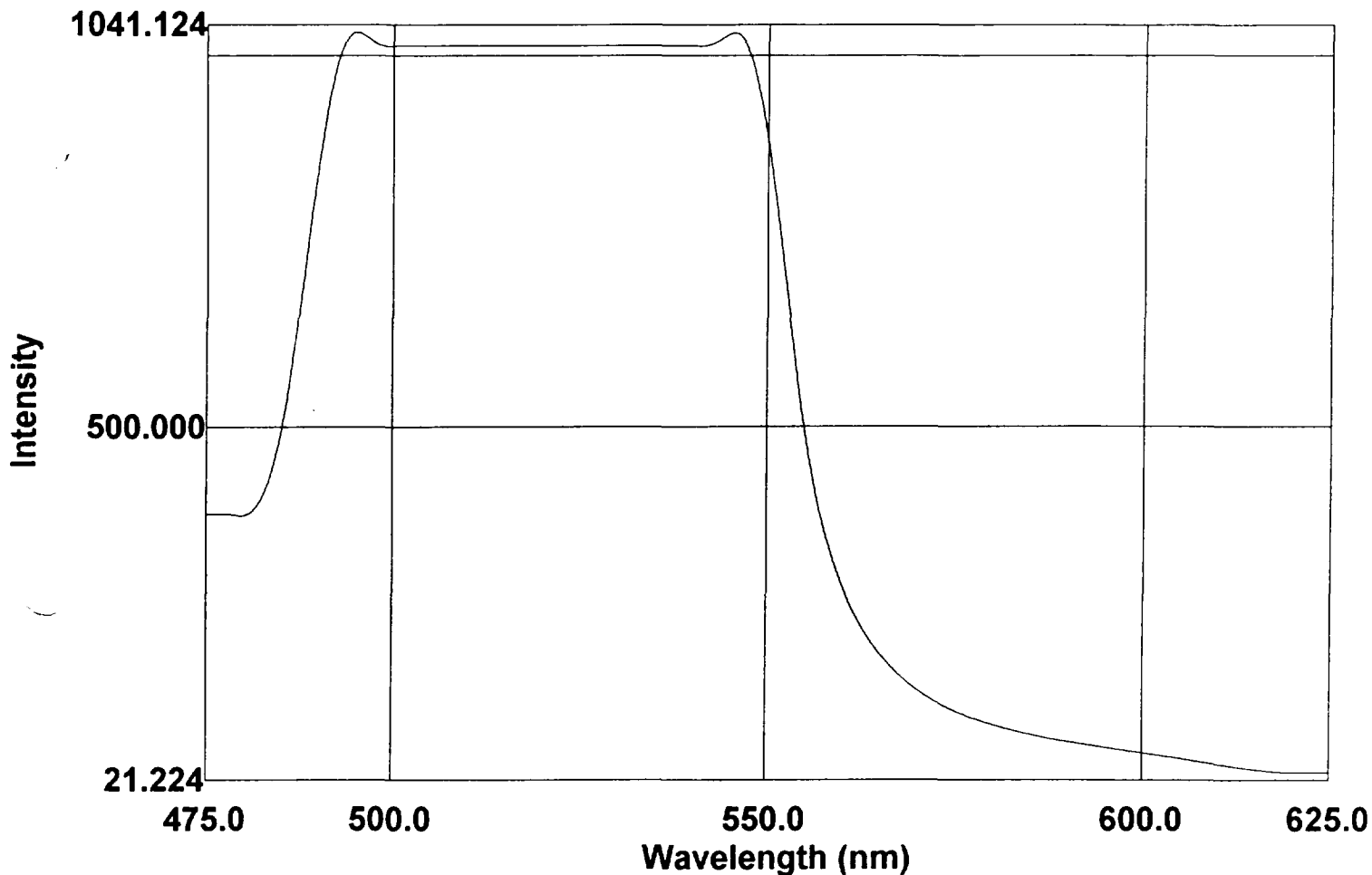
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6

CW 51 EP

Created: 13:06 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

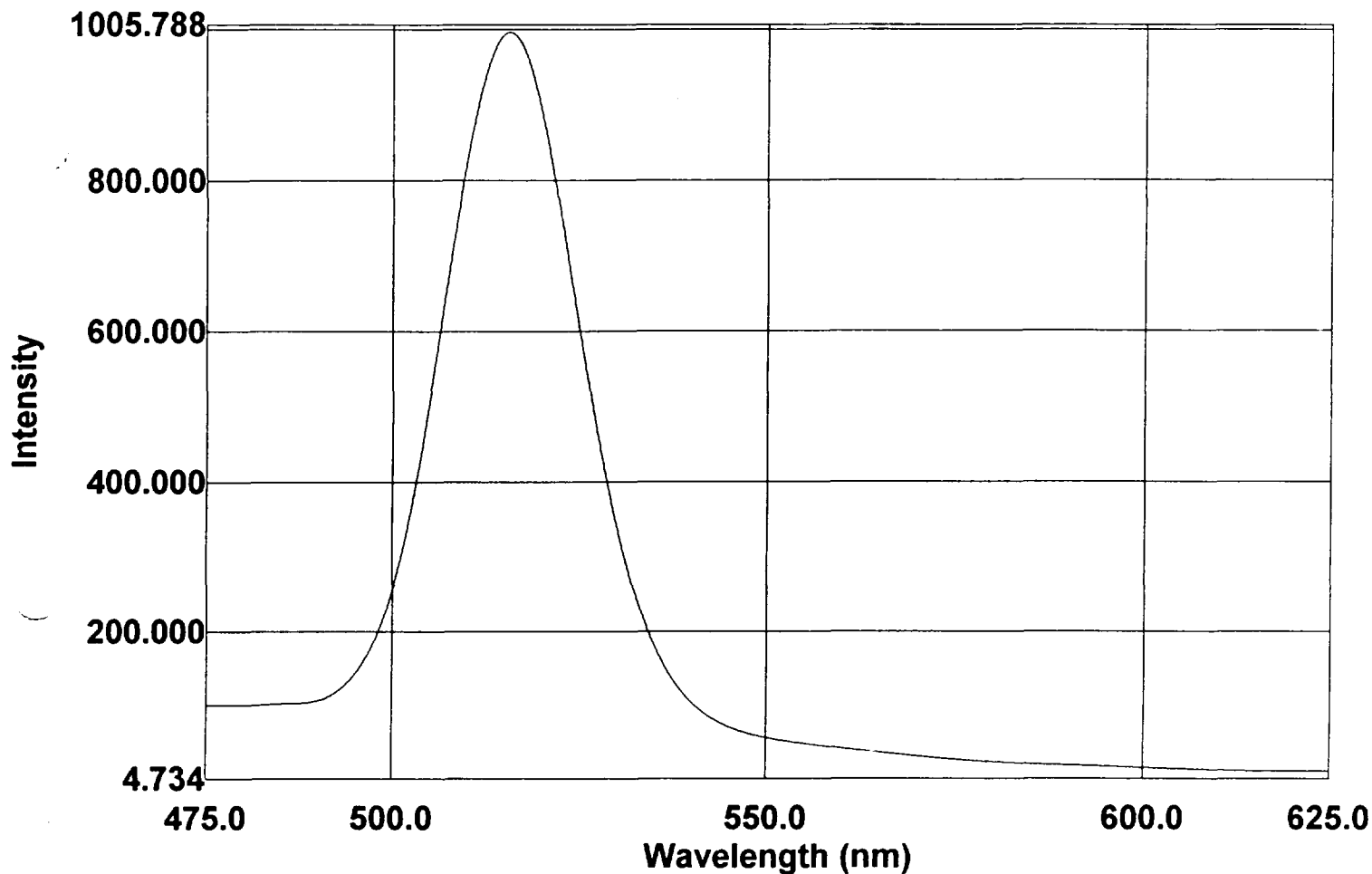
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7

CW 60 EP

reated: 13:06 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

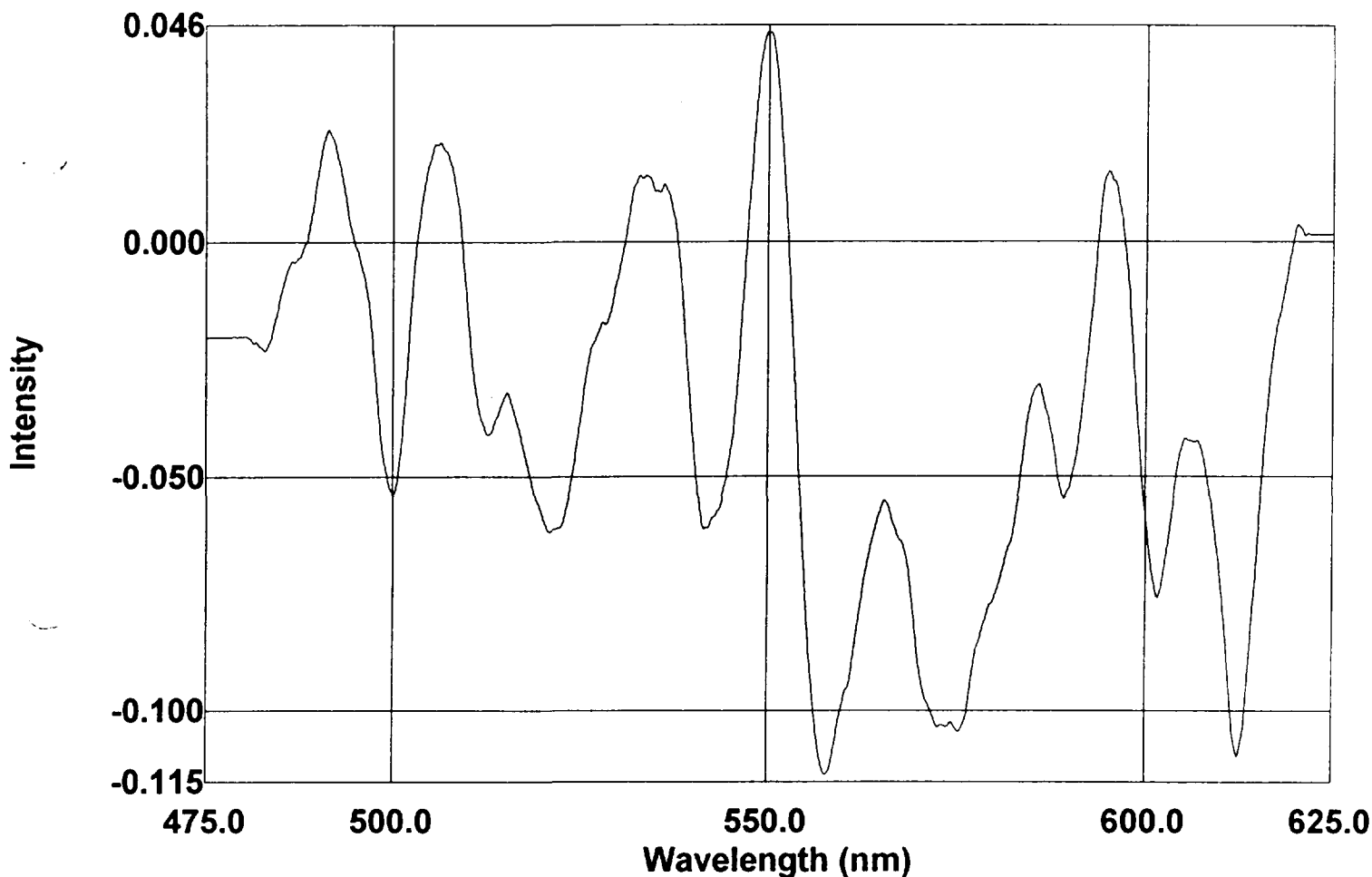
Crawford and Associates, Inc.
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 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT BLANK

Created: 13:07 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

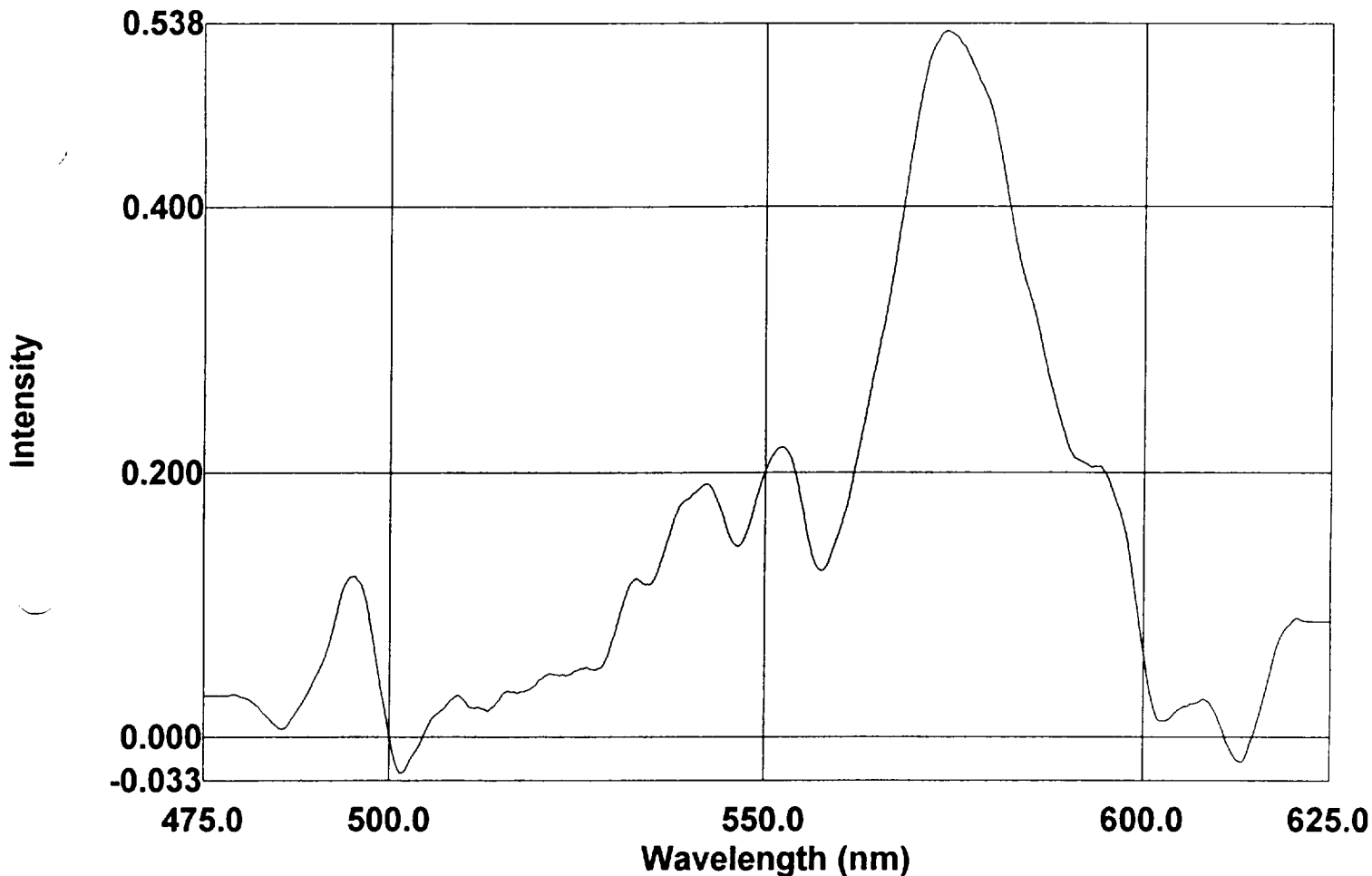
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 13:09 10/28/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

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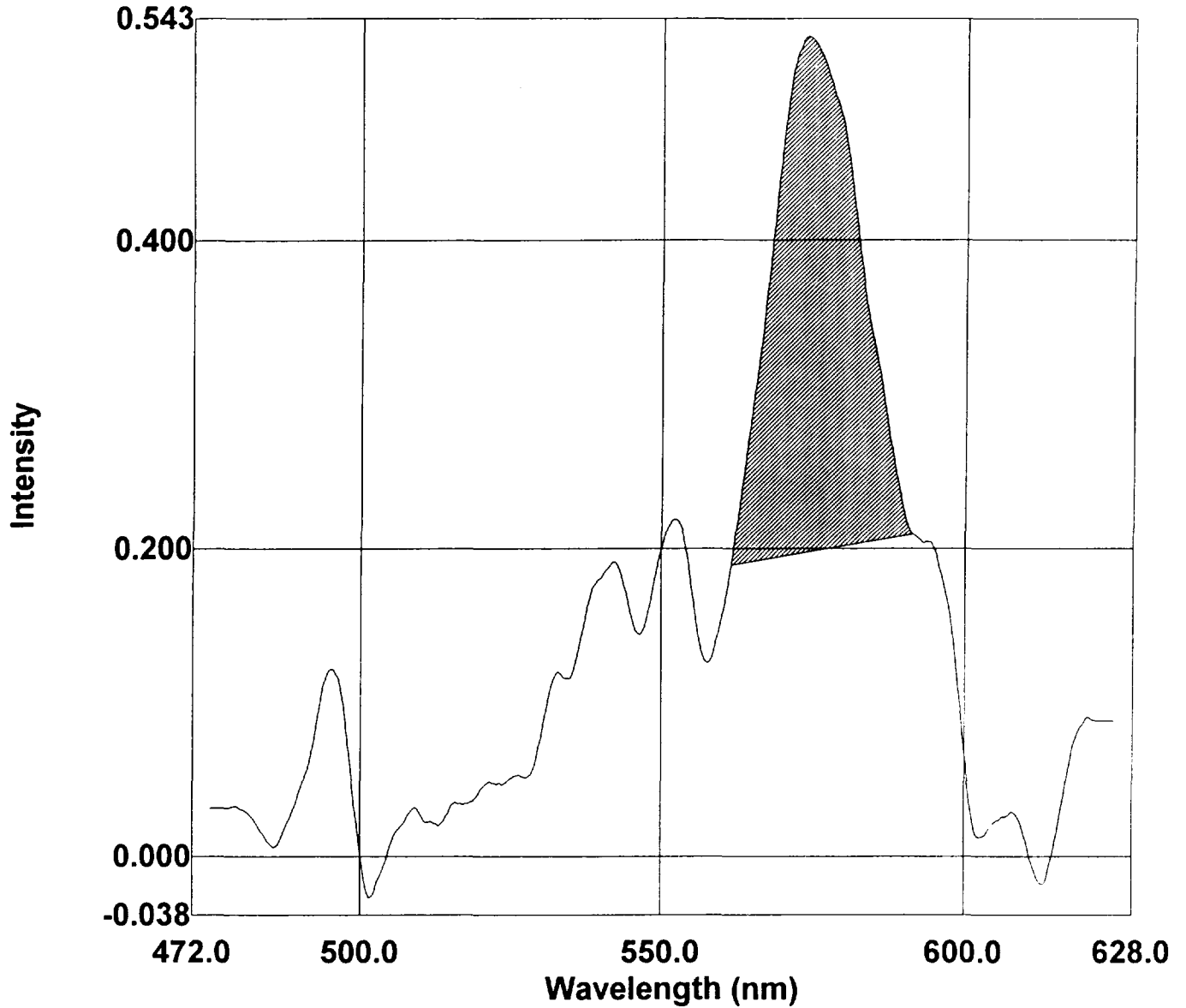
Michigan Chemical Complex Site 034

SET 02 -- 10/16/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



File Name: 9
QA-SULPHORHODAMINE B

Created: 13:09 10/28/96
Data: Modified

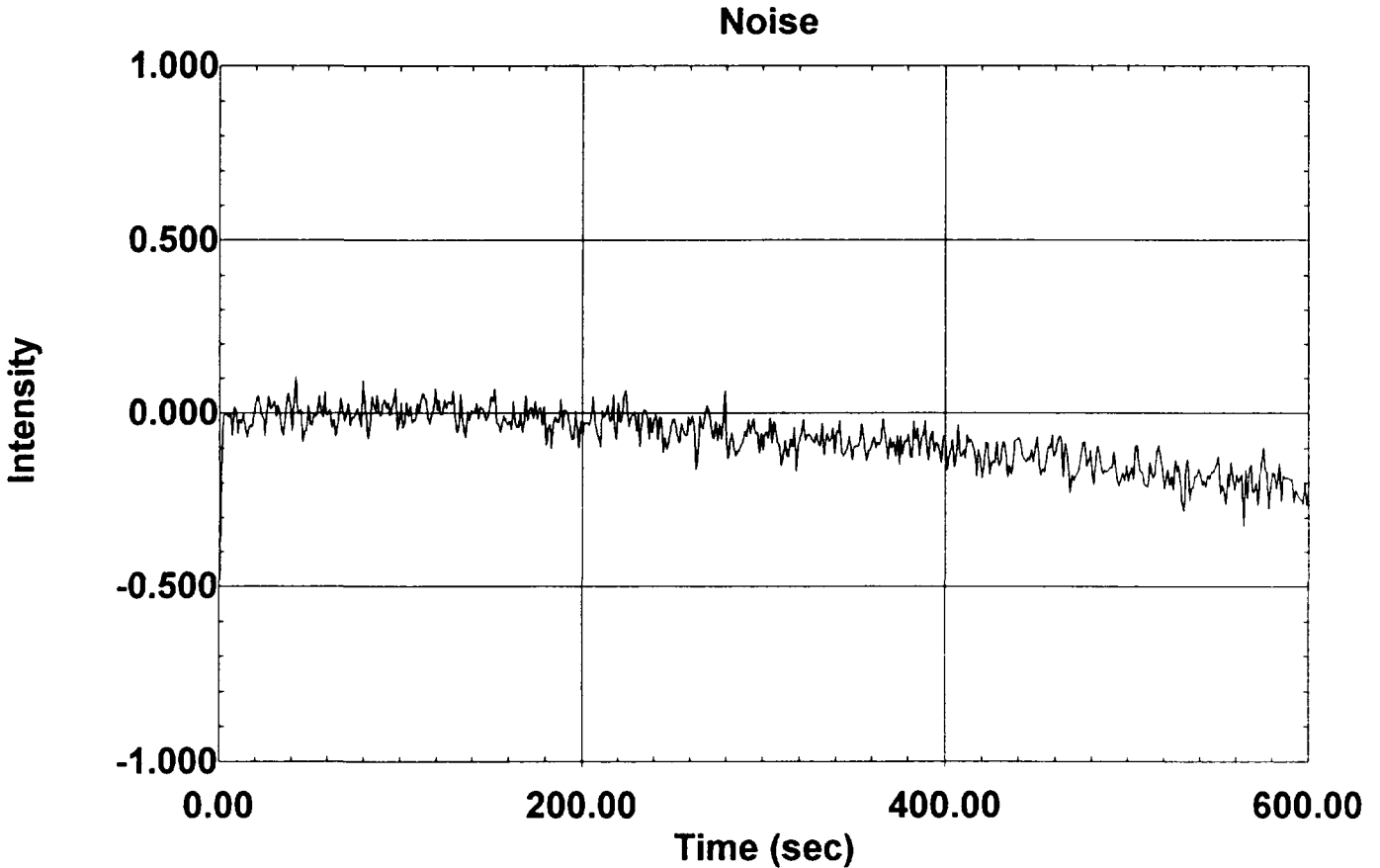
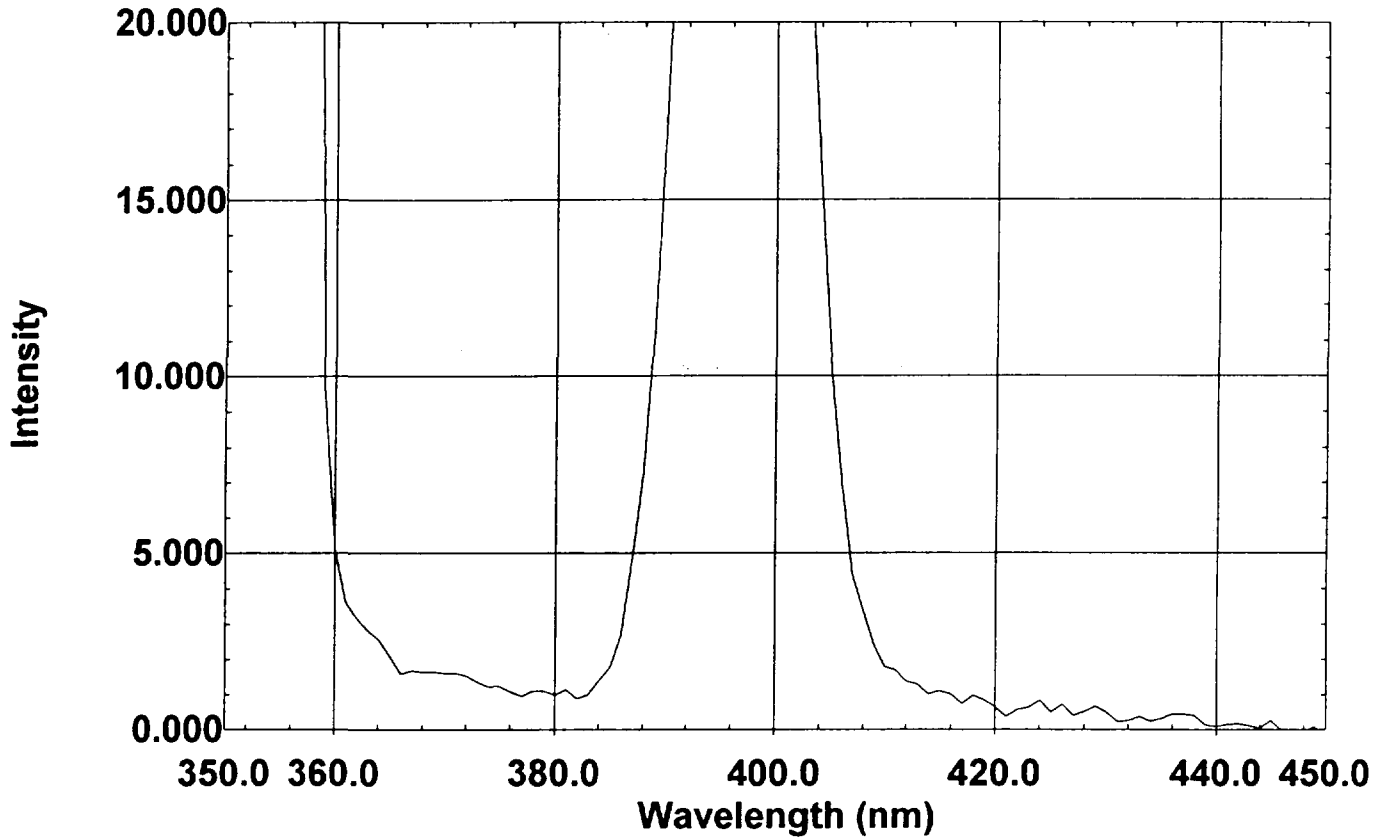
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	5.533	1.088

S/N Ratio Check

Raman Spectrum

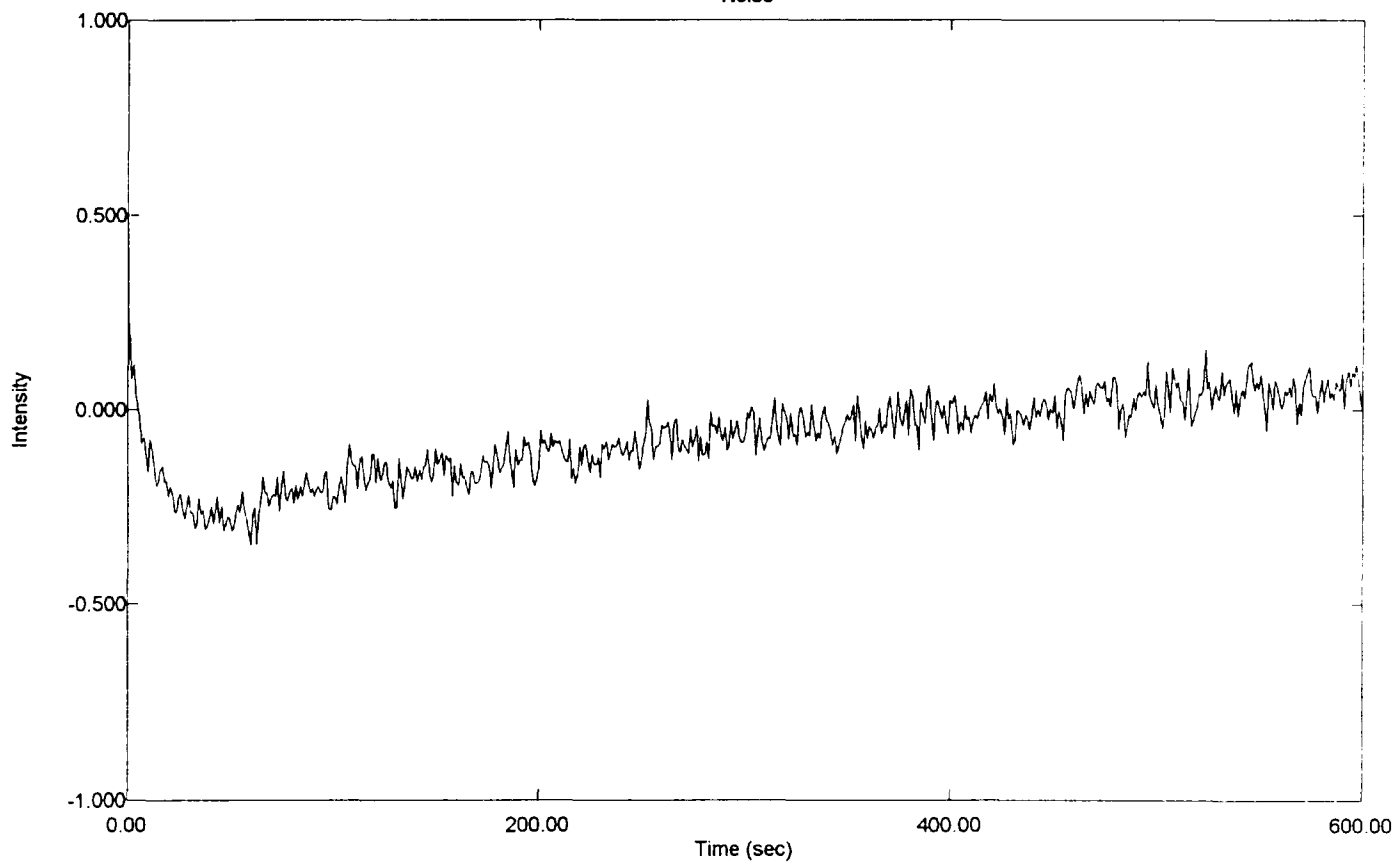
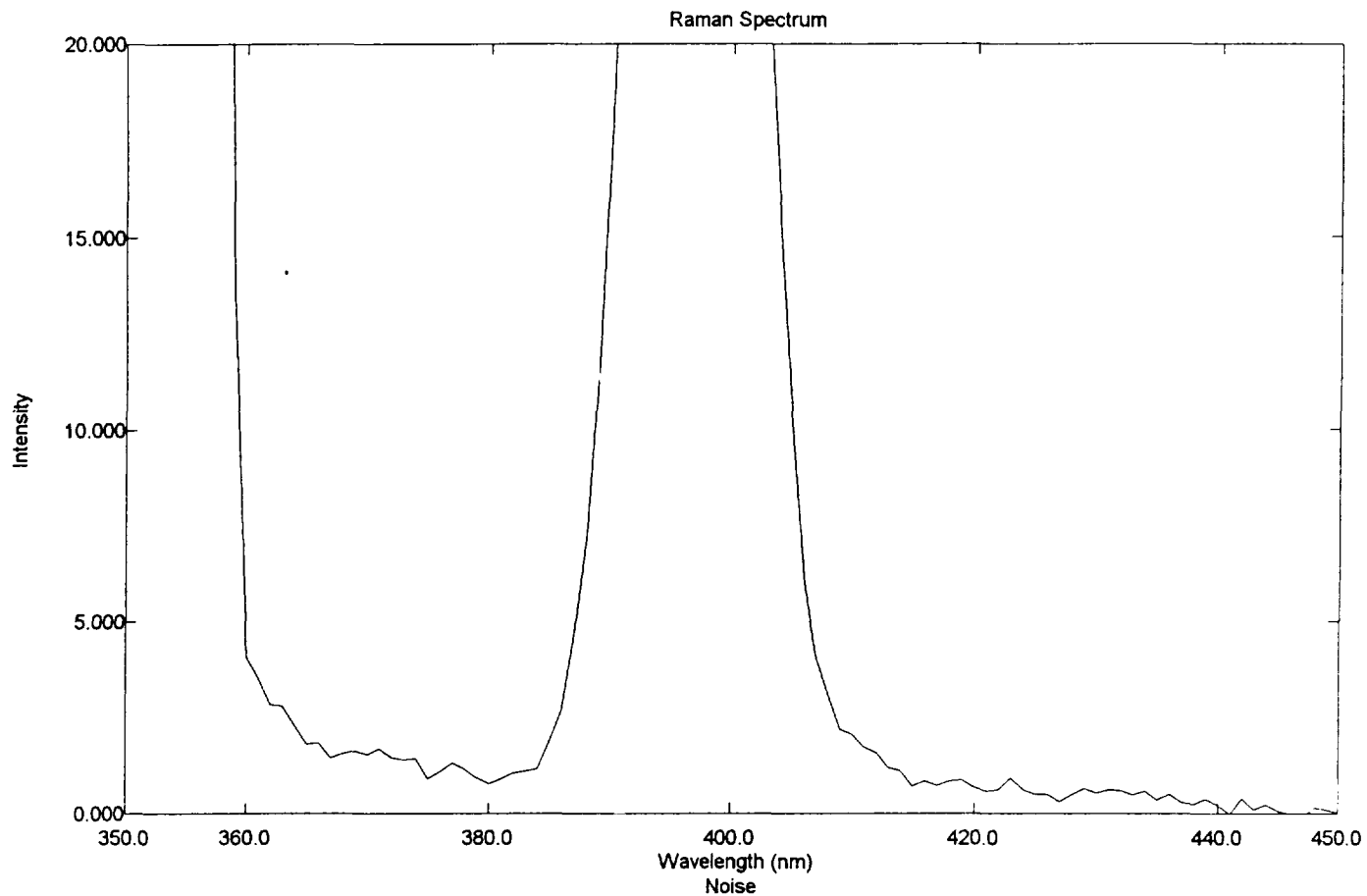


Instrument Serial Number: A401932000510D Printed: 15:33 10/28/96

Peak Height: 57.485

S/N Ratio: 482.932

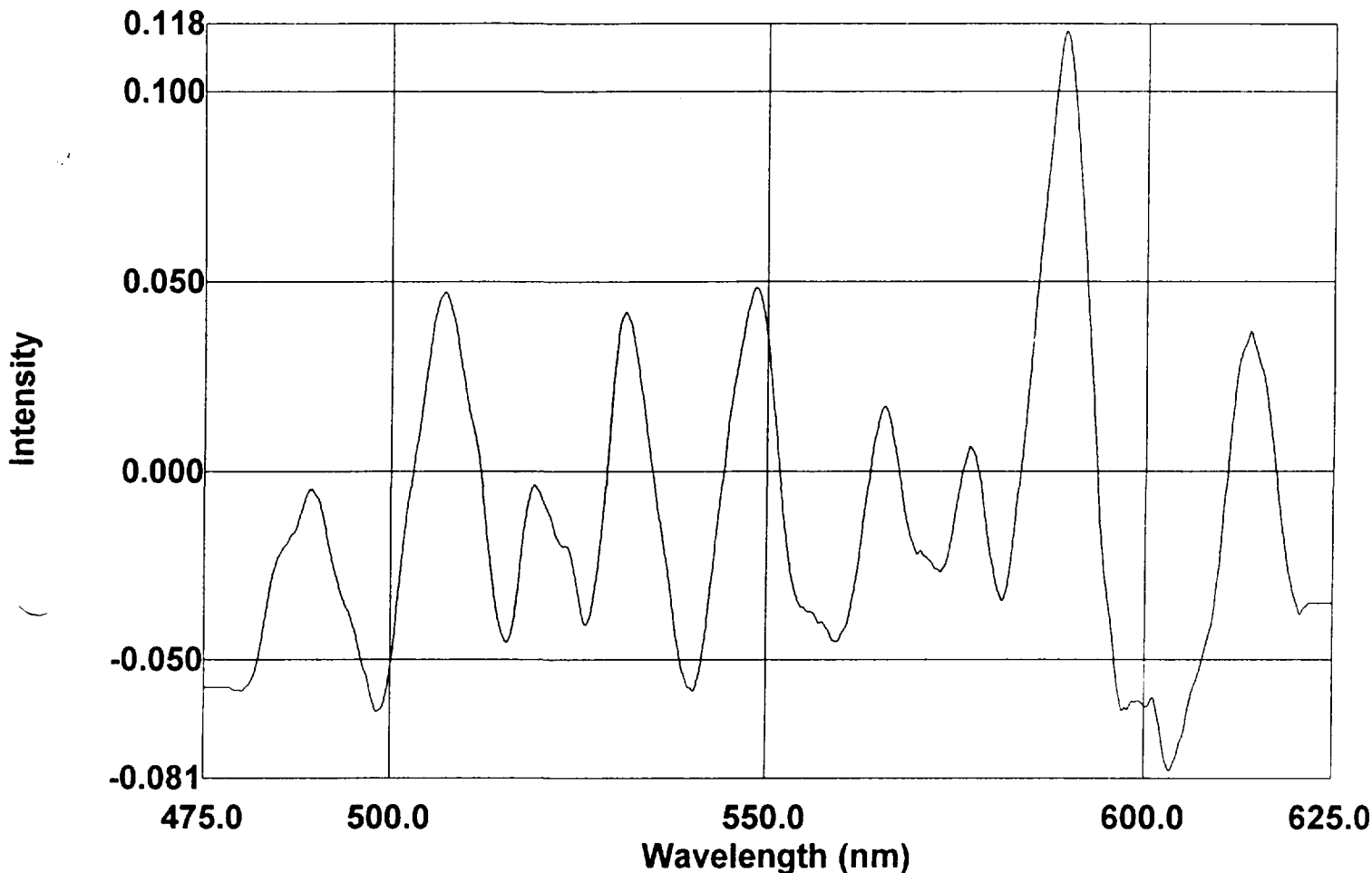
S/N Ratio Check



Instrument Serial Number: A401932000510D Printed: 12:39 11/04/96

Peak Height: 58.555

S/N Ratio: 498.058



File Name: 1
 QA-ELUENT
 Created: 12:44 11/04/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

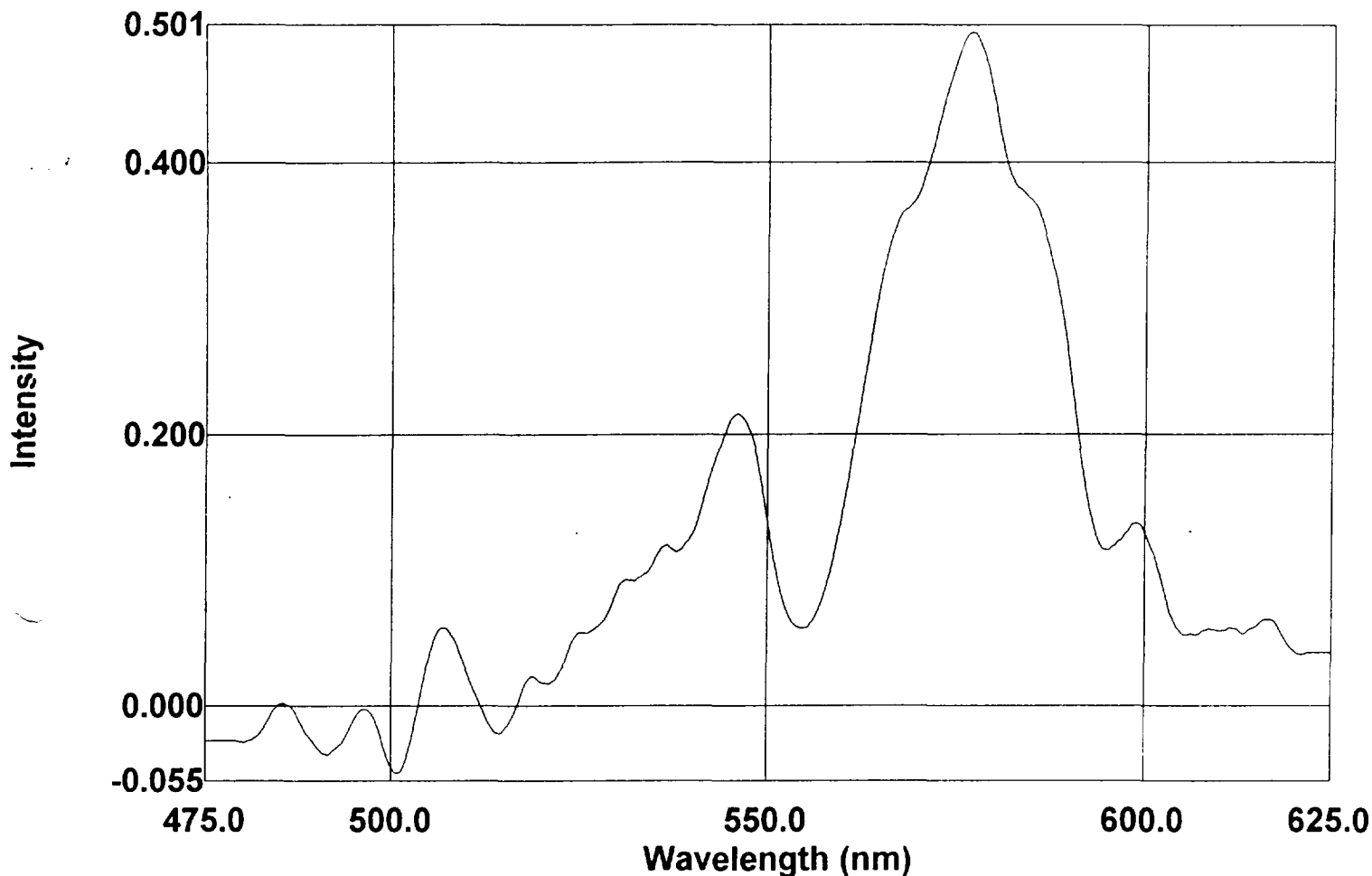
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 12:46 11/04/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

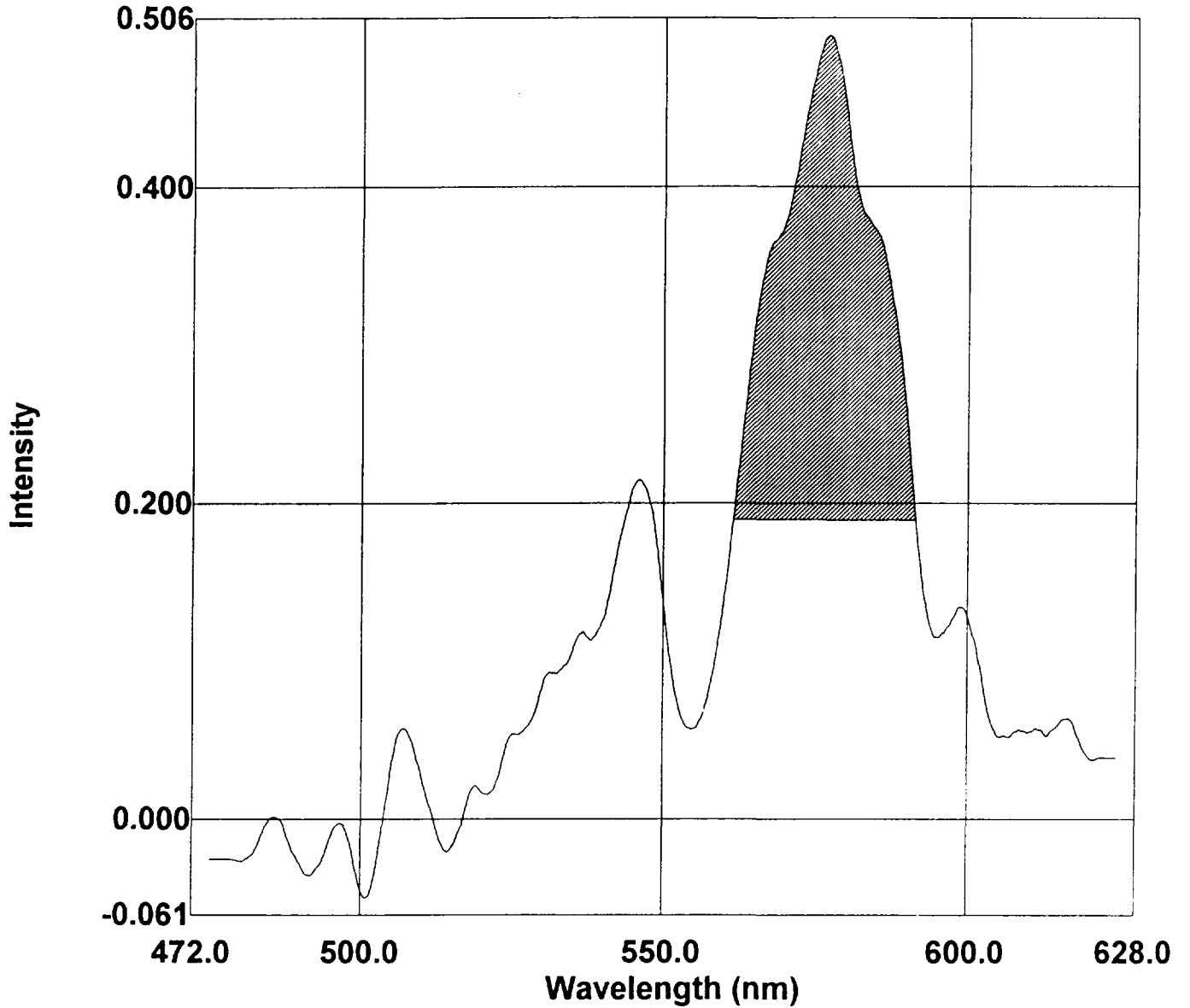
Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



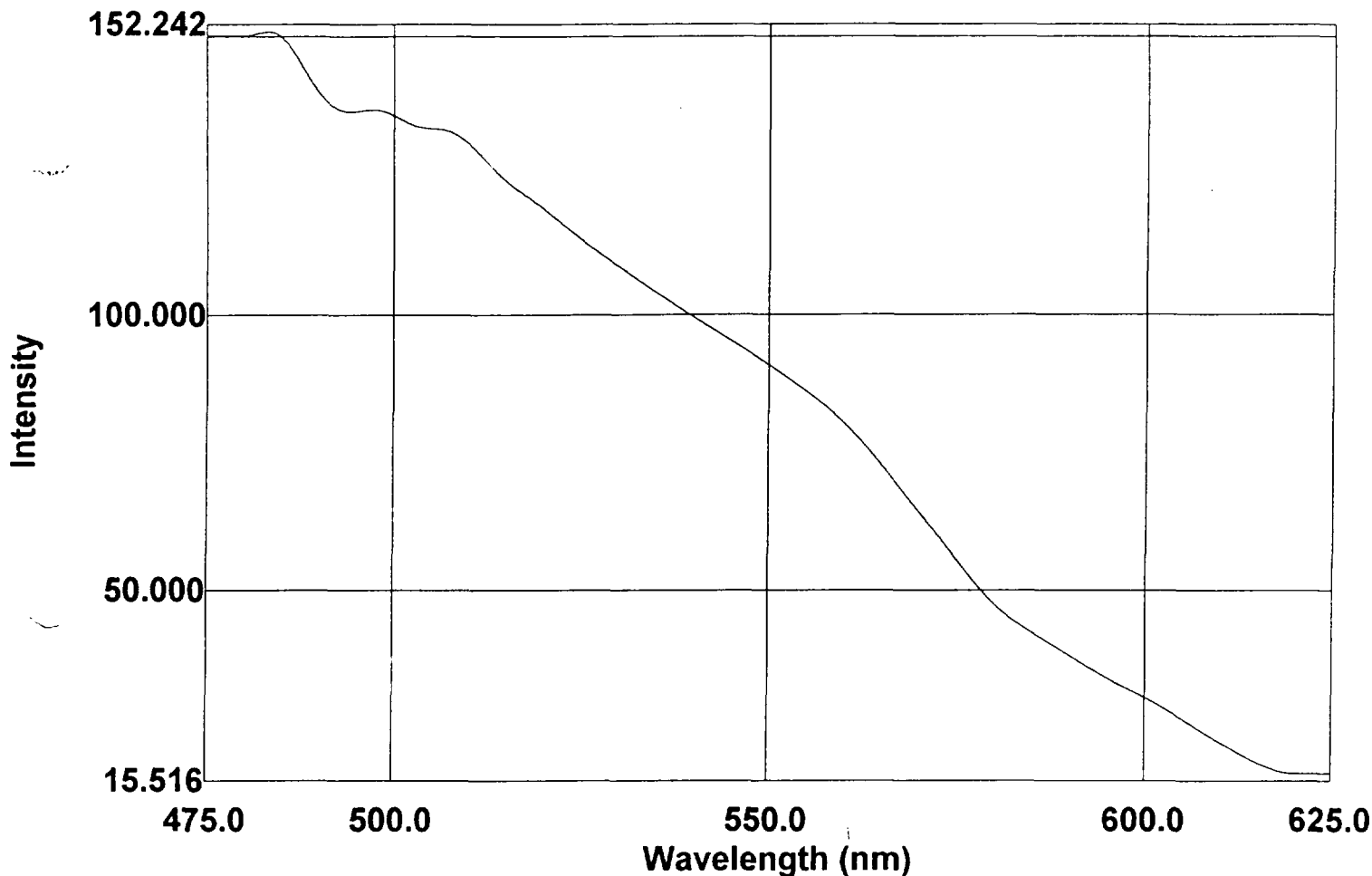
File Name: 2
QA-SULPHORHODAMINE B

Created: 12:46 11/04/96
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	5.566	1.094



File Name: 3
 CW 6 EP
 Created: 12:47 11/04/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

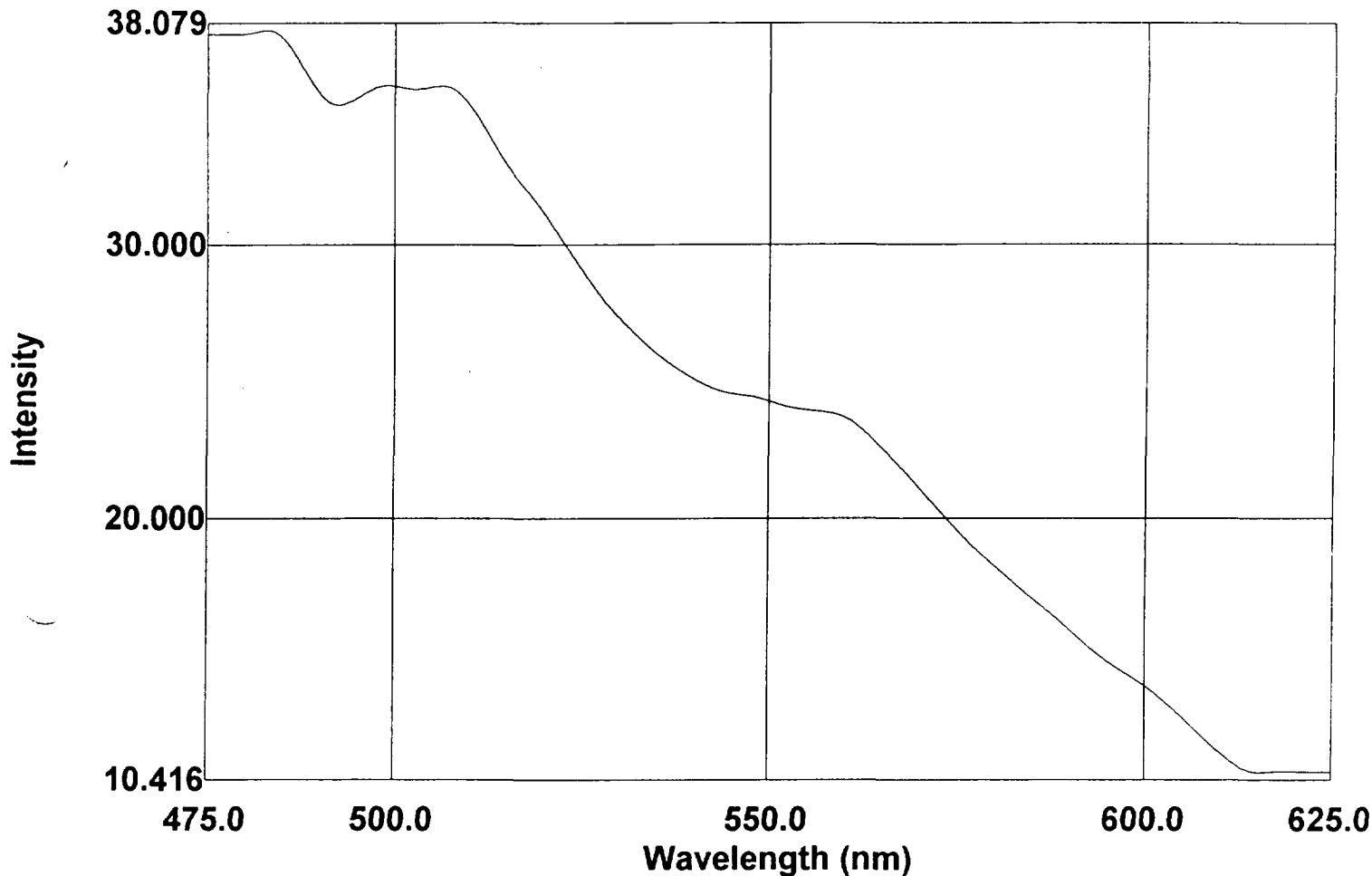
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



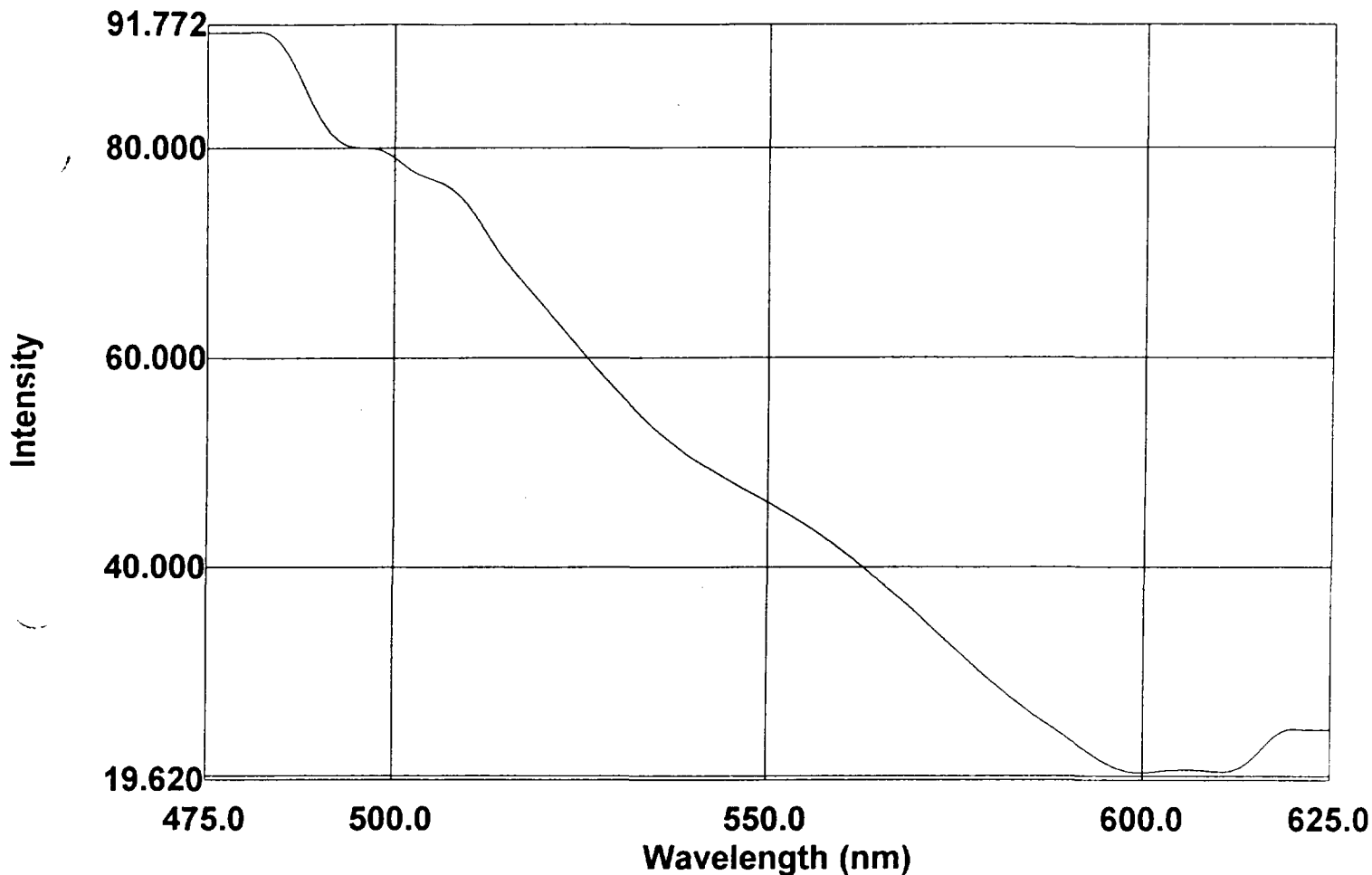
File Name: 4
 CW 19 EP
 Created: 12:48 11/04/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5

CW 31 EP

Created: 12:49 11/04/96

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:5.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:

J. Kevin Patrick

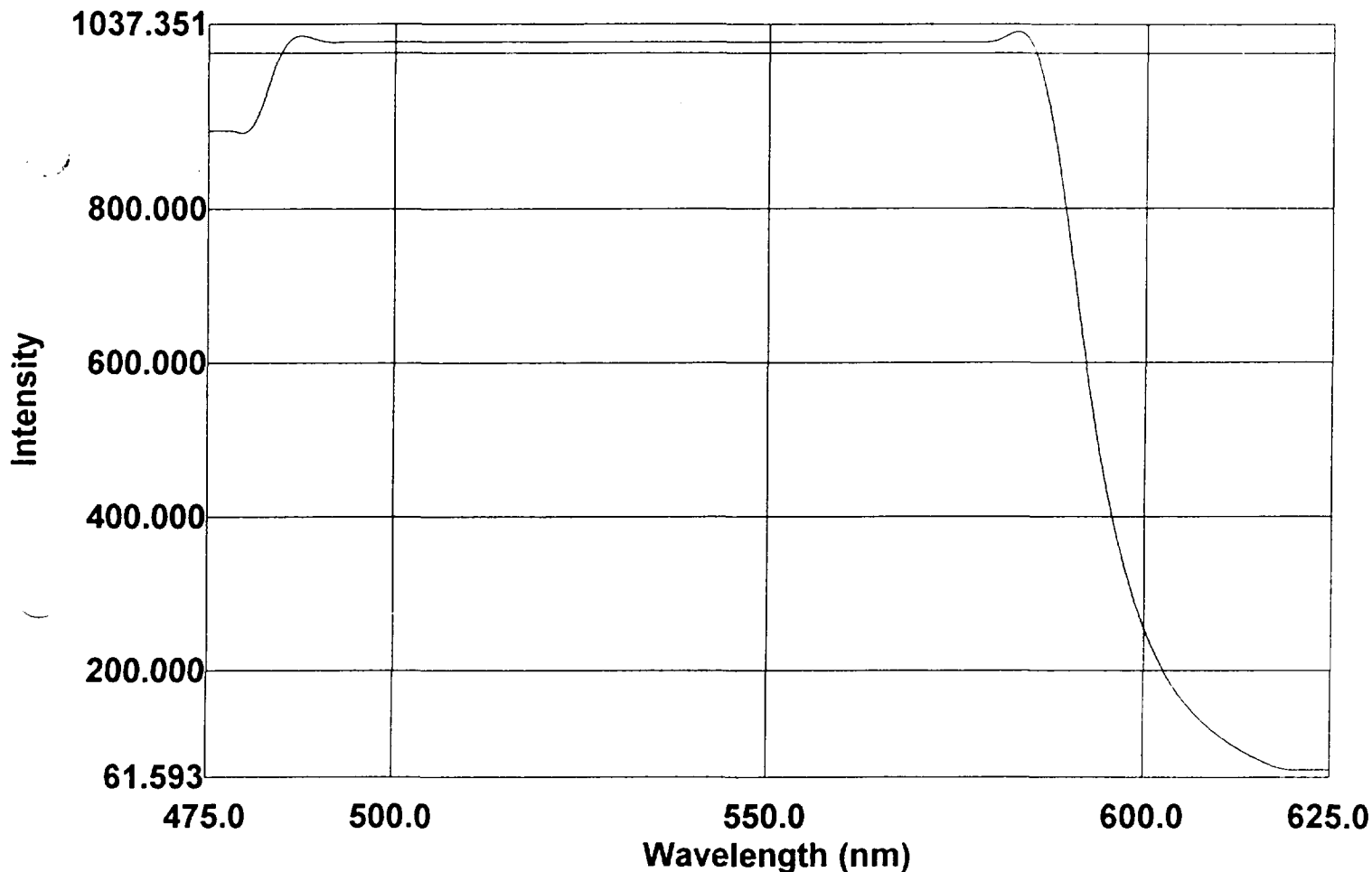
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 6A

CW 51 EP

Created: 12:50 11/04/96

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:5.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:

J. Kevin Patrick

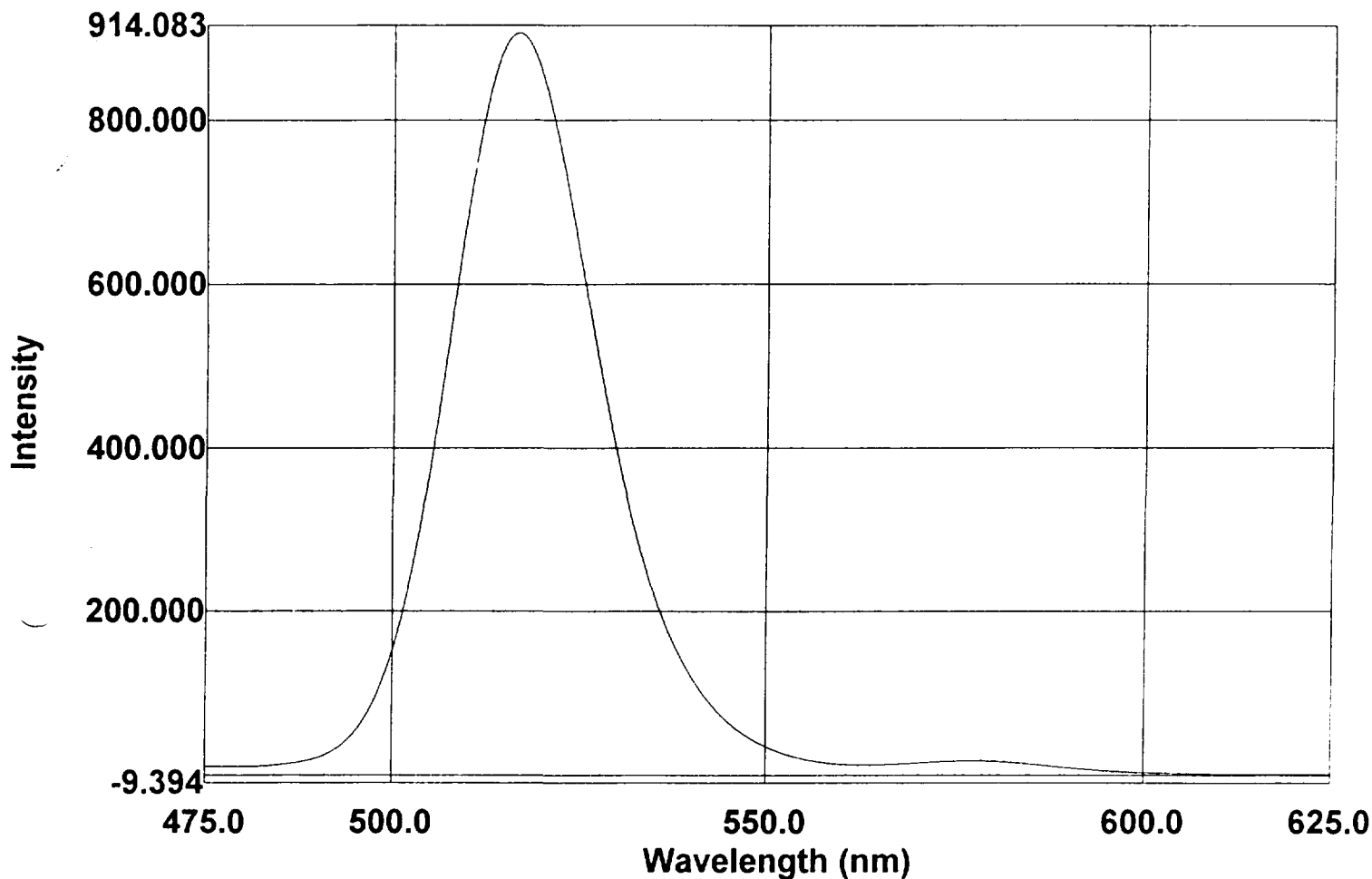
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 6B

CW 51 EP

Created: 12:53 11/04/96

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:10.0nm EM:3.0nm

Scan Speed: Fast

Sensitivity: Low

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:

J. Kevin Patrick

Samples Analyzed for:

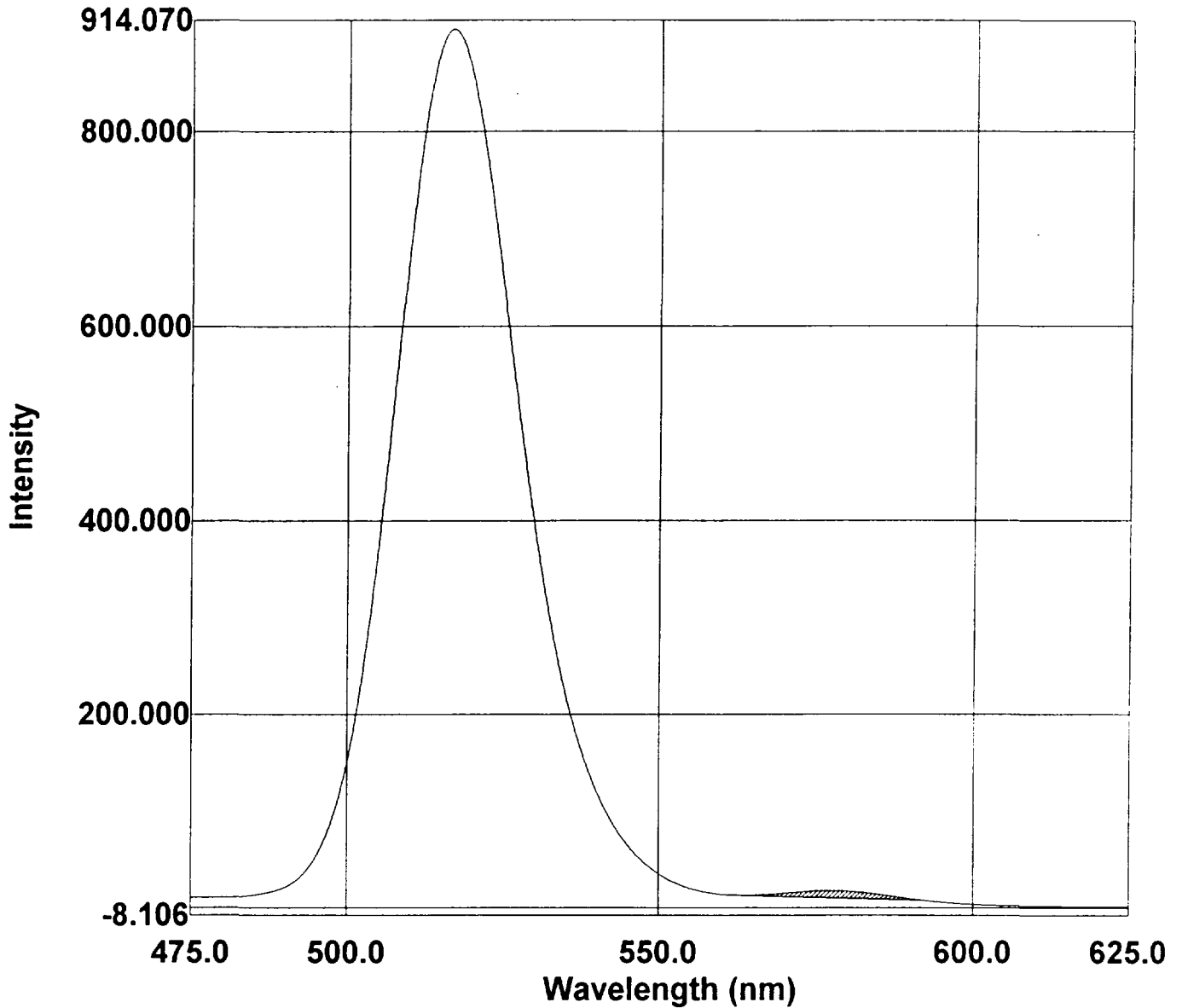
Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788

Peak Area



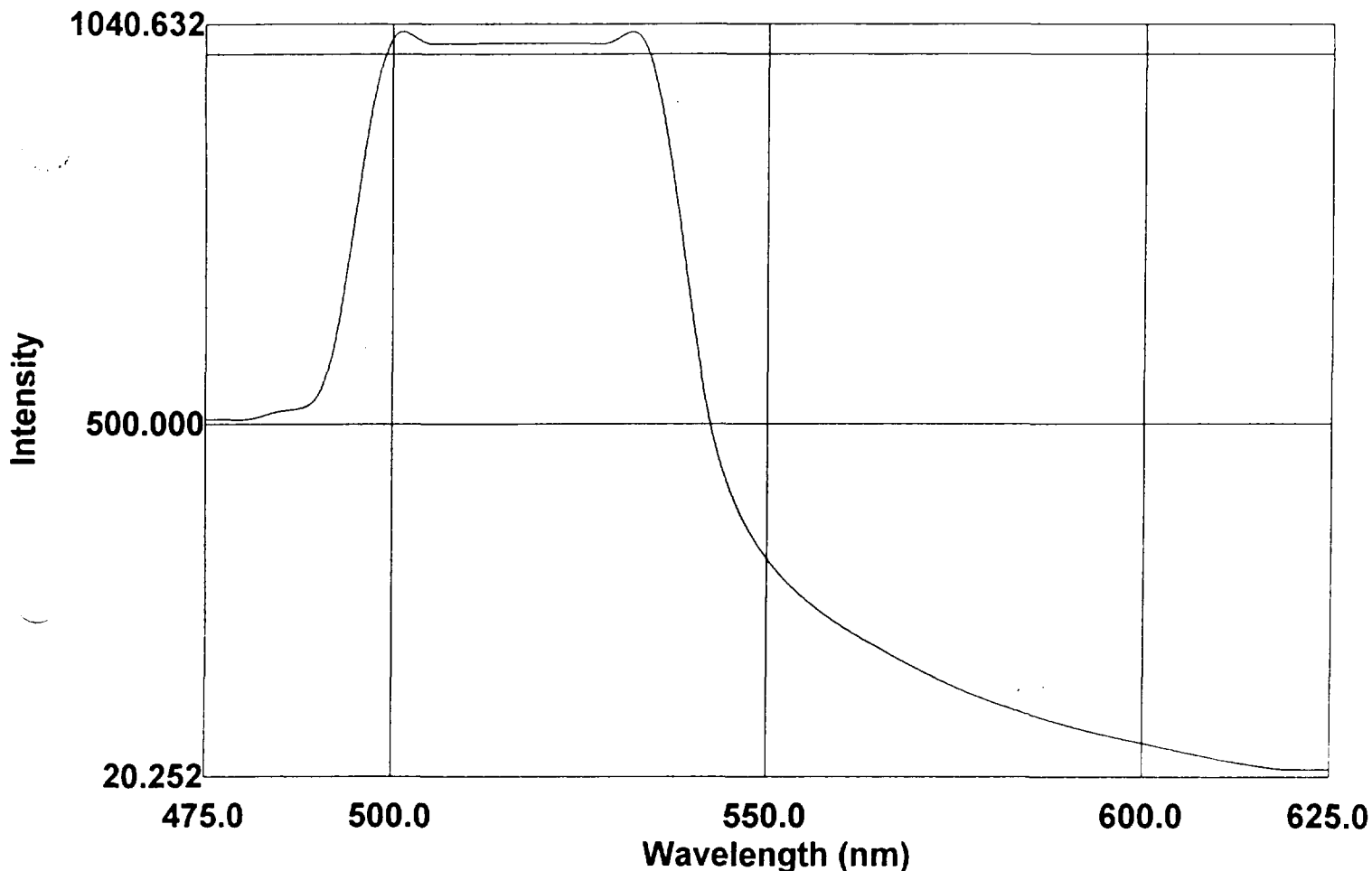
File Name: 6B
 CW 51 EP

 Created: 12:53 11/04/96
 Data: Modified

 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:10.0nm EM:3.0nm
 Scan Speed: Fast
 Sensitivity: Low
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1000.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	55.273	117.350	2123.089



File Name: 7

CW 60 EP

Created: 12:50 11/04/96

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:5.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:

J. Kevin Patrick

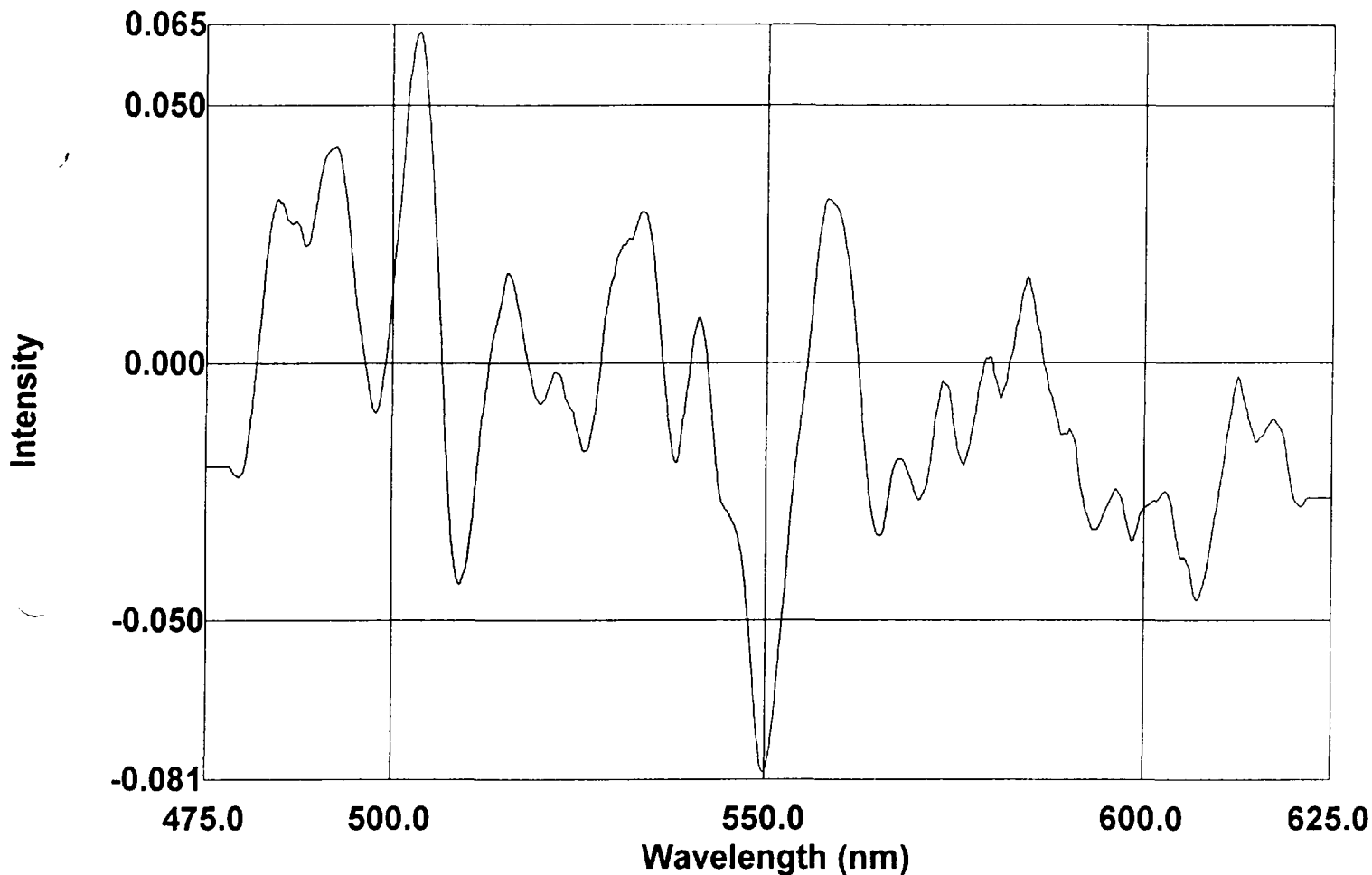
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 8

QA-ELUENT

reated: 12:57 11/04/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

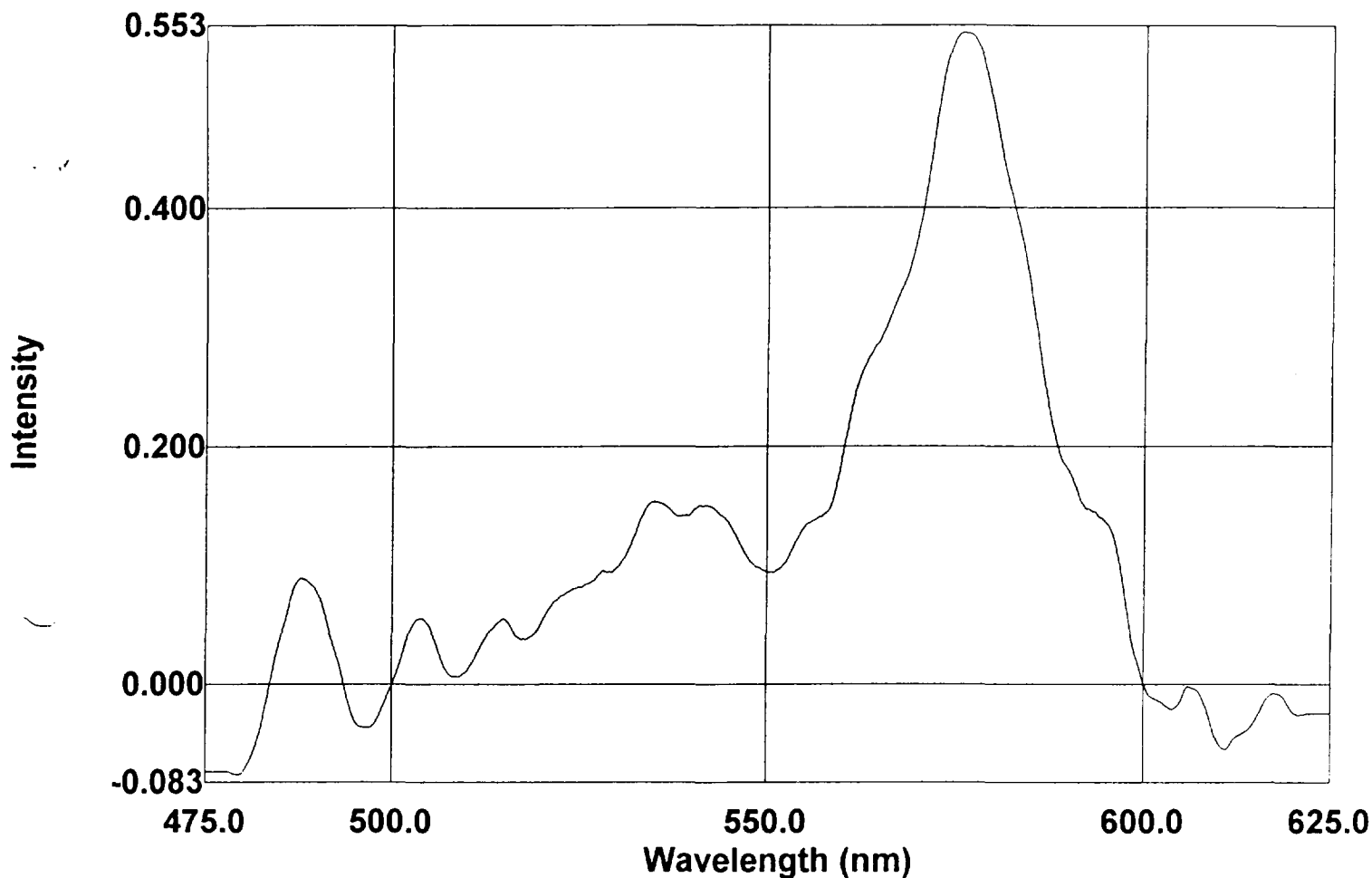
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 12:58 11/04/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

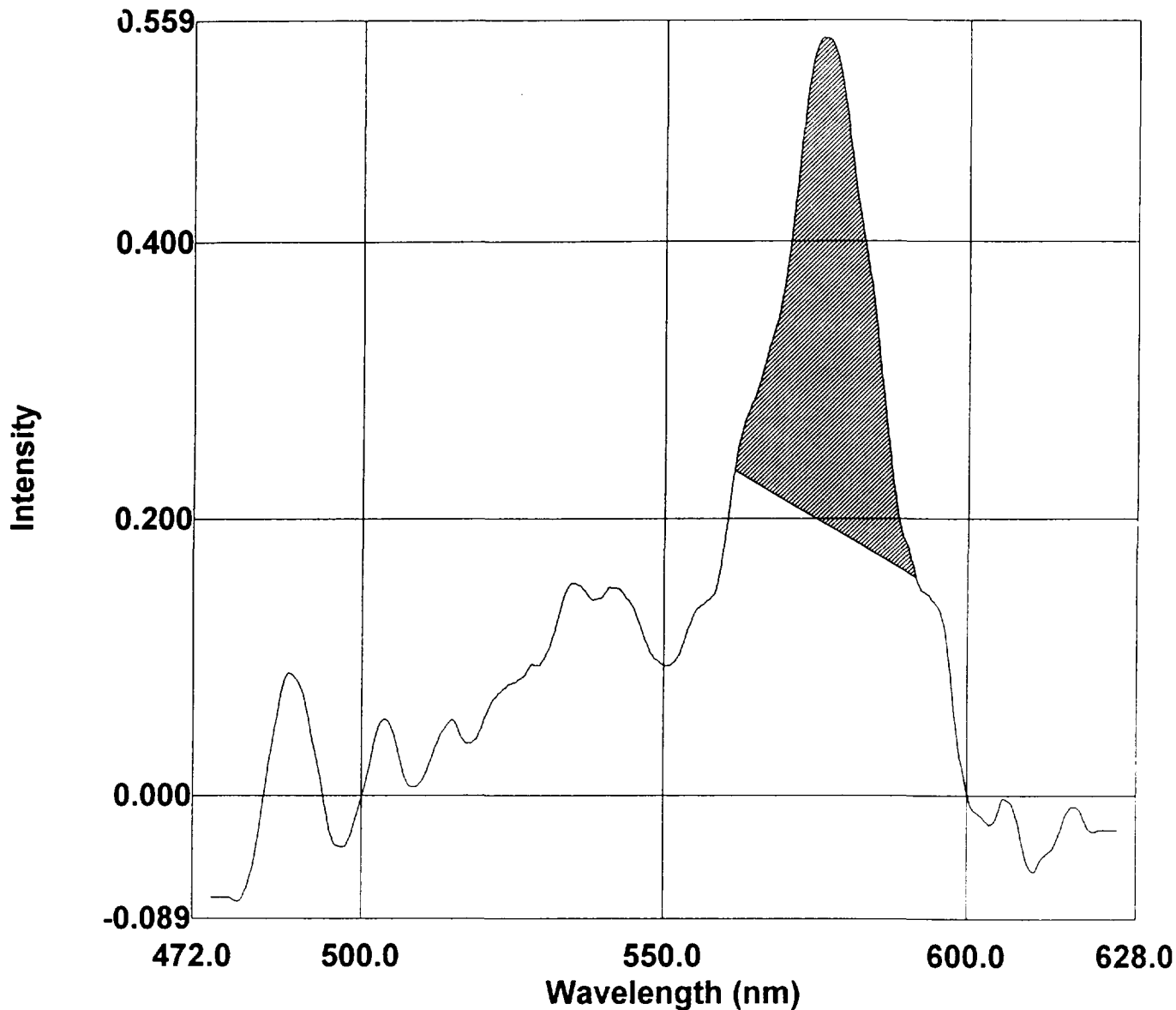
Michigan Chemical Complex Site 034

SET 03 -- 10/30/96

Samples Analyzed by:
 J. Kevin Patrick

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



File Name: 9
QA-SULPHORHODAMINE B

Created: 12:58 11/04/96
Data: Modified

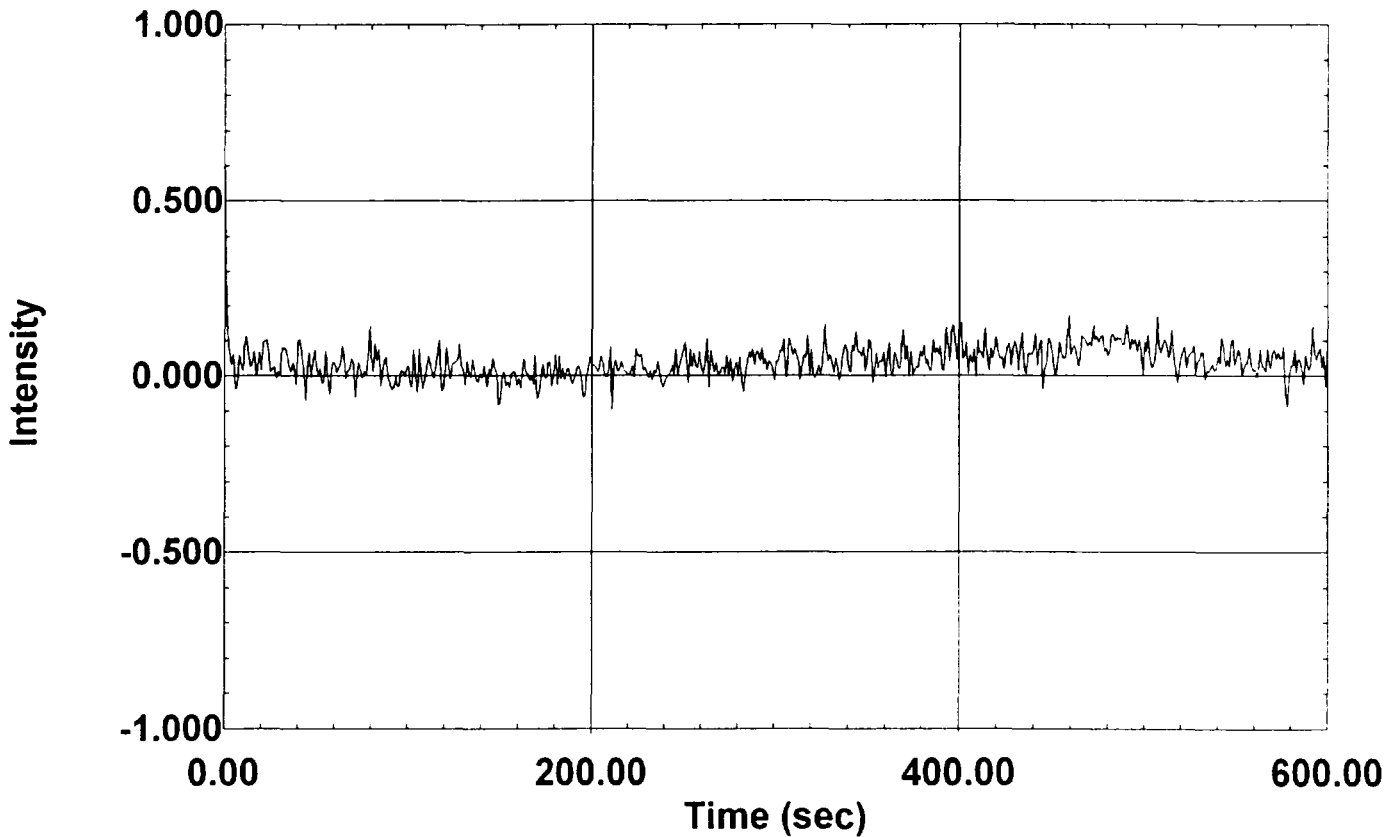
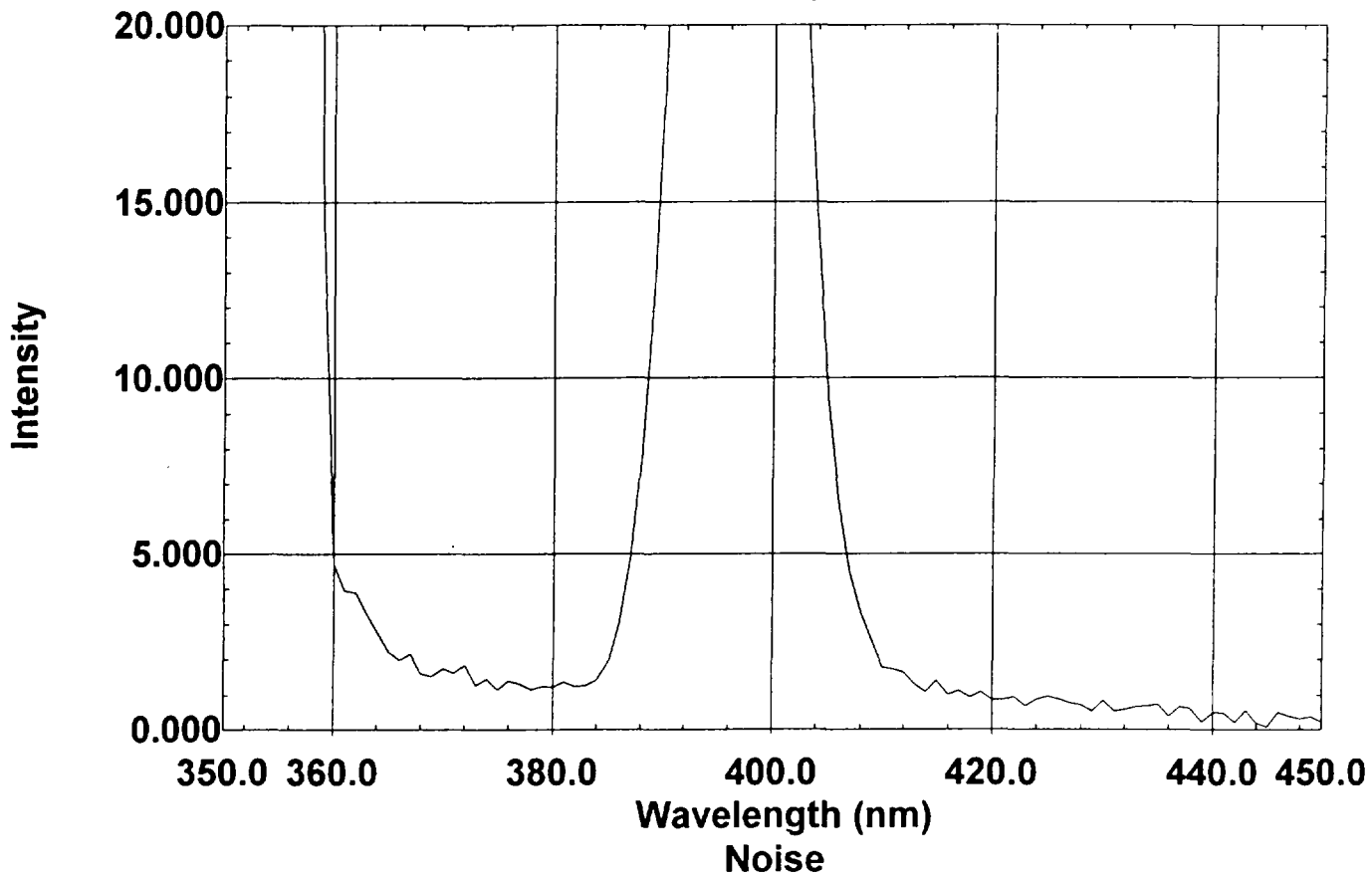
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	5.260	1.034

S/N Ratio Check

Raman Spectrum

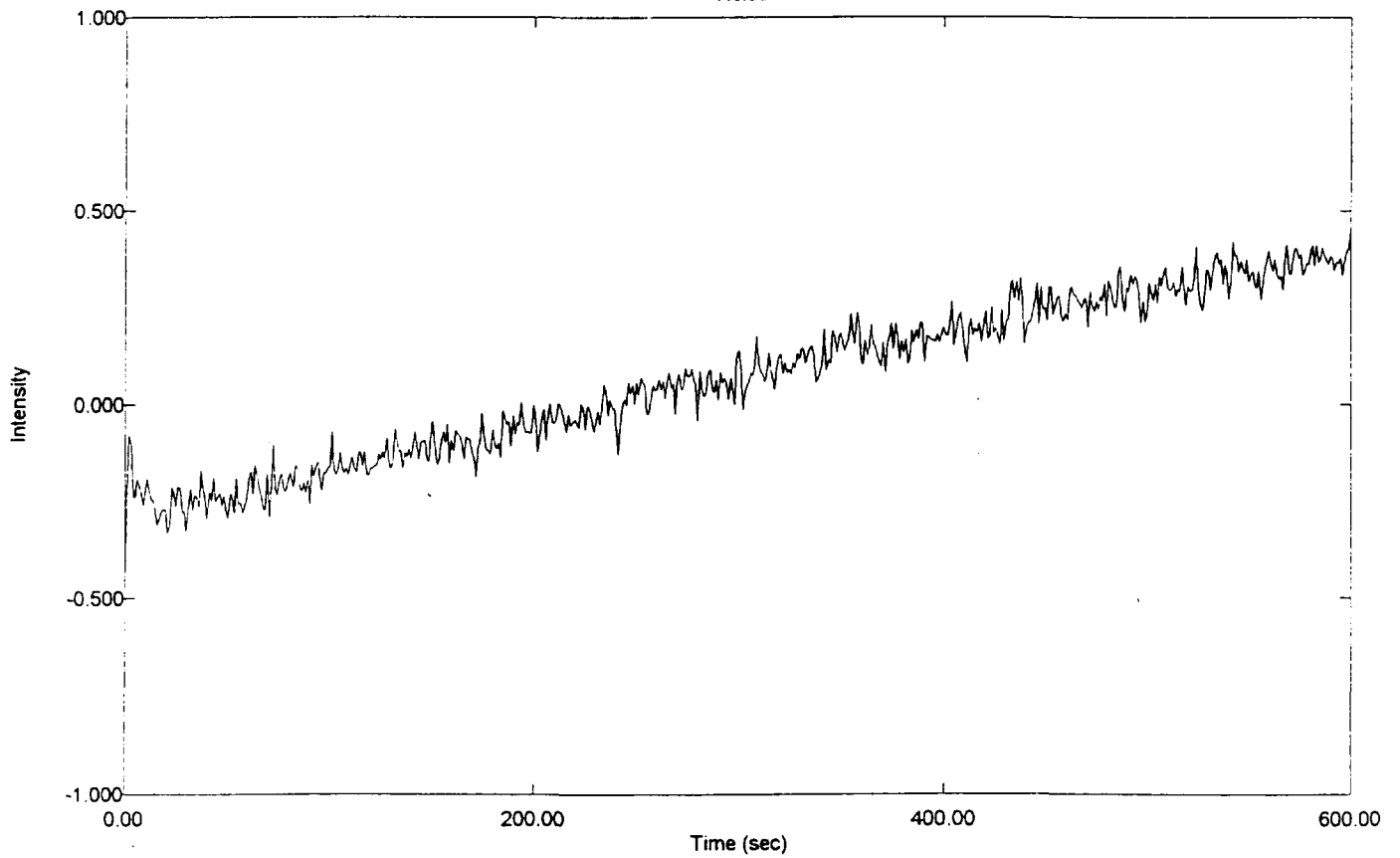
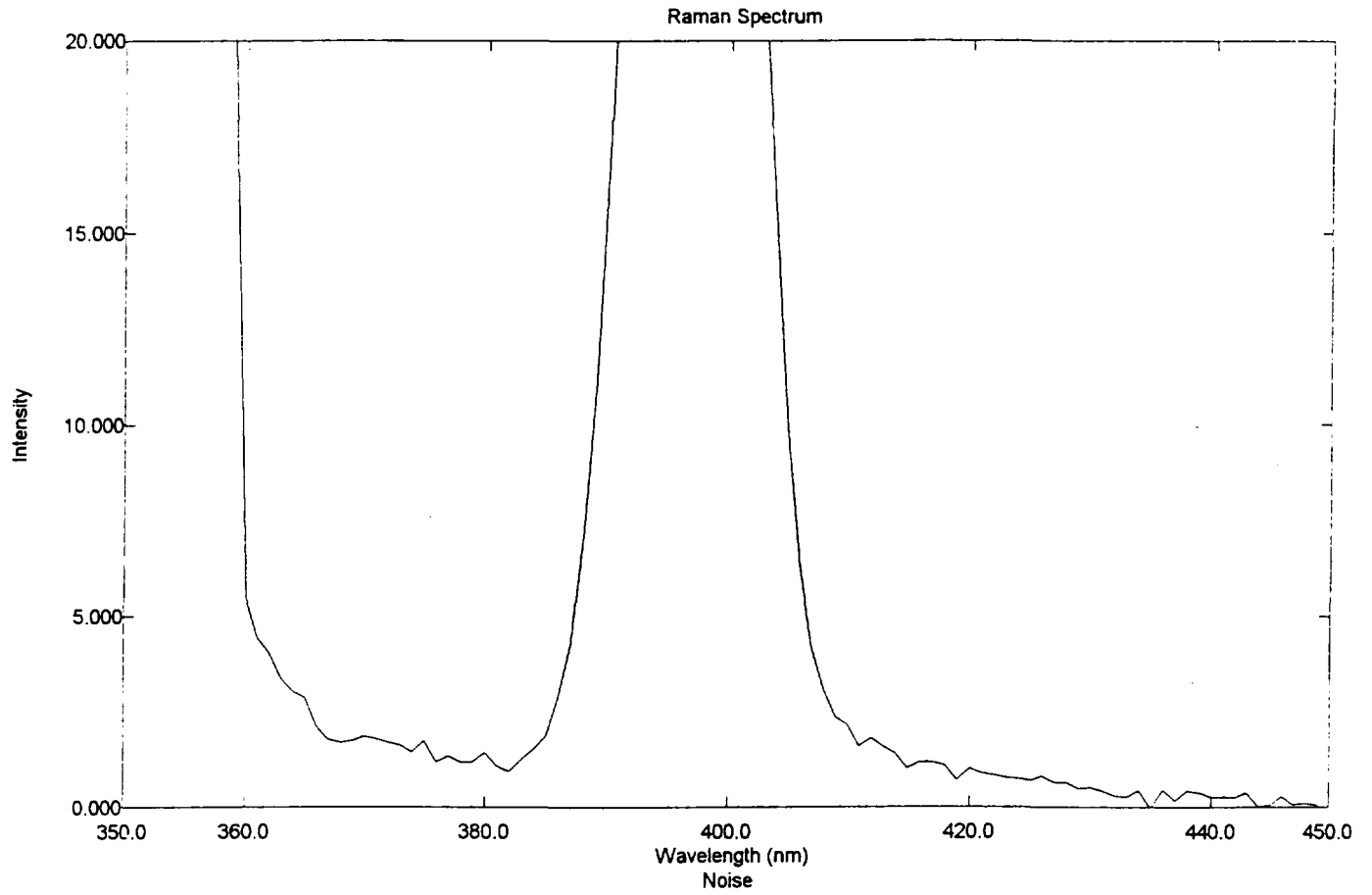


Instrument Serial Number: A401932000510D Printed: 13:27 11/04/96

Peak Height: 57.458

S/N Ratio: 465.687

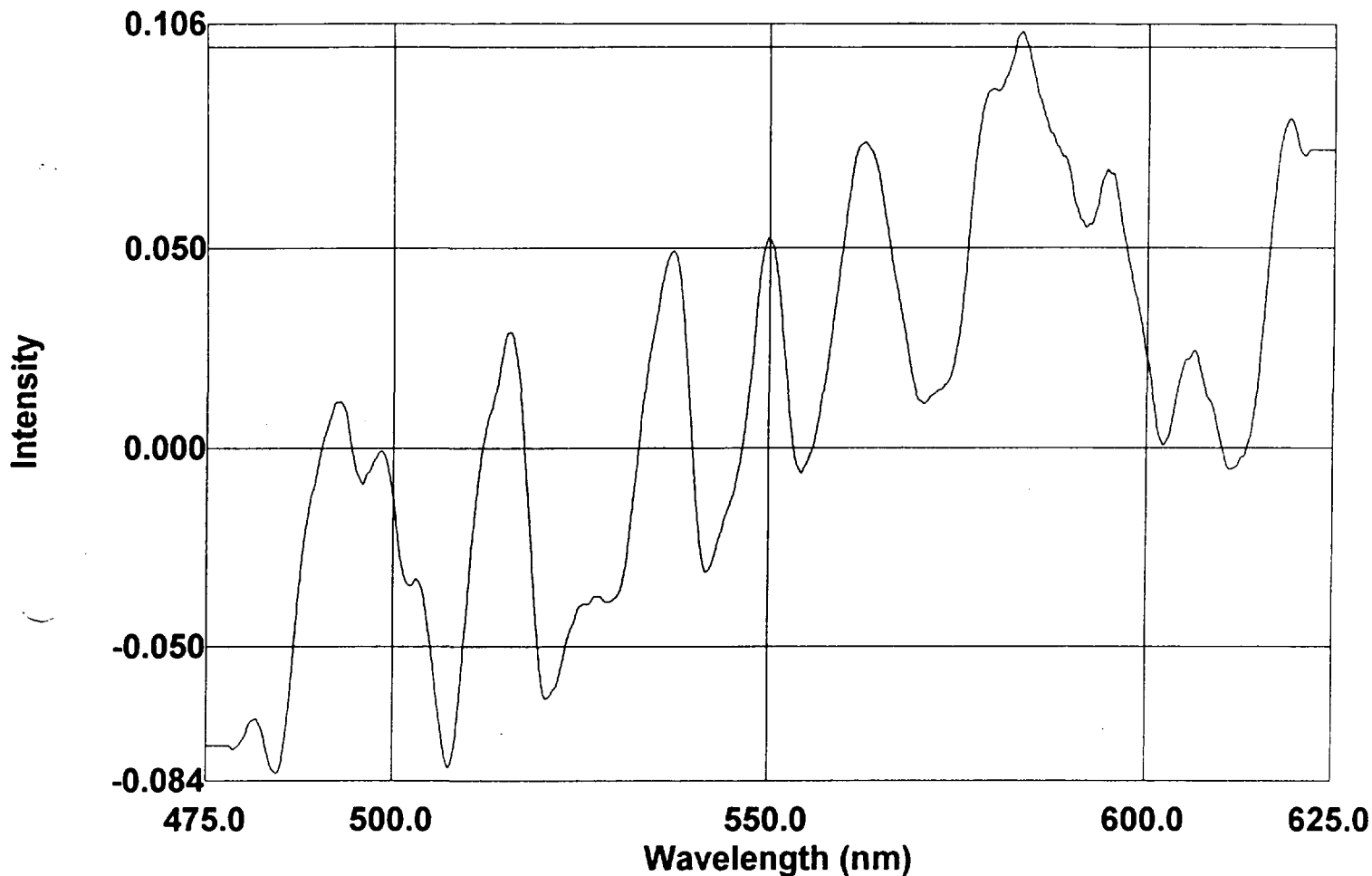
S/N Ratio Check



Instrument Serial Number: A401932000510D Printed: 12:05 11/18/96

Peak Height: 56.183

S/N Ratio: 493.410



File Name: 1
 QA-ELUENT
 Created: 16:39 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

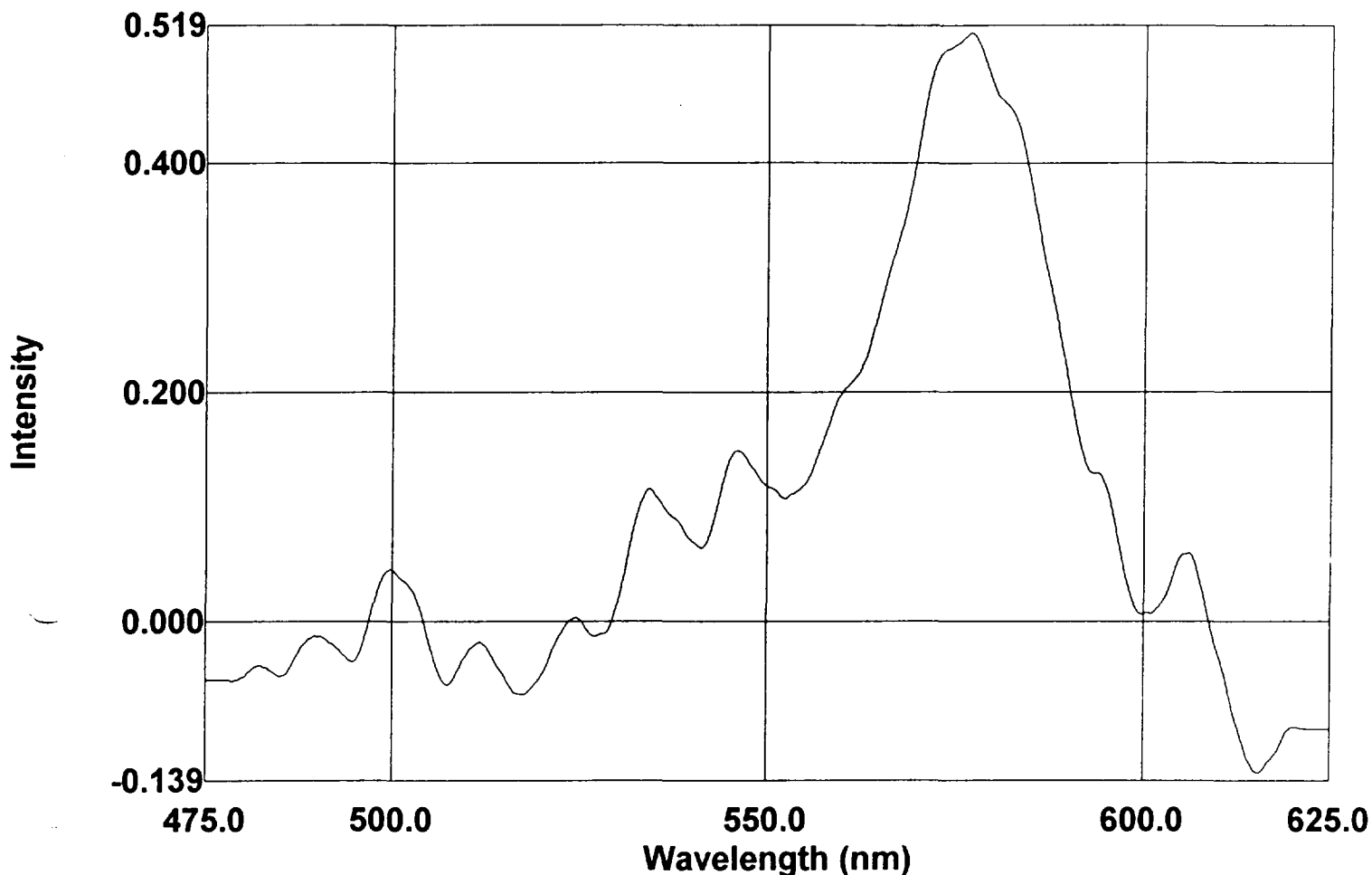
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 16:40 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

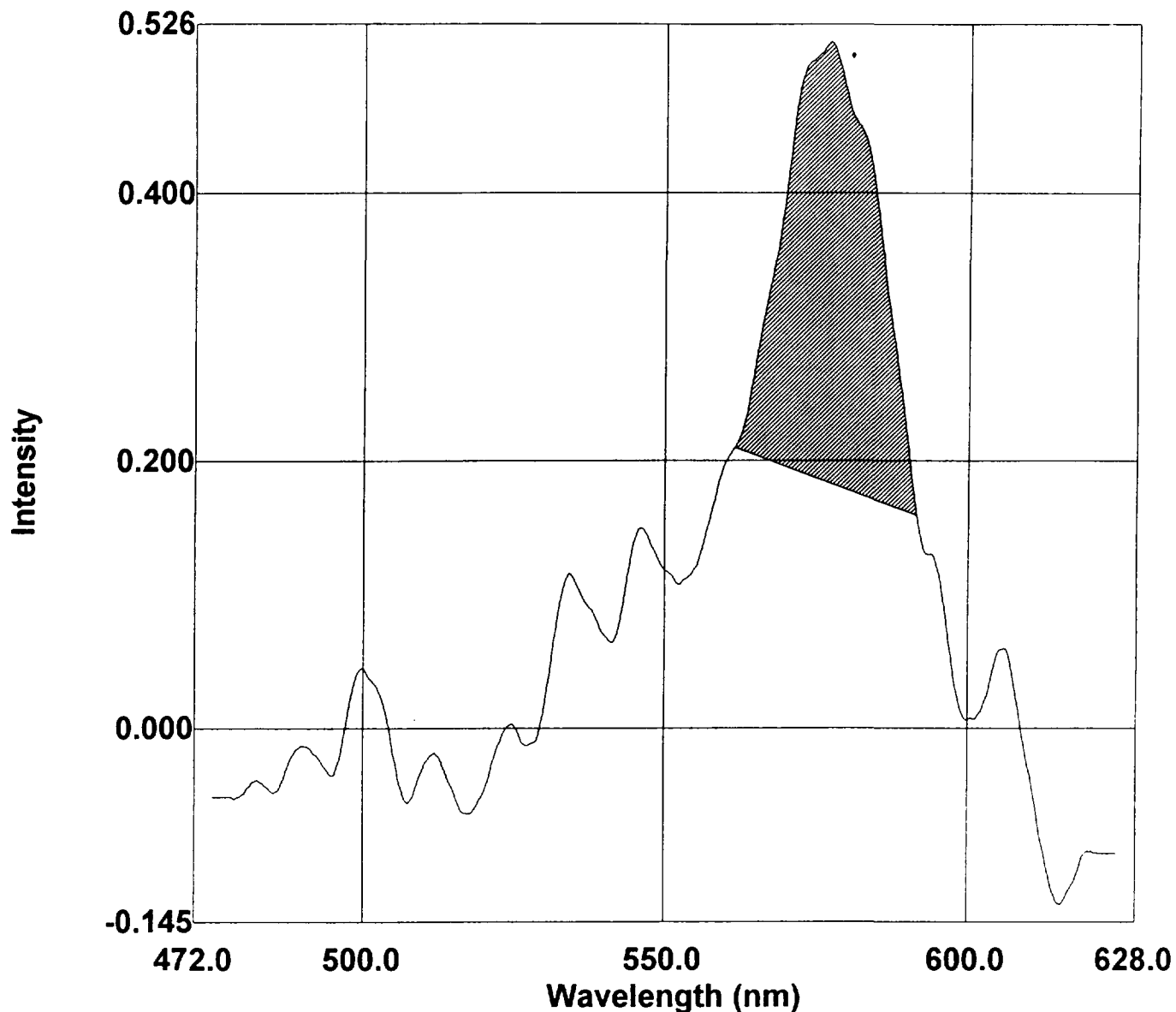
Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



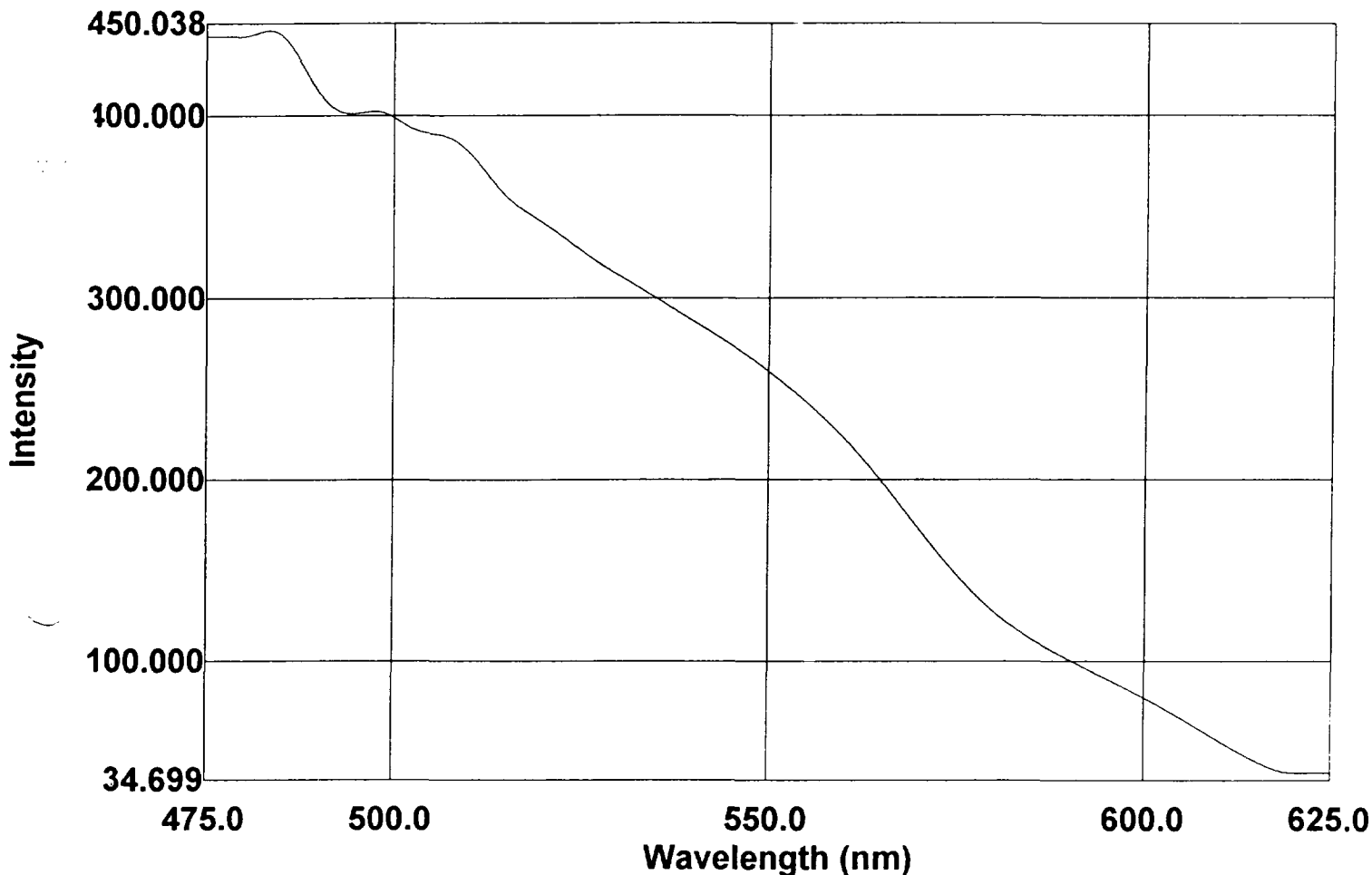
File Name: 2
QA-SULPHORHODAMINE B

Created: 16:40 11/18/96
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	5.877	1.155



File Name: 3
 CW 6 EP
 Created: 16:41 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

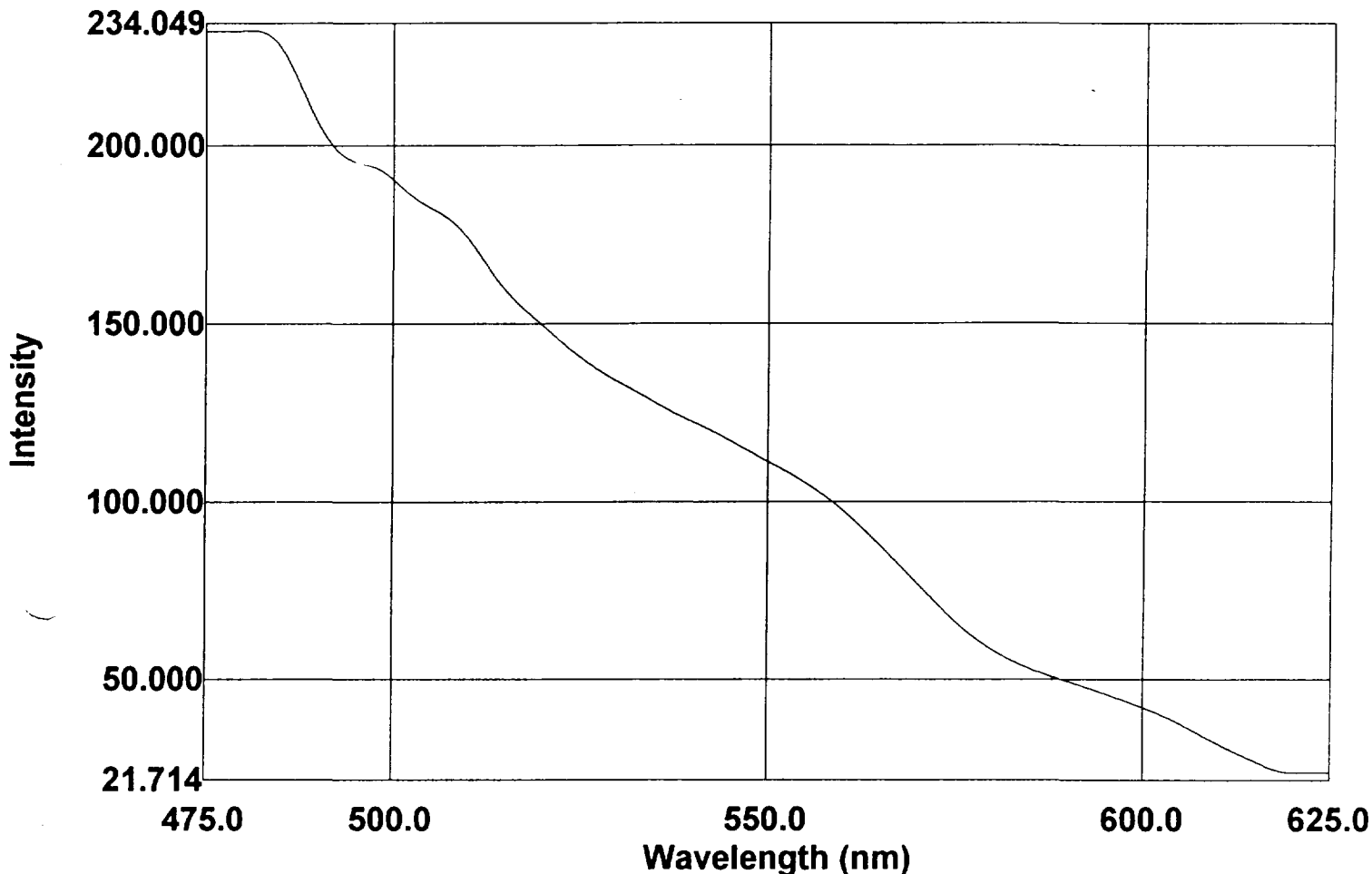
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4
 CW 19 EP
 Created: 16:42 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

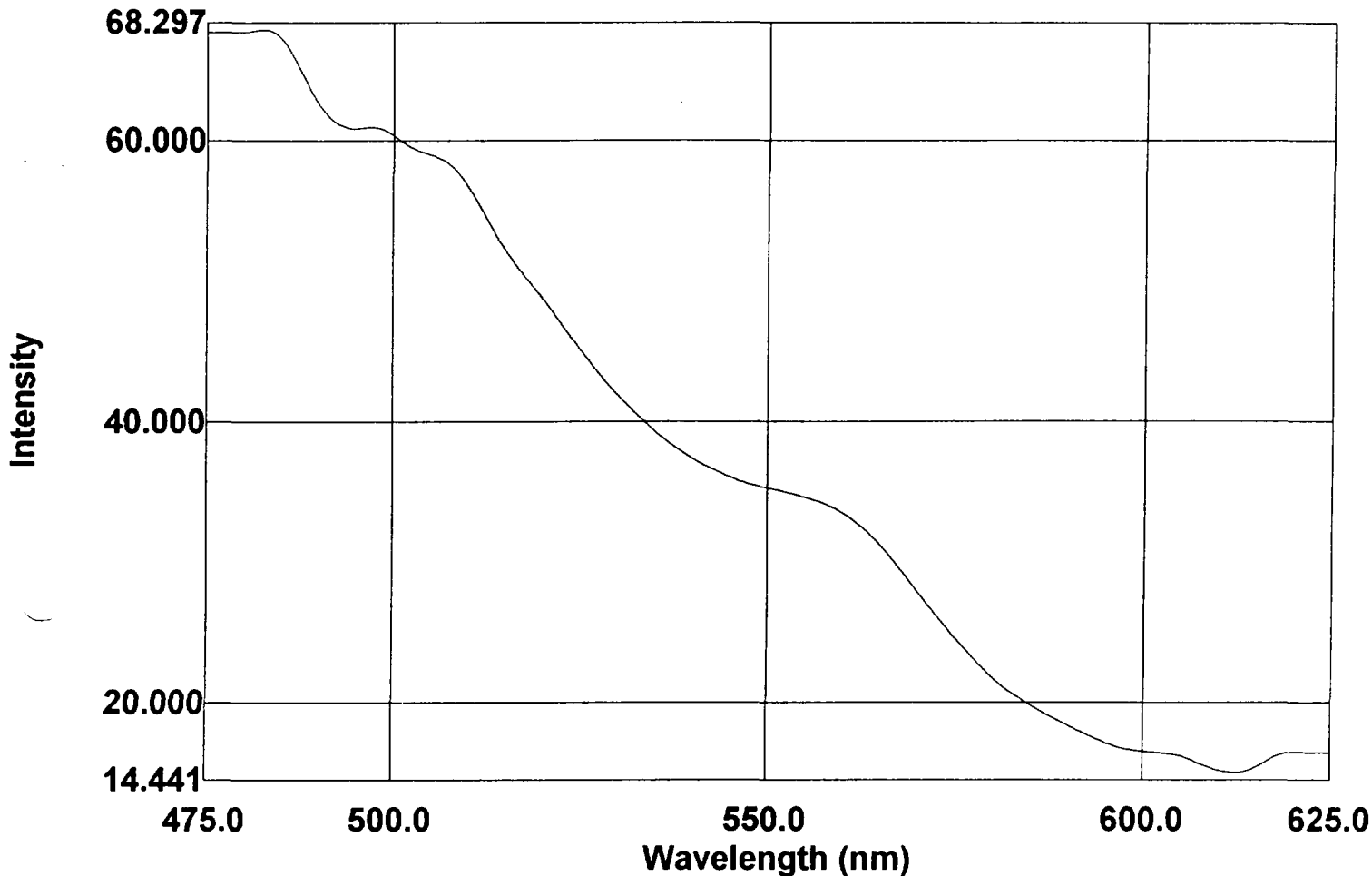
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5
 CW 31 EP
 Created: 16:43 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

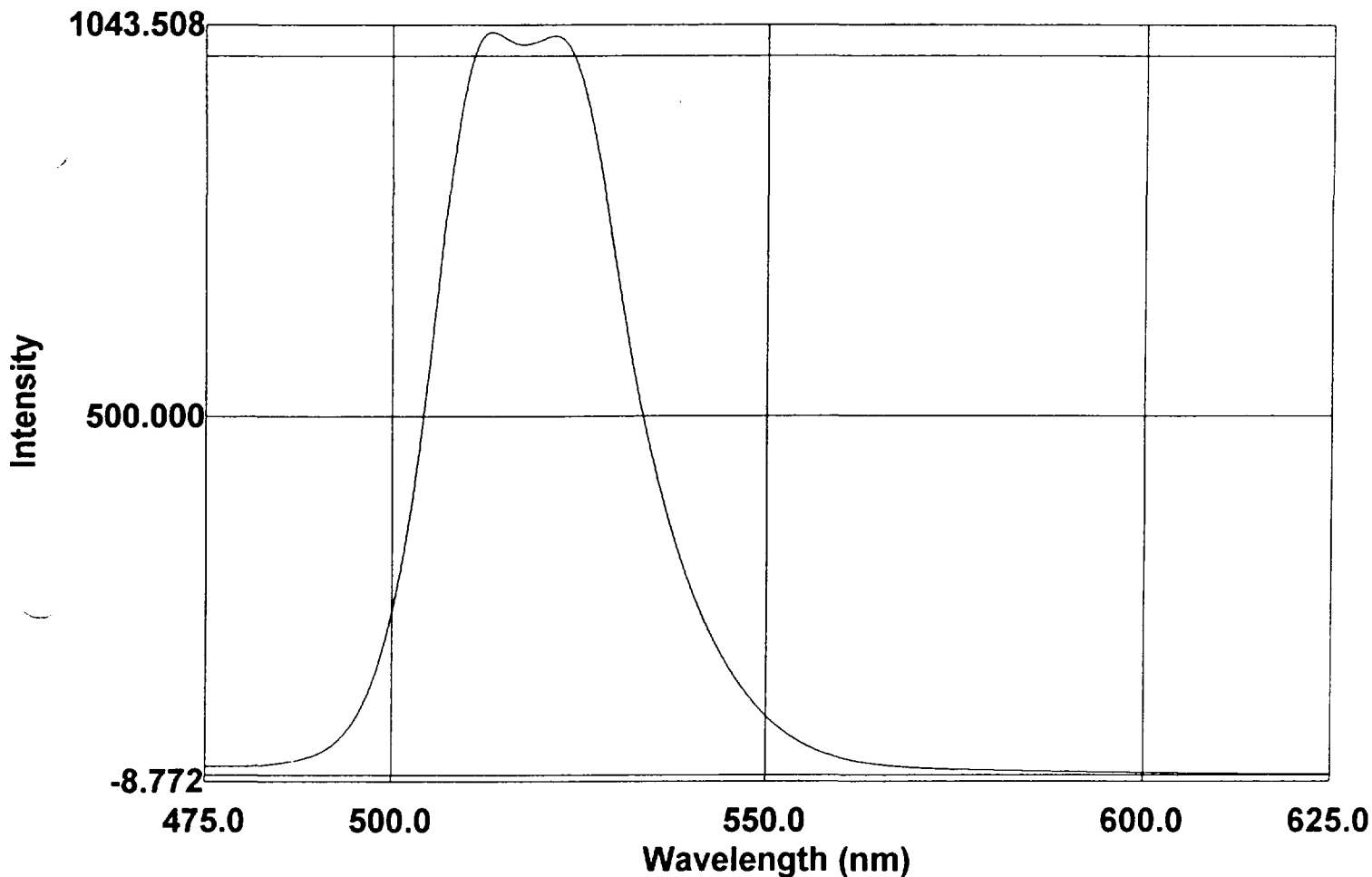
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6
 CW 51 EP
 Created: 16:49 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:10.0nm EM:3.0nm
 Scan Speed: Fast
 Sensitivity: Low
 Response Time: Auto
 Shutter: Auto, Closed

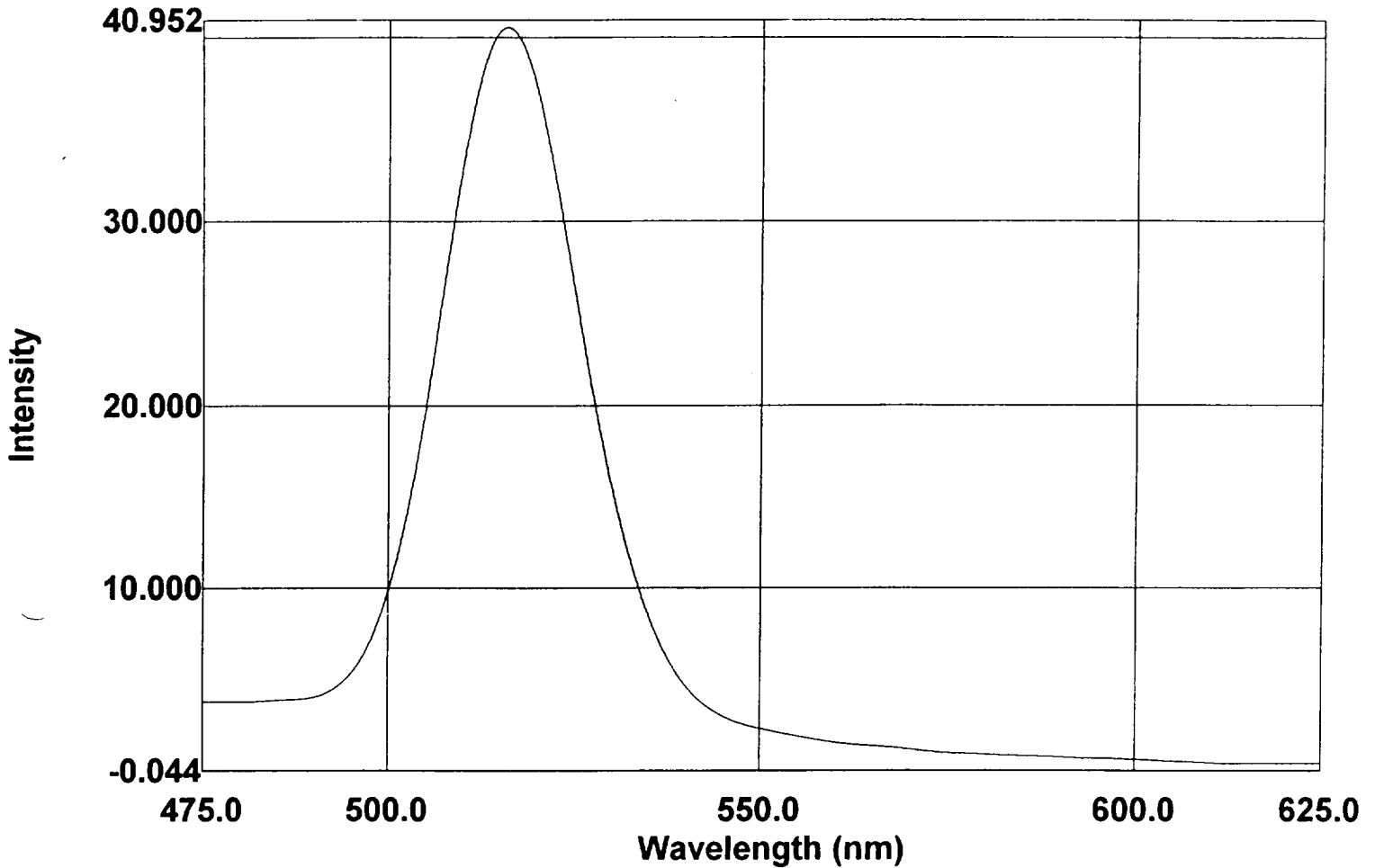
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7

CW 60 EP

Created: 16:52 11/18/96

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:10.0nm EM:3.0nm

Scan Speed: Fast

Sensitivity: Low

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:

ANDREI KERPAN

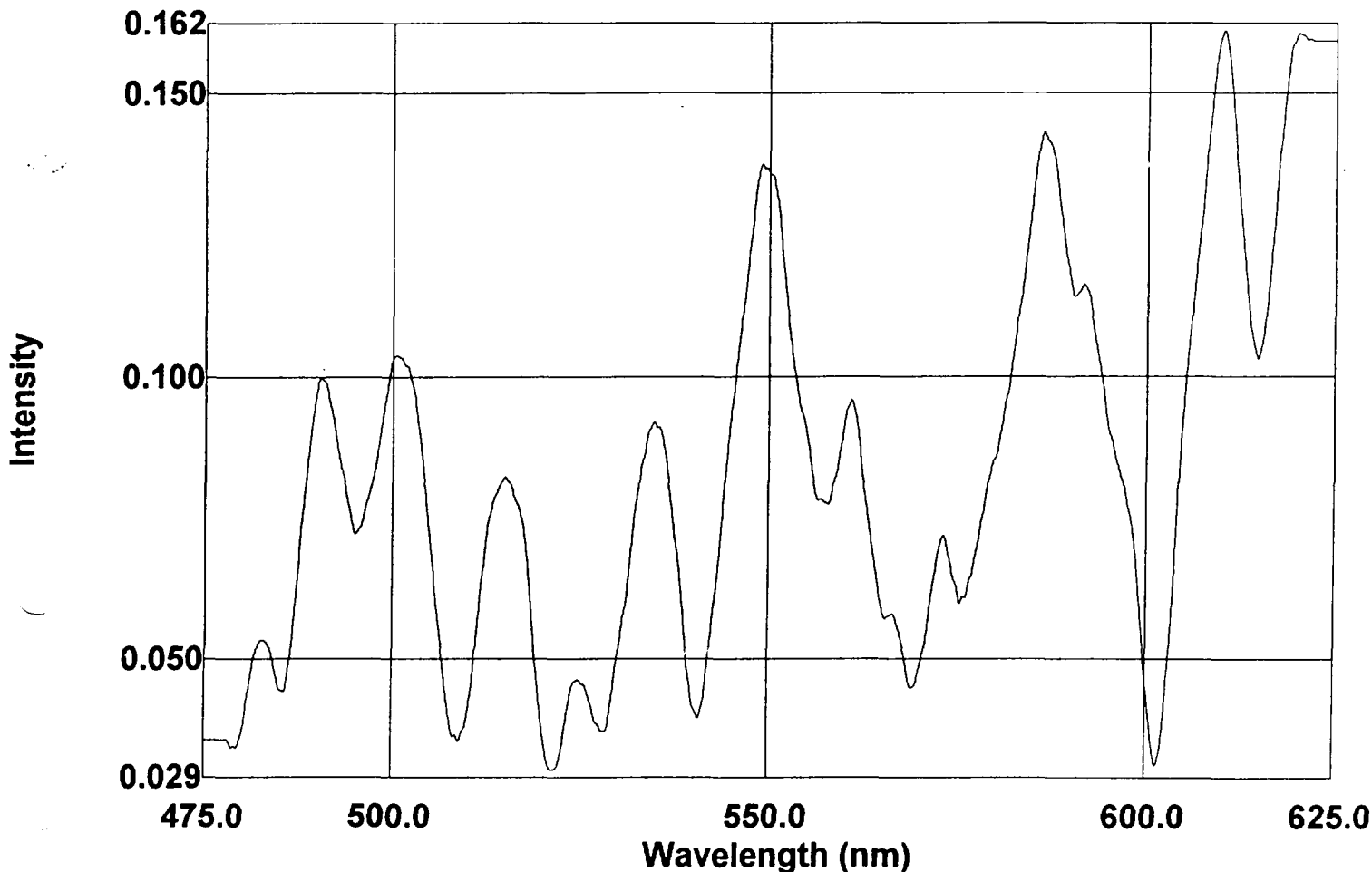
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 8
 QA-ELUENT
 Created: 16:46 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

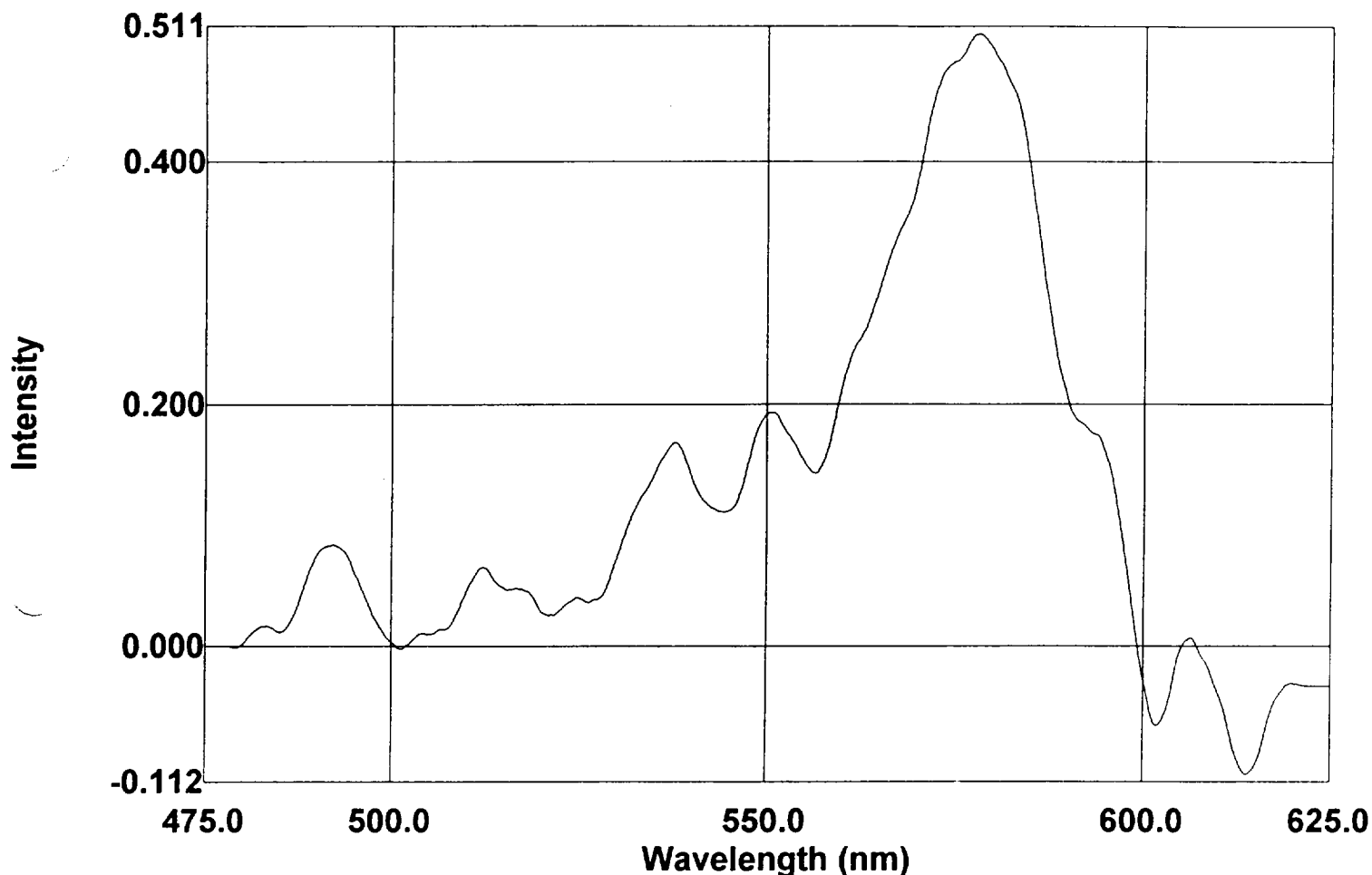
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

reated: 16:46 11/18/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:5.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

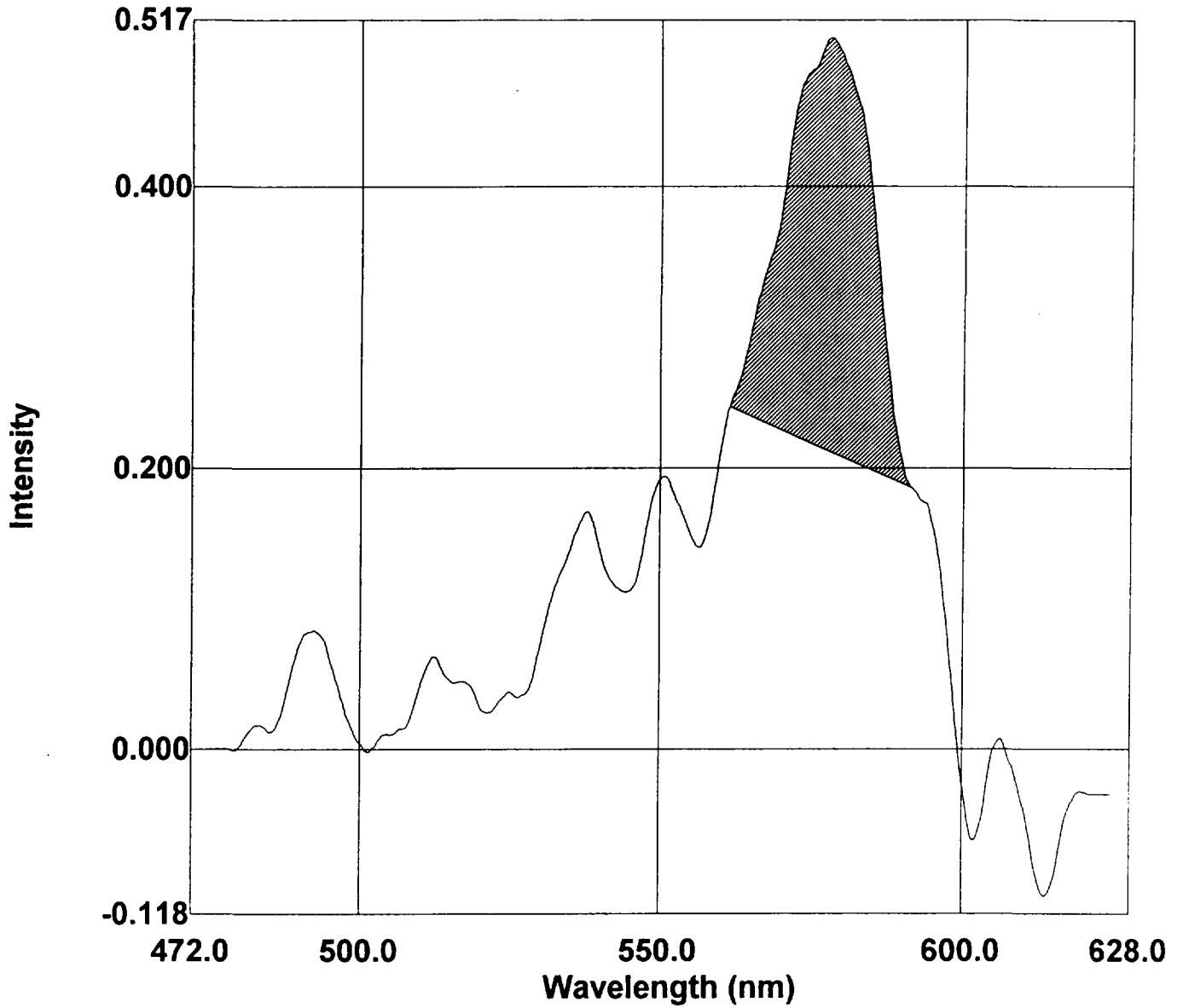
Michigan Chemical Complex Site 034

SET 04 -- 11/13/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



File Name: 9
QA-SULPHORHODAMINE B

Created: 16:46 11/18/96
Data: Modified

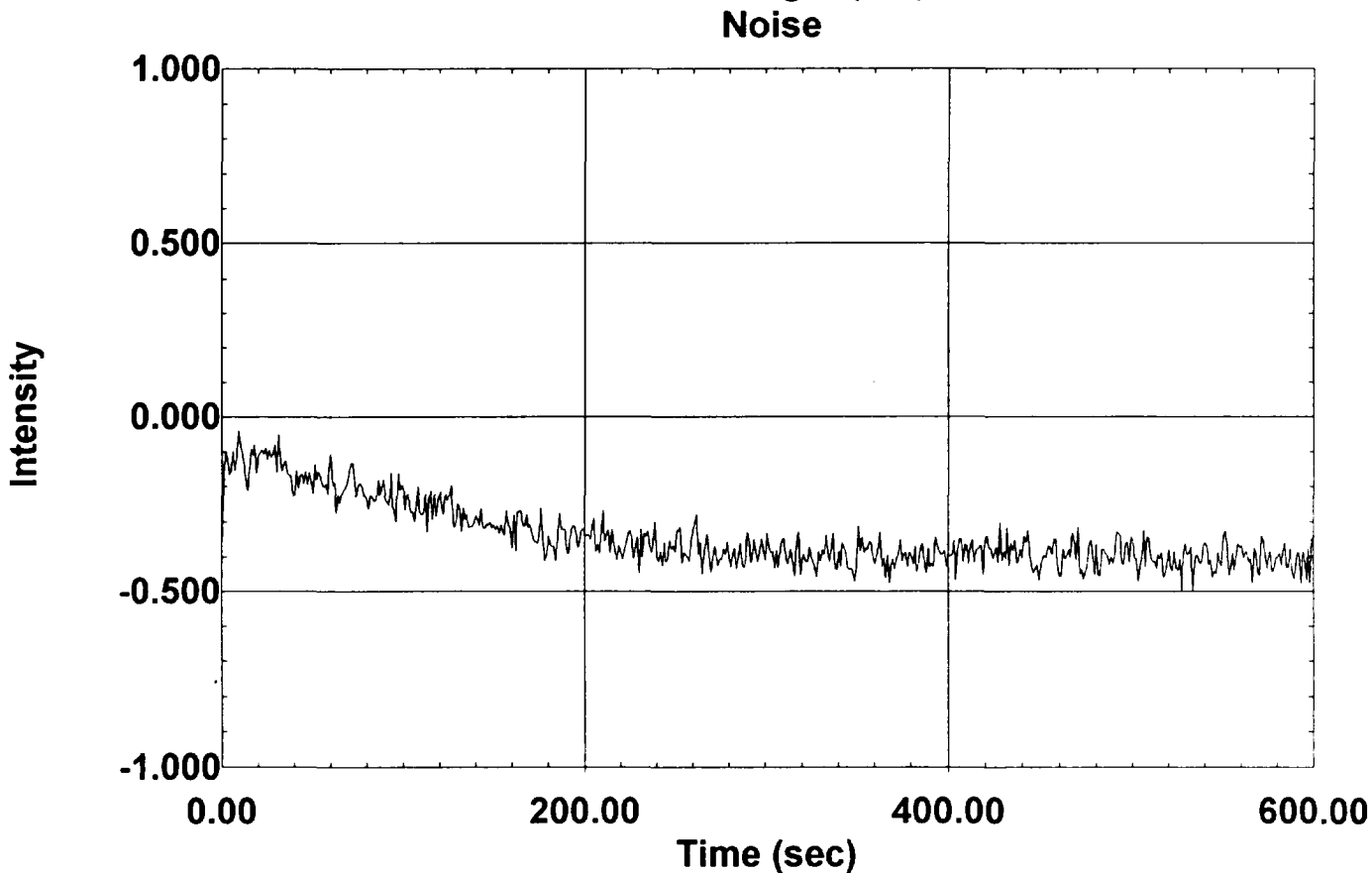
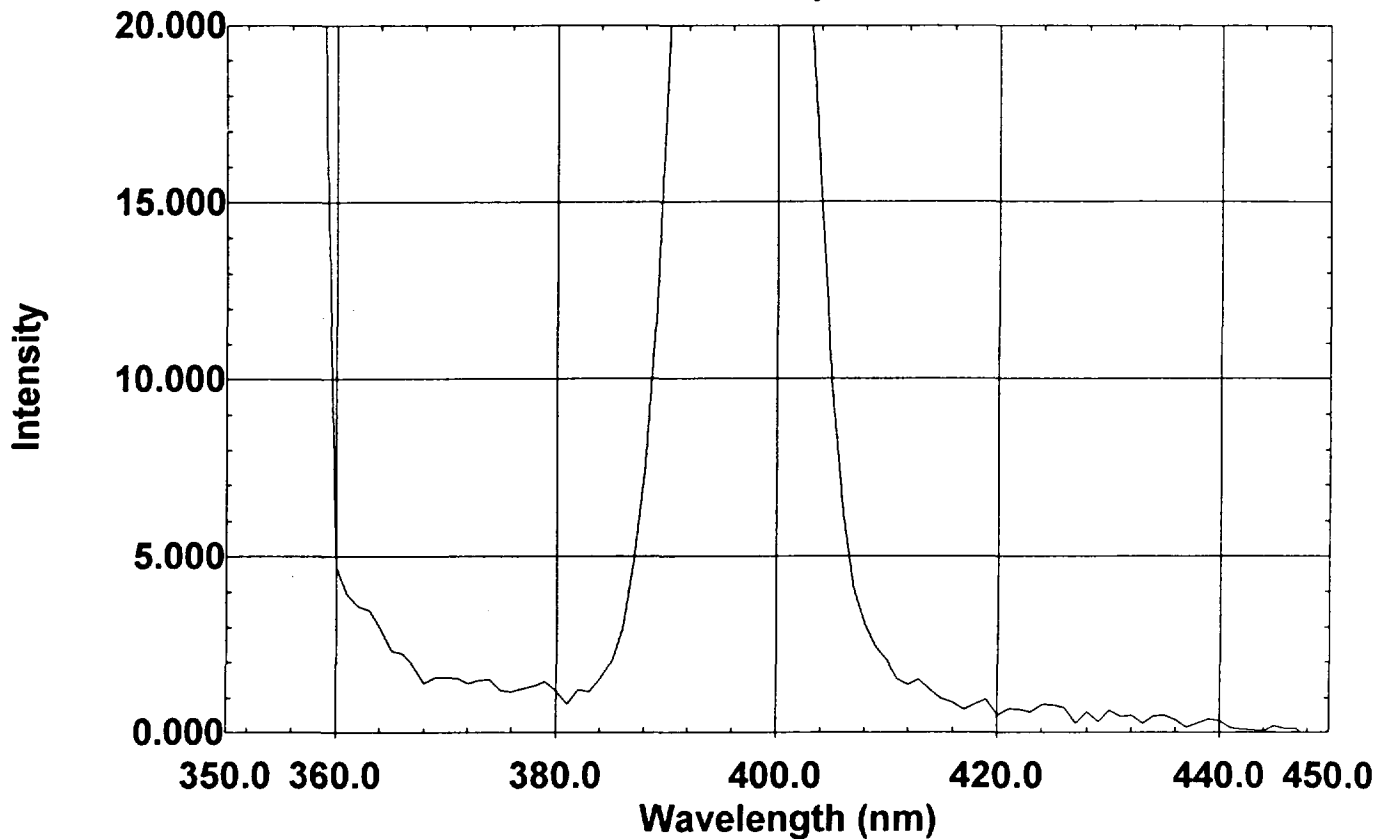
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:5.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	5086.794	4.895	0.962

S/N Ratio Check

Raman Spectrum



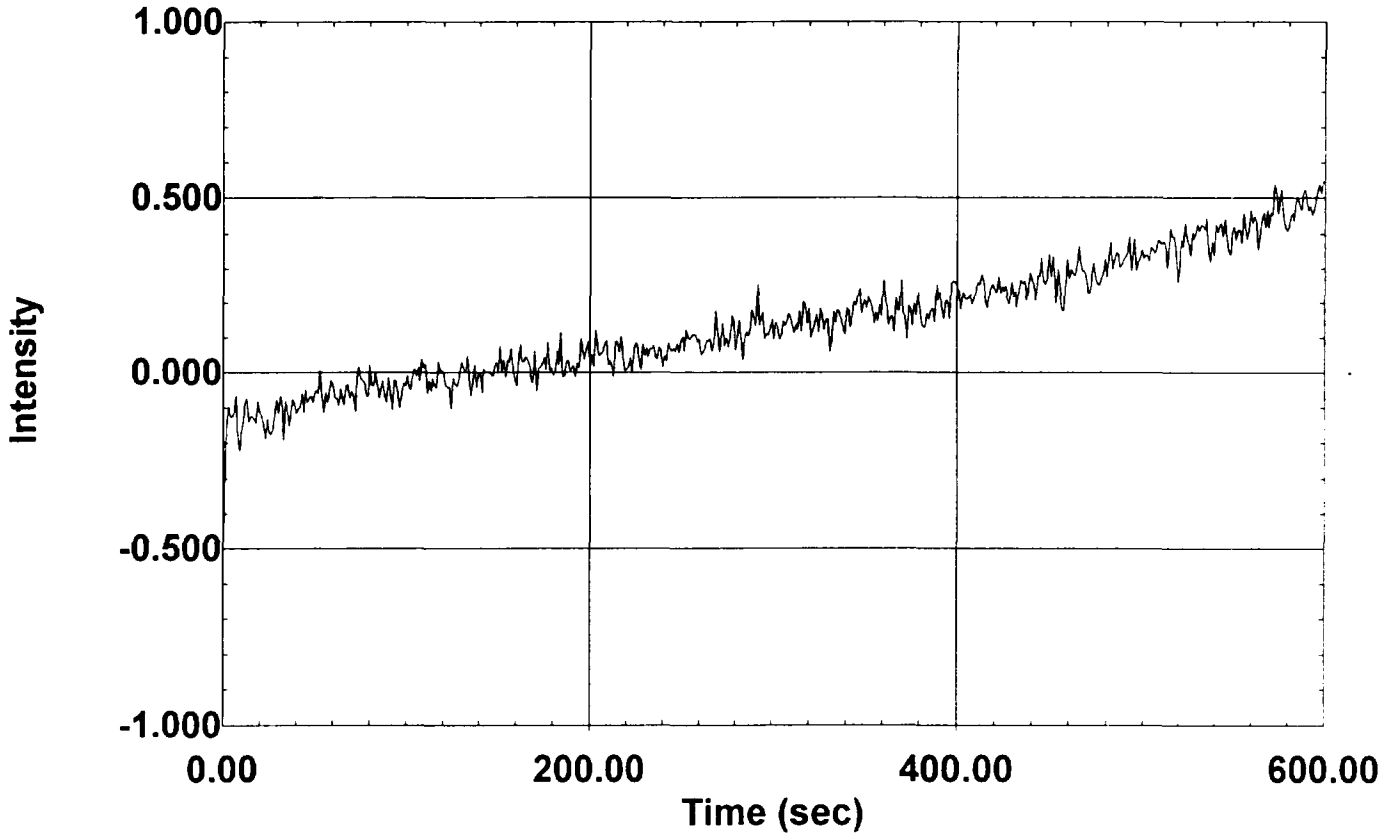
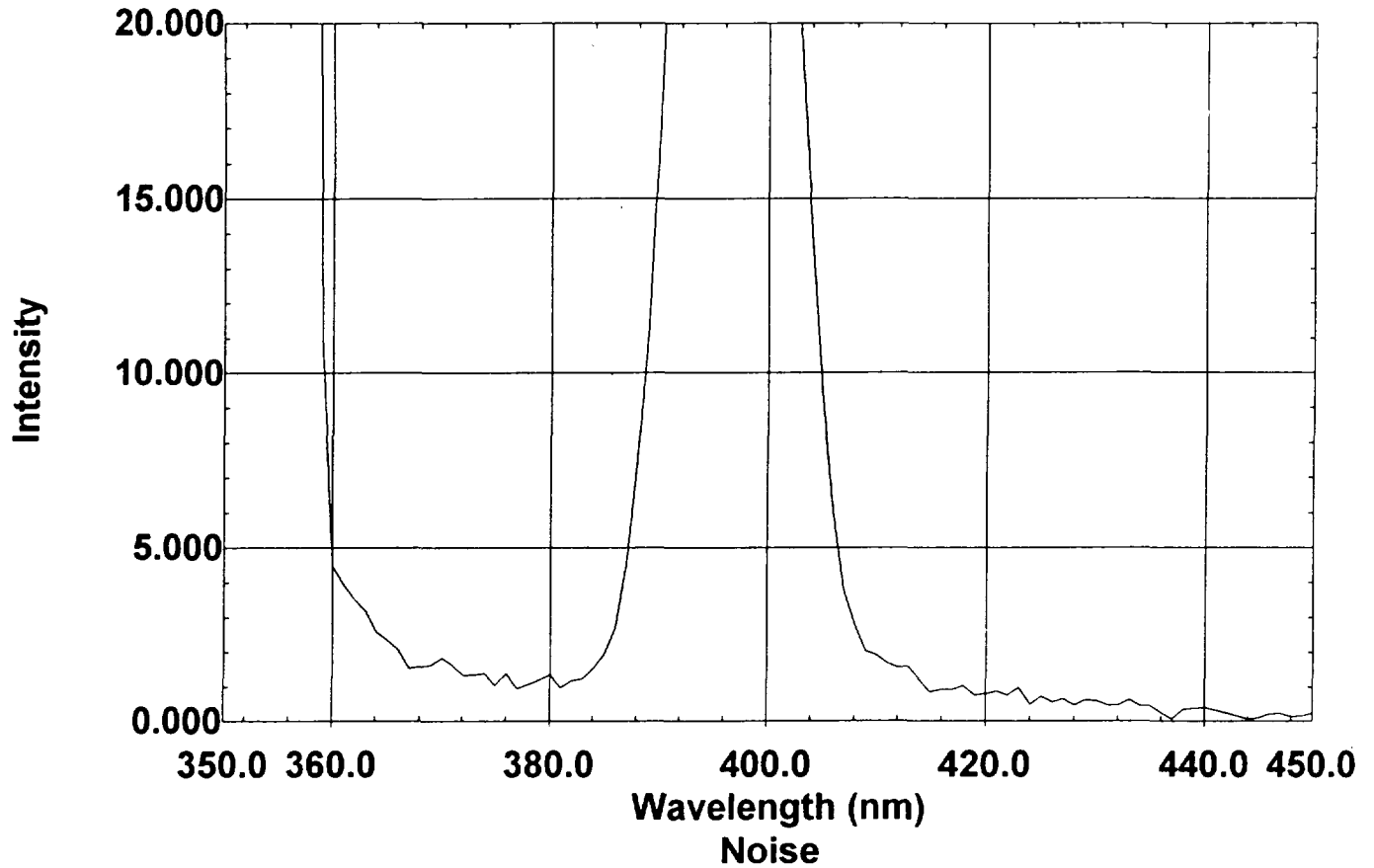
Instrument Serial Number: A401932000510D Printed: 17:12 11/18/96

Peak Height: 57.444

S/N Ratio: 510.538

S/N Ratio Check

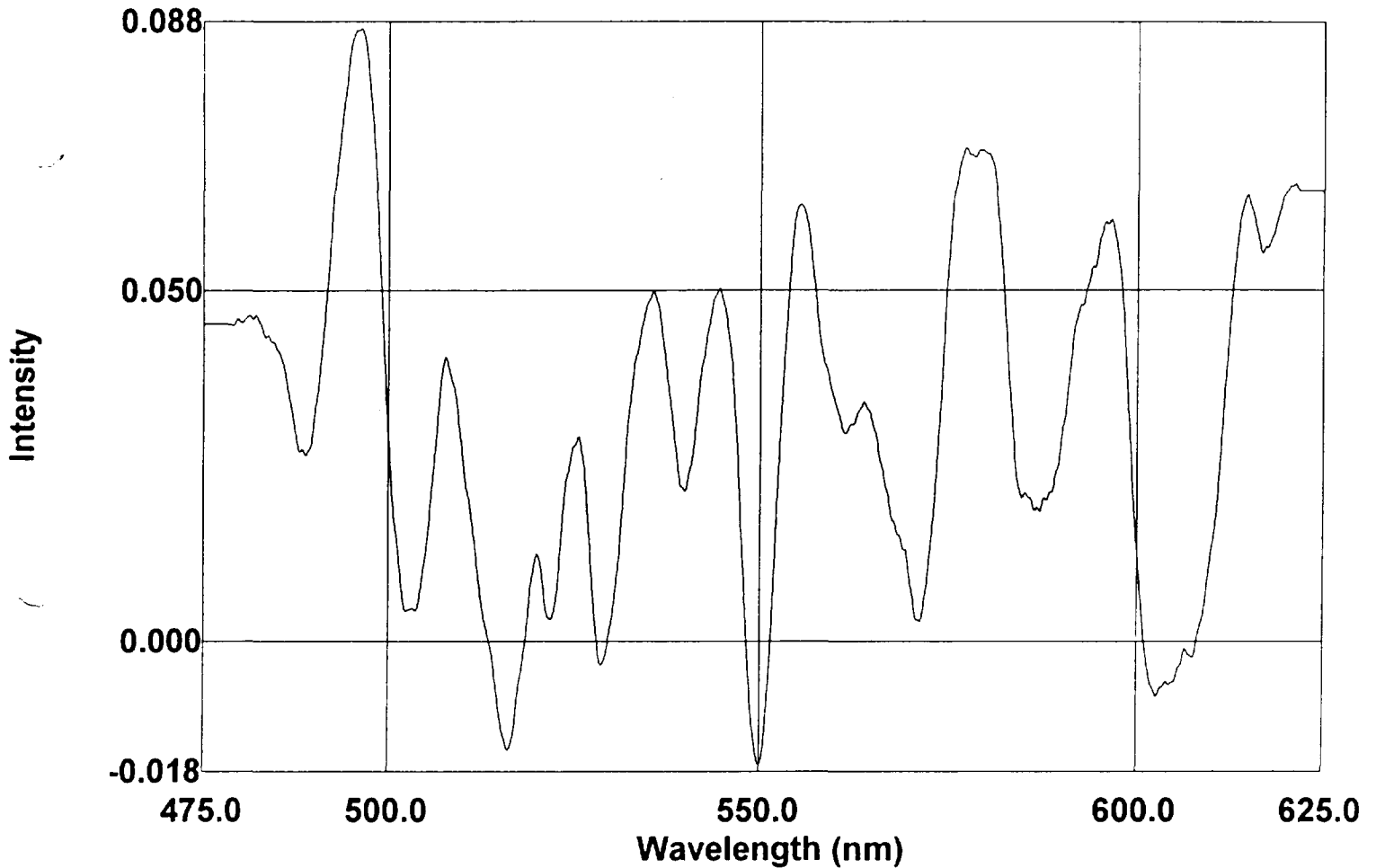
Raman Spectrum



Instrument Serial Number: A401932000510D Printed: 09:45 12/02/96

Peak Height: 54.516

S/N Ratio: 482.016



File Name: 1
 QA-ELUENT
 reated: 10:33 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

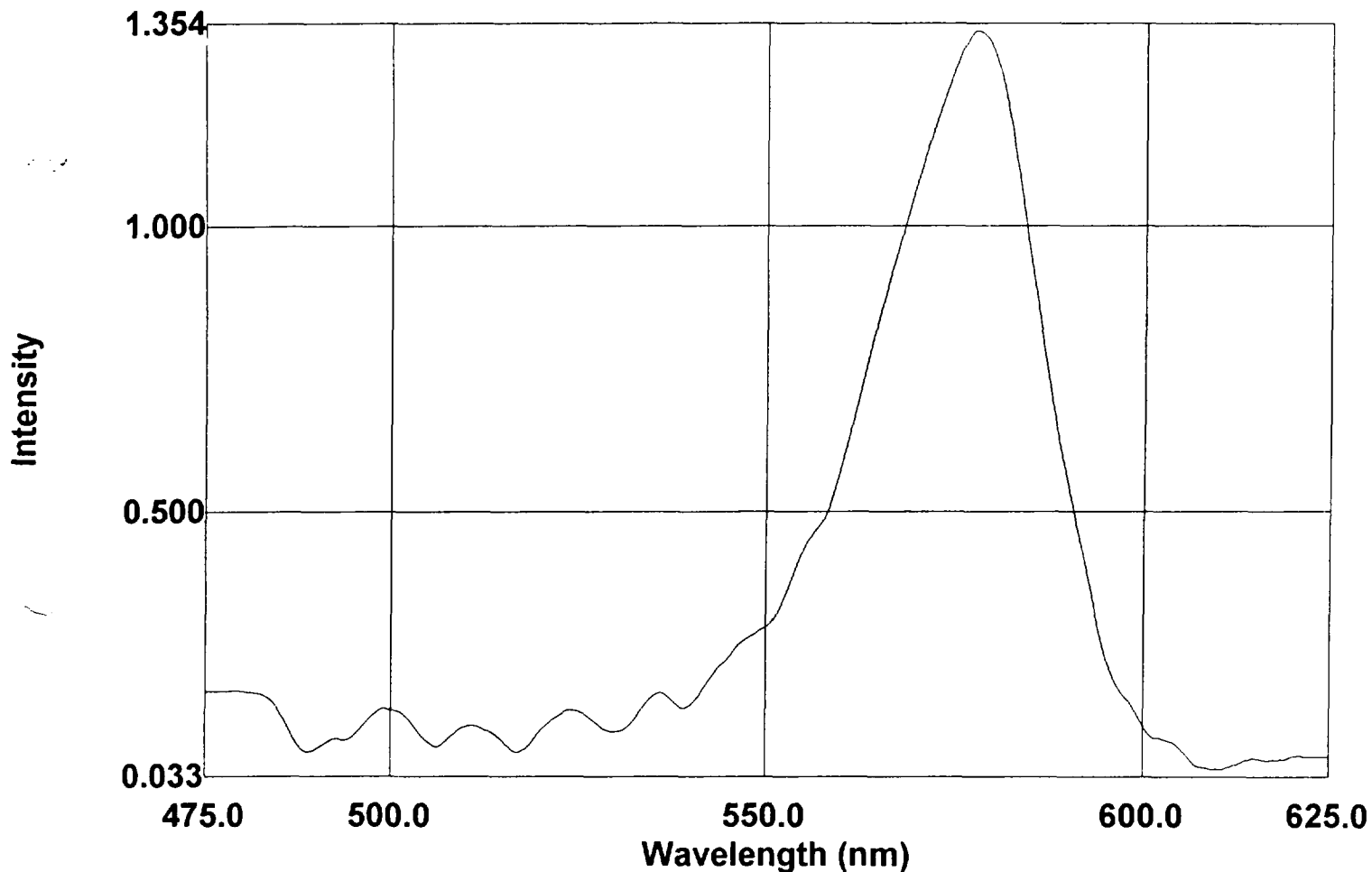
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 11:48 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

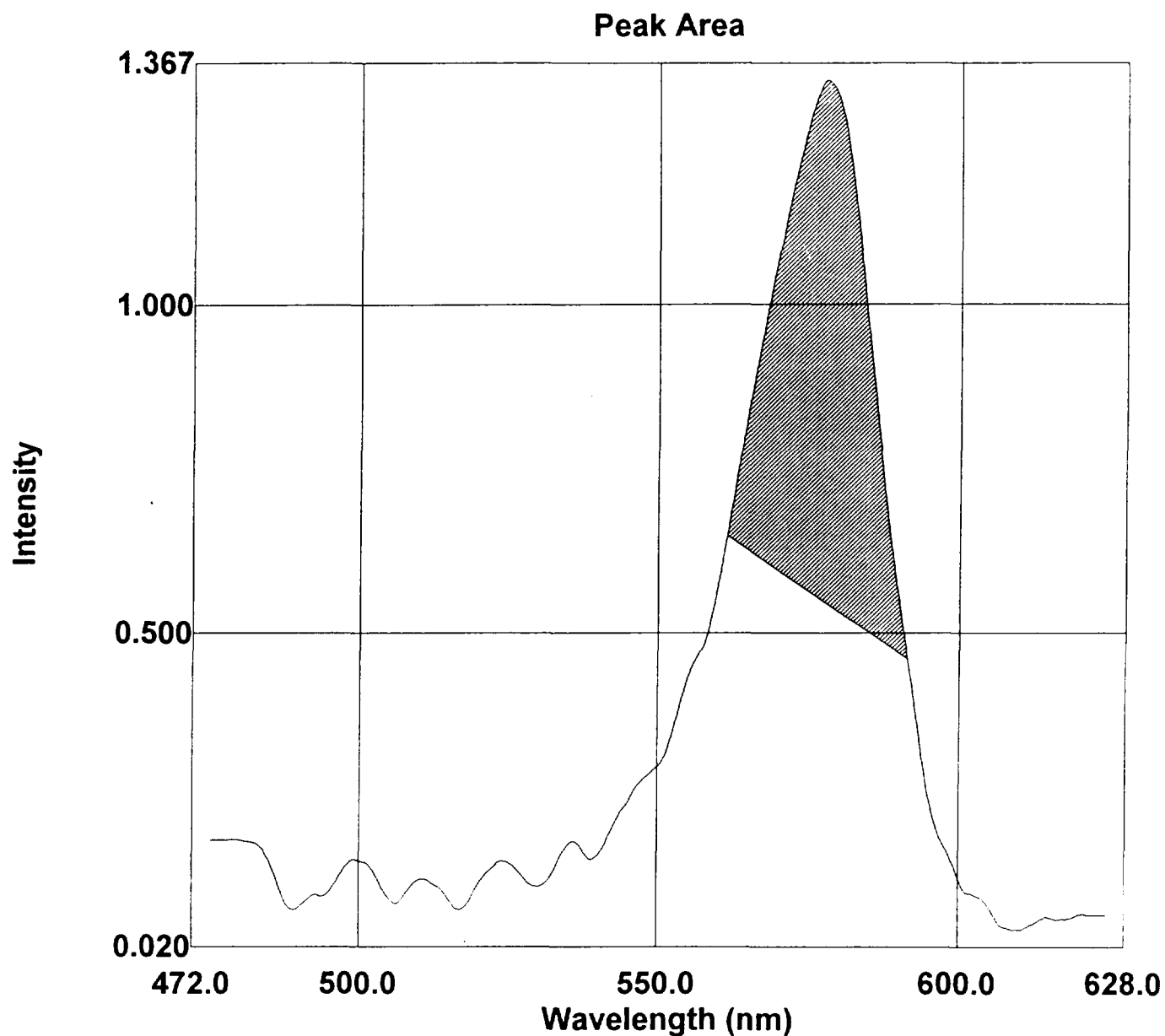
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788




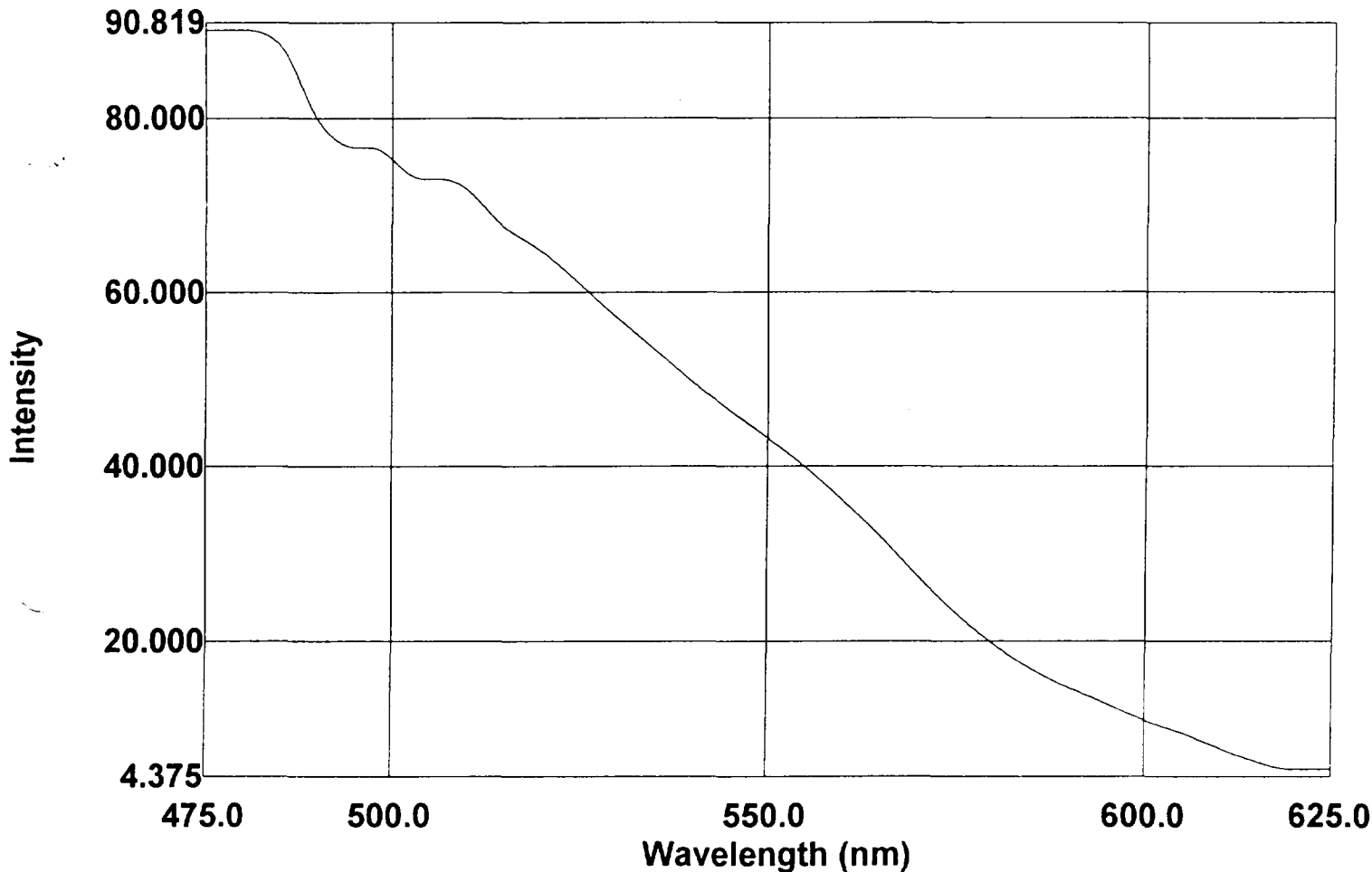
File Name: 2
QA-SULPHORHODAMINE B

Created: 11:48 12/02/96
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
 1	561.4	591.4	2004.410	13.702	6.836



File Name: CW6EP

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

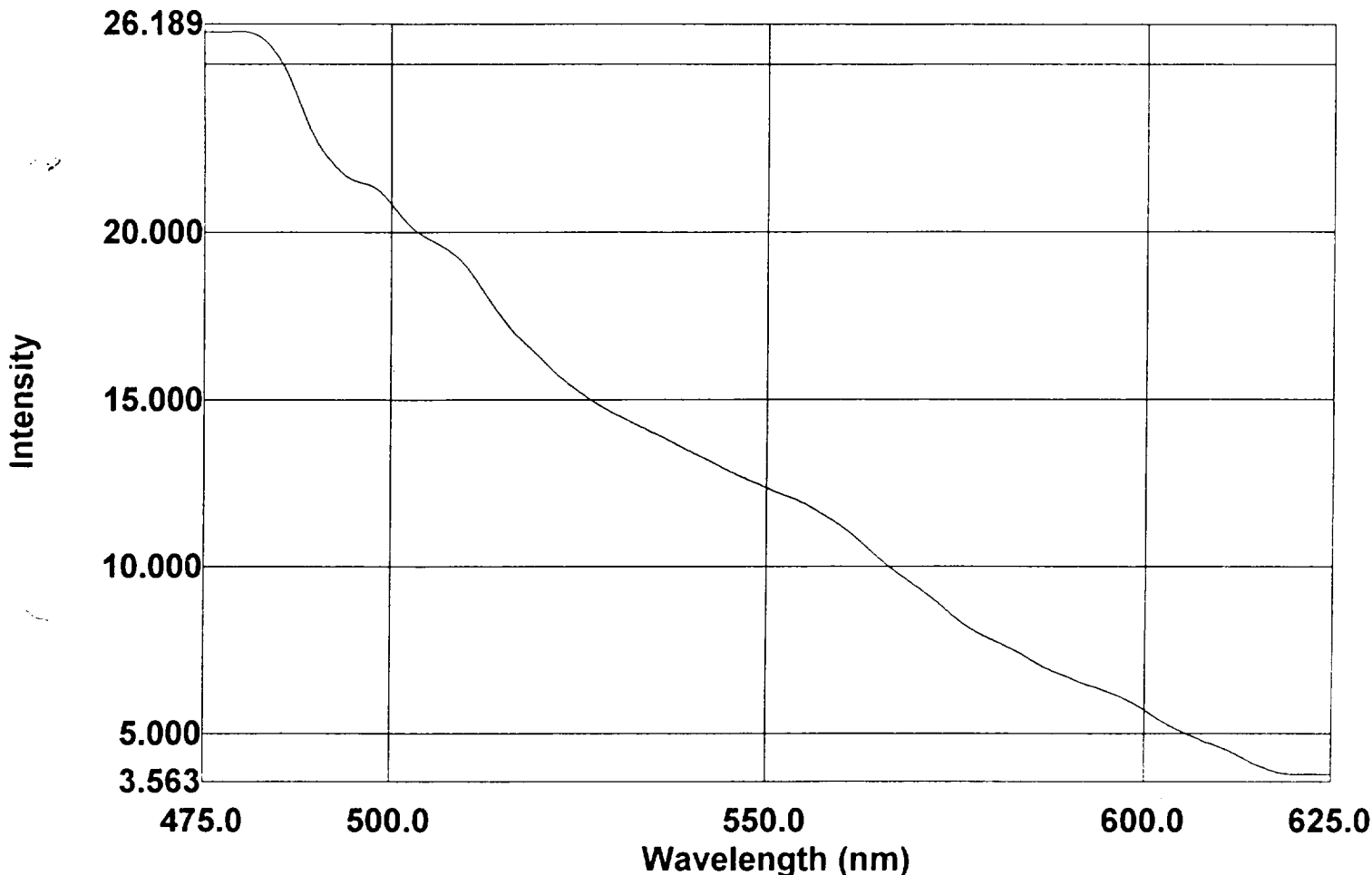
Created: 11:50 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: CW19EP

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

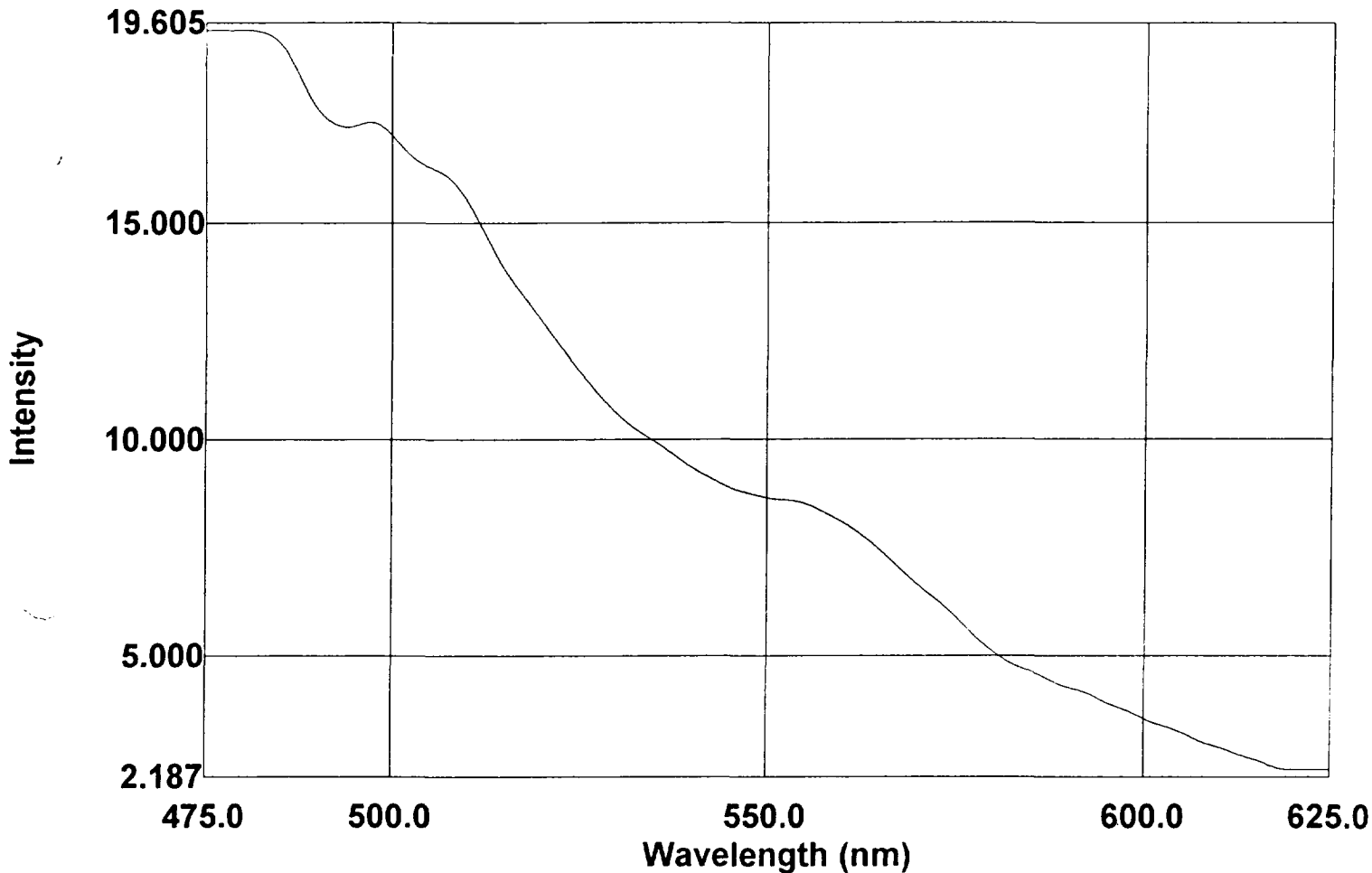
Created: 11:51 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: CW31EP

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

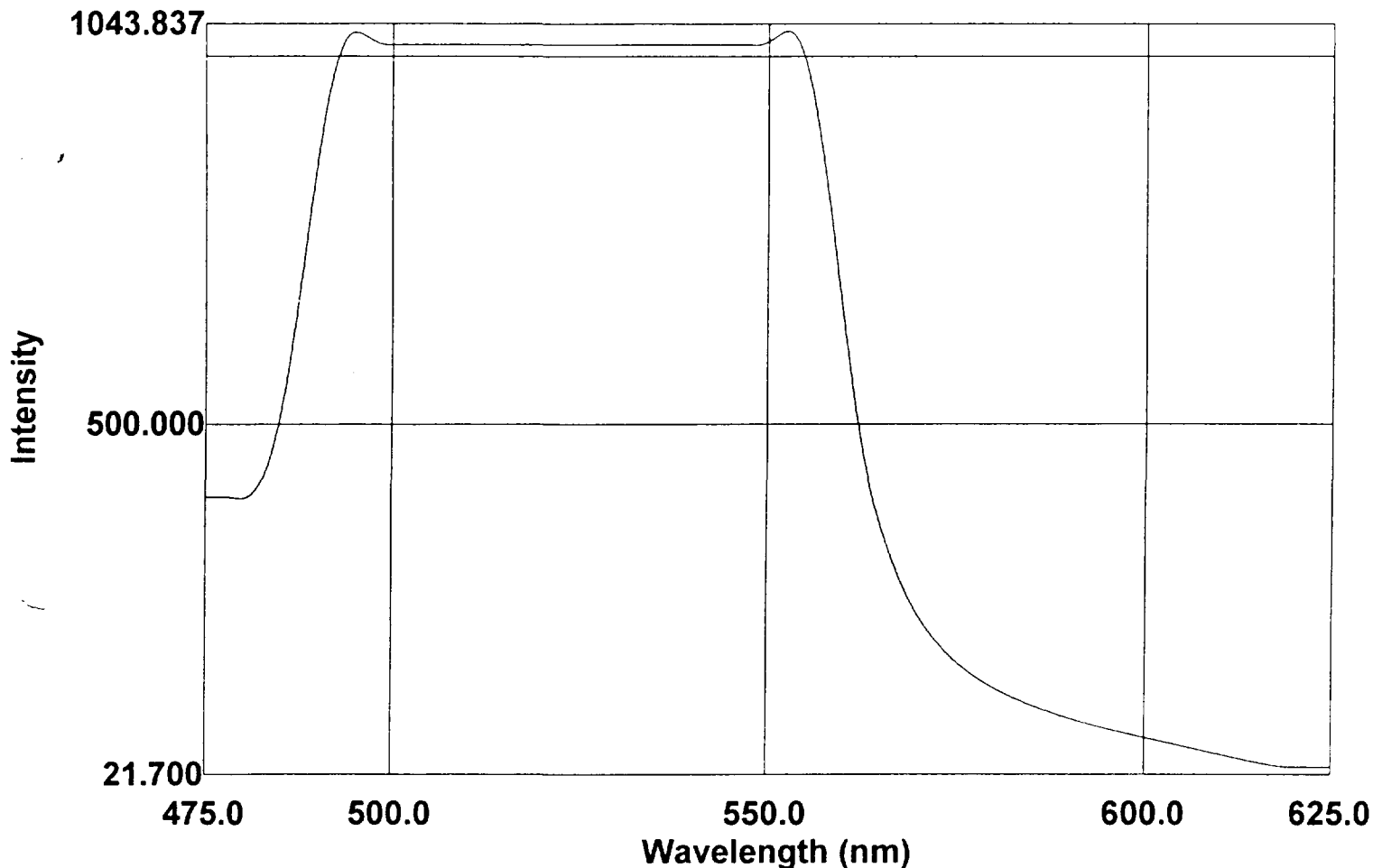
Created: 11:52 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: CW51EP

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

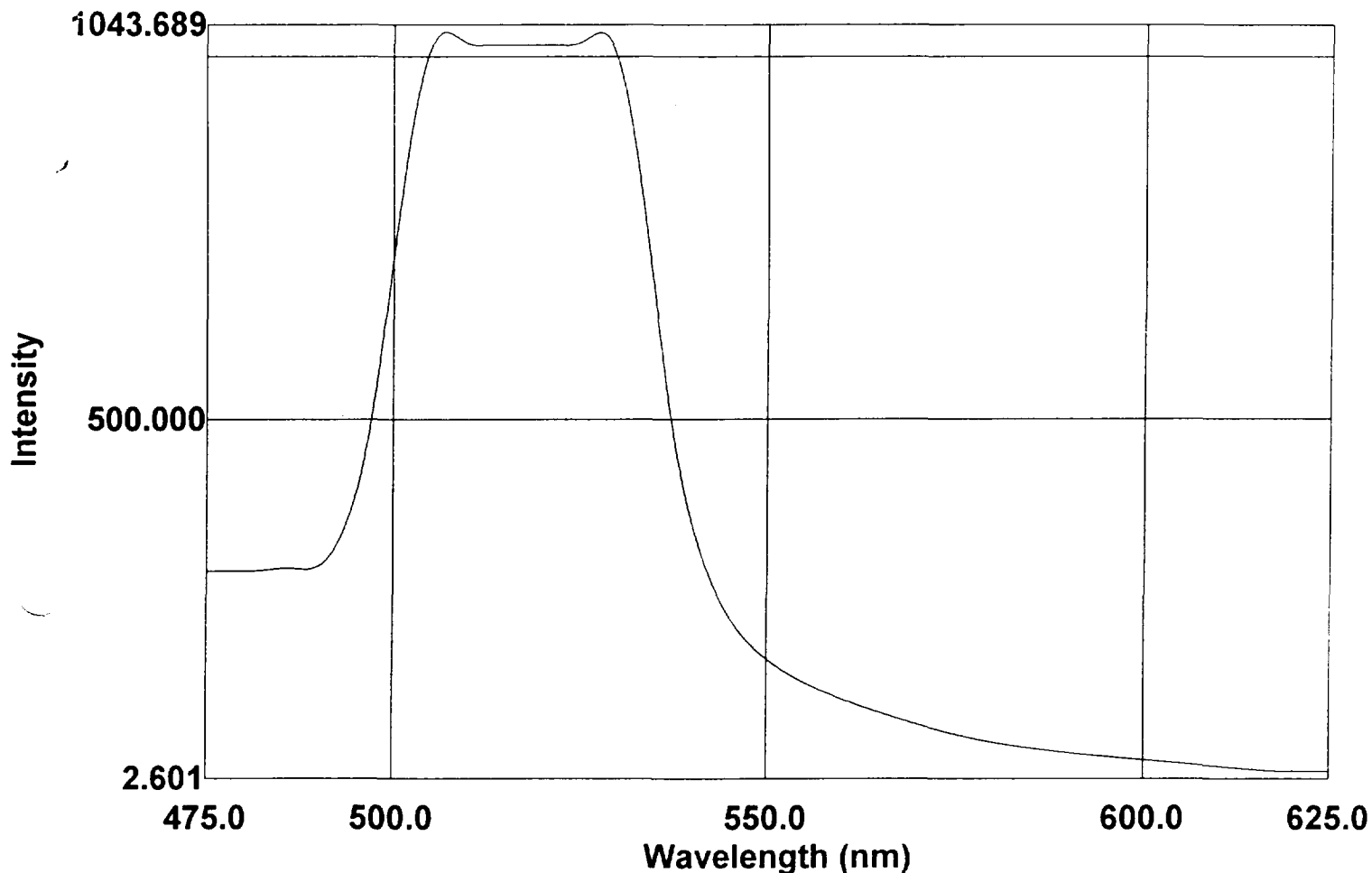
Created: 11:53 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: CW60EP

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

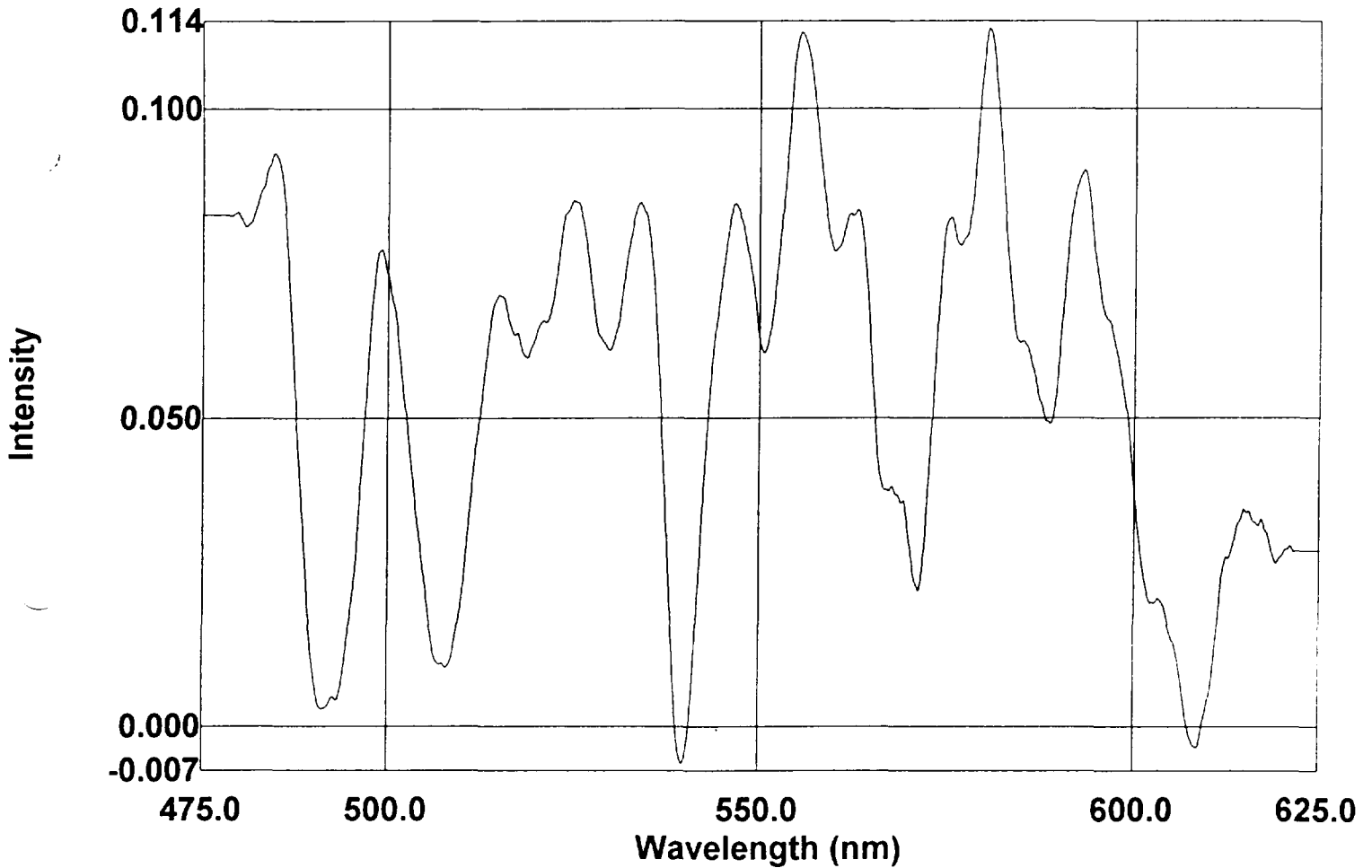
Created: 11:54 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 3
 QA-ELUENT
 Created: 11:54 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

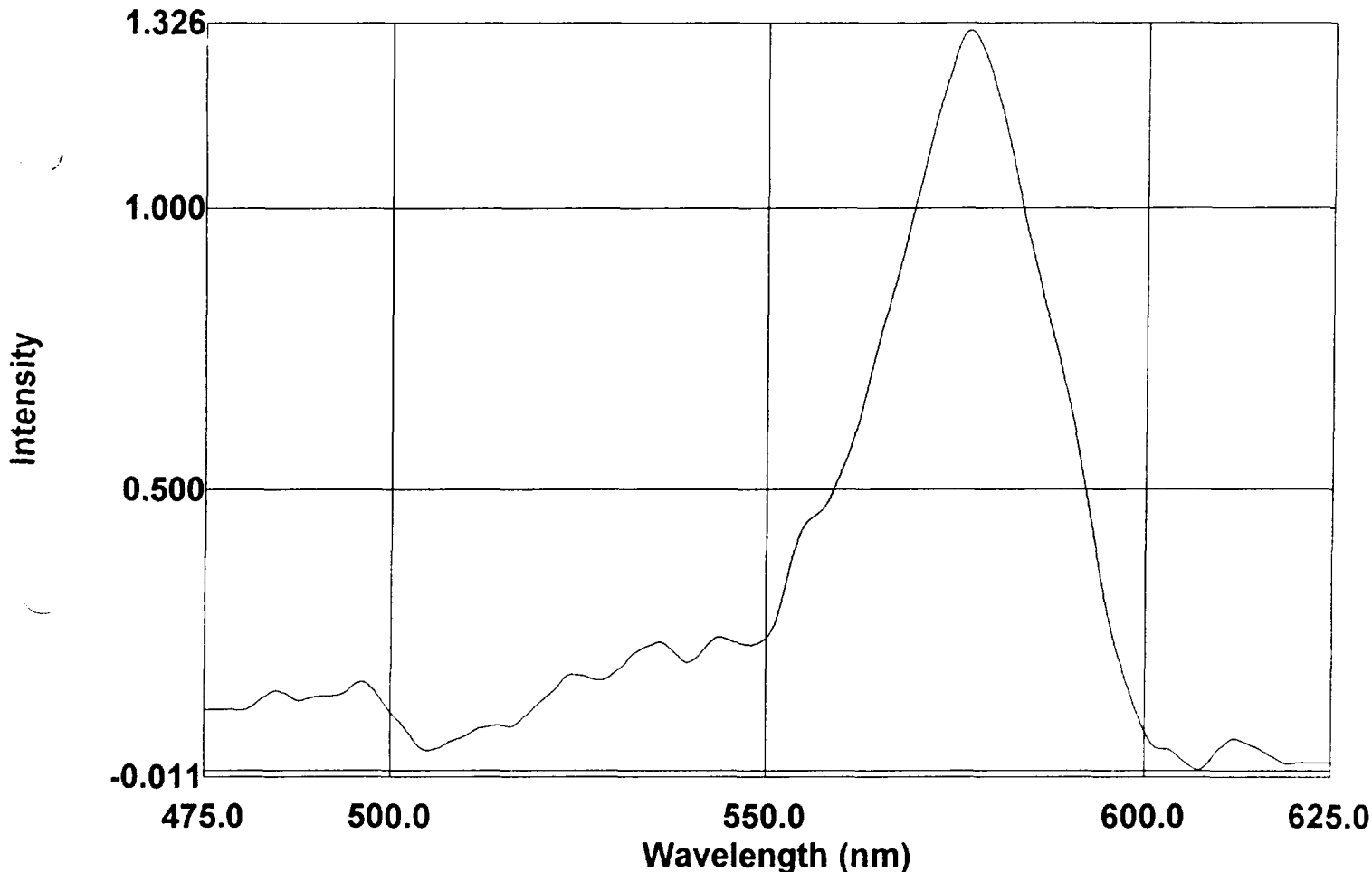
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4

QA-SULPHORHODAMINE B

Created: 11:55 12/02/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

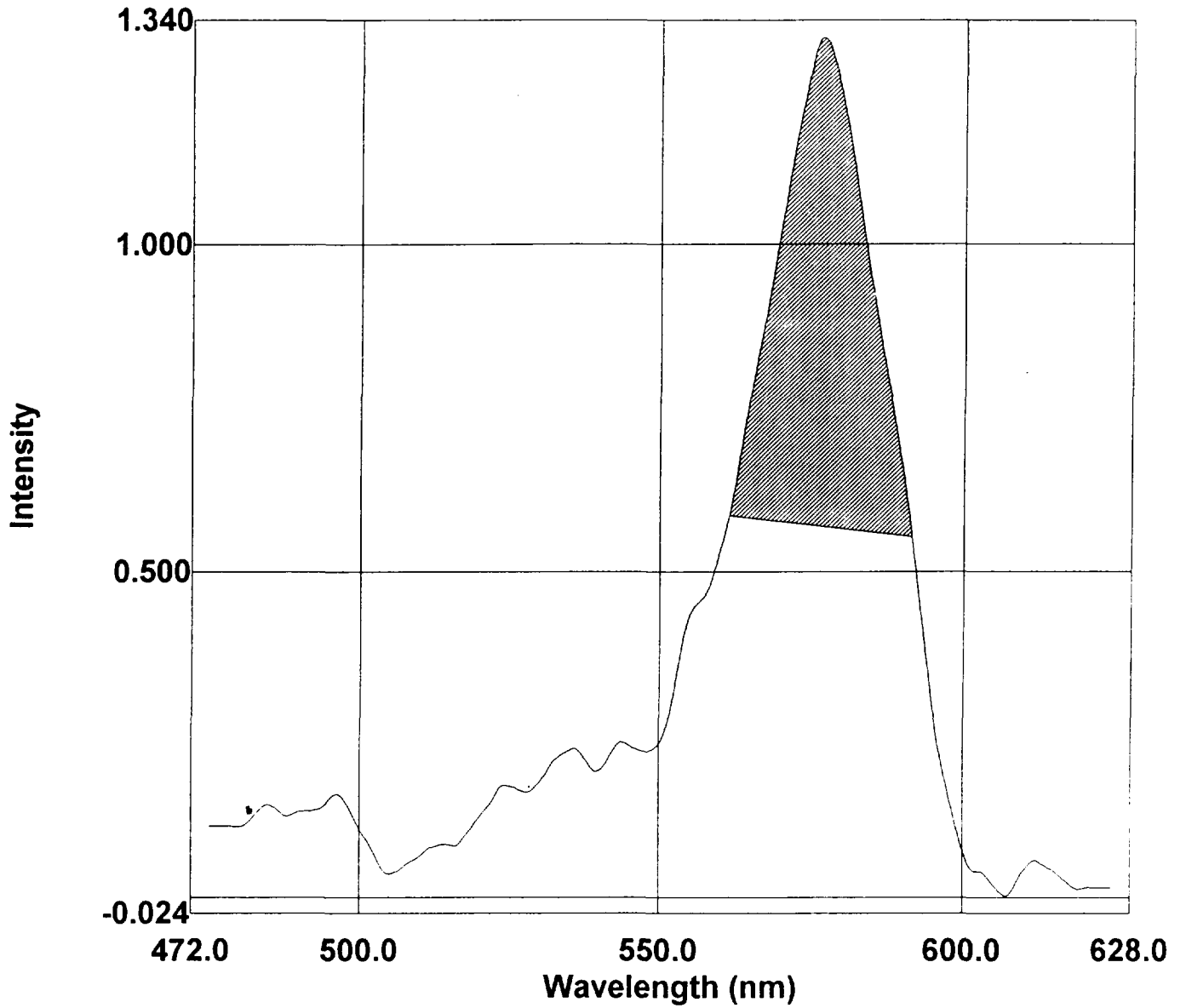
Michigan Chemical Complex Site 034

SET 05 -- 11/26/96

Samples Analyzed by:
 ANDREI KERPAN

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



File Name: 4
QA-SULPHORHODAMINE B

Created: 11:55 12/02/96
Data: Modified

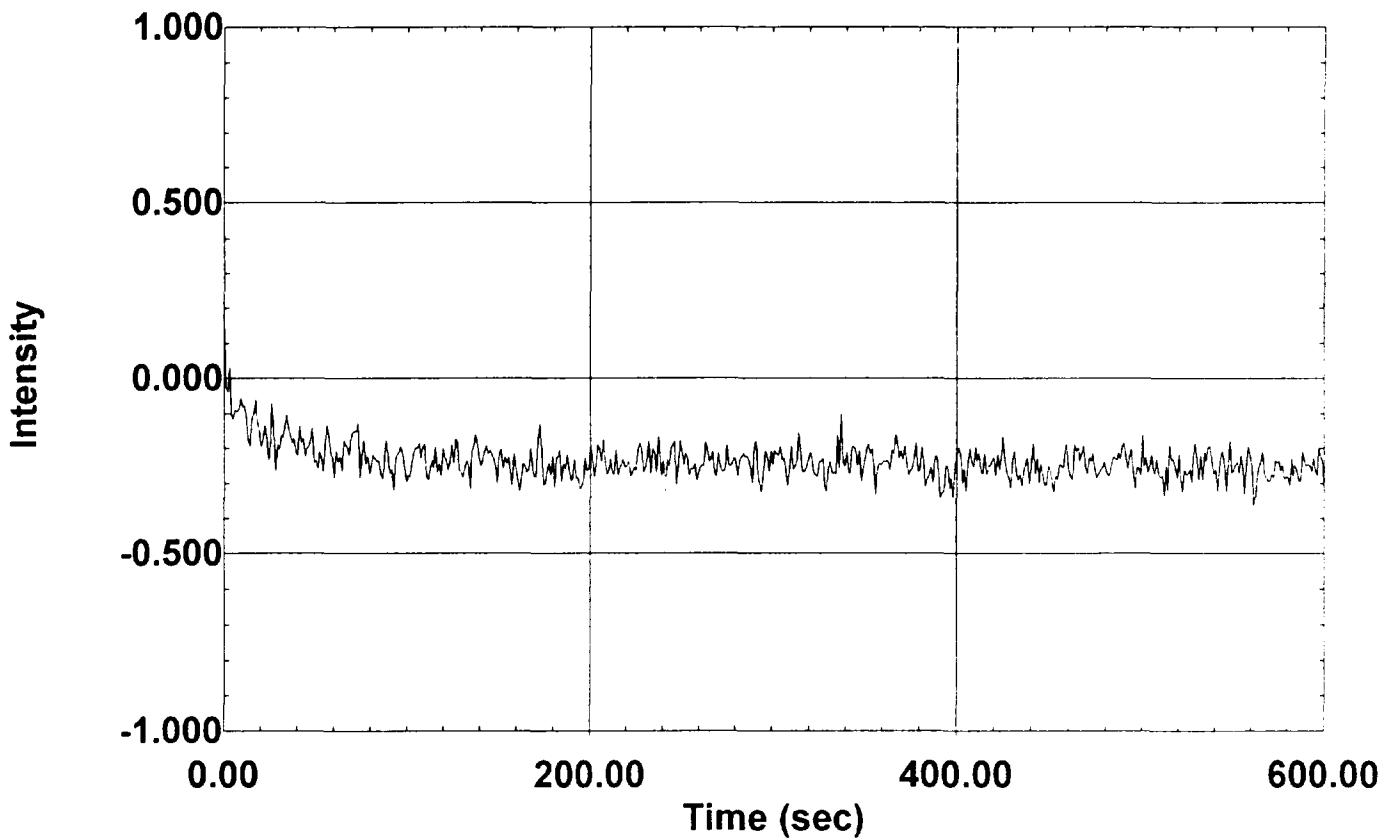
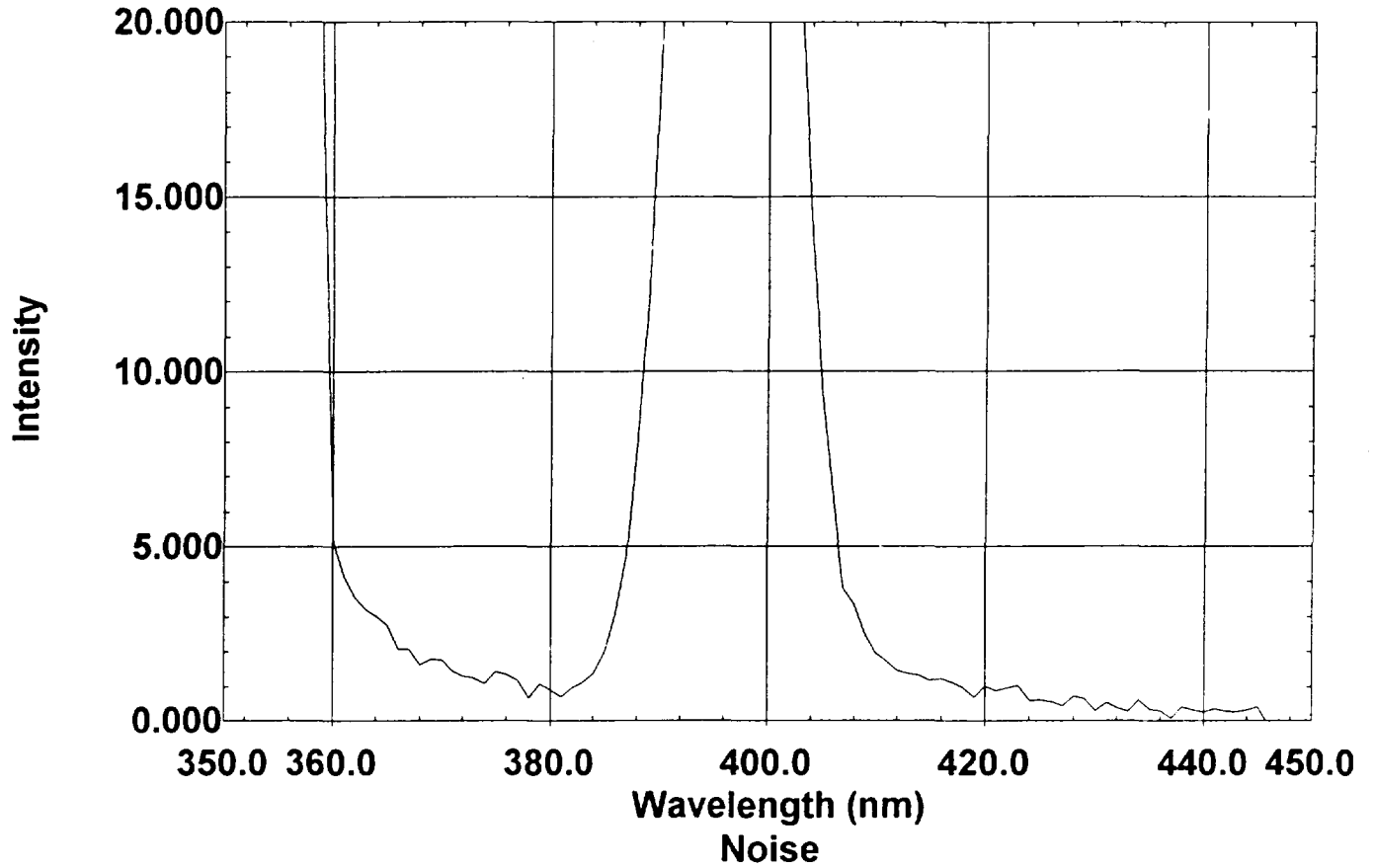
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	12.480	6.226

S/N Ratio Check

Raman Spectrum



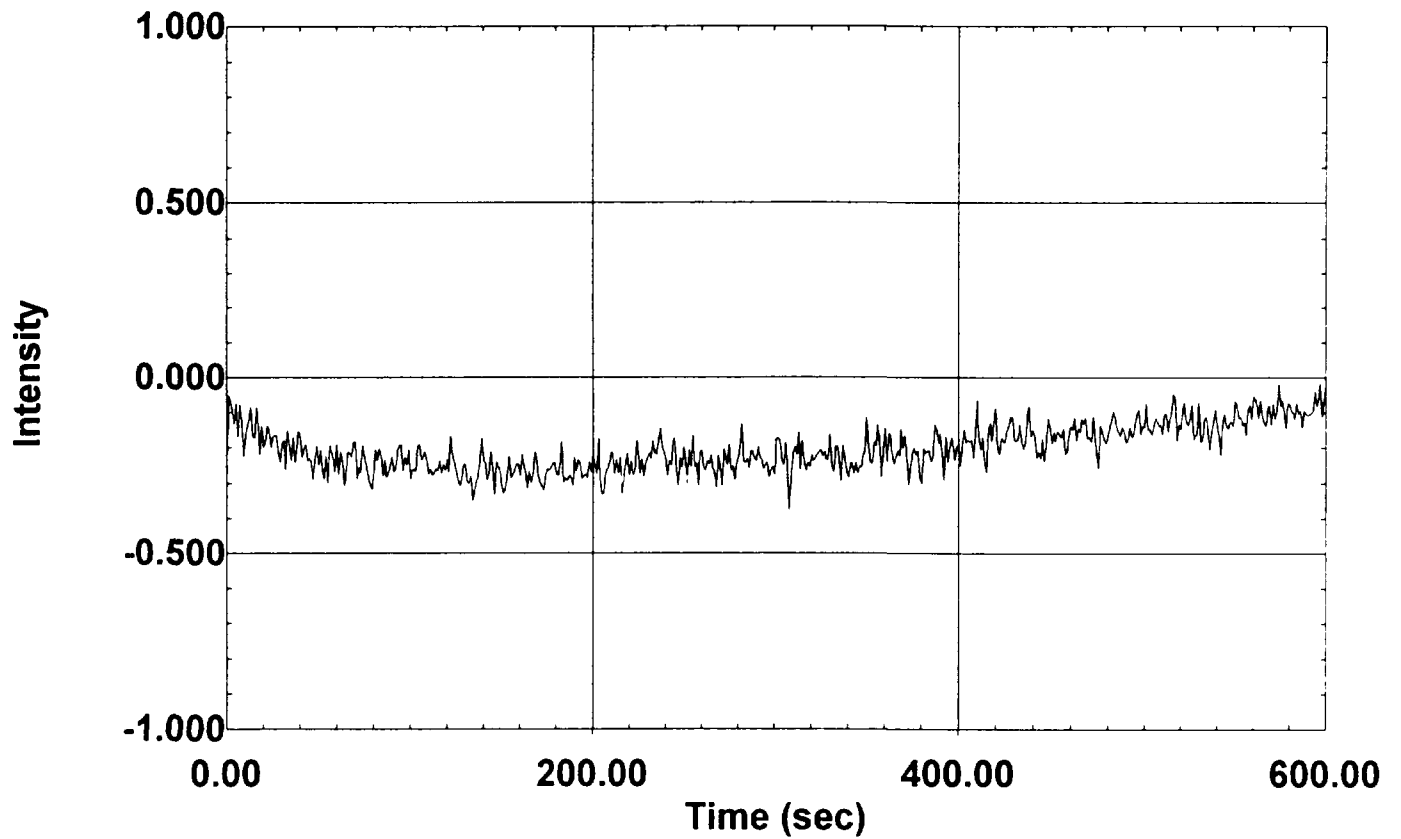
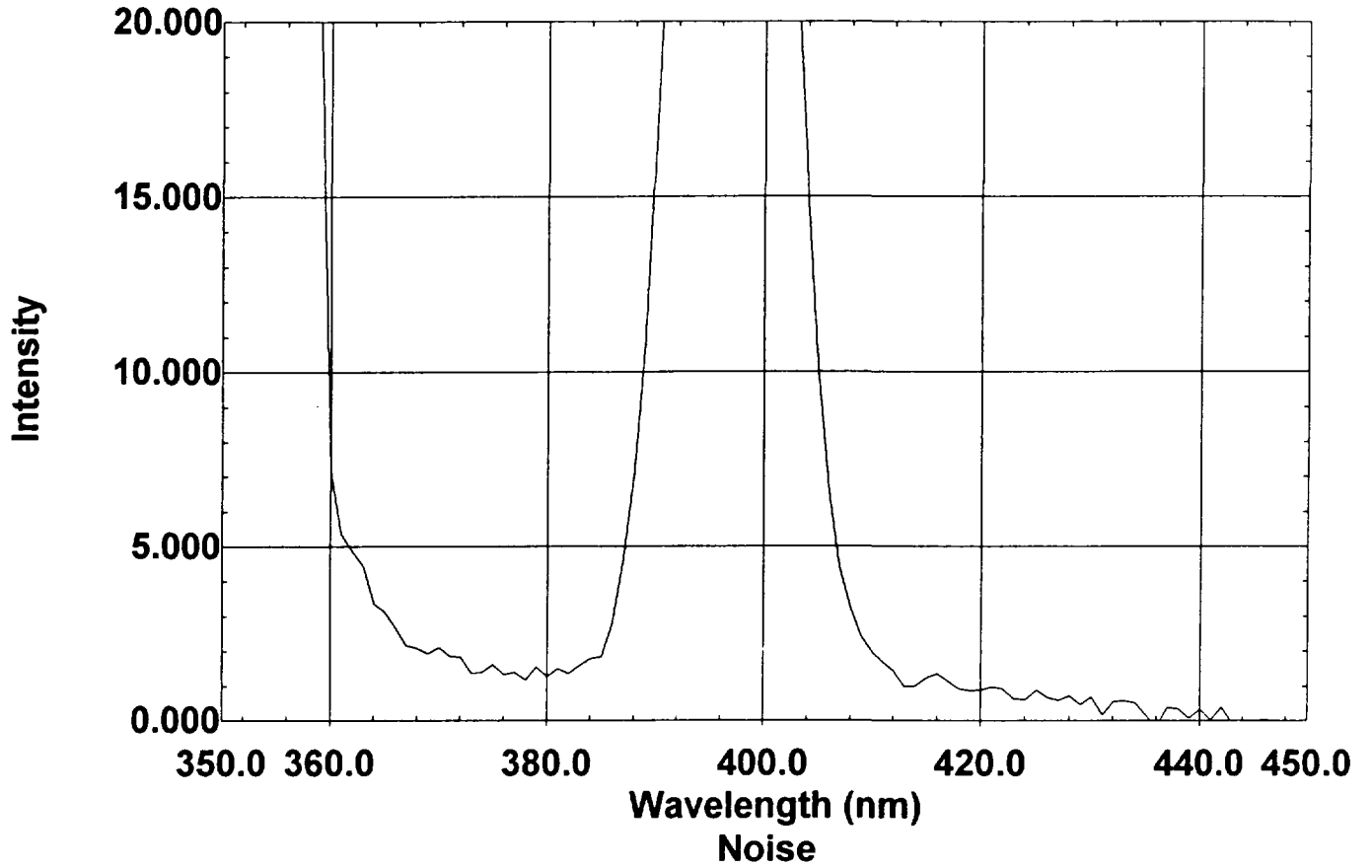
Instrument Serial Number: A401932000510D Printed: 12:17 12/02/96

Peak Height: 57.922

S/N Ratio: 486.671

S/N Ratio Check

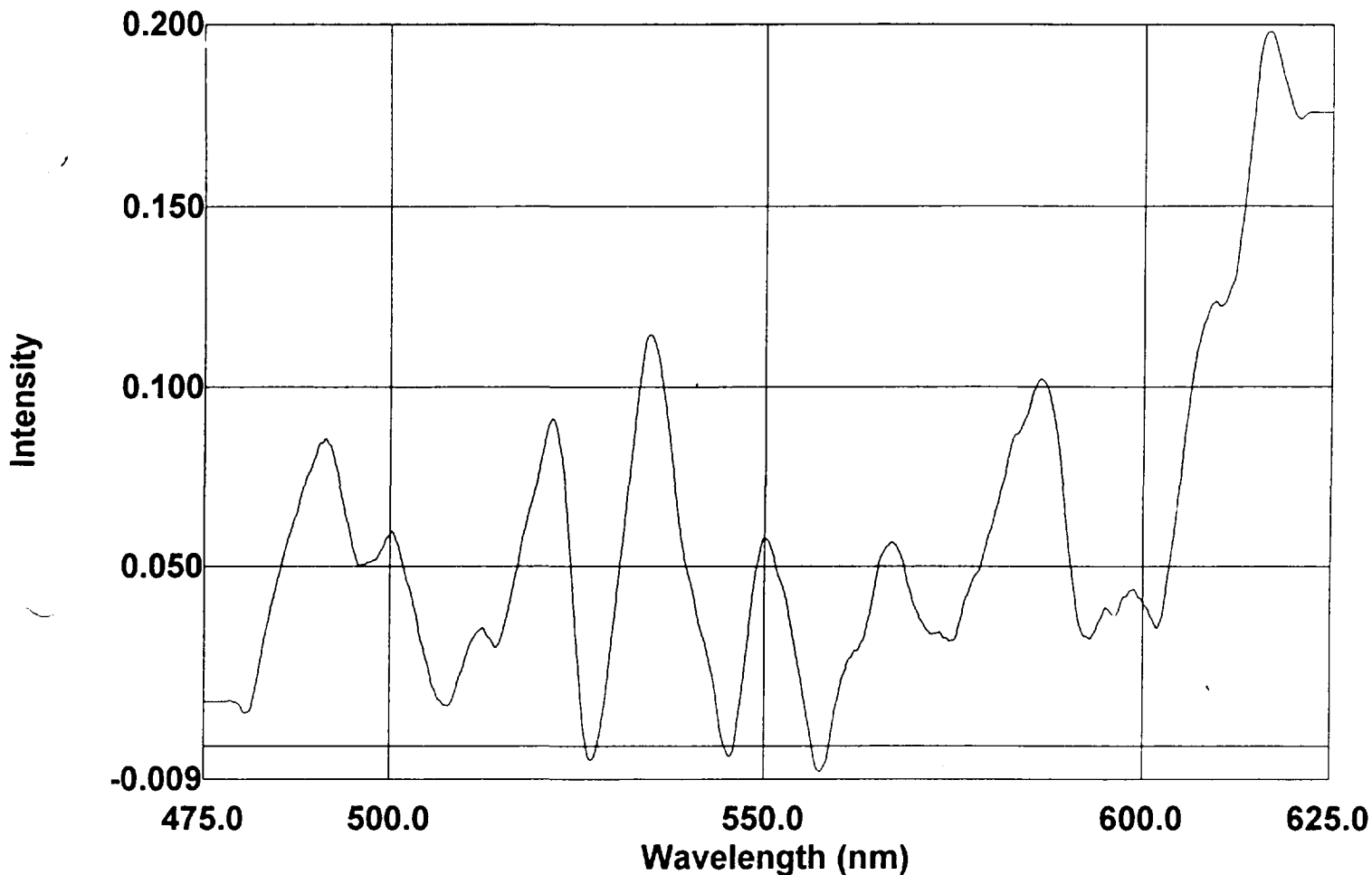
Raman Spectrum



Instrument Serial Number: A401932000510D Printed: 09:34 12/13/96

Peak Height: 55.873

S/N Ratio: 488.543



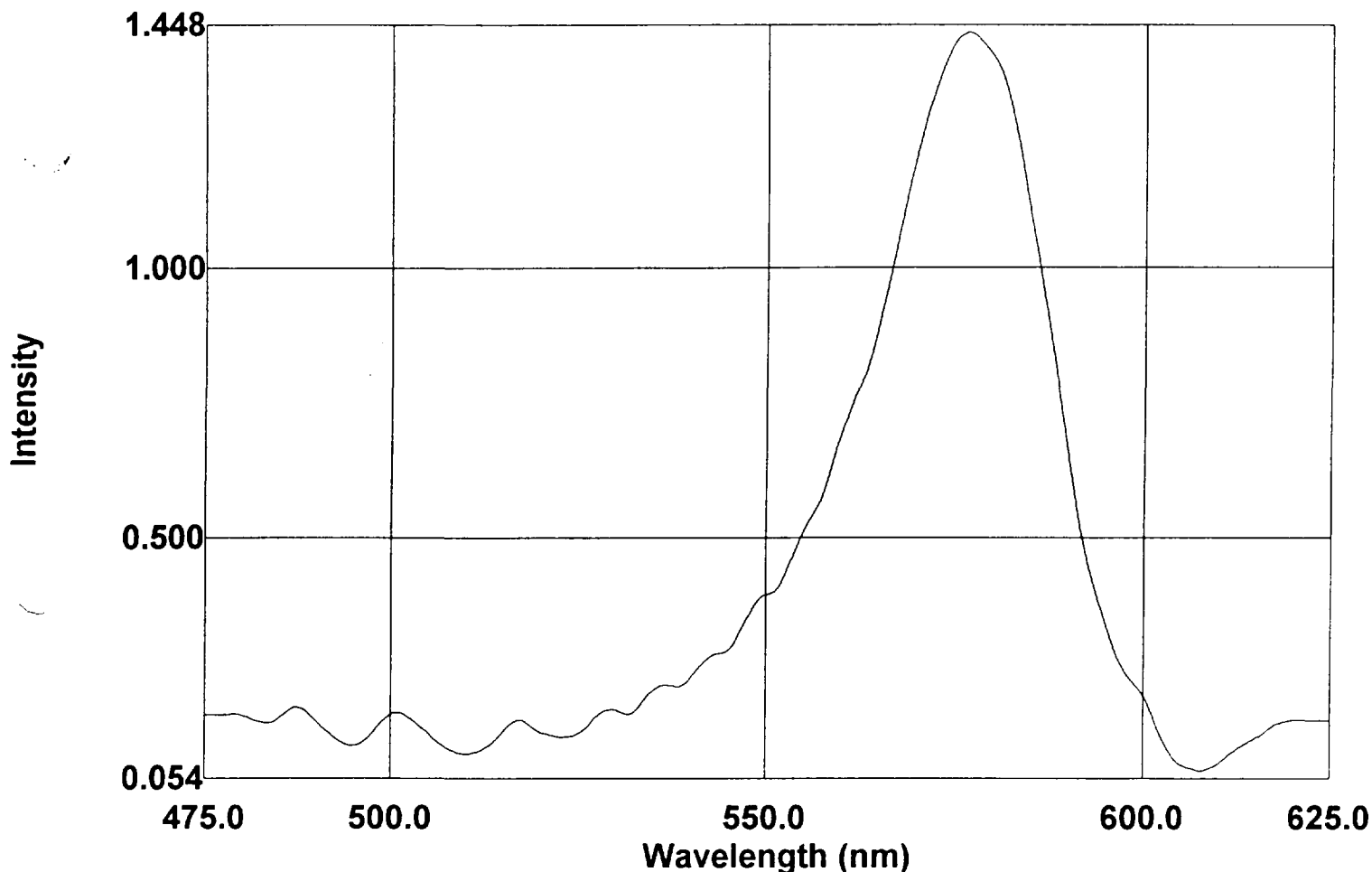
File Name: 1
 QA-ELUENT
 Created: 09:54 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

reated: 10:17 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

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 Phone: (502) 745-9224
 FAX: (502) 846-4319

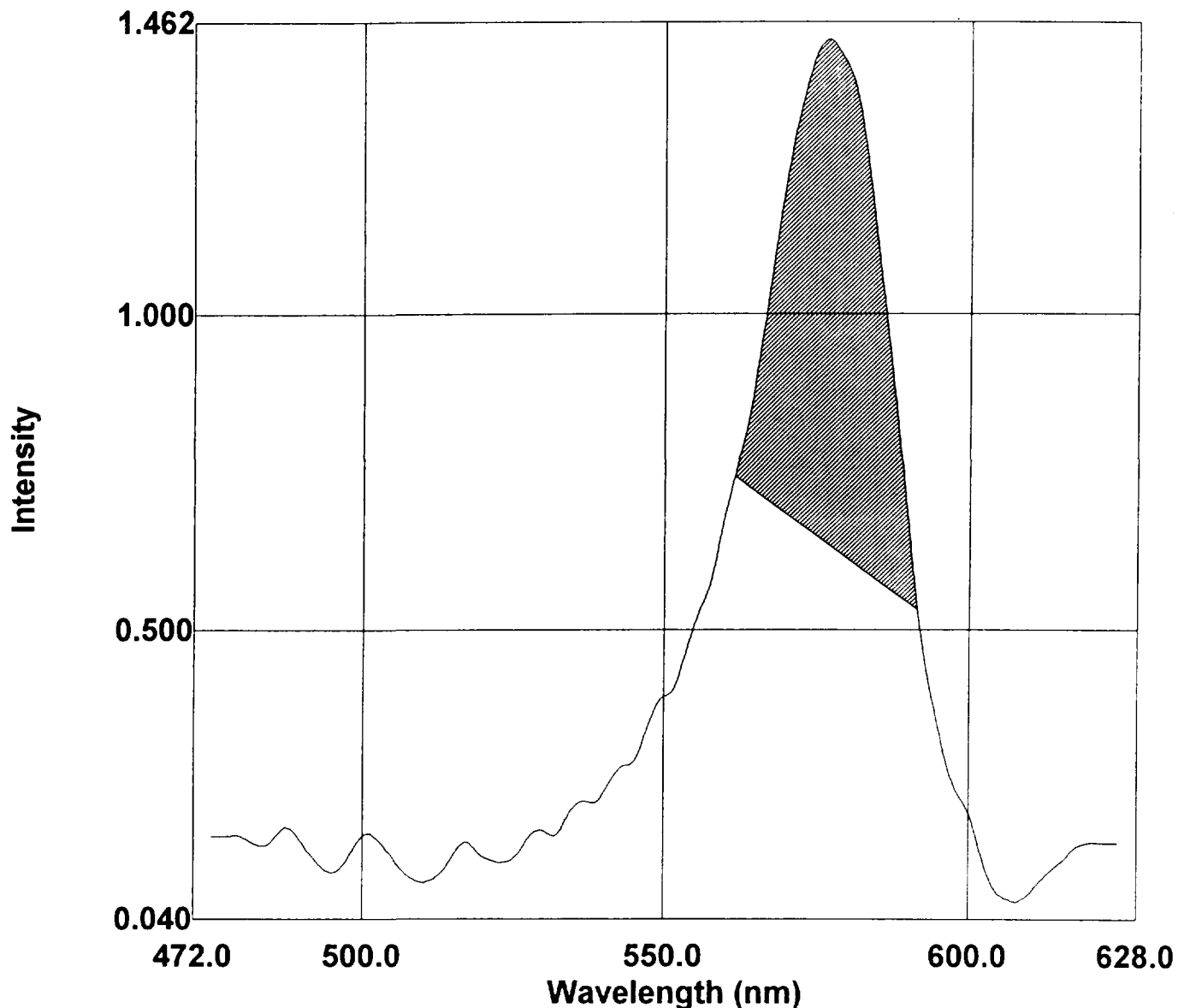
Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



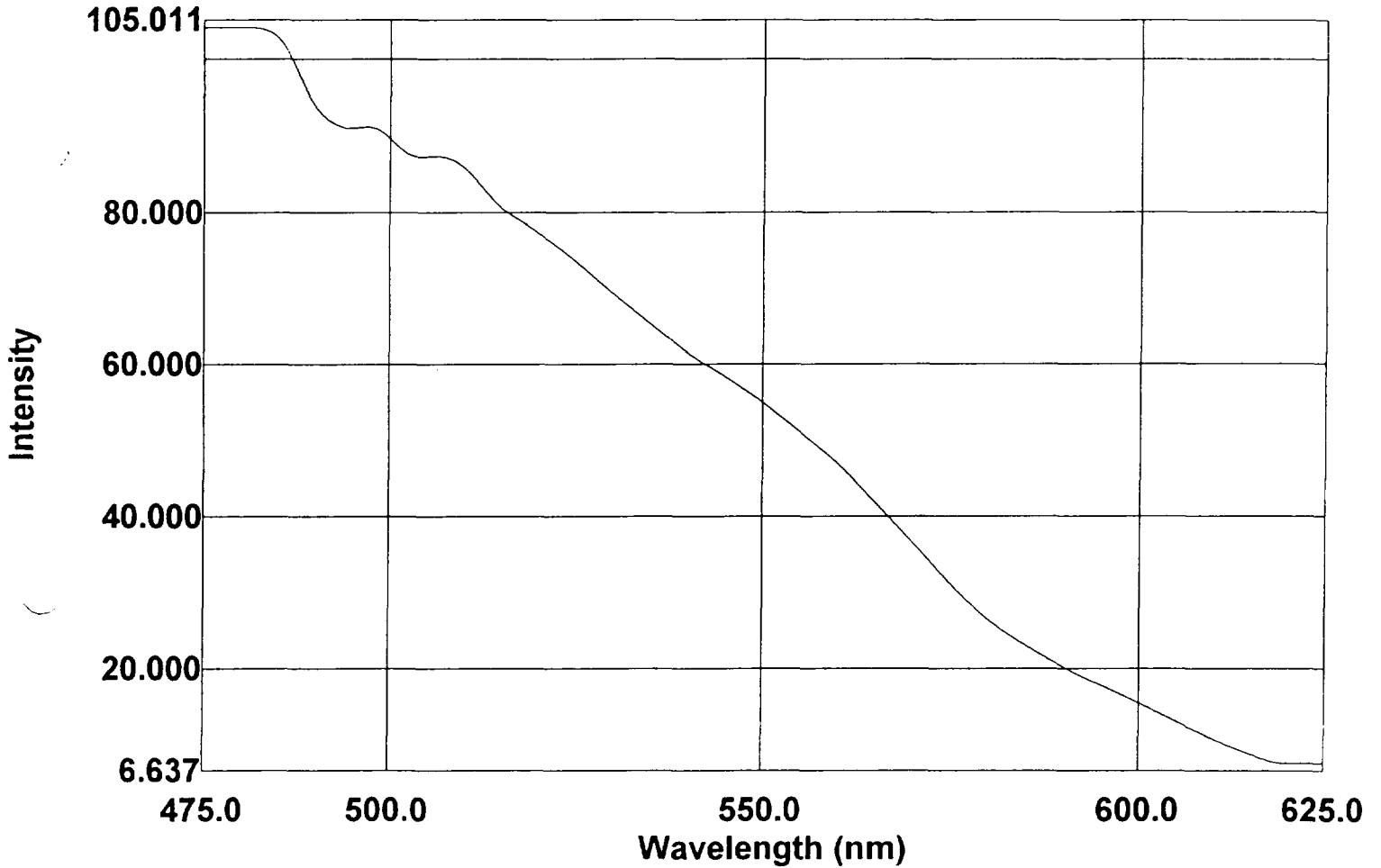
File Name: 2
QA-SULPHORHODAMINE B

Created: 10:17 12/13/96
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1000.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	14.699	7.333



File Name: 3
 CW 6 EP
 Created: 10:20 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

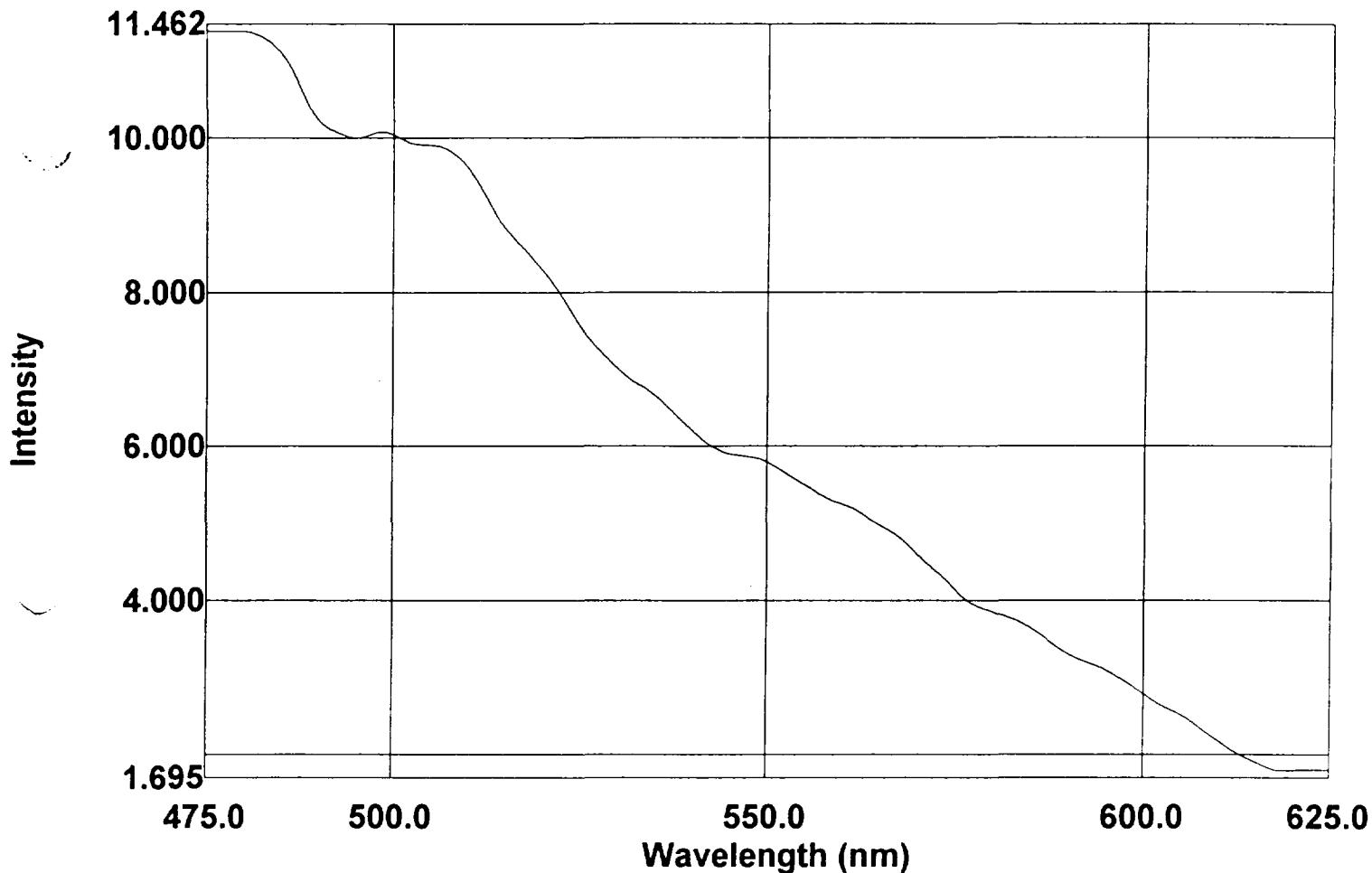
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4

CW 19 EP

reated: 10:21 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

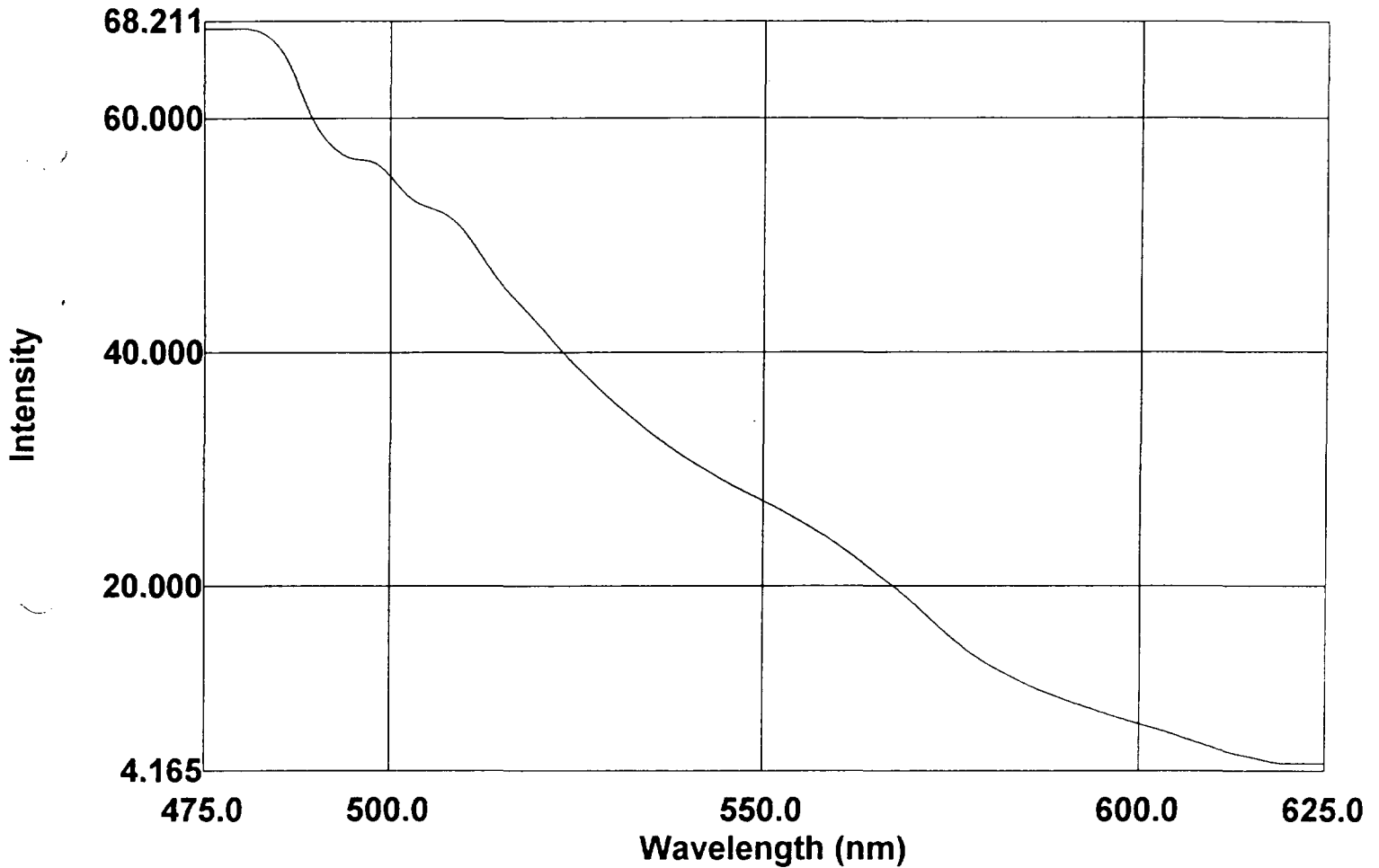
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5
 CW 31 EP
 Created: 10:22 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

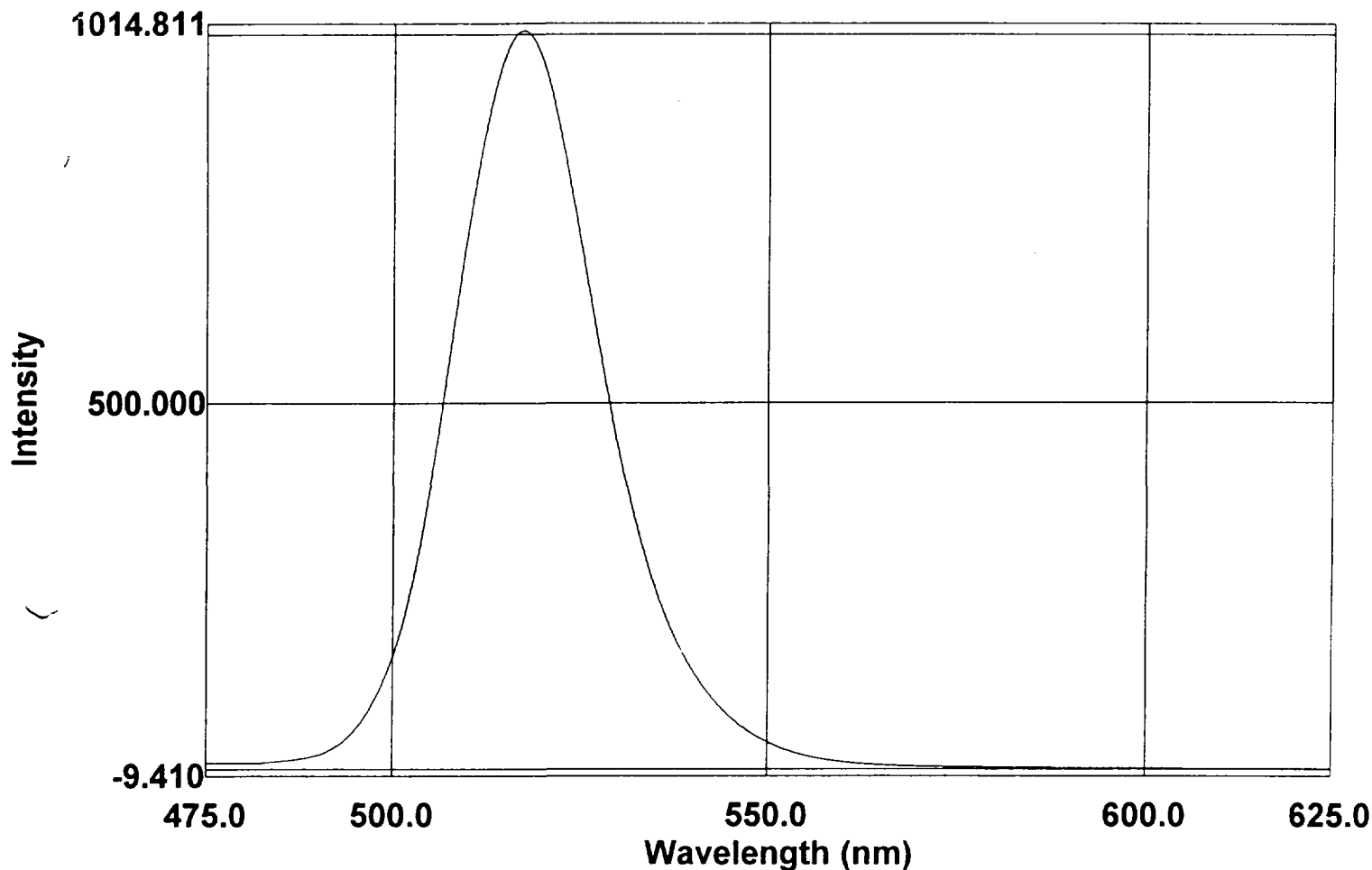
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6
 CW 51 EP
 Created: 10:29 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: Low
 Response Time: Auto
 Shutter: Auto, Closed

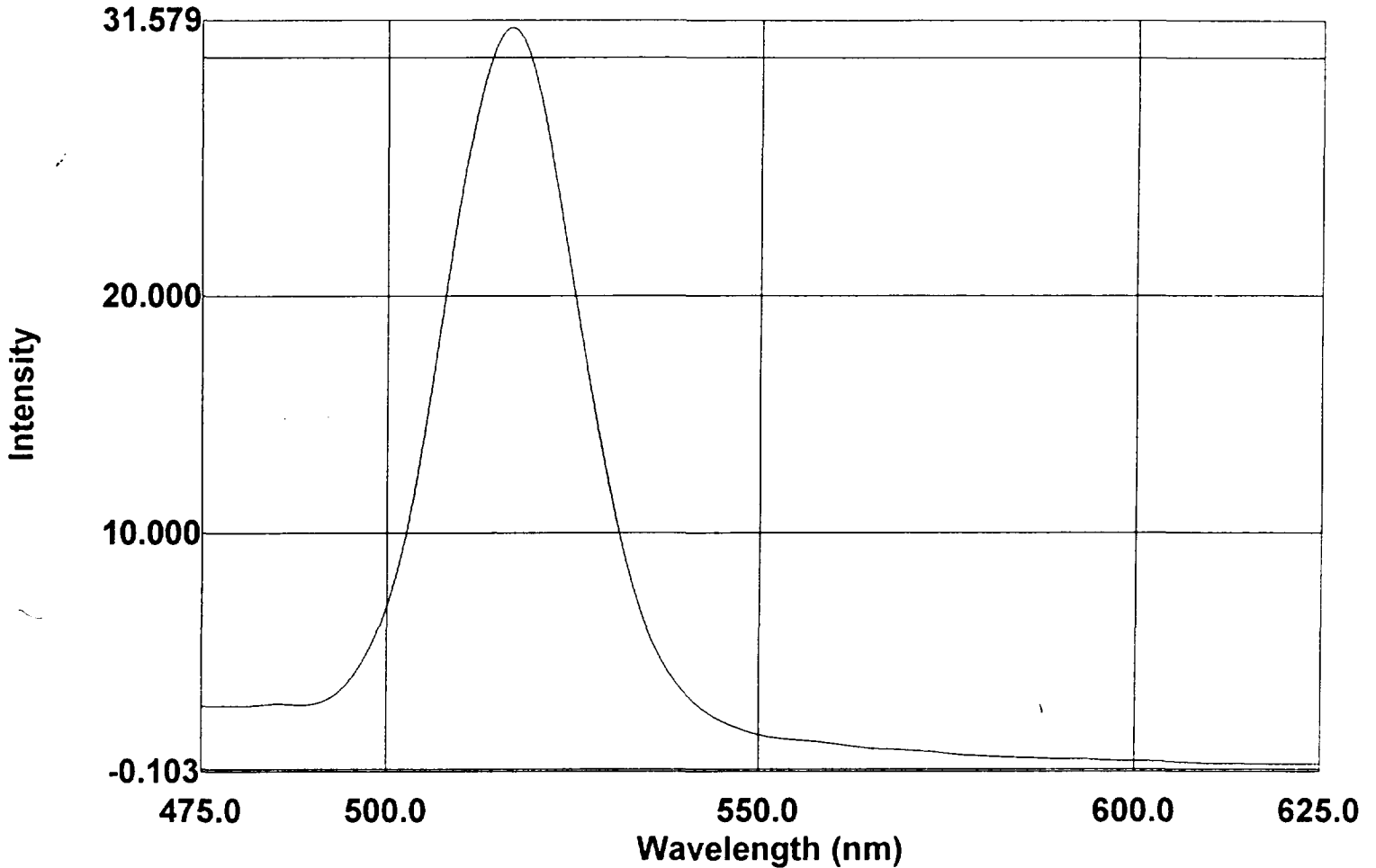
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7
 CW 60 EP
 Created: 10:31 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: Low
 Response Time: Auto
 Shutter: Auto, Closed

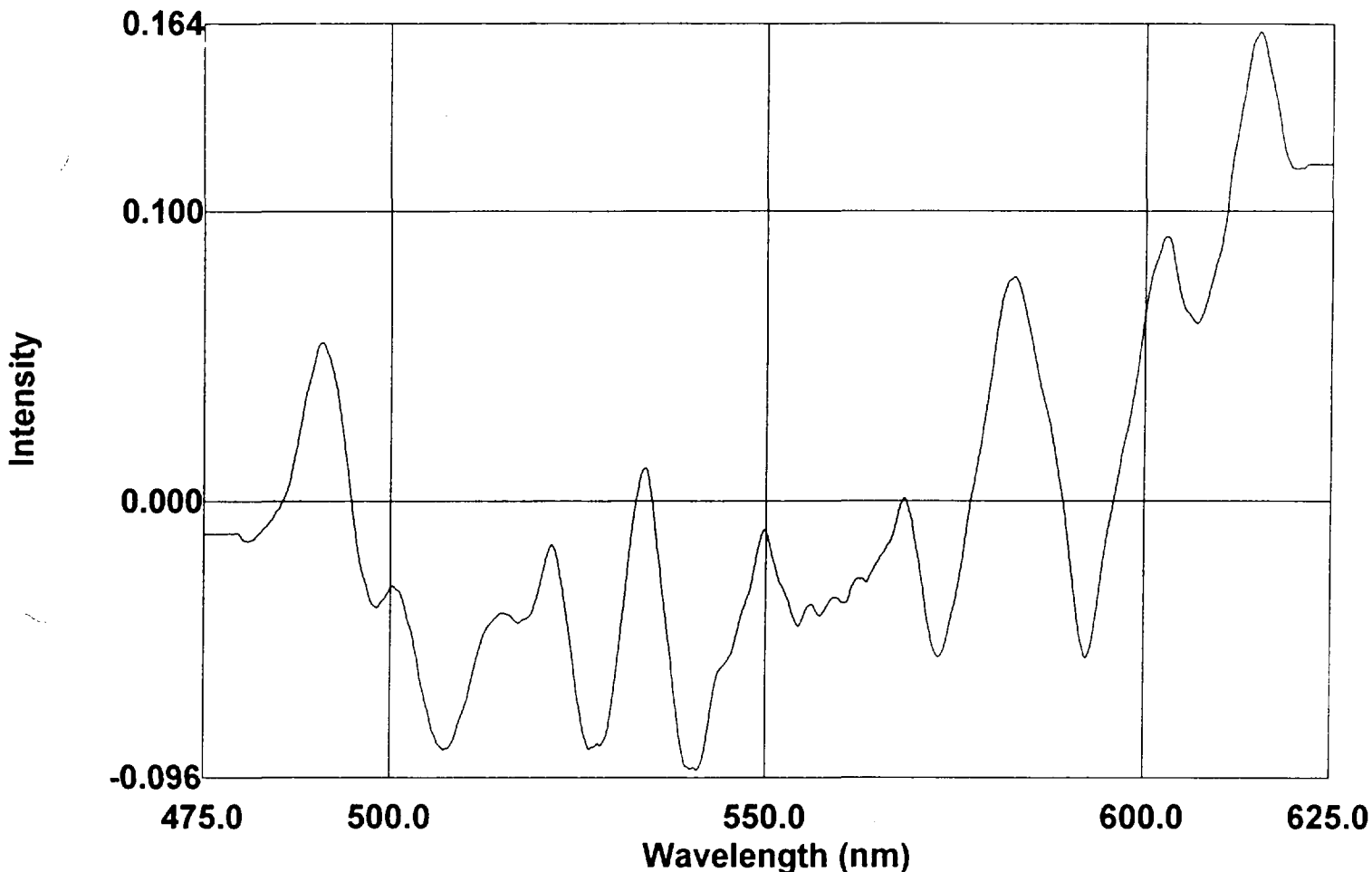
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 10:32 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

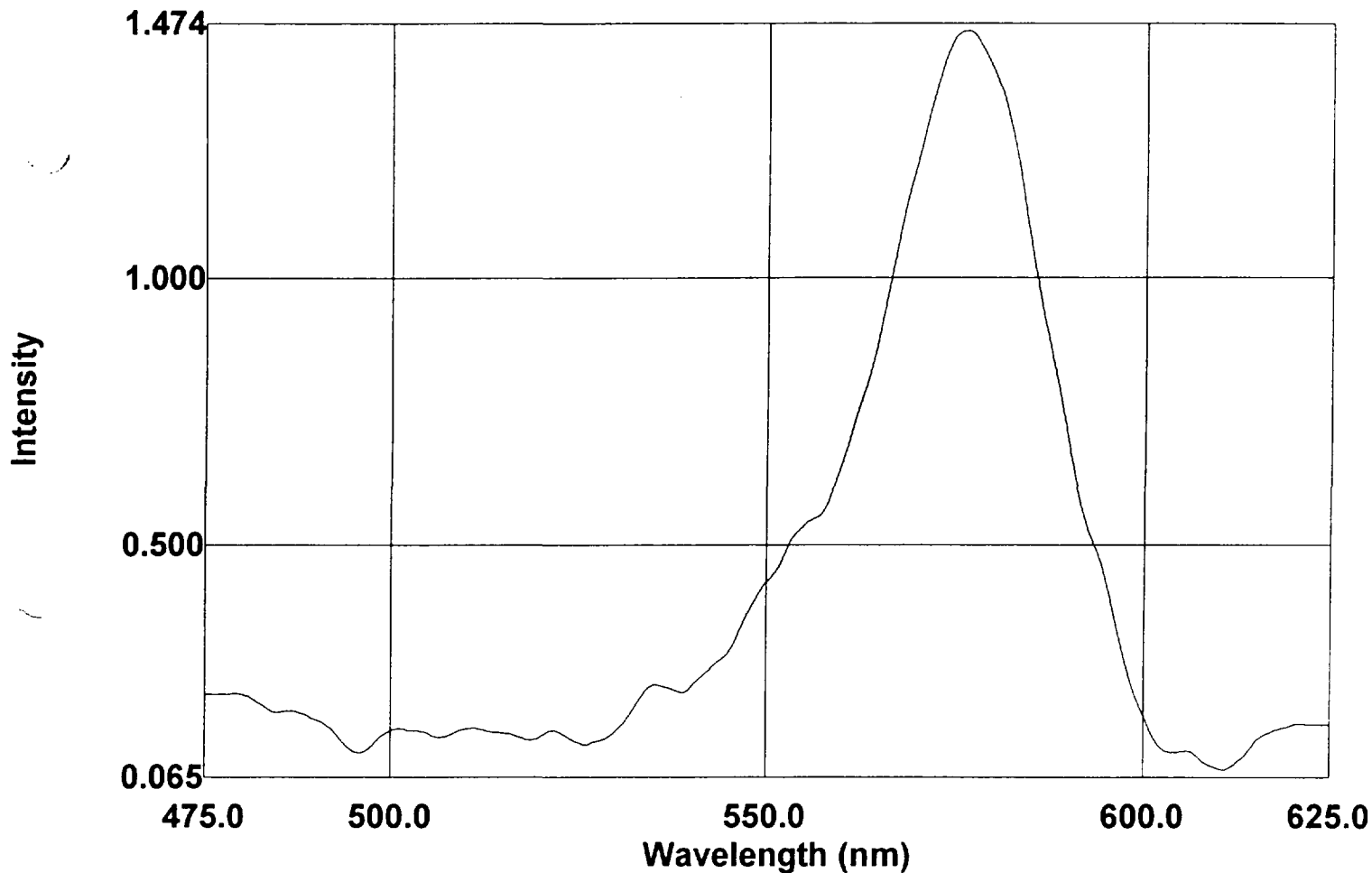
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

reated: 10:34 12/13/96
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

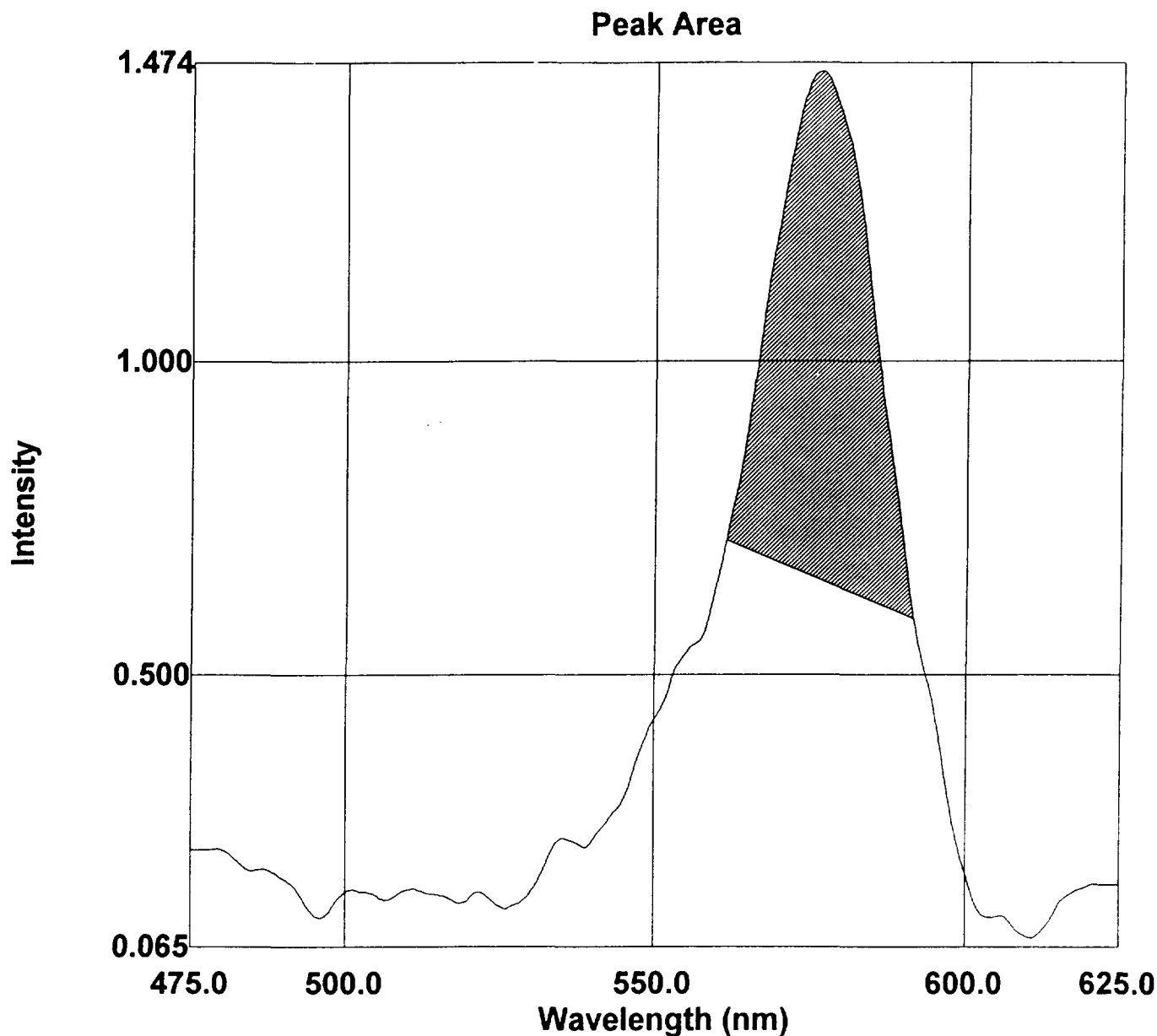
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 06 -- 12/11/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788




File Name: 9
QA-SULPHORHODAMINE B

Created: 10:34 12/13/96
Data: Modified

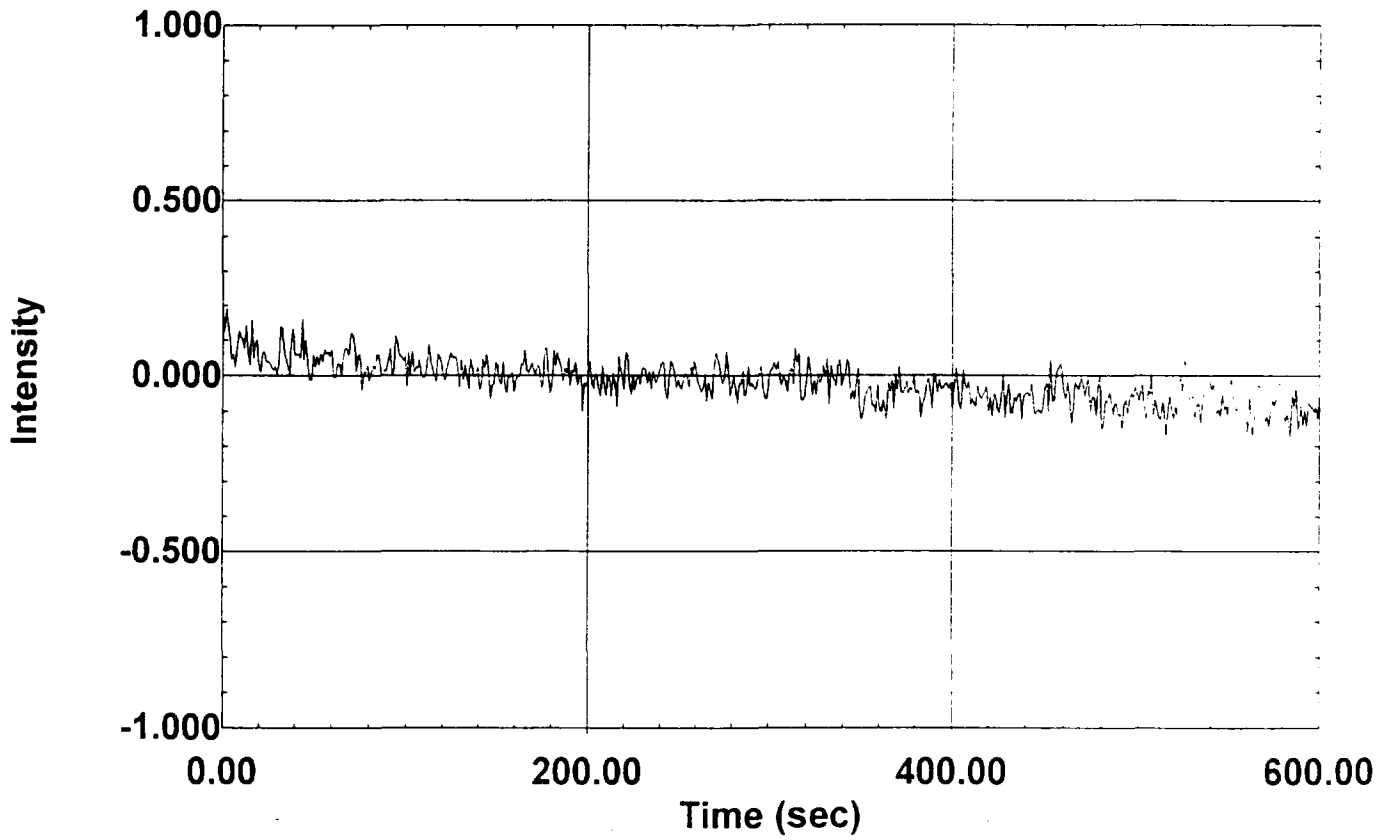
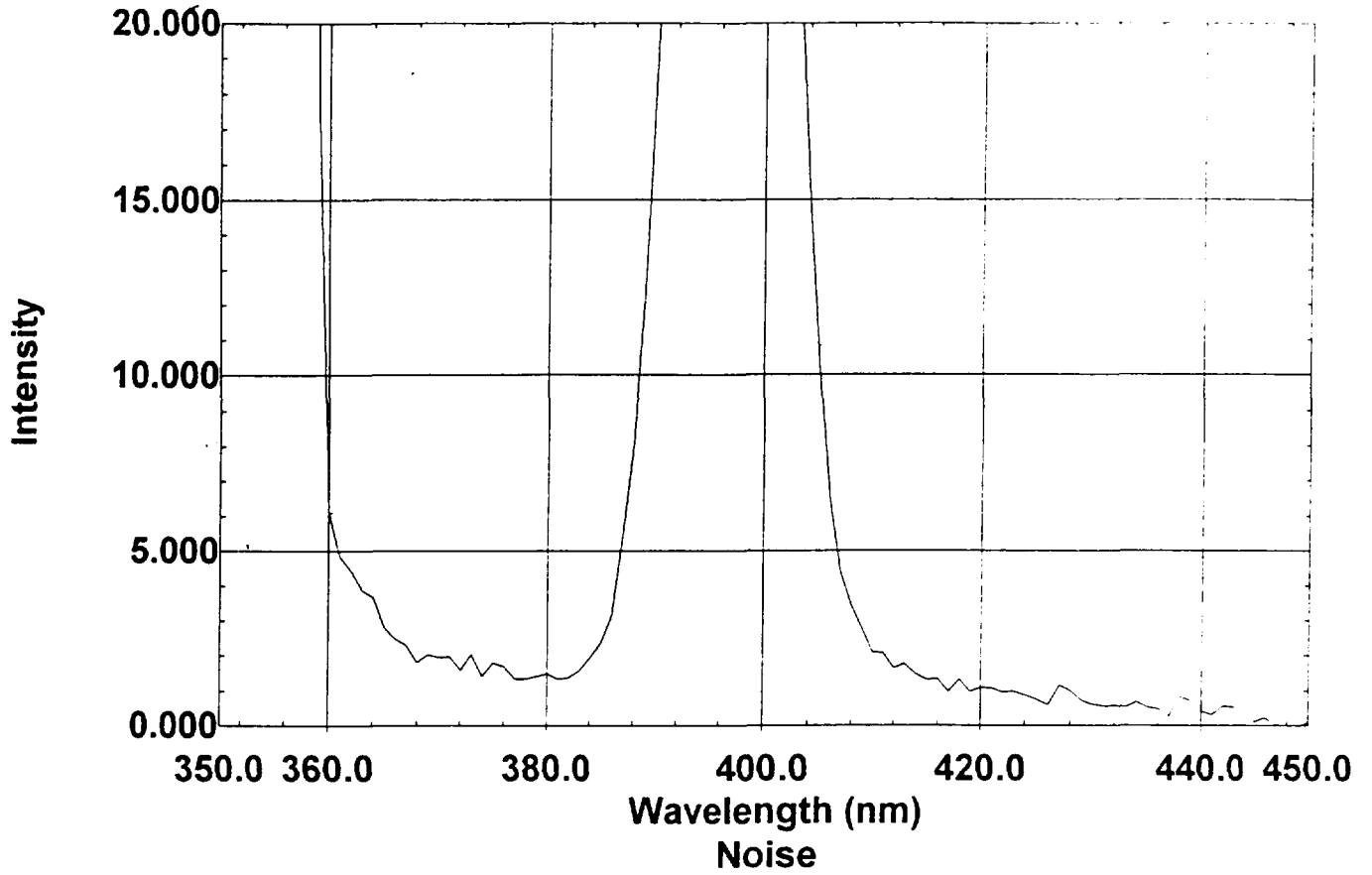
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
 1	561.4	591.4	2004.410	14.357	0.007

S/N Ratio Check

Raman Spectrum



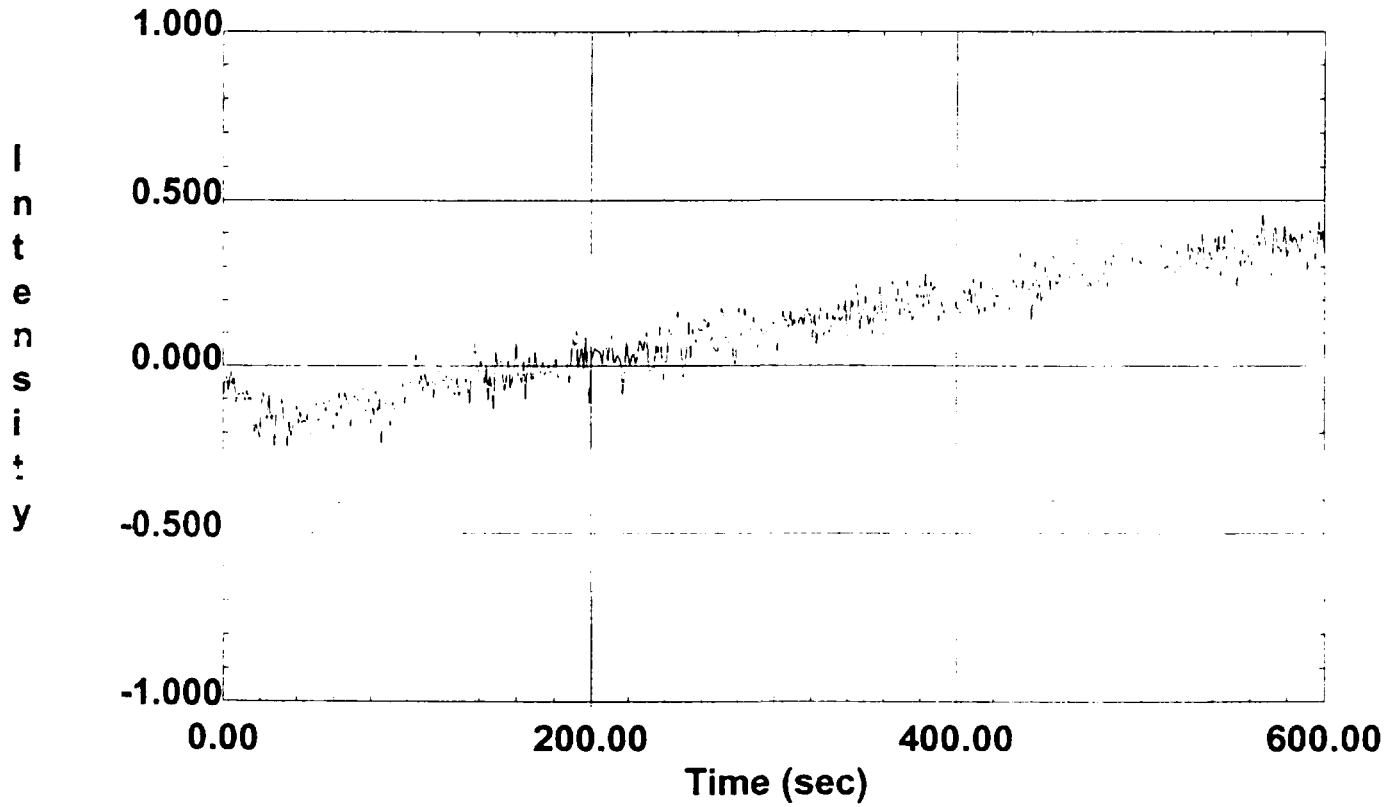
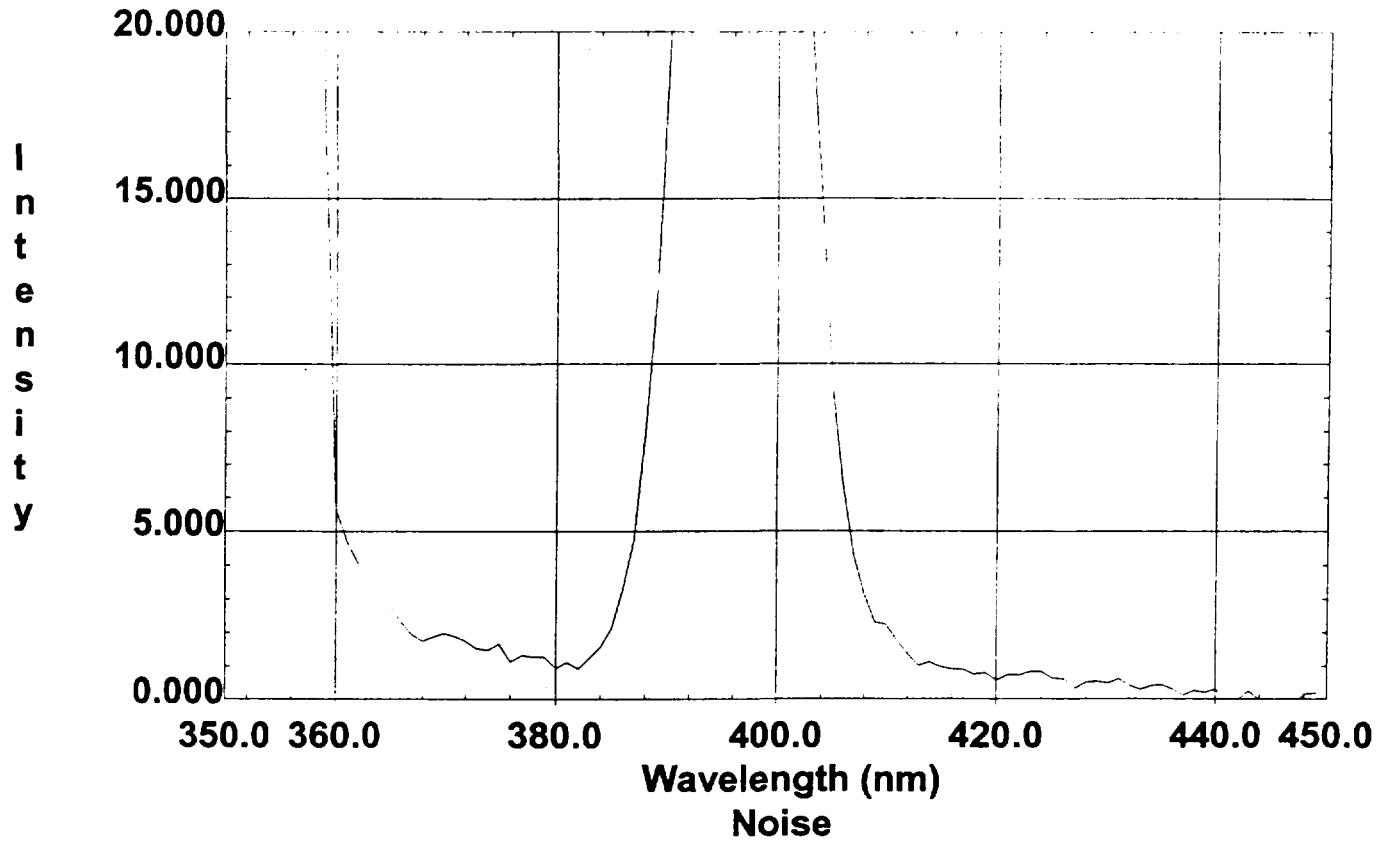
Instrument Serial Number: A401932000510D Printed: 18:39 12/13/96

Peak Height: 58.983

S/N Ratio: 529.787

S/N Ratio Check

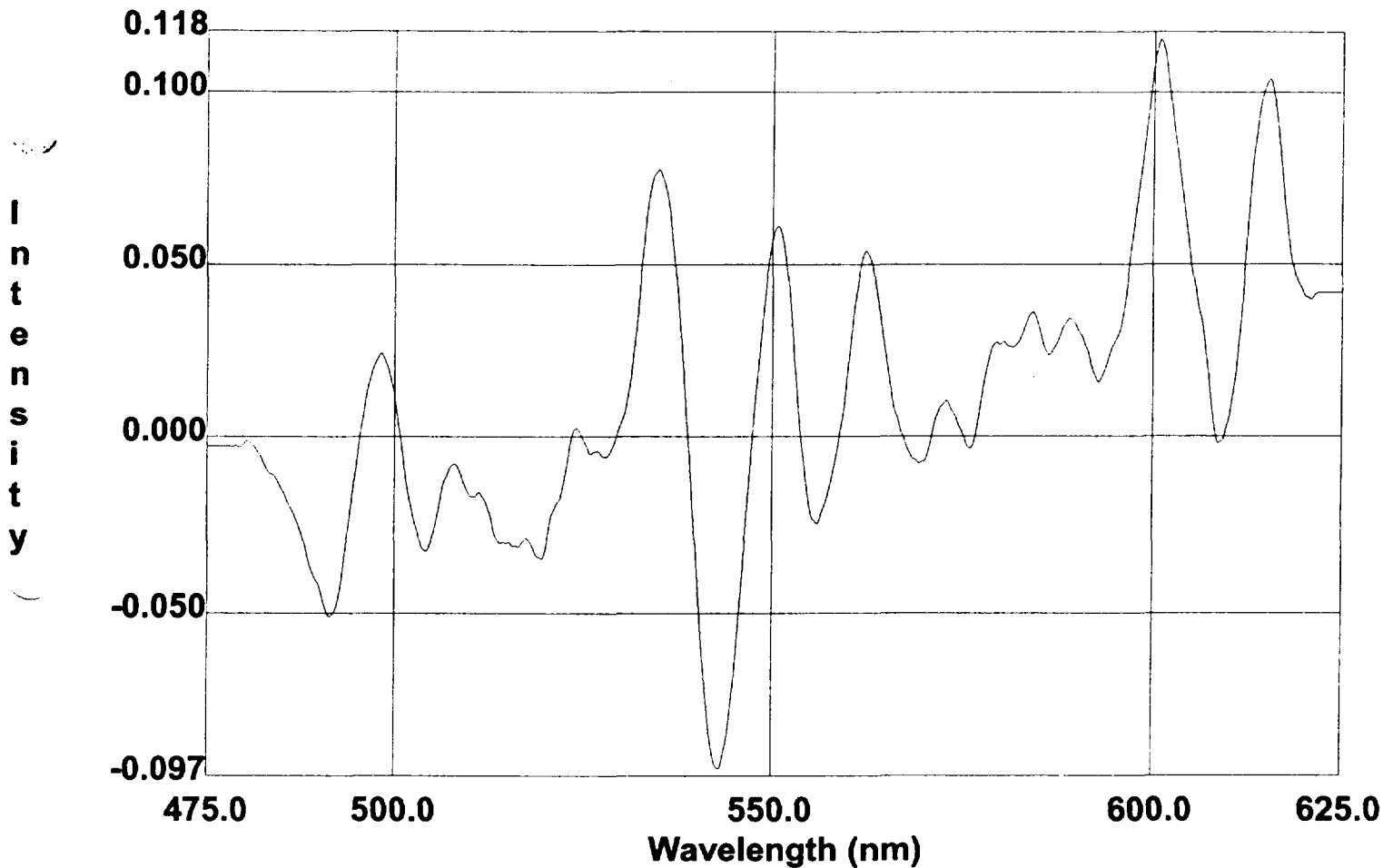
Raman Spectrum



Instrument Serial Number: A401932000510 Printed: 11:41 01/08/97

Peak Height: 58.174

S/N Ratio: 459.027



File Name: 1

QA-ELUENT

Created: 13:47 01/08/97

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:3.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:

Will Clauson

Samples Analyzed for:

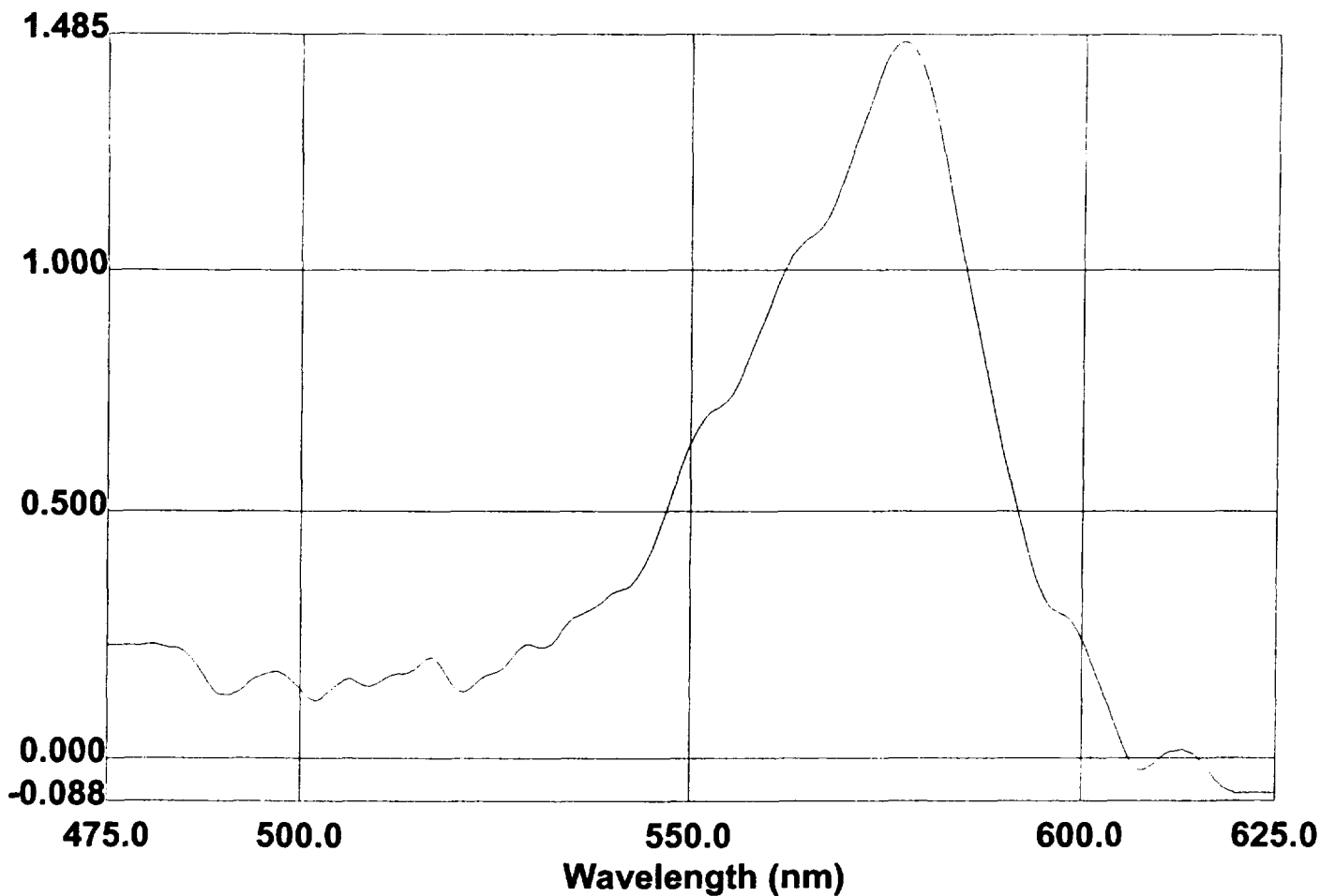
Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788

I
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File Name: 2

QA-SULPHORHODAMINE B

Created: 13:49 01/08/97
Data: Modified
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0 nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

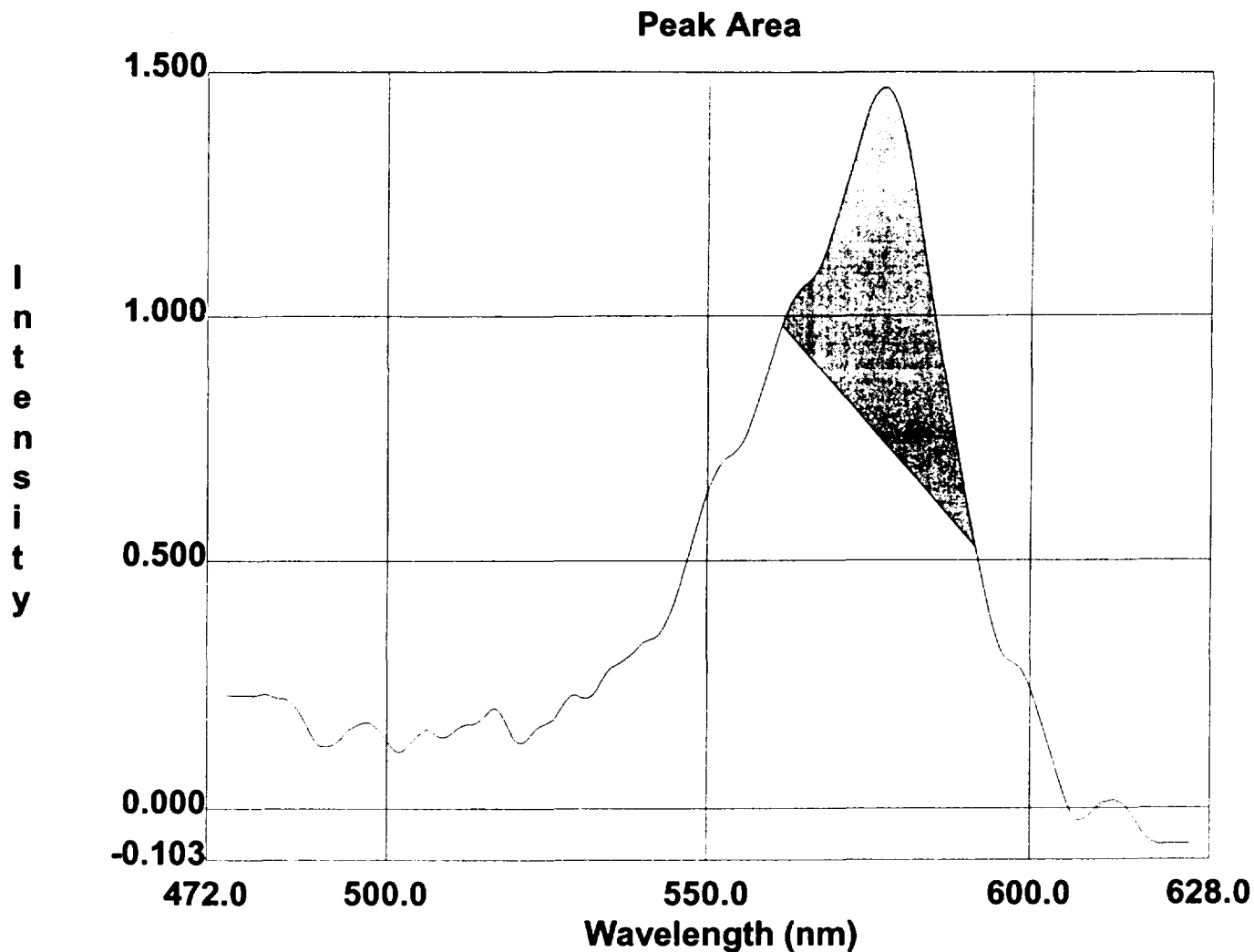
Crawford and Associates, Inc.
1711 Ashley Circle, Suite 3
Bowling Green, KY 42104
Phone: (502) 745-9224
FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:
Will Clauson

Samples Analyzed for:
Memphis Environmental Center
2603 Corporate Avenue, Suite 100
Memphis, Tennessee 38132
Phone: (901) 345-1788



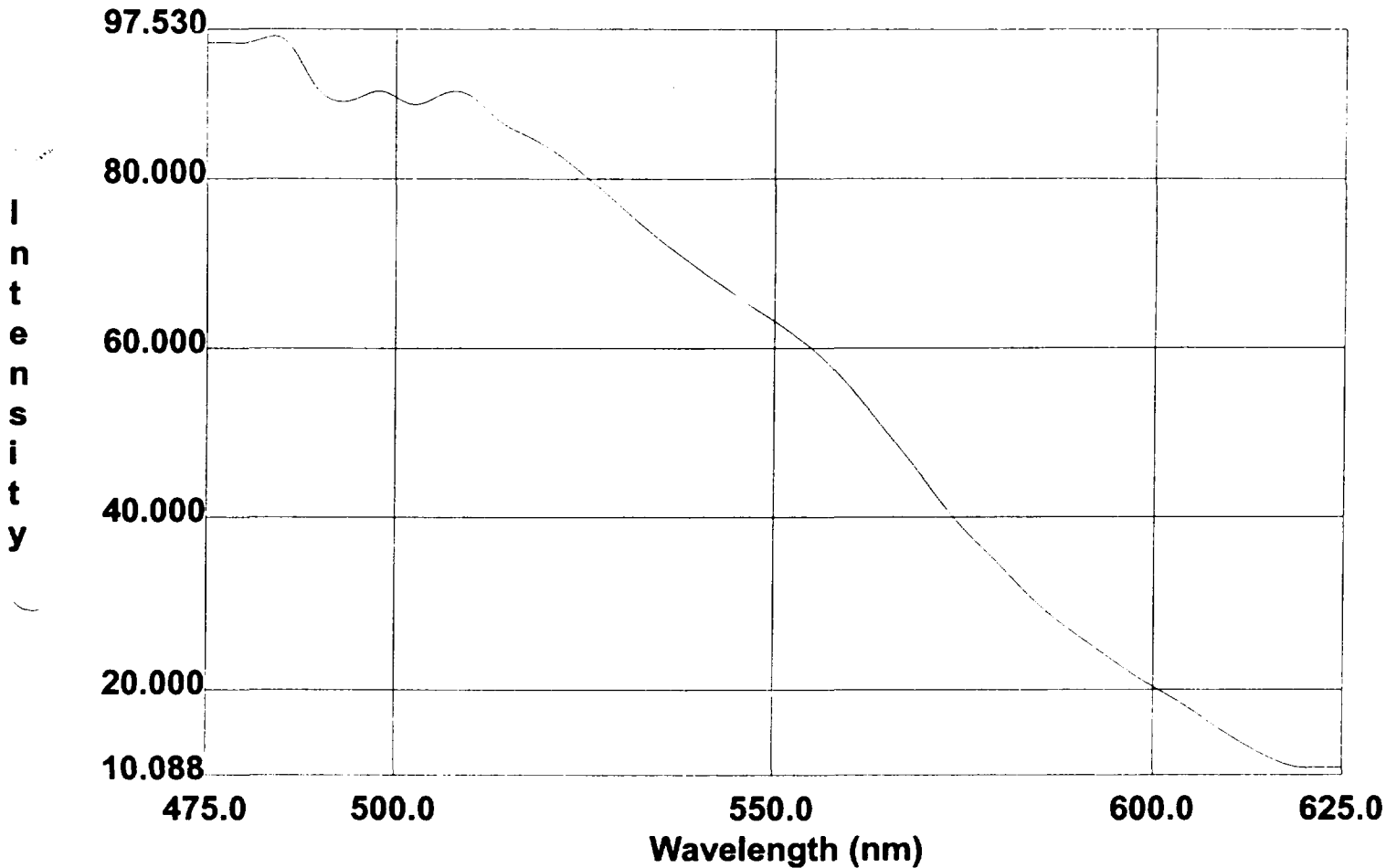
File Name: 2
 QA-SULPHORHODAMINE B

Created: 13:49 01/08/97
 Data: Modified

Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	11.769	0.006



File Name: 3
 CW 6 EP

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Created: 13:52 01/08/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

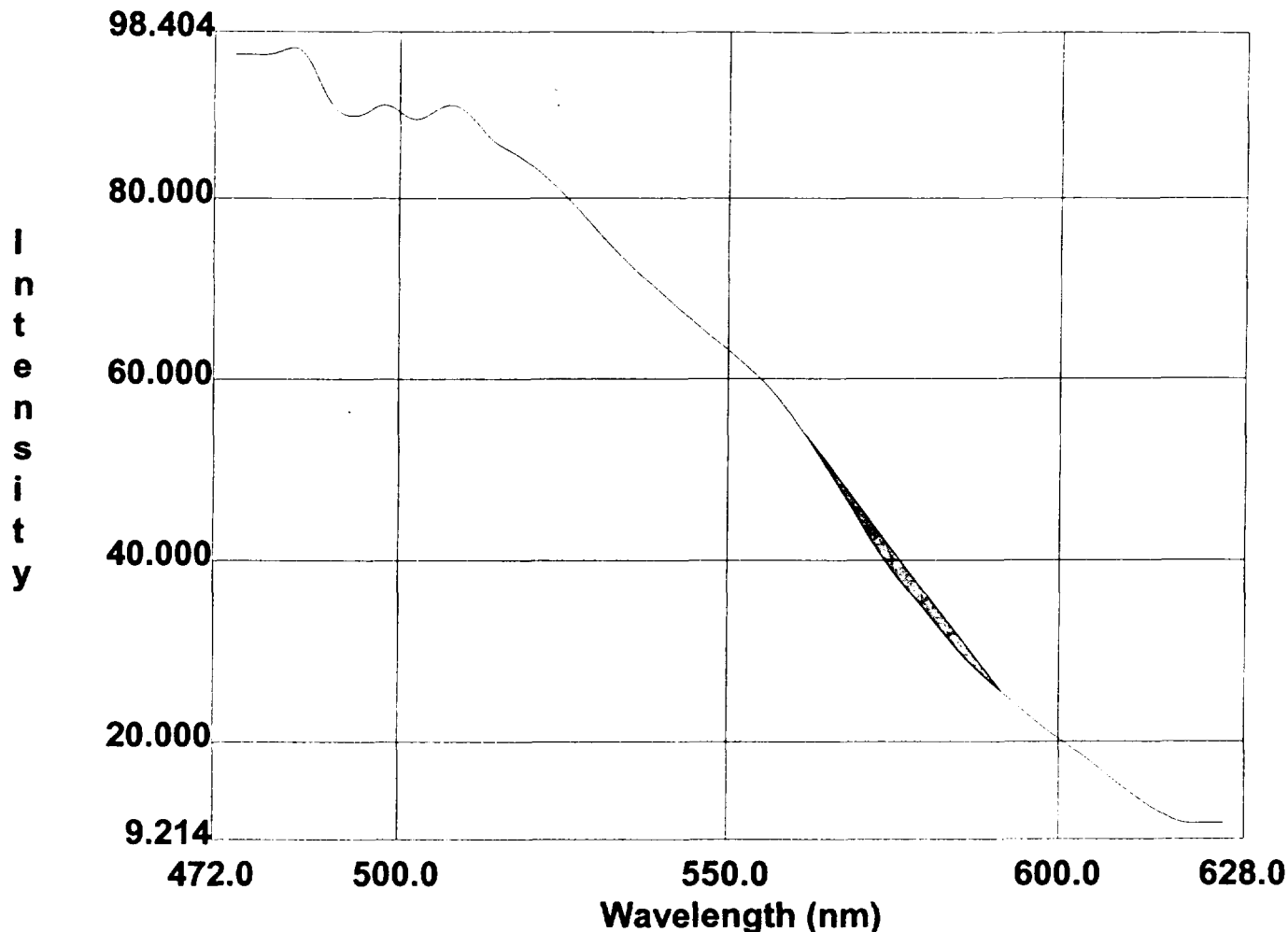
Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



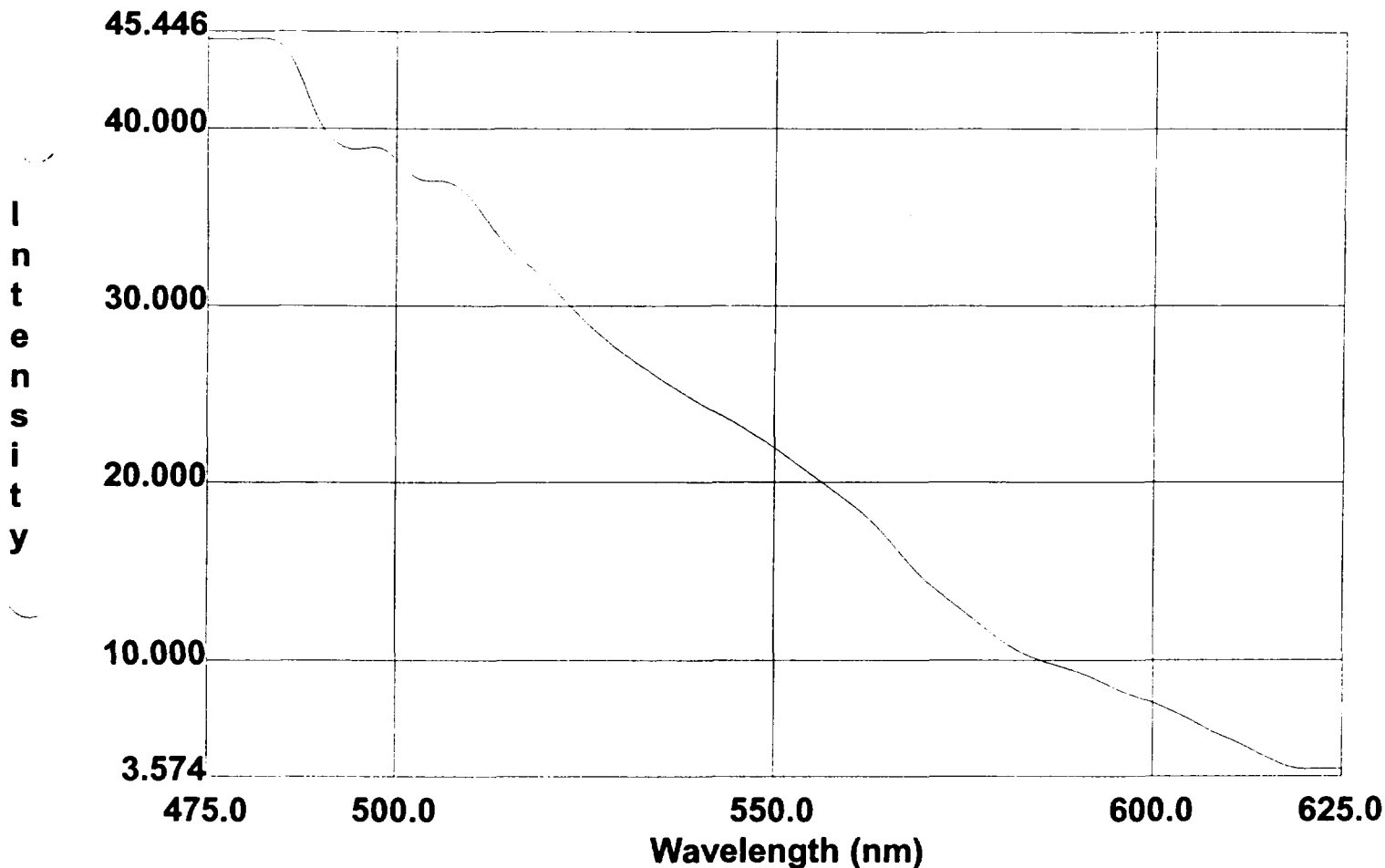
File Name: 3
 CW 6 EP

Created: 13:52 01/08/97
 Data: Modified

Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	-38.200	-0.019



File Name: 4

CW 19 EP

Created: 13:53 01/08/97

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:3.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

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Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:

Will Clauson

Samples Analyzed for:

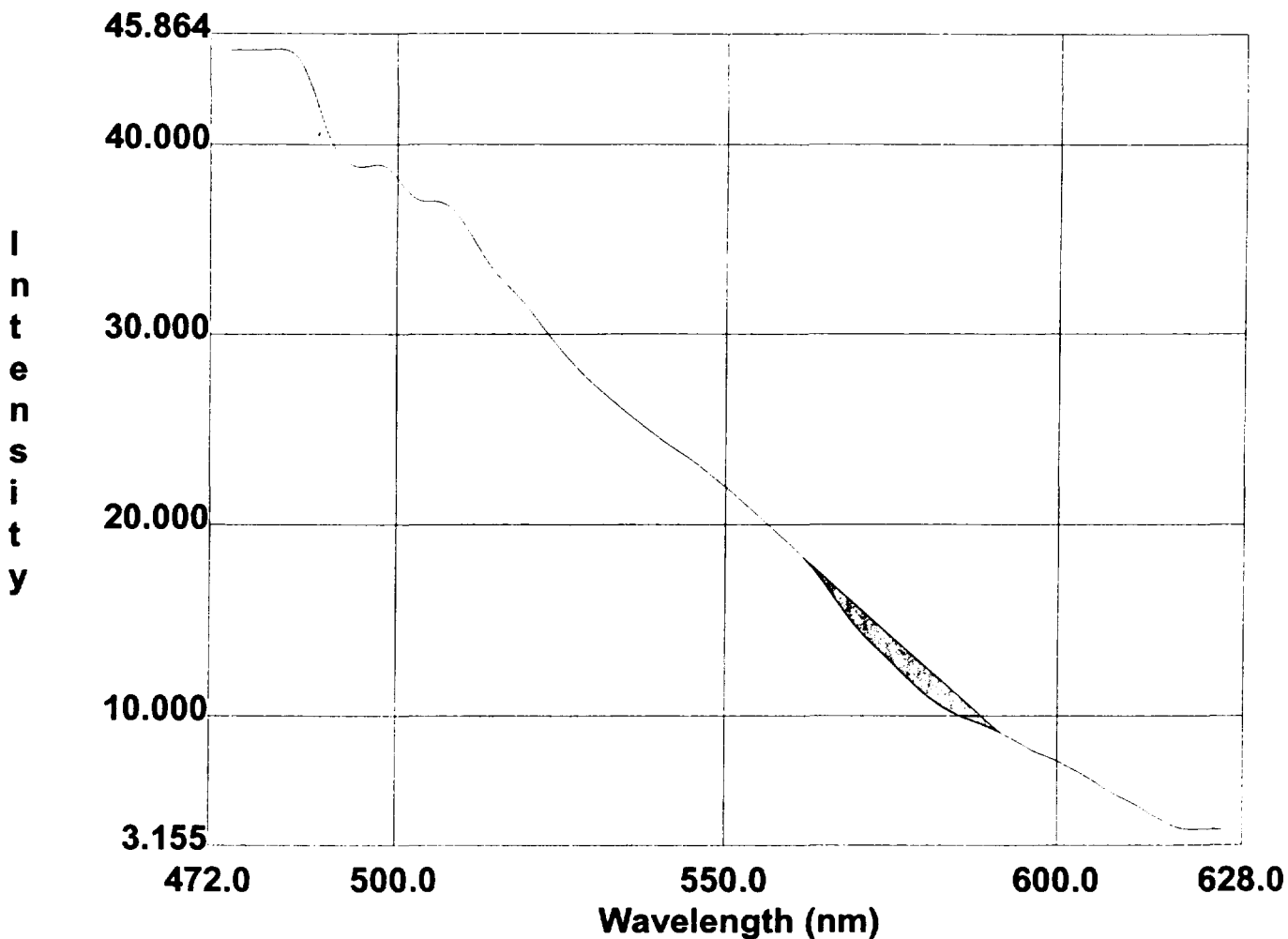
Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788

Peak Area



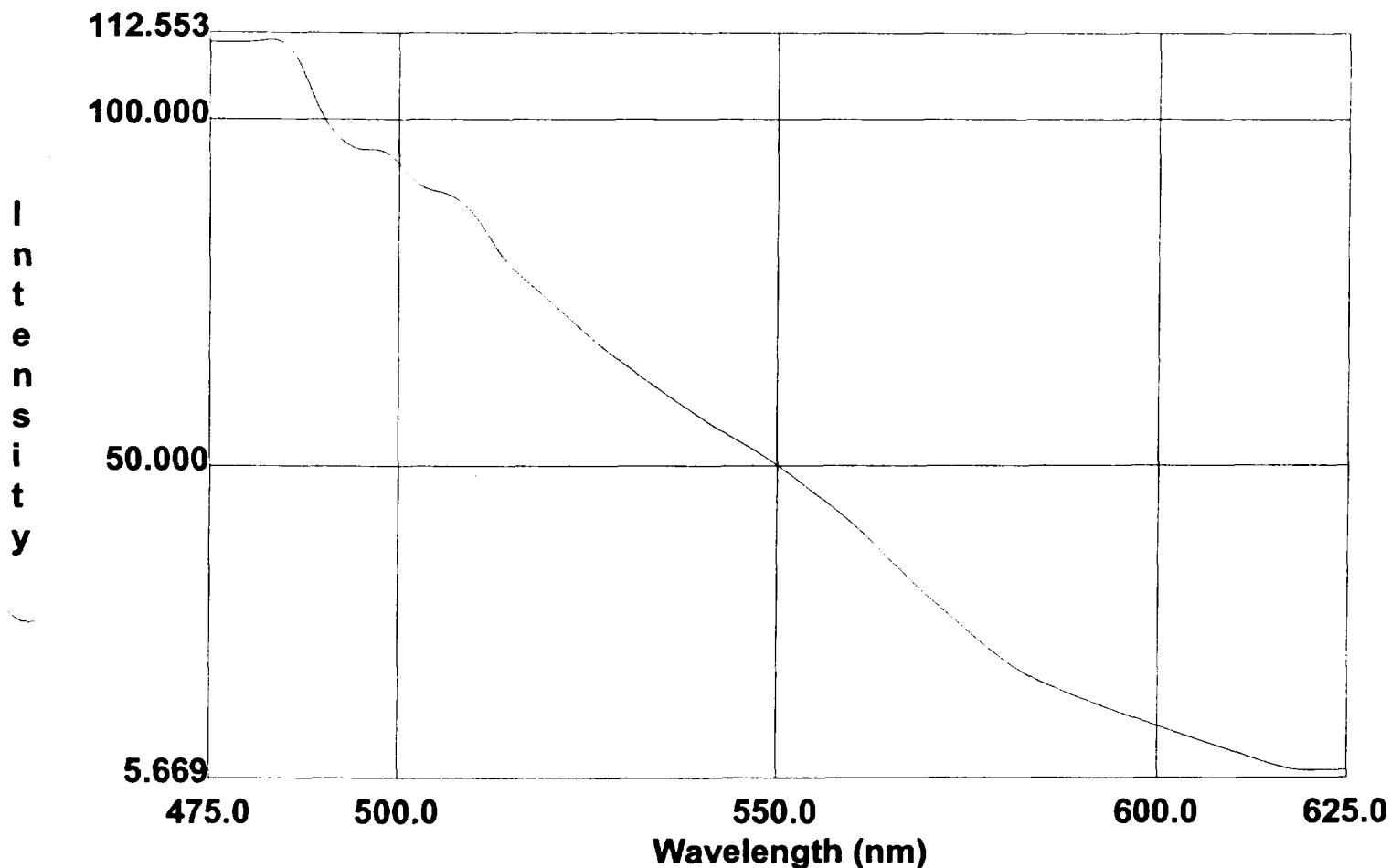
File Name: 4
CW 19 EP

Created: 13:53 01/08/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
<input type="checkbox"/> 1	561.4	591.4	2004.410	-27.302	-0.014



File Name: 5

CW 31 EP

Created: 13:53 01/08/97

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:3.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:

Will Clauson

Samples Analyzed for:

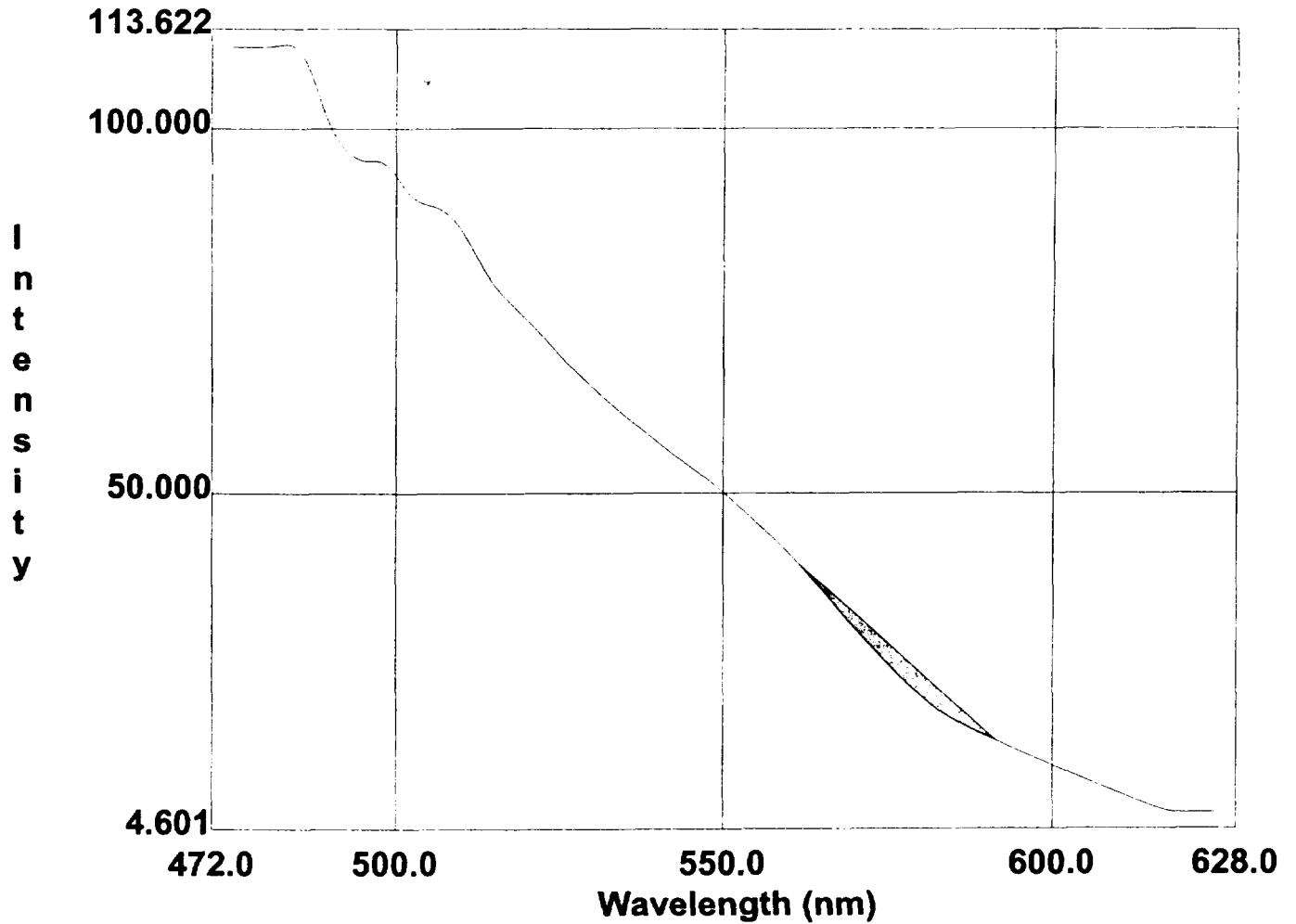
Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788

Peak Area



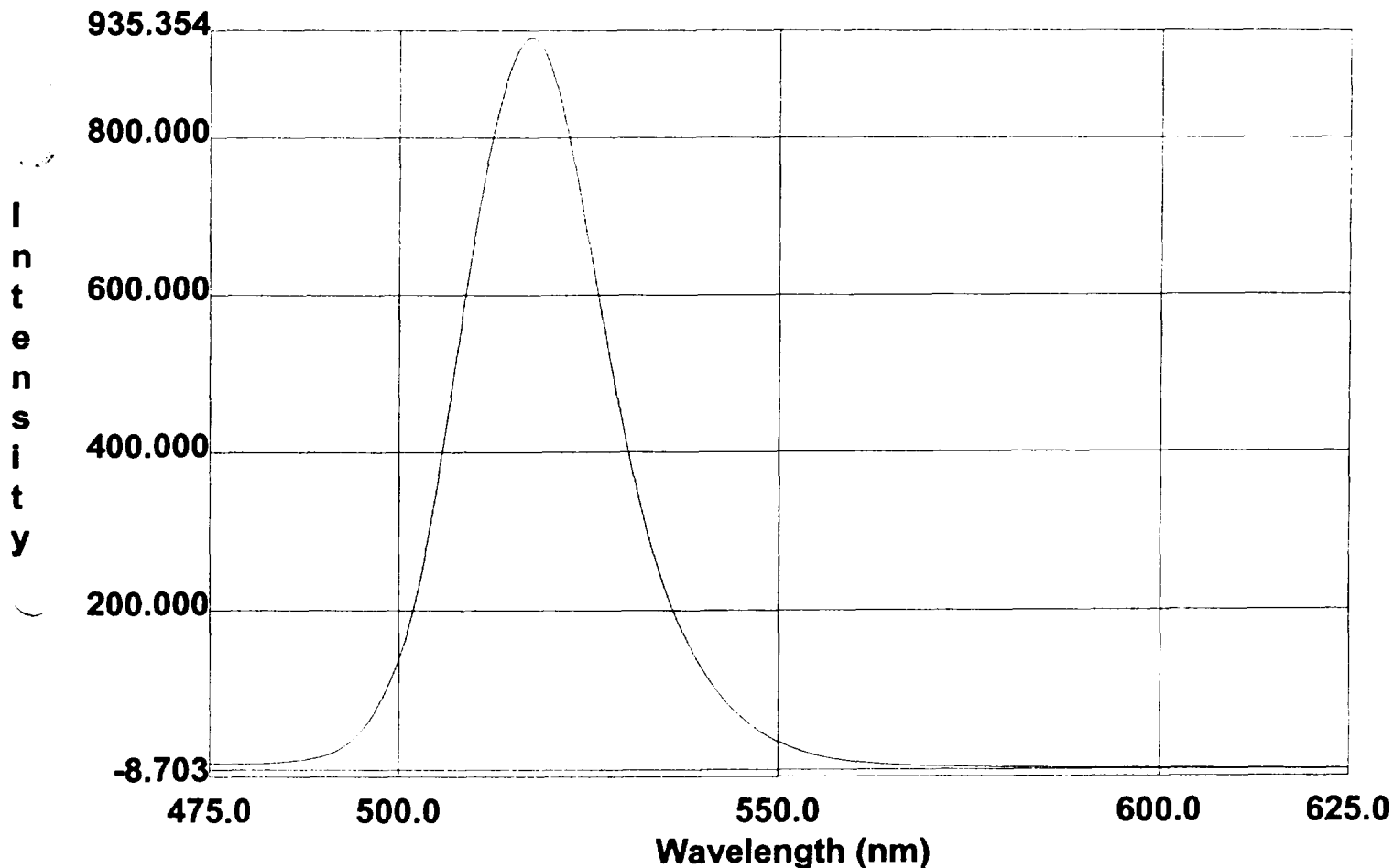
File Name: 5
CW 31 EP

Created: 13:53 01/08/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
<input type="checkbox"/> 1	561.4	591.4	2004.410	-56.904	-0.028



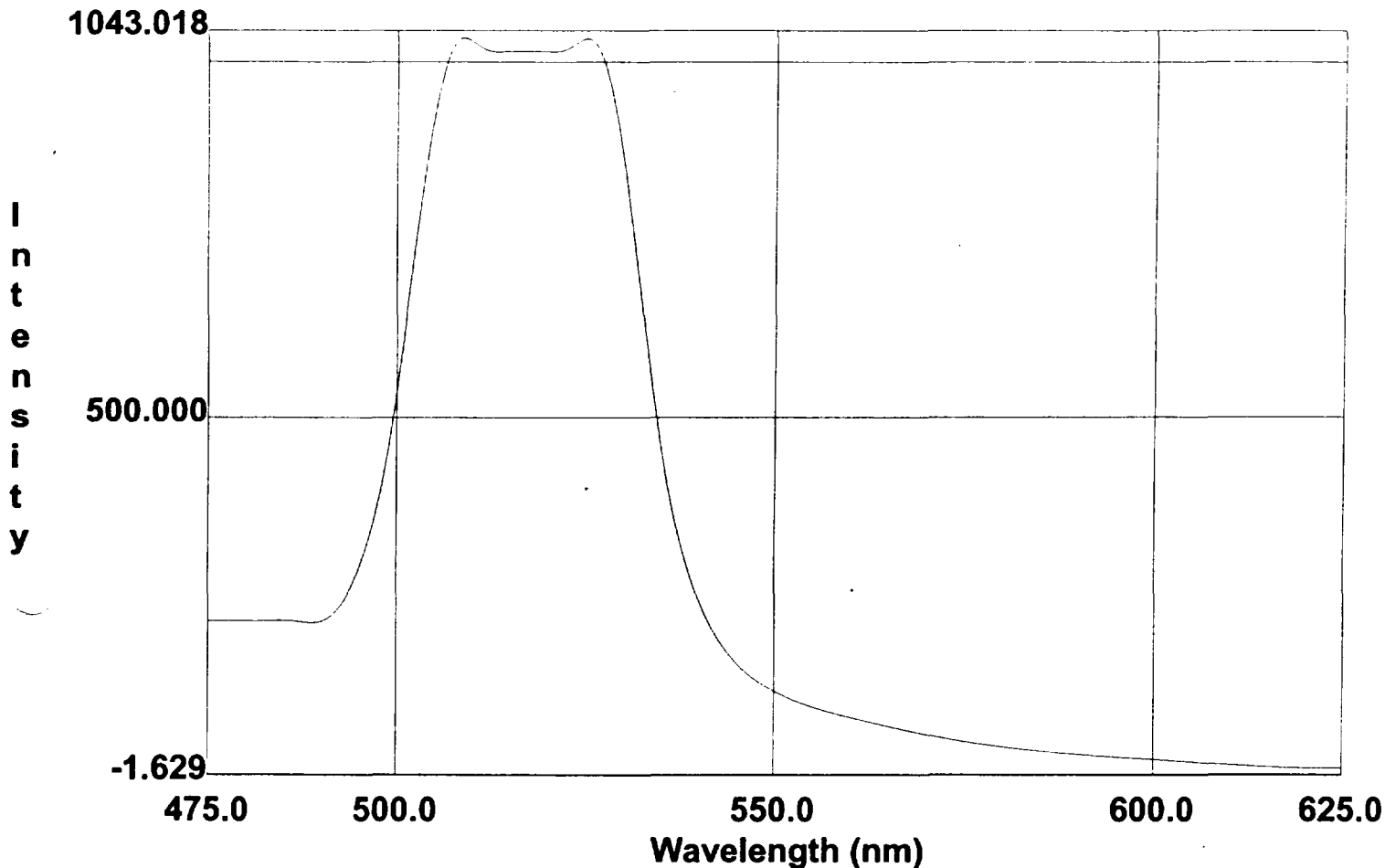
Crawford and Associates, Inc.
1711 Ashley Circle, Suite 3
Bowling Green, KY 42104
Phone: (502) 745-9224
FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:
Will Clauson

Samples Analyzed for:
Memphis Environmental Center
2603 Corporate Avenue, Suite 100
Memphis, Tennessee 38132
Phone: (901) 345-1788



File Name: 7

CW 60 EP

Created: 13:57 01/08/97

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:3.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

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Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:

Will Clauson

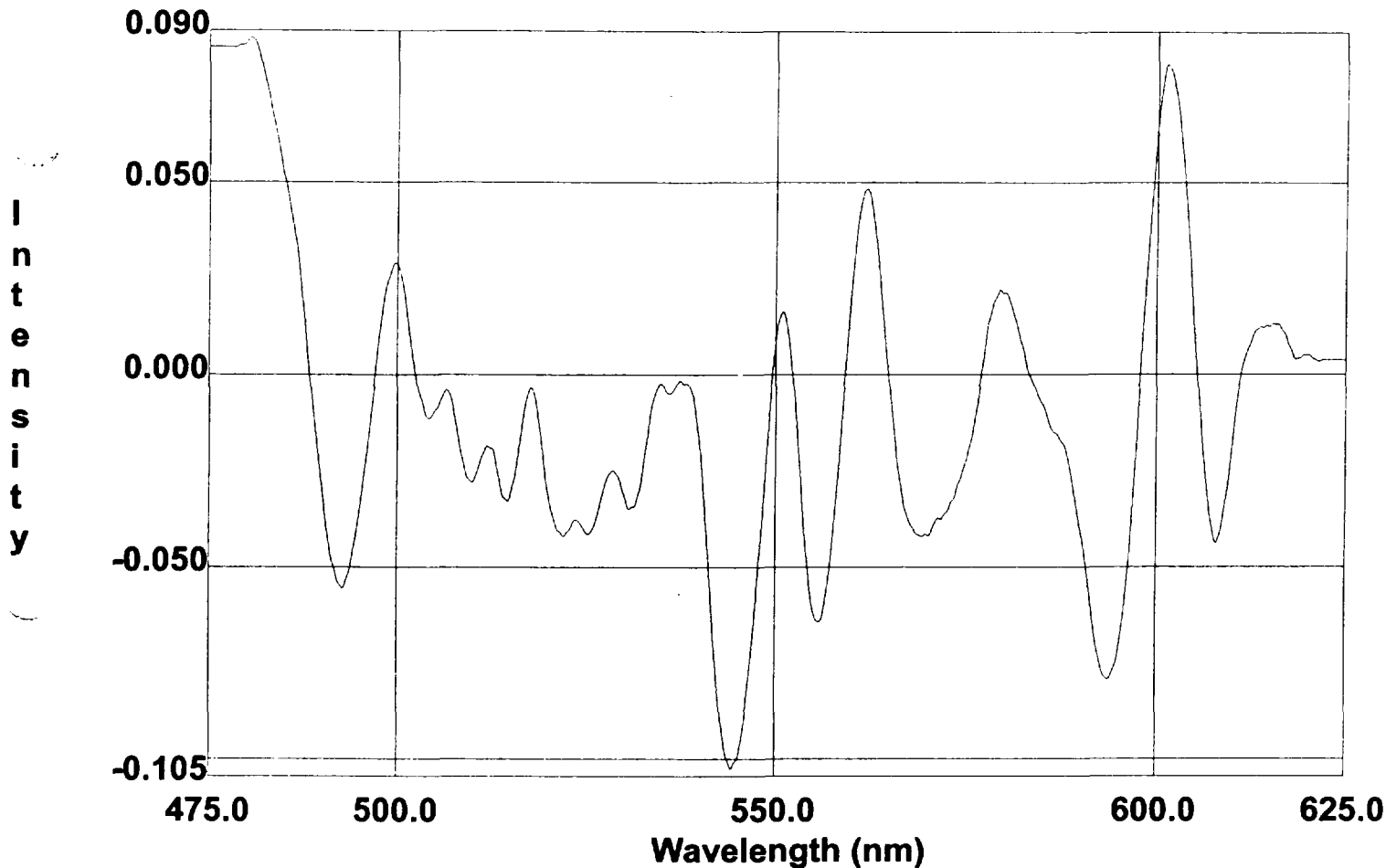
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 13:58 01/08/97

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:3.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

1711 Ashley Circle, Suite 3

Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:

Will Clauson

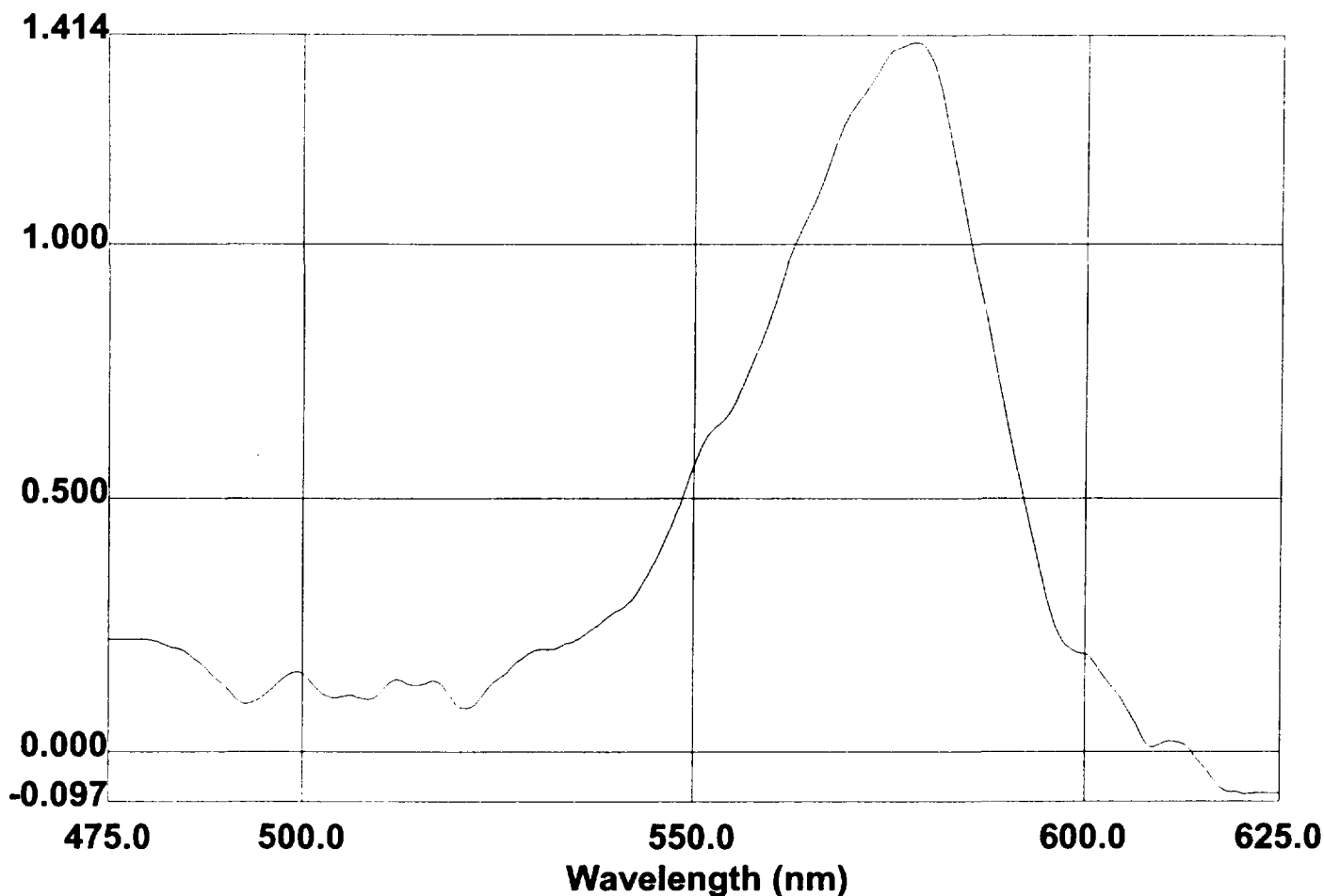
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 13:58 01/08/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

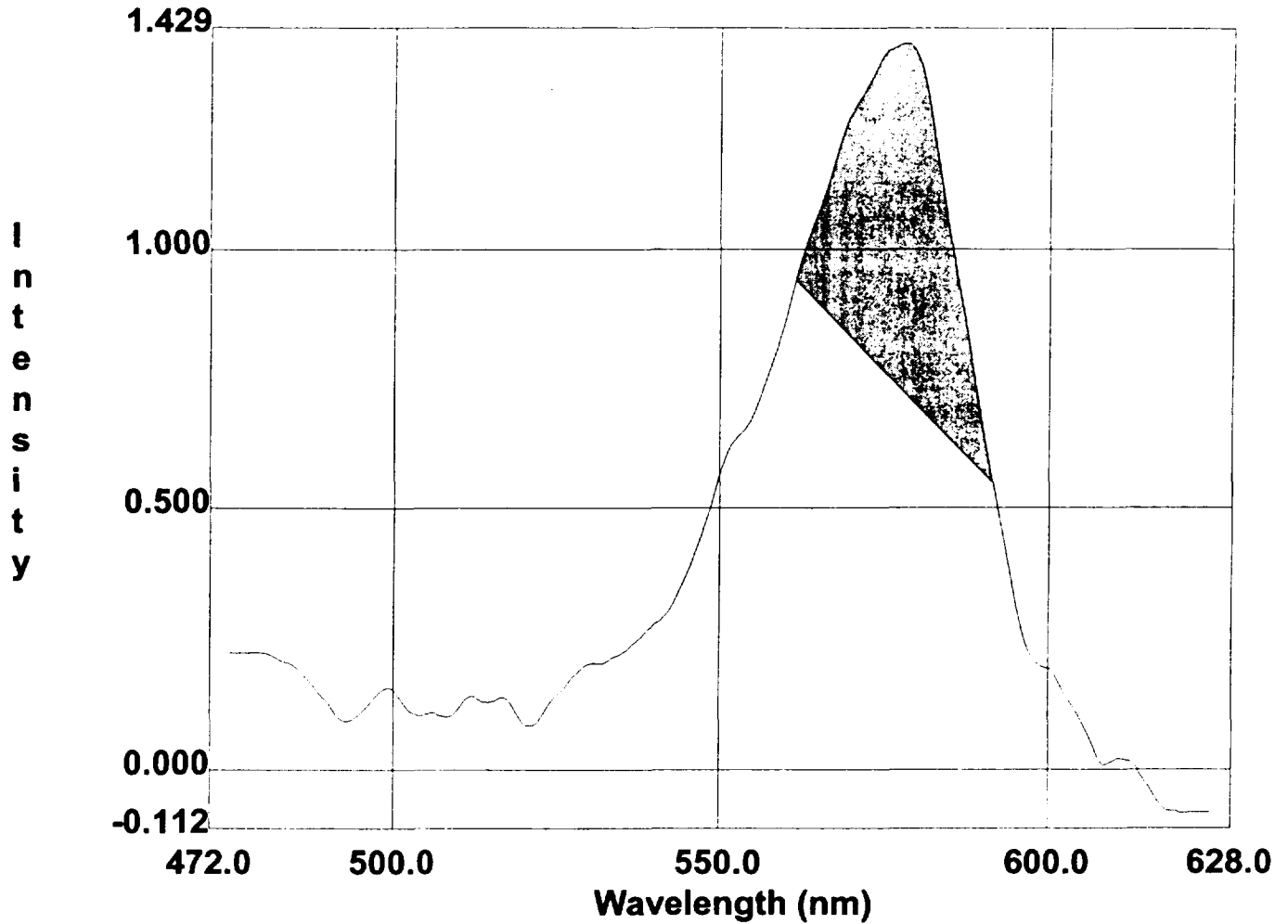
Michigan Chemical Complex Site 034

SET 07 -- 12/26/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



File Name: 9
 QA-SULPHORHODAMINE B

Created: 13:58 01/08/97
 Data: Modified

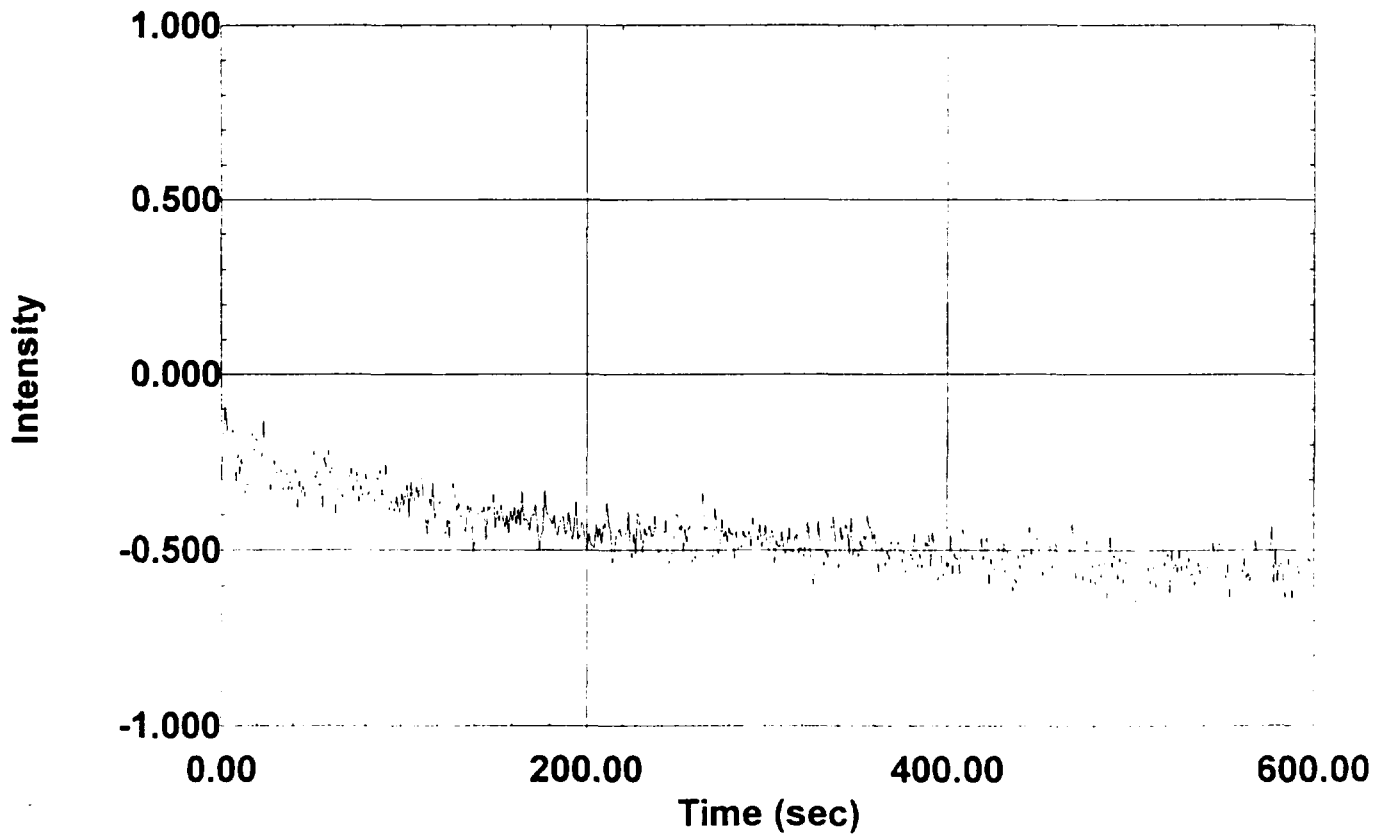
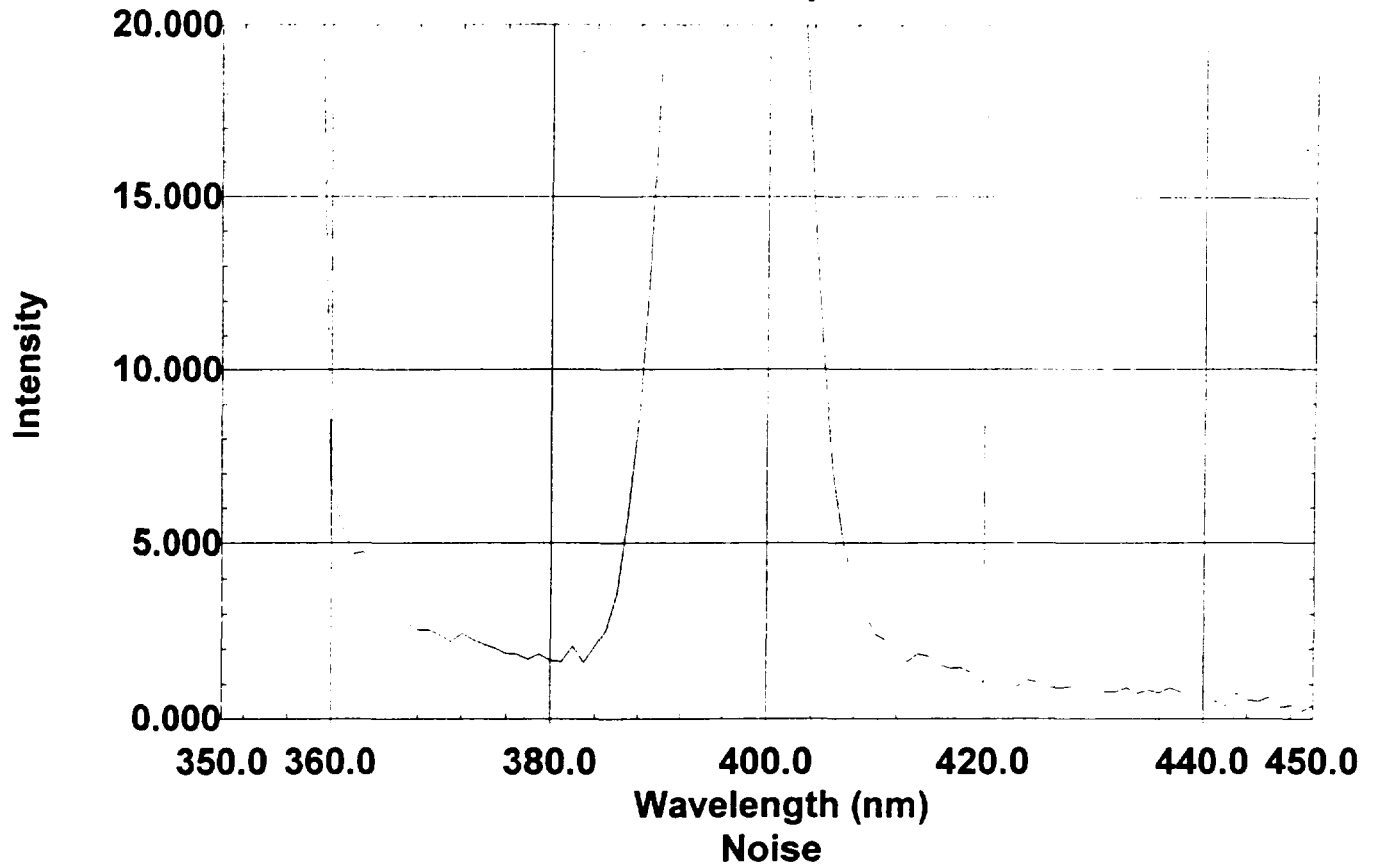
Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	12.134	0.006

S/N Ratio Check

Raman Spectrum



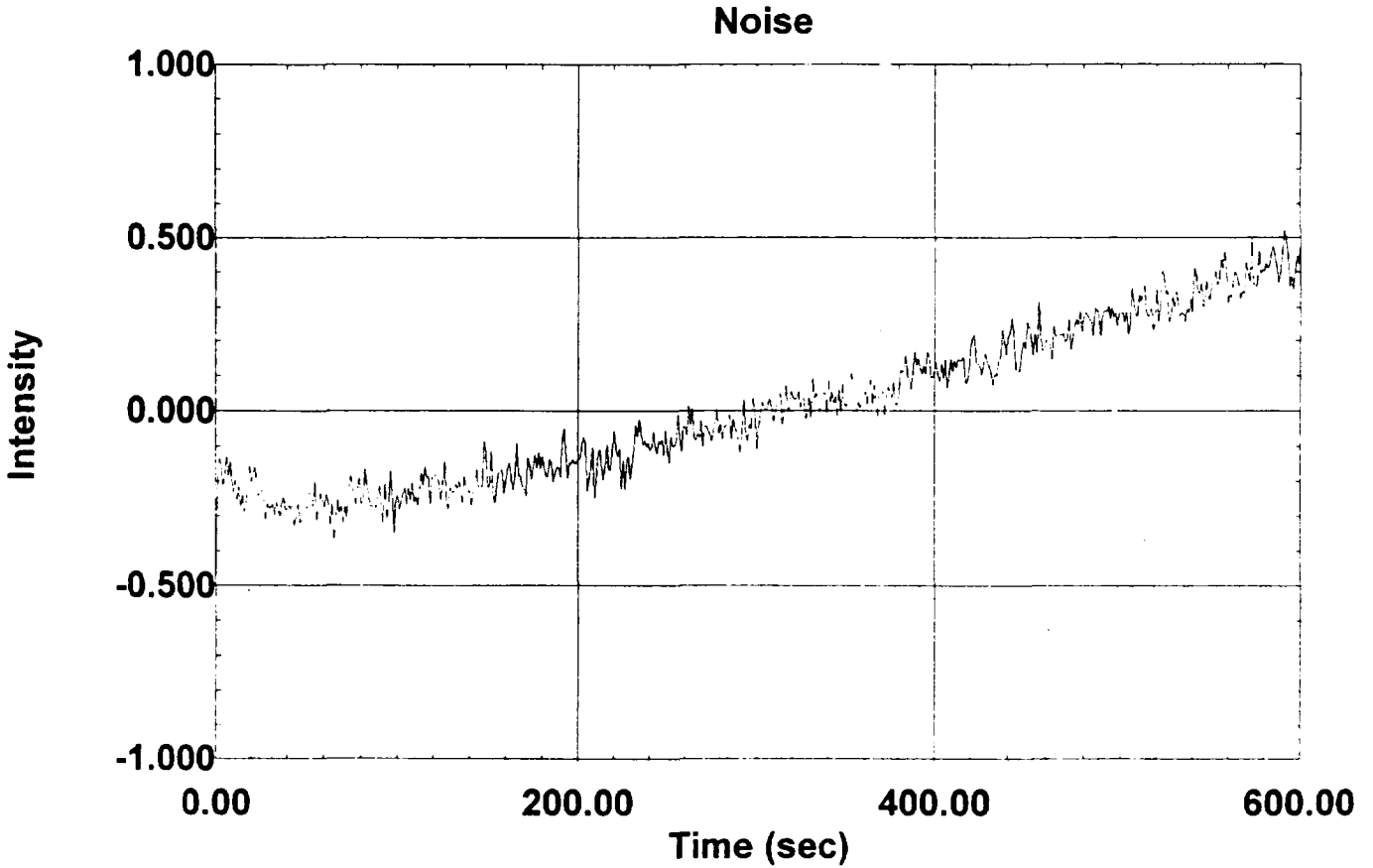
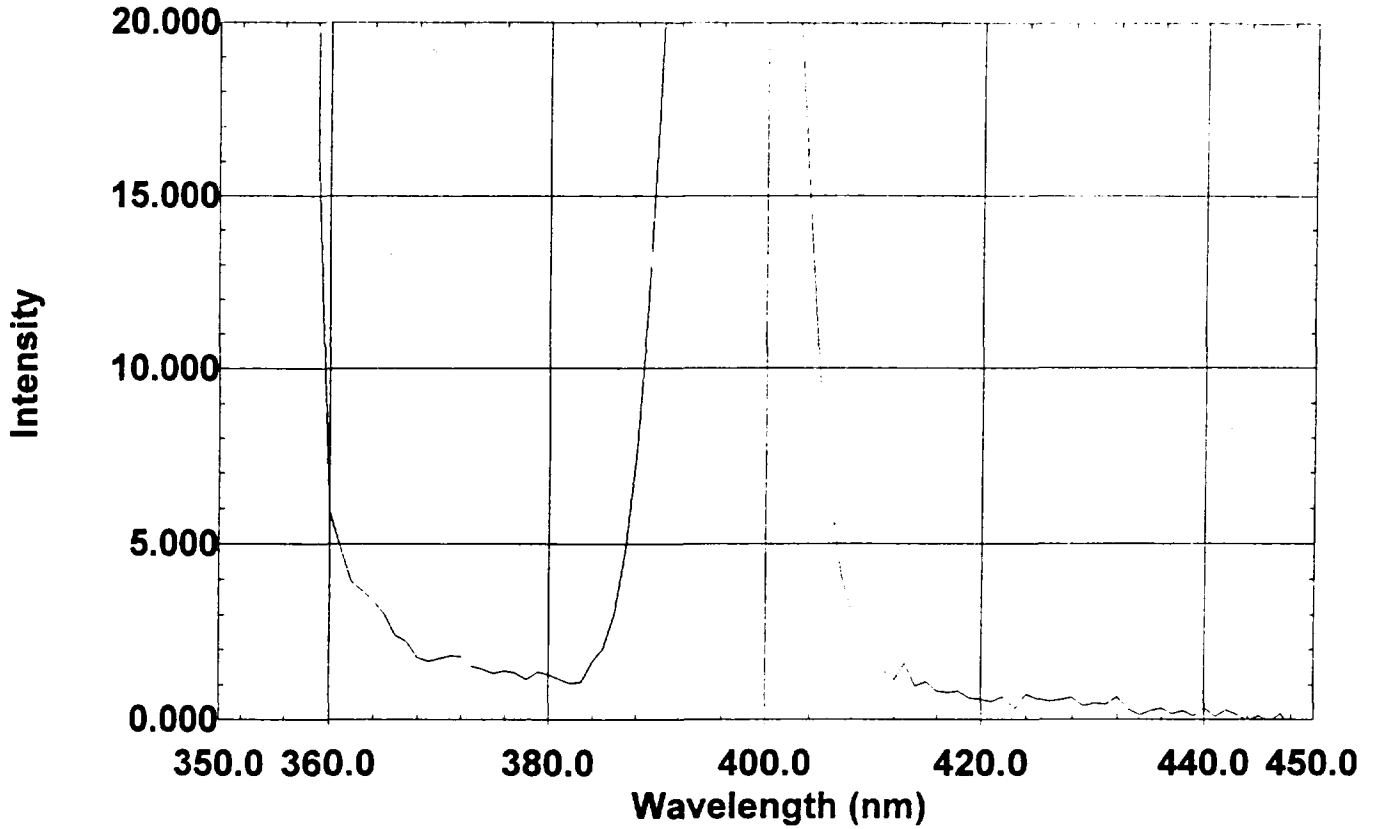
Instrument Serial Number: A401932000510 Printed: 16:50 01/08/97

Peak Height: 60.373

S/N Ratio: 465.243

S/N Ratio Check

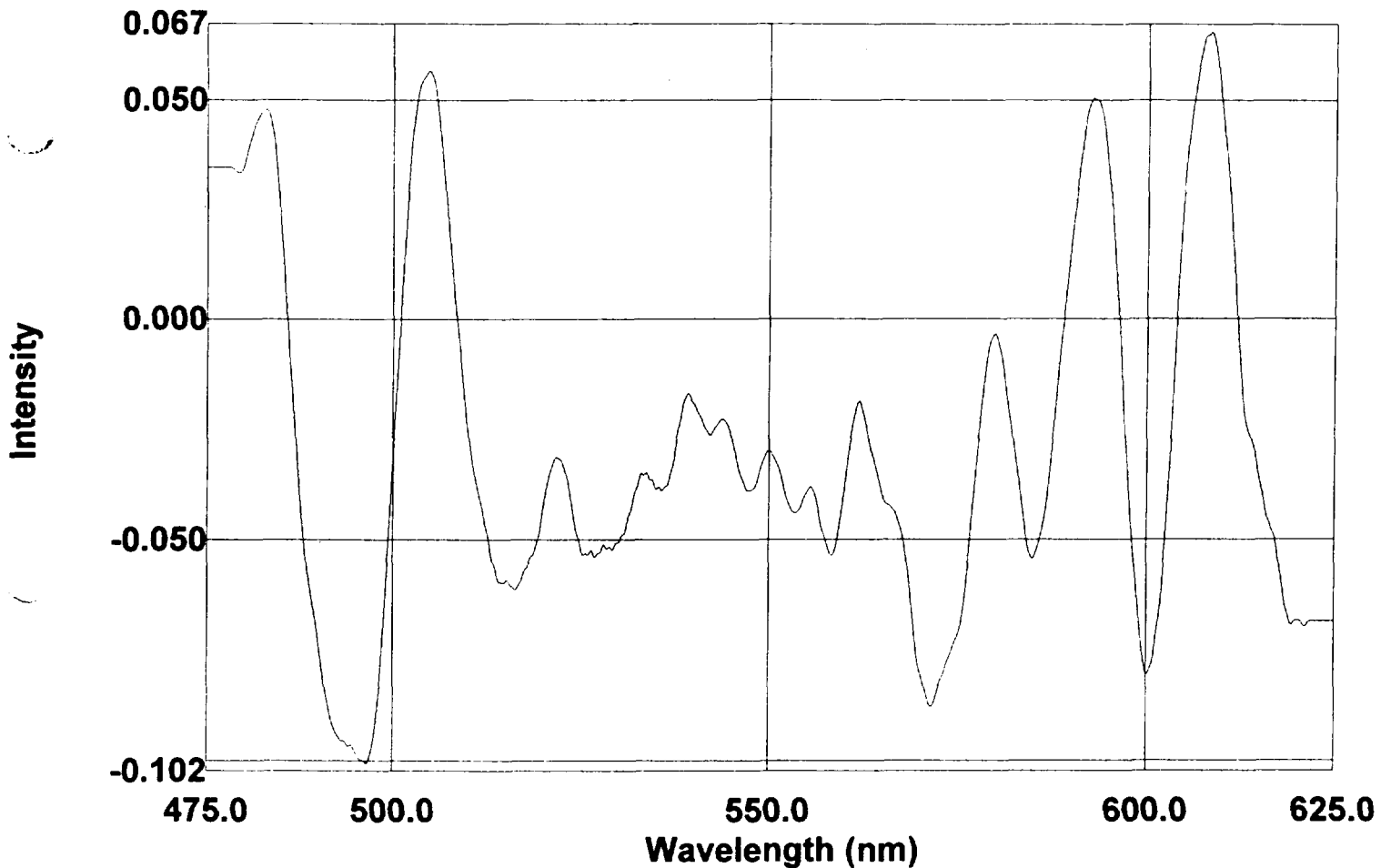
Raman Spectrum



Instrument Serial Number: A401932000510 Printed: 09:47 01/10/97

Peak Height: 56.367

S/N Ratio: 451.779



File Name: 1
 QA-ELUENT
 Created: 10:25 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

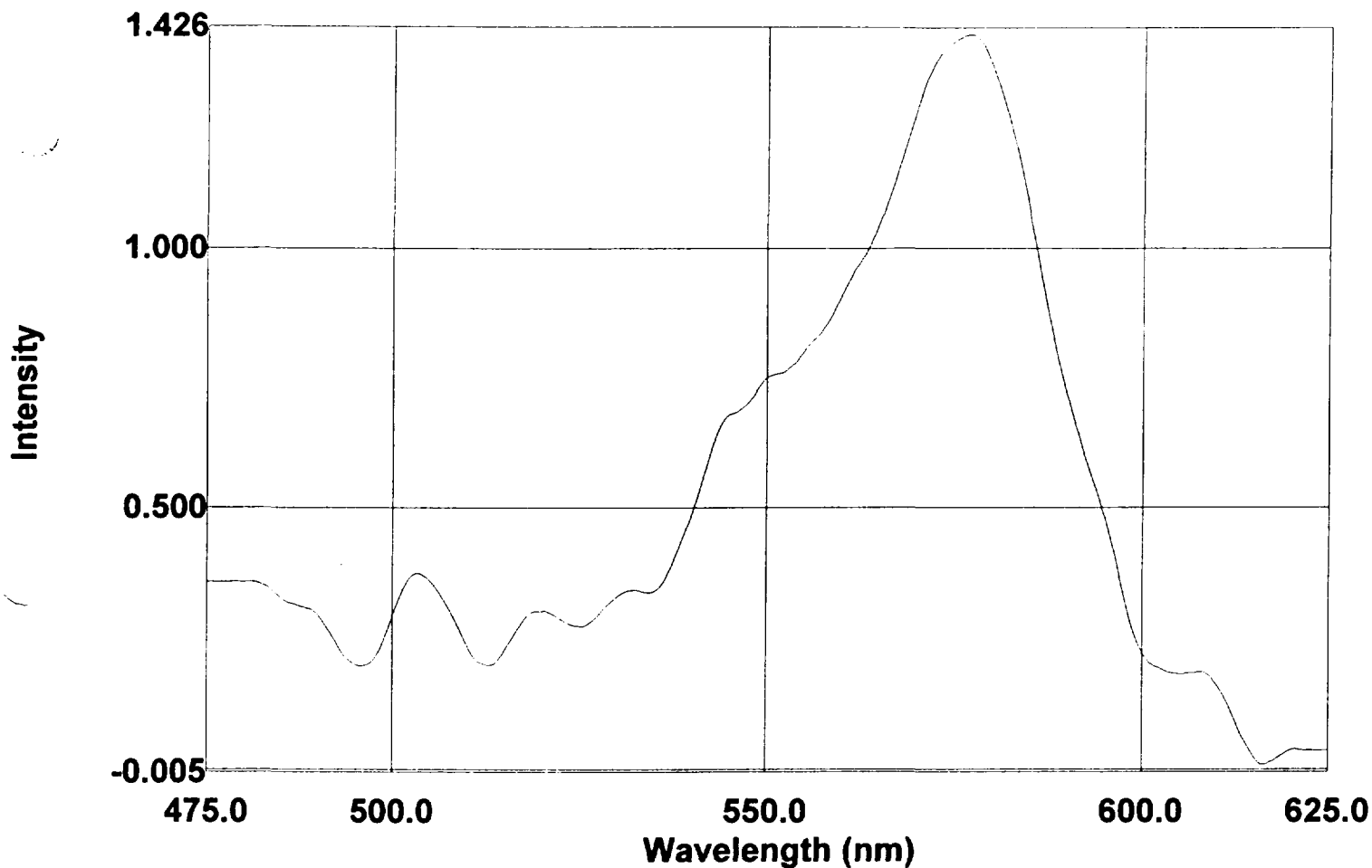
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 10:26 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

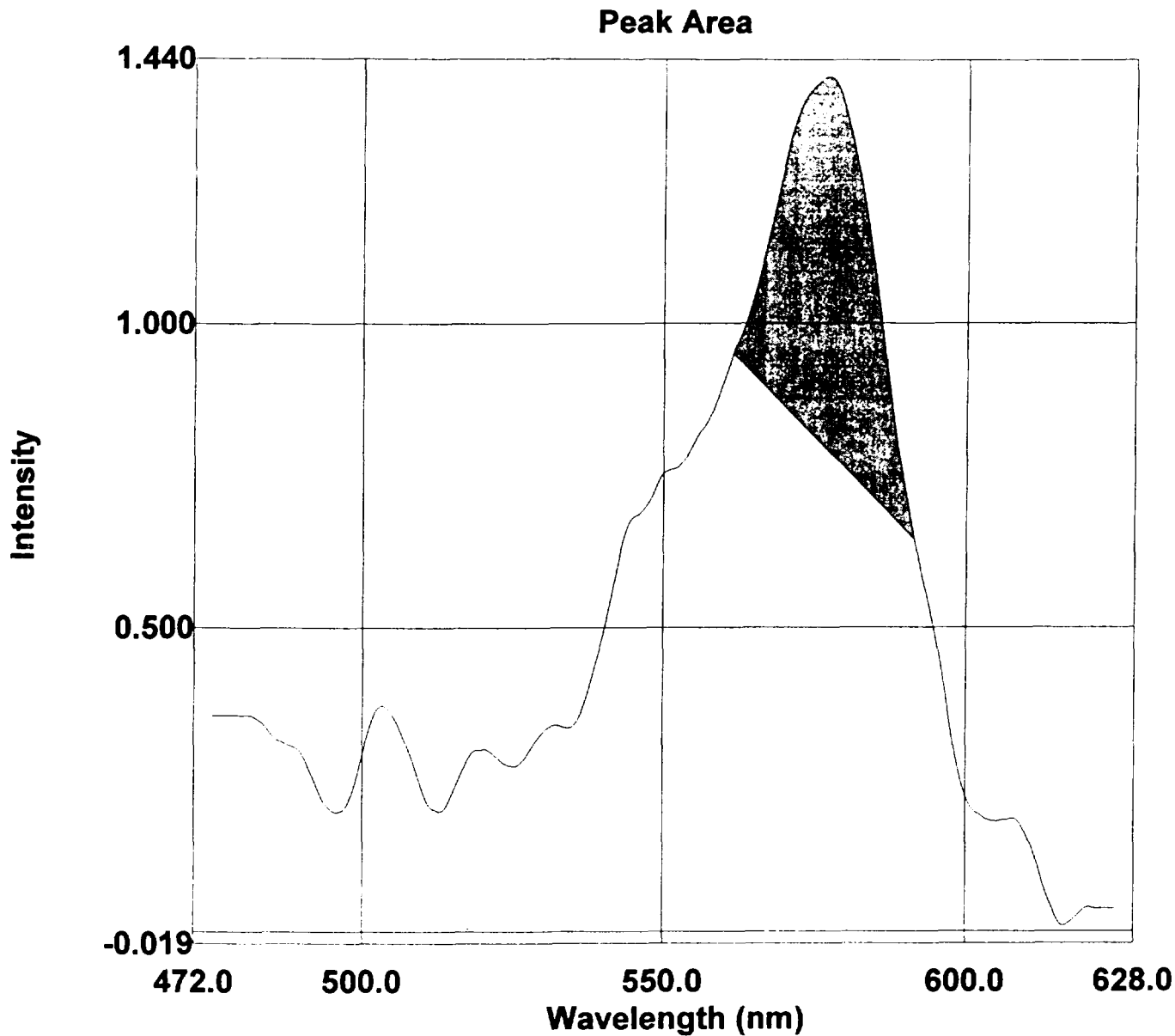
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



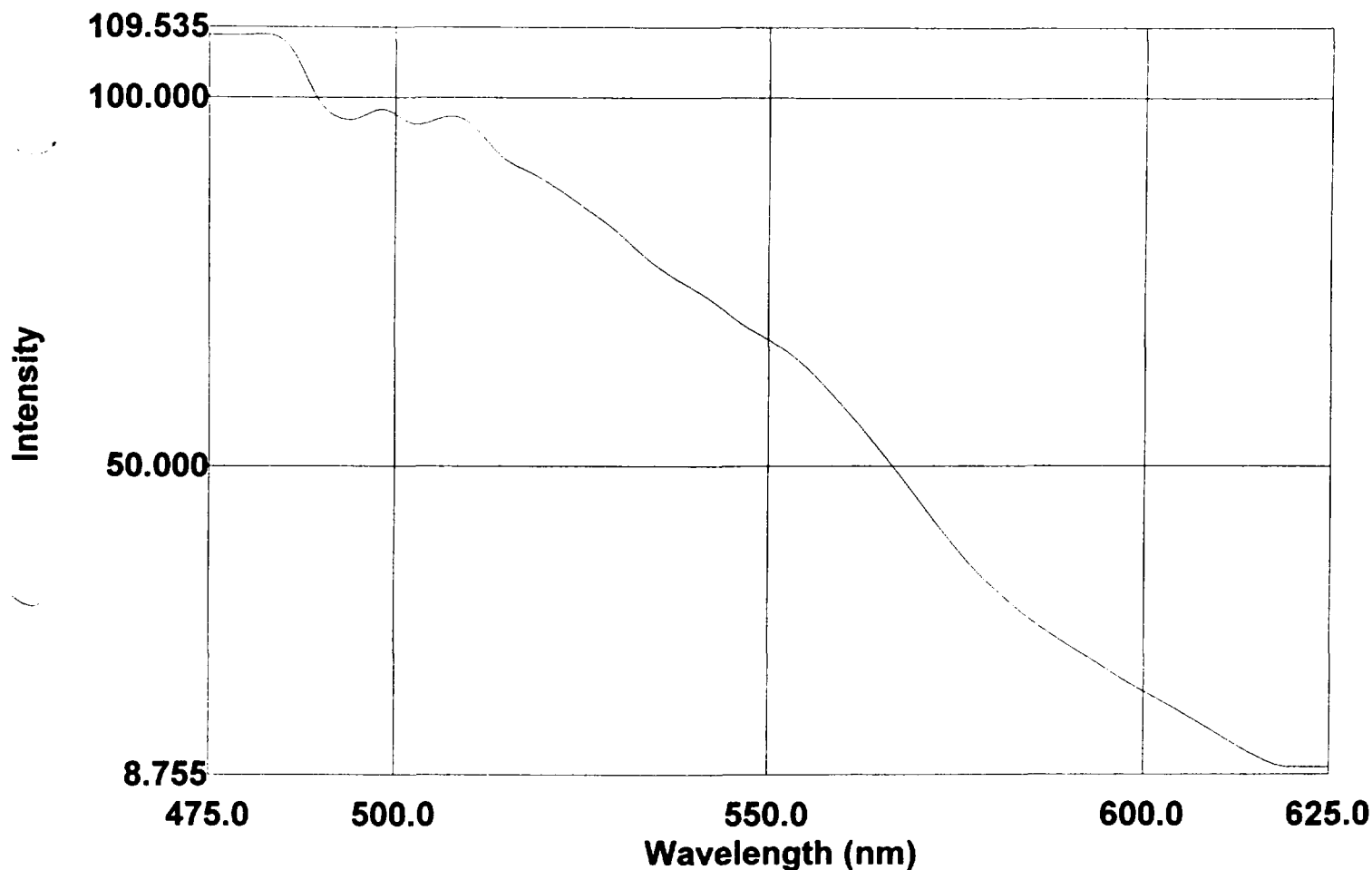
File Name: 2
QA-SULPHORHODAMINE B

Created: 10:26 01/10/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	10.908	0.005



File Name: 3

CW 6 EP

Created: 10:28 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

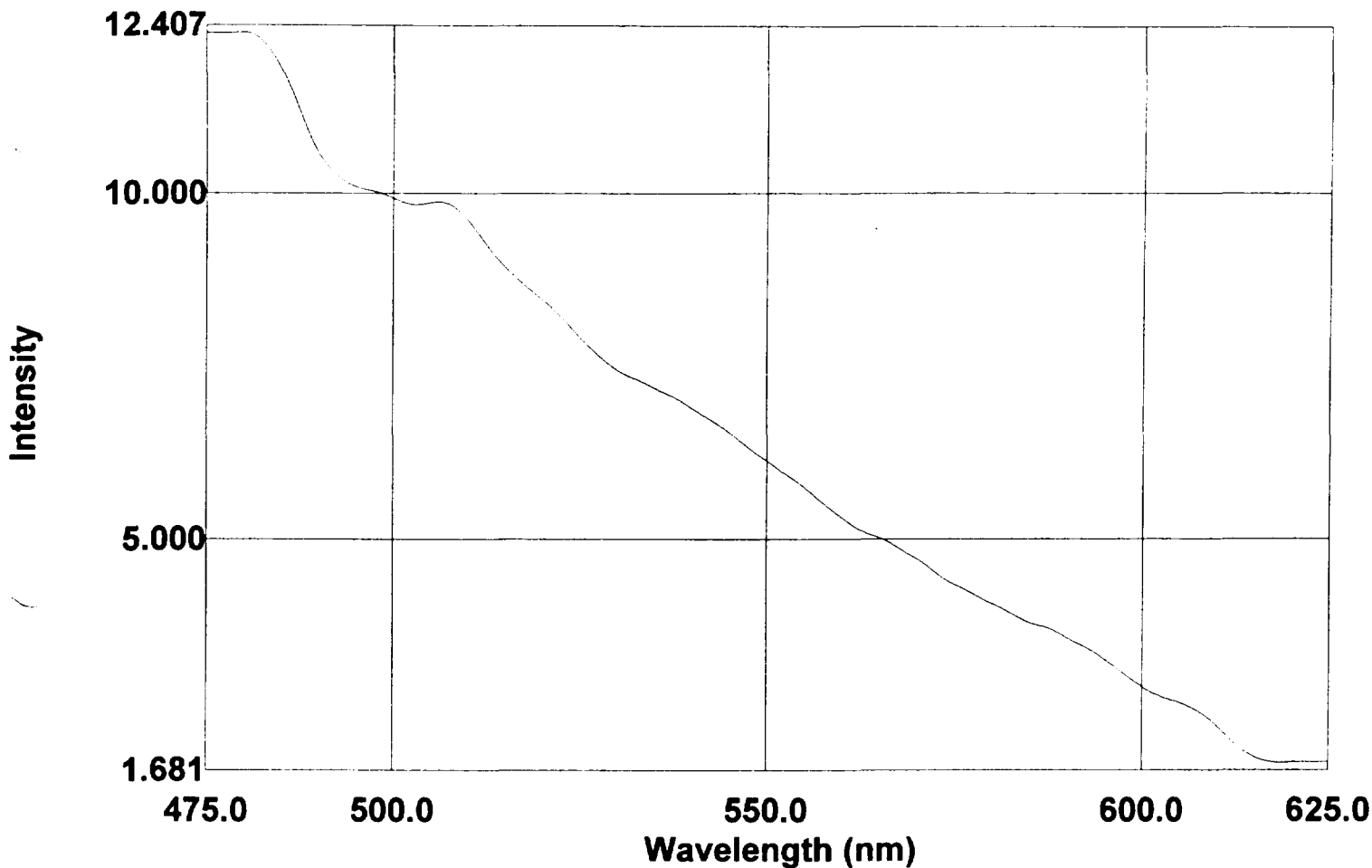
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

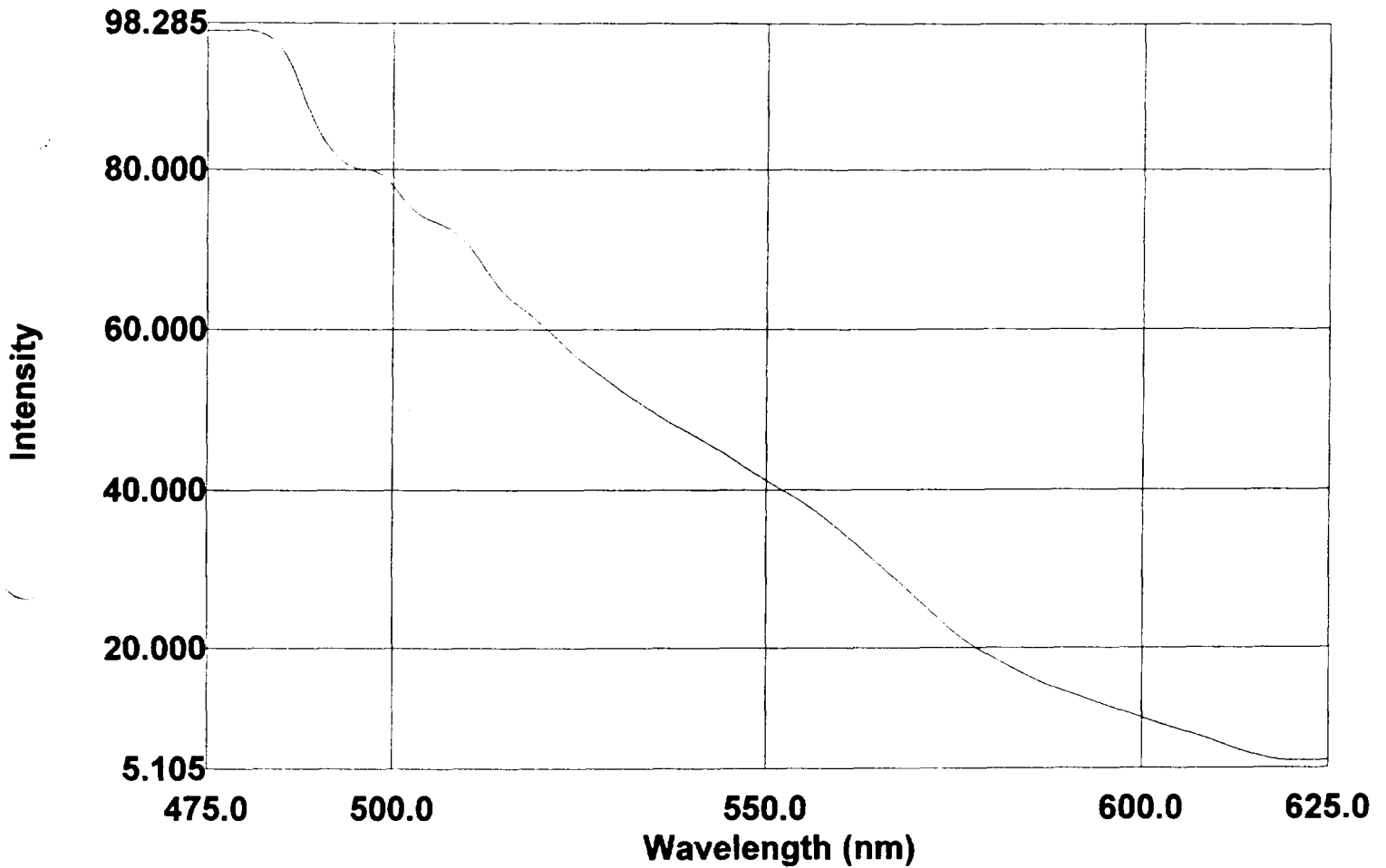
Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4
 CW 19 EP
 Created: 10:29 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034
 SET 08 -- 1//8/96
 Samples Analyzed by:
 Will Clauson
 Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5
 CW 31 EP
 Created: 10:30 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

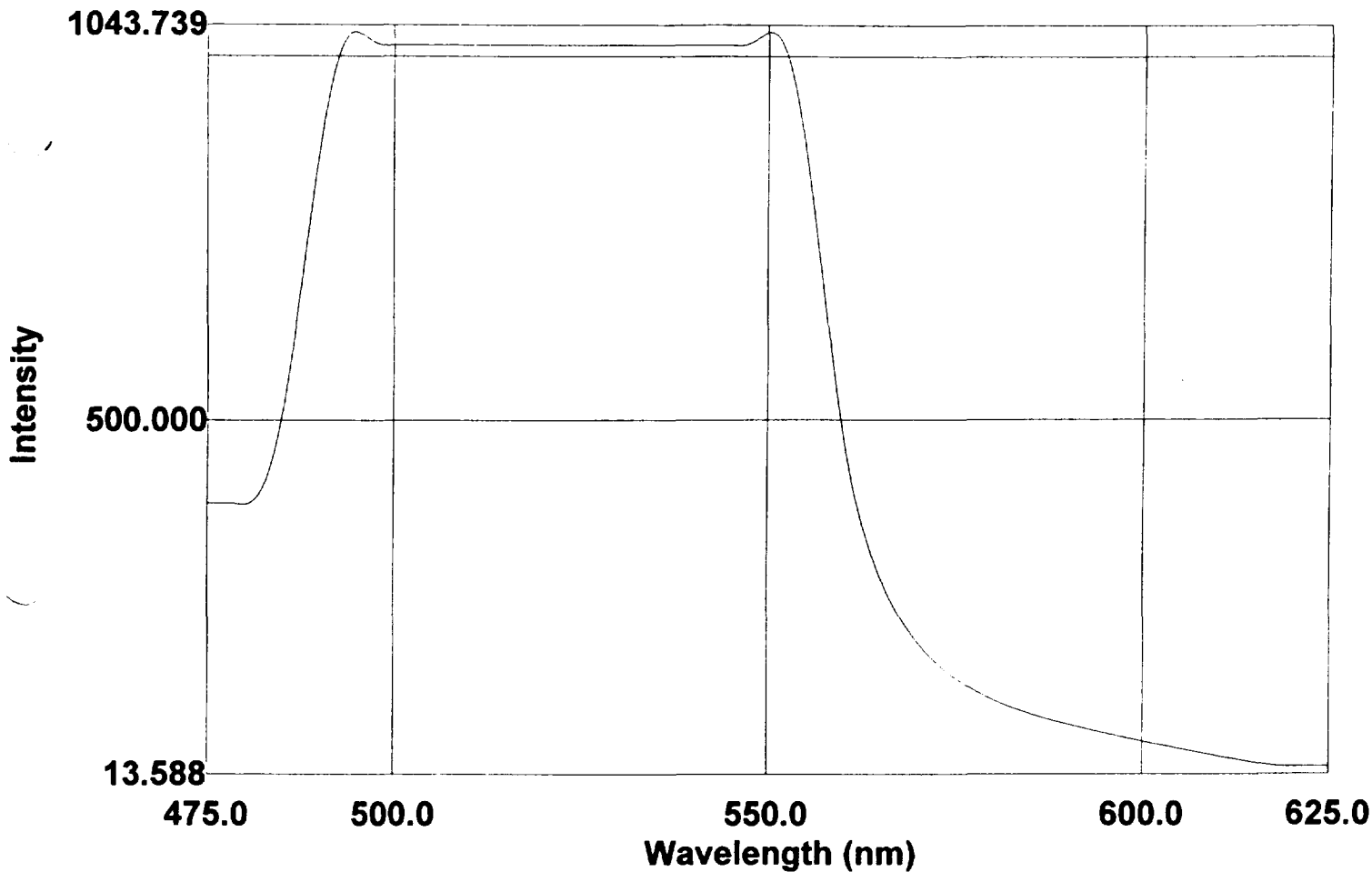
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6

CW 51 EP

Created: 10:36 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

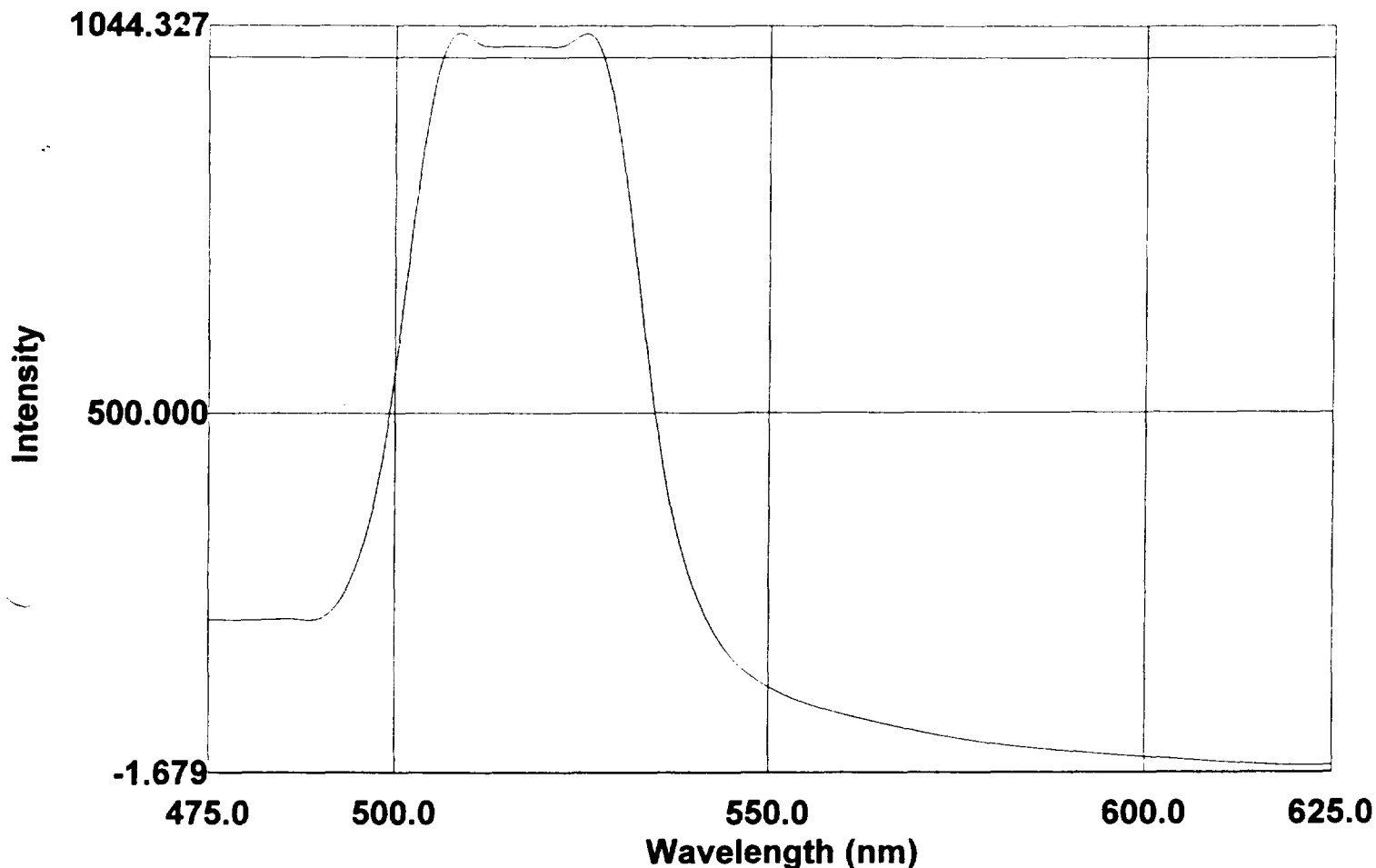
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 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

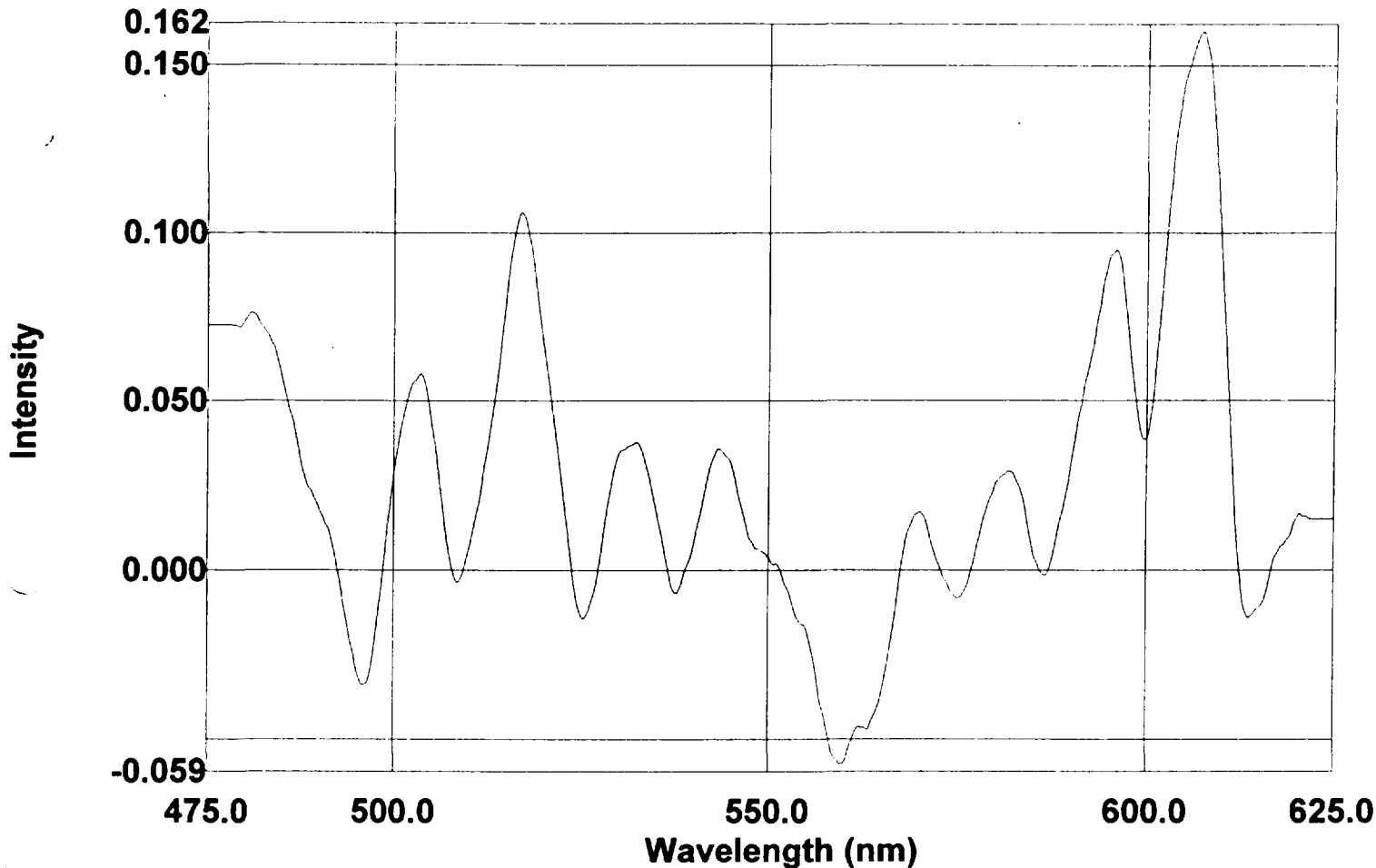
Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7
 CW 60 EP
 Created: 10:39 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
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 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034
 SET 08 -- 1//8/96
 Samples Analyzed by:
 Will Clauson
 Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 10:40 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

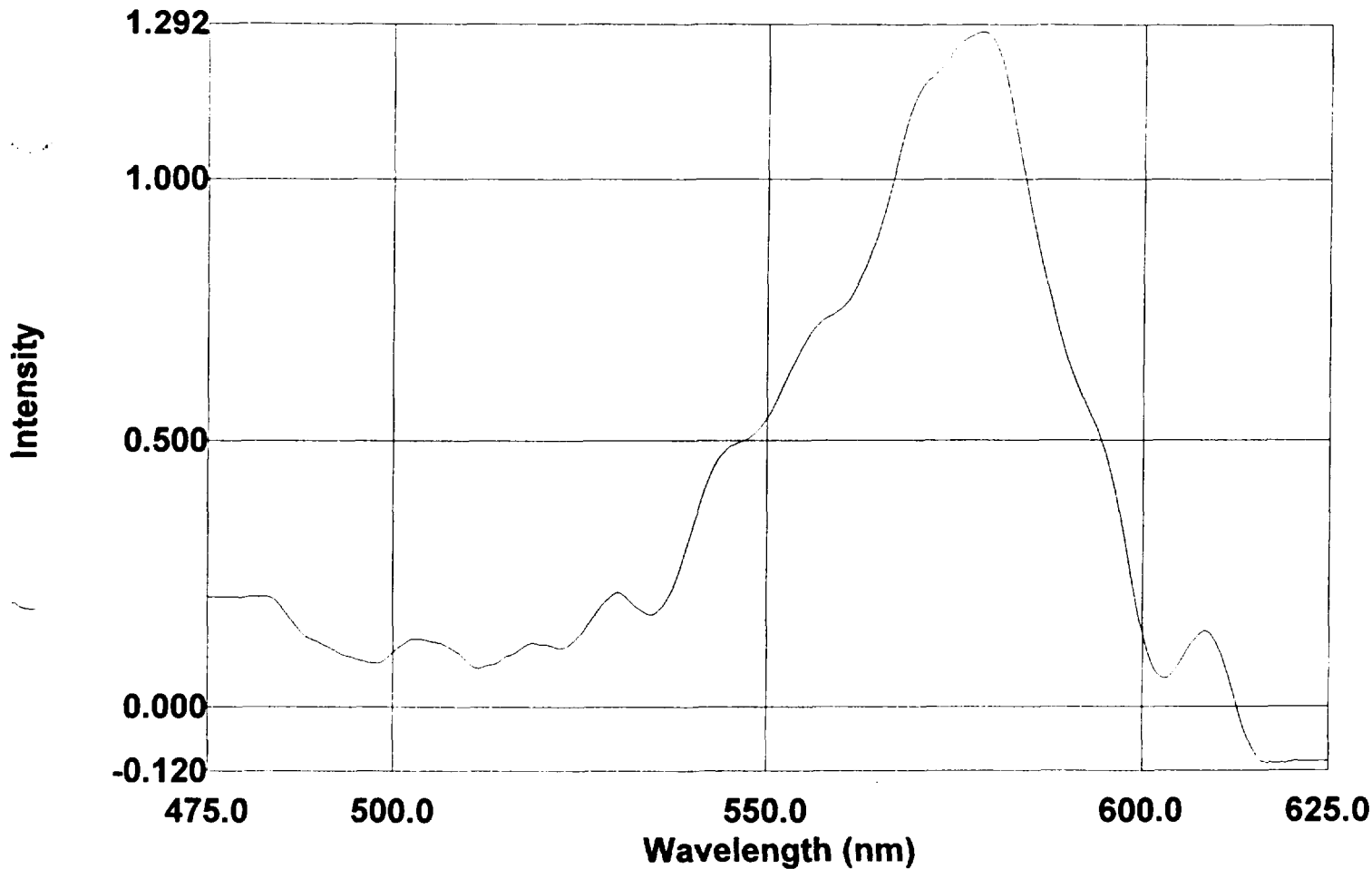
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE

Created: 10:41 01/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

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 FAX: (502) 846-4319

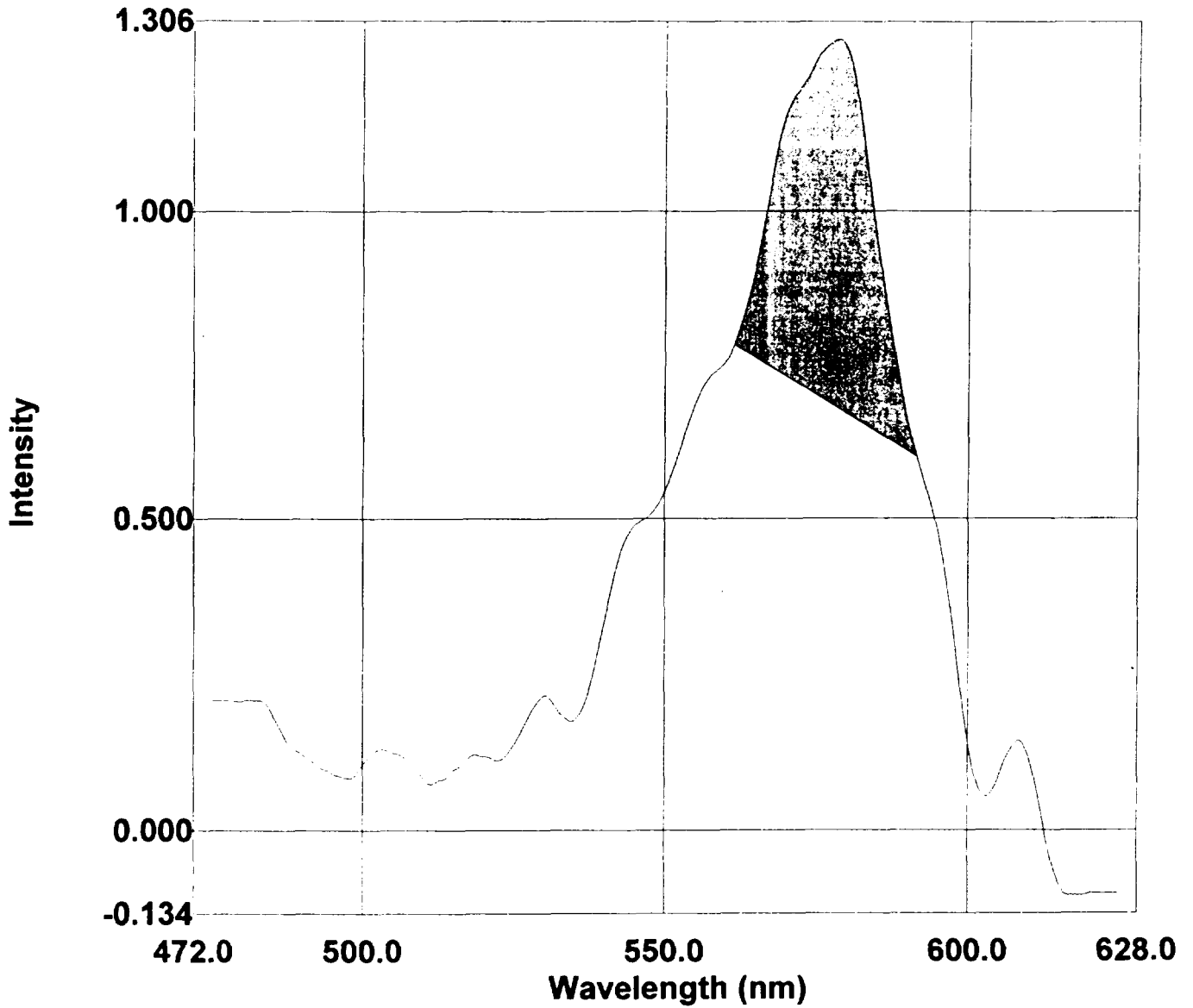
Michigan Chemical Complex Site 034

SET 08 -- 1//8/96

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



File Name: 9
QA-SULPHORHODAMINE

Created: 10:41 01/10/97
Data: Modified

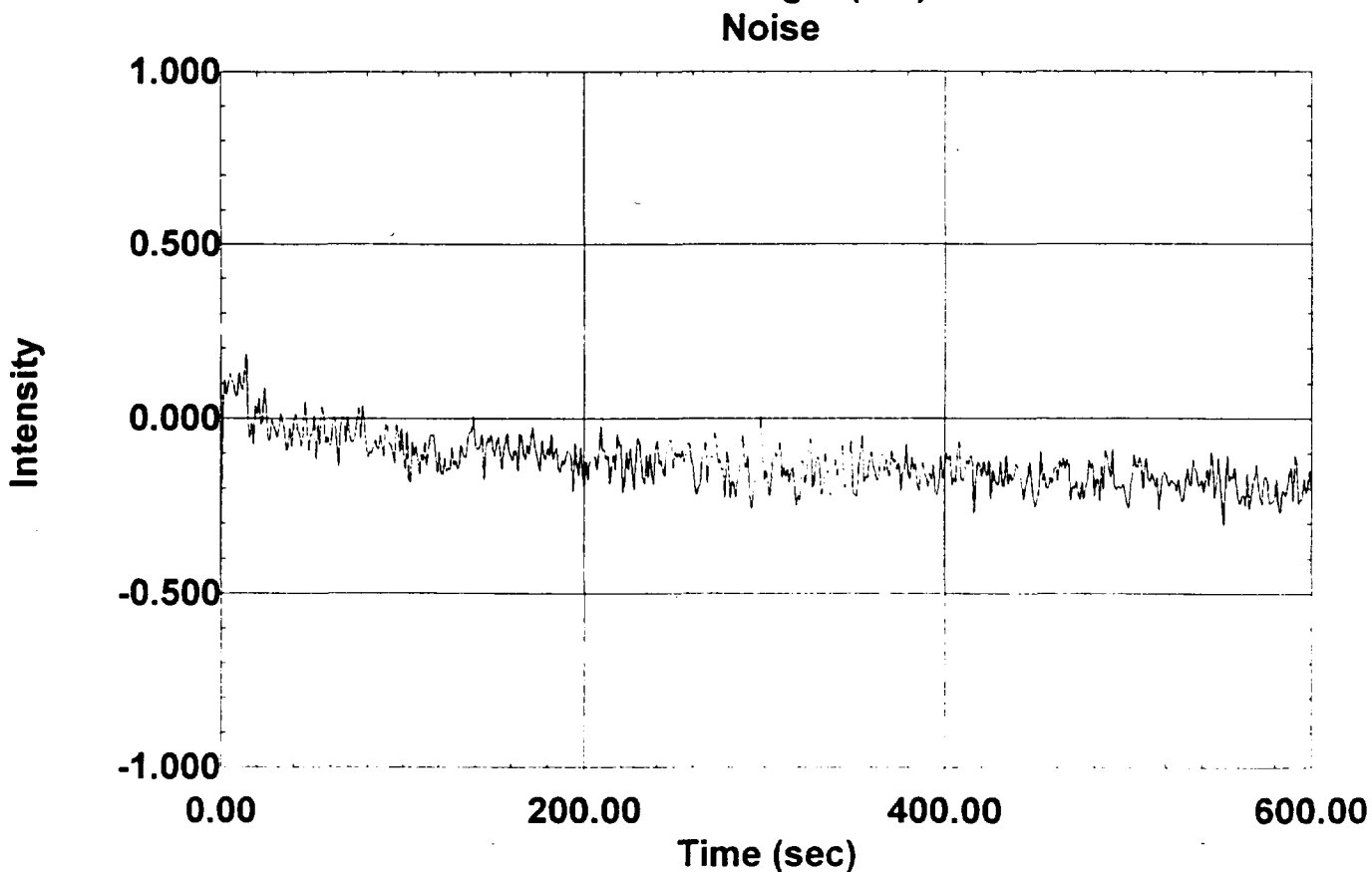
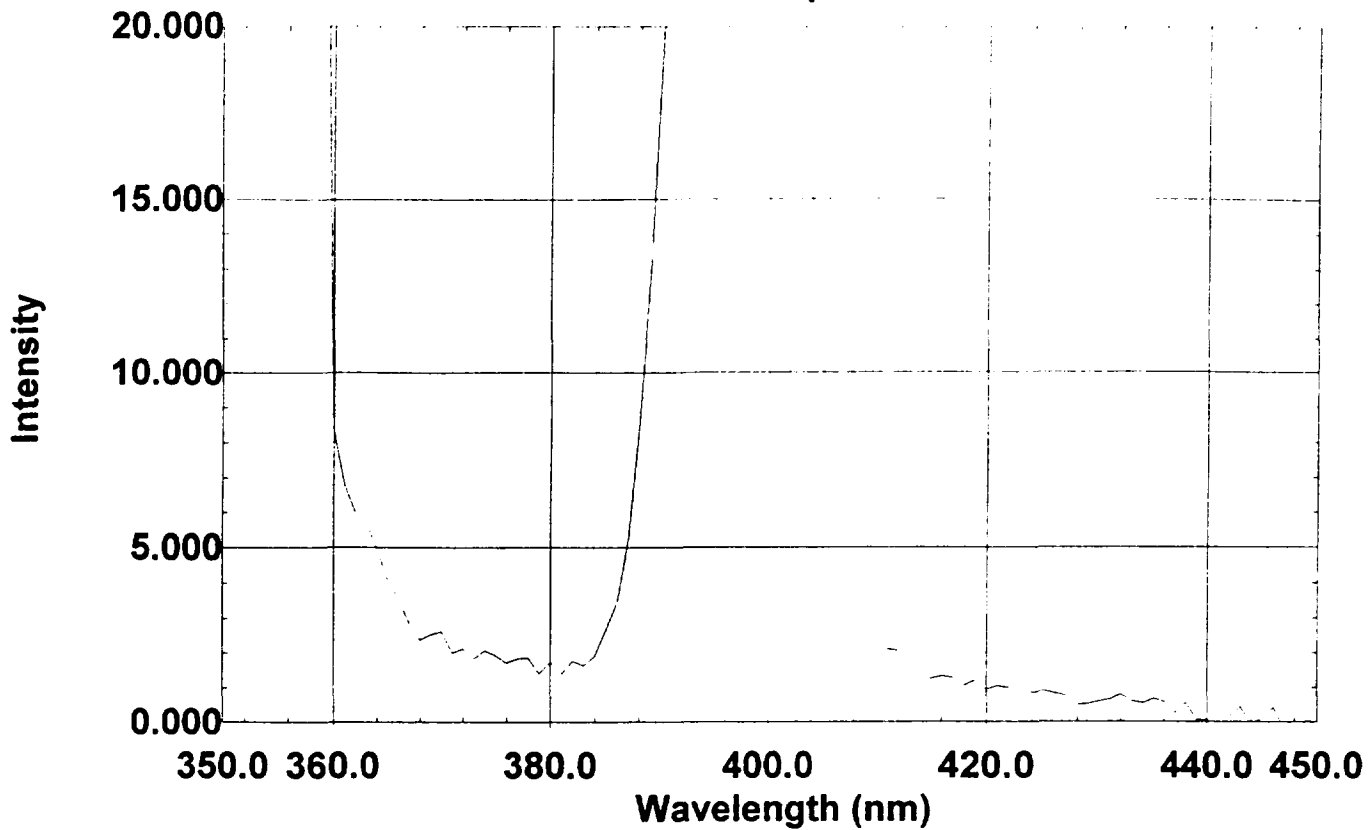
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	10.456	0.005

S/N Ratio Check

Raman Spectrum



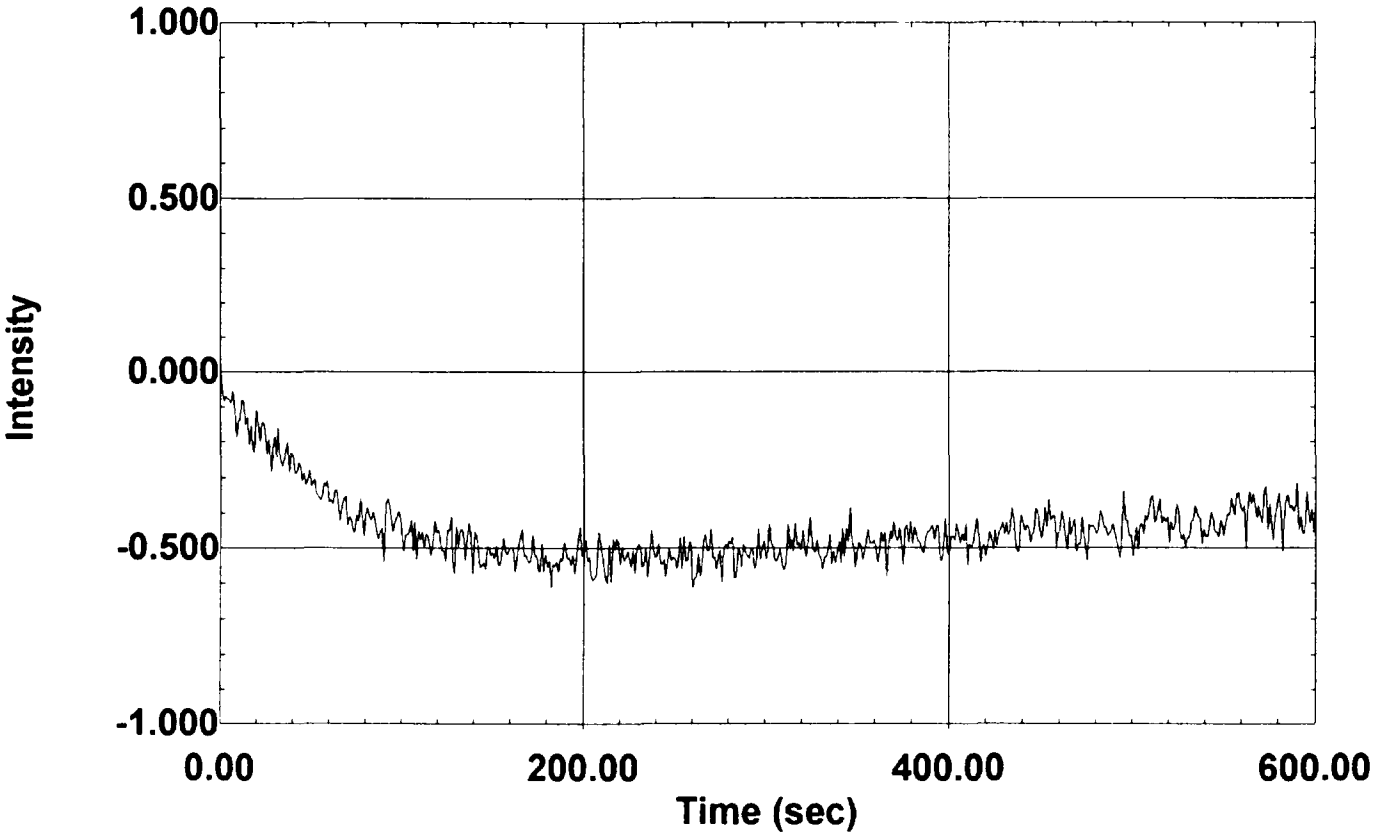
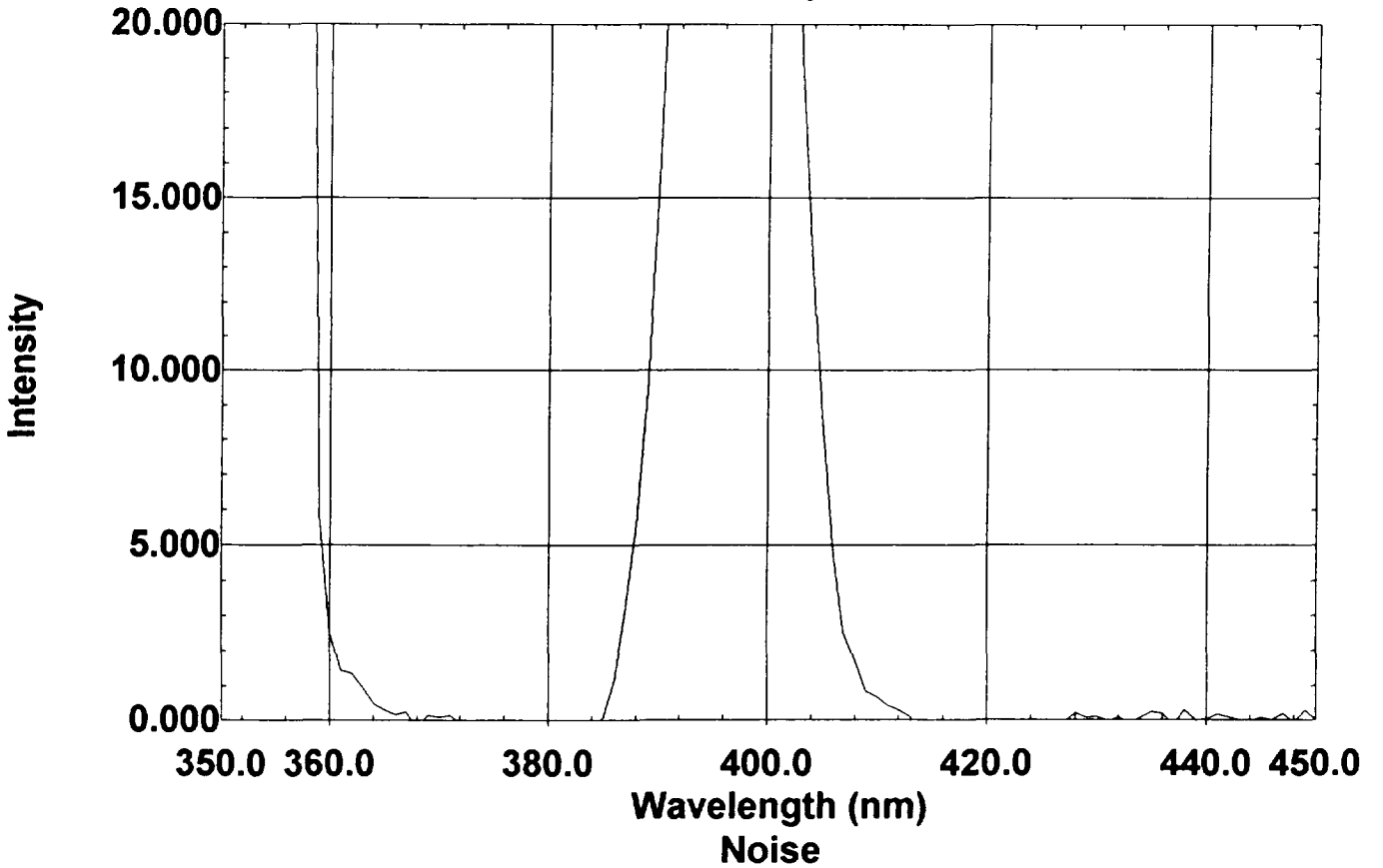
Instrument Serial Number: A401932000510 Printed: 17:27 01/10/97

Peak Height: 59.686

S/N Ratio: 427.397

S/N Ratio Check

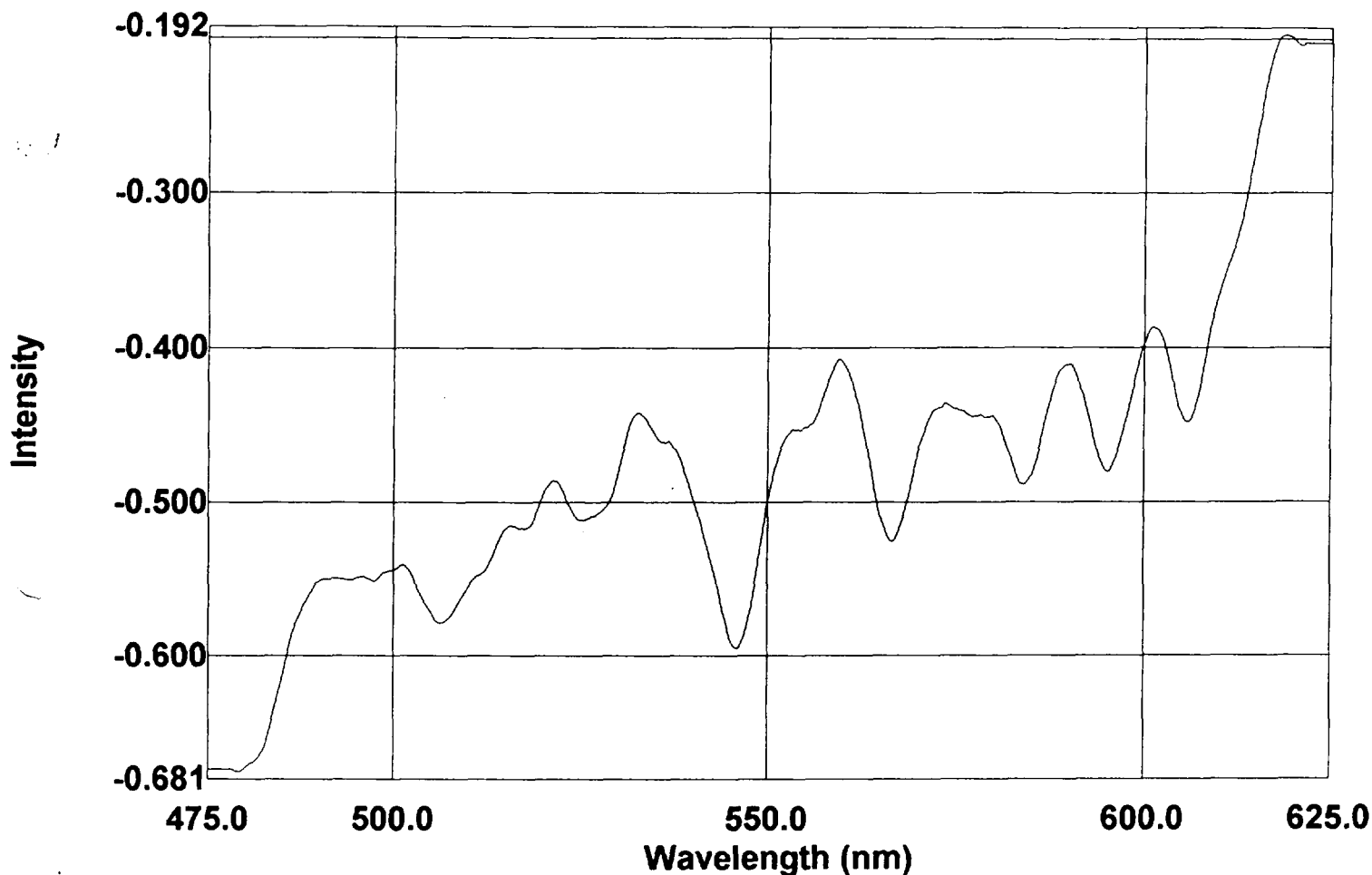
Raman Spectrum



Instrument Serial Number: A40193200051OD Printed: 10:48 01/31/97

Peak Height: 55.742

S/N Ratio: 455.533



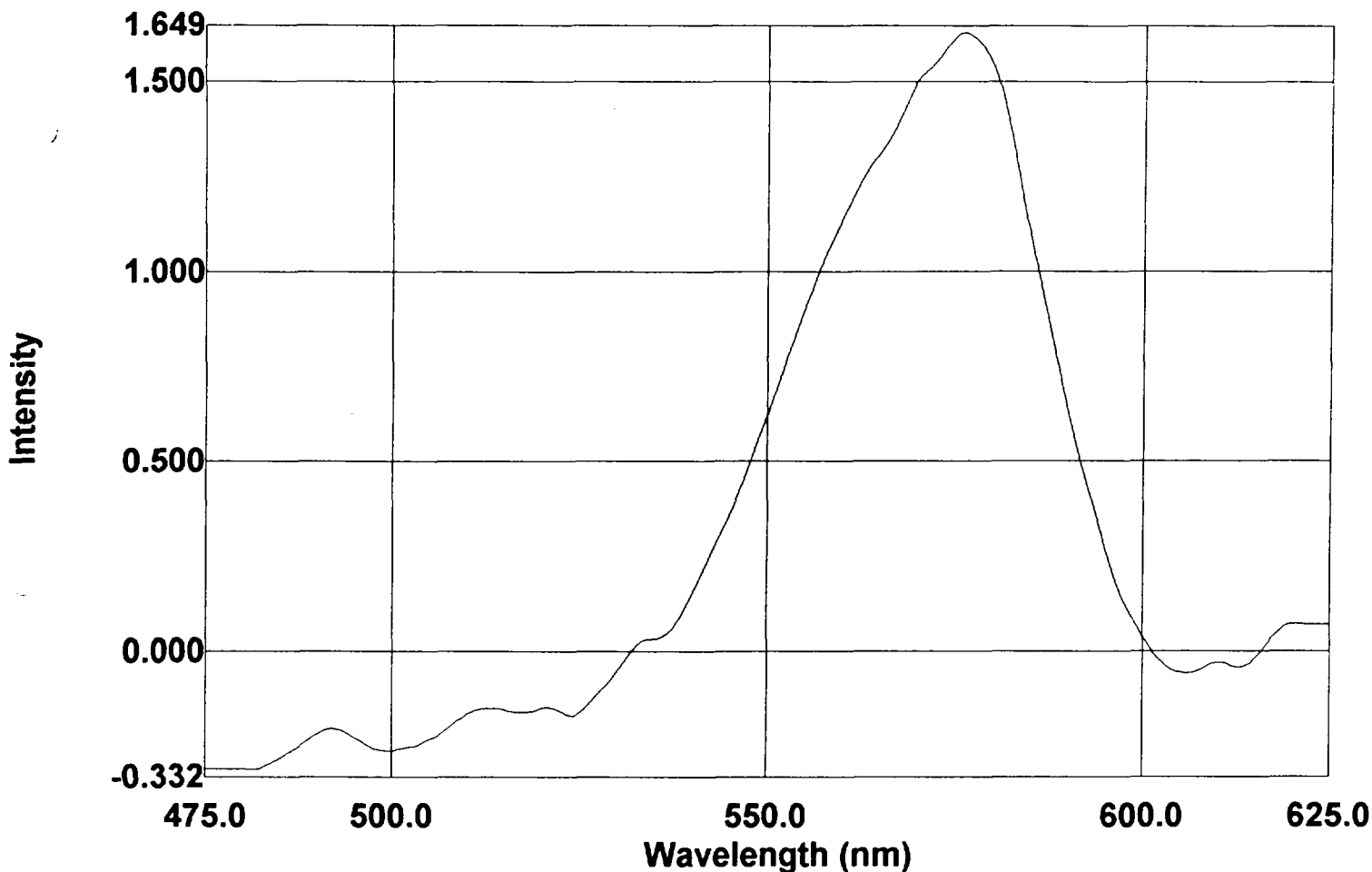
File Name: 1
 QA-ELUENT
 Created: 15:28 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
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 Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 15:29 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

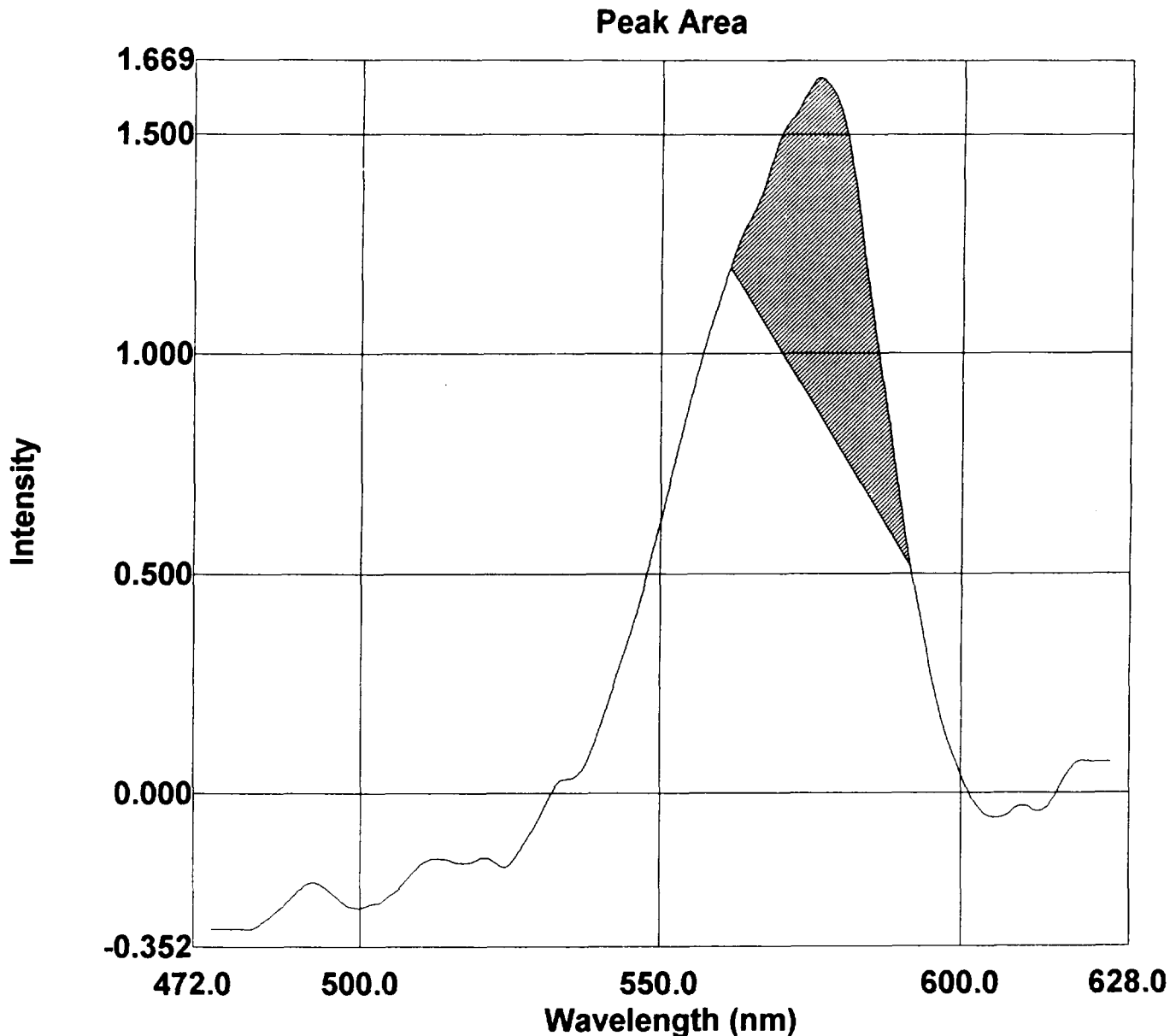
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



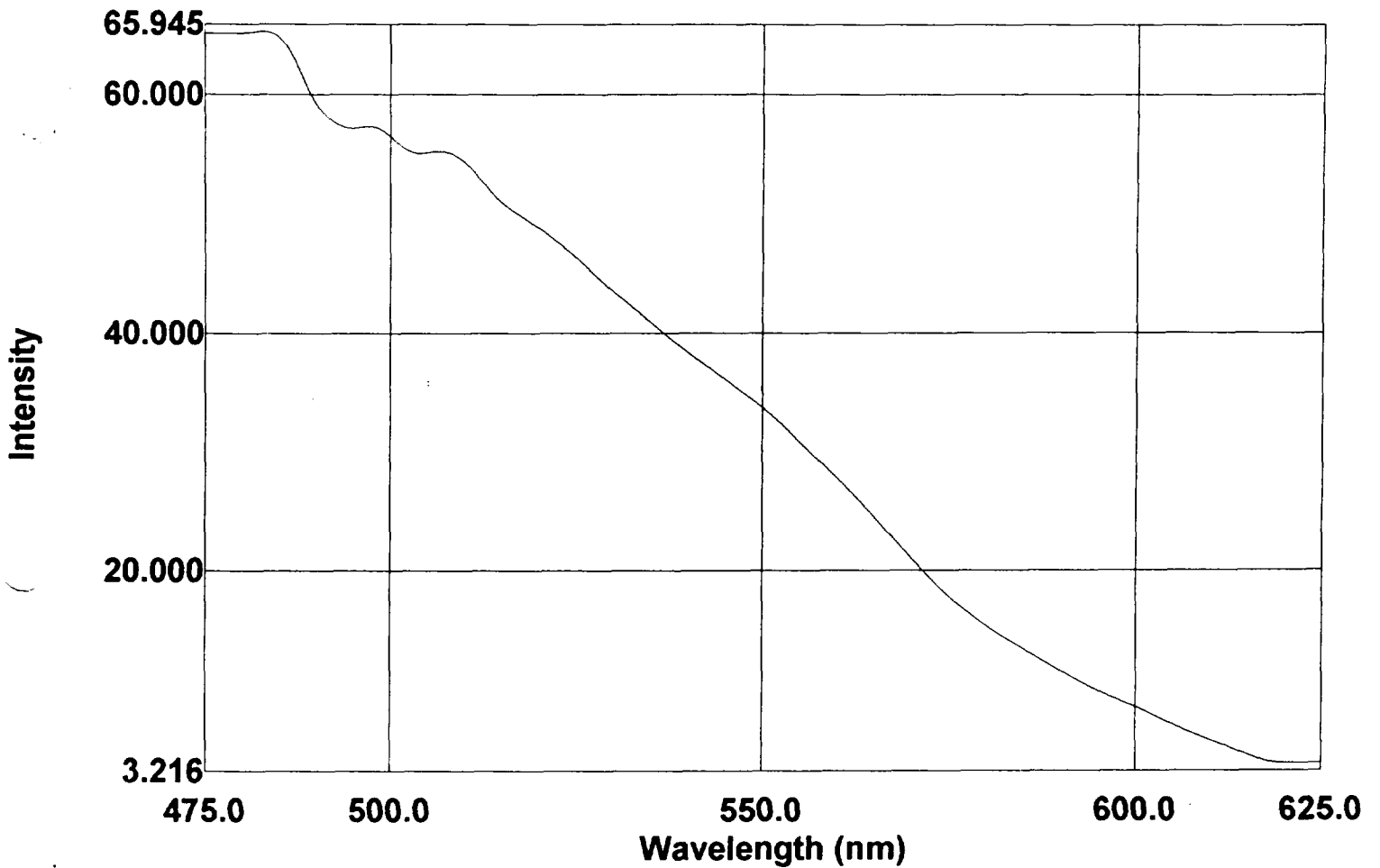
File Name: 2
QA-SULPHORHODAMINE B

Created: 15:29 01/31/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	13.785	0.007



File Name: 3

CW 6 EP

Created: 15:30 01/31/97

Data: Modified

Instrument: RF-5301

Spectrum Type: SYNC

Scan Range: 475.0nm to 625.0nm

EX Wavelength: 460.0 nm

Sample Pitch: 0.2

Slit Width: EX:3.0nm EM:5.0nm

Scan Speed: Fast

Sensitivity: High

Response Time: Auto

Shutter: Auto, Closed

Crawford and Associates, Inc.

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Bowling Green, KY 42104

Phone: (502) 745-9224

FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:

Andrei Kerpan

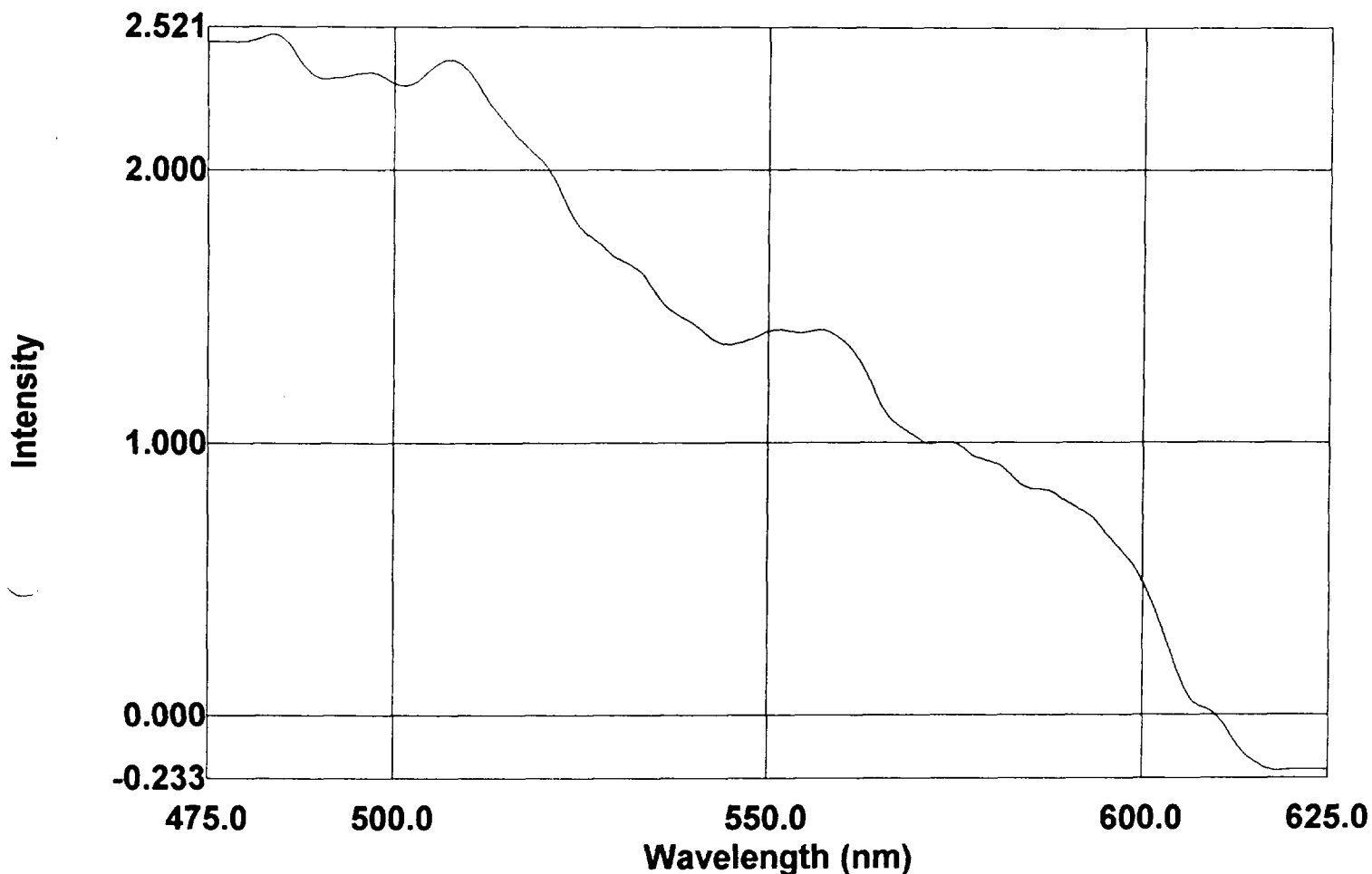
Samples Analyzed for:

Memphis Environmental Center

2603 Corporate Avenue, Suite 100

Memphis, Tennessee 38132

Phone: (901) 345-1788



File Name: 4

CW 19 EP

Created: 15:31 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

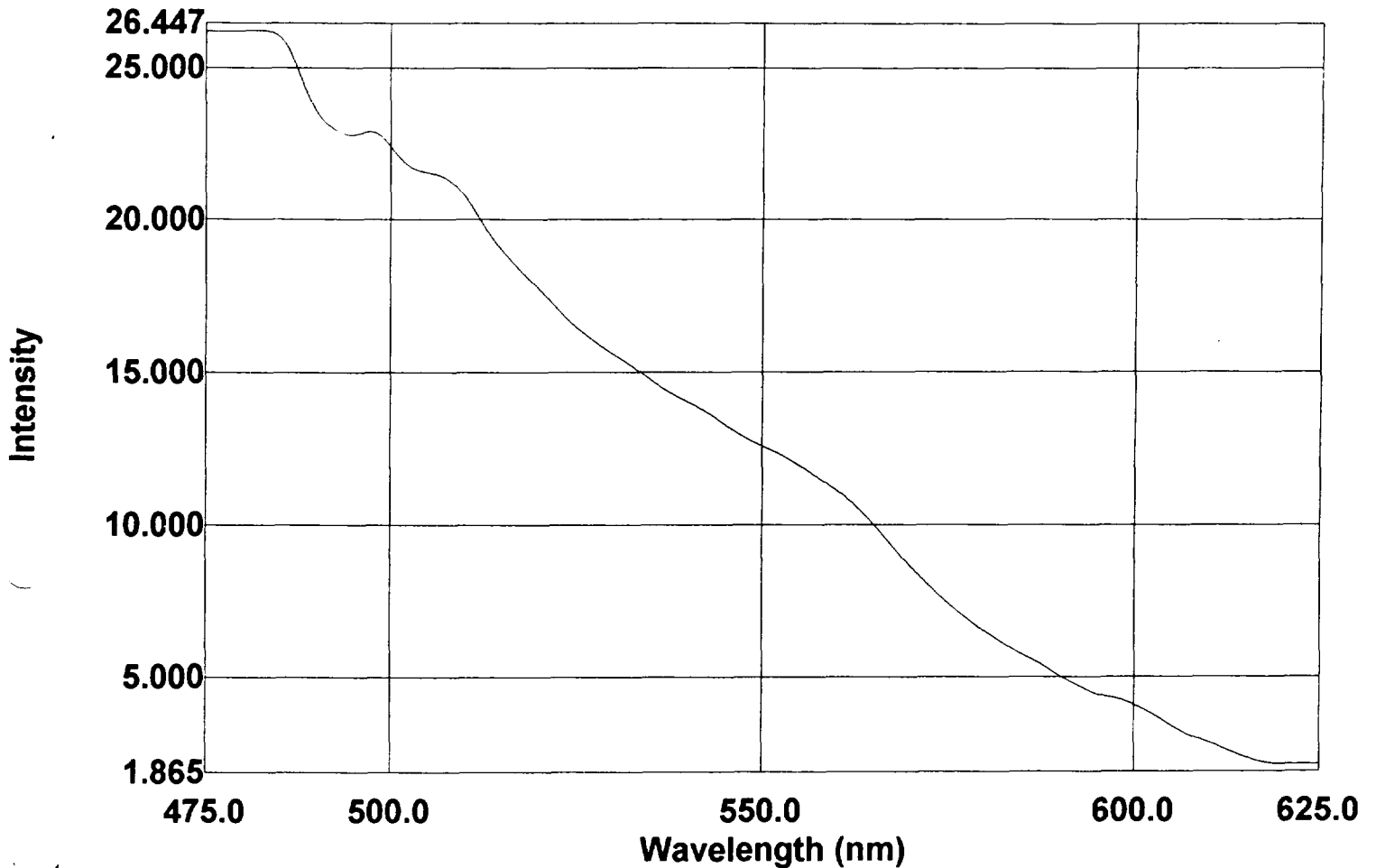
Crawford and Associates, Inc.
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 Bowling Green, KY 42104
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 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5

CW 31 EP

Created: 15:31 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

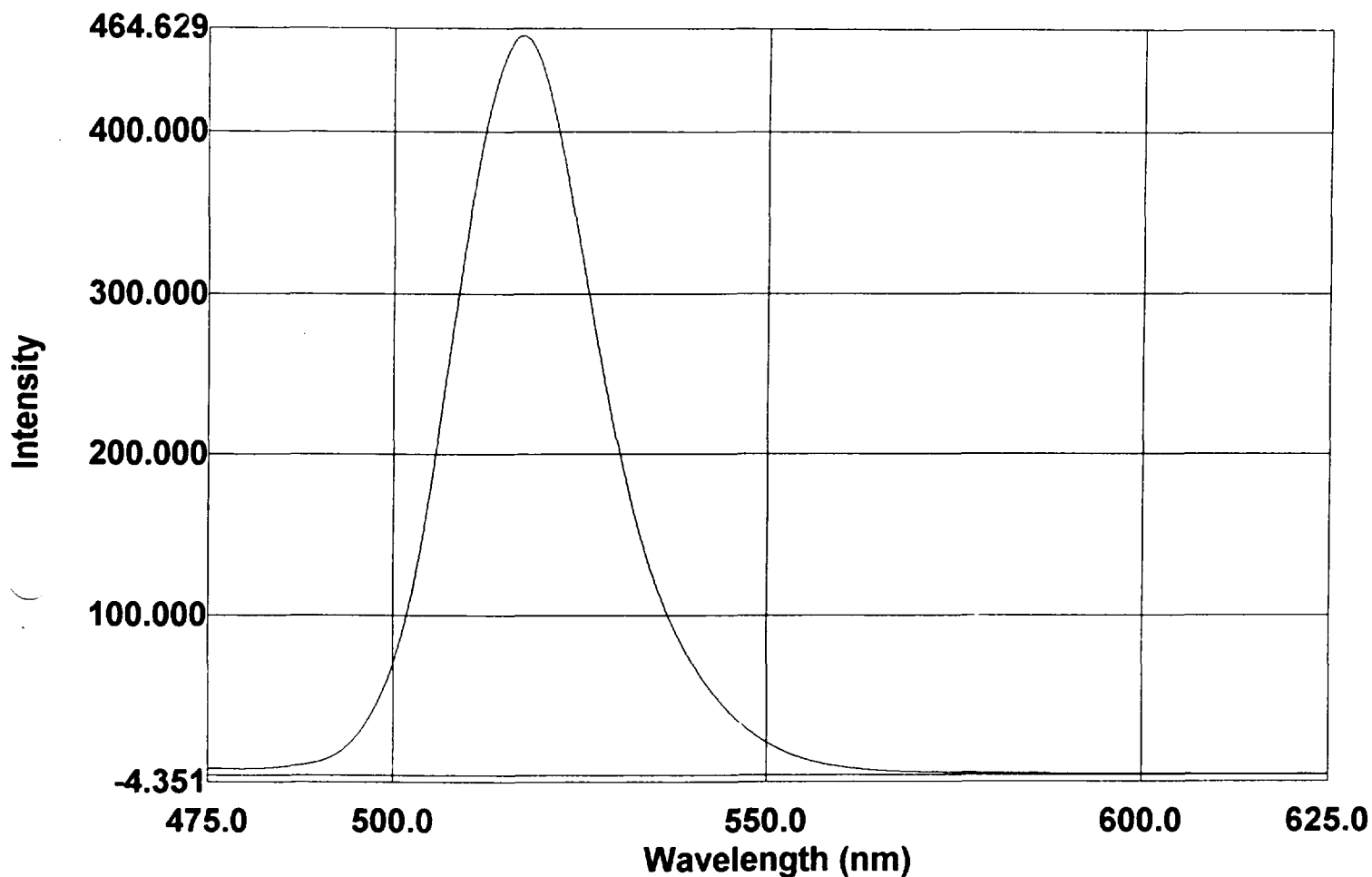
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6

Crawford and Associates, Inc.
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 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

CW 51 EP

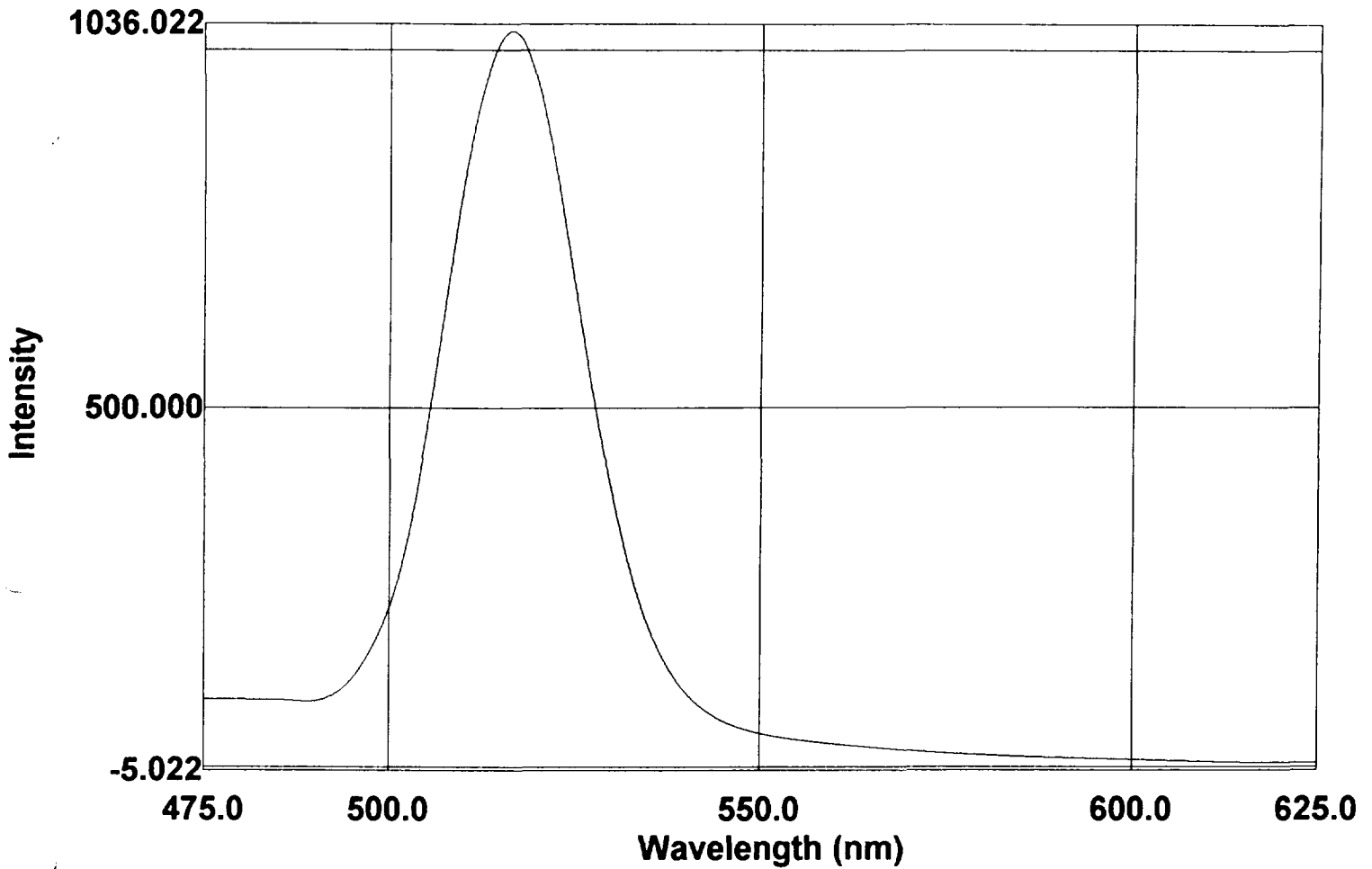
Michigan Chemical Complex Site 034

Created: 15:32 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: Low
 Response Time: Auto
 Shutter: Auto, Closed

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7

CW 60 EP

Created: 15:34 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

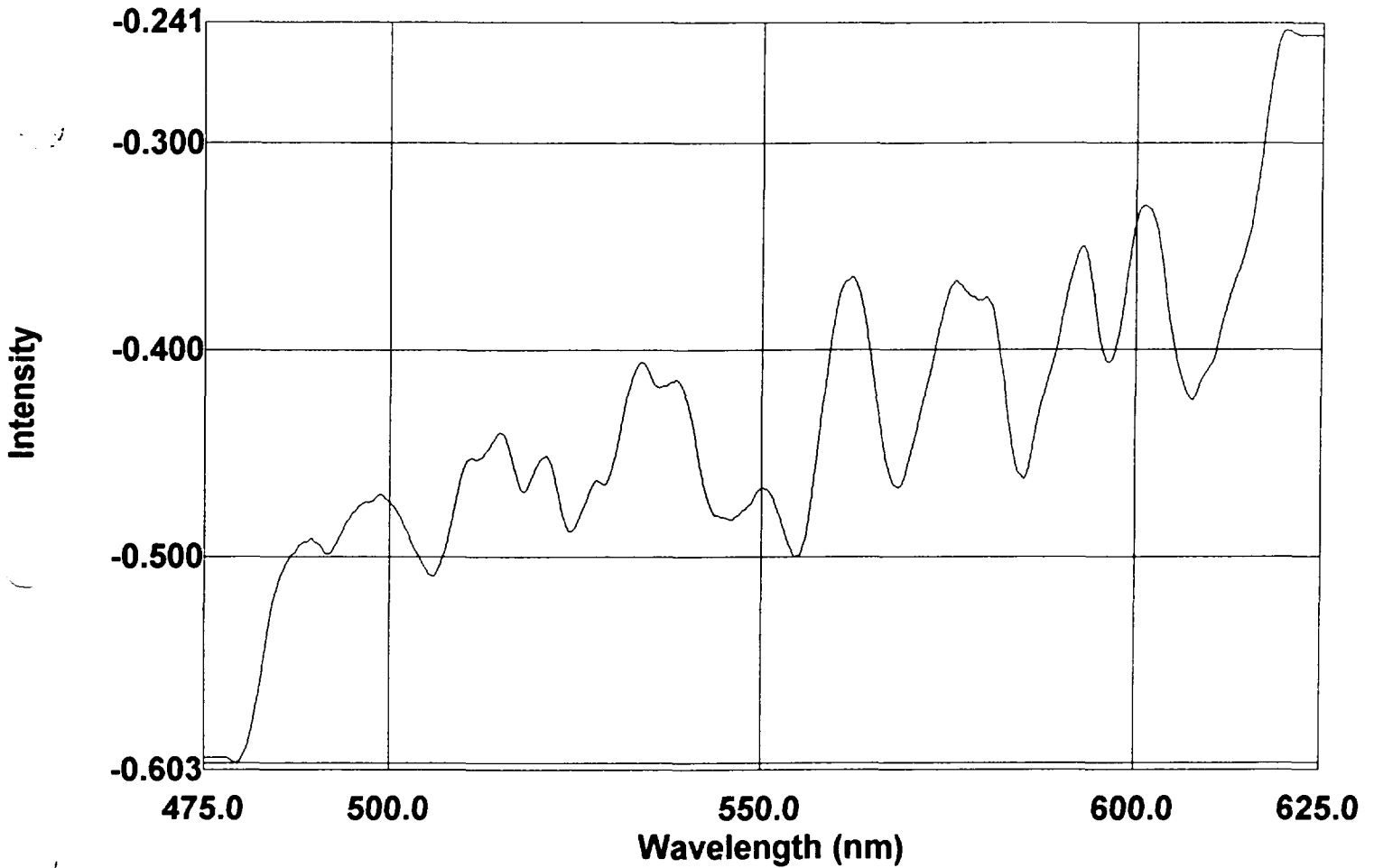
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 15:34 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

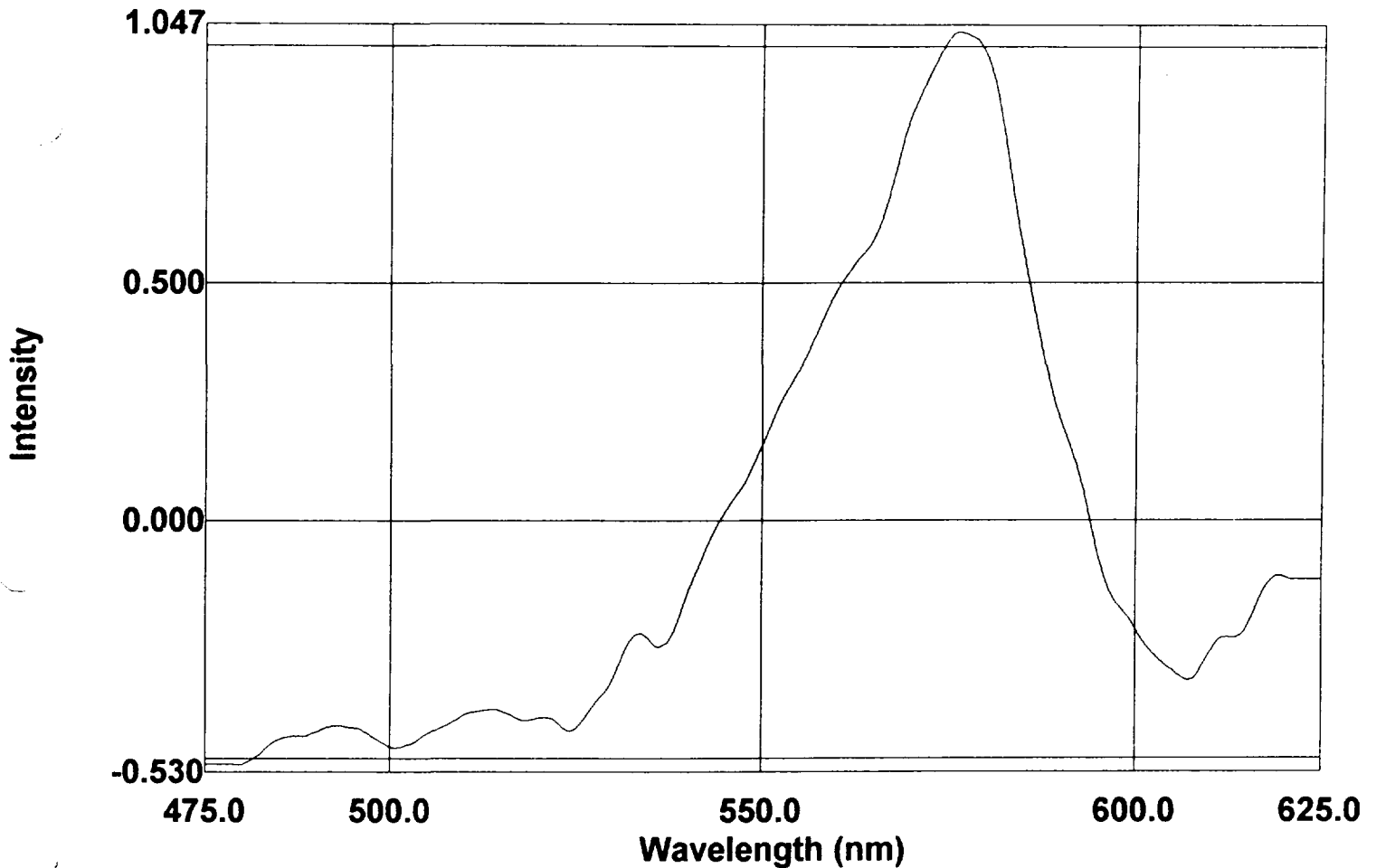
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 15:35 01/31/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

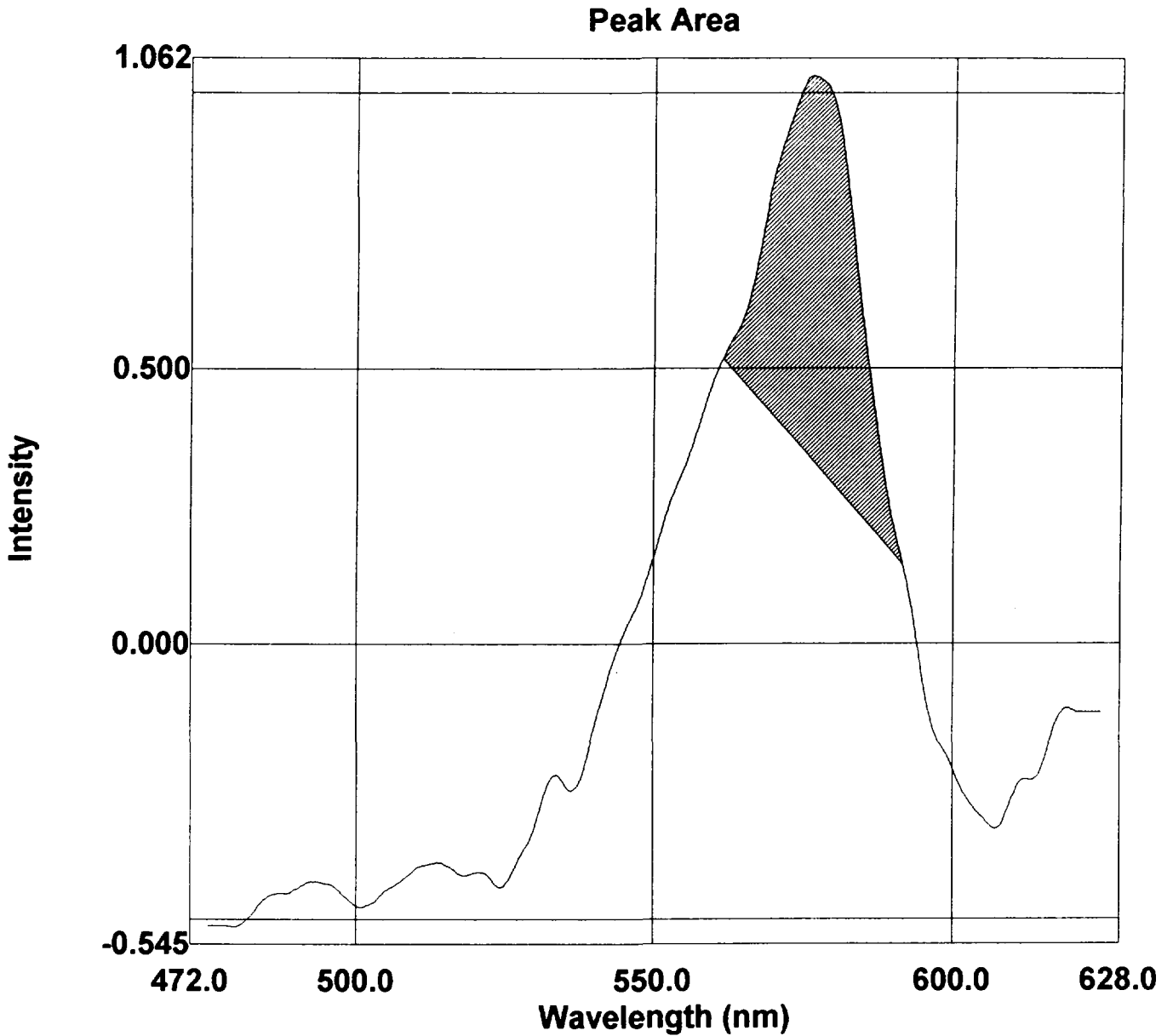
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 09 -- 1/23/96

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9
 QA-SULPHORHODAMINE B

Created: 15:35 01/31/97
 Data: Modified

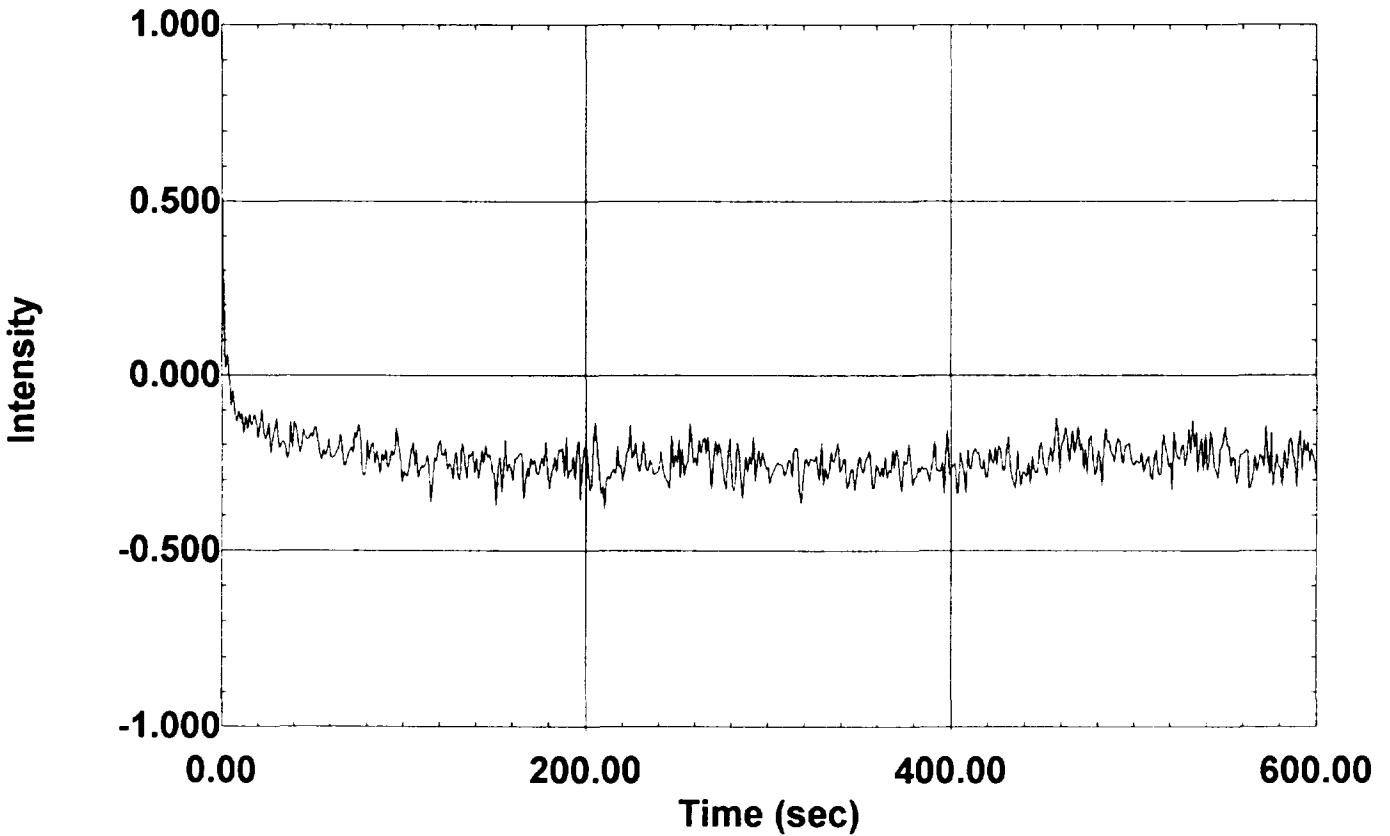
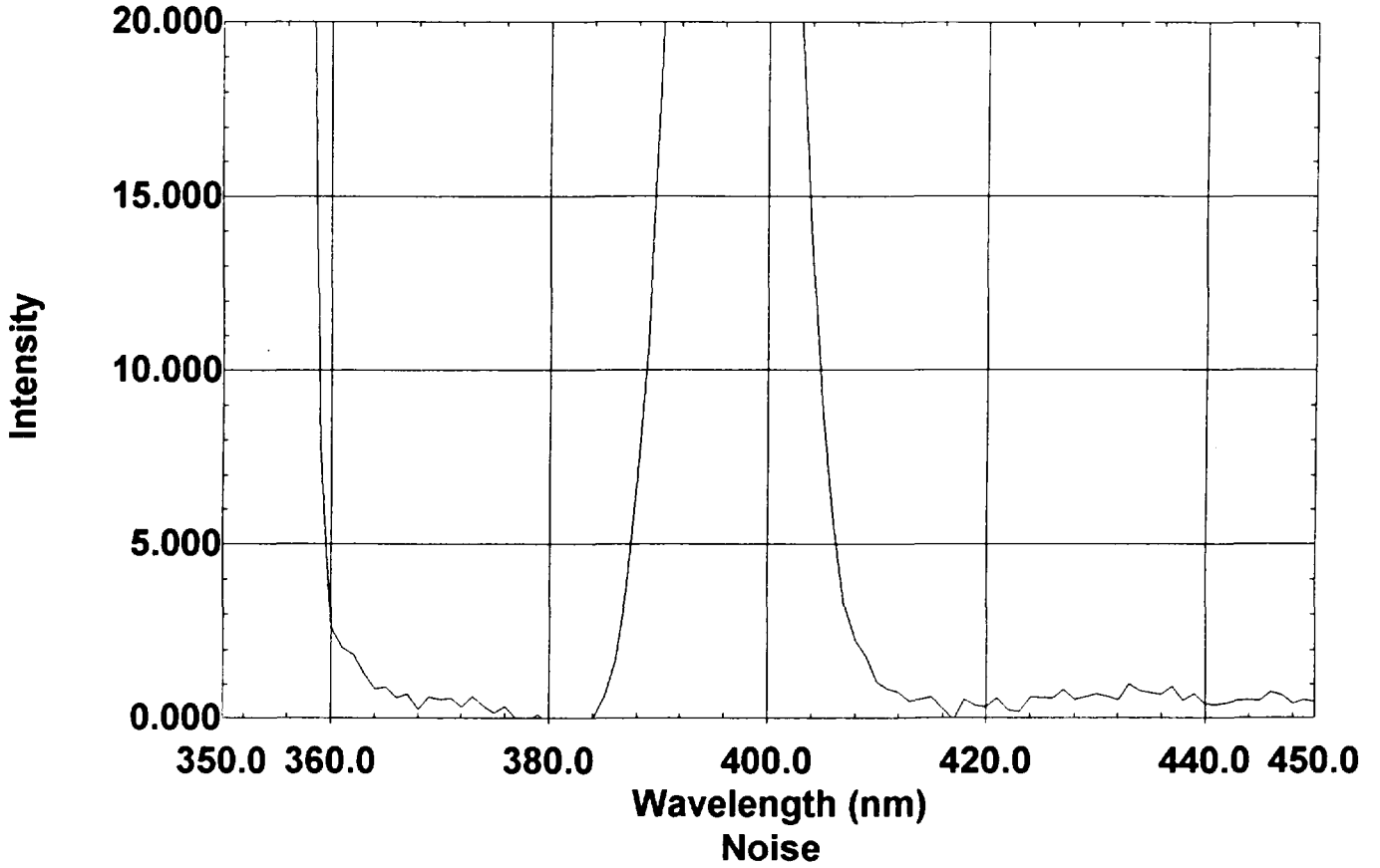
Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	11.706	0.006

S/N Ratio Check

Raman Spectrum



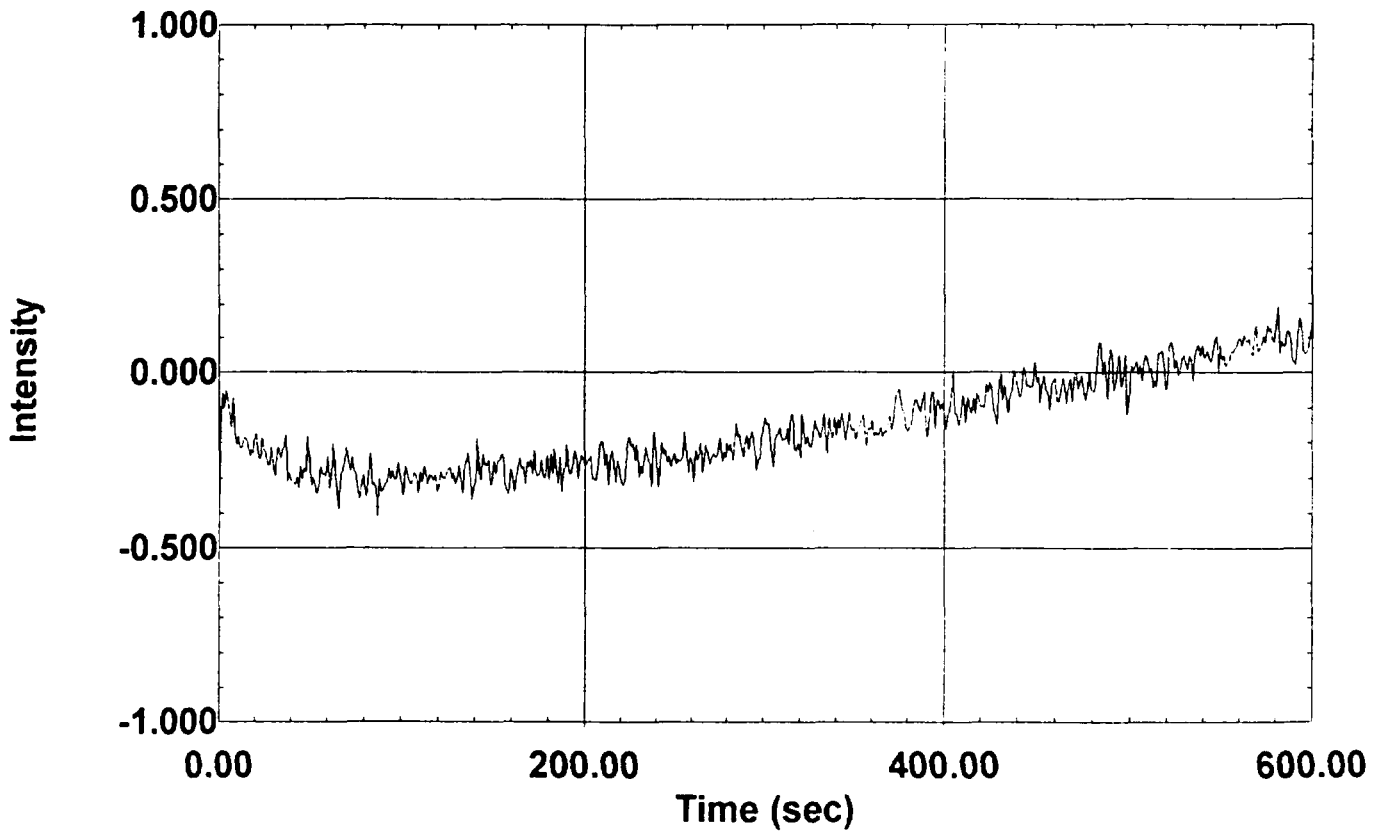
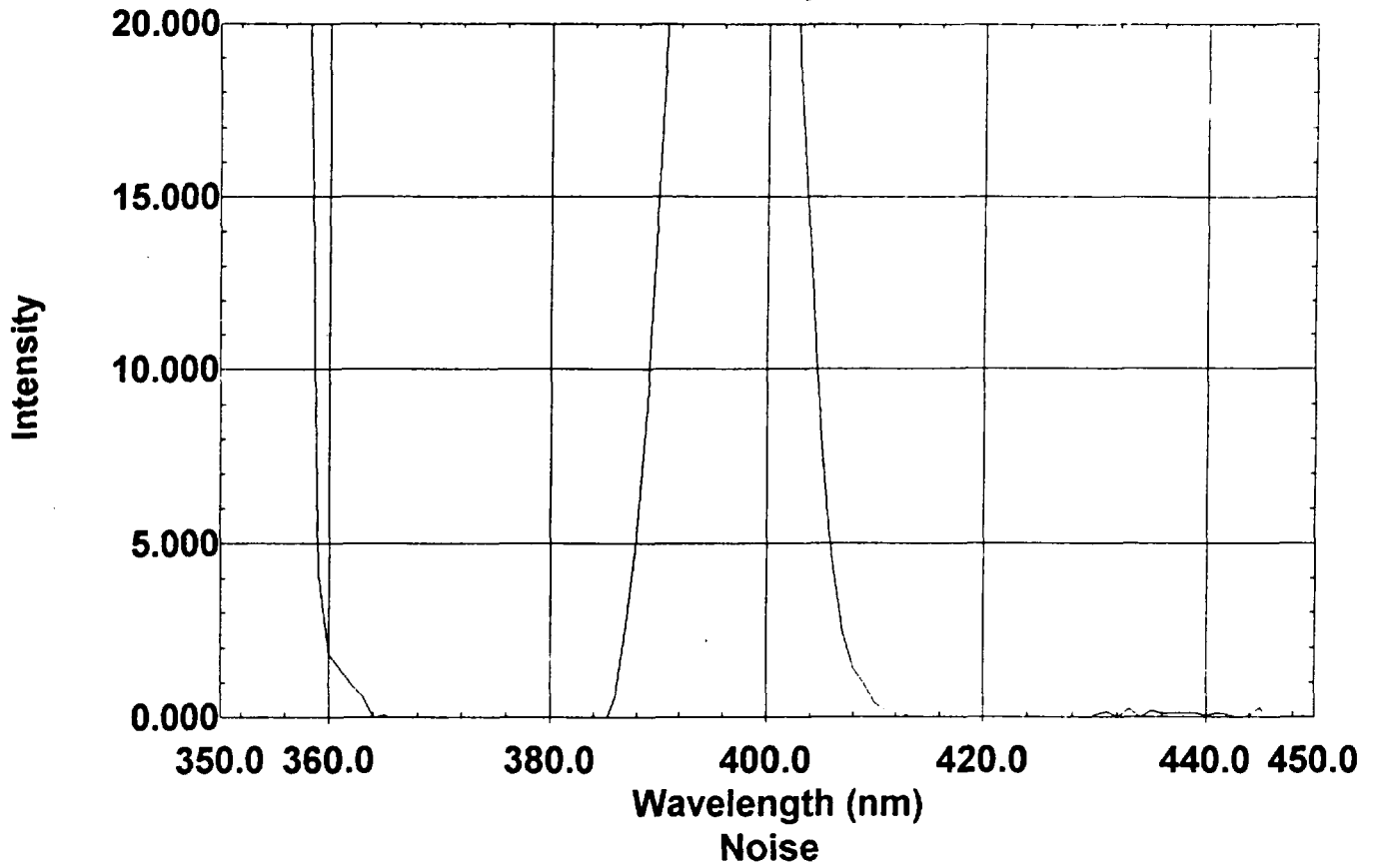
Instrument Serial Number: A401932000510D Printed: 16:13 01/31/97

Peak Height: 57.958

S/N Ratio: 424.756

S/N Ratio Check

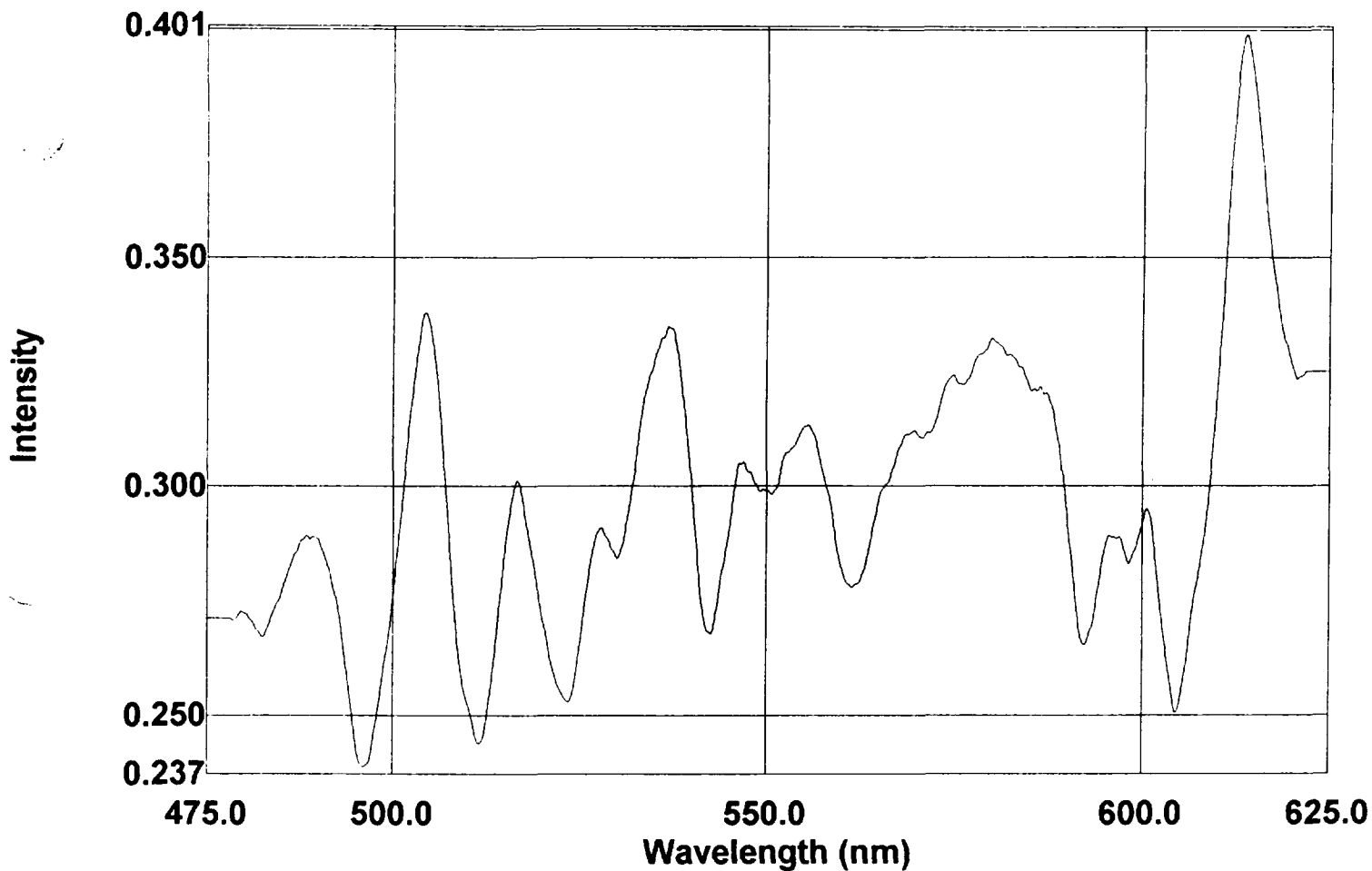
Raman Spectrum



Instrument Serial Number: A401932000510D Printed: 09:43 02/10/97

Peak Height: 54.076

S/N Ratio: 466.306



File Name: 1
 QA-ELUENT
 Created: 09:53 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

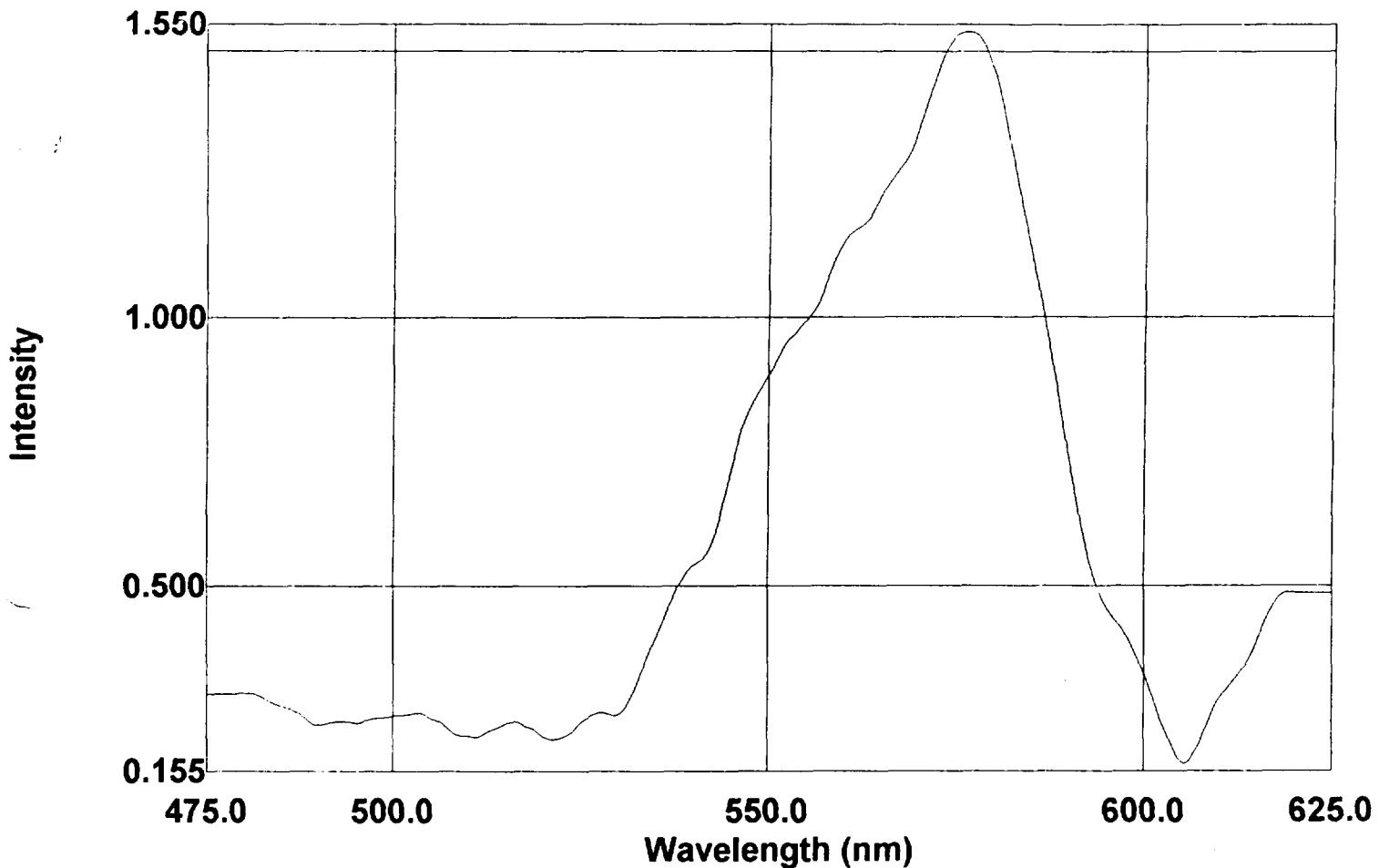
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 09:54 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

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 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

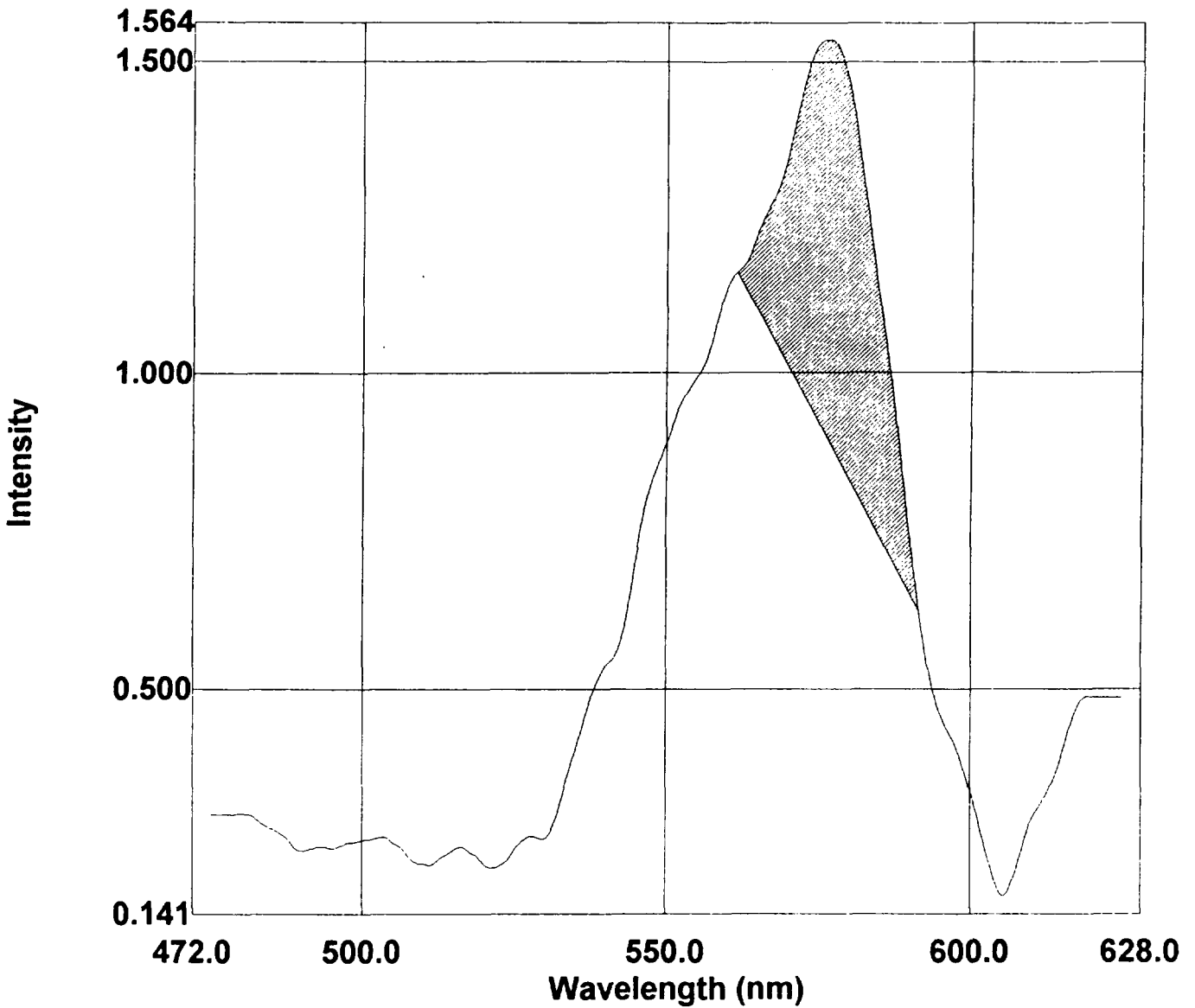
Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788

Peak Area



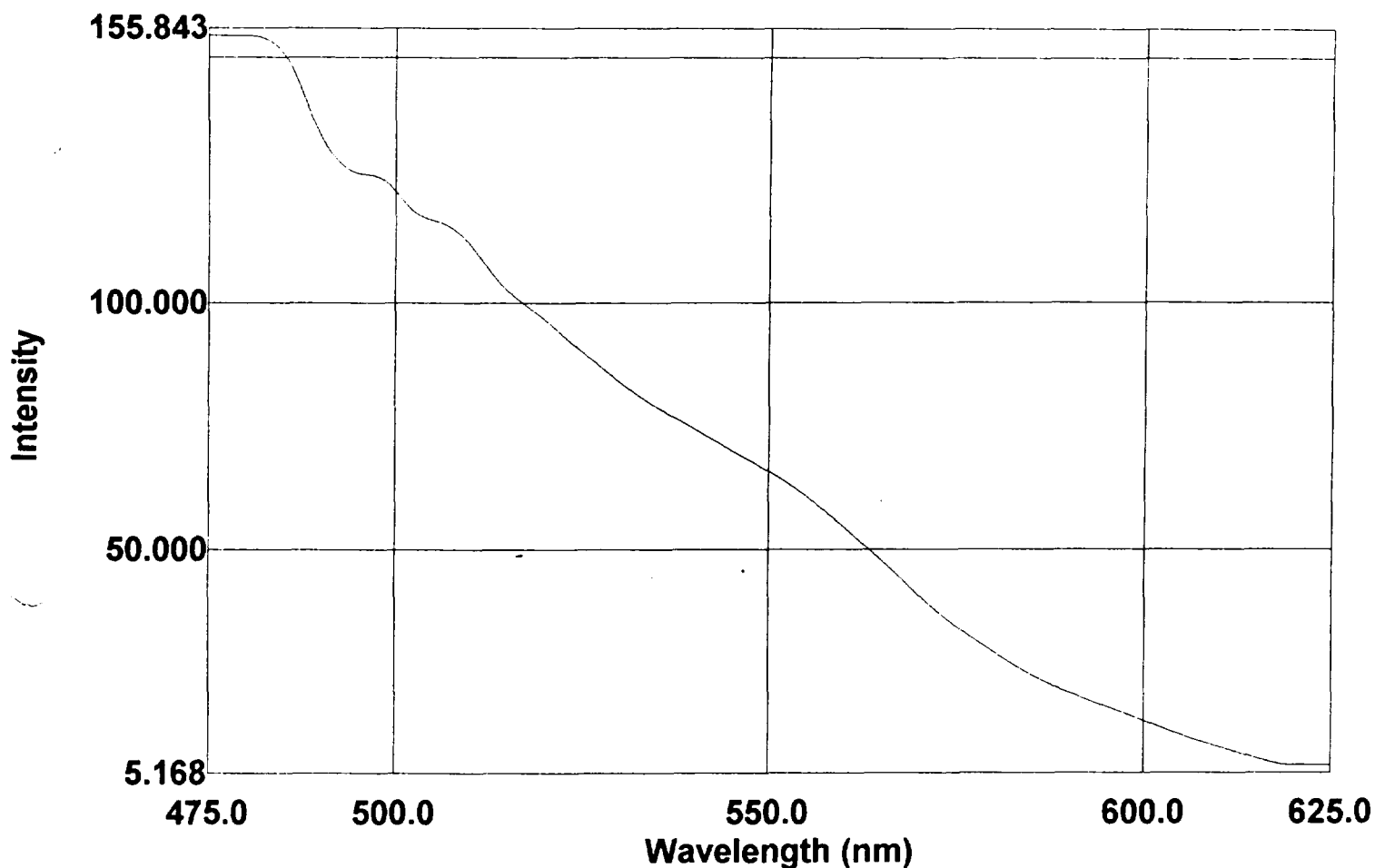
File Name: 2
QA-SULPHORHODAMINE B

Created: 09:54 02/10/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	11.111	0.006



File Name: 3
 CW 6 EP
 reated: 09:55 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

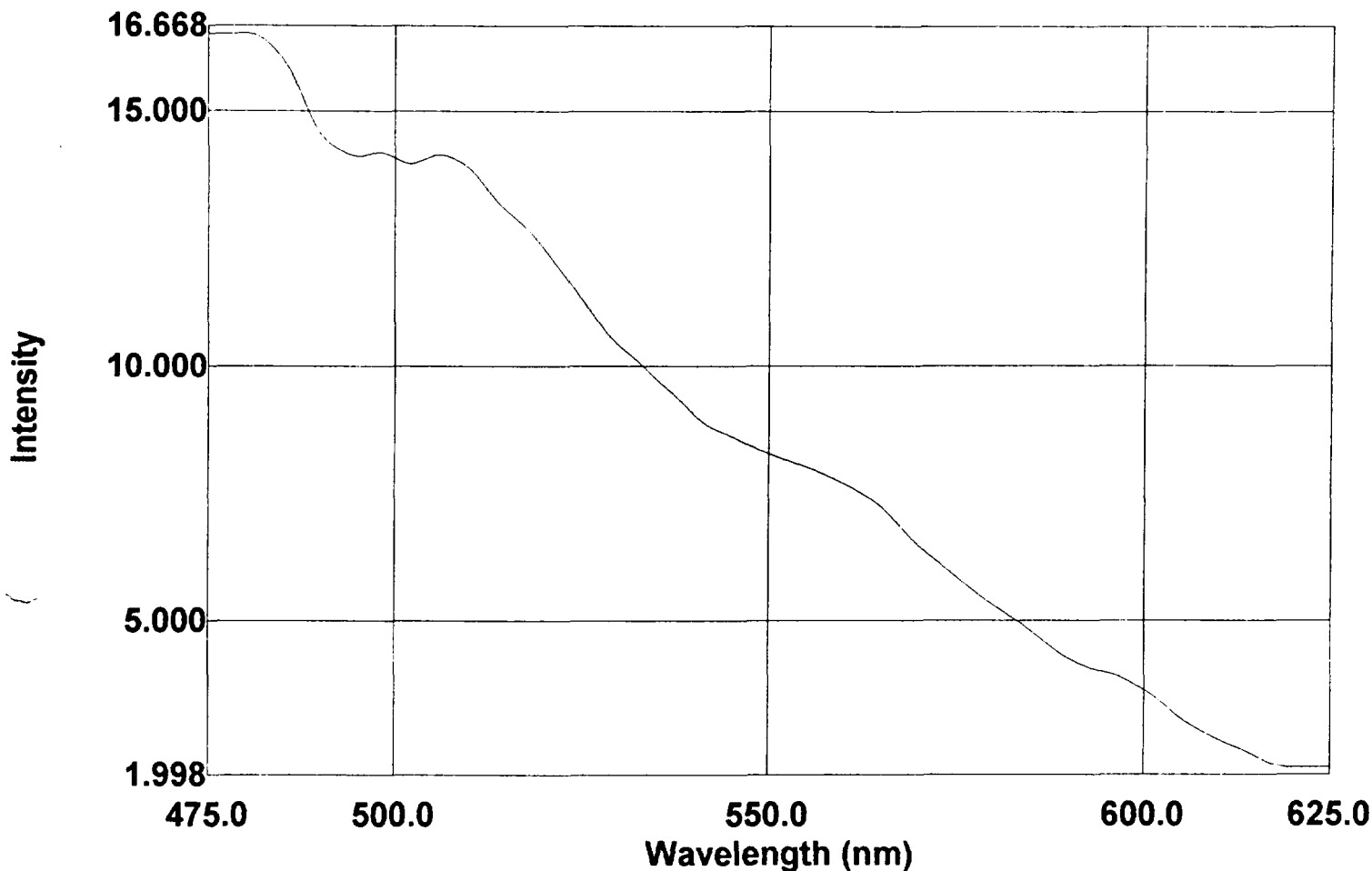
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4
 CW 19 EP
 Created: 09:56 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

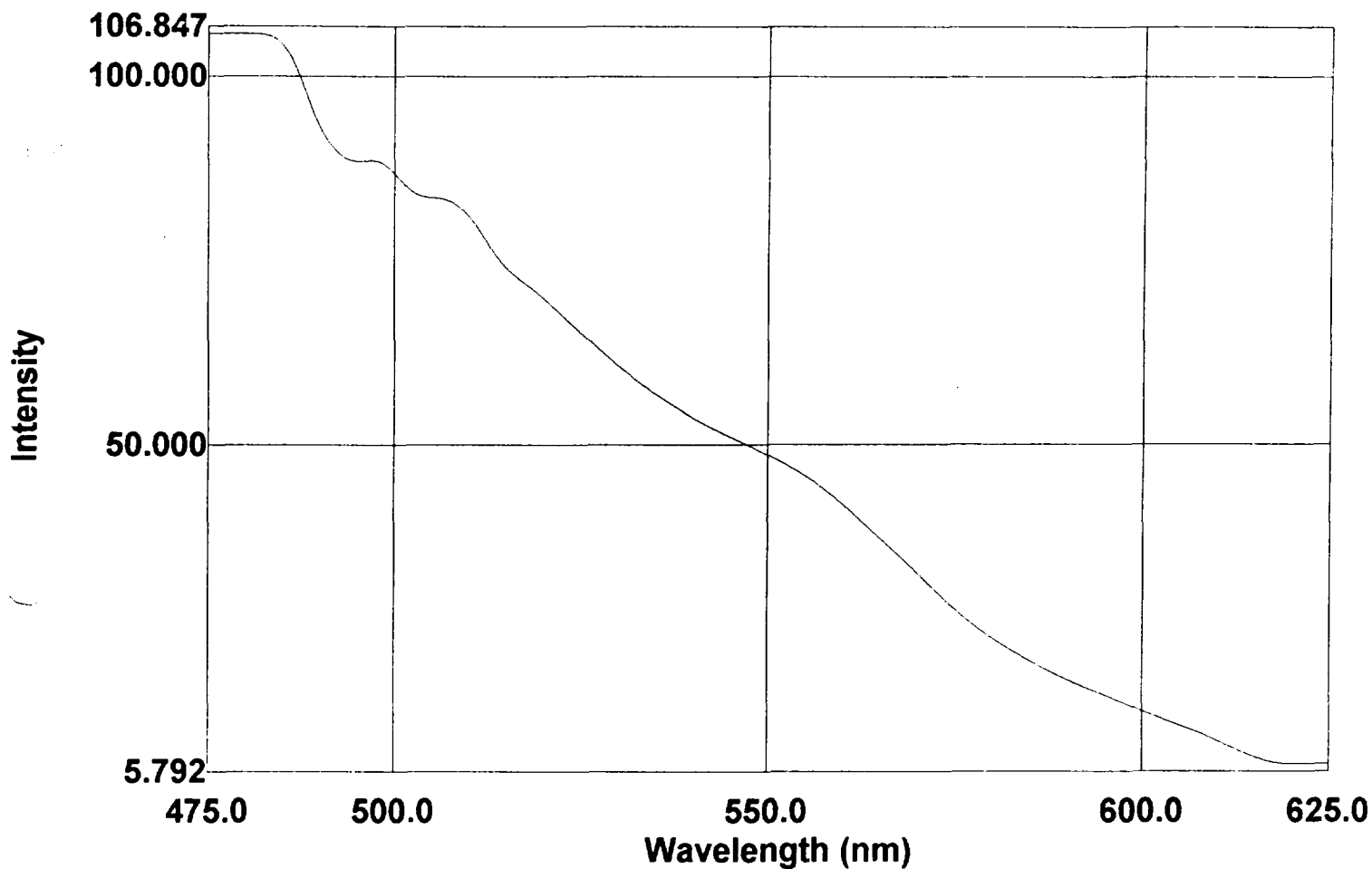
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5

CW 31 EP

Created: 09:56 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

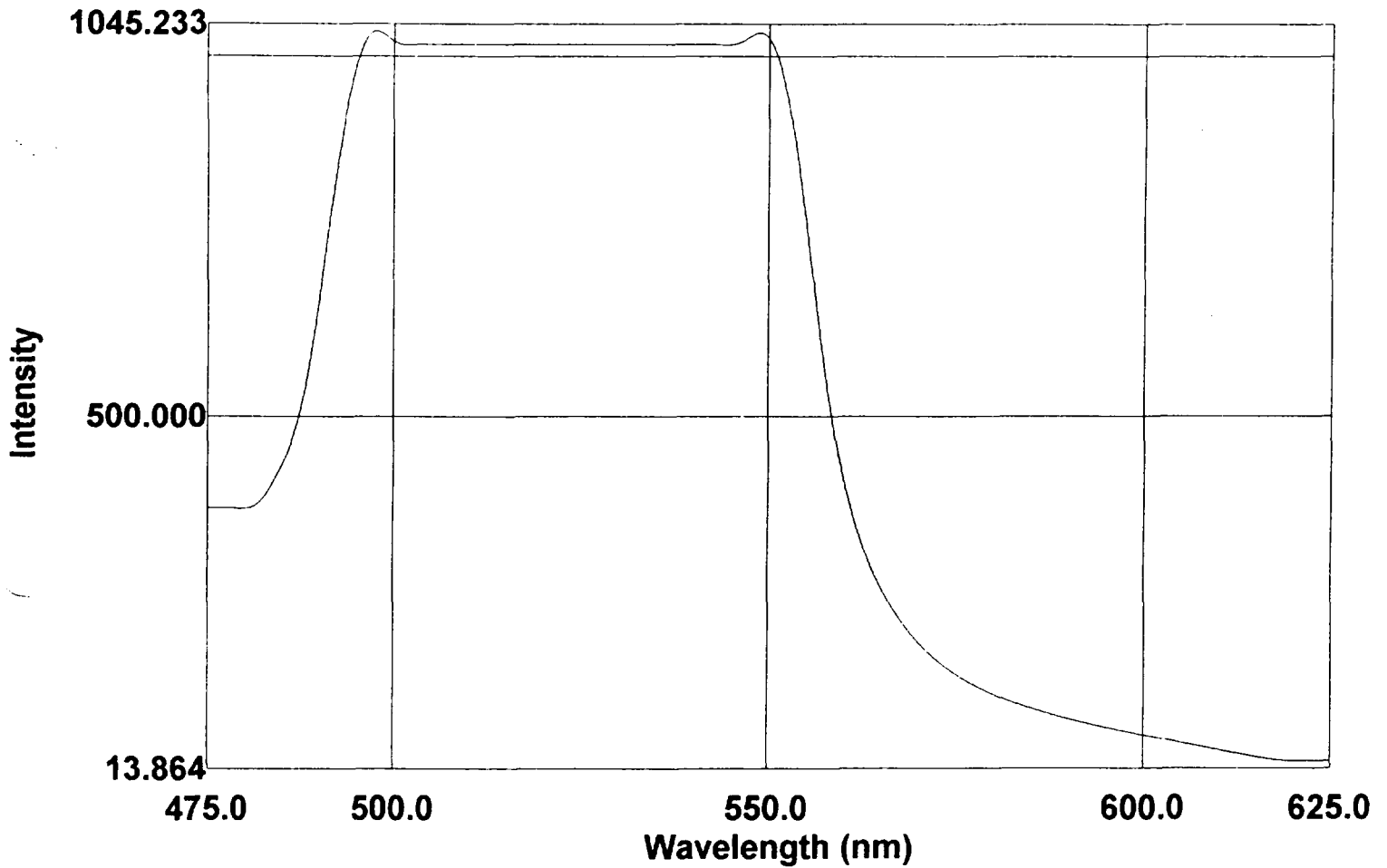
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

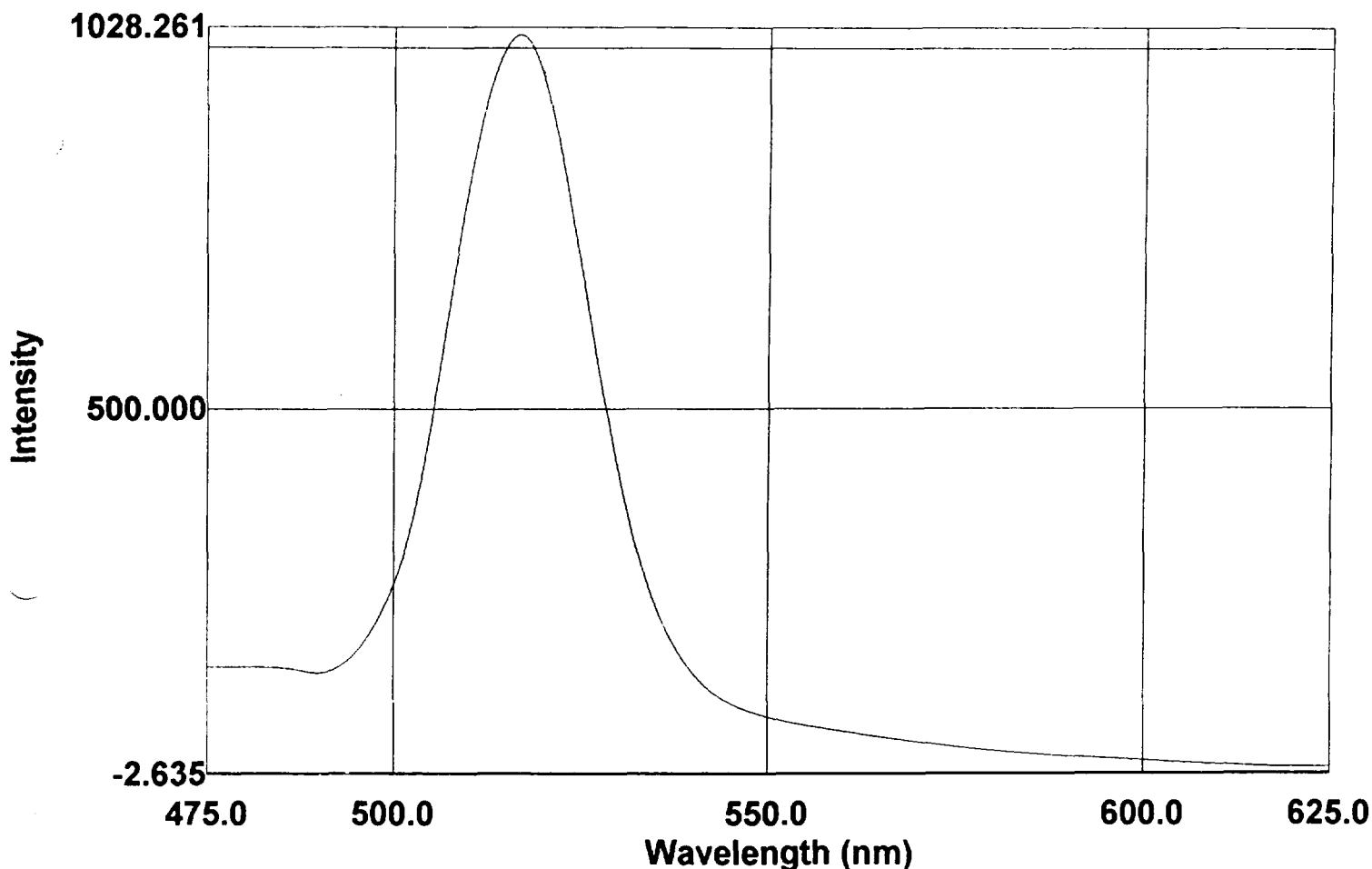
Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6
 CW 51 EP
 Created: 09:59 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034
 SET 10 -- 2/5/97
 Samples Analyzed by:
 Will Clauson
 Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7
 CW 60 EP
 Created: 10:00 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

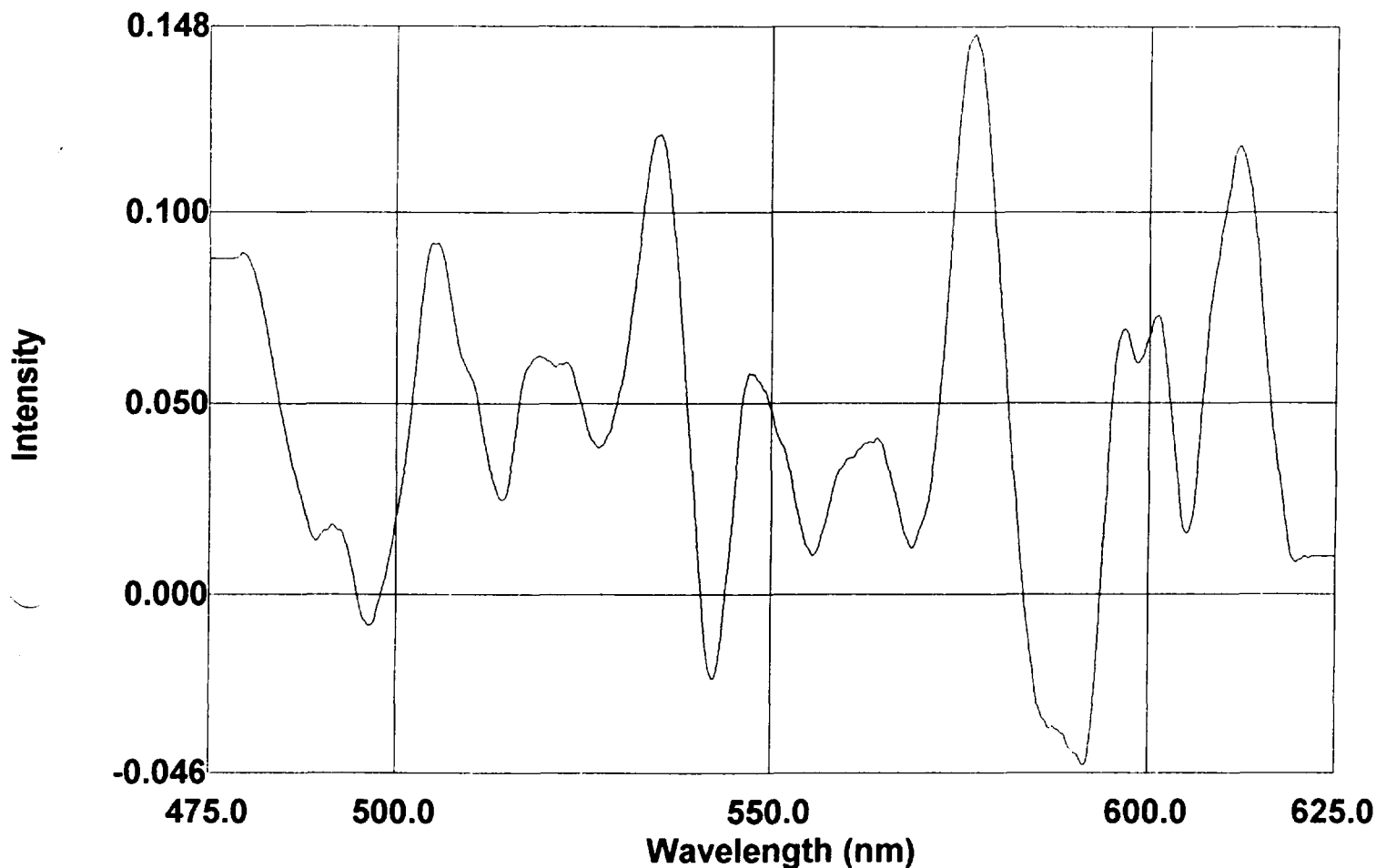
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8
 QA-ELUENT
 Created: 10:01 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

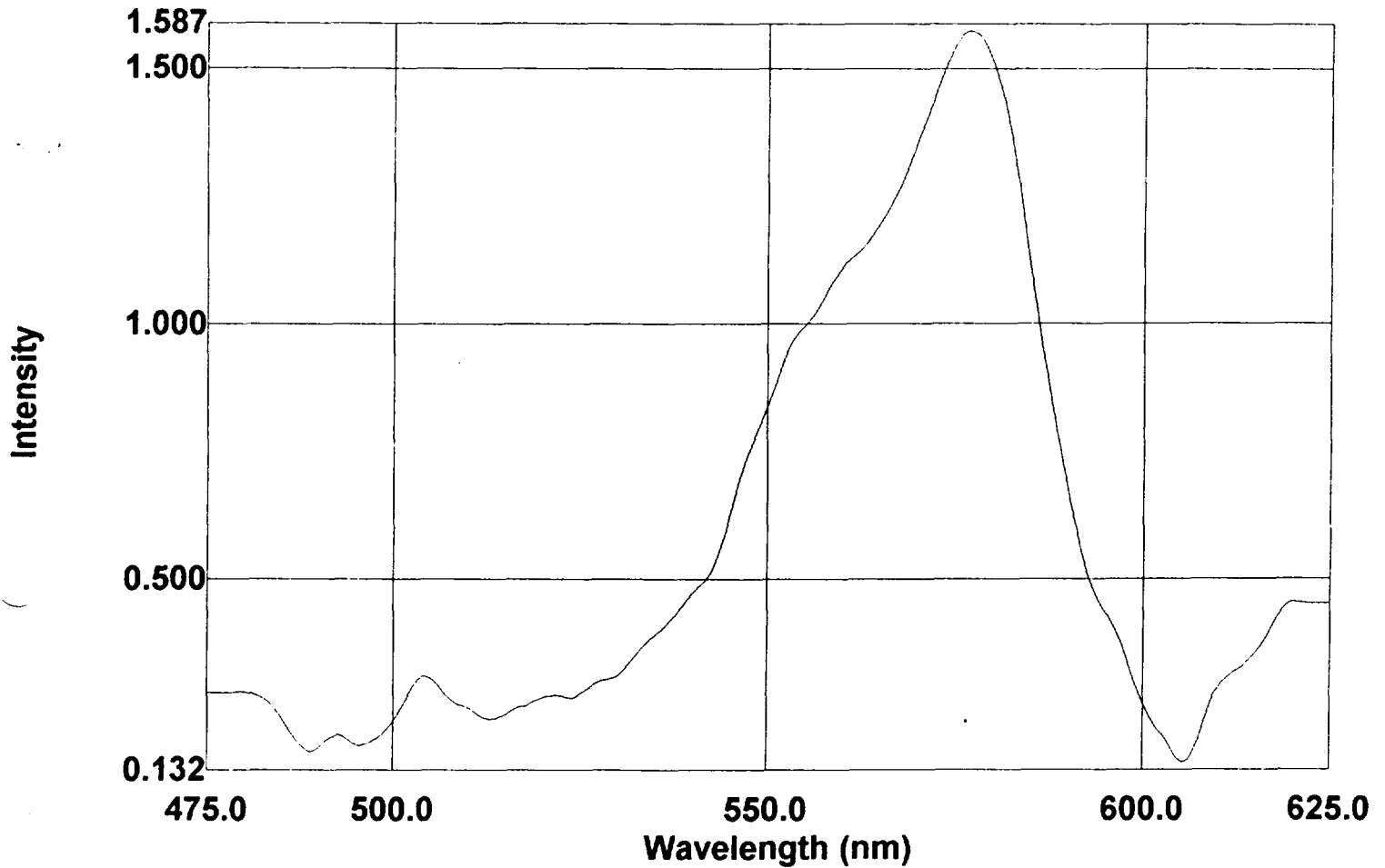
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 10:01 02/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

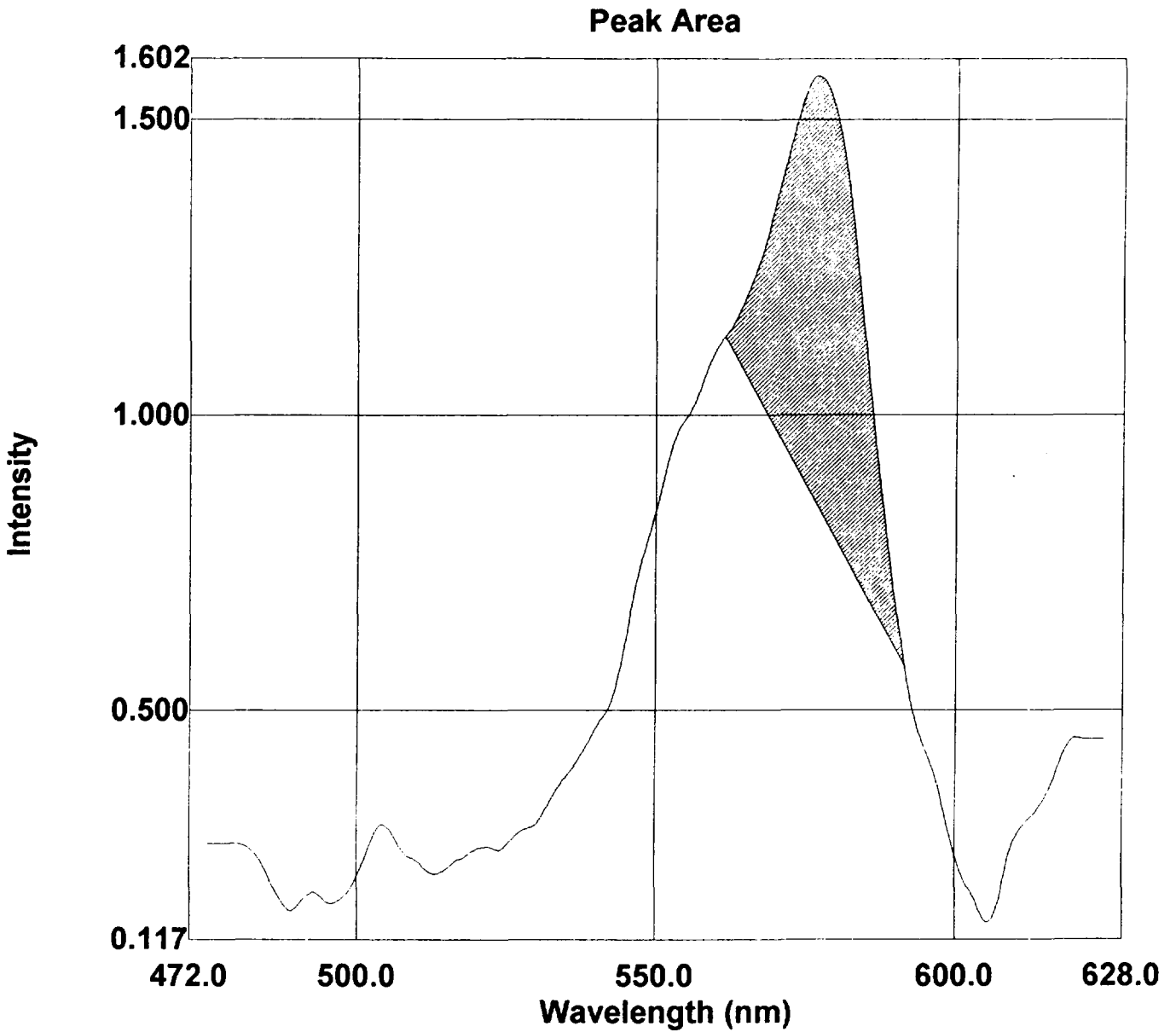
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 10 -- 2/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9
 QA-SULPHORHODAMINE B

Created: 10:01 02/10/97
 Data: Modified

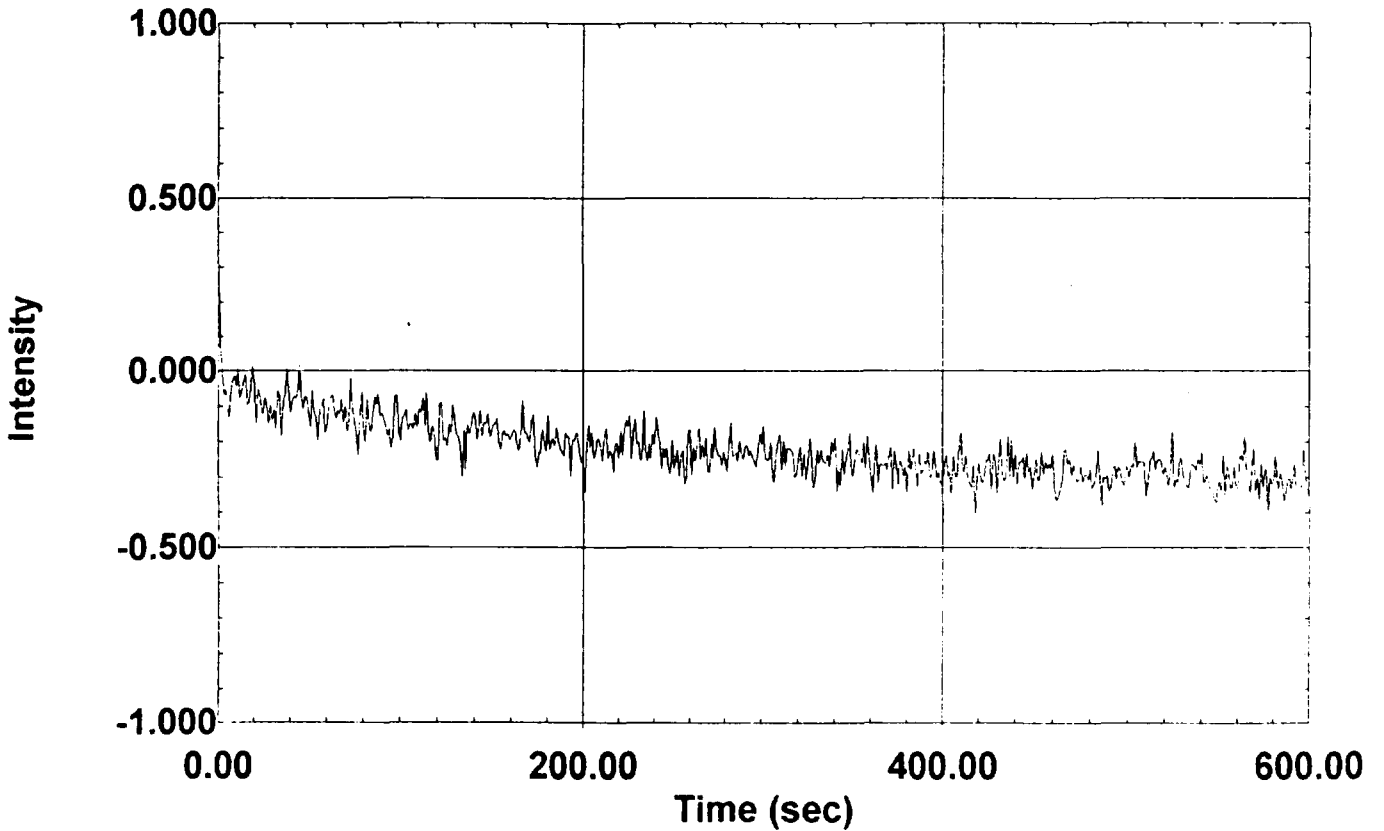
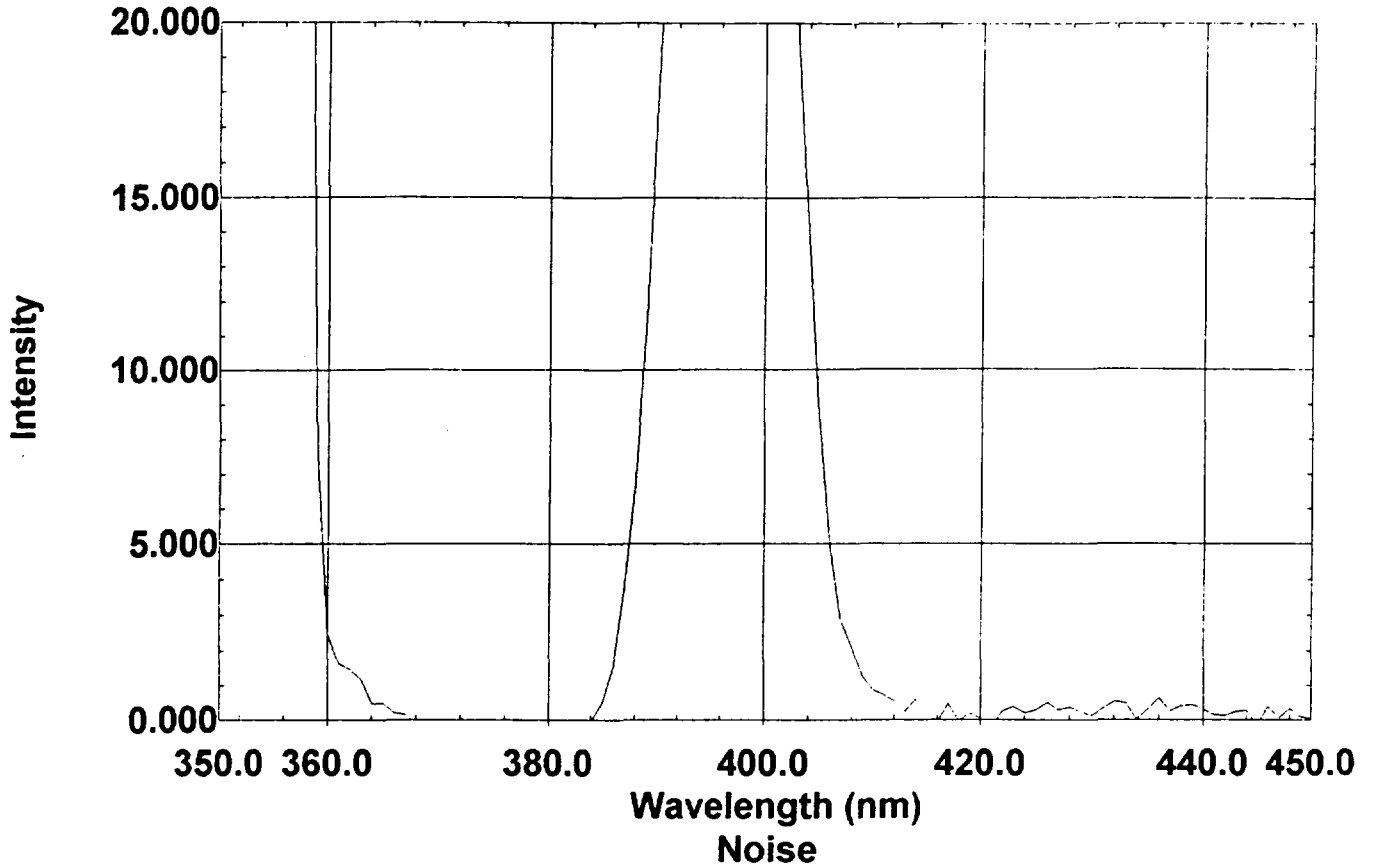
Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	12.252	0.006

S/N Ratio Check

Raman Spectrum



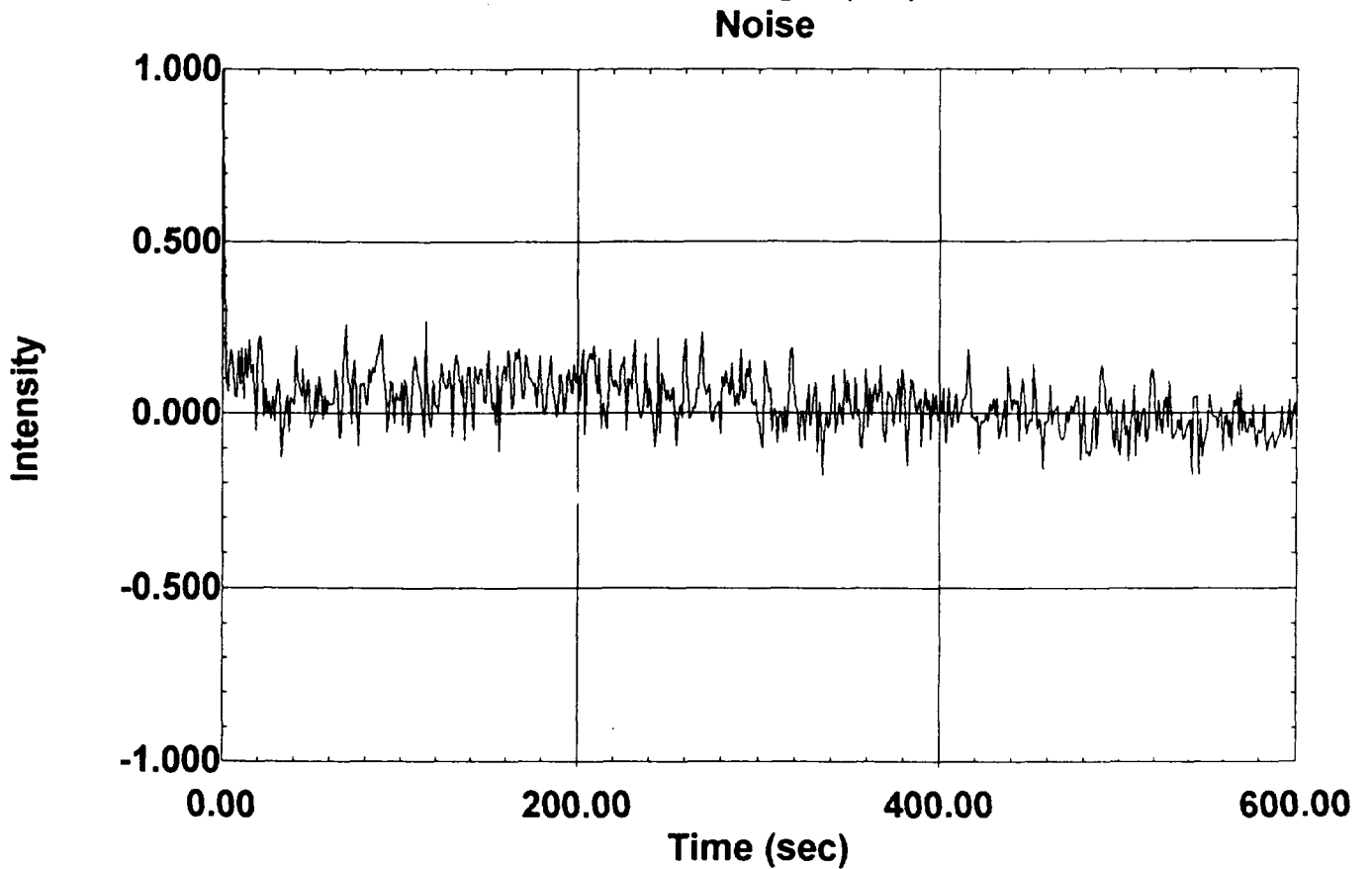
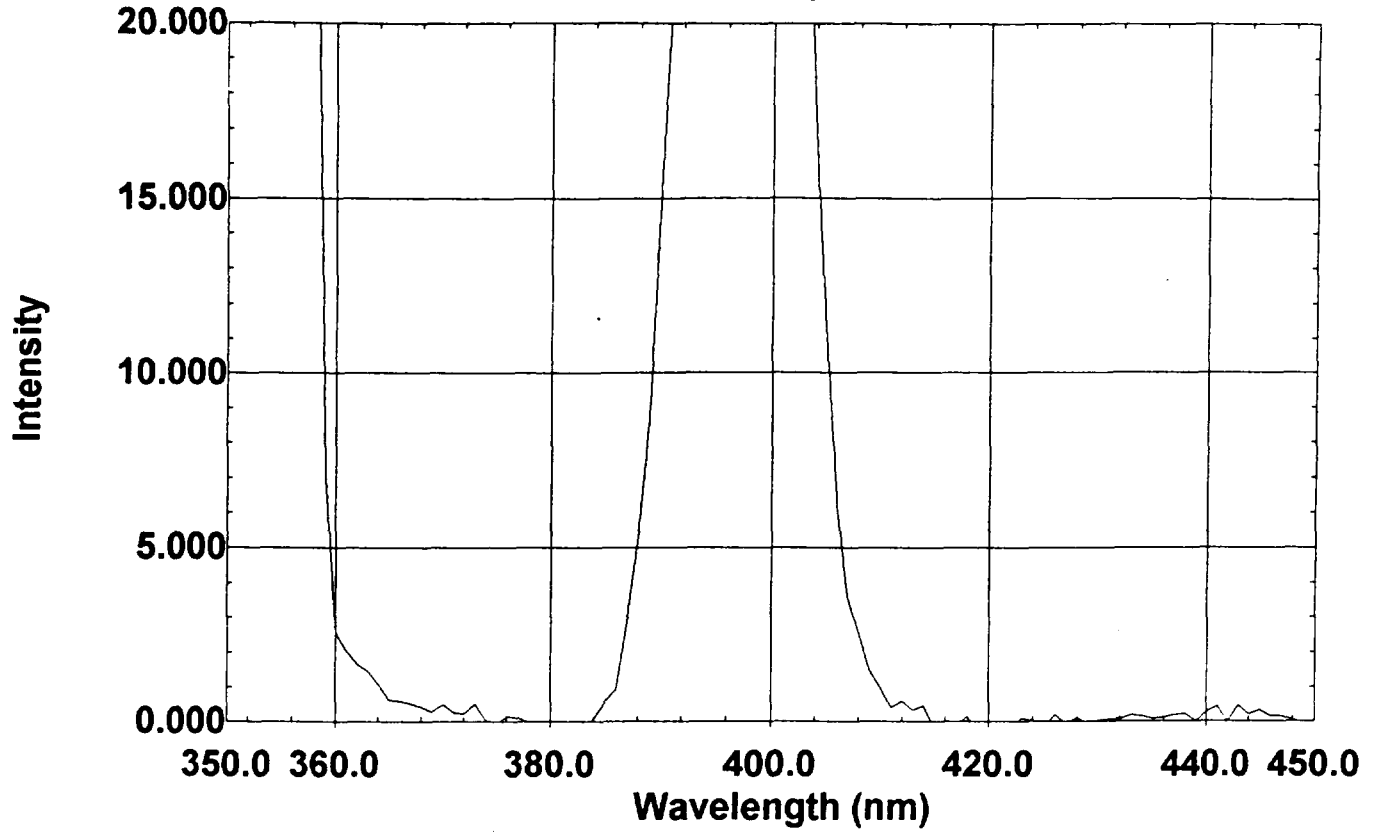
Instrument Serial Number: A401932000510D Printed: 16:37 02/10/97

Peak Height: 57.195

S/N Ratio: 417.482

S/N Ratio Check

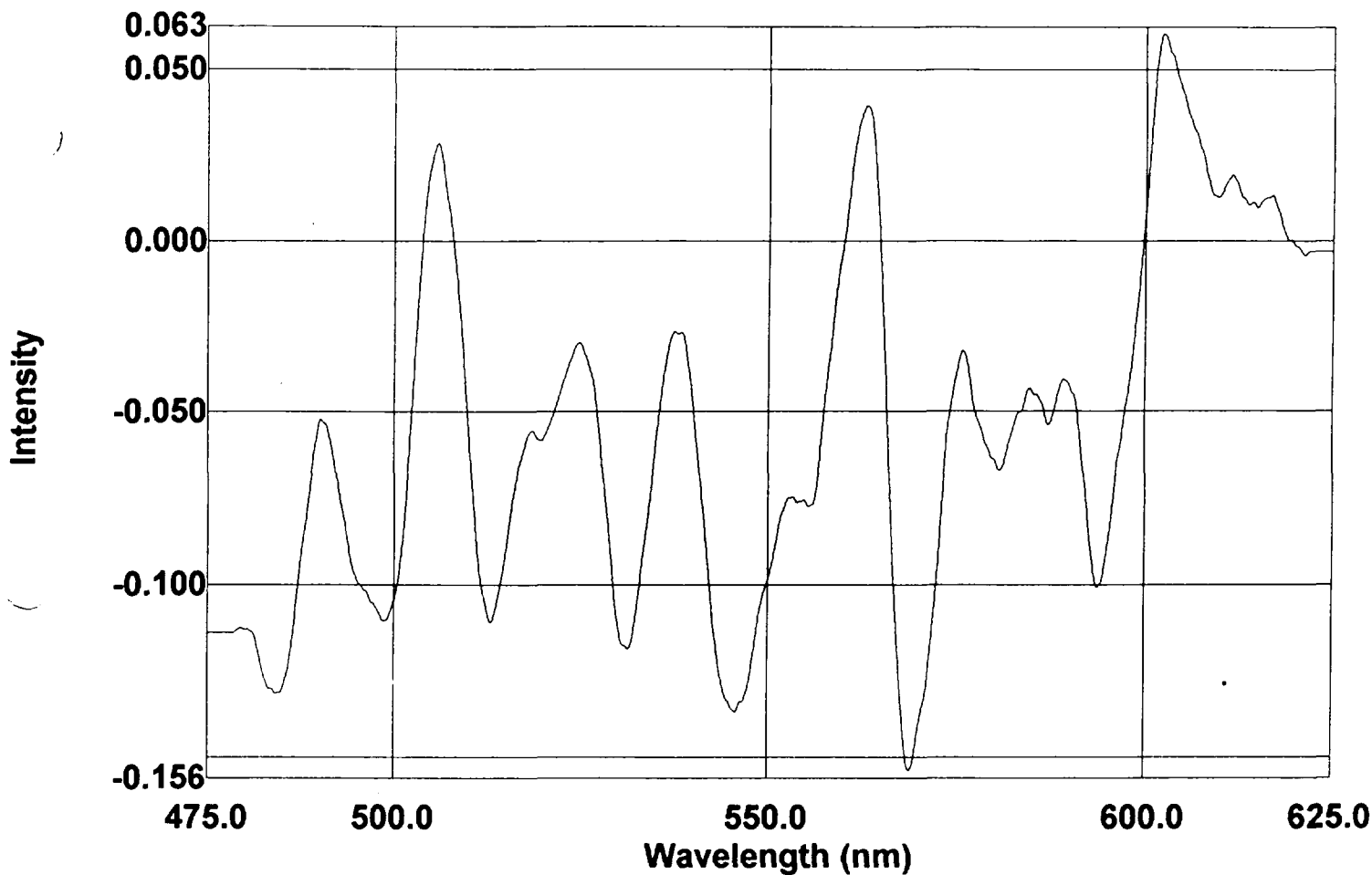
Raman Spectrum



Instrument Serial Number: A401932000510D Printed: 12:59 02/28/97

Peak Height: 59.314

S/N Ratio: 253.876



File Name: 1

QA-ELUENT

Created: 14:11 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

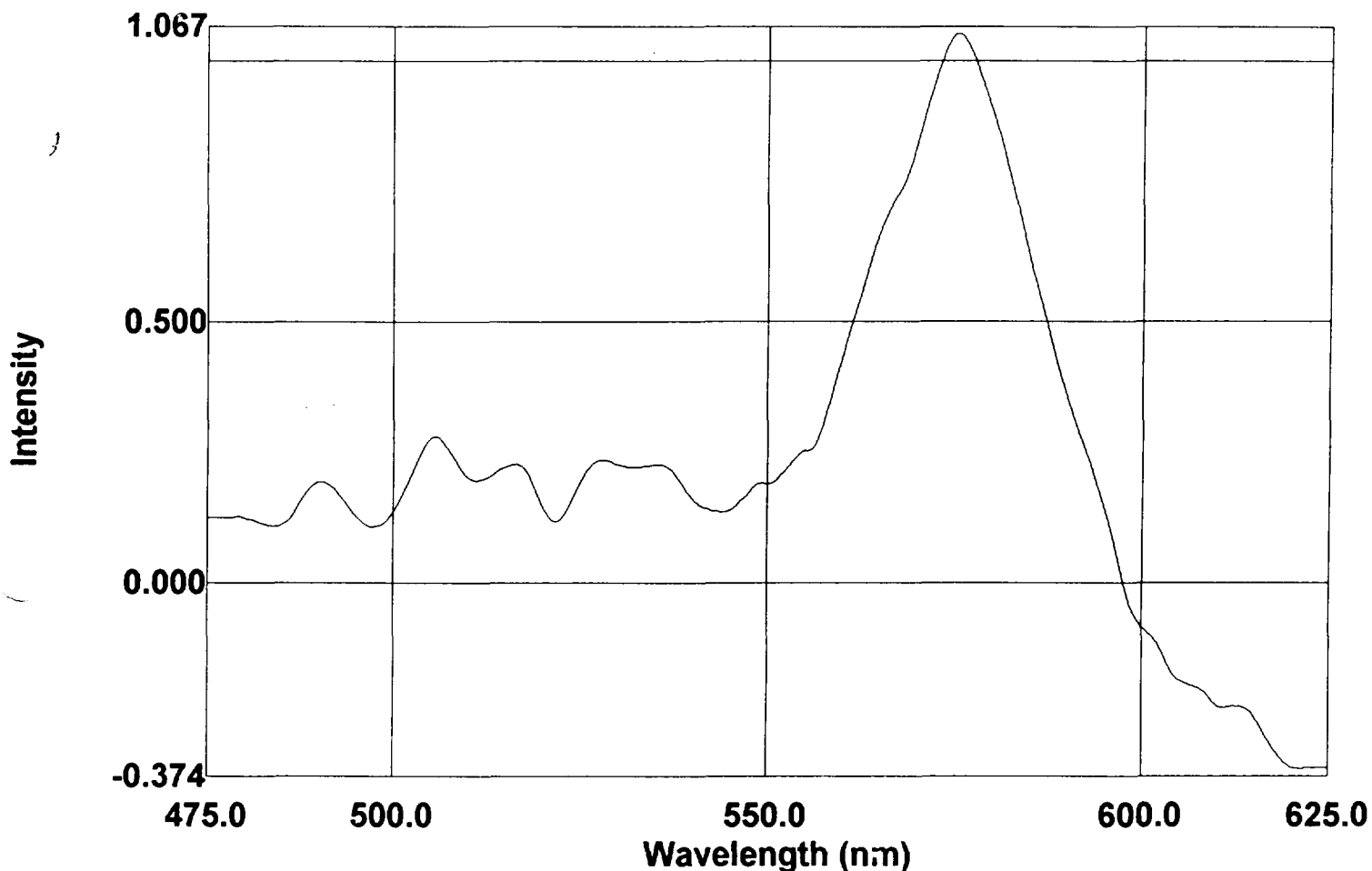
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 14:21 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

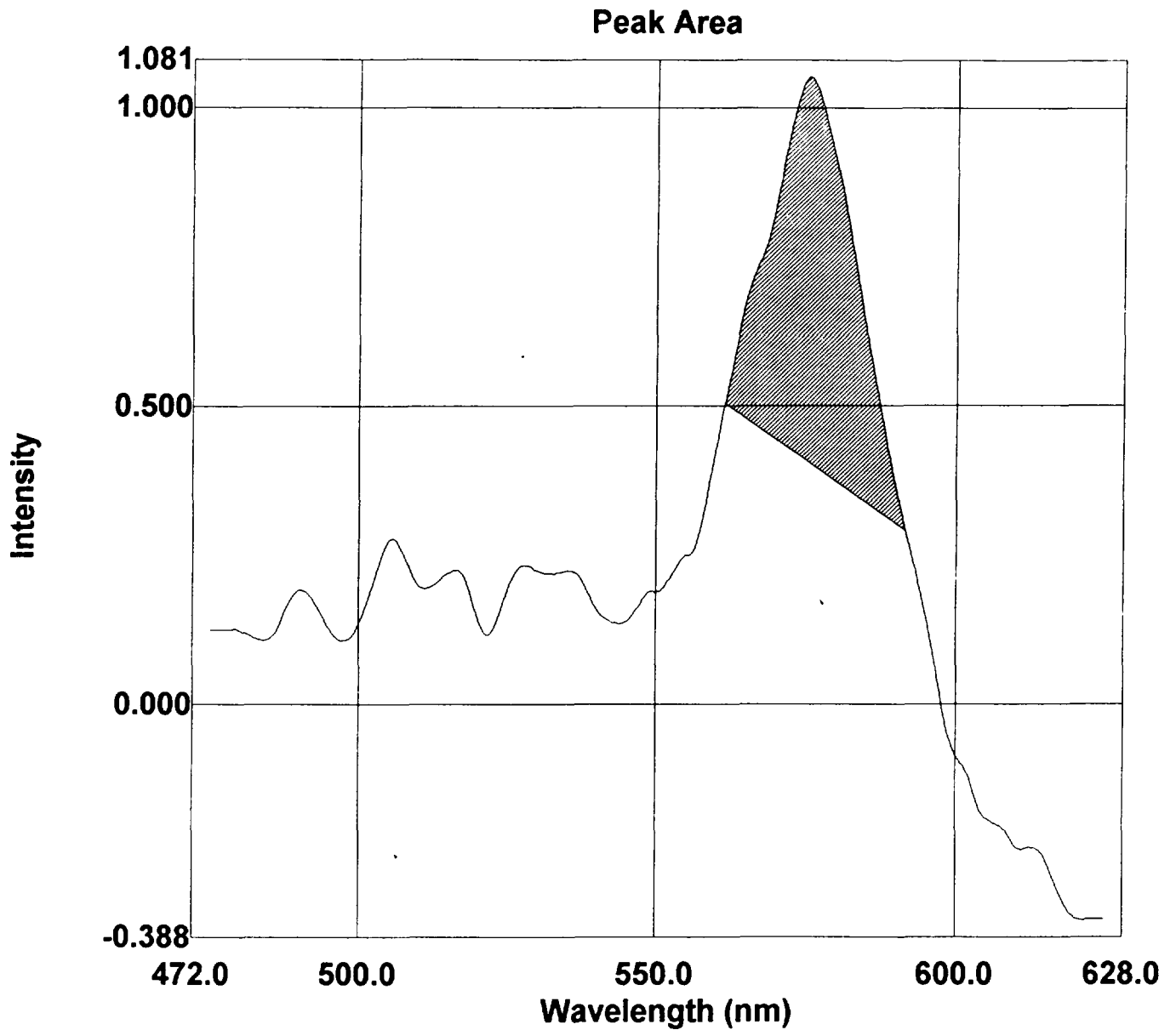
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
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 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



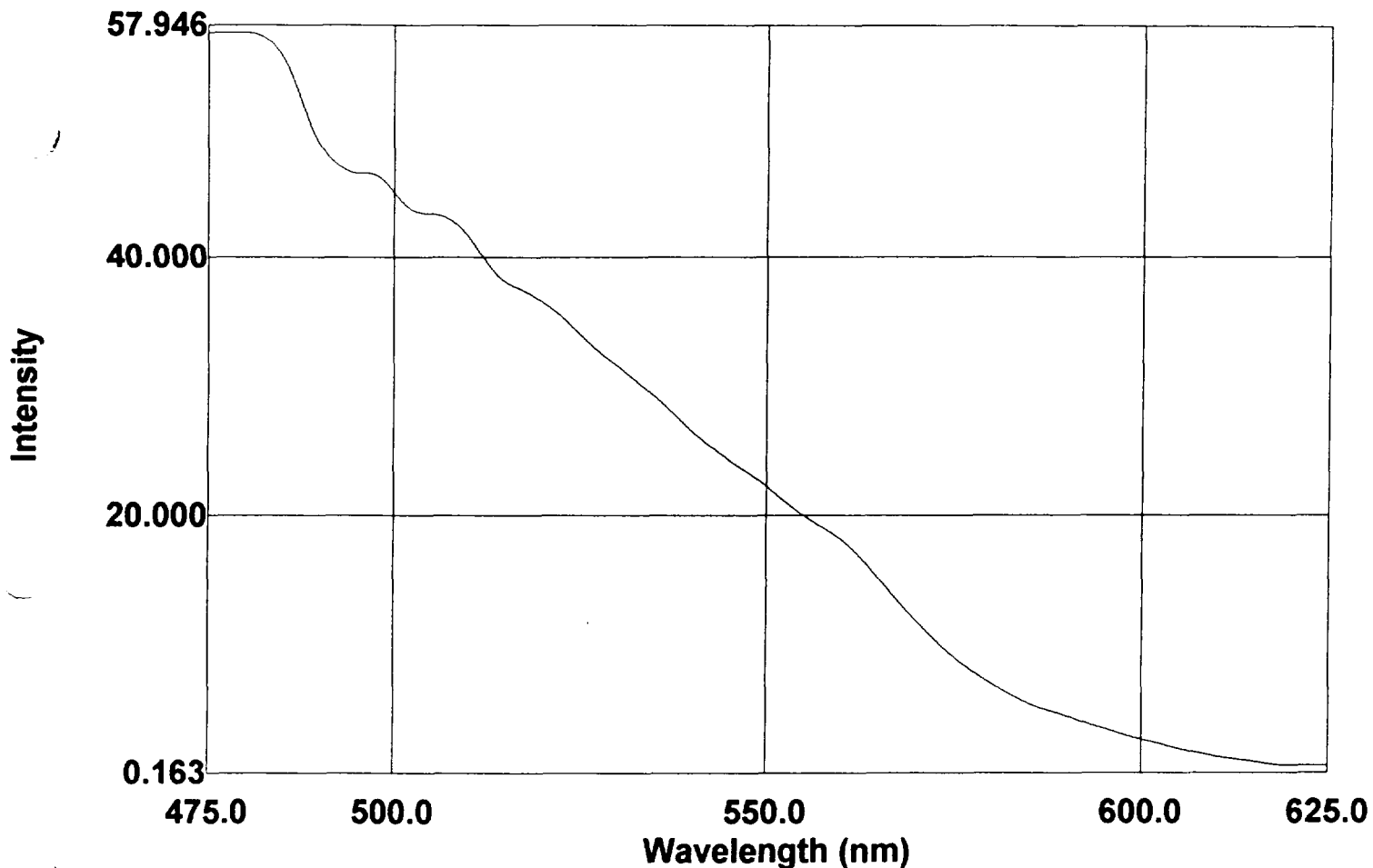
File Name: 2
 QA-SULPHORHODAMINE B

Created: 14:21 02/28/97
 Data: Modified

Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	10.638	0.005



File Name: 3

CW 6 EP

Created: 14:22 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

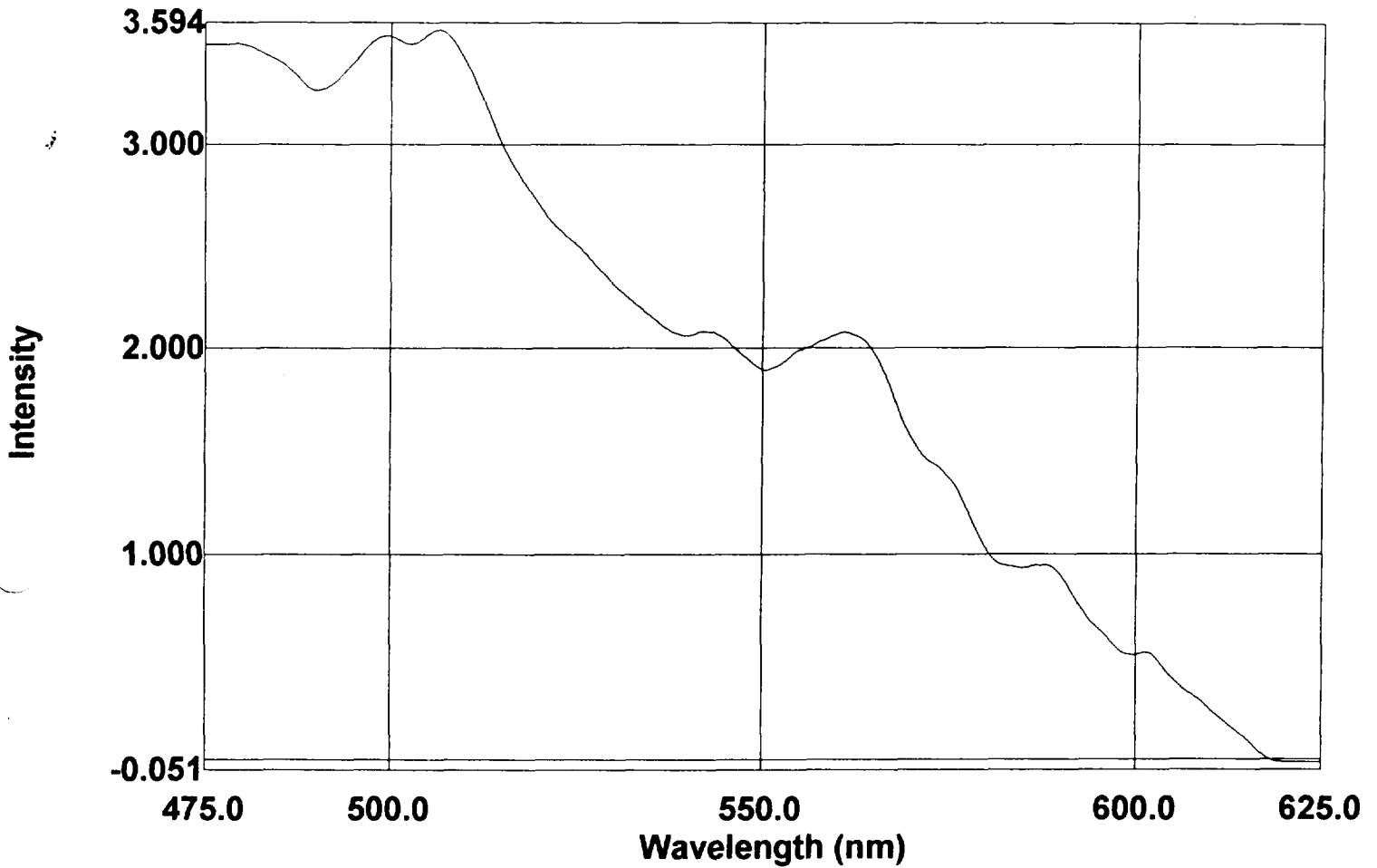
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
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Samples Analyzed for:
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 Memphis, Tennessee 38132
 Phone: (901) 345-1788



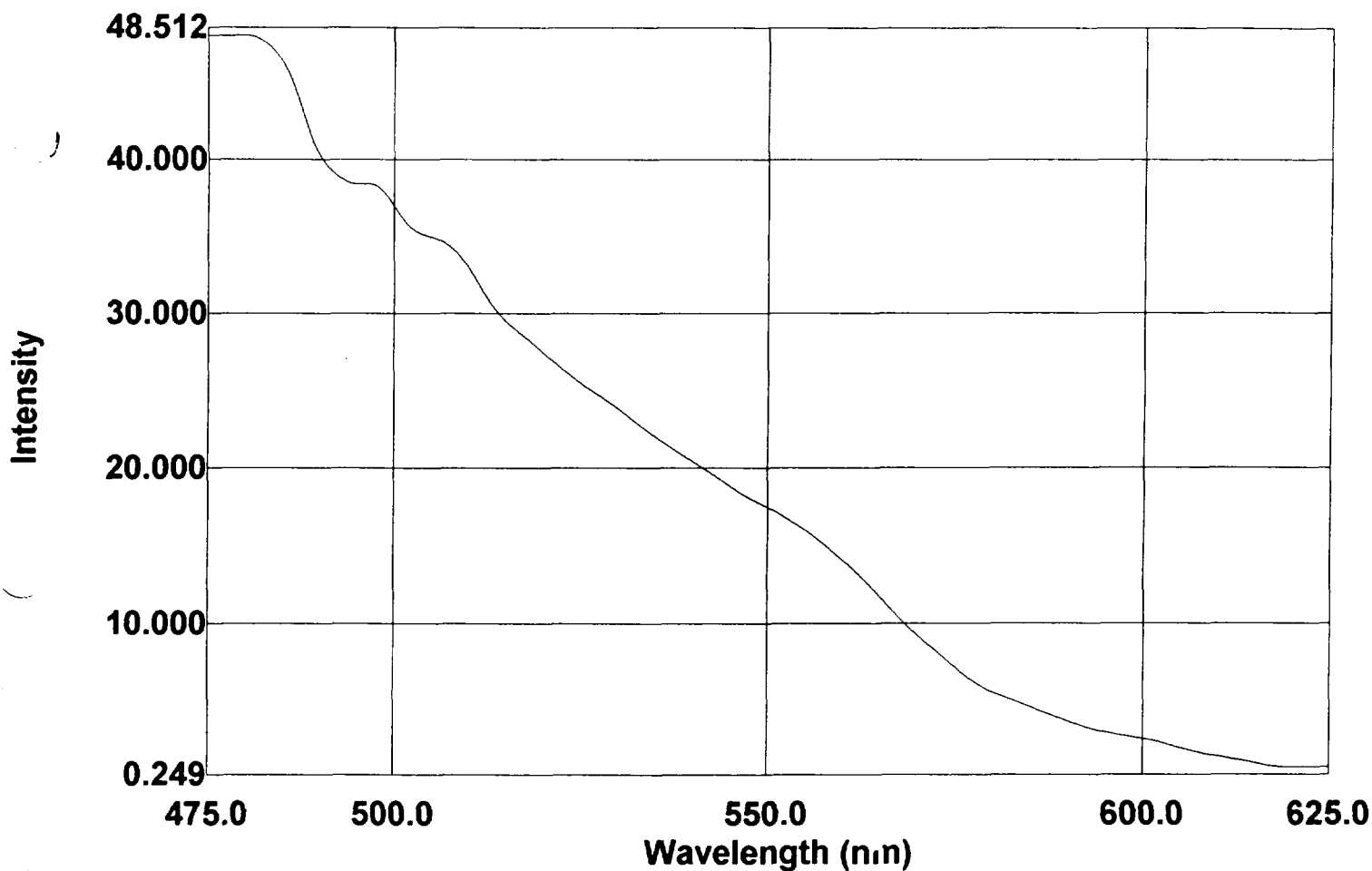
File Name: 4
 CW 19 EP
 Created: 14:23 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5
 CW 31 EP
 Created: 14:24 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

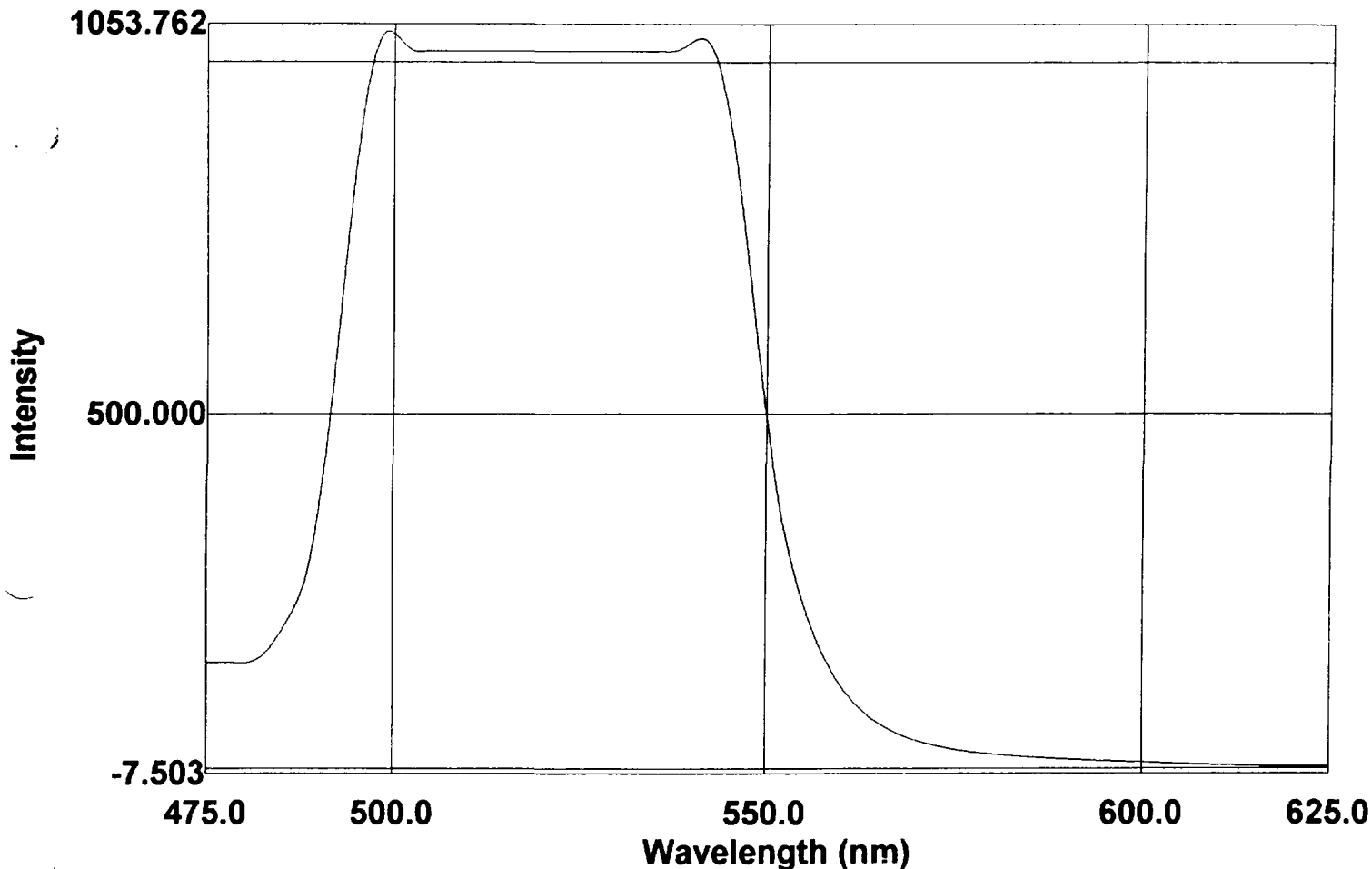
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

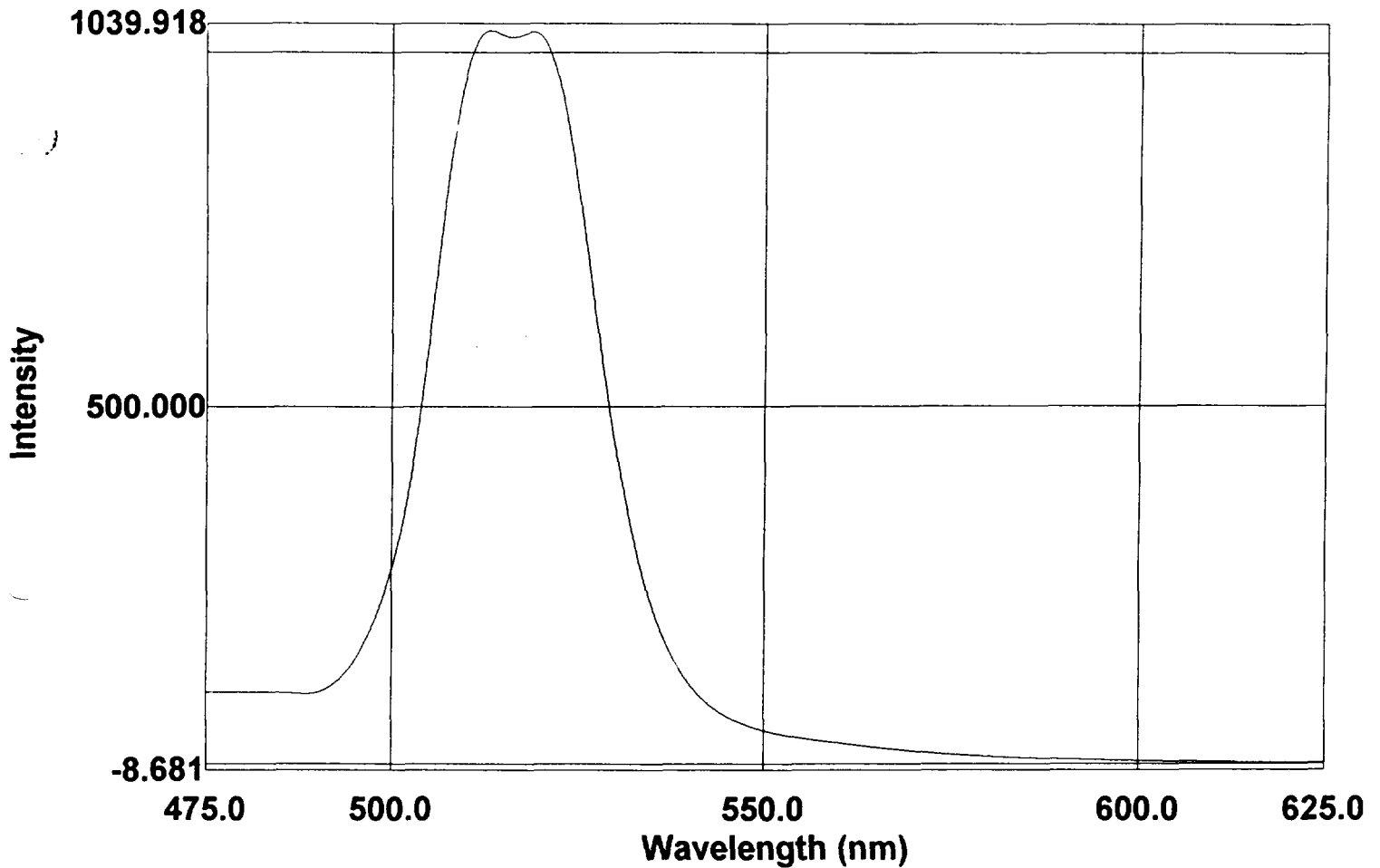
Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6
 CW 51 EP
 Created: 14:25 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034
 SET 11 -- 2/19/97
 Samples Analyzed by:
 Will Clauson
 Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7
 CW 60 EP
 Created: 14:26 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

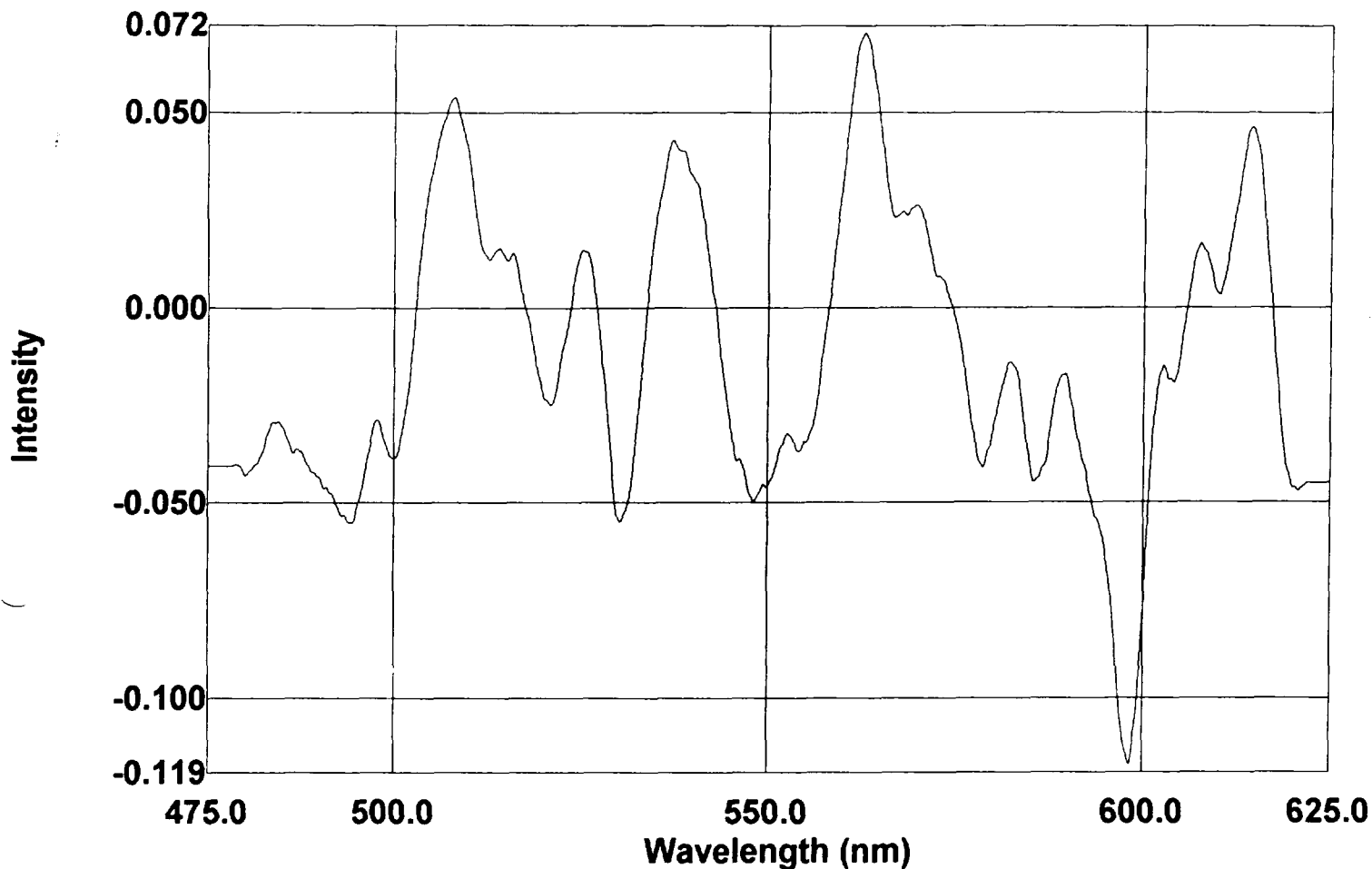
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 14:26 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

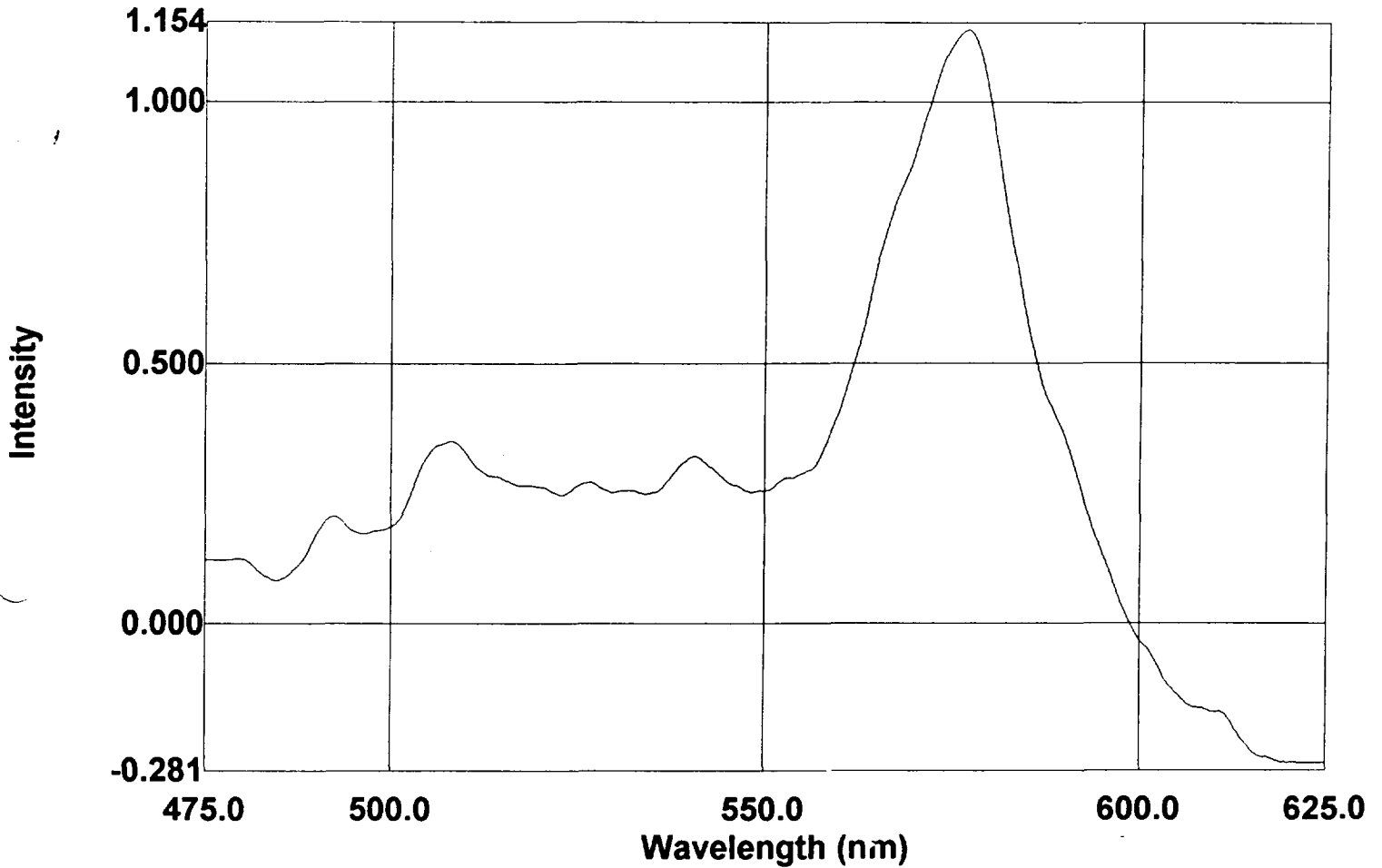
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 14:27 02/28/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

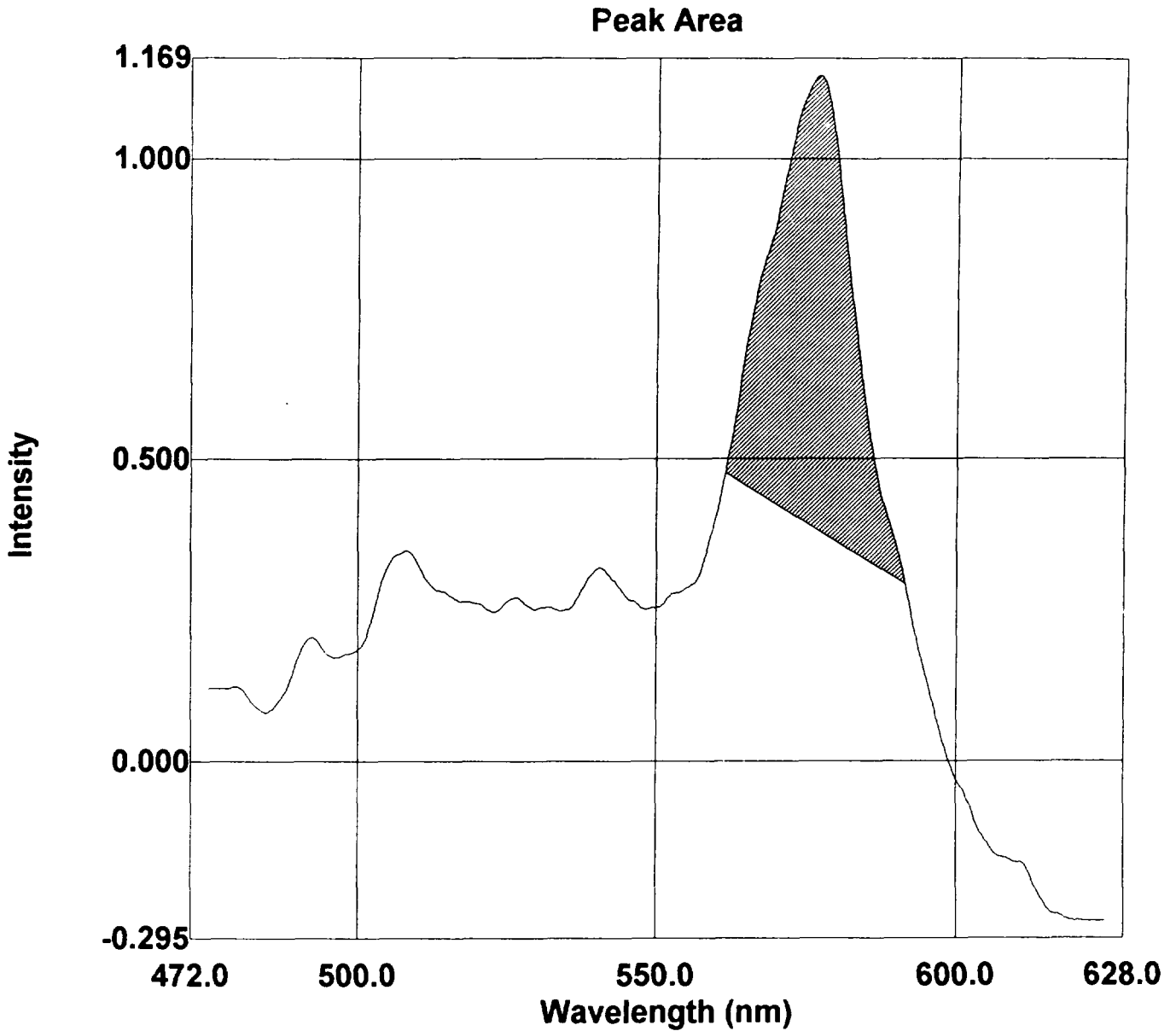
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 11 -- 2/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9
QA-SULPHORHODAMINE B

Created: 14:27 02/28/97
Data: Modified

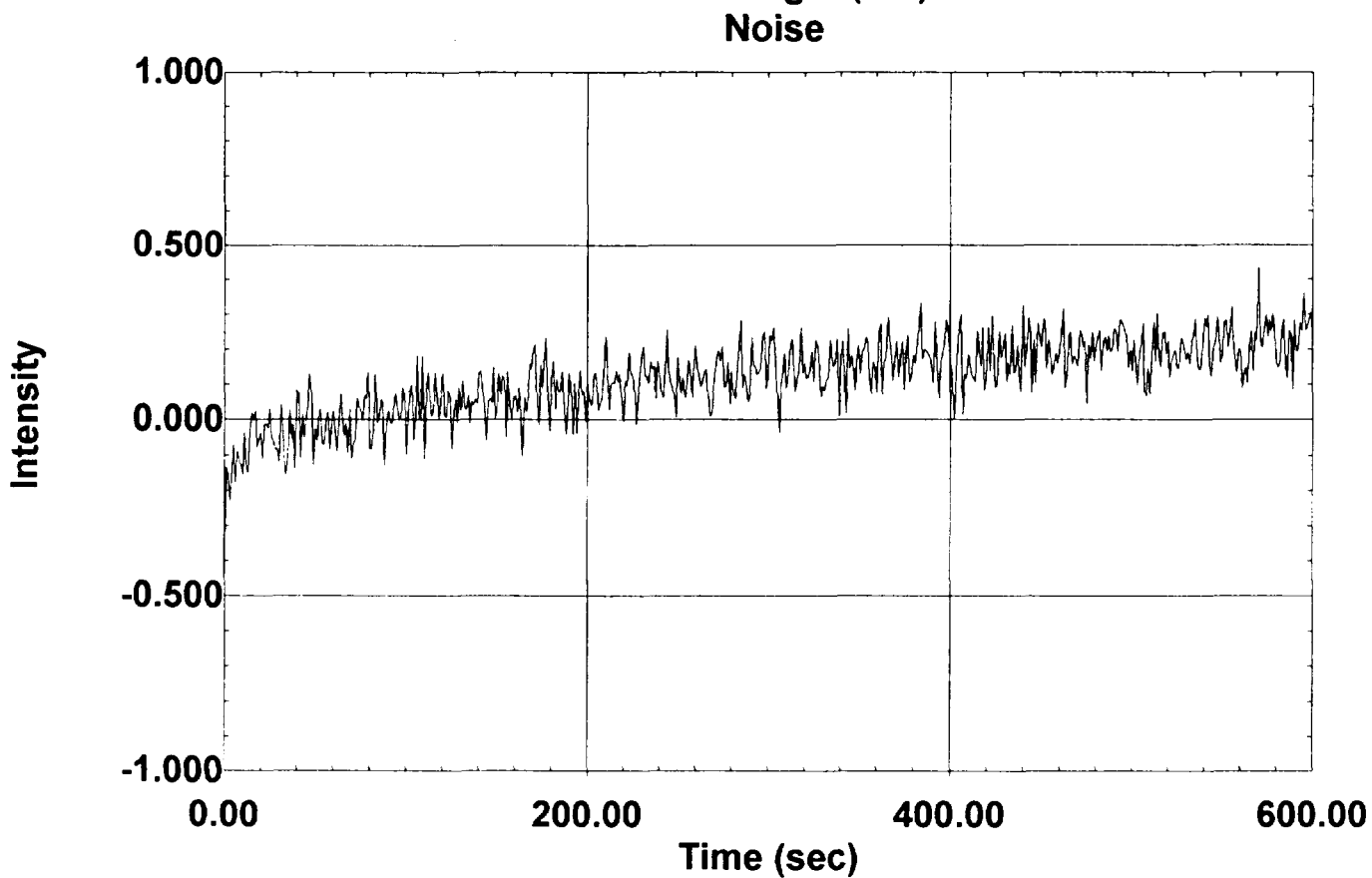
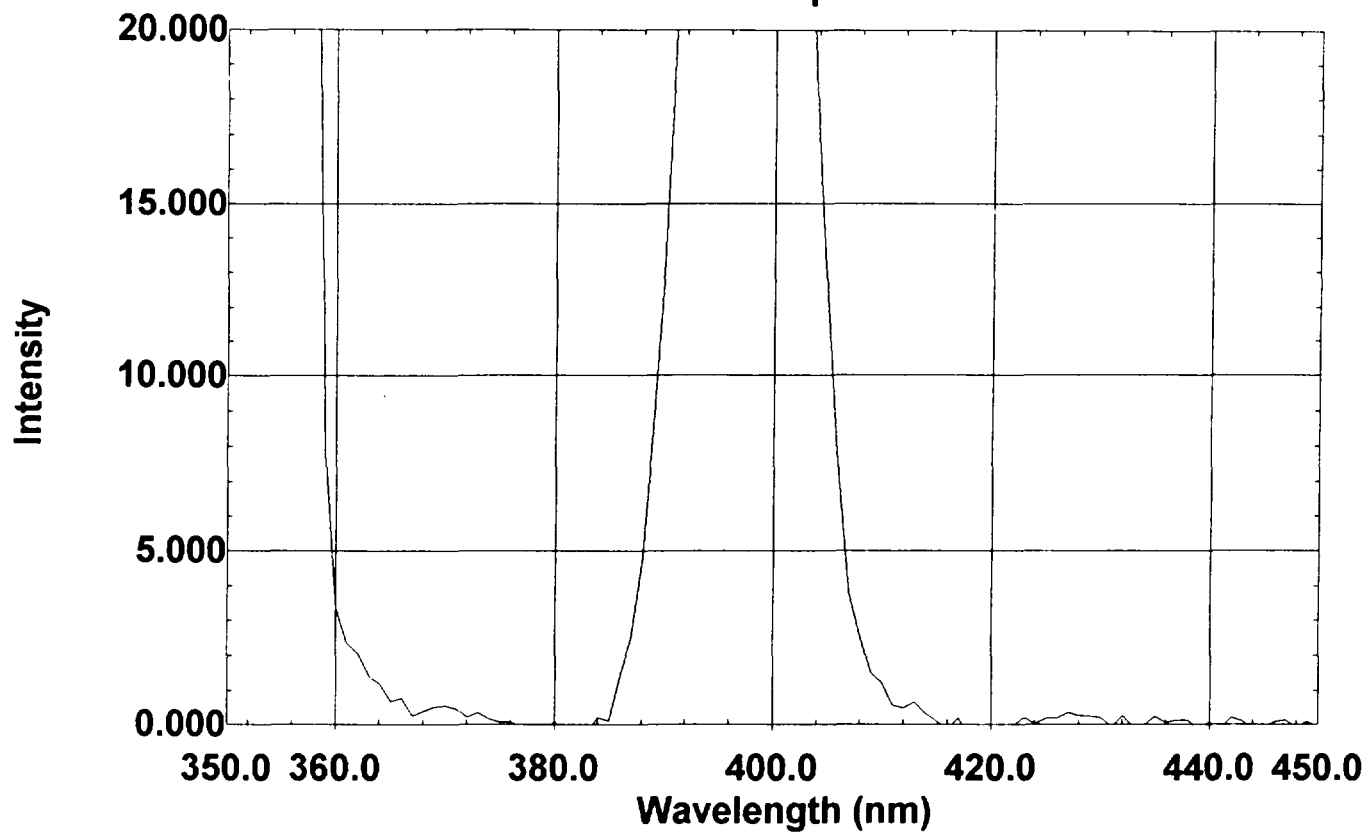
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	11.920	0.006

S/N Ratio Check

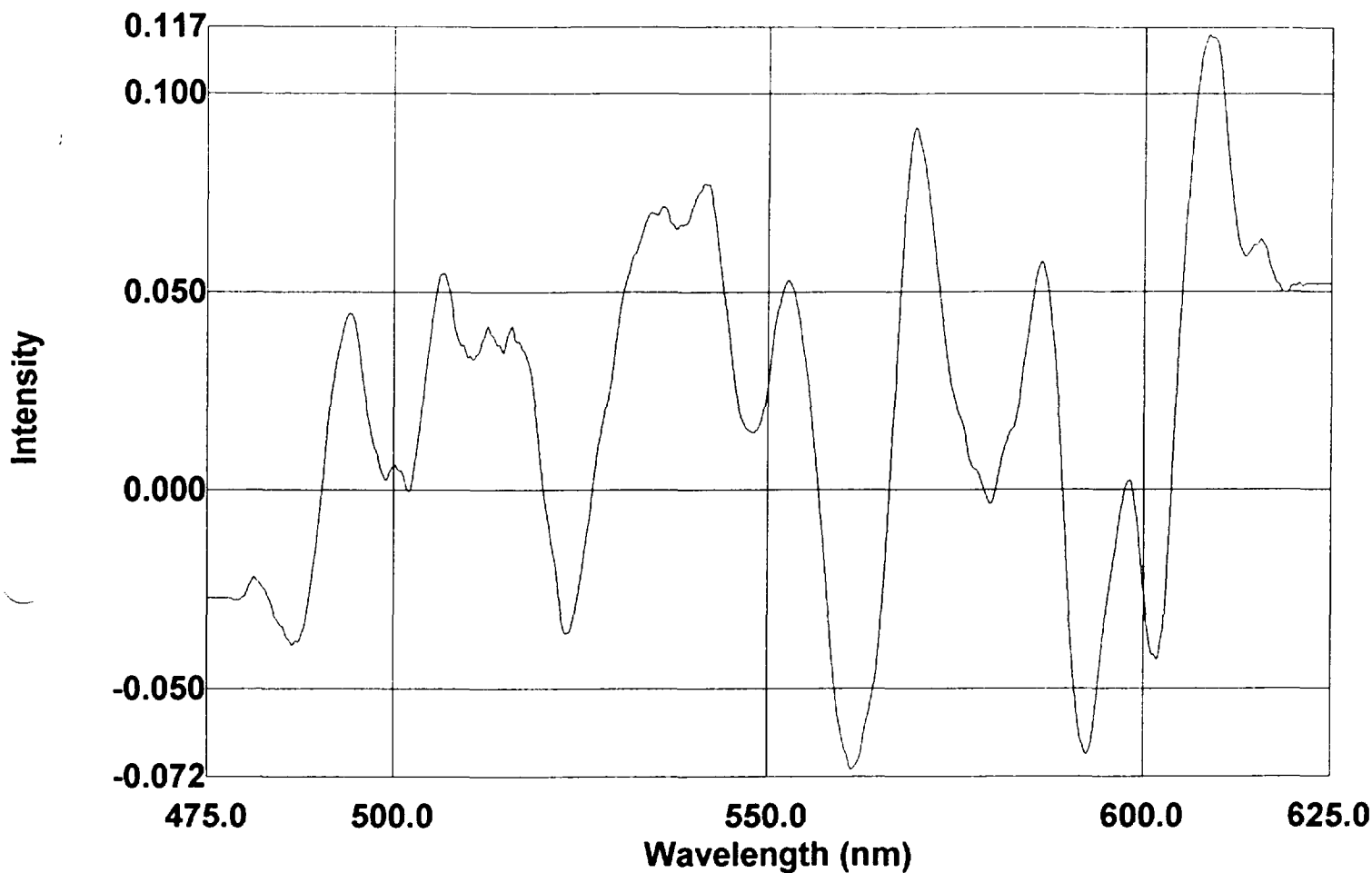
Raman Spectrum



Instrument Serial Number: A40193200051OD Printed: 17:07 02/28/97

Peak Height: 58.687

S/N Ratio: 294.515



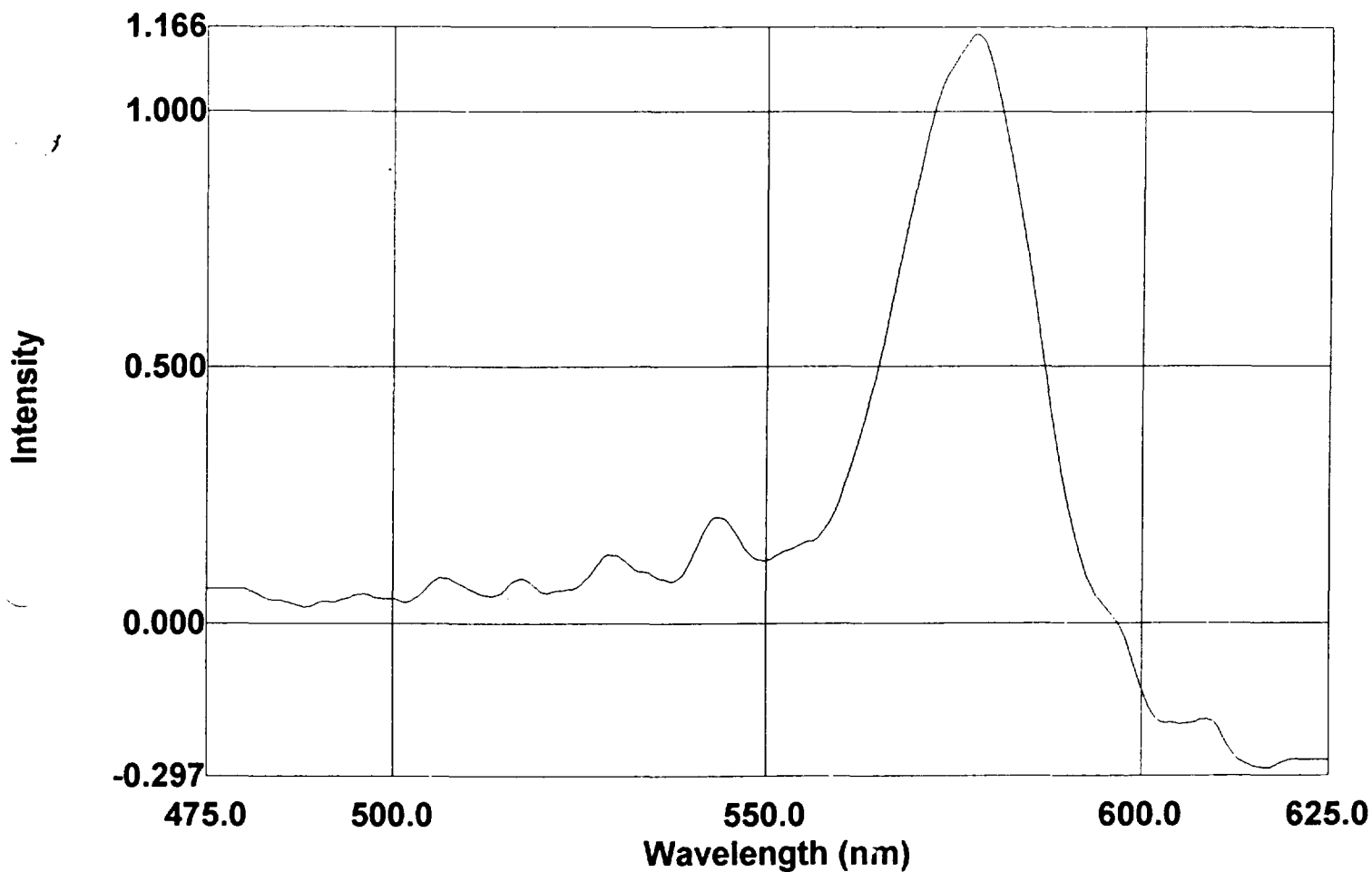
File Name: 1
 QA-ELUENT
 Created: 10:19 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 10:22 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

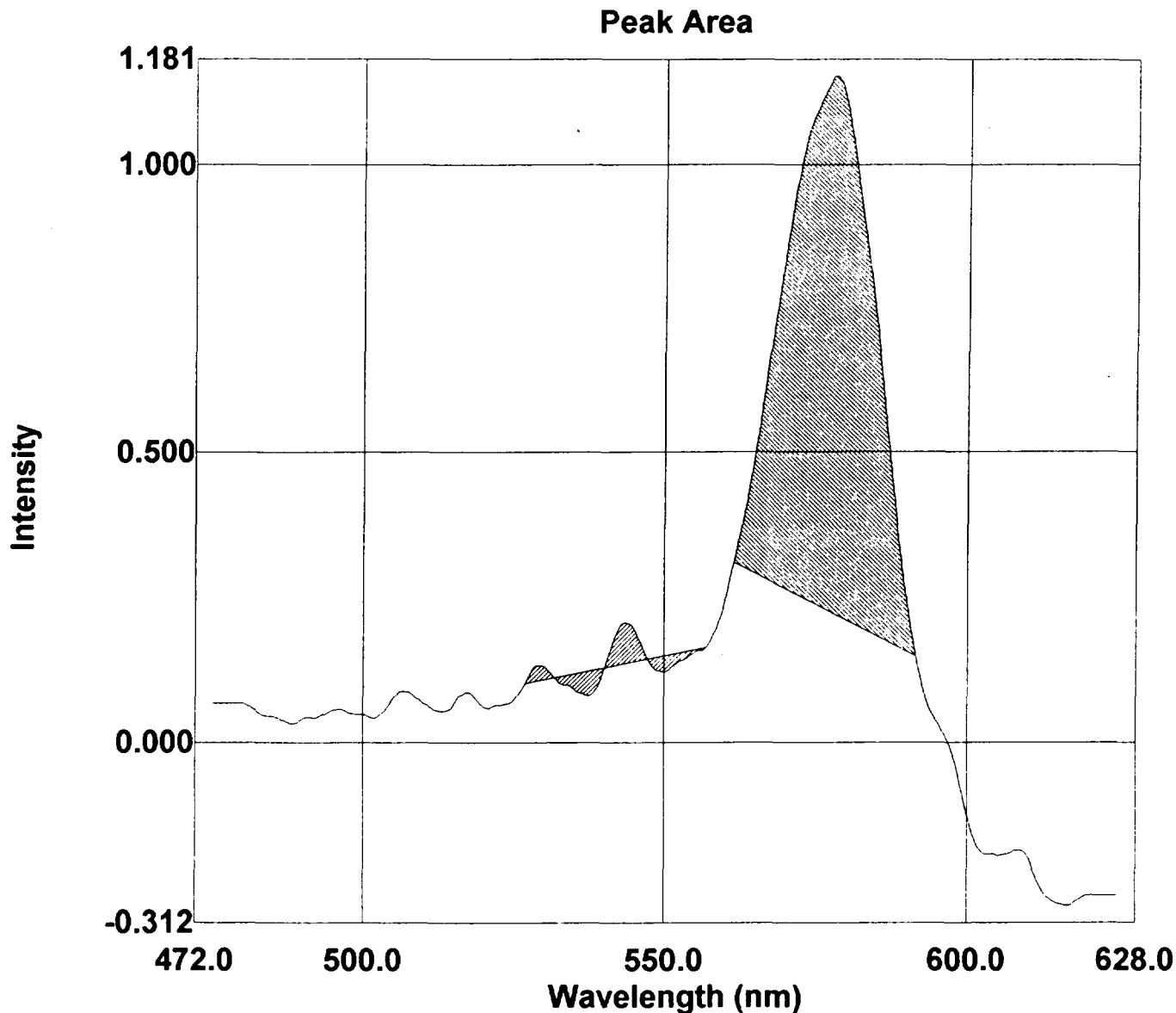
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



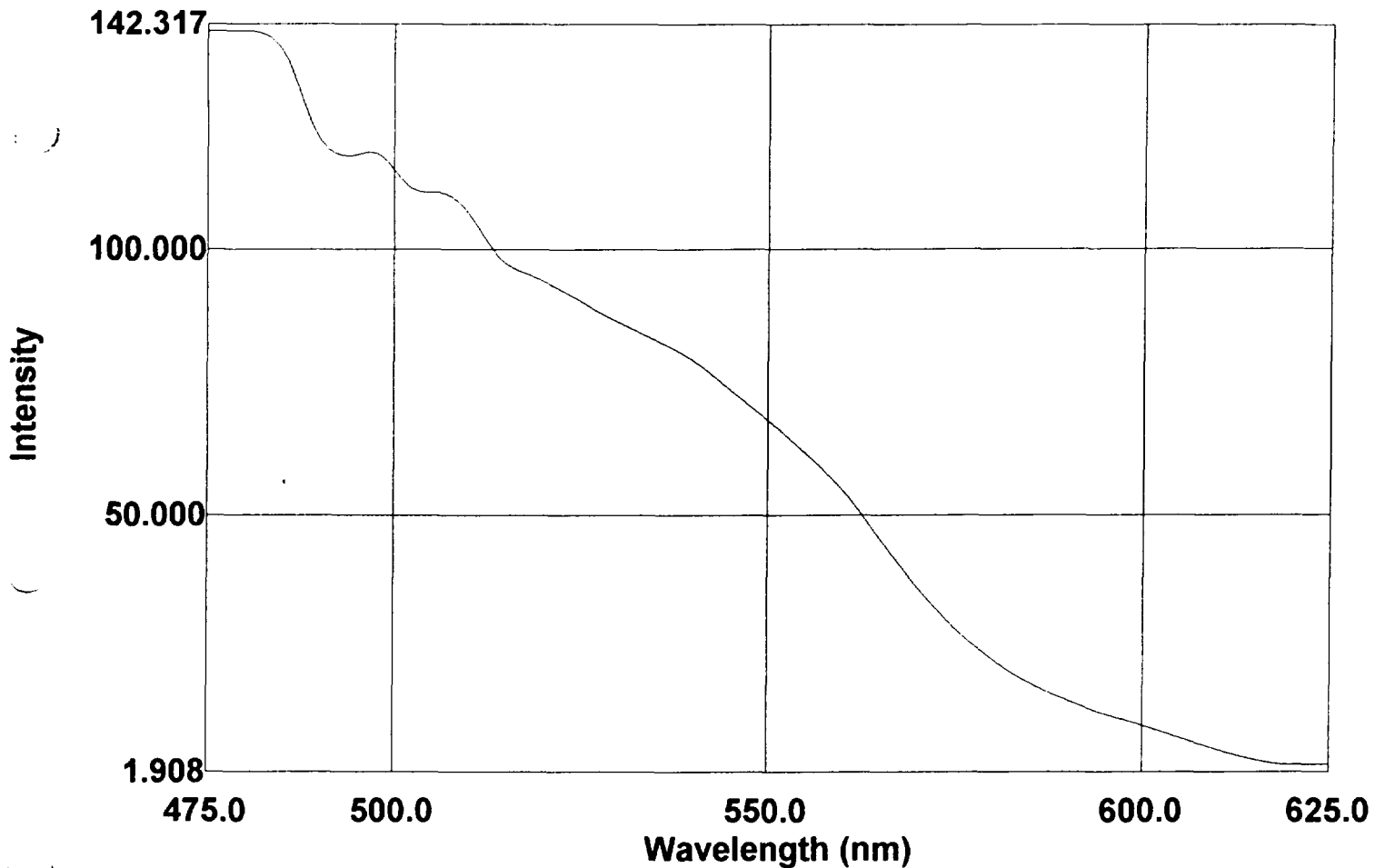
File Name: 2
 QA-SULPHORHODAMINE B

Created: 10:22 03/10/97
 Data: Modified

Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	527.0	557.0	1937.075	0.001	0.000
2	561.4	591.4	2004.410	15.878	0.008



File Name: 3

CW 6 EP

Created: 10:22 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

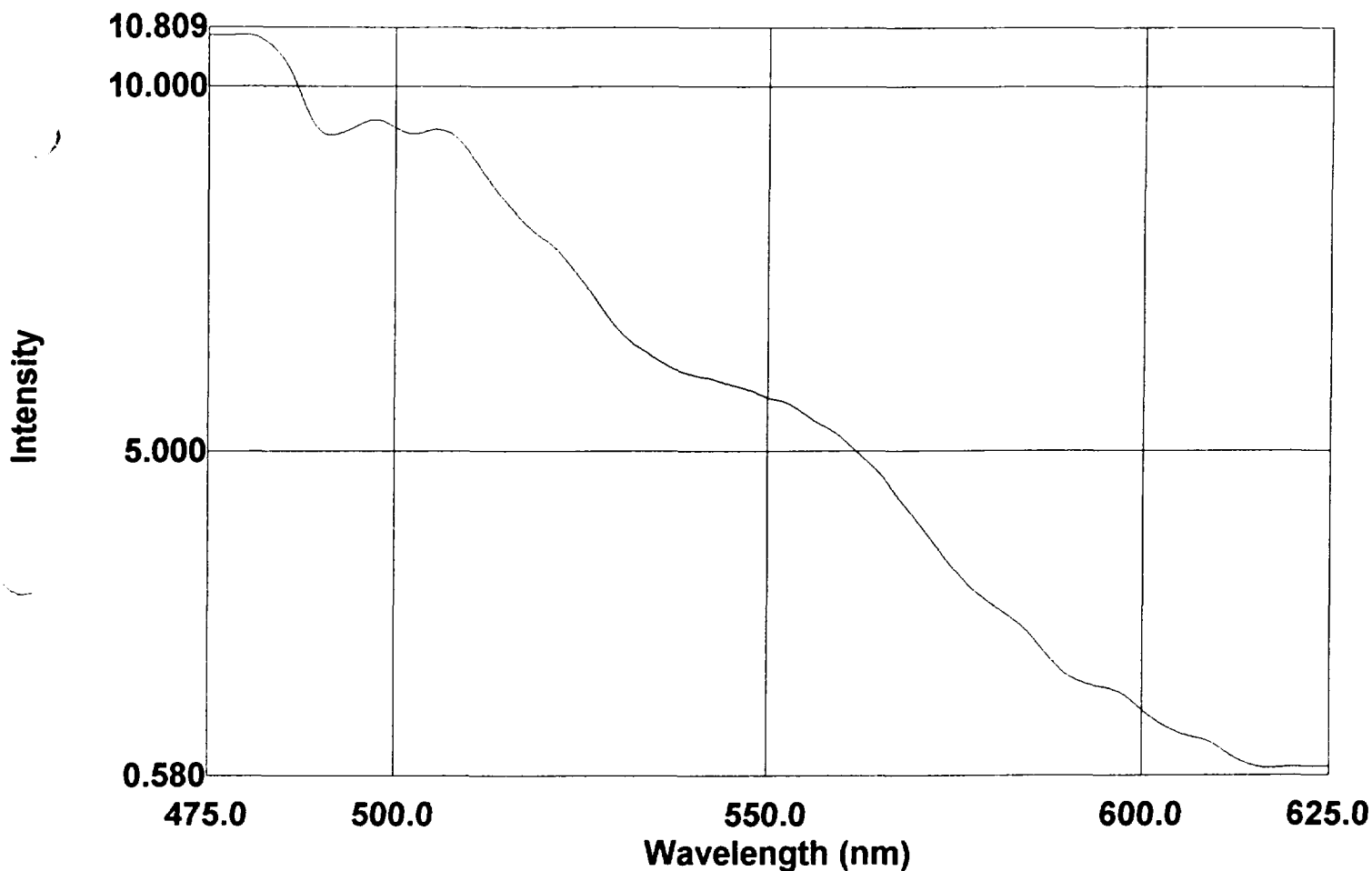
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4

CW 19 EP

Created: 10:23 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

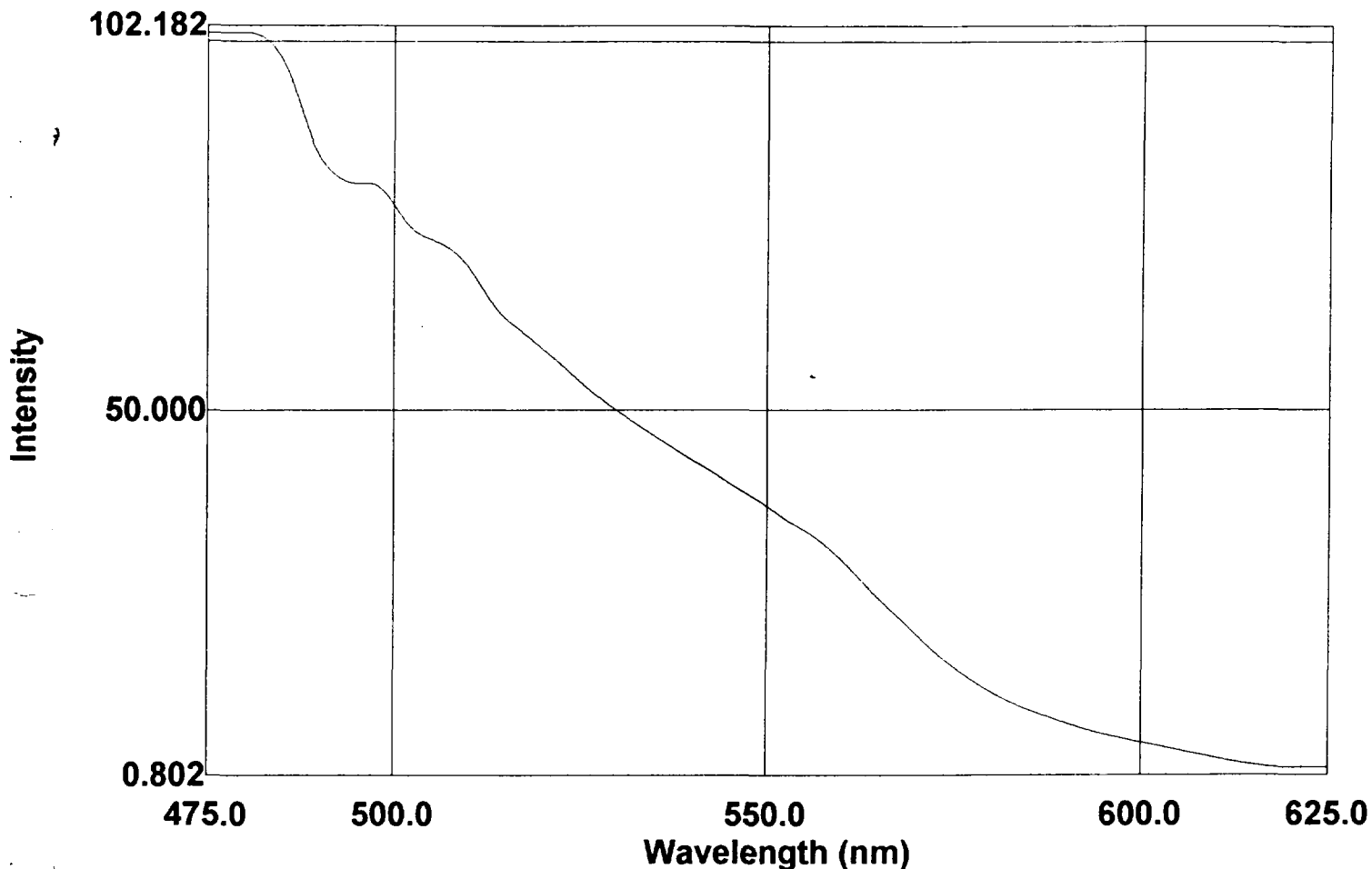
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5

CW 31 EP

Created: 10:24 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

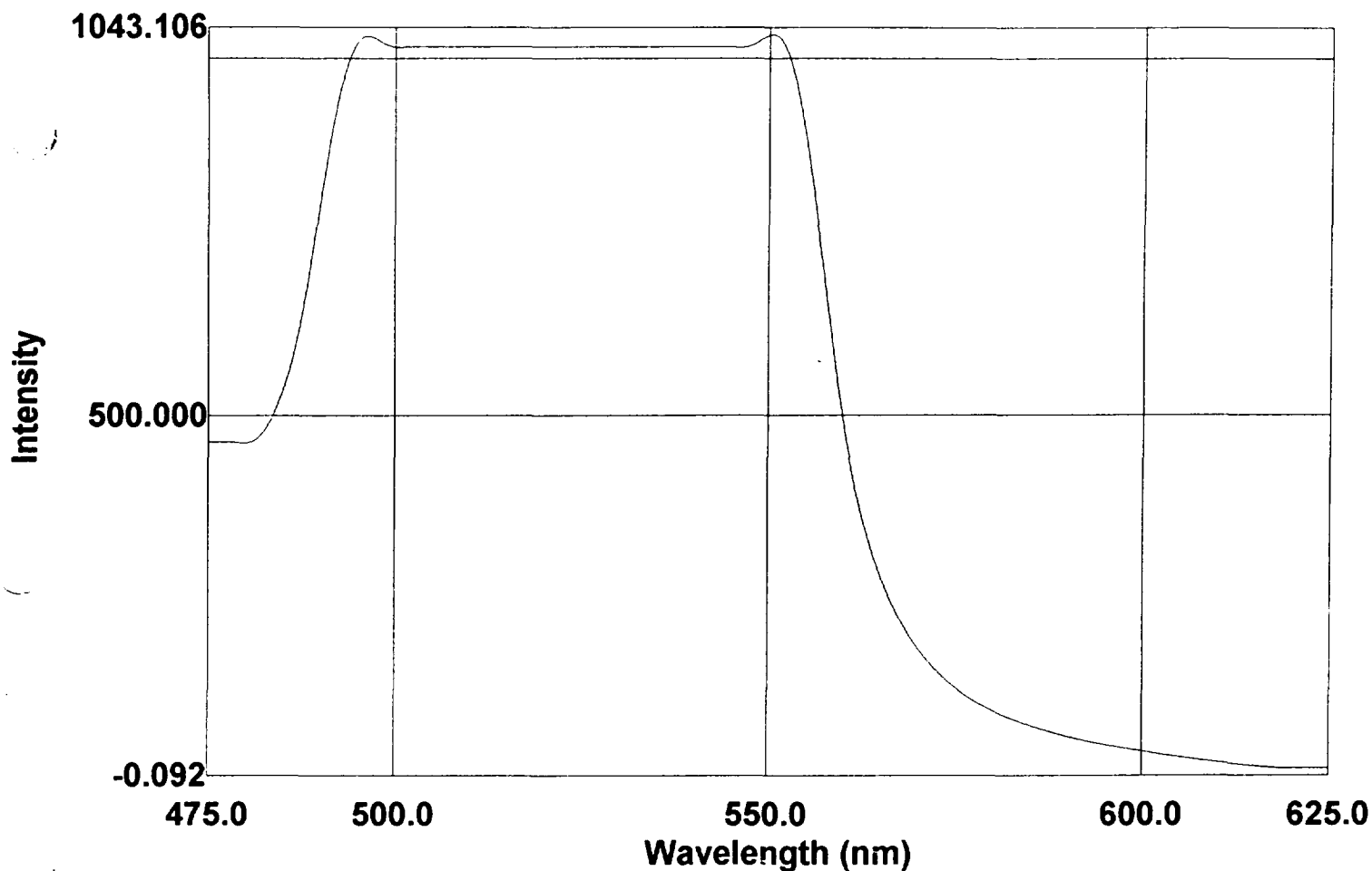
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6

CW 51 EP

Created: 10:25 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

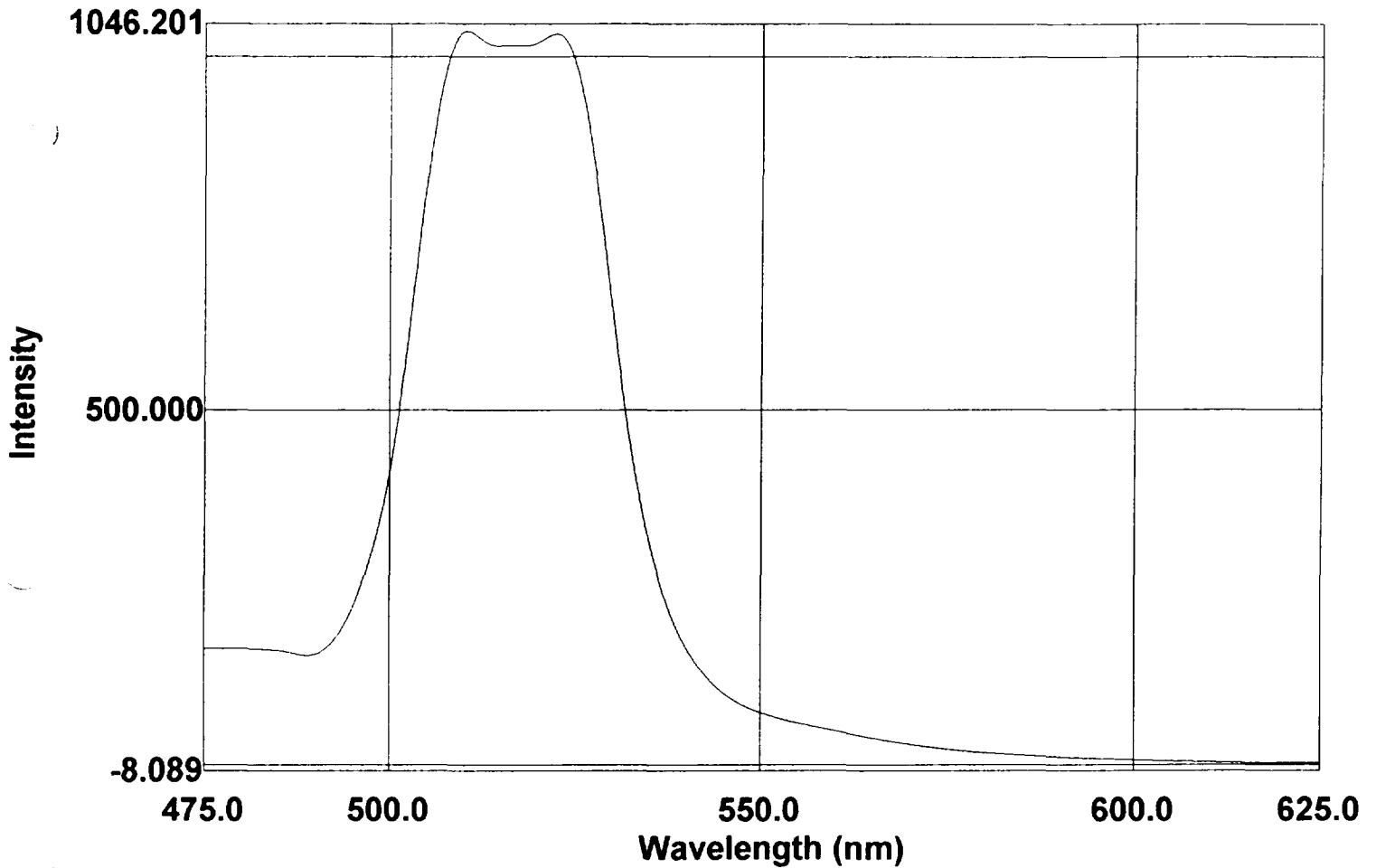
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7

CW 60 EP

Created: 10:27 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

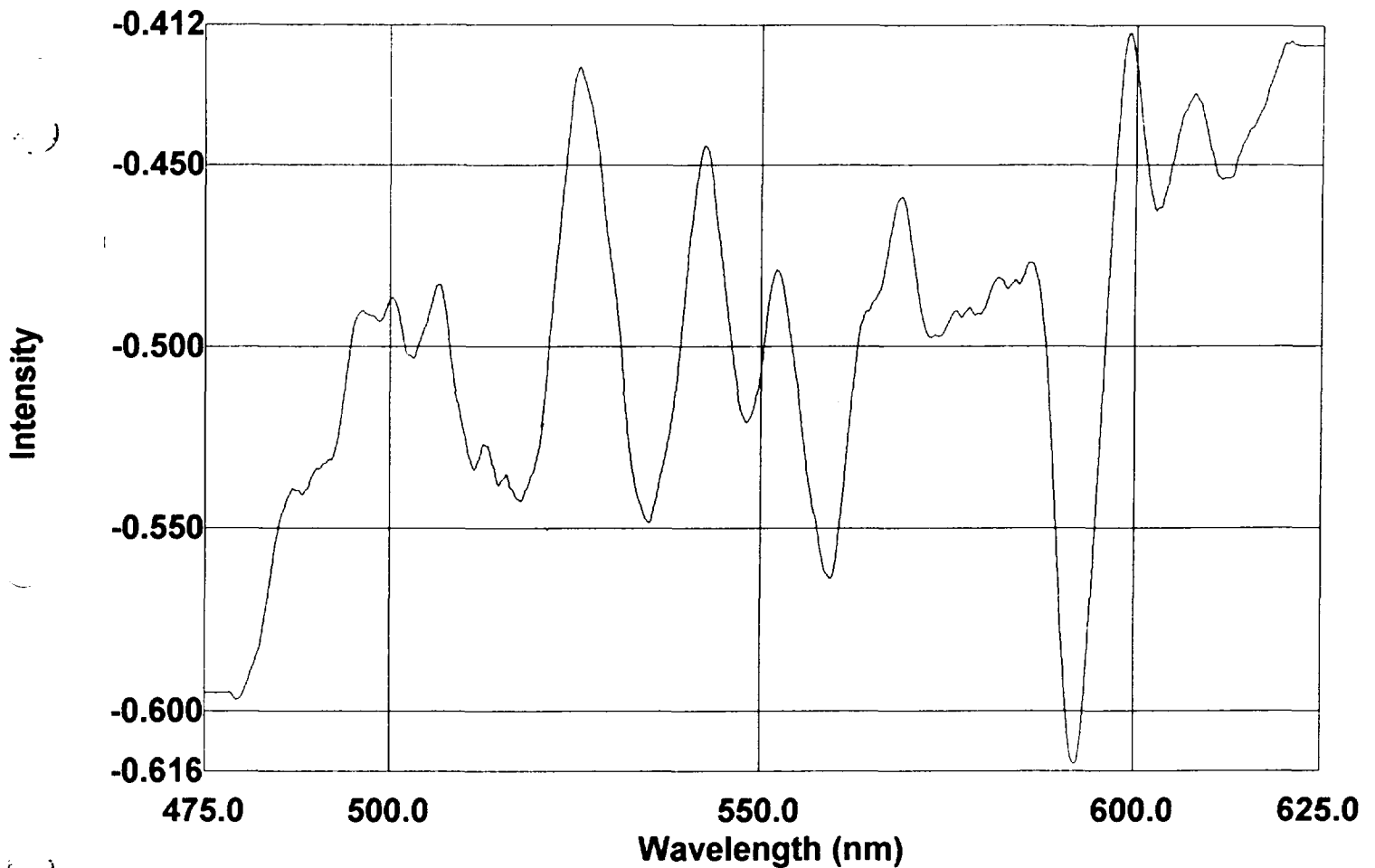
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 10:28 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

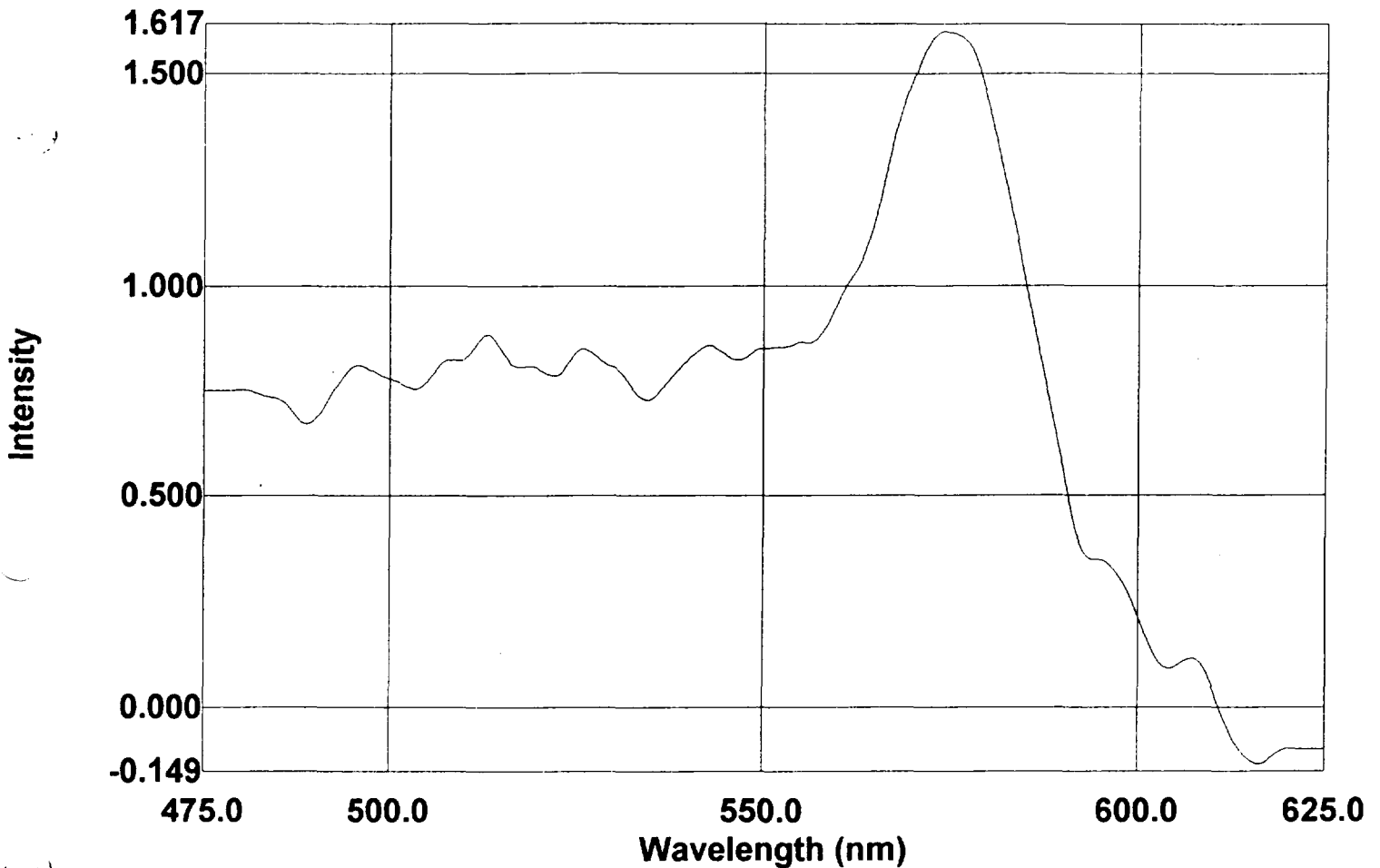
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 10:28 03/10/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

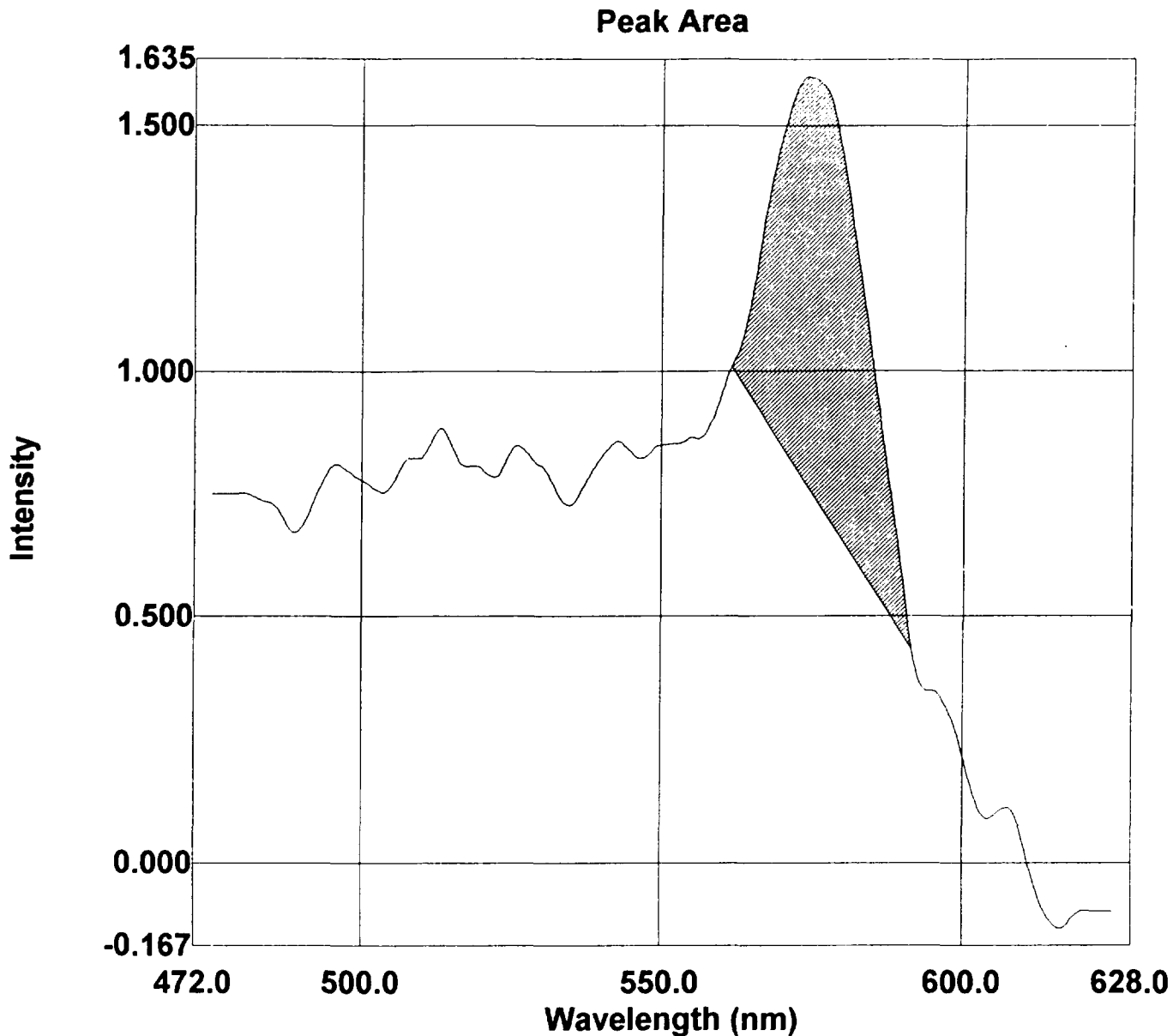
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 12 -- 3/5/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9
QA-SULPHORHODAMINE B

Created: 10:28 03/10/97
Data: Modified

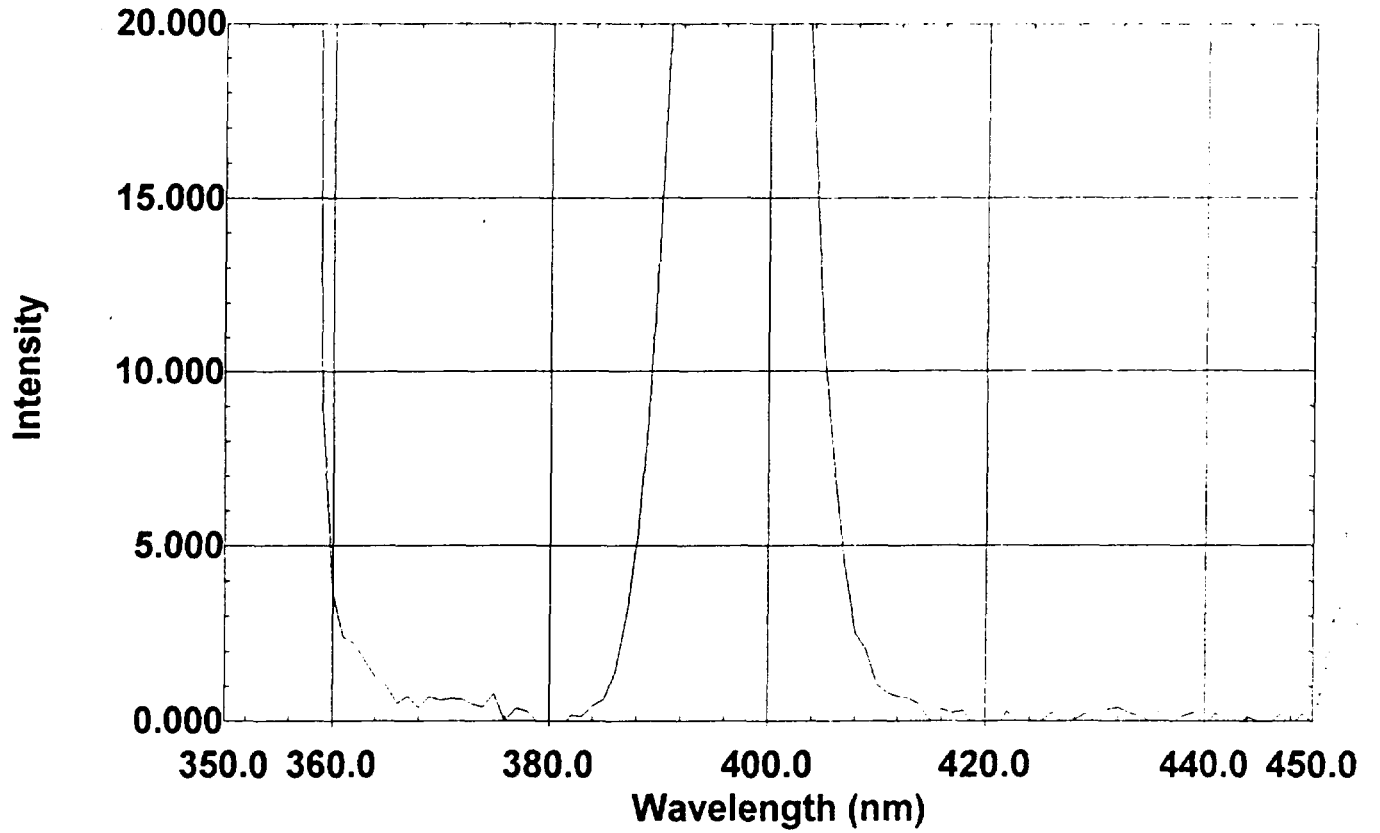
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

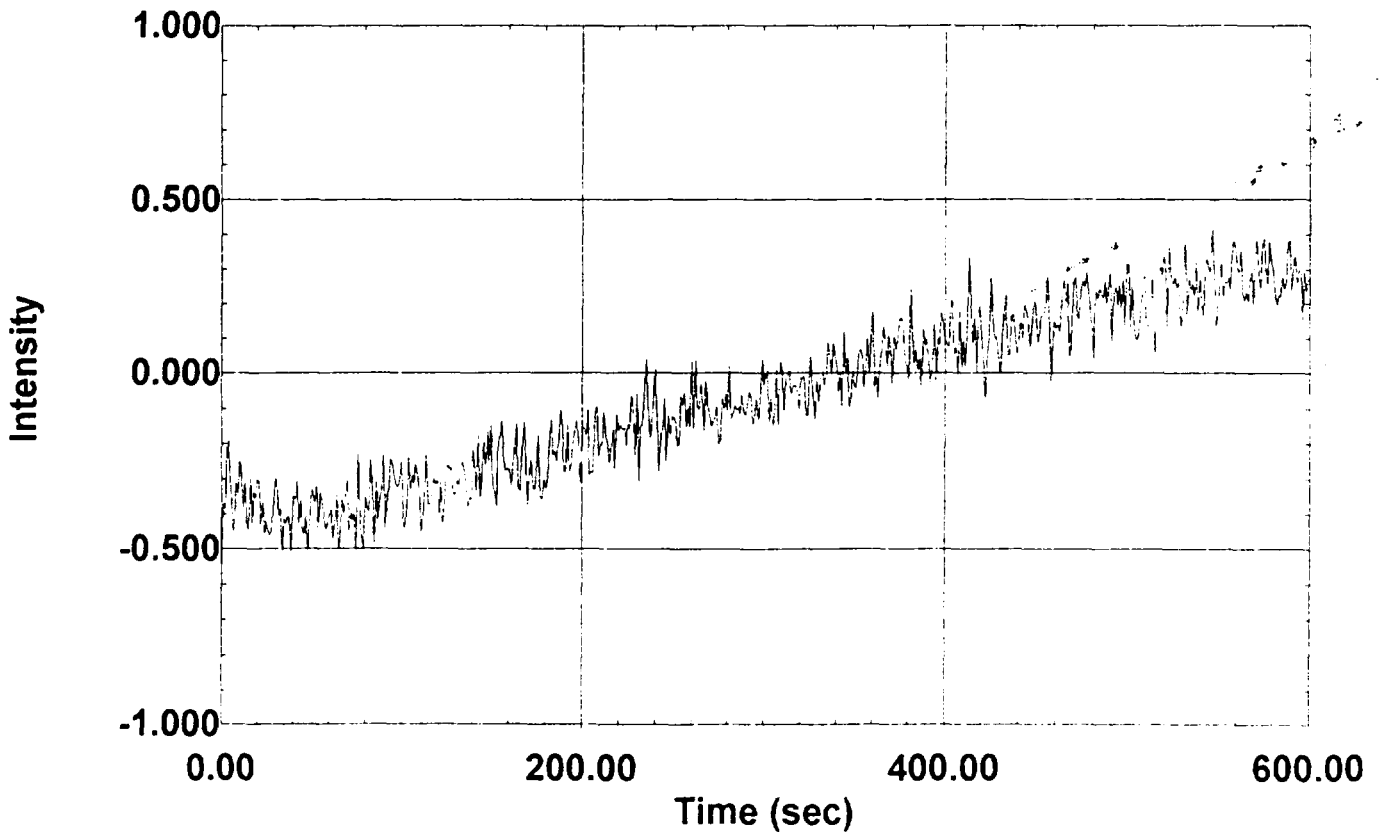
Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	15.458	0.008

S/N Ratio Check

Raman Spectrum



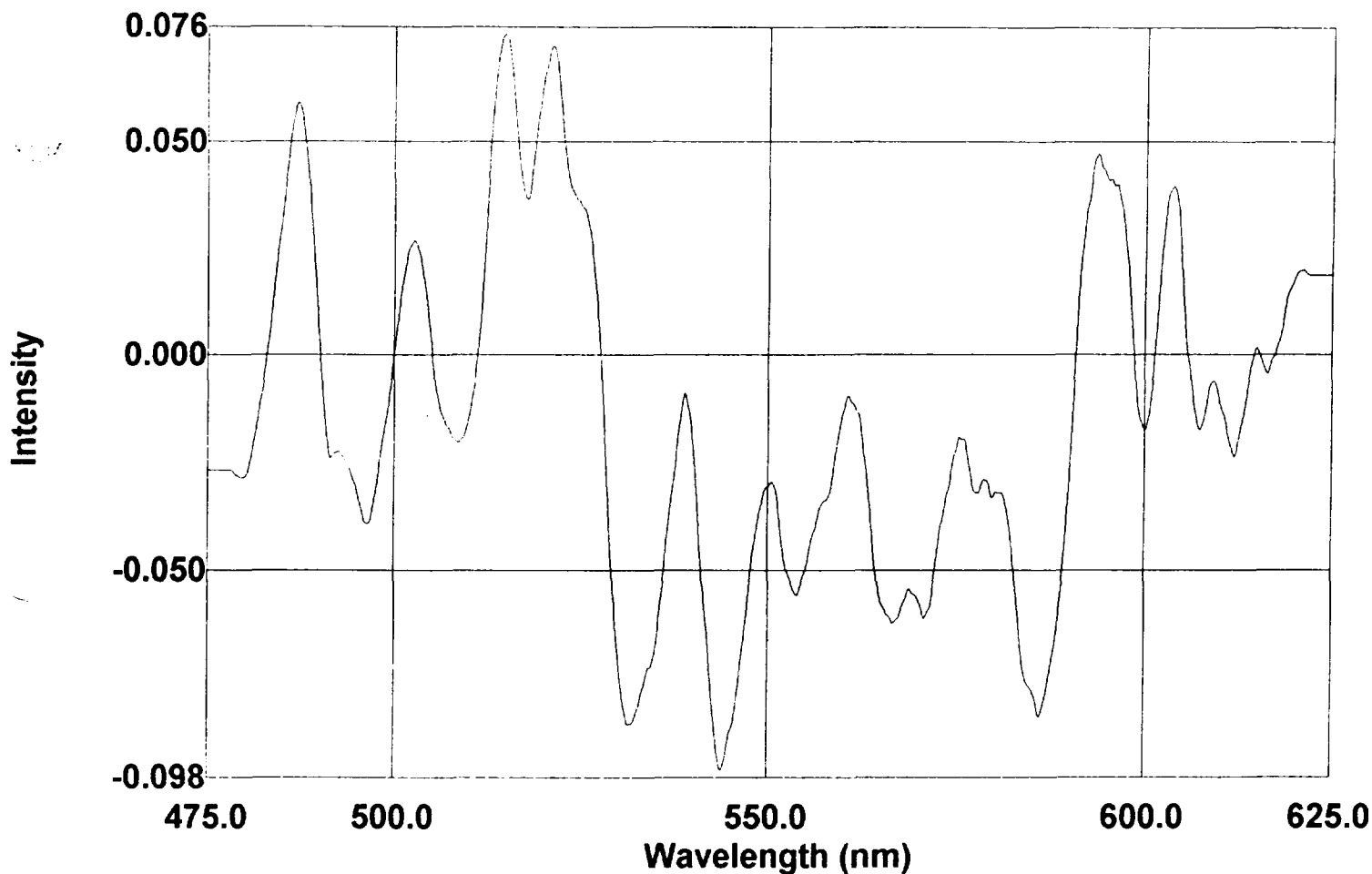
Noise



Instrument Serial Number: A401932000510D Printed: 10:18 03/25/97

Peak Height: 58.846

S/N Ratio: 279.399



File Name: 1

QA-ELUENT

Created: 16:12 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

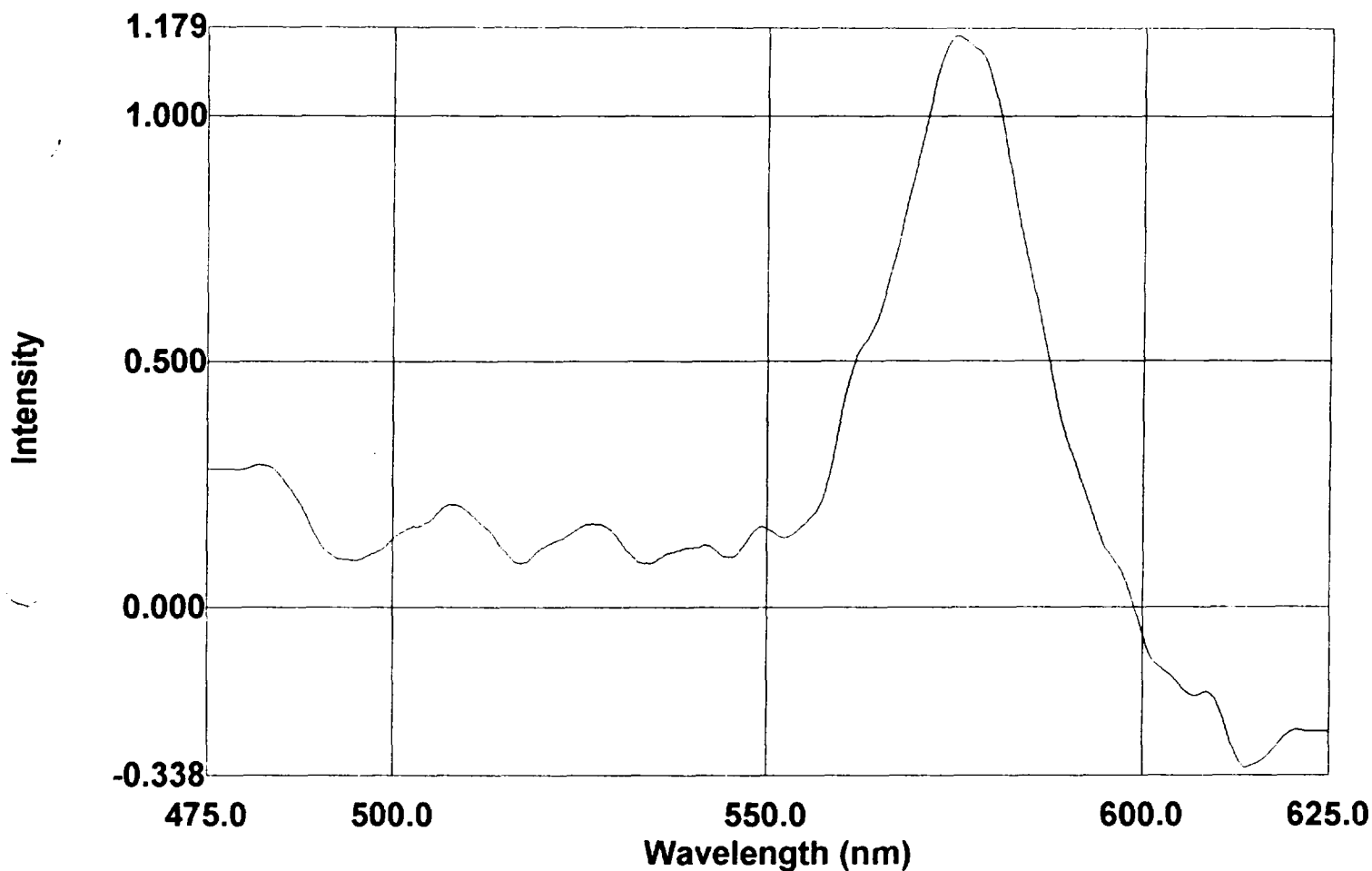
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE

Created: 16:14 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

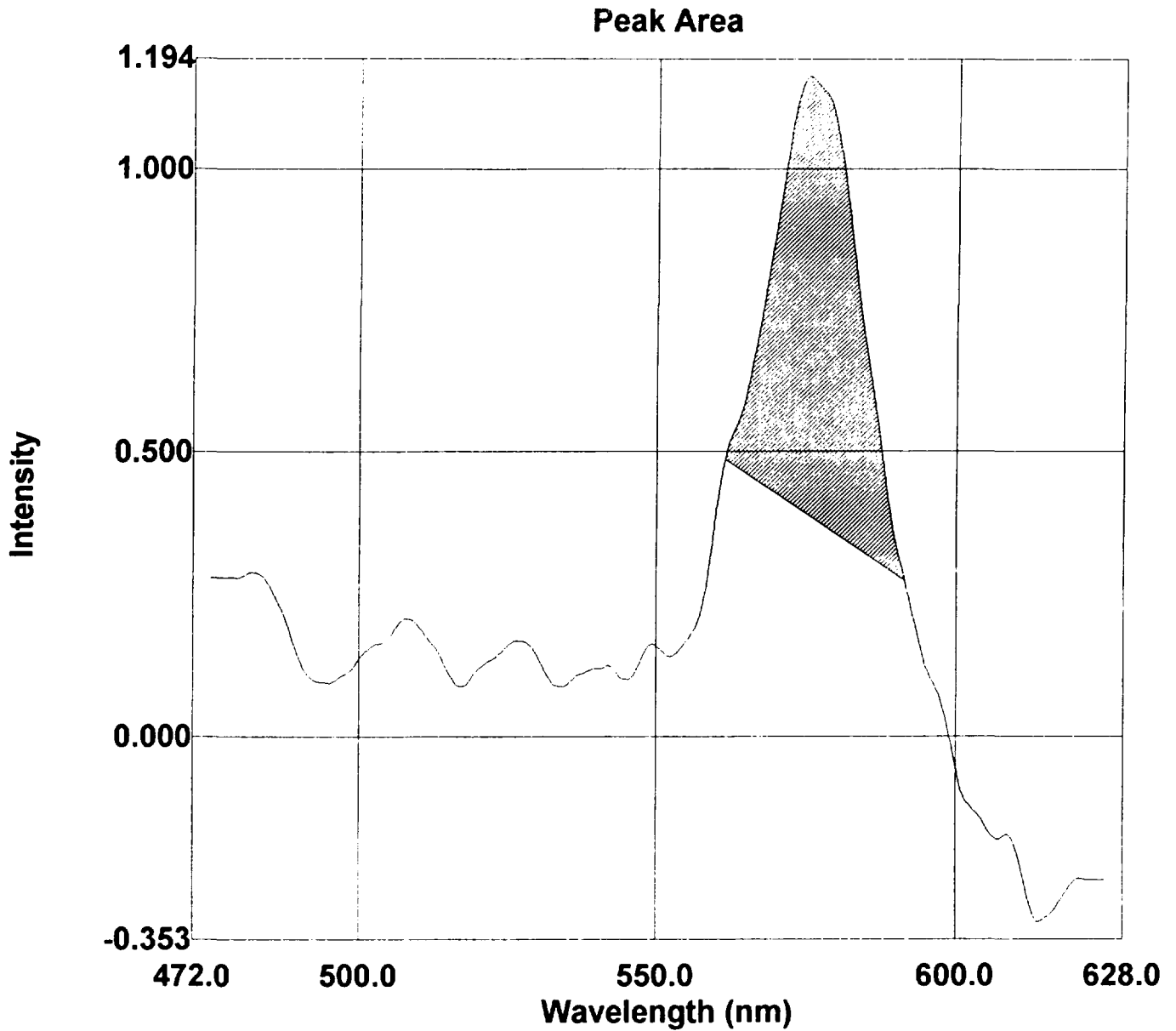
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



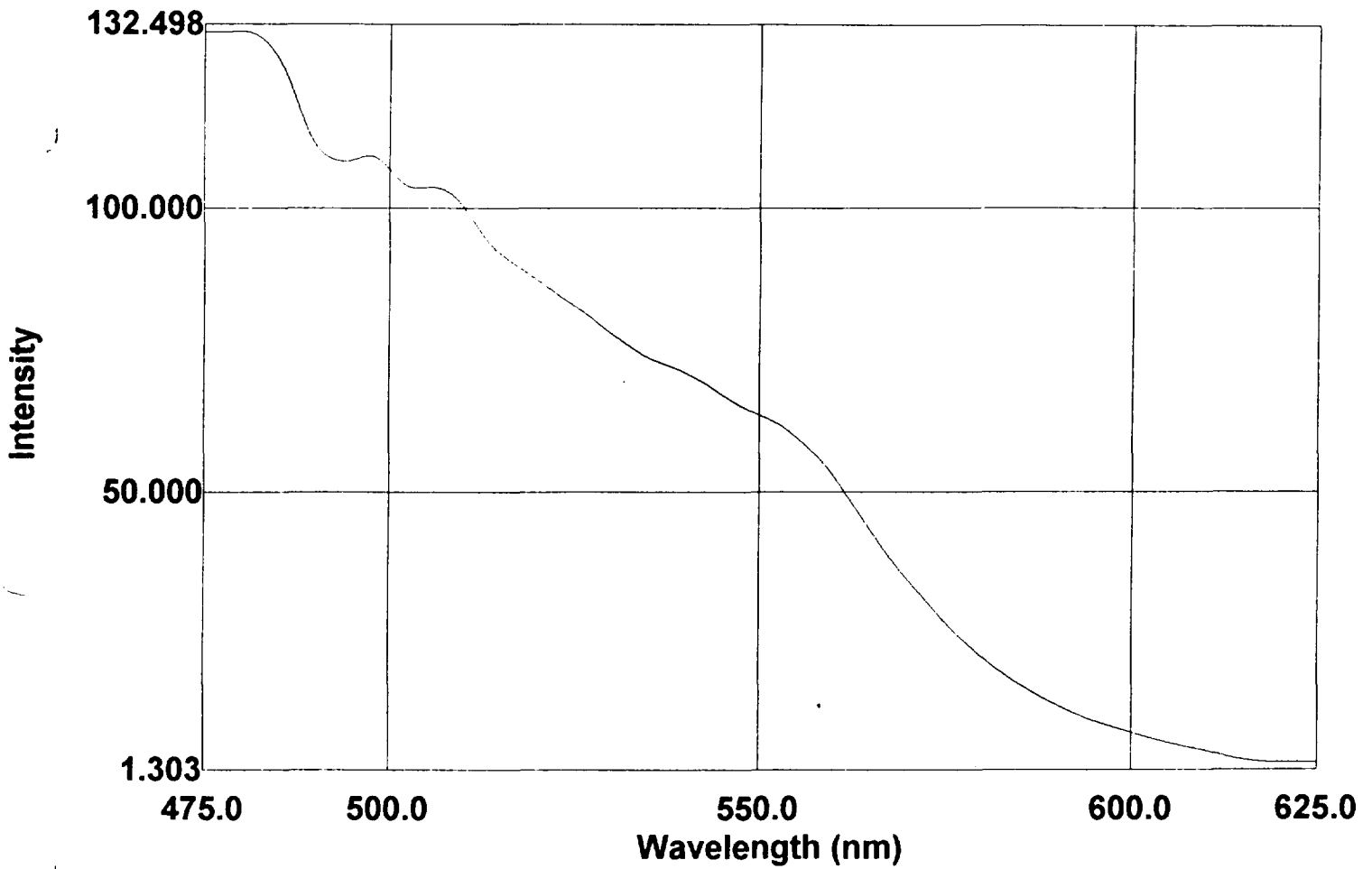
File Name: 2
QA-SULPHORHODAMINE

Created: 16:14 03/25/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	12.738	0.006



File Name: 3

CW 6 EP

Created: 16:15 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

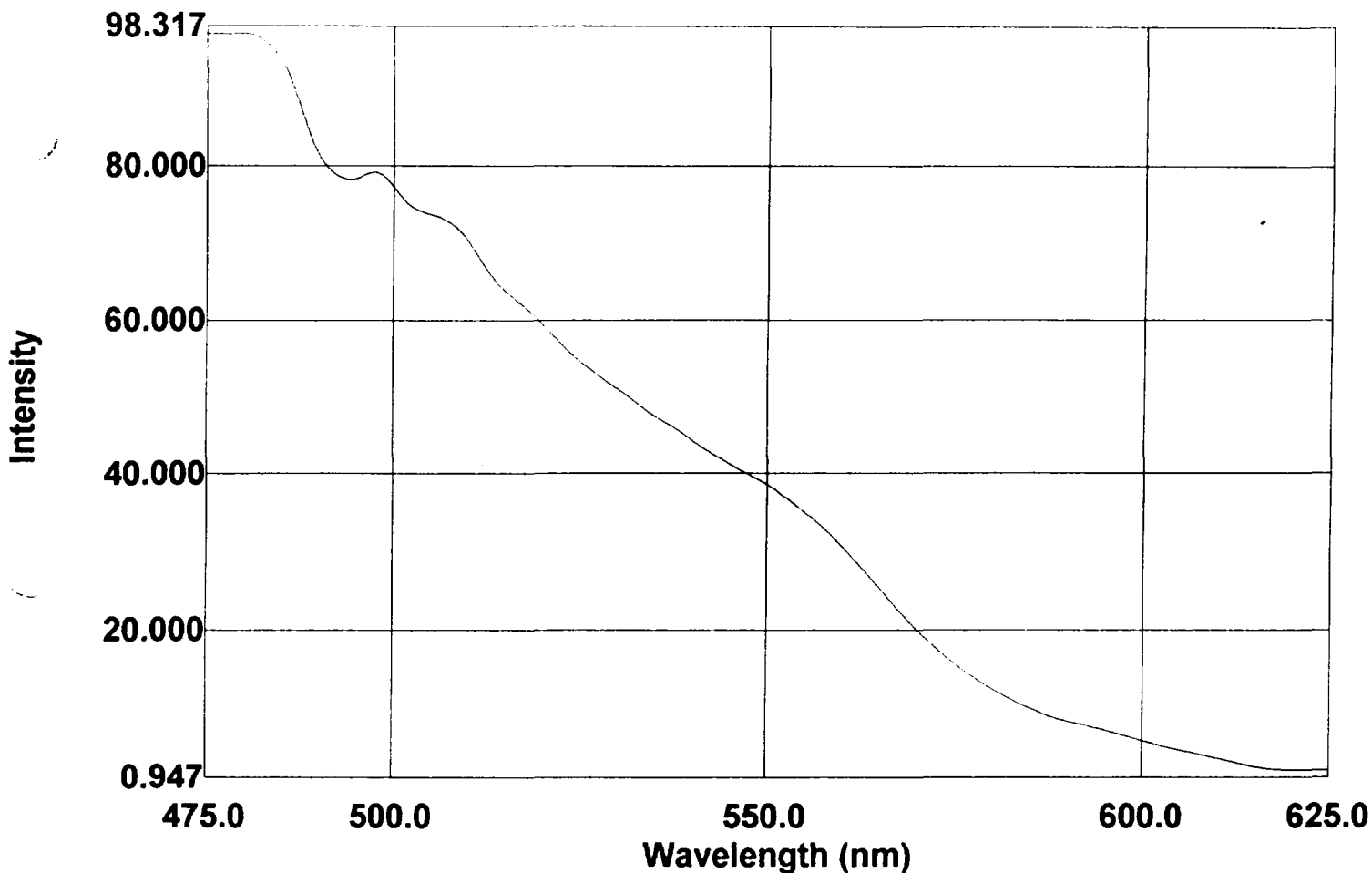
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4

CW 19 EP

Created: 16:15 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

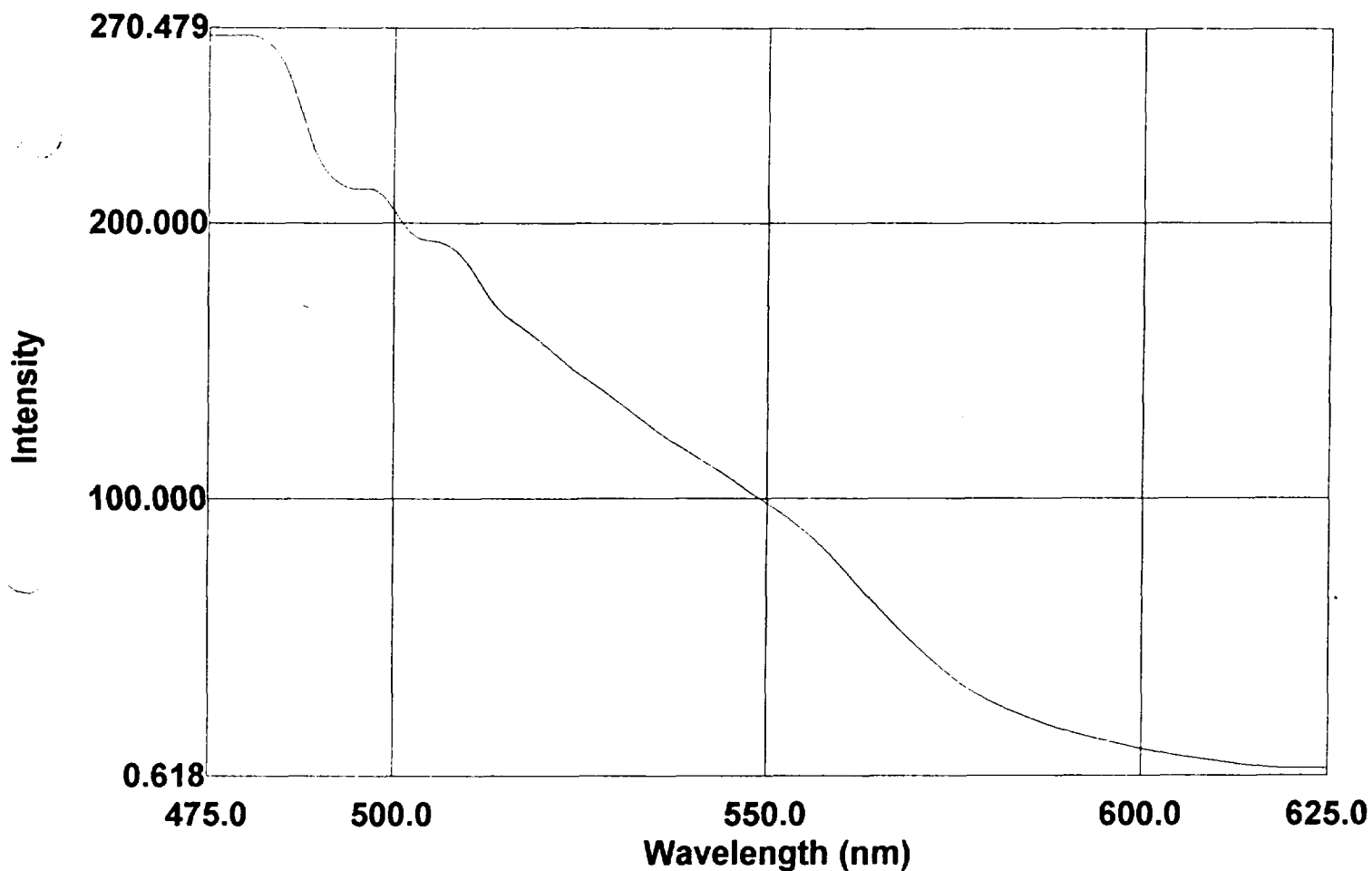
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5

CW 31 EP

Created: 16:16 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

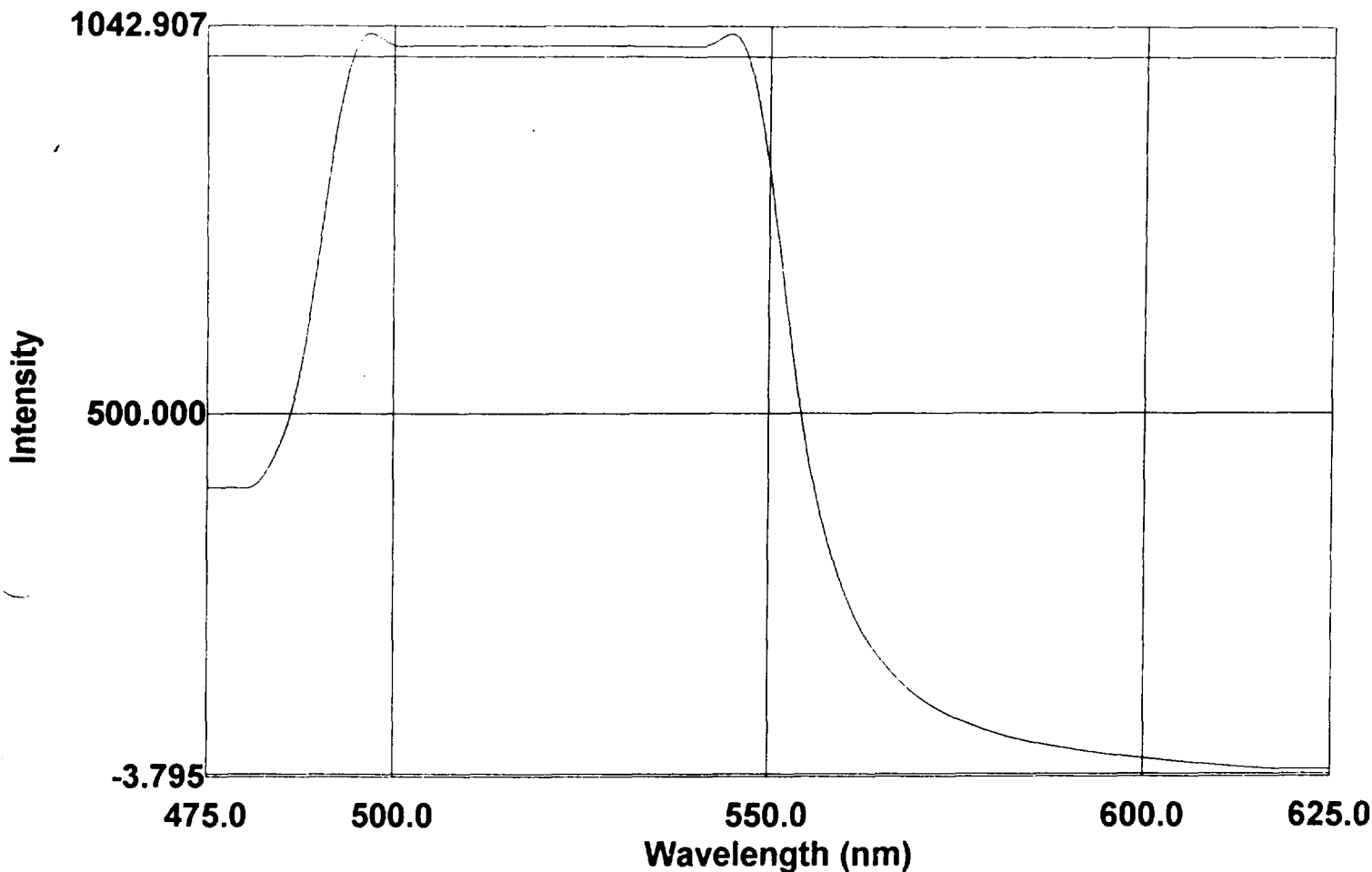
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6

CW 51 EP

Created: 16:18 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

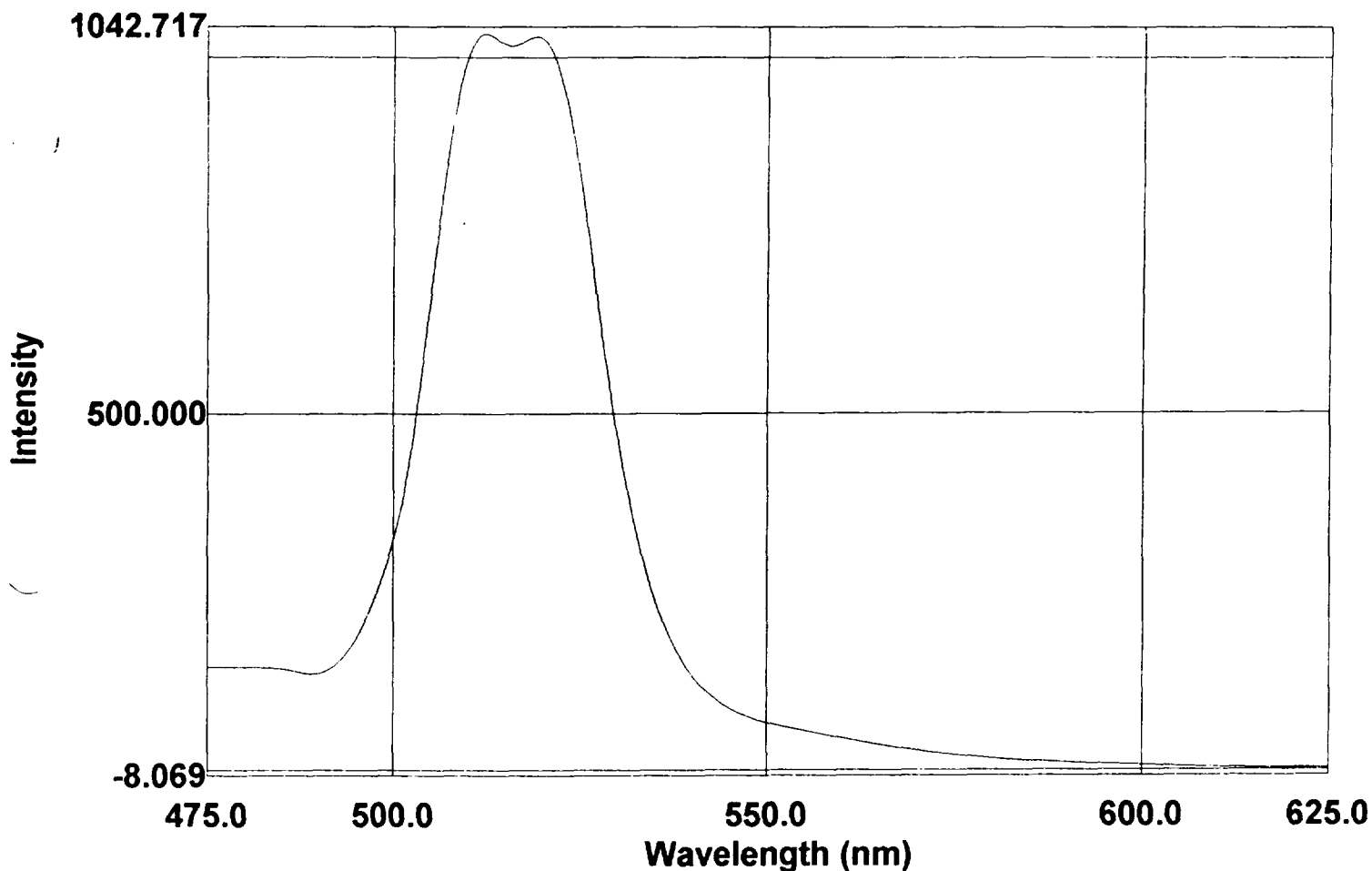
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7

CW 60 EP

Created: 16:19 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

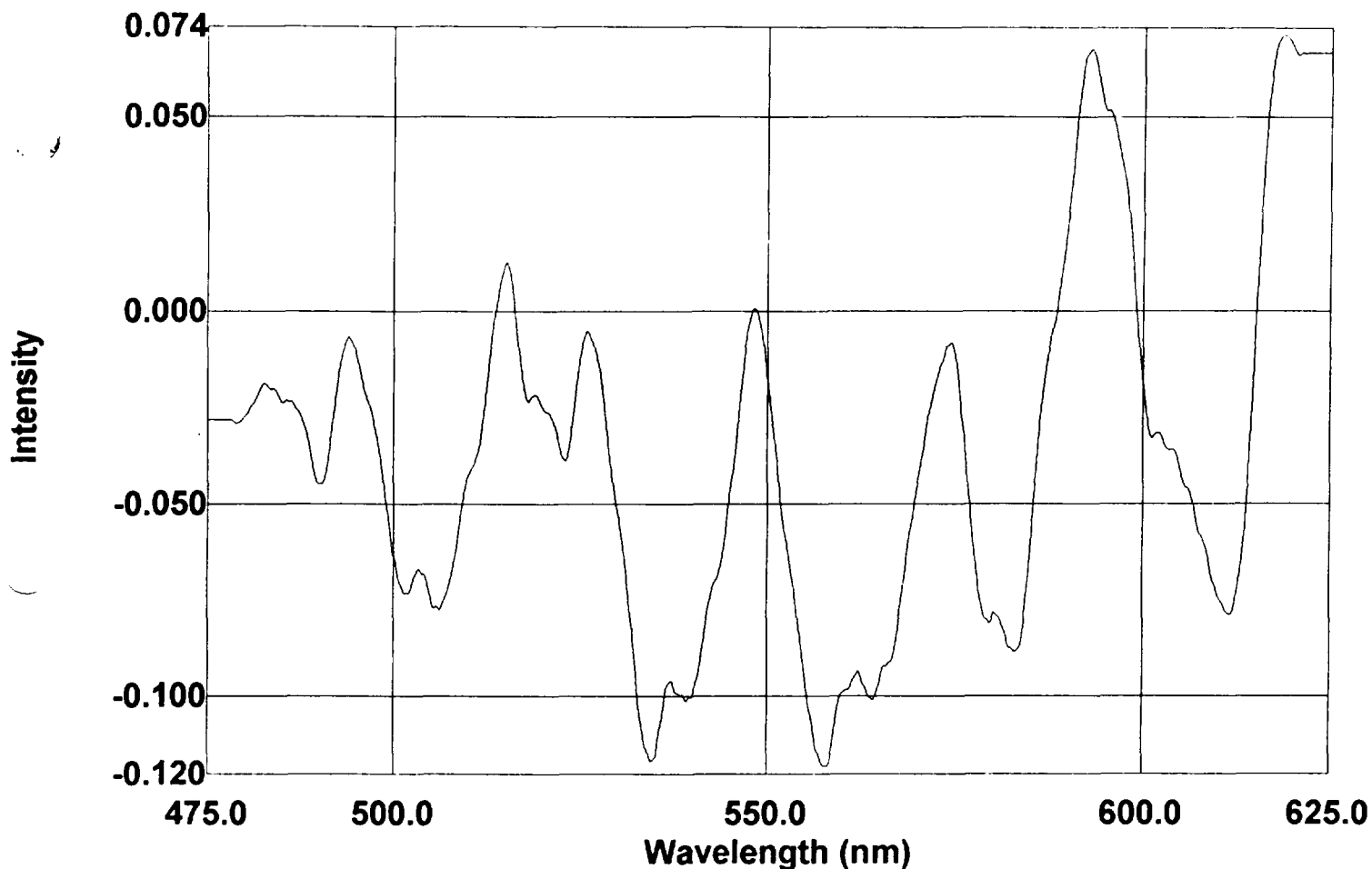
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8

QA-ELUENT

Created: 16:19 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

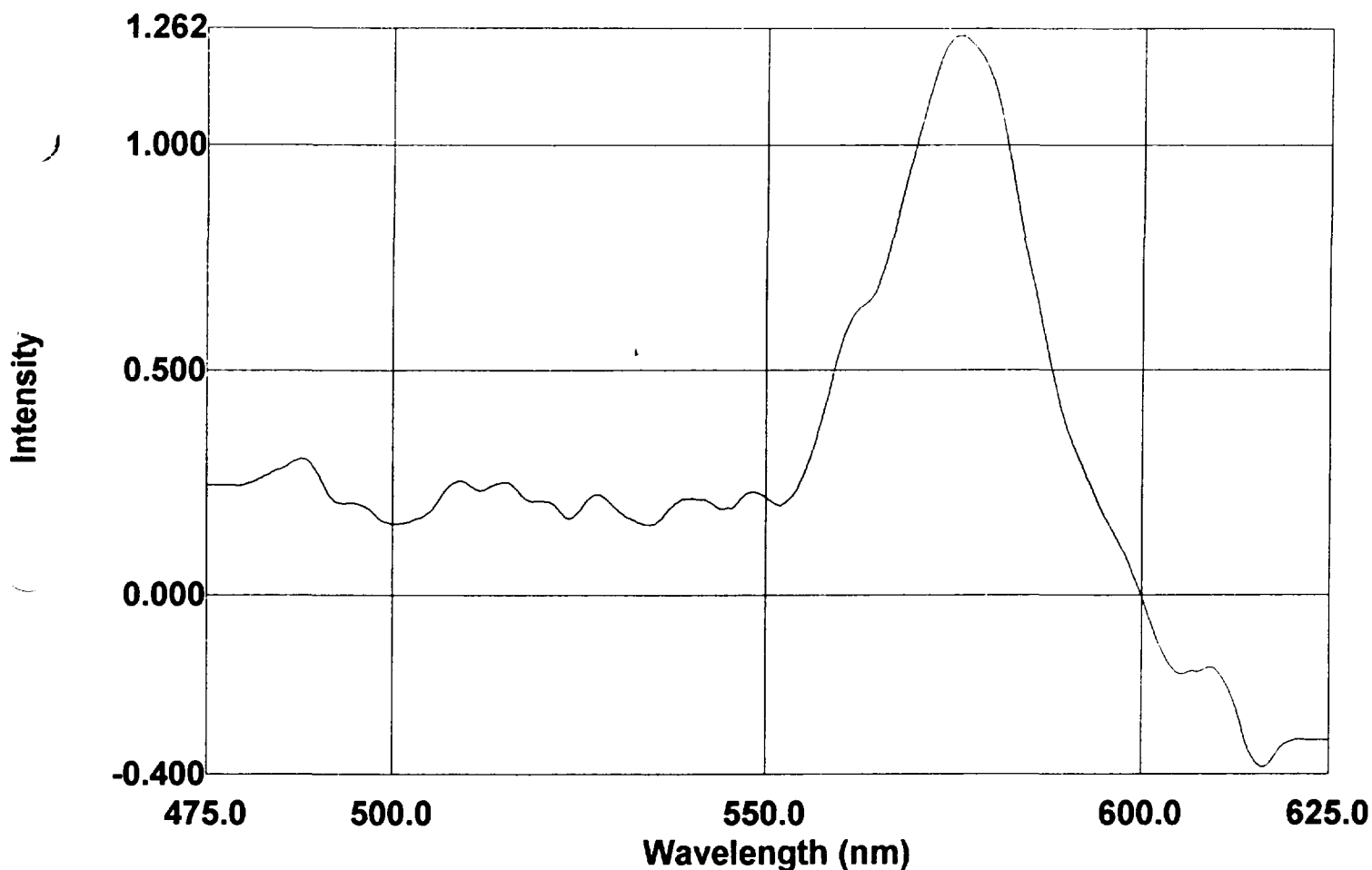
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 16:20 03/25/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

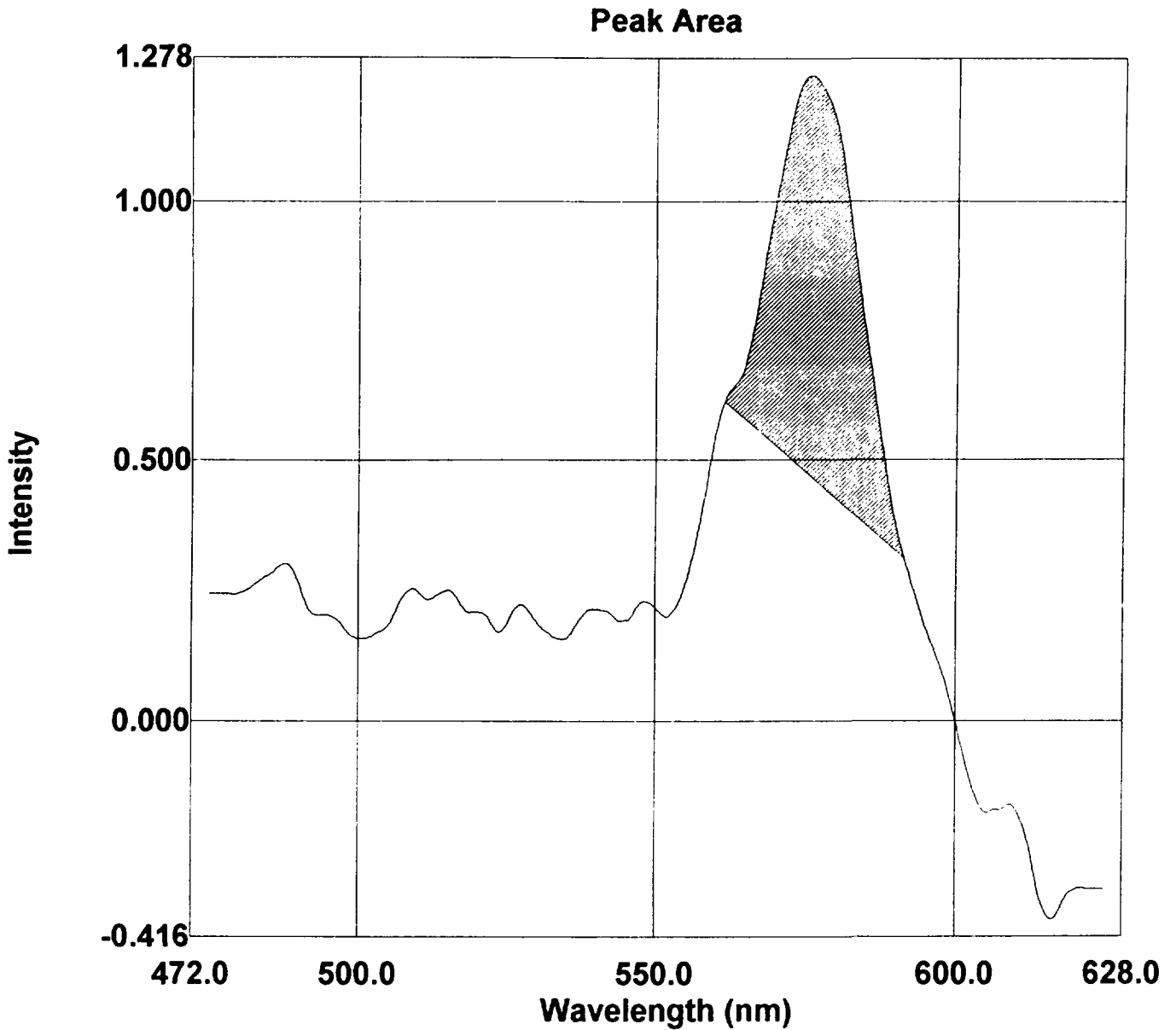
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 13 -- 3/19/97

Samples Analyzed by:
 Will Clauson

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9
 QA-SULPHORHODAMINE B

Created: 16:20 03/25/97
 Data: Modified

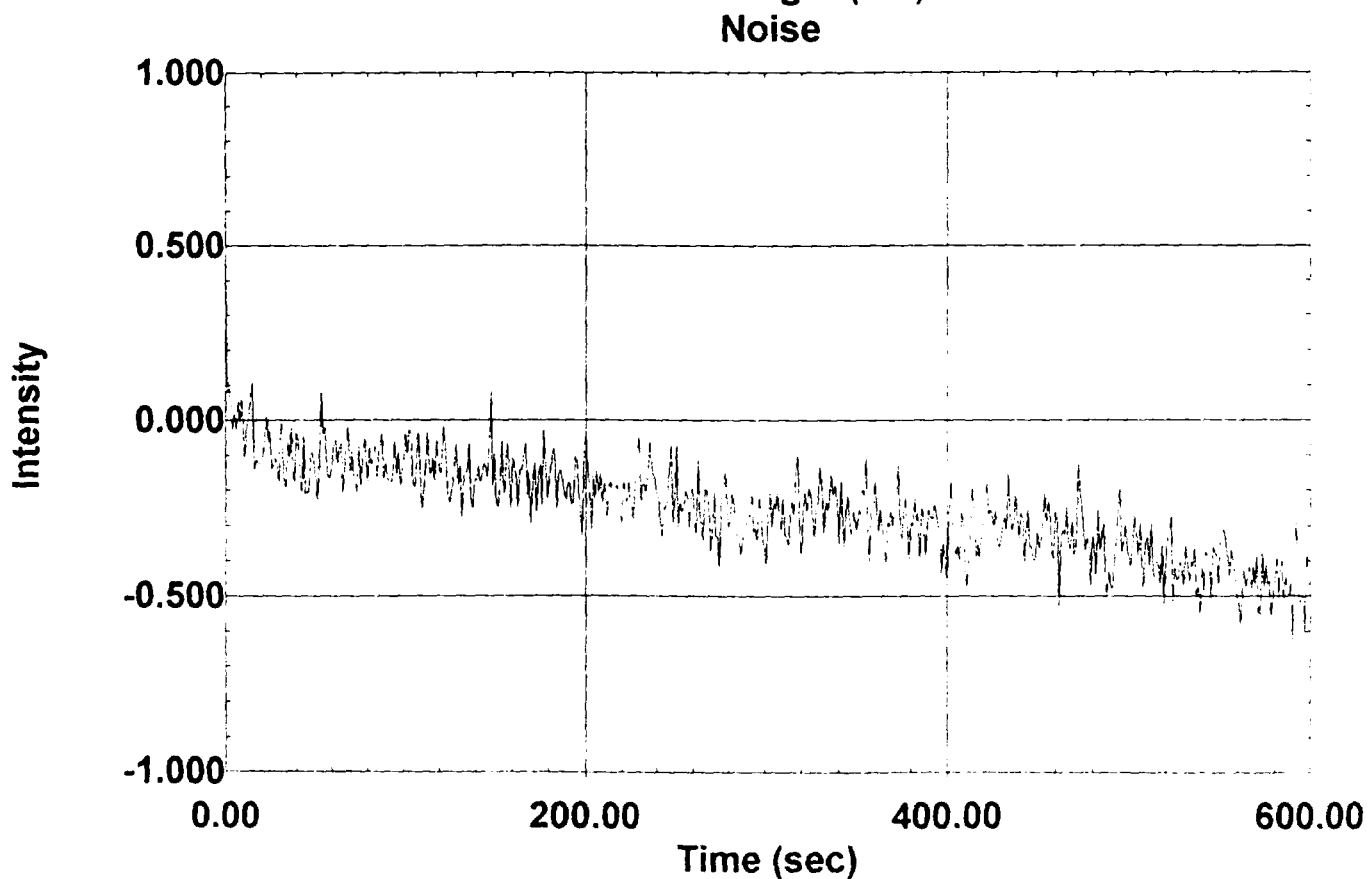
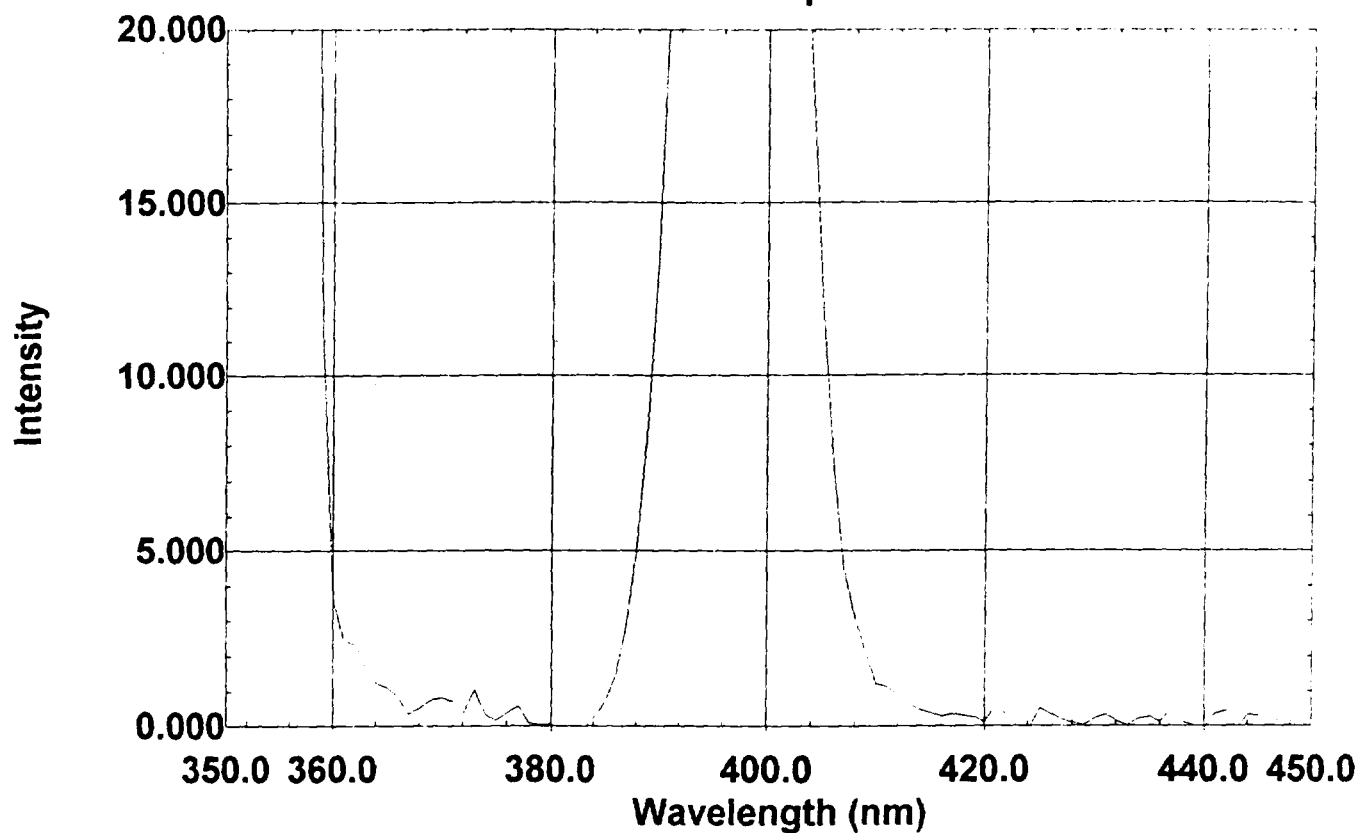
Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Factor = 1.000
 Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	12.663	0.006

S/N Ratio Check

Raman Spectrum



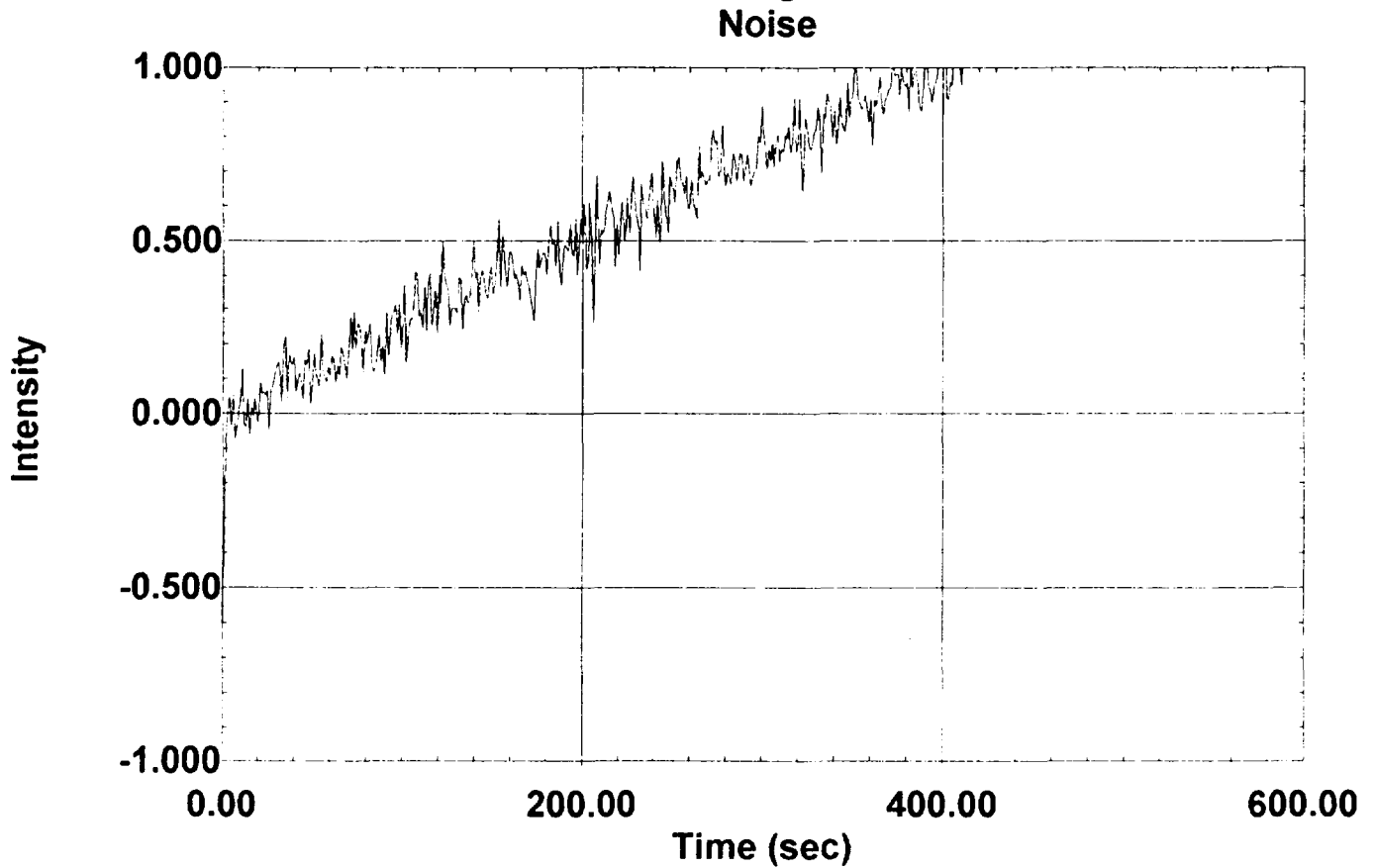
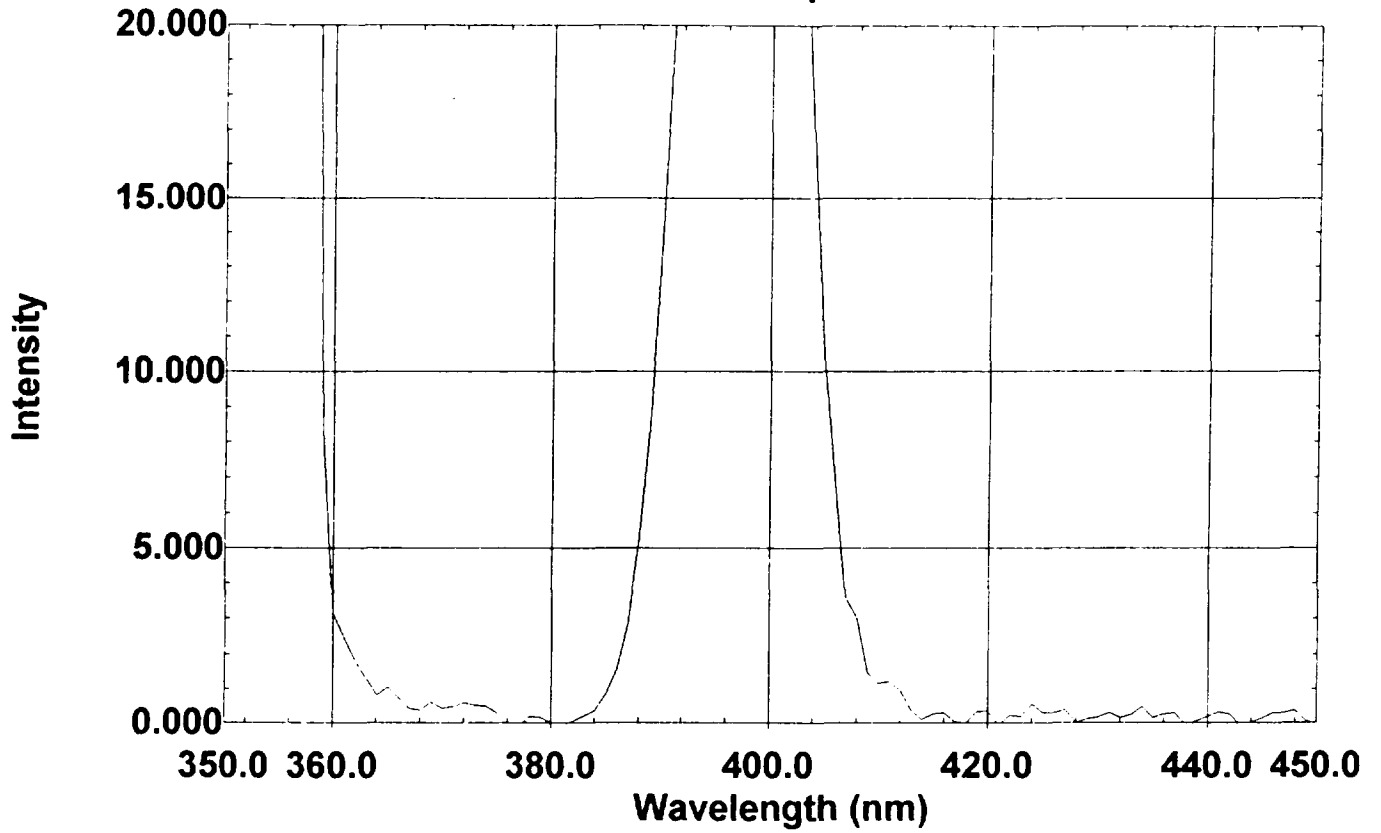
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Peak Height: 59.145

S/N Ratio: 267.382

S/N Ratio Check

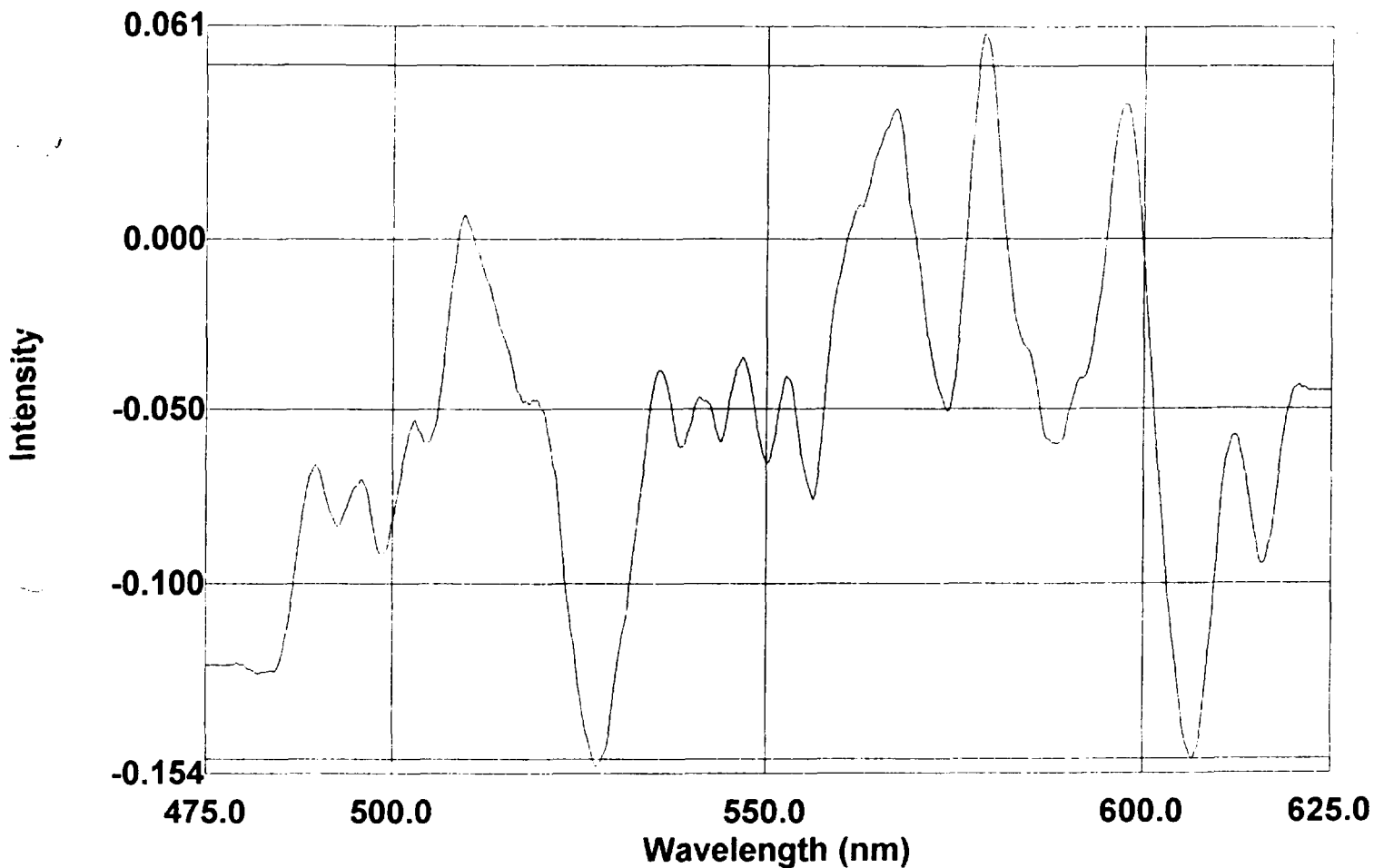
Raman Spectrum



Instrument Serial Number: A401932000510D Printed: 10:22 04/03/97

Peak Height: 54.795

S/N Ratio: 266.686



File Name: 1

QA-ELUENT

Created: 14:10 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

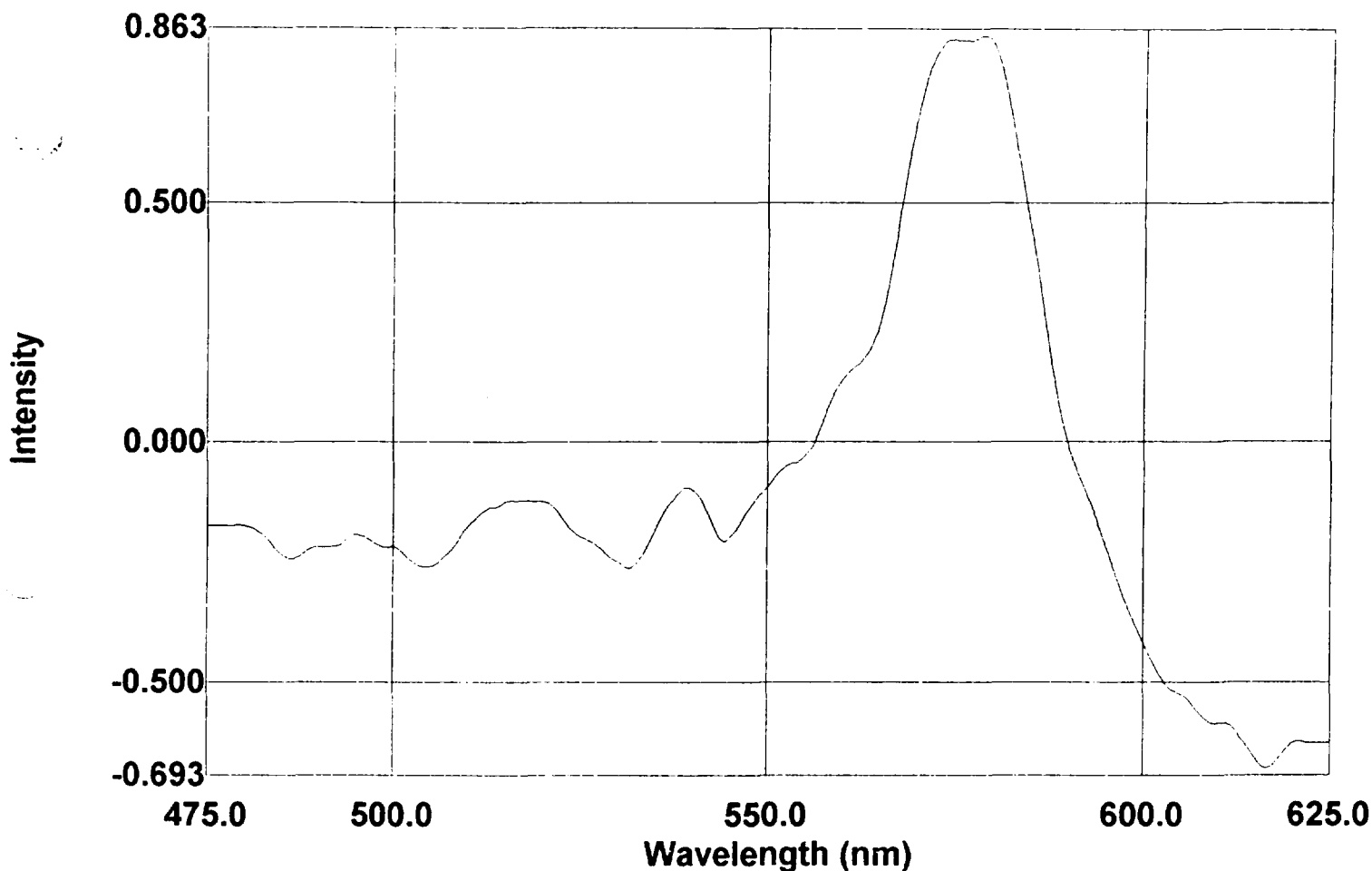
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 2

QA-SULPHORHODAMINE B

Created: 14:11 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

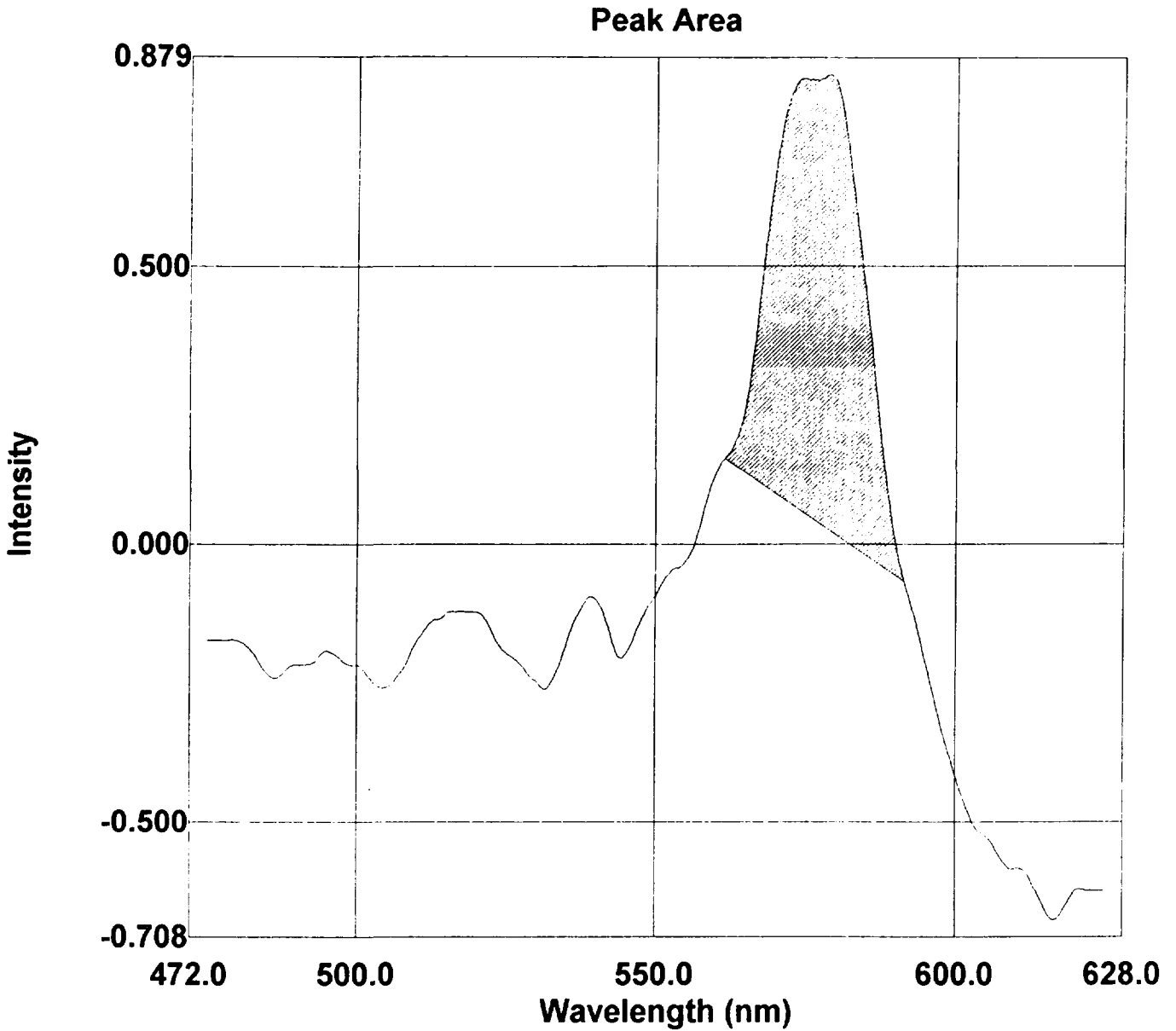
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

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 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



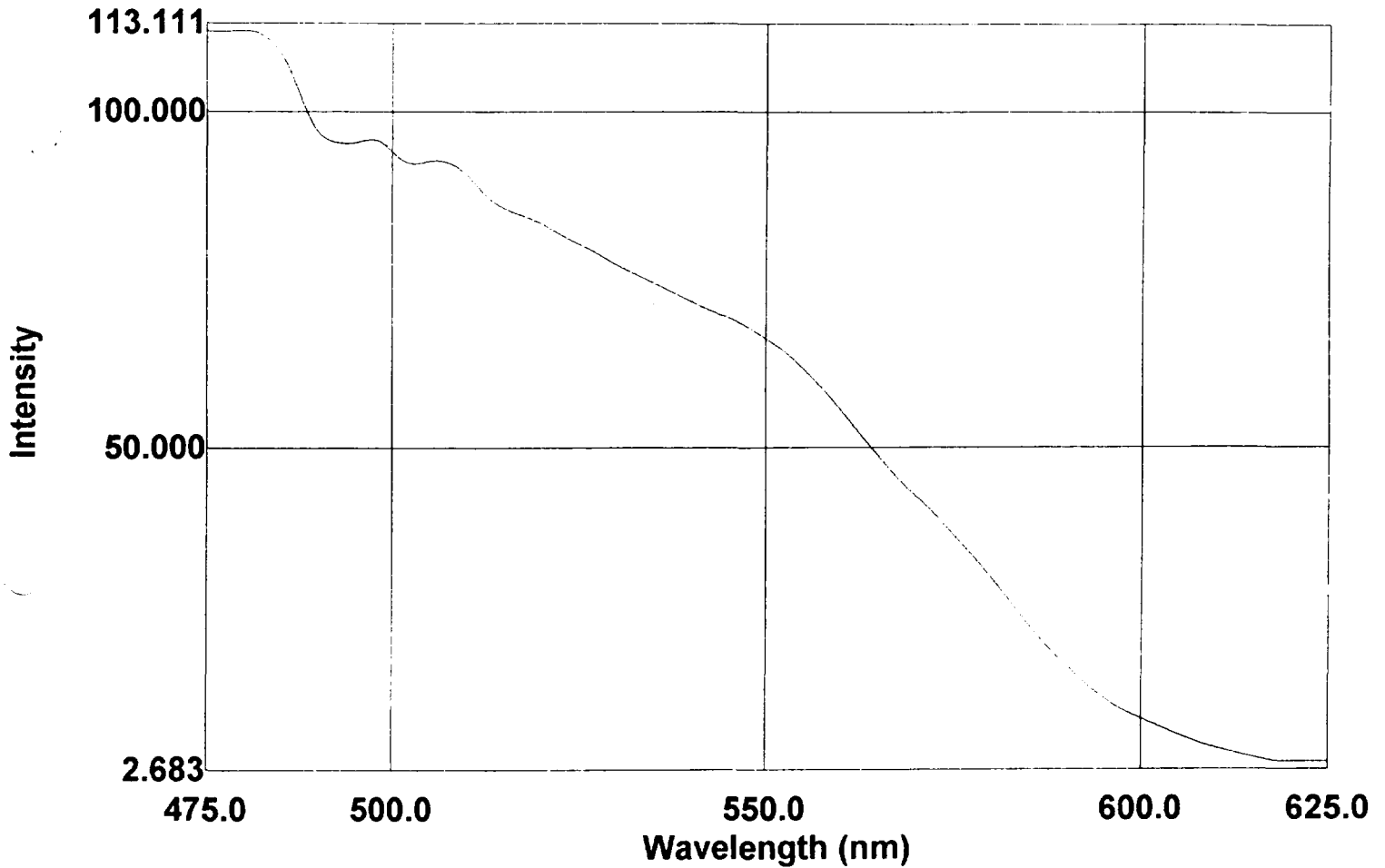
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Created: 14:11 04/03/97
Data: Modified

Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

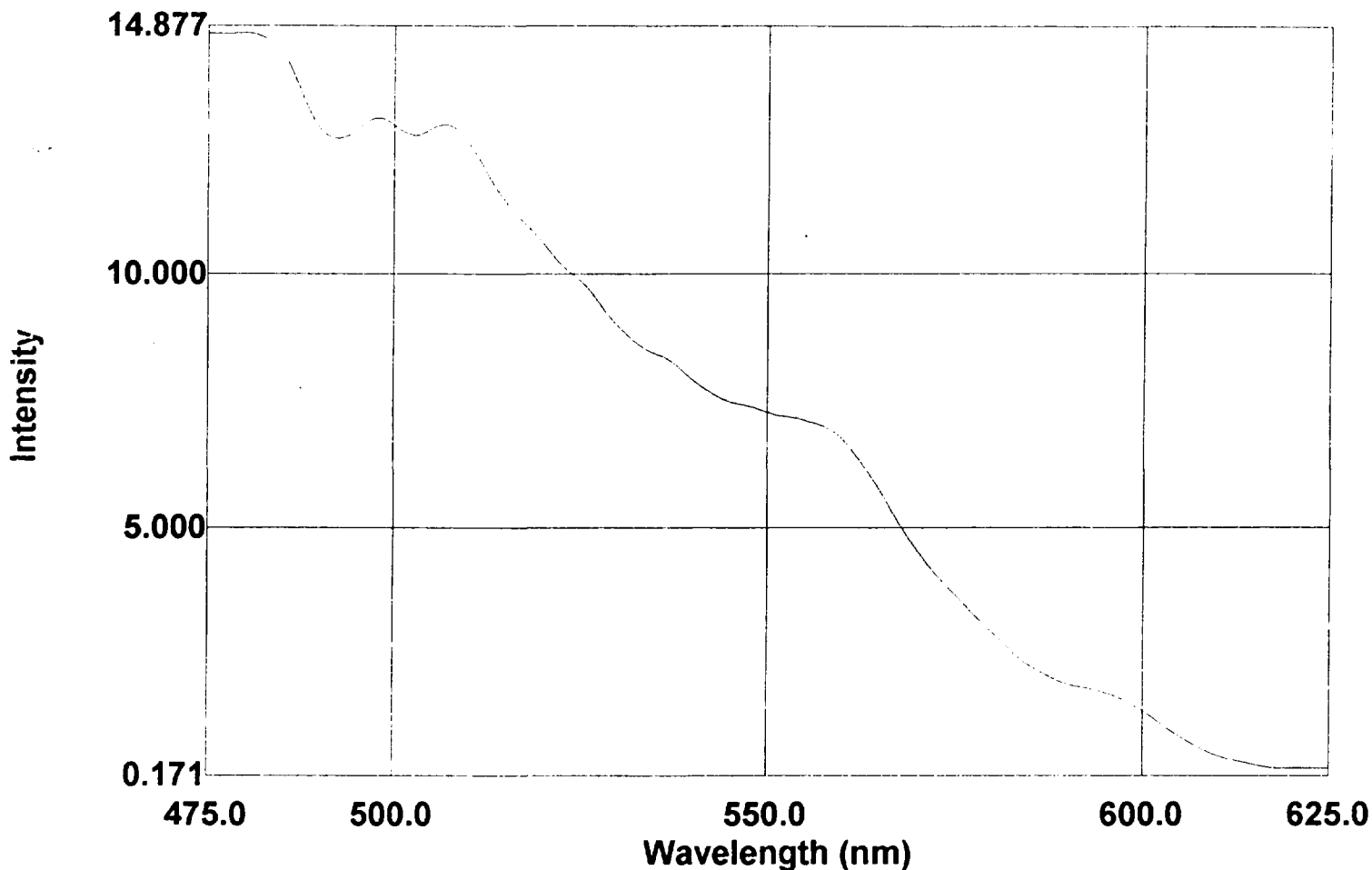
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Result = (Area * Factor) / Divisor

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File Name: 3
 CW 6 EP
 Created: 14:12 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319
 Michigan Chemical Complex Site 034
 SET 14 -- 4/2/97
 Samples Analyzed by:
 Andrei Kerpan
 Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 4
 CW 19 EP
 Created: 14:13 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

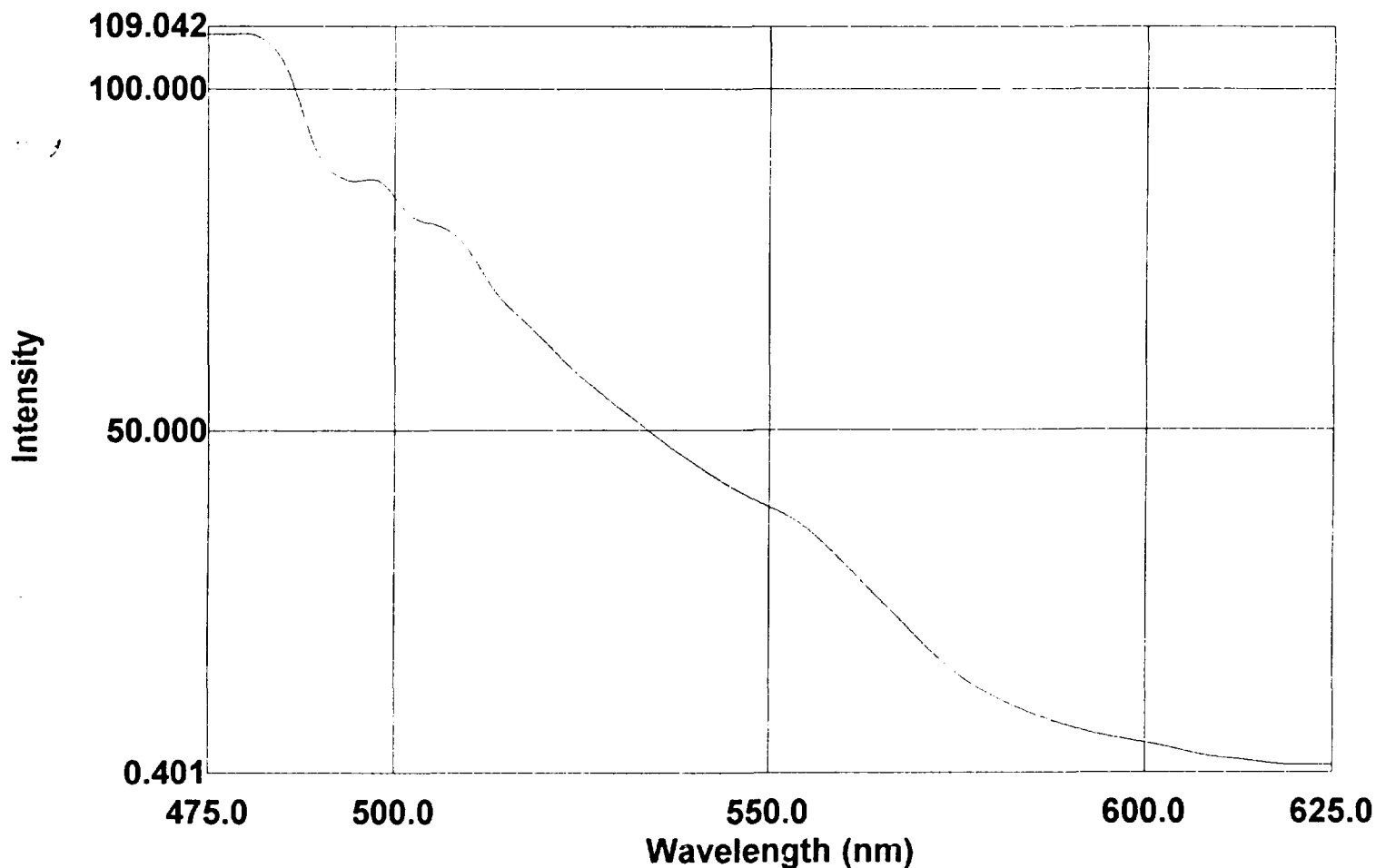
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 5

CW 31 EP

Created: 14:13 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

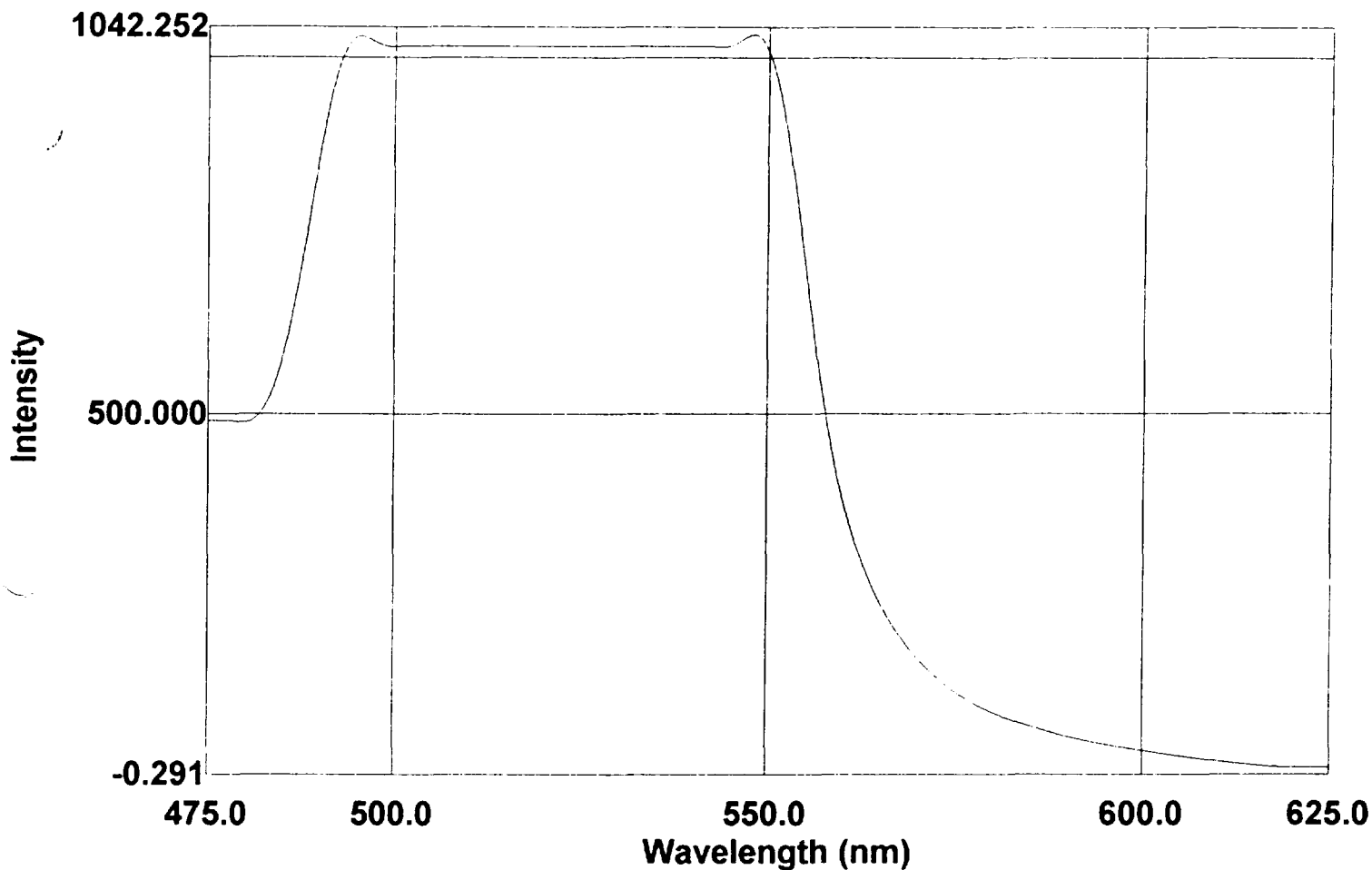
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 6

CW 51 EP

Created: 14:14 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

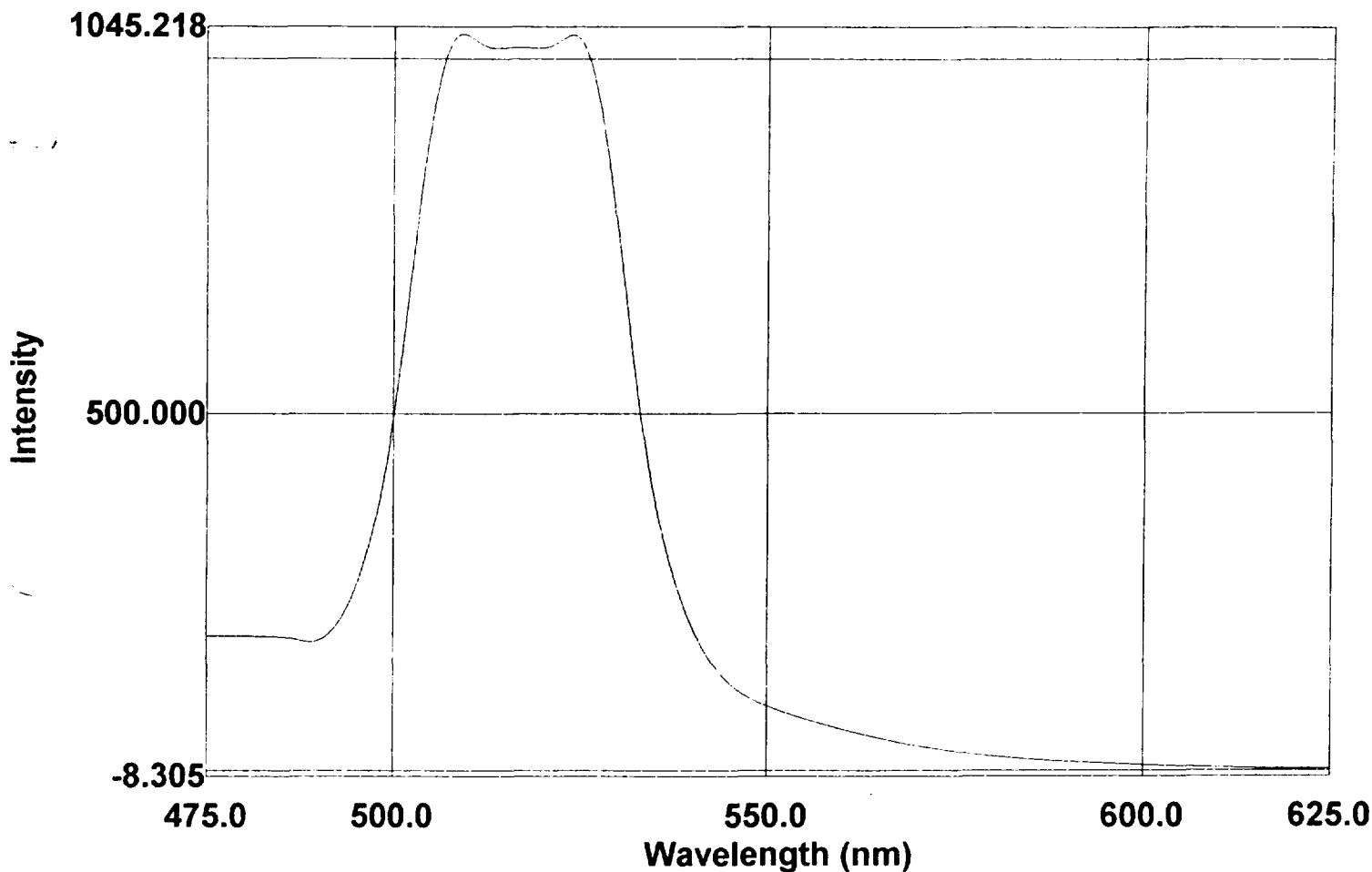
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 7

CW 60 EP

Created: 14:15 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

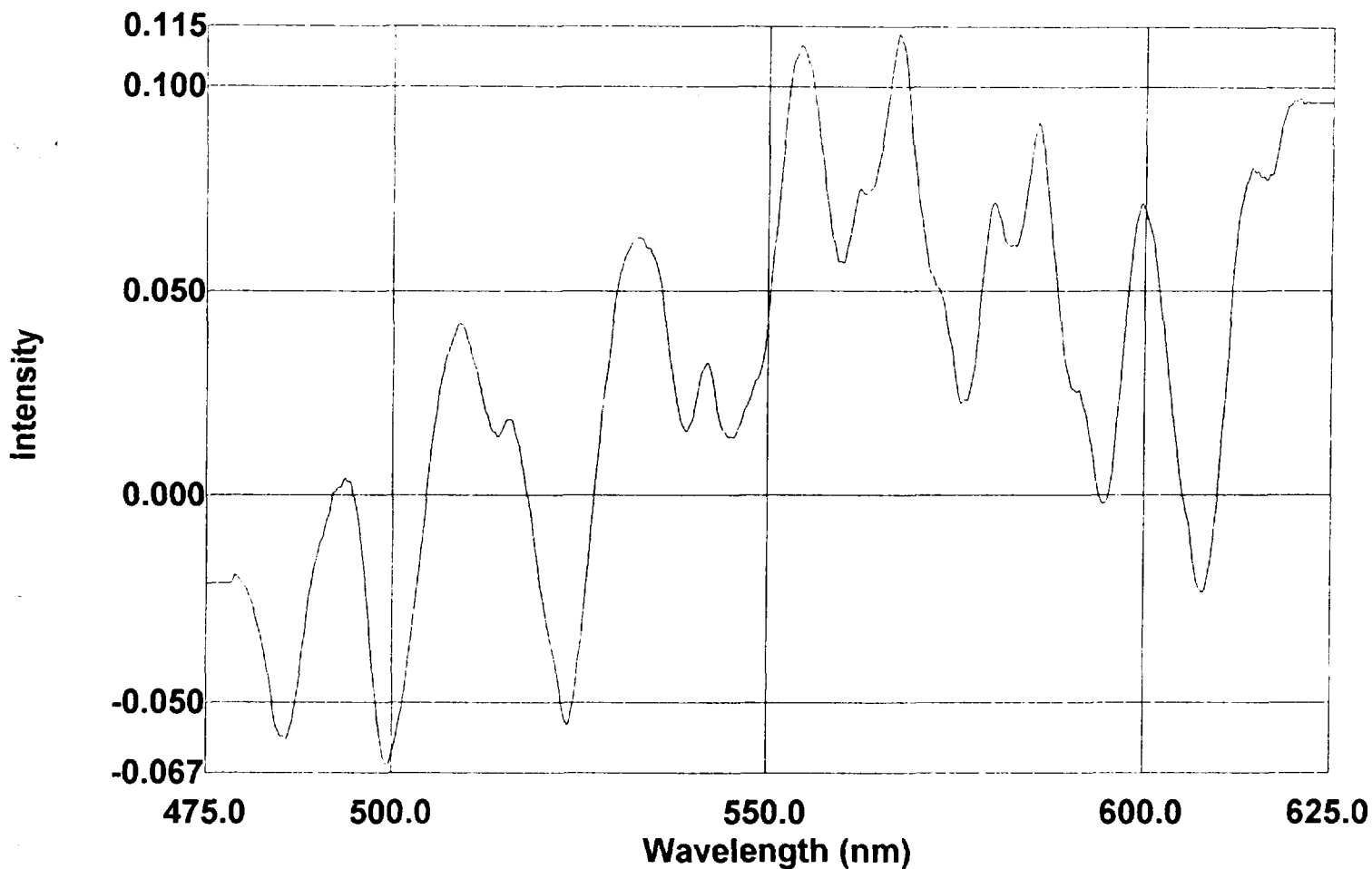
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 8
 QA-ELUENT
 Created: 14:16 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

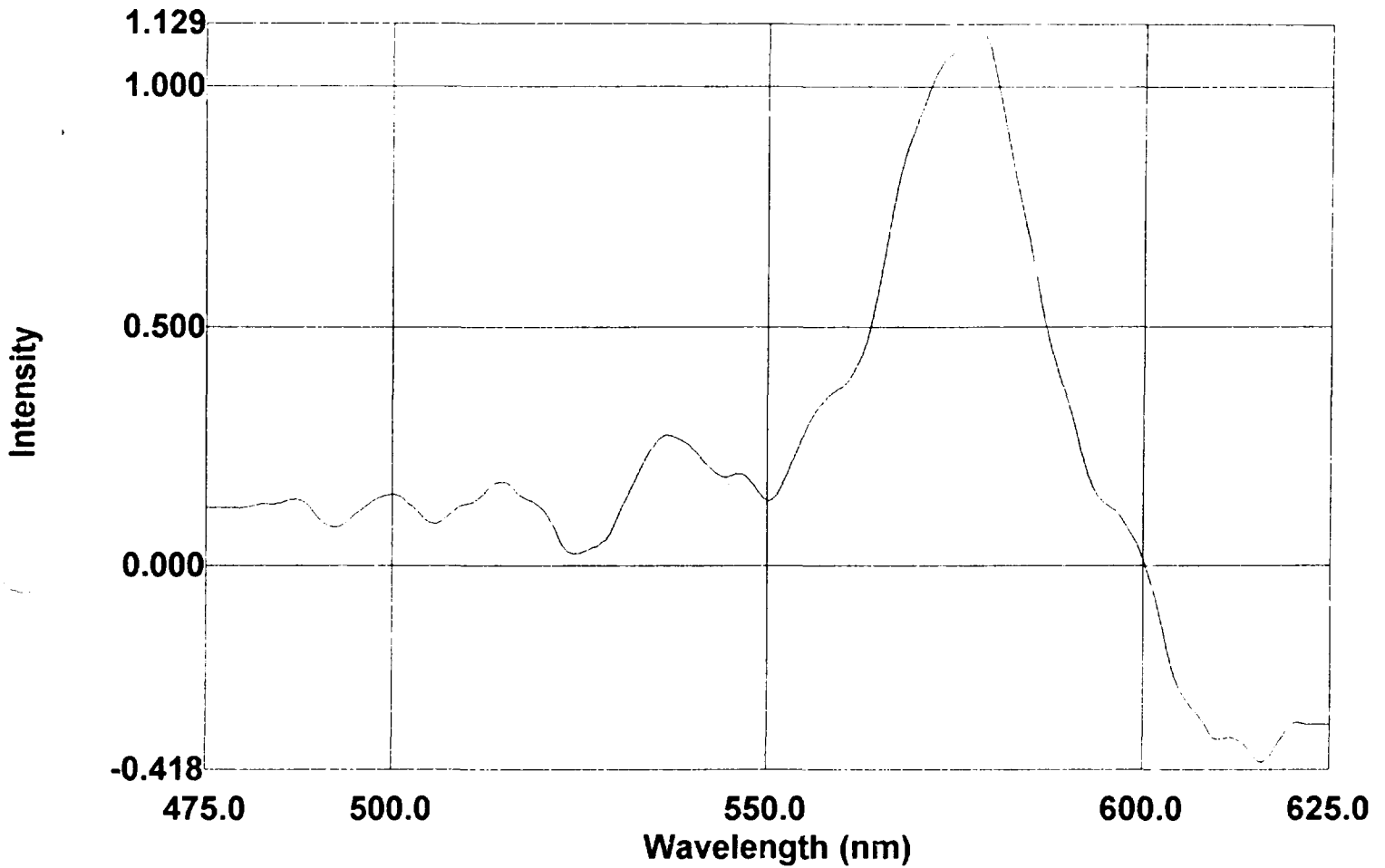
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9

QA-SULPHORHODAMINE B

Created: 14:16 04/03/97
 Data: Modified
 Instrument: RF-5301
 Spectrum Type: SYNC
 Scan Range: 475.0nm to 625.0nm
 EX Wavelength: 460.0 nm
 Sample Pitch: 0.2
 Slit Width: EX:3.0nm EM:5.0nm
 Scan Speed: Fast
 Sensitivity: High
 Response Time: Auto
 Shutter: Auto, Closed

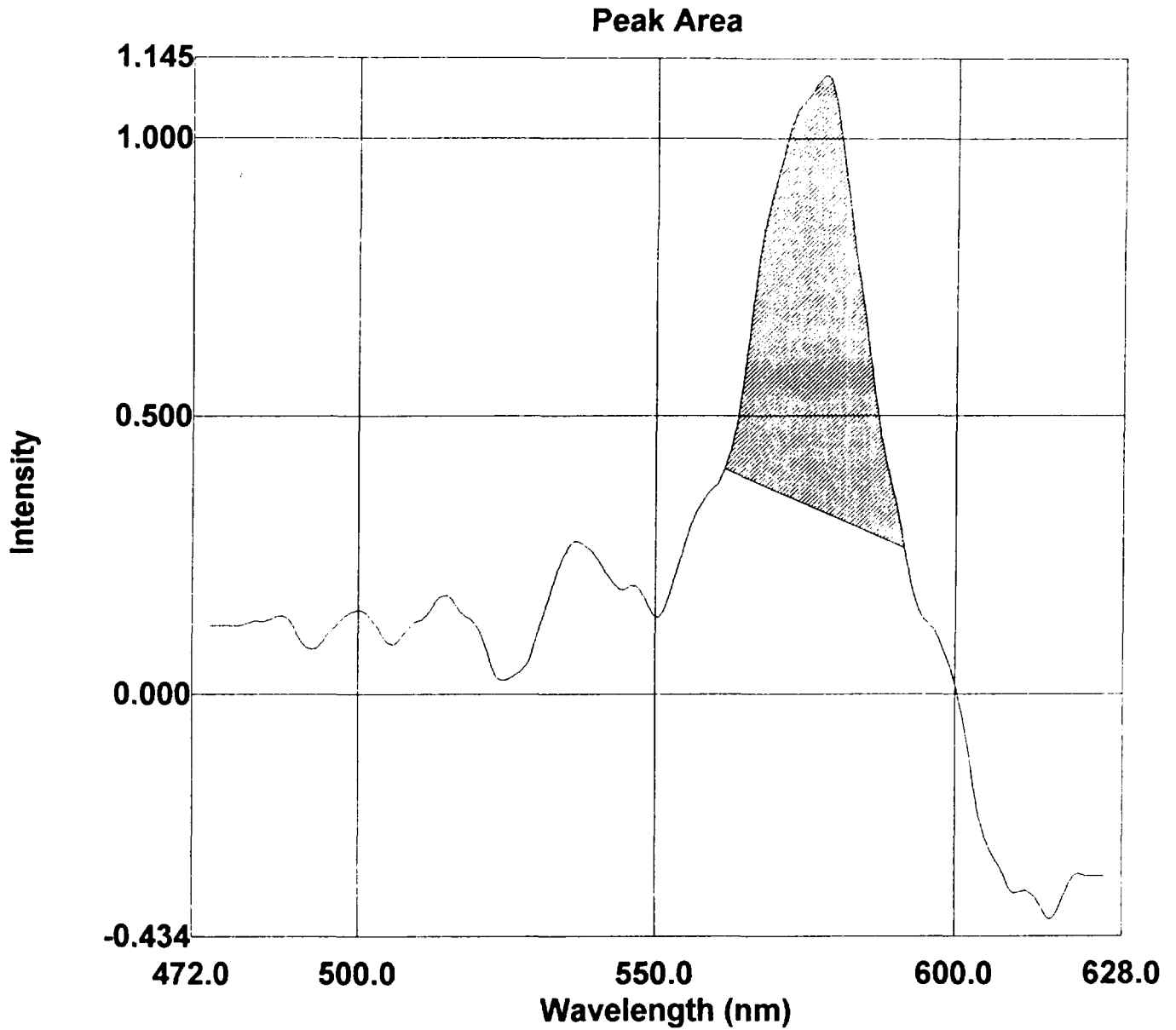
Crawford and Associates, Inc.
 1711 Ashley Circle, Suite 3
 Bowling Green, KY 42104
 Phone: (502) 745-9224
 FAX: (502) 846-4319

Michigan Chemical Complex Site 034

SET 14 -- 4/2/97

Samples Analyzed by:
 Andrei Kerpan

Samples Analyzed for:
 Memphis Environmental Center
 2603 Corporate Avenue, Suite 100
 Memphis, Tennessee 38132
 Phone: (901) 345-1788



File Name: 9
QA-SULPHORHODAMINE B

Created: 14:16 04/03/97
Data: Modified

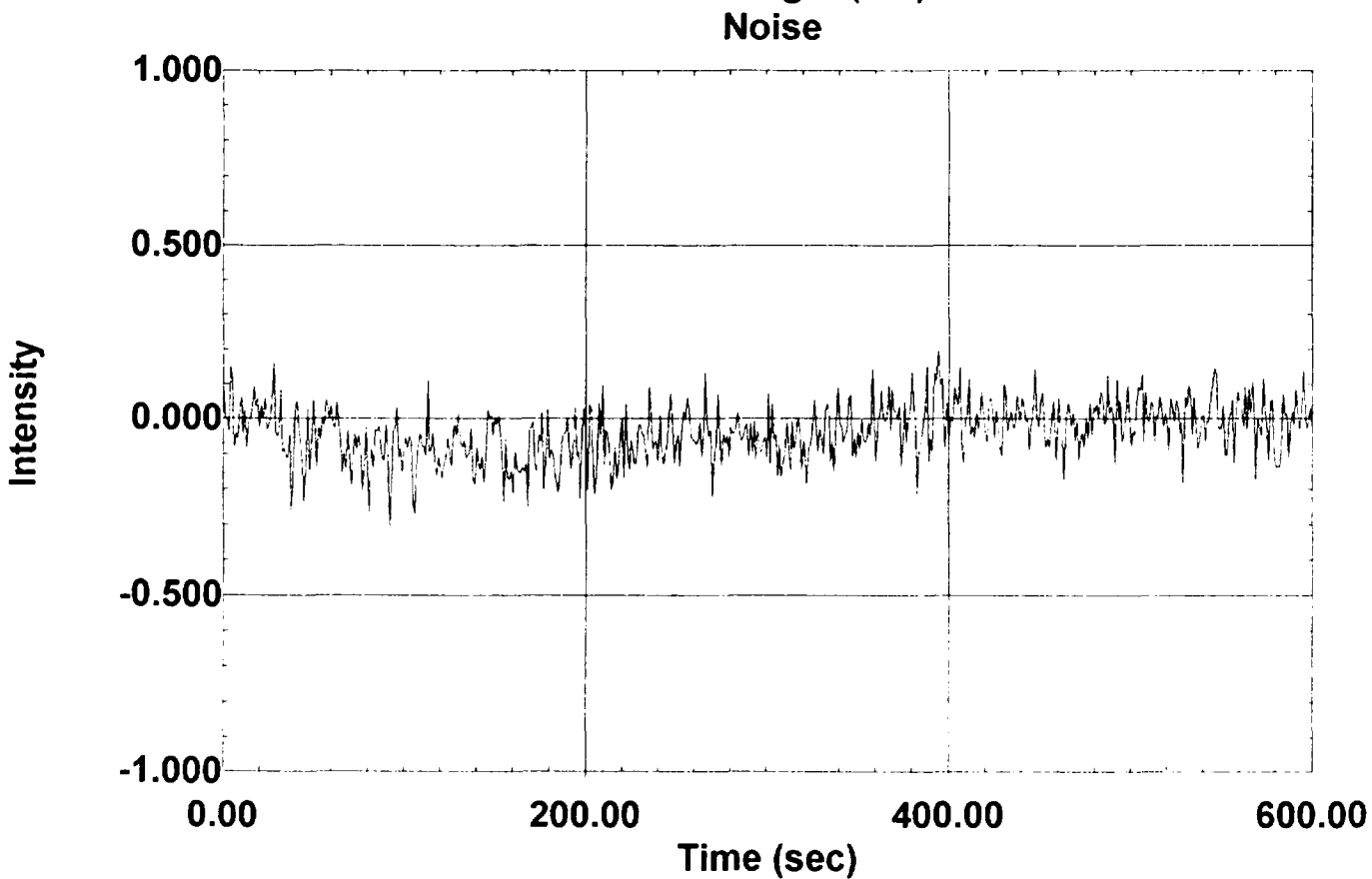
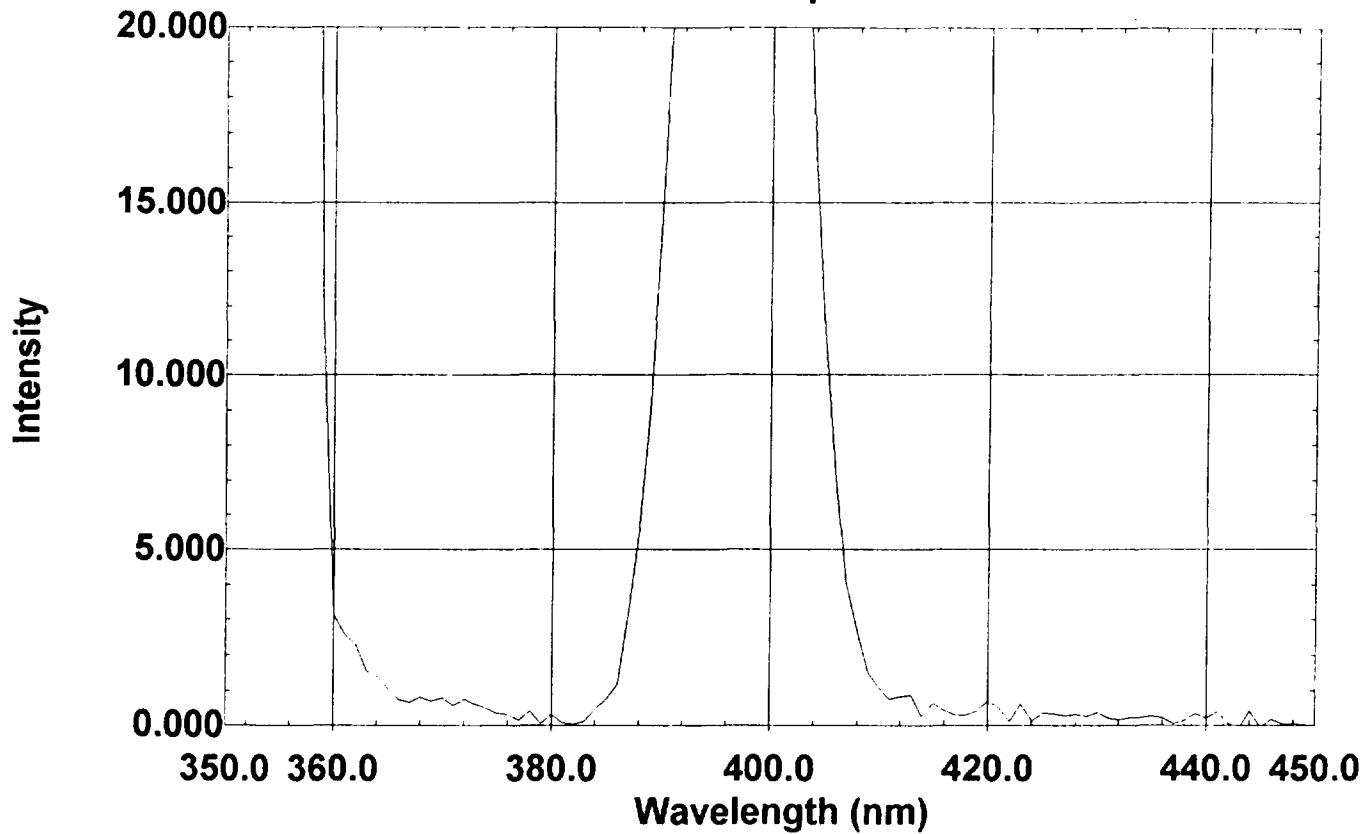
Instrument: RF-5301
Spectrum Type: SYNC
Scan Range: 475.0nm to 625.0nm
EX Wavelength: 460.0nm
Sample Pitch: 0.2
Slit Width: EX:3.0nm EM:5.0nm
Scan Speed: Fast
Sensitivity: High
Response Time: Auto
Shutter: Auto, Closed

Factor = 1.000
Result = (Area * Factor) / Divisor

Region	Start	End	Divisor	Area	Result
1	561.4	591.4	2004.410	13.600	0.007

S/N Ratio Check

Raman Spectrum



Instrument Serial Number: A401932000510D Printed: 15:23 04/03/97

Peak Height: 58.698

S/N Ratio: 269.855

Appendix A
Well Diagrams

APPENDIX A
MONITORING WELL CONSTRUCTION DIAGRAMS

DRILLING LOG OF WELL NO. MW1

Project: LAMMERS BARREL FACTORY
 Location: BEAVERCREEK, OH
 Well Coordinates/Reference System: 30' E OF GRANGE HALL RD
 5' S OF RR R.O.W
 Date Started/Finished: 3/24/97 / 3/24/97
 Drilling Company: BOWSER MORNER, INC.
 Driller/Geologist: KEN BOEHME / LARRY LUECK (START)

Total Depth of Hole (feet BGS): 30
 Ground Elevation (feet above MSL): 100.0
 Inner casing elevation (ft. above MSL): 2.5 FEET
 Groundwater Depth (feet BGS):
 During Drilling: 9.7
 After development: 7.58

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID	COMMENTS
								(ppm)	
gs elevation 100.0 ft.	Concrete		ground surface (gs)						
1			0-2' Mixed sand, silt, gravel (topsoil)	SS1	7 5 16 5	38	0.3		
2			2-4' Clay tr. silt, gravel	SS2	5 8 7 7	27	0.3		
4			4-6' Silt & clay tr. gravel	SS3	3 3 5 6	50	0.0		
95			6-8' - 8" clayey silt tr. gravel; 3" silty sand & gravel	SS4	4 5 8 8	67	0.0		
8			8-10' Hard clay tr. sand & gravel	SS5	6 7 1 1	54	0.0		
90			10-11' Hard clay little gravel	SS6	7 14 16 12	54	0.0		Groundwater @ 9'8" during drilling
11			11-12' Silty sand & gravel	SS7	13 18 17 22	75	0.0		
12			12-12.5' Clay & silt tr. sand & gravel						
13			12.5-14' Silty sand & gravel						
14			14-14.5' Hard clay, tr. ang. gravel						
15				SS8		75	0.0		



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW1

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 30

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	SAMPLE	COMMENTS	
85			14.5-16' Silty sand & gravel	SS8			75	0.0			
16			16-18' Sand & gravel								
17						SS9	10 11 12	12	75	0.1	
18					18-20' Sand tr. silt, tr. fn. gravel						
19						SS10	15 8 7 6	12	25	0.0	
80 20					20-22' Sand & gravel						
21						SS11	7 10 11 10	12	83	0.1	
22					22-24' Same as above						
23						SS12	10 11 12 11	12	100	0.2	
24					24-26' Same as above, silty toward bottom						
75 25						SS13	18 23 20 36	12	100	0.0	
26					26-28' Sand & gravel						
27						SS14	8 9 13 14	12	67	0.0	
28					28-30' Same as above						
29						SS15	8 9 13 14	12	67	0.0	
70 30			END OF BORING @ 30 FEET BELOW GROUND SURFACE								
31											
32											
33											
34											
65 35											
36											



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW2

Project: LAMMERS BARREL FACTORY
 Location: BEAVERCREEK, OH
 Well Coordinates/Reference System: NE PROPERTY, LINE, MID-WAY CREEK TO RR R.O.W
 Date Started/Finished: 3/24/97 / 3/24/97
 Drilling Company: BOWSER MORNER, INC.
 Driller/Geologist: KEN BOEHME / LARRY LUECK (START)

Total Depth of Hole (feet BGS): 40
 Ground Elevation (feet above MSL): 100.0
 Inner casing elevation (ft. above MSL): 2.5 FEET
 Groundwater Depth (feet BGS):
 During Drilling: 15.5
 After development: 12.67

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	COMMENTS
								SAMPLE	
gs elevation 8/100.0 ft.	Concrete		ground surface (gs)						
1			0-2' Mixed sand, silt, gravel (topsoil)	SS1	5 4 5	54	0.2		
2			2-4' Clayey silt little sand & gravel	SS2	5 4 3 4	71	0.3		
3			4-6' Silt & clay little sand & gravel	SS3	5 4 5 7	42	0.3		
4			6-7' Silty clay tr. sand	SS4	4 6 6 8	67	0.2		
5			7-8' Black gravel and cinders, wet	SS5	3 3 3 3	0	0.0		
6			8-10' No recovery						
7			10-11' Clay tr. sand	SS6	3 3 7 7	100	0.4		
8			11-12' Silty sand & gravel						
9			12-13' Silty clay tr. sand						
10			13-14' Silty, clayey sand & gravel	SS7	9 11 15 14	88	0.1		
11			14-16' Clay till with 2-3" sandy layers	SS8		83	0.3	Moist	
12									
13									
14									
15									



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW2

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 40

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm) SAMPLE	COMMENTS	
16			16-16.5' Clay till	SS8		83	0.3	Groundwater @ 15'6" during drilling	
17			16.5-18' Sand & gravel tr. silt	SS9	11 12 14	88	0.0	Split spoon wet	
18			18-20' Sand & gravel	SS10	9 13 12	46	0.0		
19			20-22' Same as above		15 15 16 14			75	0.0
20			22-24' Same as above	13 17 16 19	83	0.0			
21			24-26' Same as above	15 15 15 16			50	0.0	
22			26-28' Sand & gravel	19 17 17 16	50	0.0			Drill to 40' b.g.s. to learn stratigraphy
23			28-30' Same as above	21 30 33 29			63	0.0	
24			30-32' Same as above	18 29 27 31	50	0.0			
25			32-34' Sand	28 30 33 33			92	0.6	
26			34-36' Sand & gravel	34 40 41 43	83	0.2			
27									
28									
29									
30									
31									
32									
33									
34									
35									
36									



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW2

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 40

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	COMMENTS
								SAMPLE	
37			36-38' Same as above	SS19	43 50 R	67		0.2	Rough drilling 37-38' - cobbles?
38	38-40' Sand & gravel tr. silt								
39				SS20	12 11 12 13	92	0.0		
40			END OF BORING @ 40 FEET BELOW GROUND SURFACE						
41									
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									

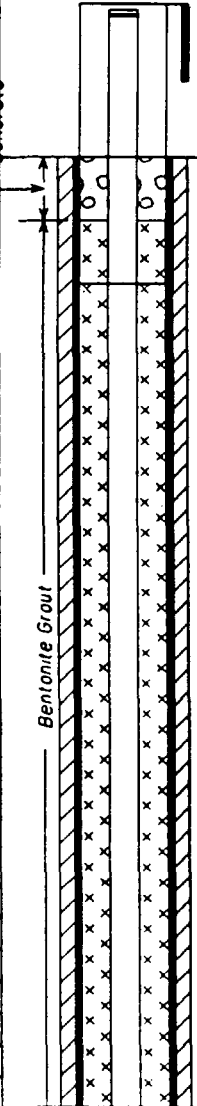



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW3

Project: LAMMERS BARREL FACTORY
 Location: BEAVERCREEK, OH
 Well Coordinates/Reference System: SE PROPERTY, LINE, MID-WAY CREEK TO PATTERSON RD
 Date Started/Finished: 3/25/97 / 3/27/97
 Drilling Company: BOWSER MORNER, INC.
 Driller/Geologist: KEN BOEHME / LARRY LUECK (START)

Total Depth of Hole (feet BGS): 42
 Ground Elevation (feet above MSL): 100.0
 Inner casing elevation (ft. above MSL): 2.5 FEET
 Groundwater Depth (feet BGS):
 During Drilling: 16
 After development: 16.60

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	COMMENTS		
				SAMPLE INTERVAL			SAMPLE			
gs elevation 100.0 ft.			ground surface (gs)							
1			0-1' Mixed sand, silt, gravel (topsoil)	SS1	5 5 5	67	0.0			
2			1-2' Silt & clay							
3			2-4' Clay tr. silt tr. sand							
4			4-6' Clay tr. sand							
5			6-8' Clay tr. sand							
6			8-10' Clay with sand & gravel							
7			10-12' Same as above							
8			12-13' Same as above							
9			13-14' Black sewer-smelling clay & sand tr. gravel							
10			14-16' Same as above							
11										
12										
13										
14										
15										



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW3

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 42

ELEVATION	DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	SAMPLE	COMMENTS
16	16			16-18' Clayey sand & gravel	SS8		58	0.0			Split spoon wet
17	17				SS9	18-24 23-21	63	21.7			
18	18			18-18.5' Black silty sand & gravel	SS10	11	54	2.6			Double cased to 22' bgs; permanent 10" outer casing
19	19				SS11	10-11 11-12	67	0.1			
20	20			20-22' Clay	SS12		0				
21	21				SS13		0				Knife-edge contact
22	22			26-28' Plastic clay	SS14	8-15 23-24	75	0.1			
23	23				SS15	9-13 15-19	67	0.0			
24	24				SS16	12-13 15-13	92	0.0			
25	25			30-31.5' Same as above	SS17	11-8 7-7	100	0.0			
26	26				SS18	11-11 20-19	79	0.0			
27	27										
28	28			32-34' Same as above							
29	29			34-35' Sand tr. silt							
30	30			35-36' Sand & gravel							
31	31										
32	32										
33	33										
34	34										
35	35										
36	36										

U.S. EPA - LAMMERS BARREL FACTORY

ecology and environment, inc.

DRILLING LOG OF WELL NO. MW3

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 42

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	COMMENTS
								SAMPLE	
37			36-38' Same as above	SS19	11 10 12 14	100	0.0	A little trouble with sand heaving up auger	
38			38-40' Sand tr. silt	SS20	7 7 7 7	83	0.0		
39									
40			40-42' Sand	SS21	7 9 12 11	100	0.0		
41			END OF BORING @ 42 FEET BELOW GROUND SURFACE						
42									
43									
44									
45									
46									
47									
48									
49									
50									
51									
52									
53									
54									
55									
56									
57									



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW4

Project: LAMMERS BARREL FACTORY
 Location: BEAVERCREEK, OH
 Well Coordinates/Reference System: S-CENTRAL, CFF PTERSON RD.
 Date Started/Finished: 3/25/97 / 3/31/97
 Drilling Company: BOWSER MORNER, INC.
 Driller/Geologist: KEN BOEHME / LARRY LUECK (START)

Total Depth of Hole (feet BGS): 38
 Ground Elevation (feet above MSL): 100.0
 Inner casing elevation (ft. above MSL): 2.5 FEET
 Groundwater Depth (feet BGS):
 During Drilling: 16
 After development: 15.93

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm)	COMMENTS	
				SAMPLE INTERVAL					
gs elevation 100.0 ft.			ground surface (gs)						
1			0-2' Mixed sand, silt, gravel (topsoil)	SS1	5 4 5 5	33	0.0		
2			2-4 Clay tr. sand tr. gravel	SS2	6 6 7 8	75	0.0		
4			4-6' Same as above	SS3	4 6 6 6	92	0.0		
6			6-8' Clay little gravel		SS4	4 4 3 4	67	0.1	
8			8-10' Silty sand & gravel			SS5	4 3 7 3	46	1.0
10			10-12' Same as above	SS6			7 10 12 15	50	3.3
12			12-14' Same as above		SS7		12 19 19 21	54	6.5
14			14-16' No recovery			SS8	43 50 8	0	0.4
15									



U.S. EPA - LAMMERS BARREL FACTORY

DRILLING LOG OF WELL NO. MW4

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 38

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER		FID/ PID (ppm)	COMMENTS	
				SAMPLE INTERVAL	BLOW COUNT			
					RECOVERY (%)	SAMPLE		
86				SS8	43 50	0	0.4	
16			16-17' Silty sand & gravel				Drilling a little rough; split spoon wet	
17			17-18' Black sewer-smelling silty sand & gravel	SS9	10 11 13 14	54		1.4
18			18-20' Same as above					
19				SS10	11 11 13 12	75		0.3
80 20			20-22' No recovery					
21				SS11	12 13 15 14	13		0.2
22			22-23.5' Sand & gravel					
23				SS12	9 10 11 13	75		375+
24			23.5-24' Clay					
24			24-26' Clay					
75 25				SS13	9 8 12 11	63	41	
26			26-28' Not sampled due to double casing				Double cased to 27' bgs; permanent 10" outer casing	
27				SS14		0		
28			28-30' Sand & gravel					
29				SS15	5 9 8 8	33	0.0	
70 30			30-32' Same as above					
31				SS16	3 4 6 9	100	0.0	
32			32-34' Sand					
33				SS17	7 7 7 11	50	0.0	
34			34-36' Sand tr. fn. gravel					
85 35				SS18	13 20 29 24	75	0.0	
36								



U.S. EPA - LAMMERS BARREL FACTORY

ecology and environment, inc.

DRILLING LOG OF WELL NO. MW4

Project: LAMMERS BARREL FACTORY

Total Depth of Hole (feet BGS): 38

ELEVATION DEPTH	WELL COMPLETION DIAGRAM	GRAPHIC LOG	SOIL/ROCK DESCRIPTION	SAMPLE NUMBER SAMPLE INTERVAL	BLOW COUNT	RECOVERY (%)	FID/ PID (ppm) SAMPLE	COMMENTS
37			36-38' Same as above END OF BORING @ 38 FEET BELOW GROUND SURFACE	SS19	13 2 7 7	50	0.0	
38								
39								
60 40								
41								
42								
43								
44								
55 45								
46								
47								
48								
49								
50 50								
51								
52								
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54								
45 55								
56								
57								



Appendix B
RW Database

APPENDIX B
RESIDENTIAL WELL DATABASE

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	I	AY	YR
AHRENDT, WILLIAM			1077	ALEDO		NONE	HOW	12	09	85
FEAR, NORMAN (RENTER:	429	3116	620	ALPHA ROAD		NONE	ODH	06	04	86
KELLER, JACK-LWR AQ	253	8157	658	ALPHA ROAD		NONE	ODH	06	04	86
KERSTEINER, SHERRI	426	6517	731	ALPHA ROAD		NONE	ODH	01	03	86
HADLEY			738	ALPHA ROAD		26 ppb TRICHLOROETHYLENE	PEI	02	07	86
WALKER, LOIS			738	ALPHA ROAD		70 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
WALKER, LOIS			738	ALPHA ROAD		28 ppb TRICHLOROETHENE	GMI	11	12	87
WALKER, LOIS			738	ALPHA ROAD		11 ppb 1,1-DICHLOROETHANE	GMI	11	12	87
WALKER, LOIS			738	ALPHA ROAD		2 ppb 1,1-DICHLOROETHENE	GMI	11	12	87
WALKER, LOIS			738	ALPHA ROAD		14 ppb UNIDENTIFIED VOC	GMI	11	12	87
WALKER			740	ALPHA ROAD		15 ppb TRICHLOROETHYLENE	PEI	02	07	86
BOWERS, PAT	426	7100	742	ALPHA ROAD		3.3 ppb TRICHLOROETHYLENE	ODH	01	03	86
BOWERS, PAT	255	6604	742	ALPHA ROAD		9.8 ppb 1,1-DICHLOROETHANE	ODH	01	03	86
BOWERS, PAT	255	6178	742	ALPHA ROAD		41.9 ppb 1,1,1-TRICHLOROETHANE	ODH	01	03	86
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		1.6 ppb 1,1-DICHLOROETHANE	HOW	12	13	85
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		12.6 ppb TRICHLOROETHYLENE	HOW	12	13	85
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		69.1 ppb 1,1,1-TRICHLOROETHANE	HOW	12	13	85
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		23.3 ppb 1,1-DICHLOROETHANE	HOW	12	13	85
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		4.0 ppb CIS-1,2-DICHLOROETHANE	HOW	12	13	85
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		16.9 ppb TRICHLOROETHYLENE	ODH	01	03	86
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		20.2 ppb 1,1-DICHLOROETHANE	ODH	01	03	86
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		79.2 ppb 1,1,1-TRICHLOROETHANE	ODH	01	03	86
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		4.1 ppb CIS-1,2-DICHLOROETHYLENE	ODH	01	03	86
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		63 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		22 ppb TRICHLOROETHENE	GMI	11	12	87
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		1 ppb TETRACHLOROETHENE	GMI	11	12	87
HORSTMAN, JACK	426	7278	745	ALPHA ROAD		18 ppb 1,1-DICHLOROETHANE	GMI	11	12	87
POST OFFICE			748	ALPHA ROAD		NONE	PEI	02	07	86
MASTERS, FLORENCE			750	ALPHA ROAD		NONE	PEI	02	07	86
SMITH, JENNIFER	426	2633	803	ALPHA ROAD		NONE	HOW	04	17	86
STEILING			3560	ALVERA COURT		NONE	HOW	11	23	85
HENWOOD			3278	AMBASSADOR DR		NONE	HOW	12	09	85
BOURBON, LARRY			4434	ARDONNA		NONE	HOW	12	09	85
			1289	ARNICA		NONE	HOW	08	06	85
			1293	ARNICA		NONE	HOW	08	06	85
			1294	ARNICA		NONE	HOW	08	06	85
			1300	ARNICA		NONE	HOW	08	06	85
DENT, HELEN			1301	ARNICA		TRACE 1,1,1 TRICHLOROETHANE	HOW	08	06	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	JAY	YR	
HUBER			2725	BIG WOODS TRAIL		NONE	HOW	12	06	85
KOCKENTIET			3782	BLOOM ROAD		NONE	HOW	12	11	85
DALE, JOSEPH			2622	BLUE ROCK DR		NONE	HOW	12	09	85
FAGHRI			2641	BLUE ROCK DR		NONE	HOW	12	09	85
ADAMS, ROY	426	6957	2646	BLUE ROCK DR		3.6 ppb METHYLENE CHLORIDE	HOW	12	11	85
CURTIS			3200	BROOKMORE DR.		NONE	HOW	12	12	85
WURST			3217	BROOKMORE DR.		NONE	HOW	12	04	85
BERTIERI, JAMES			3220	BROOKMORE DR.		NONE	HOW	12		85
POFFENBERGER			1130	BROOKVIEW DR.		NONE	HOW	12	09	85
DINSMORE			1136	BROOKVIEW DR.		NONE	HOW	12	09	85
MC DERMOTT			1149	BROOKVIEW DR.		NONE	HOW	11	29	85
CLINE			1180	BROOKVIEW DR.		NONE	HOW	12	06	85
McLEFRESH, G.			1181	BROOKVIEW DR.		NONE	HOW	12	03	85
ROBEY			189	CAMBRIA		NONE	HOW	12	11	85
DAVIS			685	CARLSBROOK DR.		NONE	HOW	12	06	85
RAJPUT, YUDH VIR	426	0776	472	CARTHAGE DRIVE		NONE	HOW	12	18	85
WALLING, JERRY			3582	CEDARWOOD		NONE	HOW	12	04	85
BOEHME			3560	CEYLON CIRCLE		NONE	HOW	11	24	85
HAMILTON, MRS. M.			3561	CEYLON CIRCLE		NONE	HOW	11	25	85
MASSARINI, ROBERT	429	2981	4165	CHALFONTE DR.		NONE	HOW	12	27	85
LITTLE			3571	COLBORNE DR.	40	NONE	HOW	11	27	85
HAFFELY			3597	COLBORNE DR.		NONE	HOW	12	11	85
GORBY			3598	COLBORNE DR.		NONE	HOW	11	25	85
DUFF			3608	COLBORNE DR.		NONE	HOW	11	25	85
SAYERS			3613	COLBORNE DR.		NONE	HOW	11	26	85
LEHMAN			3614	COLBORNE DR.		NONE	HOW	11	26	85
SMITH			490	COLONIAL DR.		NONE	HOW	12	12	85
LANDER			3712	COUNTRYLANE		NONE	HOW	12		85
WICKER, JAMES			1569	COUNTRYSIDE DR.		NONE	HOW	12		85
GUDERLEY			1645	COUNTRYSIDE DR.		NONE	HOW	12		85
BOSSMAN, CLIFF			1698	COUNTRYSIDE DR.		NONE	HOW	12		85
BENNETT			2242	COUNTY LINE RD.		NONE	HOW	12	10	85
ARMSTRONG, FRANK			2244	COUNTY LINE RD.		NONE	HOW	12	05	85
NOVAK, JOSEPH			1368	COWMAN COURT		NONE	HOW	12	19	85
BOWLING			3476	CRAB ORCHARD DR.		NONE	HOW	12	12	85
LAI			2111	CRABTREE DR.		NONE	HOW	12	20	85
PUGNALE			2124	CRABTREE DR.		NONE	HOW	12	09	85
CRAW, CHARLES A. JR.	426	7323	2136	CRABTREE DR.		NONE	HOW	12	09	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	JAY	YR
MARTIN, JAMES			2144	CRABTREE DR.		NONE	HOW	12	09 85
CRAIG			2194	CRABTREE DR.		NONE	HOW	12	09 85
SCHAEFER			2233	CRABTREE DR.		NONE	HOW	12	06 85
MOORE			3140	CREEKSIDE DR.		NONE	HOW	12	04 85
FENTON			3154	CREEKSIDE DR.		NONE	HOW	12	09 85
SWIGART			2711	CRONE ROAD		NONE	HOW	12	85
FREDERICK			2140	CRYSTAL MARIE		NONE	HOW	12	06 85
BLAKESLY			1075	DARLINGTON DR.		NONE	HOW	12	11 85
TOON			414	DARST ROAD		NONE	HOW	12	09 85
TRIB-LITTLE BCREEK				D-X RD. (N. DEALS)		NONE	HOW	08	06 85
TRIB-LITTLE BCREEK				DAYTON-XENIA RD.		8.2 ppb CIS-1,2-DICHLOROETHYLENE	ODH	07	16 85
TRIB-LITTLE BCREEK				DAYTON-XENIA RD.		1.2 ppb TRICHLOROETHYLENE	ODH	07	16 85
TRIB-LITTLE BCREEK				DAYTON-XENIA RD.		0.7 ppb TETRACHLOROETHYLENE	ODH	07	16 85
TRIB-LITTLE BCREEK				DAYTON-XENIA RD.		28 ppb CIS-1,2-DICHLOROETHYLENE	HOW	08	06 85
WESTBELD			1835	DAYTON-XENIA RD.		NONE	HOW	12	16 85
BCREEK TRUSTEE OFF.			1981	DAYTON-XENIA RD.		NONE	HOW	12	16 85
KALTENMARK, JOHN			2341	DAYTON-XENIA RD.		NONE	HOW	12	19 85
ROBERT STEWART	426	0268	2441	DAYTON-XENIA RD.		NONE	WAD	07	15 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		12.2 ppb 1,1-DICHLOROETHENE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		0.6 ppb TRANS-1,2-DICHLOROETHENE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		16.3 ppb 1,1-DICHLOROETHANE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		231.0 ppb 1,1,1-TRICHLOROETHANE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAUTON-XENIA RD.		10.9 ppb TRICHLOROETHENE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		7.4 ppb XYLENE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		1.8 ppb CIS-1,2-DICHLOROETHENE	HOW	05	01 87
ELANO CORP-LOWER AQ	426	0621	2455	DAYTON-XENIA RD.		54.6 ppb TETRACHLOROETHENE	HOW	05	01 87
BCREEK FIREHOUSE #1			2498	DAYTON-XENIA RD.		NONE	HOW	12	16 85
OBER, ROGER, DVM-LOWE			2515	DAYTON-XENIA RD.		NONE	HOW	08	07 87
BERWAGER, DAISY			2992	DAYTON-XENIA RD.		NONE	HOW	12	13 85
			3375	DAYTON-XENIA RD.		NONE	HOW	08	06 85
			3397	DAYTON-XENIA RD.		NONE	HOW	08	06 85
			3435	DAYTON-XENIA RD.		NONE	ODH	17	16 85
BUSY BEAV. ARTS/CRAFTS	429	3920	3445	DAYTON-XENIA RD.		NONE	ODH	07	16 85
BUSY BEAV. ARTS/CRAFTS	429	3920	3445	DAYTON-XENIA RD.		3.8 ppb 1,1,1-TRICHLOROETHANE	HOW	08	06 85
BUSY BEAV. ARTS/CRAFTS	429	3920	3445	DAYTON-XENIA RD.		NONE	HOW	02	20 86
BUSY BEAV. ARTS/CRAFTS	429	3920	3445	DAYTON-XENIA RD.		NONE	HOW	09	11 86
BUSY BEAV. ARTS/CRAFTS	429	3920	3445	DAYTON-XENIA RD.		NONE	HOW	02	19 87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		2505 ppb 1,1,1-TRICHLOROETHANE	HOW	06	04 85

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	MC	YR	
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		100.0 ppb BUTADIENE	HOW	06	04	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		13.9 ppb 1,1-DICHLOROETHENE	HOW	06	04	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		1250 ppb 1,1-DICHLOROETHANE	HOW	06	04	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		8200.0 ppb 1,1,1-TRICHLOROETHANE	ODH	07	16	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		355 ppb 1,1-DICHLOROETHANE	ODH	07	16	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		31.5 ppb BUTADIENE	HOW	08	06	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		51.2 ppb 1,1-DICHLOROETHENE	HOW	08	06	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		TRACE - METHYLENE CHLORIDE	HOW	08	06	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		415 ppb 1,1-DICHLOROETHANE	HOW	08	06	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		1470 ppb 1,1,1-TRICHLOROETHANE	HOW	08	06	85
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		131.0 ppb 1,2-BUTADIENE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		4000 ppb 1,1,1-TRICHLOROETHANE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		13.2 ppb 1-BUTENE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		3.4 ppb TRICHLOROETHYLENE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		2.0 ppb TOLUENE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		4.0 ppb 1,1-DICHLOROETHANE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		1510 ppb 1,1-DICHLOROETHANE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		66.2 ppb 2-BUTENE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		8.1 ppb CHLOROETHANE	HOW	02	20	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		143.0 ppb 1,1-DICHLOROETHANE	HOW	09	11	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		270.0 ppb 1,1,1-TRICHLOROETHANE	HOW	09	11	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		34.4 ppb 1,2-DICHLOROETHANE	HOW	09	11	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		69.7 ppb 1,1-DICHLOROETHENE	HOW	09	11	86
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		845.0 ppb 1,1,1-TRICHLOROETHANE	HOW	02	18	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		7.9 ppb 1,1-DICHLOROETHENE	HOW	02	18	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		0.6 ppb CHLOROETHANE	HOW	02	18	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		70.7 ppb 1,1-DICHLOROETHANE	HOW	02	18	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		1000.0 ppb 1,1,1-TRICHLOROETHANE	HOW	02	19	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		35.9 ppb 1,1-DICHLOROETHENE	HOW	02	19	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		1.1 ppb CHLOROETHANE	HOW	02	19	87
ANKENEY ENGRAVING	429	0832	3455	DAYTON-XENIA RD.		64.8 ppb 1,1-DICHLOROETHANE	HOW	02	19	87
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		122.0 ppb 1,1,1-TRICHLOROETHANE	ODH	07	16	85
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		45.5 ppb 1,1-DICHLOROETHANE	ODH	07	16	85
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		6.0 ppb TETRACHLOROETHYLENE	ODH	07	16	85
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		8.7 ppb 1,1-DICHLOROETHANE	HOW	08	06	85
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		181.0 ppb 1,1,1-TRICHLOROETHANE	HOW	08	06	85
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		54.1 ppb TETRACHLOROETHENE	HOW	08	06	85
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		2.4 ppb 1,1,1-TRICHLOROETHANE	HOW	02	20	86

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	MO	YR	YR
NU GLO LABORATORIES	426	1434	3465	DAYTON-XENIA RD.		NONE	HOW	10	07	86
DAVIS, ALICE	426	3629	3469	DAYTON-XENIA RD.		NONE	ODH	07	16	85
DAVIS, ALICE	426	3629	3469	DAYTON-XENIA RD.		NONE	HOW	08	06	85
DAVIS, ALICE	426	3629	3469	DAYTON-XENIA RD.		NONE	HOW	09	11	86
DEAL'S GARDEN CENTER-	426	2118	3472	DAYTON-XENIA RD.		NONE	HOW	08	06	85
DEAL'S GARDEN CENTER	426	2118	3472	DAYTON-XENIA RD.		NONE	HOW	08	06	85
INCREDIBLE EDIBLES			3475	DAYTON-XENIA RD.		NONE	ODH	07	16	85
INCREDIBLE EDIBLES			3475	DAYTON-XENIA RD.		NONE	HOW	08	06	85
MTL SYSTEMS, INC.	426	3111	3481	DAYTON-XENIA RD.		NONE	HOW	08	06	85
MTL SYSTEMS, INC.	426	3111	3481	DAYTON-XENIA RD.		4.6 ppb TRICHLOROETHENE	HOW	09	16	85
MTL SYSTEMS, INC.	426	3111	3481	DAYTON-XENIA RD.		4.6 ppb METHYLENE CHLORIDE	HOW	09	16	85
PEACE LUTH. CHURCH			3530	DAYTON-XENIA RD.		NONE	HOW	08	06	85
BCREEK MEDICAL CNTR			3572	DAYTON-XENIA RD.		NONE	HOW	12		85
BEAVERCREEK LIBRARY			3618	DAYTON-XENIA RD.		NONE	HOW	12	16	85
BCREEK FIREHOUSE #2			3777	DAYTON-XENIA RD.		NONE	HOW	12	16	85
KOCKENTIET			3779	DAYTON-XENIA RD.		NONE	HOW	12	11	85
PARTIDA			4067	DAYTON-XENIA RD.		NONE	HOW	12	05	85
BCREEK ENTERPRISES	429	5900	4401	DAYTON-XENIA RD.		NONE	HOW	12	09	85
FRICKE			1852	DEERBROOK TRAIL		NONE	HOW	12	18	85
JANDIAL, SATISH	426	6098	2800	DENNIS CT.		NONE	HOW	12	09	85
SCHATZLEY, L.	426	8558	1442	DEVOE DRIVE		NONE	HOW	12	09	85
SHIRA, WILLIAM			1766	DUMBARTON OAKS		NONE	HOW	12	06	85
BLOOMINGDALE			4230	DUNSMORE DRIVE		NONE	HOW	11	24	85
DISTILLED H2O BLANK				E. PATTERSON RD.		NONE	TAT	03	05	86
USEPA PERF. BLANK				E. PATTERSON RD.		WITHIN QA/QC CRITERIA	TAT	03	05	86
FORD			3415	E. PATTERSON RD.		NONE	HOW	11	22	85
MARCUM			3520	E. PATTERSON RD.		NONE	HOW	11	27	85
MARCUM			3526	E. PATTERSON RD.		NONE	HOW	11	27	85
BLANTON			3681	E. PATTERSON RD.	40	NONE	HOW	12	06	85
HAMMOND, H.			3709	E. PATTERSON RD.	41	NONE	HOW	11	02	85
EASTGATE MANOR APTS	435	3850	3710	E. PATTERSON RD.	40-50	2.2 ppb TRICHLOROETHYLENE	HOW	01	08	86
EASTGATE MANOR APTS	435	3850	3710	E. PATTERSON RD.	40-50	3.2 ppb CHLOROFORM	HOW	01	08	86
EASTGATE MANOR APTS	435	3850	3722	E. PATTERSON RD.	40-50	NONE	HOW	12	18	85
GLANTON, DAN			3745	E. PATTERSON RD.	42	NONE	WAD	06	15	88
GLANTON, DAN			3745	E. PATTERSON RD.	42	10.0 ppb METHYLENE CHLORIDE	ODH	06	22	92
GLANTON			3745	E. PATTERSON RD.	42	NONE	E&E	03	04	97
EASTGATE MANOR APTS	435	3850	3746	E. PATTERSON RD.	45-50	NONE	HOW	01	08	86
EASTGATE MANOR APTS	435	3850	3748	E. PATTERSON RD.		NONE	ODH	09	16	86

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	M'	Y	YR
WATERMAN, GERALD			3749	E. PATTERSON RD.	41	NONE	HOW	11	22	85
WATERMAN, GERALD			3749	E. PATTERSON RD.	41	NONE	ODH	09	16	86
WATERMAN, GERALD			3749	E. PATTERSON RD.	35-40	NONE	E&E	03	05	97
STEMMER, JOHN			3791	E. PATTERSON RD.		NONE	HOW	12	04	85
STEMMER, JOHN			3791	E. PATTERSON RD.		9.5 ppb TRICHLOROETHYLENE	ODH	09	16	86
STEMMER, JOHN			3791	E. PATTERSON RD.		12 ppb TRICHLOROETHENE	WAD	06	14	88
BELDEN, ELIZABETH	426	2650	3827	E. PATTERSON RD.		16 ppb VINYL CHLORIDE	PEI	11	25	85
BELDEN, ELIZABETH	429	2650	3827	E. PATTERSON RD.		12 ppb CHLOROETHANE	PEI	11	25	85
BELDEN, ELIZABETH	426	2362	3827	E. PATTERSON RD.		1.8 ppb VINYL CHLORIDE	HOW	01	08	86
STEGMAN	429	4477	3827	E. PATTERSON RD.		NONE	ODH	09	16	86
STEGMAN	429	4477	3827	E. PATTERSON RD.		19.8 ppb VINYL CHLORIDE	ODH	11	06	86
STEGMAN	429	4477	3827	E. PATTERSON RD.		<1 ppb CHLOROETHANE	ODH	11	06	86
STEGMAN	429	4477	3827	E. PATTERSON RD.		32 ppb VINYL CHLORIDE	WAD	06	14	88
KUHNS, CONNIE			3827	E. PATTERSON RD.		0.541J ppb METHYLENE CHLORIDE	E&E	03	07	97
KUHNS, CONNIE			3827	E. PATTERSON RD.		36.5 ppb VINYL CHLORIDE	E&E	03	07	97
BROWN			3845	E. PATTERSON RD.	52	NONE	PEI	11	21	85
BROWN, EARL			3845	E. PATTERSON RD.	52	1.44 ppb 1,1-DICHLOROETHANE	E&E	03	05	97
BROWN, EARL			3845	E. PATTERSON RD.	52	9.18 ppb TOTAL 1,2-DICHLOROETHENE	E&E	03	05	97
BROWN, EARL			3845	E. PATTERSON RD.	52	1.90 ppb VINYL CHLORIDE	E&E	03	05	97
GERLAUGH, HAROLD	426	1520	3874	E. PATTERSON RD.		15 ppb VINYL CHLORIDE	PEI	11	21	85
GERLAUGH, HAROLD	426	1520	3874	E. PATTERSON RD.		36 ppb CHLOROETHANE	PEI	11	21	85
MARTIN, EILEEN	429	1742	3885	E. PATTERSON RD.		NONE	HOW	10	04	85
MARTIN, EILEEN	429	1742	3885	E. PATTERSON RD.		6 ppb VINYL CHLORIDE	PEI	11	25	85
MARTIN, EILEEN	429	1742	3885	E. PATTERSON RD.		NONE	HOW	12	18	85
MARTIN, DALE	429	1742	3885	E. PATTERSON RD.		1.71 ppb VINYL CHLORIDE	E&E	03	05	97
NEELY, JULIE	429	4769	3892	E. PATTERSON RD.	40	35 ppb CHLOROETHANE	HOW	10	04	85
NEELY, JULIE	429	4769	3892	E. PATTERSON RD.	40	ANOTHER HALOCARBON	ODH	10	11	85
NEELY, JULIE	429	4769	3892	E. PATTERSON RD.	40	3.8 ppb CIS 1,2-DICHLOROETHYLENE	ODH	10	11	85
NEELY, JULIE	429	4769	3892	E. PATTERSON RD.	40	69.5 ppb METHYLENE CHLORIDE	ODH	10	11	85
NEELY--OUTSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	3.8 ppb CIS 1,2-DICHLOROETHYLENE	ODH	10	28	85
NEELY--OUTSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	69.5 ppb CHLOROETHANE	ODH	10	28	85
NEELY, CALVIN	429	4769	3892	E. PATTERSON RD.	40	3.7 ppb DICHLOROETHANE	ODH	10	28	85
NEELY, CALVIN	429	4769	3892	E. PATTERSON RD.	40	65 ppb CHLOROETHANE	ODH	10	28	85
NEELY, CALVIN	429	4769	3892	E. PATTERSON RD.	40	33 ppb UNKNOWN HALOCARBON	ODH	10	28	85
NEELY--INSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	68.0 ppb CHLOROETHANE	PEI	10	28	85
NEELY--INSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	3.8 ppb DICHLOROETHYLENE	PEI	10	28	85
NEELY--OUTSIDE TAP	426	4769	3892	E. PATTERSON RD.	40	100 ppb METHYLENE CHLORIDE	PEI	11	15	85
NEELY--INSIDE TAP	426	4769	3892	E. PATTERSON RD.	40	68 ppb METHYLENE CHLORIDE	PEI	11	15	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	M'	Y	YR
NEELY--OUTSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	78 ppb CHLOROETHANE	PEI	11	19	85
NEELY--INSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	75 ppb CHLOROETHANE	PEI	11	19	85
NEELY--INSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	12 ppb VINYL CHLORIDE	PEI	11	19	85
NEELY--OUTSIDE TAP	429	4769	3892	E. PATTERSON RD.	40	10.0 ppb VINYL CHLORIDE	PEI	11	19	85
COVEY, MARSHALL	426	3995	3897	E. PATTERSON RD.	40	NONE	ODH	11	12	85
COVEY, MARSHALL	426	3995	3897	E. PATTERSON RD.	40	0.980 ppb CHLOROETHANE	E&E	03	05	97
COVEY, MARSHALL	426	3995	3897	E. PATTERSON RD.	40	0.641 ppb TOTAL XYLENES	E&E	03	05	97
BAUSMAN	426	1560	3898	E. PATTERSON RD.	40	20.2 ppb CHLOROETHANE	ODH	10	16	85
BAUSMAN	426	1560	3898	E. PATTERSON RD.	40	20 ppb CHLOROETHANE	ODH	10	28	85
BAUSMAN	426	1560	3898	E. PATTERSON RD.	40	33 ppb VINYL CHLORIDE	ODH	10	28	85
BAUSMAN	426	1520	3898	E. PATTERSON RD.	40	0.5 ppb TETRACHLOROETHYLENE	PEI	11	08	85
BAUSMAN	426	1520	3898	E. PATTERSON RD.	40	19.8 ppb CHLOROETHANE	PEI	11	08	85
BAUSMAN	426	1520	3898	E. PATTERSON RD.	40	32.7 ppb VINYL CHLORIDE	PEI	11	08	85
BAUSMAN	426	1520	3898	E. PATTERSON RD.	40	0.5 ppb CIS-1,2-DICHLOROETHYLENE	PEI	11	08	85
BAUSMAN-INSIDE TAP	426	1560	3898	E. PATTERSON RD.	40	30 ppb METHYLENE CHLORIDE	PEI	11	15	85
BAUSMAN-OUTSIDE TAP	426	1560	3898	E. PATTERSON RD.	40	33 ppb METHYLENE CHLORIDE	PEI	11	15	85
BAUSMAN-OUTSIDE TAP	426	1520	3898	E. PATTERSON RD.	40	78 ppb VINYL CHLORIDE	PEI	11	15	85
BAUSMAN-OUTSIDE TAP	426	1520	3898	E. PATTERSON RD.	40	20 ppb CHLOROETHANE	PEI	11	15	85
BAUSMAN-INSIDE TAP	426	1520	3898	E. PATTERSON RD.	40	74 ppb VINYL CHLORIDE	PEI	11	19	85
BAUSMAN-INSIDE TAP	426	1520	3898	E. PATTERSON RD.	40	19 ppb CHLOROETHANE	PEI	11	19	85
BAUSMAN, DOROTHY	426	1520	3898	E. PATTERSON RD.	34-36	2.0 ppb CHLOROFORM	E&E	03	04	97
BAUSMAN, DOROTHY	426	1520	3898	E. PATTERSON RD.	34-36	47.8 ppb VINYL CHLORIDE	E&E	03	04	97
WINGARD			3906	E. PATTERSON RD.		6.9 ppb CHLOROETHANE	ODH	11	12	85
WINGARD			3906	E. PATTERSON RD.		1.1 ppb CIS-1,2-DICHLOROETHYLENE	ODH	11	12	85
WINGARD			3906	E. PATTERSON RD.		24.7 ppb VINYL CHLORIDE	ODH	11	12	85
WIDLICK, BILL			3906	E. PATTERSON RD.		16 ppb VINYL CHLORIDE	ODH	06	22	92
KELLIHER, CASEY			3906	E. PATTERSON RD.		17.8 ppb 1,2-DICHLOROETHENE	E&E	03	04	97
KELLIHER, CASEY			3906	E. PATTERSON RD.		103 ppb VINYL CHLORIDE	E&E	03	04	97
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		176 ppb VINYL CHLORIDE	ODH	11	12	85
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		20.8 ppb CHLOROETHANE	ODH	11	12	85
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		106 ppb CIS-1,2-DICHLOROETHANE	ODH	11	12	85
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		16 ppb CHLOROETHANE	TAT	03	05	86
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		2.9 ppb VINYL CHLORIDE	TAT	03	05	86
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		22.4 ppb 1,1-DICHLOROETHANE	TAT	03	05	86
VAN HOUTTE, RICH	426	5038	3912	E. PATTERSON RD.		6.3 ppb 1,2-DICHLOROETHYLENE	TAT	03	05	86
VAN HAUTE & EGLIN			3912	E. PATTERSON RD.		160 ppb VINYL CHLORIDE	ODH	06	22	92
VAN HAUTE & EGLIN			3912	E. PATTERSON RD.		210 ppb CIS-1,2-DICHLOROETHENE	ODH	06	22	92
GASSON	426	3901	3913	E. PATTERSON RD.		NONE	ODH	11	12	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	CELL (FEET)	CHEMICAL	LAB	MO	Y	YR
GASSON	426	3901	3913	E. PATTERSON RD.		0.376J ppb CHLOROFORM	E&E	03	05	97
GASSON-DUPLICATE	426	3901	3913	E. PATTERSON RD.		0.377J ppb CHLOROFORM	E&E	03	05	97
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	180.0 ppb CIS 1,2-DICHLOROETHYLENE	ODH	11	12	85
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	320 ppb VINYL CHLORIDE	ODH	11	12	85
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	19.1 ppb CHLOROETHANE	ODH	11	12	85
THOMAS-POSTDISCONN	426	2135	3920	E. PATTERSON RD.	42	NONE	PEI	11	20	85
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	94 ppb VINYL CHLORIDE	TAT	03	05	86
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	21 ppb CHLOROETHANE	TAT	03	05	86
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	82 ppb VINYL CHLORIDE	TAT	03	05	86
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	3.6 ppb 1,1-DICHLOROETHANE	TAT	03	05	86
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	126 ppb 1,2-DICHLOROETHYLENE	TAT	03	05	86
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	144 ppb 1,2-DICHLOROETHYLENE	TAT	03	05	86
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	4.1 ppb 1,1-DICHLOROETHANE	TAT	03	05	86
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	18 ppb CHLOROETHANE	TAT	03	05	86
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	56 ppb VINYL CHLORIDE	ODH	06	22	92
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	42 ppb METHYLENE CHLORIDE	ODH	06	22	92
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	210 ppb CIS-1,2-DICHLOROETHENE	ODH	06	22	92
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	0.418 ppb BENZENE	E&E	03	04	97
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	1.95 ppb 1,1-DICHLOROETHANE	E&E	03	04	97
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	0.425 ppb 1,1-DICHLOROETHENE	E&E	03	04	97
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	71.33 ppb 1,2-DICHLOROETHENE	E&E	03	04	97
THOMAS, CLARENCE	426	2135	3920	E. PATTERSON RD.	42	31.5 ppb VINYL CHLORIDE	E&E	03	04	97
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	0.342 ppb BENZENE	E&E	03	04	97
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	2.03 ppb 1,1-DICHLOROETHANE	E&E	03	04	97
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	0.974 ppb 1,1-DICHLOROETHENE	E&E	03	04	97
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	75.7 ppb 1,2-DICHLOROETHENE	E&E	03	04	97
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	1.88 ppb METHYLENE CHLORIDE	E&E	03	04	97
THOMAS-DUPLICATE	426	2135	3920	E. PATTERSON RD.	42	46.1 ppb VINYL CHLORIDE	E&E	03	04	97
TROUTMAN			3927	E. PATTERSON RD.		NONE	ODH	11	12	85
TROUTMAN, MARGARET			3927	E. PATTERSON RD.		NONE	E&E	03	05	97
SHOUP, EDWARD	426	7356	3928	E. PATTERSON RD.		4.3 ppb CIS-1,2-DICHLOROETHYLENE	ODH	09	16	85
SHOUP, EDWARD	426	7356	3928	E. PATTERSON RD.		3.5 ppb CIS 1,2-DICHLOROETHYLENE	ODH	10	16	85
SHOUP, EDWARD	426	7356	3928	E. PATTERSON RD.		NONE	PEI	11	25	85
SHOUP, EDWARD	426	7356	3928	E. PATTERSON RD.		11.1 ppb CIS-1,2-DICHLOROETHYLENE	HOW	01	08	86
THOMAS, JERRY			3928	E. PATTERSON RD.		8.64 ppb 1,2-DICHLOROETHENE	E&E	03	04	97
JOHNNIE'S CARRY OUT	429	0996	3985	E. PATTERSON RD.		NONE	HOW	12	18	85
JOHNNIE'S CARRY OUT	429	0996	3985	E. PATTERSON RD.		NONE	HOW	12	18	85
(GULF) RALPH LINDEN	426	9033	3999	E. PATTERSON RD.		NONE	ODH	11	12	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	M'	Y	YR
(GULF)MICHAEL LINDON	426	9033	3999	E. PATTERSON RD.		1.03 ppb BENZENE	E&E	03	04	97
(GULF)MICHAEL LINDON	426	9033	3999	E. PATTERSON RD.		0.609 ppb ETHYL BENZENE	E&E	03	04	97
(GULF)MICHAEL LINDON	426	9033	3999	E. PATTERSON RD.		2.46 ppb TOLUENE	E&E	03	04	97
(GULF)MICHAEL LINDON	426	9033	3999	E. PATTERSON RD.		2.63 ppb TOTAL XYLENES	E&E	03	04	97
(GULF)MICHAEL LINDON	426	9033	3999	E. PATTERSON RD.		0.798 ppb 1,2,4-TRIMETHYLBENZENE	E&E	03	04	97
STECK & STEVENS	426	3116	4014	E. PATTERSON RD.	40-57	NONE	HOW	12	18	85
STECK & STEVENS	426	3116	4014	E. PATTERSON RD.	40-57	0.35 ppb CHLOROFORM	E&E	03	04	97
STECK & STEVENS	426	3116	4014	E. PATTERSON RD.	40-57	0.557 ppb TOTAL XYLENES	E&E	03	04	97
PATTERSON BAP.CHURCH			4184	E. PATTERSON RD.		NONE	HOW	12	30	85
DOCKERY, LOUIS			4188	E. PATTERSON RD.		NONE	HOW	11	25	85
KUHBANDER			4384	E. PATTERSON RD.		NONE	HOW	12	13	85
DERKSER			6864	E. CABAUGH RD.		NONE	HOW	12	16	85
			1260	ENOCHS		NONE	HOW	08	06	85
KIRK			1288	ENOCHS		NONE	HOW	08	06	85
KIRK			1288	ENOCHS		NONE	HOW	02	20	86
KISER, R.K.			1297	ENOCHS		NONE	HOW	08	06	85
KISER, R.K.			1297	ENOCHS		NONE	HOW	09	11	86
			1298	ENOCHS		NONE	HOW	08	06	85
			1313	ENOCHS		NONE	HOW	08	06	85
BCREEK WW PLANT			420	FACTORY ROAD		NONE	ODH	04	16	86
O. KELLY CO. INC.			785	FACTORY ROAD		NONE	HOW	12	11	85
MOOREHEAD, JERRY			818	FACTORY ROAD		310 ppb TETRACHLOROETHYLENE SAM	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		1600 ppb 1,1,1-TRICHLOROETHANE SA	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		28 ppb 1,1-DICHLOROETHANE SAM#1	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		760 ppb TRICHLOROETHYLENE SAM#1	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		680 ppb TRICHLOROETHYLENE SAM#2	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		1800 ppb 1,1,1-TRICHLOROETHANE SA	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		28 ppb 1,1-DICHLOROETHANE SAM#3	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		30 ppb 1,1-DICHLOROETHANE SAM#2	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		370 ppb TETRACHLOROETHYLENE SAM	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		350 ppb TETRACHLOROETHYLENE SAM	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		1600 ppb 1,1,1-TRICHLOROETHANE SA	PEI	03	11	86
MOOREHEAD, JERRY			818	FACTORY ROAD		200 ppb TRICHLOROETHYLENE SAM#3	PEI	03	11	86
WYATT, JOE	426	5992	843	FACTORY ROAD		NONE	ODH	04	16	86
WYATT,JOE-DUPLICATE	426	5992	843	FACTORY ROAD		NONE	ODH	04	16	86
HUBELL, ERMA	426	3683	914	FACTORY ROAD		NONE	WAD	07	15	87
REED, JAMES	426	3515	1003	FACTORY ROAD		NONE	ODH	04	16	86
GW EXT. WELL				FACTORY/RTE35SW		21.4 ppb BENZENE	HOW	01	04	88

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	M'	Y	YR
GW EXT. WELL				FACTORY/RTE35SW		69.1 ppb DICHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		130 ppb TRICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		24.5 ppb 1,1-DICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		588 ppb 1,1,1-TRICHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		2.16 ppb CHLOROFORM	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		0.36 ppb TRANS-1,2-DICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		23 ppb CIS-1,2-DICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		57.3 ppb TETRACHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		84.5 ppb TOLUENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		452 ppb XYLENES (O,M,P)	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SE		36.3 ppb 1,1-DICHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		0.66 ppb 1,2-DICHLOROPROPANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		99.9 ppb ETHYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		0.27 ppb CHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		95.0 ppb N-PROPYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		101 ppb 1,3,5-TRIMETHYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		90 ppb ISOPROPYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		90 ppb TERT-BUTYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		90 ppb SEC-BUTYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35SW		12000 ppb GASOLINE COMPONENTS	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		65.3 ppb 1,2-DICHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		99.6 ppb TRICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		20 ppb 1,1-DICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		533 ppb 1,1,1-TRICHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		0.47 ppb CHLOROFORM	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		0.32 ppb TRANS-1,2-DICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		24.0 ppb CIS-1,2-DICHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		29.9 ppb TETRACHLOROETHENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		0.99 ppb TOLUENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		3.57 ppb XYLENES (O,M,P)	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		25.1 ppb 1,1-DICHLOROETHANE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		1.88 ppb ETHYLBENZENE	HOW	01	04	88
GW EXT. WELL				FACTORY/RTE35NE		1.51 ppb CHLOROETHANE	HOW	01	04	88
GW EXT. WELL #16				FACT/S.ALPHABLL		38.6 ppb TRICHLOROETHENE	HOW	02	22	88
GW EXT. WELL #16				FACT/S.ALPHABLL		12.9 ppb 1,1-DICHLOROETHENE	HOW	02	22	88
GW EXT. WELL #16				FACT/S.ALPHABLL		103.0 ppb 1,1,1-TRICHLOROETHANE	HOW	02	22	88
GW EXT. WELL #16				FACT/S.ALPHABLL		11.8 ppb CIS-1,2-DICHLOROETHENE	HOW	02	22	88
GW EXT. WELL #16				FACT/S.ALPHABLL		2.0 ppb TETRACHLOROETHENE	HOW	02	22	88

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	M'	Y	YR
GW EXT. WELL #16				FACT/S.ALPHABLL		12.9 ppb 1,1-DICHLOROETHANE	HOW	02	22	88
MERRELLI, DAVID			3345	FAIR OAKS		NONE	HOW	12	06	85
SPENCER			450	FAIRFIELD ROAD		NONE	HOW	12	09	85
PITMAN			738	FAWCETT DRIVE		NONE	HOW	12	21	85
SPARKLIN, JACK	426	7766	783	FAWCETT DRIVE		NONE	HOW	12	09	85
SLEDGE, CECELIA			825	FAWCETT DRIVE		NONE	HOW	12	06	85
SLEDGE, CECELIA			825	FAWCETT DRIVE		1.1 ppb 1,1,1-TRICHLOROETHANE	HOW	12	06	85
COCHRAN			1111	FERGUS DRIVE		NONE	HOW	11	25	85
GIAMBRONE			1123	FERGUS DRIVE		NONE	HOW	11	25	85
BERGMAN, GLENN			1150	FERGUS DRIVE		NONE	HOW	12		85
KAISER, MARY			1161	FERGUS DRIVE		NONE DETECTED	E&E	03	06	97
GOFFE, RONALD			1162	FERGUS DRIVE	~68	0.289J ppb 1,1,1-TRICHLOROETHANE	E&E	03	07	97
LANDERER, CINDY			1173	FERGUS DRIVE		NONE DETECTED	E&E	03	06	97
LANDERER-DUPLICATE			1173	FERGUS DRIVE		NONE DETECTED	E&E	03	06	97
HILL, CHARLES			1174	FERGUS DRIVE		2.84 ppb DICHLORODIFLUOROMETHANE	E&E	03	07	97
MCCALL, ARNIE			1185	FERGUS DRIVE		NONE DETECTED	E&E	03	06	97
OTTO, JOHN			1186	FERGUS DRIVE		NONE	HOW	12	12	85
SNYDER			1186	FERGUS DRIVE	30??	NONE DETECTED	E&E	03	07	97
HERITAGE REALTORS			2365	FERRY ROAD		NONE	HOW	12	20	85
BECK			1021	FIREWOOD DRIVE		NONE	HOW	11	22	85
FRILLMAN, PATSY	429	1401	1026	FIREWOOD DRIVE		NONE	HOW	12	09	85
DWYER			1077	FIREWOOD DRIVE		NONE	HOW	11	23	85
MURRAY			1160	FIREWOOD DRIVE		NONE	HOW	12	17	85
FORSELL, HAZEL			1181	FIREWOOD DRIVE		NONE	HOW	12	03	85
MARDEROSIAN			1182	FIREWOOD DRIVE		NONE	HOW	11	29	85
HOWARD			1141	FOREST DRIVE		NONE	HOW	12	05	85
BERMAN			1698	FORESTDALE AVE.		NONE	HOW	12	06	85
GARNER			1743	FORESTDALE AVE.		NONE	HOW	12	11	85
BUIRLEY			811	FRUITLAND PLACE		NONE	HOW	12	10	85
SANNER, RUSSELL			822	FRUITLAND PLACE		NONE	HOW	12		85
TAYLOR			12225	FUDGE DRIVE		NONE	HOW	12	20	85
TUPPER & RICHMAN			3526	FULLERTON DRIVE		NONE	HOW	12	06	85
DARDEN, ROBERT			1621	GEO.WASHINGTON		1.2 ppb 1,1,1-TRICHLOROETHANE	HOW	12	09	85
MINOR			5255	GERMANTOWN PK		NONE	HOW	12	12	85
HILL			2451	GLENBORO DRIVE		NONE	HOW	12	09	85
SCHNEIDER, D.A.			2465	GLENBORO DRIVE		NONE	HOW	12	12	85
MESSER			4855	GLENMINA DRIVE		NONE	HOW	12	11	85
BAXTER, JEROME			2099	GRANADA DRIVE		NONE	HOW	12	18	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	'ELL (FEET)	CHEMICAL	LAB	M'	Y	YR
BENNETT			438	GRANGE-HALL RD		NONE	HOW	12	10	85
BCREEK SDA CHURCH			670	GRANGE-HALL RD		NONE	HOW	12	15	85
VOISARD, WALTER			1072	GRANGE-HALL RD		NONE	HOW	12	07	85
POTEET, CHARLES	429	1445	1086	GRANGE-HALL RD		NONE	HOW	12	10	85
TEMPLE			1146	GRANGE-HALL RD		NONE	HOW	11	25	85
APPLE VALLEY VET.	426	6950	1235	GRANGE-HALL RD		NONE	ODH	11	12	85
SUPER VALU WAREHOUSE			1300	GRANGE-HALL RD	150-170	NONE	PEI	11	25	85
CARTER LUMBER			1306	GRANGE-HALL RD	145	NONE	PEI	11	25	85
BIGGS			1684	GRANGE-HALL RD		NONE	HOW	12	05	85
BIGGS			1691	GRANGE-HALL RD		NONE	HOW	12	05	85
HOLT, ROBERT	426	2743	1898	GRANGE-HALL RD		NONE	HOW	12	11	85
CLINE			2110	GRANGE-HALL RD		NONE	HOW	12	10	85
DESARO			2345	GRANGE-HALL RD		NONE	HOW	12	12	85
STEVENS, MICHAEL	429	2982	2380	GREENLAWN		NONE	HOW	12	10	85
GAUDER			862	GREENWAY DRIVE		NONE	HOW	12	16	85
FIQUEROA, JANIS	429	5419	888	GROVE HILL DRIVE		NONE	HOW	12	08	85
MEZERA			910	GROVE HILL DRIVE		NONE	HOW	12	11	85
TRUSSELL, RICHARD	426	6496	947	GROVE HILL DRIVE		NONE	HOW	12	06	85
FLUHARTY			951	GROVE HILL DRIVE		NONE	HOW	12	12	85
HAWKINS			1040	GROVE HILL DRIVE		NONE	HOW	12	09	85
BRUNNER			1064	GROVE HILL DRIVE		NONE	HOW	12	05	85
CORRON			1291	HANES ROAD		NONE	HOW	12	06	85
ALBRIGHT			1318	HANES ROAD		NONE	HOW	12	09	85
SCHMID			1672	HANES ROAD		NONE	HOW	11	27	85
JOHNS, ROBERT	426	4535	3582	HARRY TRUMAN		NONE	HOW	12	09	85
TEEGARDEN, HALLIE	426	8286	2318	HARTMAN DRIVE		NONE	ODH	04	16	86
MOORMAN			2332	HARTMAN DRIVE		NONE	HOW	12	11	85
GREENE MET. HOUSING			1751	HILDRETH DRIVE		NONE	HOW	12	11	85
LUBECKI, T.S.			1645	HILLSIDE		NONE	HOW	12	06	85
COGGSHALL, MARVIN	426	0547	3301	HOME ACRES AVE		NONE	HOW	12	09	85
HARTLEY			3393	HOME ACRES AVE		NONE	HOW	12	08	85
SMITH, WILLIAM	426	4158	3409	HOME ACRES AVE		NONE	HOW	12	18	85
McGLAUN, DONALD	426	3415	3427	HOME ACRES AVE		NONE	HOW	12	09	85
REEVES, GARY & JENNY			2460	INDIAN RIPPLE RD		NONE	ODH	10	12	88
NARROW RES-GR.CO.REC/	429	9590	2575	INDIAN RIPPLE RD		0.50 ppb 1,1,1-TRICHLOROETHANE #1	ODH	10	05	88
NARROW RES-GR.CO.REC/	429	9590	2575	INDIAN RIPPLE RD		0.46 ppb 1,1,1-TRICHLOROETHANE #2	ODH	10	05	88
STAUB			3009	INDIAN RIPPLE RD		NONE	HOW	12	15	85
BCREEK FIREHOUSE #4			3633	INDIAN RIPPLE RD		NONE	HOW	12	16	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	MC	YR	
KOOGLER-SUB. REFUSE			4080	INDUSTRIAL LANE		NONE	HOW	11	25	85
IMPERIAL AUTO REPAIR			4100	INDUSTRIAL LANE	18-31	NONE	PEI	11	22	85
RAMROTH			2325	JACAVANDA DRIVE		NONE	HOW	12	06	85
CORLEY			251	JACOBY ROAD		NONE	HOW	12	11	85
JOHNSON, LINDA			705	JAYELL DRIVE		NONE	HOW	12	10	85
SHUMWAY			1027	JOFFRE PLACE		NONE	HOW	12	16	85
MIDDLETON, DAVID			1054	JOFFRE PLACE		NONE	HOW	12	02	85
BARLAGE			1069	JOFFRE PLACE		NONE	HOW	12	06	85
HICKMAN			1088	JOFFRE PLACE		NONE	HOW	12	26	85
HELLER, KATHY			3540	JONATHON DRIVE		NONE	HOW	12		85
MARBURGER			3550	JONATHON DRIVE		NONE	HOW	12	16	85
VALLEY ELEM.	429	1606	3601	JONATHON DRIVE		NONE	HOW	12	04	85
BOCKELMAN			2888	KANT PLACE		NONE	HOW	12	10	85
LEWIS, KATHERINE			1082	KATHERINE DRIVE		NONE	HOW	12	06	85
MILLER			1129	KATHERINE DRIVE		NONE	HOW	12	18	85
BCREEK FIREHOUSE #3			3100	KEMP ROAD		NONE	HOW	12	16	85
BAER, JOHN	426	0198	4086	KEMP ROAD		NONE	HOW	12	27	85
BROWN			4448	KEMP ROAD		NONE	HOW	12	20	85
MORGAN			1701	KEN KLARE DRIVE		NONE	HOW	11	23	85
NOBLE			1077	KENBROOK DRIVE		NONE	HOW	12	09	85
CARMAN			1142	KENORA CIRCLE	25-30??	NONE	HOW	12	05	85
CARMAN, DIANE			1142	KENORA CIRCLE	25-30??	NONE DETECTED	E&E	03	06	97
GARRETT, JOHN			1145	KENORA CIRCLE	~40	0.288J ppb TRICHLOROETHENE	E&E	03	05	97
WOLFF, JOHN			1149	KENORA CIRCLE	30-35	2.22 ppb TRICHLOROETHENE	E&E	03	05	97
WIEGEL			1152	KENORA CIRCLE		NONE	HOW	12	09	85
WOJICK, RICHARD			1152	KENORA CIRCLE		1.85 ppb TRICHLOROETHENE	E&E	03	05	97
PRICE			1164	KENORA CIRCLE		NONE	PEI	11	25	85
LAMIROULT, CHRIS			1164	KENORA CIRCLE		11.8 ppb 1,1-DICHLOROETHANE	E&E	03	06	97
LAMIROULT, CHRIS			1164	KENORA CIRCLE		7.24 ppb TOTAL 1,2-DICHLOROETHENE	E&E	03	06	97
LAMIROULT, CHRIS			1164	KENORA CIRCLE		13.3 ppb TETRACHLOROETHENE	E&E	03	06	97
LAMIROULT, CHRIS			1164	KENORA CIRCLE		5.02 ppb 1,1,1-TRICHLOROETHANE	E&E	03	06	97
LAMIROULT, CHRIS			1164	KENORA CIRCLE		5.94 ppb TRICHLOROETHENE	E&E	03	06	97
LAMIROULT-DUPLICATE			1164	KENORA CIRCLE		11.7 ppb 1,1-DICHLOROETHANE	E&E	03	06	97
LAMIROULT-DUPLICATE			1164	KENORA CIRCLE		7.21 ppb TOTAL 1,2-DICHLOROETHENE	E&E	03	06	97
LAMIROULT-DUPLICATE			1164	KENORA CIRCLE		13.3 ppb TETRACHLOROETHENE	E&E	03	06	97
LAMIROULT-DUPLICATE			1164	KENORA CIRCLE		4.98 ppb 1,1,1-TRICHLOROETHANE	E&E	03	06	97
LAMIROULT-DUPLICATE			1164	KENORA CIRCLE		5.87 ppb TRICHLOROETHENE	E&E	03	06	97
LUTHMAN, DENNIS	258	2092	1165	KENORA CIRCLE		12 ppb CHLOROETHANE	PEI	11	25	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	CELL (FEET)	CHEMICAL	LAB	MC	Y	YR
REEVES, CARRY	426	1396	1848	MAPLE LANE		NONE	HOW	12	16	85
GREENFIELD, AIMEE			2362	MAPLE STREET		NONE	PEI	02	07	86
TRACEY, WALTER			2372	MAPLE STREET		NONE	PEI	02	07	86
TRACEY, WALTER			2372	MAPLE STREET		8 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
COCHRAN, MIKE			2382	MAPLE STREET		NONE	PEI	02	07	86
O'BRIEN, ALTA	426	6063	2396	MAPLE STREET		83.4 ppb 1,1,1-TRICHLOROETHANE	ODH	04	16	86
O'BRIEN, ALTA	426	6063	2396	MAPLE STREET		15.6 ppb TRICHLOROETHYLENE	ODH	04	16	86
O'BRIEN, ALTA	426	6063	2396	MAPLE STREET		18.1 ppb 1,1-DICHLOROETHANE	ODH	04	16	86
O'BRIEN, WILLIAM	426	6063	2396	MAPLE STREET		70 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
O'BRIEN, WILLIAM	426	6063	2396	MAPLE STREET		16 ppb TRICHLOROETHENE	GMI	11	12	87
O'BRIEN, WILLIAM	426	6063	2396	MAPLE STREET		12 ppb 1,2-DICHLOROETHANE	GMI	11	12	87
O'BRIEN, WILLIAM	426	6063	2396	MAPLE STREET		2 ppb TOLUENE	GMI	11	12	88
MENDENHALL, EVERETT			2397	MAPLE STREET		NONE	PEI	02	07	86
HILL, CHARLES			2408	MAPLE STREET		41 ppb 1,1-DICHLOROETHANE	PEI	03	11	86
HILL, CHARLES			2408	MAPLE STREET		9 ppb TRICHLOROETHYLENE	PEI	03	11	86
HILL, CHARLES			2408	MAPLE STREET		24 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
HILL, CHARLES			2408	MAPLE STREET		11 ppb TRICHLOROETHENE	GMI	11	12	87
HILL, CHARLES			2408	MAPLE STREET		24 ppb 1,1-DICHLOROETHANE	GMI	11	12	87
HILL, CHARLES			2408	MAPLE STREET		10 ppb TRANS-1,2-DICHLOROETHENE	GMI	11	12	87
HILL, CHARLES			2408	MAPLE STREET		23 ppb CHLOROMETHANE	GMI	11	12	87
PETTITT, MIKE			2409	MAPLE STREET		NONE	PEI	02	07	86
WYATT			2421	MAPLE STREET		210 ppb TRICHLOROETHYLENE	PEI	02	07	86
WYATT			2421	MAPLE STREET		240 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
WYATT			2421	MAPLE STREET		54 ppb TRICHLOROETHENE	GMI	11	12	87
WYATT			2421	MAPLE STREET		5 ppb TETRACHLOROETHENE	GMI	11	12	87
WYATT			2421	MAPLE STREET		10 ppb 1,1-DICHLOROETHANE	GMI	11	12	87
WYATT			2421	MAPLE STREET		4 ppb 1,1-DICHLOROETHENE	GMI	11	12	87
WYATT			2421	MAPLE STREET		3 ppb TOLUENE	GMI	11	12	87
GENTNER, WILLIAM			2427	MAPLE STREET		350 ppb 1,1,1-TRICHLOROETHANE SAM	PEI	03	11	86
GENTNER, WILLIAM			2427	MAPLE STREET		200 ppb TRICHLOROETHYLENE SAM#2	PEI	03	11	86
GENTNER, WILLIAM			2427	MAPLE STREET		210 ppb TRICHLOROETHYLENE SAM#1	PEI	03	11	86
GENTNER, WILLIAM			2427	MAPLE STREET		300 ppb 1,1,1-TRICHLOROETHANE SAM	PEI	03	11	86
BARBRE, MARY ANN			2429	MAPLE STREET		330 ppb TRICHLOROETHYLENE	PEI	03	11	86
BARBRE, MARY ANN			2429	MAPLE STREET		21 ppb 1,1-DICHLOROETHANE	PEI	03	11	86
BARBRE, MARY ANN			2429	MAPLE STREET		180 ppb 1,1,1-TRICHLOROETHANE	PEI	03	11	86
BARBRE, MARY ANN			2429	MAPLE STREET		310 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
BARBRE, MARY ANN			2429	MAPLE STREET		82 ppb TRICHLOROETHENE	GMI	11	12	87
BARBRE, MARY ANN			2429	MAPLE STREET		23 ppb TETRACHLOROETHENE	GMI	11	12	87

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	MC	Y	YR
BERNER			823	N. FAIRFIELD RD		NONE	HOW	12	08	85
McCOY, PIERCE			828	N. FAIRFIELD RD		NONE	HOW	12		85
MURPHY			833	N. FAIRFIELD RD		NONE	HOW	12	07	85
MARSH			914	N. FAIRFIELD RD		NONE	HOW	12	06	85
WILEY, HERBERT	426	6158	924	N. FAIRFIELD RD		NONE	HOW	12	06	85
FALTER, THOMAS			934	N. FAIRFIELD RD		NONE	HOW	12	05	85
GOODRUM			960	N. FAIRFIELD RD		NONE	HOW	12	05	85
BARNHART			980	N. FAIRFIELD RD		1.6 ppb 1,1,1-TRICHLOROETHANE	HOW	12	23	85
BARNHART			980	N. FAIRFIELD RD		1.6 ppb TRICHLOROETHENE	HOW	12	23	85
NUSSBAUM, WILMER	426	0228	984	N. FAIRFIELD RD		NONE	HOW	12	09	85
HAGENBUCH			1088	N. FAIRFIELD RD		NONE	HOW	12	18	85
PUGH			1112	N. FAIRFIELD RD		NONE	HOW	12	18	85
MAXWELL	426	1713	1187	N. FAIRFIELD RD		NONE	HOW	08	06	85
REA			1668	N. LONGVIEW ST		NONE	HOW	12	07	85
JOSEPH			1813	NUGGET COURT		NONE	HOW	12	06	85
MARTIN OIL CO.			435	ORCHARD LANE		17 ppb TRANS-1,2-DICHLOROETHENE	WAL	02	26	88
MARTIN OIL CO.			435	ORCHARD LANE		23 ppb 1,1-DICHLOROETHENE	WAL	02	26	88
MARTIN OIL CO.			435	ORCHARD LANE		19 ppb 1,1-DICHLOROETHANE	WAL	02	26	88
MARTIN OIL CO.			435	ORCHARD LANE		300 ppb TRICHLOROETHENE	WAL	02	26	88
MARTIN OIL CO.			435	ORCHARD LANE		590 ppb 1,1,1-TRICHLOROETHANE	WAL	02	26	88
SCOWDEN, RONALD			445	ORCHARD LANE		173 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
SCOWDEN, RONALD			445	ORCHARD LANE		65 ppb TRICHLOROETHENE	GMI	11	12	87
SCOWDEN, RONALD			445	ORCHARD LANE		4 ppb 1,1-DICHLOROETHANE	GMI	11	12	87
SCOWDEN, RONALD			445	ORCHARD LANE		5 ppb 1,1-DICHLOROETHENE	GMI	11	12	87
BRILL ESTATE (RENTER: LI	426	5927	490	ORCHARD LANE		7.2 ppb 1,1-DICHLOROETHANE	ODH	06	04	86
BRILL ESTATE (MR. THOMA	426	5927	490	ORCHARD LANE		16.2 ppb 1,1,1-TRICHLOROETHANE	ODH	06	04	86
THOMAS, JAMES			490	ORCHARD LANE		8 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
BRILL ESTATE - SPRING B			490	ORCHARD LANE		NONE	WAD	06	14	88
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		31.0 ppb CIS-1,2-DICHLOROETHYLENE	ODH	04	16	86
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		200.0 ppb TRICHLOROETHYLENE	ODH	04	16	86
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		365.0 ppb 1,1,1-TRICHLOROETHANE	ODH	04	16	86
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		21.2 ppb 1,1-DICHLOROETHANE	ODH	04	16	86
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		10.1 ppb 1,1-DICHLOROETHYLENE	ODH	04	16	86
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		620 ppb 1,1,1-TRICHLOROETHANE	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		570 ppb TRICHLOROETHANE (DUP)	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		2 ppb 1,1,2-TRICHLOROETHANE (DUP)	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		190 ppb TRICHLOROETHENE	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		175 ppb TRICHLOROETHENE (DUP)	GMI	11	12	87

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	MC	Y	YR
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		3 ppb TETRACHLOROETHENE	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		4 ppb TETRACHLOROETHENE (DUP)	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		17 ppb DICHLOROETHANE	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		17 ppb 1,1-DICHLOROETHANE (DUP)	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		20 ppb 1,1-DICHLOROETHENE	GMI	11	12	87
DEBAY, LAWRENCE	429	0810	498	ORCHARD LANE		19 ppb 1,1-DICHLOROETHENE (DUP)	GMI	11	12	87
ACME SCREW	426	0621	530	ORCHARD LANE		2.9 ppb 1,1,1-TRICHLOROETHANE	ODH	04	16	86
NUTTERFIELD C/O BCAA			5465	ORCHARD LANE/RTE 35		NONE	ODH	06	05	86
JAMES THOMAS			5927	ORCHARD LANE		NONE	WAL	02	26	88
CRAWFORD			3470	PEBBLE CREEK DR		NONE	HOW	12	06	85
KNAB			3490	PEBBLE CREEK DR		NONE	HOW	12	12	85
DOWNEY, ROBERT	426	5824	2390	PHIL HUBBEL DR.		1254 ppb 1,1,1-TRICHLOROETHANE	ODH	01	03	86
DOWNEY, ROBERT	426	5824	2390	PHIL HUBBEL DR.		306 ppb TRICHLOROETHYLENE	ODH	01	03	86
DOWNEY, ROBERT	426	5824	2390	PHIL HUBBEL DR.		16.5 ppb TETRACHLOROETHYLENE	ODH	01	03	86
DOWNEY, ROBERT	426	5824	2390	PHIL HUBBEL DR.		23.9 ppb CIS-1,2-DICHLOROETHYLENE	ODH	01	03	86
DOWNEY, ROBERT	429	4878	2390	PHIL HUBBEL DR.		21.7 ppb 1,1-DICHLOROETHANE	ODH	01	03	86
LOXLEY, TOM & LARRY	426	9851	2393	PHIL HUBBEL DR.		2569 ppb 1,1,1-TRICHLOROETHANE	ODH	01	03	86
LOXLEY, TOM & LARRY	426	9851	2393	PHIL HUBBEL DR.		230 ppb TETRACHLOROETHYLENE	ODH	01	03	86
LOXLEY, TOM & LARRY	426	9851	2393	PHIL HUBBEL DR.		63.0 ppb CIS-1,2-DICHLOROETHYLENE	ODH	01	03	86
LOXLEY, TOM & LARRY	426	9851	2393	PHIL HUBBEL DR.		699 ppb TRICHLOROETHYLENE	ODH	01	03	86
LOXLEY, TOM & LARRY	426	9851	2393	PHIL HUBBEL DR.		62.2 ppb 1,1-DICHLOROETHANE	ODH	01	03	86
DELANEY, LARRY	426	9933	2394	PHIL HUBBEL DR.		NONE	ODH	01	03	86
PARKER, ELBERT	426	5914	2087	RED ROCK DRIVE		NONE	HOW	12	12	85
SMITH, LEE			2122	RED ROCK DRIVE		NONE	HOW	12		85
JACOBS, FLORENCE			1098	REGAL HILL CT		NONE	HOW	12		85
BESCOE			1103	REGAL HILL CT		NONE	HOW	12	11	85
CARNEQIS, I.A.			1110	REGAL HILL CT		NONE	HOW	12	06	85
CRIST, MARVIN			1125	REGAL HILL CT		NONE	HOW	12		85
CONLEY			1113	REGAL COURT DR		NONE	HOW	12	09	85
BCREEK CITY HALL			1368	RESEARCH PK DR		NONE	HOW	08	06	85
KOPP			3974	REXFORD ROAD		NONE	HOW	12	06	85
HARNER			3990	REXFORD ROAD		NONE	HOW	11	23	85
FUGATE BUILDING	429	2207	1136	RICHFIELD CNTR		NONE	HOW	12	18	85
FUGATE BUILDING	429	2207	1136	RICHFIELD CNTR		NONE	HOW	01	08	86
EDWARD'S PRINTING	426	4311	1138	RICHFIELD CNTR		NONE	HOW	12	18	85
EDWARDS PRINTING	426	2771	1138	RICHFIELD CNTR		NONE	HOW	01	08	86
MOOSE LODGE	426	9251	1143	RICHFIELD CNTR		NONE	HOW	12	18	85
LOYAL ORDER OF MOOSE	426	9251	1134	RICHFIELD CNTR		NONE	HOW	12	18	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	MO	Y	YR
EAGLES NESTPIZZALNGE	426	1215	1152	RICHFIELD CNTR		NONE	HOW	12	18	85
EAGLES NESTPIZZALNGE	426	1215	1152	RICHFIELD CNTR		NONE	HOW	12	18	85
FRY'S AUTO BODY			1158	RICHFIELD CNTR	16	1.09 ppb TRICHLOROETHENE	E&E	03	05	97
FRY'S AUTO BODY-DUPLICATE			1158	RICHFIELD CNTR	16	1.10 ppb TRICHLOROETHENE	E&E	03	05	97
FOE 321 (EAGLES)	426	5141	1190	RICHFIELD CNTR	117	NONE	PEI	11	21	85
FOE 321 (EAGLES)	426	5141	1180	RICHFIELD CNTR	117	NONE	HOW	12	18	85
FOE 321 (EAGLES)	426	5141	1190	RICHFIELD CNTR	117	NONE	HOW	12	18	85
DRISKELL			2624	RICHMAR DRIVE		NONE	HOW	12		85
KOSAN, DOUGLAS	426	9236	2658	RICHMAR DRIVE		NONE	HOW	04	17	86
MOYER			4128	RIDGECLIFF DRIVE		NONE	HOW	12	13	85
RIHM, ROBERT	429	1006	1006	RIVER HILLS		NONE	HOW	12	10	85
COLE			941	RIVERHILL ROAD		NONE	HOW	11	24	85
MOORE			950	RIVERHILL ROAD		NONE	HOW	11	23	85
MANGEOT			974	RIVERHILL ROAD		NONE	HOW	12	09	85
ARENZ			979	RIVERHILL ROAD		NONE	HOW	12	11	85
PARRETT, CALVIN			1018	RIVERHILL ROAD		NONE	HOW	12	05	85
TURNER			1060	ROCKDELL COURT		NONE	HOW	12	11	85
TOBEY, RICHARD			1074	ROCKDELL COURT		NONE	HOW	12	06	85
MACHINO			3904	ROCKFIELD DRIVE	51	NONE	HOW	12	03	85
DOCKERY REALTORS			3919	ROCKFIELD DRIVE		NONE	HOW	12	12	85
CLINT'S PRINTING	426	2771	3953	ROCKFIELD DRIVE	68	NONE	HOW	12	18	85
CLINT'S PRINTING	426	2771	3953	ROCKFIELD DRIVE	68	NONE	HOW	01	08	86
LOLLIPOP LAND	429	0605	3961	ROCKFIELD DRIVE		NONE	HOW	12	18	85
KRAMER GRAPHICS	426	6118	3975	ROCKFIELD DRIVE		NONE	HOW	12	09	85
KRAMER GRAPHICS	426	6118	3975	ROCKFIELD DRIVE		NONE	HOW	01	08	86
DORSTEN, CYRIL L.			2423	ROLLINVIEW		NONE	HOW	12	06	85
SCHUMACHER			3415	ROME BEAUTY DR		NONE	HOW	12	05	85
NORDHEIM			3437	ROME BEAUTY DR		NONE	HOW	11	23	85
FINLEY			3437	ROME BEAUTY DR		NONE	HOW	11	23	85
REIHL			3442	ROME BEAUTY DR		1.8 ppb 1,1,1-TRICHLOROETHANE	HOW	11	23	85
RIEHL			3442	ROME BEAUTY DR		21.4 ppb TRICHLOROETHYLENE	HOW	11	23	85
MURTAUGH			3464	ROME BEAUTY DR		1.1 ppb TRICHLOROETHYLENE	HOW	11	23	85
MURTAUGH			3464	ROME BEAUTY DR		NONE	HOW	12	04	85
BRIZIUS, CLARENCE	426	7973	1100	ROSENDALE DR.		NONE	HOW	12	10	85
RADELOFF			1111	ROSENDALE DR.		NONE	HOW	11	30	85
EIQNOR, PHILIP			1132	ROSENDALE DR.		NONE	HOW	12	06	85
RAYMOND, NEIL	429	0807	1140	ROSENDALE DR.		NONE	PEI	12	18	85
MALHOTRA, PRAN	426	8019	1148	ROSENDALE DR.	~30	NONE	PEI	12	17	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	M	Y	YR
MALHOTRA, PRAN	426	8019	1148	ROSENDALE DR.	~30	2.4 ppb TRICHLOROETHYLENE	ODH	09	16	86
MALHOTRA, PRAN	426	8019	1148	ROSENDALE DR.	~30	2.33 ppb TRICHLOROETHENE	E&E	03	05	97
SNYDER			1162	ROSENDALE DR.	88	NONE	PEI	11	25	85
HAMLIN, JEFFREY			1162	ROSENDALE DR.	45??	1.85 ppb 1,1-DICHLOROETHANE	E&E	03	05	97
HAMLIN, JEFFREY			1162	ROSENDALE DR.	45??	3.72 ppb TOTAL 1,2-DICHLOROETHENE	E&E	03	05	97
HAMLIN, JEFFREY			1162	ROSENDALE DR.	45??	4.33 ppb TETRACHLOROETHENE	E&E	03	05	97
HAMLIN, JEFFREY			1162	ROSENDALE DR.	45??	2.22 ppb 1,1,1-TRICHLOROETHANE	E&E	03	05	97
HAMLIN, JEFFREY			1162	ROSENDALE DR.	45??	5.01 ppb TRICHLOROETHENE	E&E	03	05	97
MOORE			1170	ROSENDALE DR.	56	NONE	PEI	11	25	85
MILLER			1182	ROSENDALE DR.	61	NONE	PEI	11	25	85
SCOTT, RICHARD			1182	ROSENDALE DR.		6.76 ppb TRICHLOROETHENE	E&E	03	05	97
ROSELL			886	SHADY LANE		NONE	HOW	11	22	85
HENDRICKSON			1692	SHADY LANE		NONE	HOW	12	06	85
KIRKMONT PRES. CHURCH			3377	SHAKERTOWN RD		NONE	HOW	12	16	85
HILLSIDE CHAPEL			3515	SHAKERTOWN RD		NONE	HOW	12	20	85
LAUSE			3557	SHAKERTOWN RD		NONE	HOW	12	04	85
CORBET			3730	SHAKERTOWN RD		NONE	HOW	12	09	85
ANKENEY JR. HIGH	429	9021	4085	SHAKERTOWN RD		NONE	HOW	12	04	85
CRISP			4339	SHAKERTOWN RD		NONE	HOW	12	10	85
SELF, MIKE			3301	SHETLAND		NONE	HOW	12	06	85
BOHANNON			4137	SIERA PIKE TERR.		NONE	HOW	12	09	85
SHIRA			432	SILVERCREST TERR.		NONE	HOW	12	12	85
MARCISCHAK			2446	S. OLD OAKS DR.		NONE	HOW	12	12	85
HAHN			3577	SOUTHBROOK DR.		NONE	HOW	12	09	85
MOORE			3588	SOUTHBROOK DR.		NONE	HOW	11	25	85
BYRD			3691	SOUTHBROOK DR.		NONE	HOW	11	27	85
HAYNES			761	SPACE DRIVE		NONE	HOW	12	09	85
GARVIN, ERNEST			1011	STANWICK DRIVE		NONE	HOW	12		85
STANTON, JOHN			1045	STANWICK DRIVE		NONE	HOW	12	05	85
KAISER			1058	STANWICK DRIVE		NONE	HOW	11	29	85
DYE			1114	STANWICK DRIVE		NONE	HOW	12	08	85
KERSTEINER, LULA			1151	STANWICK DRIVE		NONE DETECTED	E&E	03	06	97
NANDERGRIFF, PAMELA			1154	STANWICK DRIVE	40	NONE DETECTED	E&E	03	06	97
JENKINS, NANCY	426	6406	1160	STANWICK DRIVE	40	NONE	PEI	12	18	85
JENKINS, TOM	426	6406	1160	STANWICK DRIVE	40	0.875 ppb TRICHLOROETHENE	E&E	03	06	97
McILVAIN, RICHARD	429	5130	1165	STANWICK DRIVE		NONE	PEI	12	18	85
KARL, STEVE			1165	STANWICK DRIVE		NONE DETECTED	E&E	03	06	97
NIEMER, GEORGE	426	6589	1174	STANWICK DRIVE		15.0 ppb TRICHLOROETHENE	PEI	12	18	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	ELL (FEET)	CHEMICAL	LAB	MO	Y	YR
NIEMER, GEORGE	426	6589	1174	STANWICK DRIVE		13.4 ppb TRICHLOROETHYLENE	ODH	09	16	86
NIEMER, GEORGE	426	6589	1174	STANWICK DRIVE		3.4 ppb TETRACHLOROETHYLENE	ODH	09	16	86
FIFE			1186	STANWICK DRIVE		NONE	PEI	11	25	85
MARTIN, PAUL	429	0278	1187	STANWICK DRIVE		NONE	PEI	11	25	85
MARTIN, GAREY			1187	STANWICK DRIVE		NONE	WAD	06	14	88
MARTIN			1189	STANWICK DRIVE		NONE	PEI	11	25	85
BERWAGER, CARL	429	0175	1197	STANWICK DRIVE	35	6.0 ppb VINYL CHLORIDE	PEI	11	21	85
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	3.9 ppb 1,1-DICHLOROETHANE	HOW	01	08	86
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	2.2 ppb CIS-1,2-DICHLOROETHYLENE	HOW	01	08	86
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	3.2 ppb CHLOROETHANE	HOW	01	08	86
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	1.78 ppb 1,1-DICHLOROETHANE	E&E	03	05	97
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	1.47 ppb 1,1,1-TRICHLOROETHANE	E&E	03	05	97
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	0.782 ppb TRICHLOROETHENE	E&E	03	05	97
BERWAGER, CARL	426	0175	1197	STANWICK DRIVE	35	3.69 ppb VINYL CHLORIDE	E&E	03	05	97
STANTON			1045	STANWICK PLACE		NONE	HOW	12	05	85
NORVAISIS			3206	SUBURBAN DRIVE		NONE	HOW	12	06	85
JOHNSON			723	SUEDEN DRIVE		NONE	HOW	12	09	85
BLAIR, DONALD			4182	SUNBEAM		NONE	HOW	12	12	85
BARKER			2565	SUNNYWOOD CT		NONE	HOW	12	17	85
GAST			3383	SWIGART ROAD		NONE	HOW	12	02	85
RILEY			1564	SYCAMORE DRIVE		NONE	HOW	12	12	85
BROWN			1613	SYCAMORE DRIVE		NONE	HOW	12	17	85
VINSON, WALLACE	426	6185	372	TANGLEWOOD DR		NONE	HOW	12	13	85
STICKEL			377	TANGLEWOOD DR		NONE	HOW	12	13	85
LINSAY, WILLIAM			420	TANGLEWOOD DR		NONE	HOW	12		85
BAUER			3937	TIMBERLINE		NONE	HOW	12	05	85
STICHWEH, CARL F.	426	0548	3954	TIMBERLINE		NONE	HOW	12	06	85
BURNS, WILLIAM	426	3905	679	TIMBERWOOD DR		NONE	HOW	12	18	85
BECHTEL, KEVIN			789	TIMBERWOOD DR		NONE	HOW	12		85
WICKER			789	TIMBERWOOD DR		NONE	HOW	12	07	85
WALKER			837	TIMBERWOOD DR		NONE	HOW	10	22	85
JORDAN			1011	TRALEE TRAIL		NONE	HOW	12	13	85
BAUMAN, VINCENT			1061	TRALEE TRAIL		NONE	HOW	12		85
SCHMICKER			1087	TRALEE TRAIL		NONE	HOW	11	28	85
DAFLER			1149	TRALEE TRAIL		NONE	HOW	12	09	85
COALT, CHRIS			1149	TRALEE TRAIL		NONE DETECTED	E&E	03	06	97
BARRY, JOYCE			1161	TRALEE TRAIL		NONE DETECTED	E&E	03	06	97
HARP, ANDREW			1162	TRALEE TRAIL		NONE DETECTED	E&E	03	06	97

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	MC	Y	YR
WELLS, JACK			1173	TRALEE TRAIL		NONE	ODH	09	16	86
MELTON, THOMAS	429	2506	1185	TRALEE TRAIL	39	11.0 ppb TRICHLOROETHENE	PEI	12	18	85
MELTON	429	2506	1185	TRALEE TRAIL	39	6.06 ppb 1,1-DICHLOROETHANE	E&E	03	06	97
MELTON	429	2506	1185	TRALEE TRAIL	39	3.42 ppb TOTAL 1,2-DICHLOROETHENE	E&E	03	06	97
MELTON	429	2506	1185	TRALEE TRAIL	39	0.685 ppb TETRACHLOROETHENE	E&E	03	06	97
MELTON	429	2506	1185	TRALEE TRAIL	39	0.357J ppb 1,1,1-TRICHLOROETHANE	E&E	03	06	97
MELTON	429	2506	1185	TRALEE TRAIL	39	4.61 ppb TRICHLOROETHENE	E&E	03	06	97
OLSON, JAMES			1186	TRALEE TRAIL	40	NONE	HOW	11	27	85
OLSON, JAMES			1186	TRALEE TRAIL	20-30??	0.942 ppb DICHLORODIFLUOROMETHANE	E&E	03	07	97
HUNN, JOHN	429	5204	1197	TRALEE TRAIL	41	5.4 ppb TRANS-1,2-DICHLOROETHENE	PEI	12	17	85
HUNN, JOHN	429	5204	1197	TRALEE TRAIL	41	24.0 ppb TRICHLOROETHENE	PEI	12	17	85
CARMODY			2069	TURNBULL ROAD		NONE	HOW	11	23	85
RASNAKE			1540	UPPER BELLBROOK RD		NONE	HOW	12	05	85
			1197	WALLABY		NONE	HOW	08	06	85
CHADWELL			1210	WALLABY		NONE	HOW	08	06	85
CHADWELL			1210	WALLABY		NONE	HOW	02	20	86
			1211	WALLABY		NONE	HOW	08	06	85
			1240	WALLABY		NONE	HOW	08	06	85
SCUDDER, JUDY			1240	WALLABY		NONE	HOW	09	11	86
CRAFT			1255	WALLABY		TRACE 1,1,1-TRICHLOROETHANE	HOW	08	06	85
CRAFT			1255	WALLABY		NONE	HOW	02	25	86
CRAFT, MR.			1255	WALLABY		NONE	HOW	09	11	86
CRAFT			1255	WALLABY		NONE	HOW	02	18	87
			1261	WALLABY		NONE	HOW	08	06	85
			1265	WALLABY		NONE	HOW	08	06	85
WHEELER, DAVID G.			1277	WALLABY		NONE	HOW	08	06	85
WHEELER, DAVID G.			1277	WALLABY		NONE	HOW	08	06	85
WHEELER, DAVID G.			1277	WALLABY		NONE	HOW	02	19	87
			1281	WALLABY		NONE	HOW	08	06	85
			1285	WALLABY		NONE	HOW	08	06	85
FISHER			1291	WALLABY		1.1 ppb 1,1,1-TRICHLOROETHANE	HOW	08	06	85
FISHER			1291	WALLABY		NONE	HOW	02	25	86
FISHER, MR.			1291	WALLABY		NONE	HOW	09	15	86
			1294	WALLABY		NONE	HOW	08	06	85
			1295	WALLABY		NONE	HOW	08	06	85
LAGOON BEHIND HOUSE			1295	WALLABY		NONE	HOW	08	06	85
			1301	WALLABY		NONE	HOW	08	06	85
			1303	WALLABY		NONE	HOW	08	06	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	'ELL (FEET)	CHEMICAL	LAB	MC	Y	YR
			1304	WALLABY		NONE	HOW	08	06	85
			1311	WALLABY		NONE	HOW	08	06	85
YOUNG, WATT			1315	WALLABY		NONE	HOW	08	06	85
YOUNG, WATT			1315	WALLABY		NONE	HOW	08	06	85
YOUNG, WATT			1315	WALLABY		NONE	HOW	09	11	86
			1321	WALLABY		NONE	HOW	08	06	85
KIRK			1325	WALLABY		NONE	HOW	08	06	85
KIRK			1325	WALLABY		NONE	HOW	02	20	86
			1328	WALLABY		NONE	HOW	08	06	85
			1331	WALLABY		NONE	HOW	08	06	85
SMITH, HERBERT W.			1341	WALLABY		1.3 ppb 1,1,1-TRICHLOROETHANE	HOW	08	06	85
SMITH, HERBERT W.			1341	WALLABY		NONE	HOW	02	20	86
SMITH, HERBERT W.			1341	WALLABY		3.2 ppb TETRACHLOROETHENE	HOW	09	15	86
SMITH, HERBERT W.			1341	WALLABY		NONE	HOW	02	19	87
			1343	WALLABY		NONE	HOW	08	06	85
TRIB-LITTLE BCREEK				WALLABY (DXR009)		30 ppb DIMETHYL DISULFIDE	HOW	08	06	85
HAIL			510	WAYSIDE DRIVE		NONE	HOW	12	16	85
KNOLLWOOD CHURCH CH			1031	WELFORD DRIVE		NONE	HOW	12	06	85
SILER, NOEL			1137	WENRICK DRIVE		NONE	HOW	12	06	85
BLESSING			1521	WEST LYNN DRIVE		NONE	HOW	12	17	85
HOOKER			1528	WEST LYNN DRIVE		NONE	HOW	12	05	85
TOBE			1900	W. SKYVIEW DRIVE		NONE	HOW	12	09	85
JOSEPH			3136	WESTVIEW DRIVE		NONE	HOW	12	10	85
MARSHALL, WENDELL	426	2846	2275	WHITEY MARSHALL DR		NONE	WAD	01	07	87
EQQUESTON, ROBERT			3144	WILLOW BEND EAST		NONE	HOW	12	07	85
HEATH, ROBERT, JR.			3181	WILLOWBEND DR		NONE	HOW	12	11	85
TROHATAS			3961	WILLOWCREST RD		NONE	HOW	12	04	85
BROWER			3980	WILLOW CREST RD		NONE	HOW	11	23	85
SCHRADER			3981	WILLOW CREST RD		NONE	HOW	12	07	85
COMBS			3987	WILLOW CREST RD		NONE	HOW	12	10	85
WILHELM			3991	WILLOW CREST RD		NONE	HOW	11	23	85
GROTTKE			3993	WILLOW CREST RD		NONE	HOW	11	23	85
ASHBAUGH, NOEL			3179	WINDMILL DRIVE		NONE	HOW	12	09	85
CLAYBURN			909	WINESAP DRIVE		NONE	HOW	12	06	85
SHEFFS, JOHN			3545	WOODGREEN DR		NONE	HOW	12		85
MILLER, OWEN			3585	WOODGREEN DR		NONE	HOW	12	06	85
HENDERSON, HAROLD	426	7034	3580	WOODGREEN DR		NONE	HOW	12	06	85
DAVIS			3592	WOODGREEN DR		NONE	HOW	12	11	85

NAME	PH.	PH.	HOUSE NUMBER	STREET	WELL (FEET)	CHEMICAL	LAB	M'	Y	YR
GRIESHOP, TERESA	426	3710	1001	WOODHAVEN		NONE	HOW	12	08	85
HEIL, WILBUR			1030	WOODHAVEN		NONE	HOW	12	05	85
BOHMER			4270	WOODLAND TERR.		1.6 ppb 1,1,1-TRICHLOROETHANE	HOW	12	16	85
MILLER			2759	WOODMONT DR.		NONE	HOW	12	11	85
ROSE, JO ANN			1566	WOODS DRIVE		NONE	HOW	12	12	85
FOGLE			1621	WOODS DRIVE		NONE	HOW	12	18	85
BAUGHN, DOROTHY	426	5115	1051	WYBURN WAY		NONE	HOW	12	09	85
FRAZIER, STEPHEN	426	2133	2872	ZIMMER		NONE	HOW	12	09	85
WRIGHT TOWNE PROP ASS			2492	ZINK ROAD		NONE	HOW	12	11	85

Appendix C
Tax Profiles

APPENDIX C
TOXICOLOGICAL PROFILES

Benzene

Benzene occurs environmentally as a result of both natural processes and human activity. Today, most benzene is produced from petroleum sources. Benzene has a long history of industrial use, most notably as a solvent and as a starting material for the synthesis of other chemicals.

Benzene evaporates easily, and exposure of the general public to benzene occurs mainly by breathing contaminated air. The major sources of benzene in air are gasoline and automobile exhaust, tobacco smoke, and industrial emissions. It has been estimated that 50% of the exposure to benzene in the United States is due to tobacco smoke. Household products, including glues, paints, furniture wax, and detergents, can also be a source of exposure.

Benzene is readily absorbed by inhalation and ingestion, but is absorbed to a lesser extent through the skin. Most of what is known about the human health effects of benzene exposure is based on studies of workers who were exposed for long periods to high concentrations of benzene.

Benzene is toxic to blood-forming organs and to the immune system. Excessive exposure (inhalation of concentrations of 10 to 100 parts per million [ppm]) can result in anemia, a weakened immune system, and headaches. Occupational exposure to benzene may be associated with spontaneous abortions and miscarriages (supported by limited animal data), and certain developmental abnormalities such as low birth weight, delayed bone formation, and bone marrow toxicity. Benzene is classified as a Group A human carcinogen based on numerous studies documenting excess leukemia mortality among occupationally exposed workers. An acute minimum risk level (MRL) of 0.002 ppm has been established for benzene in air based on animal studies of immunological effects.

1,1-Dichloroethene (1,1-DCE)

1,1-DCE is a man-made chemical that does not occur naturally in the environment. It is a clear, colorless liquid that has a mild, sweet, chloroform-like odor. 1,1-DCE is used to make plastic products such as Saran Wrap[®] and flame-retardant fabrics.

High levels of exposure to 1,1-DCE can occur among workers in plants making or using this chemical. Low levels of 1,1-DCE have been detected in the environment. 1,1-DCE can be detected at background levels of less than 1 ppm in indoor and outdoor air. Higher concentrations of 1,1-DCE have been found in air near factories that make or use 1,1-DCE and some chemical waste sites. Surveys of U.S. drinking water supplies have found a small percentage of drinking water supplies contain detectable 1,1-DCE.

1,1-DCE usually enters the body via inhalation and/or ingestion. It may also enter the body through the skin. The human health effects resulting from exposure to 1,1-DCE are unknown. In animal studies, brief exposures to high concentrations of 1,1-DCE have caused liver, kidney, heart, and lung damage, nervous system disorders, and death. Prolonged exposure to lower concentrations of 1,1-DCE has also produced liver damage.

An increased risk for cancer was observed in one study of animals exposed to 1,1-DCE, although most studies do not show an increased cancer risk. Based upon this one positive study, 1,1-DCE is classified as a Group C possible human carcinogen.

MRLs for short- and long-term exposures (also based on animal studies) are, respectively, 0.1 and 0.004 ppm in air and 4 and 10 ppm in food and/or water.

1,2-Dichloroethene (1,2-DCE)

1,2-DCE is a man-made flammable liquid with a sharp, harsh odor. 1,2-DCE is primarily used in the production of solvents and as an additive to dyes, lacquer solutions, perfumes, and thermoplastics. There are two forms of 1,2-DCE: cis-1,2-DCE, and trans-1,2-DCE, which may occur separately or as a mixture.

In the environment, 1,2-DCE evaporates rapidly. When 1,2-DCE is released to either surface soil or surface water, almost all of the chemical will evaporate into air. When 1,2-DCE occurs in the subsurface, such as in landfills and chemical waste sites, it can dissolve in water and migrate into groundwater. In groundwater, 1,2-DCE breaks down to vinyl chloride, which ultimately breaks down to water, carbon dioxide, and chloride ions. Vinyl chloride, the initial breakdown product, is more toxic than 1,2-DCE.

1,2-DCE can enter the body by drinking water, eating food, or breathing air that contains 1,2-DCE. Because 1,2-DCE evaporates readily, inhalation is the most likely route of human exposure. Inhalation of high levels of 1,2-DCE can cause nausea, drowsiness, dizziness, and may result in death. Liver, heart, and lung damage were observed in laboratory animals after short or long term exposure to 1,2-DCE in air. Liver and lung damage was reported in animals fed 1,2-DCE. Death can also occur in animals fed large amounts of 1,2-DCE. Changes in blood chemistry are the critical or most sensitive effect and serves as the basis for the RfD used in the SRE.

The long term health effects resulting from exposure to 1,2-DCE are not known. Increased risk of cancer has not been reported in humans or animals exposed to 1,2-DCE.

Ethylbenzene

Ethylbenzene is a colorless liquid with a gasoline-like odor. Ethylbenzene occurs naturally in coal tar and petroleum, and it is found in many synthetic products, including paints, inks, and insecticides. Gasoline contains roughly 2% ethylbenzene by weight.

Ethylbenzene evaporates easily into the air from soil or water. People living in urban areas or near factories or highways may be exposed to ethylbenzene in the air. Indoor air, on average, contains more ethylbenzene than outside air due to the buildup from household products such as cleaning products and paints. Tobacco smoke also contains ethylbenzene.

Ethylbenzene can potentially enter the body through inhalation of vapors, through dermal contact with gasoline, paint vapors, or glue vapors, or through ingestion of food or water containing its residues.

Humans exposed to high levels of ethylbenzene have exhibited signs of dizziness and lethargy. Low-level exposure has been associated with eye and throat irritation. No deaths have been reported among humans exposed to ethylbenzene.

Short-term exposure to high concentrations of ethylbenzene in air is associated with liver, kidney, and nervous system damage, and death in laboratory animals. However, these results are unclear, due to conflicting results and weakness in many of the studies.

There are no data on long-term health effects in humans exposed to ethylbenzene. One long-term study showed increased tumors in rats treated with ethylbenzene, but the study was flawed. EPA has placed ethylbenzene in Group D, not classified for carcinogenicity, because of limited laboratory data and lack of adequate human data. No MRLs are available for ethylbenzene.

Lead

Lead is a naturally occurring metal that is used in the manufacture of storage batteries and the production of ammunition and miscellaneous metal products (e.g., sheet lead, solder, and pipes). Other uses for lead are in the manufacturing of lead compounds including gasoline additives and pigments. In recent years, the quantity of lead used in paints, gasoline additives, ammunition, and solder has been reduced due to its toxic effects.

Lead can enter the body via ingestion and inhalation. Although it may also enter the body through the skin, dermal absorption of inorganic lead compounds is less significant than absorption through other routes. Children appear to be the segment of the population at greatest risk from toxic effects of lead. Children absorb about 50% of ingested lead whereas adults absorb only 5% to 15%. Initially, lead travels

in the blood to the soft tissues (heart, liver, kidney, brain, etc.), and then gradually redistributes to the bones and teeth where it tends to remain. Children retain a larger fraction of the absorbed lead, about 57% in the blood and soft tissue compartments whereas in adults roughly 95% of the total body burden of lead is found in bones and teeth.

The most serious effects associated with markedly elevated blood lead levels include neuro toxic effects such as irreversible brain damage. Health effects are the same for inhaled and ingested lead. At blood lead levels of 40 to 100 $\mu\text{g}/\text{dl}$, children have exhibited nerve damage, permanent mental retardation, colic, anemia, brain damage, and death. Chronic kidney disease is also evident at these levels. For most adults, such damage does not occur until blood lead levels exceed 100 $\mu\text{g}/\text{dl}$ to 120 $\mu\text{g}/\text{dl}$. At these levels, damage to the male reproductive system; miscarriages; anemia; severe digestive system symptoms; decreased reaction time; weakness in fingers, wrists, or ankles; and some increased risk of heart and circulatory system disease may be exhibited. Pregnant women are at increased risk from exposure to lead because of the inherent susceptibility of the fetus from transplacental transfer of maternal lead.

None of the epidemiology studies conducted to explore the relationship between lead exposure and increased cancer risk in humans found any relationship. However, animal studies have shown increased kidney cancer and central nervous system (CNS) cancer in rats and mice orally exposed to lead. EPA has classified lead as Group B2, probable human carcinogen.

Polychlorinated Biphenyls (PCBs)

PCBs are a class of compounds with varying degrees of chlorine substitution on two phenyl rings joined by a single bond between the 1 and 1' positions. Because of their thermal stability and resistance, low water solubility, and favorable dielectric properties, PCBs were widely used in hydraulic fluids, compressor lubricants, heat transfer fluids, paints, lacquers, and ink (EPA 1987).

Commercial PCB products consist of various complex mixtures of many of the 209 possible individual PCB isomers and congeners and have been marketed under trade names that vary with manufacturer and country of origin. The term "Aroclor" is the trade name of a series of PCB products formerly manufactured by Monsanto in the United States. The various Aroclor products were identified by a four-digit number. The first two digits identified the type of compound and the last two digits indicated the average weight percentage of chlorine. The only exception is Aroclor 1016, which retained the 1016 designation by which it was known during development. The chlorine percentage in Aroclor 1016 is similar to that of Aroclor 1242.

The uptake, distribution, metabolism, excretion, and toxicity of the individual congeners are all affected to a greater or lesser degree by the number and position of chlorine substituents on the biphenyl molecule. In general, a greater degree of chlorination increases absorption, favors deposition in the body's lipid stores, and slows metabolism and excretion, which is strongly dependent on metabolism.

The liver is the target organ most frequently associated with the toxic effects of PCBs. Hepatic effects have been seen in rats, mice, guinea pigs, rabbits, dogs, and monkeys. The toxic manifestations typically include liver enlargement, fat deposition, enzyme induction, and tissue necrosis. Hepatic effects, including liver enlargement and increases in hepatic enzyme levels, have also been reported in humans occupationally exposed to PCBs (Maroni *et al.* 1981a, b; Fishbein 1985; Alvares *et al.* 1977).

Exposure to PCBs both by dermal contact and by oral exposure has led to skin lesions in animals. Exudative lesions have been seen in rats, and monkeys exhibit chloracne-like lesions (EPA 1988). Various skin lesions, including rashes, burning sensations, acne, hyper pigmentation of the skin, and other manifestations, have been seen in humans occupationally exposed to PCBs, and in victims of two accidental poisoning episodes in which PCBs were ingested (EPA 1988).

Developmental effects have also been reported in humans following PCB exposures. In a series of studies (Fein *et al.* 1984a, 1984b; Jacobson *et al.* 1990a, 1990b), neuro-developmental effects were reported in children of women who consumed PCB-contaminated fish from Lake Michigan before and during pregnancy. Intrauterine exposure was associated with lower birth weight, deficits in visual recognition memory in infancy, and short-term memory deficits at age 4. Exposure to PCBs in breast milk was associated with reduced activity levels at age 4. As often occurs in epidemiological studies, methodologies including the validity of the exposure assessment, selection of the exposed and control samples, and comparability of the exposed and control samples have been criticized (Paneth 1991).

PCB exposure has resulted in decreased reproductive success and reproductive failure in mink, monkeys, and rats. Few studies on reproductive effects in humans have been conducted; however, the weight of evidence from animal studies suggests that PCBs cause adverse reproductive effects in humans.

A number of studies have found PCBs (specifically Aroclor 1260 and 1254, and Clophen A-30 and Clophen A-60) to be carcinogenic in rats and mice. In the animal studies, the carcinogenic effects were much more pronounced in females exposed to PCBs with higher levels of chlorination (Aroclor 1254 and 1260).

The possible carcinogenicity of PCBs in humans has been investigated in several epidemiological studies of individuals occupationally exposed to PCBs in the capacitor and electrical equipment manufacturing industries (Brown and Jones 1981; Brown 1986; Bertazzi *et al.* 1987; and Gustavsson, Hogstedt, and Rappe 1986) and in individuals who accidentally ingested PCBs in Japan (Yusho incident) (Kuratsune *et al.* 1987). To date, the occupational studies have not shown a consistent tumorigenic effect due to PCB exposures. A statistically significant increase in liver cancers was found in victims of the Yusho incident, but only among individuals living in one prefecture. The PCBs ingested by these individuals also contained polychlorinated dibenzofurans (PCDFs) and polychlorinated quatrphenyls, which also could have been responsible for or contributed to the effects. The Yusho results are therefore inconclusive.

EPA's Carcinogen Assessment Group has classified PCBs in weight-of-evidence group B2: probable human carcinogen based on sufficient evidence in animals and insufficient evidence in humans.

Tetrachloroethene (Perchloroethylene, PCE)

PCE is a man-made chemical that is widely used for dry-cleaning fabrics, for metals degreasing operations, and in the manufacture of other chemicals. Most PCE released into surface soil or surface water will rapidly evaporate into the air. PCE dissolves in water and can contaminate groundwater. PCE biodegrades slowly in groundwater. Some of the breakdown products of PCE are also hazardous chemicals such as trichloroethylene and vinyl chloride. Detectable background levels of PCE frequently occur in air and less frequently occur in drinking water.

Humans may be exposed to PCE by breathing air or ingesting food or water that has been contaminated with it. For the general public, inhalation is the most likely route of exposure. PCE can occur in many household products, including suede protectors, water repellents, spot removers, and wood cleaners. Exposure to high concentrations in air, particularly in confined areas, can cause central nervous system effects, which may be expressed as dizziness, headache, sleepiness, confusion, nausea, and possibly unconsciousness and death.

Animal studies, conducted with concentrations much higher than those usually encountered in the environment, suggest that PCE can cause liver and kidney damage, developmental effects on fetuses, and toxicity to pregnant animals. Liver toxicity is the critical, or most sensitive effect and serves as the basis for the RfD used in the risk assessment.

PCE causes liver and kidney cancer in mice and rats. There are conflicting results from studies of human PCE exposure in relationship to increased cancer risk. Based on the evidence from animal studies, EPA has classified PCE as a Group B2, probable human carcinogen.

MRLs have been derived based on non-cancer effects for short-term and long-term inhalation exposure of PCE, and long-term oral exposure. The MRLs for short-term and long-term exposure by inhalation are 1 ppm and 0.0125 ppm in air, respectively. The MRL for long-term oral exposure is 0.125 mg/kg-day.

Toluene

Toluene is used as a solvent in the production of a variety of products and as a constituent in the formulation of gasoline and aviation fuels. Toluene can enter and affect the body if it is inhaled, comes in contact with the eyes or skin, or is swallowed.

Exposure to toluene can cause a number of CNS effects. Fatigue, weakness, confusion, headache, dizziness, drowsiness, and irritation of the eyes, respiratory tract, and skin have been reported in association with occupational exposure to airborne concentrations of toluene ranging from 50 ppm to 1.5 ppm. Symptoms generally increase in severity with increased exposures.

Toluene does not appear to cause cancer in humans or animals. No increased risk of cancer was detected in studies of occupationally exposed men, and toluene has not been shown to cause cancer in rats and mice exposed via inhalation.

The MRL for short-term exposure to toluene in air is 1 ppm. The MRL for long-term exposure to toluene in air is 0.3 ppm (1.1 mg/m³). The MRLs for oral exposure to toluene are 460 ppm and 84 ppm for short- and long-term exposures, respectively.

1,1,1-Trichloroethane (1,1,1-TCA)

1,1,1-TCA is a man-made chemical with a variety of industrial and household uses. It is used as a degreaser for manufactured metal parts, as a solvent to dissolve glue and paint, and is often found in spot removers. Much of the 1,1,1-TCA produced in the United States ends up in the atmosphere as a result of evaporation during use. 1,1,1-TCA released onto or into the ground can migrate into groundwater.

Inhalation is the major route of exposure in humans, but exposure can also occur through the consumption of contaminated food and water and by skin contact with 1,1,1-TCA-contaminated soil and water.

1,1,1-TCA is readily absorbed into the body following exposure by inhalation of air containing the vapor or ingestion of water or food containing 1,1,1-TCA. It also readily leaves the body with exhaled air.

Human inhalation of high levels of 1,1,1-TCA over a short period of time has resulted in CNS effects such as dizziness, light-headedness, and loss of balance and coordination. These health effects are readily reversible when exposure stops.

Studies in animals and humans have shown that mild liver effects result from long-term exposure. Kidney damage has also been reported in animal studies.

Chronic animal cancer studies were done on mice and rats dosed orally. No consistent pattern of an increased incidence of cancer was found, but the study was of limited value because of the death of many of the test animals. It is not known whether 1,1,1-TCA causes cancer in humans.

Trichloroethene (TCE)

TCE is a man-made chemical widely used as a cleaning agent and solvent for degreasing operations. Most TCE released into surface water or surficial soil will rapidly evaporate into the air. In the subsurface, TCE is moderately to highly mobile and can migrate to groundwater. TCE biodegrades very slowly in subsurface soils and groundwater. Microbial degradation products include dichloroethylene and vinyl chloride.

Humans are most likely to be exposed to TCE in air. TCE also may occur in drinking water supplies and consumer products including metal cleaners, spot removers, rug cleaning fluids, paints, and paint removers. TCE may cause adverse health effects following exposure via inhalation, ingestion, or skin or eye contact. Exposure to high levels of TCE can cause central nervous system effects including drowsiness, dizziness, headache, blurred vision, lack of coordination, mental confusion, flushed skin, tremors, nausea, vomiting, fatigue, irregular heartbeat, and, in some cases, death. In the past, TCE was used as an anesthetic, but that use was discontinued when it was found to cause irregular heartbeats. Chronic exposure to TCE can cause liver damage and skin reactions, as well as central nervous system effects.

Exposure of laboratory animals to TCE has been associated with an increased incidence of a variety of tumors, including kidney, liver, and lung cancers. However, it is uncertain whether people exposed to TCE have a higher risk of cancer. TCE is considered a Group B2 probable human carcinogen.

Vinyl Chloride (VC)

VC, which is a gas or pressurized liquid at ambient temperature, is primarily used in the chemical manufacturing industry in the production of polymeric chemicals that are in turn used to manufacture a variety of plastic products. In addition, VC is a known degradation product of many chlorinated solvents including tetra-, tri-, and dichloroethenes. Most of the VC in the environment comes from the plastic industry's releases to air or water. In surface water or surface soil, VC evaporates readily. Once in the air, VC breaks down rapidly to nonhazardous chemicals. VC can dissolve in water and migrate to groundwater. Once in the groundwater, VC can persist for many years.

People are most likely to be exposed to VC in the air, although it is also possible to be exposed to VC in drinking water. Levels of VC have not been detected in background air samples, but it has been detected in the air near some plastics factories, landfills, and chemical waste sites. VC has also been detected in tobacco smoke.

VC may cause adverse health effects following exposure by inhalation, ingestion, or dermal or eye contact. VC inhalation can cause dizziness or sleepiness. Breathing very high levels of VC can cause unconsciousness and in some cases, death. On skin, exposure to liquid VC can cause burns. Non cancer effects associated with long-term occupational VC exposure include hepatitis-like changes in the liver, immune reactions, and nerve damage.

VC has been shown to cause liver and lung cancer in rats, and liver cancer in workers occupationally exposed to air concentrations in the range of 25 parts per million (ppm) to greater than 200 ppm. Based on this evidence, EPA has classified VC as a Group A human carcinogen.

Xylenes

Xylenes are components of coal tar and petroleum; however, the majority of xylenes used commercially are man-made. There are three isomers of xylene (ortho-, meta-, and para-xylene), which can occur as a mixture, and are referred to collectively here as xylenes. Xylenes are used in solvent mixtures and cleaning agents, and are components of airplane fuel and gasoline.

Xylene evaporates easily and is widespread in the environment. Xylene is released from industrial sources, automobile exhaust, operations employing it as a solvent, and chemical waste disposal sites. Xylene can be detected in air in cities and industrial areas, and has been detected in some public drinking water supplies.

Exposure to xylene may occur by breathing xylene vapors, or by eating or drinking xylene-contaminated food or water. Xylene is rapidly absorbed following inhalation or ingestion. Short-term

human exposure to high levels of xylene in air (100 ppm to 230 ppm) causes irritation of the skin, eyes, nose, throat, increased reaction time to a visual stimuli, impaired memory, stomach discomfort, and possible changes in the liver and kidneys. Inhalation or ingestion of large concentrations of xylene may be fatal. There are no studies on the long-term effects of inhalation or ingestion of xylene by humans. Exposure of laboratory animals to high levels of xylene in air resulted in changes in the cardiovascular system, changes in liver weights, and hearing loss.

Decreased body weight and an increased number of birth defects were observed in unborn rats exposed to high concentrations of xylene. Decreased body weight is the critical or most sensitive effect. The effects of long-term exposure to low concentrations of xylene has not been extensively studied in animals. MRLs have not been derived for xylene.

Ingestion of xylenes did not cause increased cancer in rats or mice exposed via the oral route. Xylenes are not regarded as carcinogens. EPA has placed xylene in Group D, not classified for carcinogenicity.

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Appendix D
GW Risk Est.

APPENDIX D
GROUNDWATER RISK ESTIMATES

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1. ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3827 E. Patterson Rd.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Methylene chloride	5.4E-04	6.0E-02	1.9E-05	3.1E-04	7.5E-03	8.0E-06	6.0E-08
	Vinyl chloride	3.6E-02	NA	1.3E-03	--	1.9E+00	5.4E-04	1.0E-03
Totals for Ingestion of Water			3.1E-04			1.0E-03		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Methylene chloride	5.4E-04	8.6E-01	1.0E-04	1.2E-04	1.6E-03	4.3E-05	7.1E-08
	Vinyl chloride	3.6E-02	NA	6.8E-03	--	3.0E-01	2.9E-03	8.7E-04
Totals for Inhalation of Vapors from Tap Water			1.2E-04			8.7E-04		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Methylene chloride	5.4E-04	6.0E-02	1.9E-07	3.2E-06	7.5E-03	8.3E-08	6.2E-10
	Vinyl chloride	3.6E-02	NA	2.1E-05	--	1.9E+00	9.2E-06	1.7E-05
Totals for Dermal Absorption from Water			3.2E-06			1.7E-05		
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Methylene chloride	--	--	1.2E-04	4.3E-04	--	5.1E-05	1.3E-07
	Vinyl chloride	--	--	8.1E-03	--	--	3.5E-03	1.9E-03
Totals for Adult/Child (Int) Residents of 3827 E. Patterson Rd. Homes; RME Case			4.3E-04			1.9E-03		

Table D-1
Estimates of Potential Exposures and Risks for the Lammers Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3845 E. Patterson Rd.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Dichloroethane, 1,1-	1.4E-03	1.0E-01	5.0E-05	5.0E-04	NA	2.1E-05	--
	Dichloroethene, cis-1,2-	7.1E-03	1.0E-02	2.5E-04	2.5E-02	NA	--	--
	Dichloroethene, trans-1,2-	2.1E-03	2.0E-02	7.1E-05	3.6E-03	NA	--	--
	Vinyl chloride	1.9E-03	NA	6.6E-05	--	1.9E+00	2.8E-05	5.4E-05
Totals for Ingestion of Water			2.9E-02			5.4E-05		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Dichloroethane, 1,1-	1.4E-03	1.4E-01	2.7E-04	1.9E-03	NA	1.1E-04	--
	Dichloroethene, cis-1,2-	7.1E-03	1.0E-02	1.3E-03	1.3E-01	NA	--	--
	Dichloroethene, trans-1,2-	2.1E-03	2.0E-02	3.8E-04	1.9E-02	NA	--	--
	Vinyl chloride	1.9E-03	NA	3.5E-04	--	3.0E-01	1.5E-04	4.6E-05
Totals for Inhalation of Vapors from Tap Water			1.5E-01			4.6E-05		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Dichloroethane, 1,1-	1.4E-03	1.0E-01	1.0E-06	1.0E-05	NA	4.4E-07	--
	Vinyl chloride	1.9E-03	NA	1.1E-06	--	1.9E+00	4.8E-07	9.1E-07
Totals for Dermal Absorption from Water			1.0E-05			9.1E-07		
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Dichloroethane, 1,1-	--	--	3.2E-04	2.4E-03	--	1.4E-04	--
	Dichloroethene, cis-1,2-	--	--	1.6E-03	1.6E-01	--	--	--
	Dichloroethene, trans-1,2-	--	--	4.5E-04	2.3E-02	--	--	--
	Vinyl chloride	--	--	4.2E-04	--	--	1.8E-04	1.0E-04
Totals for Adult/Child (Int) Residents of 3845 E. Patterson Rd. Homes; RME Case			1.8E-01			1.0E-04		

Table D-1
Estimates of Potential Exposures and Risks for the Lammers Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		Cancer Risk
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	
Current Adult/Child (Int) Resident; RME Case								
3885 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Vinyl chloride	1.7E-03	NA	5.9E-05	--	1.9E+00	2.5E-05	4.8E-05
	Totals for Ingestion of Water		--					4.8E-05
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Vinyl chloride	1.7E-03	NA	3.2E-04	--	3.0E-01	1.4E-04	4.1E-05
	Totals for Inhalation of Vapors from Tap Water		--					4.1E-05
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Vinyl chloride	1.7E-03	NA	1.0E-06	--	1.9E+00	4.3E-07	8.2E-07
	Totals for Dermal Absorption from Water		--					8.2E-07
	Totals by Chemical		SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Vinyl chloride	--	--	3.8E-04	--	--	1.6E-04	9.0E-05
	Totals for Adult/Child (Int) Residents of 3885 E. Patterson Rd. Homes; RME Case		--					9.0E-05

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RFD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	I. ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3897 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02	
	Vinyl chloride	6.4E-04	NA	2.2E-05	--	1.9E+00	9.5E-06	1.8E-05
	Totals for Ingestion of Water				--			1.8E-05
	Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02	
	Vinyl chloride	6.4E-04	NA	1.2E-04	--	3.0E-01	5.1E-05	1.5E-05
	Totals for Inhalation of Vapors from Tap Water				--			1.5E-05
	Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01	
	Vinyl chloride	6.4E-04	NA	3.8E-07	--	1.9E+00	1.6E-07	3.1E-07
	Totals for Dermal Absorption from Water				--			3.1E-07
	Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01	
	Vinyl chloride	--	--	1.4E-04	--	--	6.1E-05	3.4E-05
	Totals for Adult/Child (Int) Residents of 3897 E. Patterson Rd. Homes; RME Case				--			3.4E-05

Table D-1
Estimates of Potential Exposures and Risks for the Lammers Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3898 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Vinyl chloride	4.8E-02	NA	1.7E-03	--	1.9E+00	7.1E-04	1.4E-03
	Totals for Ingestion of Water		--			1.4E-03		
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Vinyl chloride	4.8E-02	NA	8.9E-03	--	3.0E-01	3.8E-03	1.1E-03
	Totals for Inhalation of Vapors from Tap Water		--			1.1E-03		
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Vinyl chloride	4.8E-02	NA	2.8E-05	--	1.9E+00	1.2E-05	2.3E-05
	Totals for Dermal Absorption from Water		--			2.3E-05		
	Totals by Chemical		SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Vinyl chloride	--	--	1.1E-02	--	--	4.5E-03	2.5E-03
	Totals for Adult/Child (Int) Residents of 3898 E. Patterson Rd. Homes; RMECase		--			2.5E-03		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
<i>Current Adult/Child (Int) Resident; RME Case</i>								
3906 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02		SIF - Cancer = 1.49E-02		
	Dichloroethene, cis-1,2-	1.8E-02	1.0E-02	6.2E-04	6.2E-02	NA	--	--
	Methylene chloride	1.6E-03	6.0E-02	5.6E-05	9.3E-04	7.5E-03	2.4E-05	1.8E-07
	Vinyl chloride	1.0E-01	NA	3.6E-03	--	1.9E+00	1.5E-03	2.9E-03
	Totals for Ingestion of Water				6.3E-02			2.9E-03
	Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01		SIF - Cancer = 7.98E-02		
	Dichloroethene, cis-1,2-	1.8E-02	1.0E-02	3.3E-03	3.3E-01	NA	--	--
	Methylene chloride	1.6E-03	8.6E-01	3.0E-04	3.5E-04	1.6E-03	1.3E-04	2.1E-07
	Vinyl chloride	1.0E-01	NA	1.9E-02	--	3.0E-01	8.2E-03	2.5E-03
	Totals for Inhalation of Vapors from Tap Water				3.3E-01			2.5E-03
	Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01		SIF - Cancer = 1.38E-01		
	Methylene chloride	1.6E-03	6.0E-02	5.7E-07	9.5E-06	7.5E-03	2.5E-07	1.8E-09
	Vinyl chloride	1.0E-01	NA	6.0E-05	--	1.9E+00	2.6E-05	4.9E-05
	Totals for Dermal Absorption from Water				9.5E-06			4.9E-05
	Totals by Chemical			SIF - Noncancer = 2.21E-01		SIF - Cancer = 9.47E-02		
	Dichloroethene, cis-1,2-	--	--	3.9E-03	3.9E-01	--	--	--
	Methylene chloride	--	--	3.5E-04	1.3E-03	--	1.5E-04	3.9E-07
	Vinyl chloride	--	--	2.3E-02	--	--	9.8E-03	5.4E-03
	Totals for Adult/Child (Int) Residents of 3906 E. Patterson Rd. Homes; RME Case				3.9E-01			5.4E-03

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3913 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Chloroform	3.8E-04	1.0E-02	1.3E-05	1.3E-03	6.1E-03	5.6E-06	3.4E-08
	Totals for Ingestion of Water		1.3E-03			3.4E-08		
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Chloroform	3.8E-04	1.1E-02	7.0E-05	6.4E-03	8.0E-02	3.0E-05	2.4E-06
	Totals for Inhalation of Vapors from Tap Water		6.4E-03			2.4E-06		
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Chloroform	3.8E-04	1.0E-02	2.7E-07	2.7E-05	6.1E-03	1.1E-07	7.0E-10
	Totals for Dermal Absorption from Water		2.7E-05			7.0E-10		
	Totals by Chemical		SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Chloroform	--	--	8.3E-05	7.7E-03	--	3.6E-05	2.5E-06
	Totals for Adult/Child (Int) Residents of 3913 E. Patterson Rd. Homes; RMECase		7.7E-03			2.5E-06		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LAADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3920 E. Patterson Rd.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Benzene	3.8E-04	1.7E-03	1.3E-05	7.7E-03	2.9E-02	5.7E-06	1.6E-07
	Dichloroethane, 1,1-	2.0E-03	1.0E-01	6.9E-05	6.9E-04	NA	3.0E-05	--
	Dichloroethene, 1,1-	7.0E-04	9.0E-03	2.4E-05	2.7E-03	6.0E-01	1.0E-05	6.2E-06
	Dichloroethene, cis-1,2-	7.3E-02	1.0E-02	2.5E-03	2.5E-01	NA	--	--
	Dichloroethene, trans-1,2-	9.9E-04	2.0E-02	3.4E-05	1.7E-03	NA	--	--
	Methylene chloride	1.1E-03	6.0E-02	3.7E-05	6.2E-04	7.5E-03	1.6E-05	1.2E-07
	Vinyl chloride	4.6E-02	NA	1.6E-03	--	1.9E+00	6.8E-04	1.3E-03
	Totals for Ingestion of Water				2.7E-01			1.3E-03
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Benzene	3.8E-04	1.7E-03	7.1E-05	4.1E-02	2.9E-02	3.0E-05	8.8E-07
	Dichloroethane, 1,1-	2.0E-03	1.4E-01	3.7E-04	2.6E-03	NA	1.6E-04	--
	Dichloroethene, 1,1-	7.0E-04	9.0E-03	1.3E-04	1.4E-02	1.7E-01	5.6E-05	9.8E-06
	Dichloroethene, cis-1,2-	7.3E-02	1.0E-02	1.4E-02	1.4E+00	NA	--	--
	Dichloroethene, trans-1,2-	9.9E-04	2.0E-02	1.8E-04	9.2E-03	NA	--	--
	Methylene chloride	1.1E-03	8.6E-01	2.0E-04	2.3E-04	1.6E-03	8.5E-05	1.4E-07
	Vinyl chloride	4.6E-02	NA	8.6E-03	--	3.0E-01	3.7E-03	1.1E-03
	Totals for Inhalation of Vapors from Tap Water				1.4E+00			1.1E-03
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Benzene	3.8E-04	1.7E-03	6.2E-07	3.6E-04	2.9E-02	2.7E-07	7.8E-09
	Dichloroethane, 1,1-	2.0E-03	1.0E-01	1.4E-06	1.4E-05	NA	6.0E-07	--
	Dichloroethene, 1,1-	7.0E-04	9.0E-03	8.8E-07	9.8E-05	6.0E-01	3.8E-07	2.3E-07
	Methylene chloride	1.1E-03	6.0E-02	3.8E-07	6.4E-06	7.5E-03	1.6E-07	1.2E-09
	Vinyl chloride	4.6E-02	NA	2.7E-05	--	1.9E+00	1.2E-05	2.2E-05
	Totals for Dermal Absorption from Water				4.8E-04			2.2E-05

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (<i>i</i>)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
	Totals by Chemical							
				SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01	
	Benzene	--	--	8.5E-05	4.9E-02	--	3.6E-05	1.1E-06
	Dichloroethane, 1,1-	--	--	4.4E-04	3.3E-03	--	1.9E-04	--
	Dichloroethene, 1,1-	--	--	1.6E-04	1.7E-02	--	6.7E-05	1.6E-05
	Dichloroethene, cis-1,2-	--	--	1.6E-02	1.6E+00	--	--	--
	Dichloroethene, trans-1,2-	--	--	2.2E-04	1.1E-02	--	--	--
	Methylene chloride	--	--	2.4E-04	8.5E-04	--	1.0E-04	2.6E-07
	Vinyl chloride	--	--	1.0E-02	--	--	4.4E-03	2.4E-03
	Totals for Adult/Child (Int) Residents of 3920 E. Patterson Rd. Homes; RMECase				1.7E+00			2.4E-03
3928 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer =	
	Dichloroethene, cis-1,2-	8.6E-03	1.0E-02	3.0E-04	3.0E-02	NA	--	--
	Totals for Ingestion of Water				3.0E-02			--
	Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer =	
	Dichloroethene, cis-1,2-	8.6E-03	1.0E-02	1.6E-03	1.6E-01	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				1.6E-01			--
	Totals by Chemical			SIF - Noncancer = 2.21E-01			SIF - Cancer =	
	Dichloroethene, cis-1,2-	--	--	1.9E-03	1.9E-01	--	--	--
	Totals for Adult/Child (Int) Residents of 3928 E. Patterson Rd. Homes; RMECase				1.9E-01			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
3999 E. Patterson Rd.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Benzene	1.0E-03	1.7E-03	3.6E-05	2.1E-02	2.9E-02	1.5E-05	4.4E-07
	Ethylbenzene	5.1E-04	1.0E-01	1.8E-05	1.8E-04	NA	--	--
	Toluene	2.5E-03	2.0E-01	8.5E-05	4.3E-04	NA	--	--
	Xylenes	2.6E-03	2.0E+00	9.1E-05	4.6E-05	NA	--	--
Totals for Ingestion of Water			2.2E-02			4.4E-07		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Benzene	1.0E-03	1.7E-03	1.9E-04	1.1E-01	2.9E-02	8.2E-05	2.4E-06
	Ethylbenzene	5.1E-04	2.9E-01	9.5E-05	3.3E-04	NA	--	--
	Toluene	2.5E-03	1.1E-01	4.6E-04	4.0E-03	NA	--	--
	Xylenes	2.6E-03	2.0E+00	4.9E-04	2.4E-04	NA	--	--
Totals for Inhalation of Vapors from Tap Water			1.2E-01			2.4E-06		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Benzene	1.0E-03	1.7E-03	1.7E-06	9.9E-04	2.9E-02	7.2E-07	2.1E-08
	Ethylbenzene	5.1E-04	1.0E-01	2.6E-06	2.6E-05	NA	--	--
	Toluene	2.5E-03	2.0E-01	8.5E-06	4.3E-05	NA	--	--
Totals for Dermal Absorption from Water			1.1E-03			2.1E-08		
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Benzene	--	--	2.3E-04	1.3E-01	--	9.8E-05	2.9E-06
	Ethylbenzene	--	--	1.2E-04	5.4E-04	--	--	--
	Toluene	--	--	5.5E-04	4.5E-03	--	--	--
	Xylenes	--	--	5.8E-04	2.9E-04	--	--	--
Totals for Adult/Child (Int) Residents of 3999 E. Patterson Rd. Homes; RME Case			1.4E-01			2.9E-06		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1. ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
4014 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Chloroform	3.5E-04	1.0E-02	1.2E-05	1.2E-03	6.1E-03	5.2E-06	3.2E-08
	Xylenes	5.6E-04	2.0E+00	1.9E-05	9.7E-06	NA	--	--
	Totals for Ingestion of Water				1.2E-03			3.2E-08
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Chloroform	3.5E-04	1.1E-02	6.5E-05	5.9E-03	8.0E-02	2.8E-05	2.2E-06
	Xylenes	5.6E-04	2.0E+00	1.0E-04	5.2E-05	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				6.0E-03			2.2E-06
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Chloroform	3.5E-04	1.0E-02	2.5E-07	2.5E-05	6.1E-03	1.1E-07	6.5E-10
	Totals for Dermal Absorption from Water				2.5E-05			6.5E-10
	Totals by Chemical		SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Chloroform	--	--	7.8E-05	7.2E-03	--	3.3E-05	2.3E-06
	Xylenes	--	--	1.2E-04	6.2E-05	--	--	--
	Totals for Adult/Child (Int) Residents of 4014 E. Patterson Rd. Homes; RME Case				7.2E-03			2.3E-06

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1162 Fergus Dr.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 3.47E-02			SIF - Cancer =		
	Trichloroethane, 1,1,1-	2.9E-04	9.0E-02	1.0E-05	1.1E-04	NA	--	--
	Totals for Ingestion of Water		1.1E-04			--		
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 1.86E-01			SIF - Cancer =		
	Trichloroethane, 1,1,1-	2.9E-04	2.9E-01	5.4E-05	1.9E-04	NA	--	--
	Totals for Inhalation of Vapors from Tap Water		1.9E-04			--		
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 3.21E-01			SIF - Cancer =		
	Trichloroethane, 1,1,1-	2.9E-04	9.0E-02	3.9E-07	4.3E-06	NA	--	--
	Totals for Dermal Absorption from Water		4.3E-06			--		
	Totals by Chemical		SIF - Noncancer = 5.42E-01			SIF - Cancer =		
	Trichloroethane, 1,1,1-	--	--	6.4E-05	3.0E-04	--	--	--
	Totals for Adult/Child (Int) Residents of 1162 Fergus Dr. Homes: RME Case		3.0E-04			--		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1174 Fergus Dr.								
	Pathway 1A: Ingestion of Water							
	Dichlorodifluoromethane	2.8E-03	2.0E-01	9.9E-05	4.9E-04	NA	--	--
	Totals for Ingestion of Water				4.9E-04			--
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Dichlorodifluoromethane	2.8E-03	5.7E-02	5.3E-04	9.3E-03	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				9.3E-03			--
	Pathway 1C: Dermal Absorption from Water							
	Dichlorodifluoromethane	2.8E-03	2.0E-01	2.7E-06	1.3E-05	NA	--	--
	Totals for Dermal Absorption from Water				1.3E-05			--
	Totals by Chemical							
	Dichlorodifluoromethane	--	--	6.3E-04	9.8E-03	--	--	--
	Totals for Adult/Child (Int) Residents of 1174 Fergus Dr. Homes; RMECase				9.8E-03			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1145 Kenora Circle								
	Pathway 1A: Ingestion of Water							
	Trichloroethene	2.9E-04	NA	1.0E-05	--	1.1E-02	4.3E-06	4.7E-08
	Totals for Ingestion of Water				--			4.7E-08
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethene	2.9E-04	NA	5.4E-05	--	6.0E-03	2.3E-05	1.4E-07
	Totals for Inhalation of Vapors from Tap Water				--			1.4E-07
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethene	2.9E-04	NA	3.5E-07	--	1.1E-02	1.5E-07	1.7E-09
	Totals for Dermal Absorption from Water				--			1.7E-09
	Totals by Chemical							
	Trichloroethene	--	--	6.4E-05	--	--	2.7E-05	1.9E-07
	Totals for Adult/Child (Int) Residents of 1145 Kenora Circle Homes; RME Case				--			1.9E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1149 Kenora Circle								
	Pathway 1A: Ingestion of Water							
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	7.7E-05	8.6E-04	NA	--	--
	Totals for Ingestion of Water				8.6E-04			
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethane, 1,1,1-	2.2E-03	2.9E-01	4.1E-04	1.4E-03	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				1.4E-03			
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	3.0E-06	3.3E-05	NA	--	--
	Totals for Dermal Absorption from Water				3.3E-05			
	Totals by Chemical							
	Trichloroethane, 1,1,1-	--	--	4.9E-04	2.3E-03	--	--	--
	Totals for Adult/Child (Int) Residents of 1149 Kenora Circle Homes; RME Case				2.3E-03			

Table D-1
Estimates of Potential Exposures and Risks for the Lammers Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		Cancer Risk
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	
Current Adult/Child (Int) Resident; RME Case								
1152 Kenora Circle								
	Pathway 1A: Ingestion of Water							
	Trichloroethane, 1,1,1-	1.9E-03	9.0E-02	6.4E-05	7.1E-04	NA	--	--
	Totals for Ingestion of Water				7.1E-04			--
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethane, 1,1,1-	1.9E-03	2.9E-01	3.4E-04	1.2E-03	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				1.2E-03			--
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethane, 1,1,1-	1.9E-03	9.0E-02	2.5E-06	2.7E-05	NA	--	--
	Totals for Dermal Absorption from Water				2.7E-05			--
	Totals by Chemical							
	Trichloroethane, 1,1,1-	--	--	4.1E-04	1.9E-03	--	--	--
	Totals for Adult/Child (Int) Residents of 1152 Kenora Circle Homes; RMECase				1.9E-03			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1164 Kenora Circle								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Dichloroethane, 1,1-	1.2E-02	1.0E-01	4.1E-04	4.1E-03	NA	1.7E-04	--
	Dichloroethene, cis-1,2-	5.9E-03	1.0E-02	2.0E-04	2.0E-02	NA	--	--
	Dichloroethene, trans-1,2-	1.4E-03	2.0E-02	4.7E-05	2.4E-03	NA	--	--
	Tetrachloroethene	1.3E-02	1.0E-02	4.6E-04	4.6E-02	5.2E-02	2.0E-04	1.0E-05
	Trichloroethane, 1,1,1-	5.0E-03	9.0E-02	1.7E-04	1.9E-03	NA	--	--
	Trichloroethene	5.9E-03	NA	2.0E-04	--	1.1E-02	8.8E-05	9.7E-07
	Totals for Ingestion of Water				7.5E-02			1.1E-05
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Dichloroethane, 1,1-	1.2E-02	1.4E-01	2.2E-03	1.5E-02	NA	9.4E-04	--
	Dichloroethene, cis-1,2-	5.9E-03	1.0E-02	1.1E-03	1.1E-01	NA	--	--
	Dichloroethene, trans-1,2-	1.4E-03	2.0E-02	2.5E-04	1.3E-02	NA	--	--
	Tetrachloroethene	1.3E-02	1.0E-02	2.5E-03	2.5E-01	2.0E-03	1.1E-03	2.2E-06
	Trichloroethane, 1,1,1-	5.0E-03	2.9E-01	9.3E-04	3.3E-03	NA	--	--
	Trichloroethene	5.9E-03	NA	1.1E-03	--	6.0E-03	4.7E-04	2.8E-06
	Totals for Inhalation of Vapors from Tap Water				3.9E-01			5.0E-06
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Dichloroethane, 1,1-	1.2E-02	1.0E-01	8.3E-06	8.3E-05	NA	3.6E-06	--
	Tetrachloroethene	1.3E-02	1.0E-02	4.1E-05	4.1E-03	5.2E-02	1.8E-05	9.2E-07
	Trichloroethane, 1,1,1-	5.0E-03	9.0E-02	6.7E-06	7.4E-05	NA	--	--
	Trichloroethene	5.9E-03	NA	7.3E-06	--	1.1E-02	3.1E-06	3.4E-08
	Totals for Dermal Absorption from Water				4.3E-03			9.5E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Dichloroethane, 1,1-	--	--	2.6E-03	1.9E-02	--	1.1E-03	--
	Dichloroethene, cis-1,2-	--	--	1.3E-03	1.3E-01	--	--	--
	Dichloroethene, trans-1,2-	--	--	3.0E-04	1.5E-02	--	--	--
	Tetrachloroethene	--	--	3.0E-03	3.0E-01	--	1.3E-03	1.3E-05
	Trichloroethane, 1,1,1-	--	--	1.1E-03	5.3E-03	--	--	--
	Trichloroethene	--	--	1.3E-03	--	--	5.6E-04	3.8E-06
Totals for Adult/Child (Int) Residents of 1164 Kenora Circle Homes; RMECase					4.7E-01			1.7E-05
1158 Richfield Cntr.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Trichloroethene	1.1E-03	NA	3.8E-05	--	1.1E-02	1.6E-05	1.8E-07
Totals for Ingestion of Water					--			1.8E-07
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Trichloroethene	1.1E-03	NA	2.0E-04	--	6.0E-03	8.7E-05	5.2E-07
Totals for Inhalation of Vapors from Tap Water					--			5.2E-07
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Trichloroethene	1.1E-03	NA	1.3E-06	--	1.1E-02	5.8E-07	6.3E-09
Totals for Dermal Absorption from Water					--			6.3E-09
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Trichloroethene	--	--	2.4E-04	--	--	1.0E-04	7.1E-07
Totals for Adult/Child (Int) Residents of 1158 Richfield Cntr. Homes; RMECase					--			7.1E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	I.LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1148 Rosendale Dr.								
	Pathway 1A: Ingestion of Water							
	Trichloroethene	2.3E-03	NA	8.1E-05	--	1.1E-02	3.5E-05	3.8E-07
	Totals for Ingestion of Water				--			3.8E-07
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethene	2.3E-03	NA	4.3E-04	--	6.0E-03	1.9E-04	1.1E-06
	Totals for Inhalation of Vapors from Tap Water				--			1.1E-06
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethene	2.3E-03	NA	2.9E-06	--	1.1E-02	1.2E-06	1.4E-08
	Totals for Dermal Absorption from Water				--			1.4E-08
	Totals by Chemical							
	Trichloroethene	--	--	5.2E-04	--	--	2.2E-04	1.5E-06
	Totals for Adult/Child (Int) Residents of 1148 Rosendale Dr. Homes; RMECase				--			1.5E-06

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1162 Rosendale Dr.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Dichloroethane, 1,1-	1.9E-03	1.0E-01	6.4E-05	6.4E-04	NA	2.8E-05	--
	Dichloroethene, cis-1,2-	2.9E-03	1.0E-02	1.0E-04	1.0E-02	NA	--	--
	Dichloroethene, trans-1,2-	8.1E-04	2.0E-02	2.8E-05	1.4E-03	NA	--	--
	Tetrachloroethene	4.3E-03	1.0E-02	1.5E-04	1.5E-02	5.2E-02	6.4E-05	3.3E-06
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	7.7E-05	8.6E-04	NA	--	--
	Trichloroethene	5.0E-03	NA	1.7E-04	--	1.1E-02	7.5E-05	8.2E-07
	Totals for Ingestion of Water				2.8E-02			4.2E-06
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Dichloroethane, 1,1-	1.9E-03	1.4E-01	3.4E-04	2.4E-03	NA	1.5E-04	--
	Dichloroethene, cis-1,2-	2.9E-03	1.0E-02	5.4E-04	5.4E-02	NA	--	--
	Dichloroethene, trans-1,2-	8.1E-04	2.0E-02	1.5E-04	7.5E-03	NA	--	--
	Tetrachloroethene	4.3E-03	1.0E-02	8.1E-04	8.1E-02	2.0E-03	3.5E-04	7.0E-07
	Trichloroethane, 1,1,1-	2.2E-03	2.9E-01	4.1E-04	1.4E-03	NA	--	--
	Trichloroethene	5.0E-03	NA	9.3E-04	--	6.0E-03	4.0E-04	2.4E-06
	Totals for Inhalation of Vapors from Tap Water				1.5E-01			3.1E-06
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Dichloroethane, 1,1-	1.9E-03	1.0E-01	1.3E-06	1.3E-05	NA	5.6E-07	--
	Tetrachloroethene	4.3E-03	1.0E-02	1.3E-05	1.3E-03	5.2E-02	5.7E-06	3.0E-07
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	3.0E-06	3.3E-05	NA	--	--
	Trichloroethene	5.0E-03	NA	6.2E-06	--	1.1E-02	2.6E-06	2.9E-08
	Totals for Dermal Absorption from Water				1.4E-03			3.3E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammar's Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration ()	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Dichloroethane, 1,1-	--	--	4.1E-04	3.1E-03	--	1.8E-04	--
	Dichloroethene, cis-1,2-	--	--	6.4E-04	6.4E-02	--	--	--
	Dichloroethene, trans-1,2-	--	--	1.8E-04	8.9E-03	--	--	--
	Tetrachloroethene	--	--	9.7E-04	9.7E-02	--	4.2E-04	4.3E-06
	Trichloroethane, 1,1,1-	--	--	4.9E-04	2.3E-03	--	--	--
	Trichloroethene	--	--	1.1E-03	--	--	4.8E-04	3.2E-06
Totals for Adult/Child (Int) Residents of 1162 Rosendale Dr. Homes; RME Case			1.8E-01			7.6E-06		
1182 Rosendale Dr.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Trichloroethene	6.8E-03	NA	2.3E-04	--	1.1E-02	1.0E-04	1.1E-06
Totals for Ingestion of Water			--			1.1E-06		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Trichloroethene	6.8E-03	NA	1.3E-03	--	6.0E-03	5.4E-04	3.2E-06
Totals for Inhalation of Vapors from Tap Water			--			3.2E-06		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Trichloroethene	6.8E-03	NA	8.3E-06	--	1.1E-02	3.6E-06	3.9E-08
Totals for Dermal Absorption from Water			--			3.9E-08		
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Trichloroethene	--	--	1.5E-03	--	--	6.4E-04	4.4E-06
Totals for Adult/Child (Int) Residents of 1182 Rosendale Dr. Homes; RME Case			--			4.4E-06		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1160 Stanwick Dr.								
	Pathway 1A: Ingestion of Water							
	Trichloroethene	8.8E-04	NA	3.0E-05	--	1.1E-02	1.3E-05	1.4E-07
	Totals for Ingestion of Water				--			1.4E-07
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethene	8.8E-04	NA	1.6E-04	--	6.0E-03	7.0E-05	4.2E-07
	Totals for Inhalation of Vapors from Tap Water				--			4.2E-07
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethene	8.8E-04	NA	1.1E-06	--	1.1E-02	4.6E-07	5.1E-09
	Totals for Dermal Absorption from Water				--			5.1E-09
	Totals by Chemical							
	Trichloroethene	--	--	1.9E-04	--	--	8.3E-05	5.7E-07
	Totals for Adult/Child (Int) Residents of 1160 Stanwick Dr. Homes; RME Case				--			5.7E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1197 Stanwick Dr.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Dichloroethane, 1,1-	1.8E-03	1.0E-01	6.2E-05	6.2E-04	NA	2.6E-05	--
	Trichloroethane, 1,1,1-	1.5E-03	9.0E-02	5.1E-05	5.7E-04	NA	--	--
	Vinyl chloride	3.7E-03	NA	1.3E-04	--	1.9E+00	5.5E-05	1.0E-04
Totals for Ingestion of Water			1.2E-03			1.0E-04		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Dichloroethane, 1,1-	1.8E-03	1.4E-01	3.3E-04	2.3E-03	NA	1.4E-04	--
	Trichloroethane, 1,1,1-	1.5E-03	2.9E-01	2.7E-04	9.6E-04	NA	--	--
	Vinyl chloride	3.7E-03	NA	6.9E-04	--	3.0E-01	2.9E-04	8.8E-05
Totals for Inhalation of Vapors from Tap Water			3.3E-03			8.8E-05		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Dichloroethane, 1,1-	1.8E-03	1.0E-01	1.3E-06	1.3E-05	NA	5.4E-07	--
	Trichloroethane, 1,1,1-	1.5E-03	9.0E-02	2.0E-06	2.2E-05	NA	--	--
	Vinyl chloride	3.7E-03	NA	2.2E-06	--	1.9E+00	9.3E-07	1.8E-06
Totals for Dermal Absorption from Water			3.4E-05			1.8E-06		
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Dichloroethane, 1,1-	--	--	3.9E-04	3.0E-03	--	1.7E-04	--
	Trichloroethane, 1,1,1-	--	--	3.3E-04	1.5E-03	--	--	--
	Vinyl chloride	--	--	8.2E-04	--	--	3.5E-04	1.9E-04
Totals for Adult/Child (Int) Residents of 1197 Stanwick Dr. Homes; RMECase			4.5E-03			1.9E-04		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
1185 Tralee Trail								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer = 1.49E-02		
	Dichloroethane, 1,1-	6.1E-03	1.0E-01	2.1E-04	2.1E-03	NA	9.0E-05	--
	Dichloroethene, cis-1,2-	2.6E-03	1.0E-02	8.9E-05	8.9E-03	NA	--	--
	Dichloroethene, trans-1,2-	8.6E-04	2.0E-02	3.0E-05	1.5E-03	NA	--	--
	Tetrachloroethene	6.8E-04	1.0E-02	2.4E-05	2.4E-03	5.2E-02	1.0E-05	5.3E-07
	Trichloroethane, 1,1,1-	3.6E-04	9.0E-02	1.2E-05	1.4E-04	NA	--	--
	Trichloroethene	4.6E-03	NA	1.6E-04	--	1.1E-02	6.9E-05	7.5E-07
Totals for Ingestion of Water			1.5E-02			1.3E-06		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer = 7.98E-02		
	Dichloroethane, 1,1-	6.1E-03	1.4E-01	1.1E-03	7.9E-03	NA	4.8E-04	--
	Dichloroethene, cis-1,2-	2.6E-03	1.0E-02	4.8E-04	4.8E-02	NA	--	--
	Dichloroethene, trans-1,2-	8.6E-04	2.0E-02	1.6E-04	8.0E-03	NA	--	--
	Tetrachloroethene	6.8E-04	1.0E-02	1.3E-04	1.3E-02	2.0E-03	5.5E-05	1.1E-07
	Trichloroethane, 1,1,1-	3.6E-04	2.9E-01	6.7E-05	2.3E-04	NA	--	--
	Trichloroethene	4.6E-03	NA	8.6E-04	--	6.0E-03	3.7E-04	2.2E-06
Totals for Inhalation of Vapors from Tap Water			7.7E-02			2.3E-06		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer = 1.38E-01		
	Dichloroethane, 1,1-	6.1E-03	1.0E-01	4.3E-06	4.3E-05	NA	1.8E-06	--
	Tetrachloroethene	6.8E-04	1.0E-02	2.1E-06	2.1E-04	5.2E-02	9.1E-07	4.7E-08
	Trichloroethane, 1,1,1-	3.6E-04	9.0E-02	4.8E-07	5.3E-06	NA	--	--
	Trichloroethene	4.6E-03	NA	5.7E-06	--	1.1E-02	2.4E-06	2.7E-08
Totals for Dermal Absorption from Water			2.6E-04			7.4E-08		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Adult/Child (Int) Resident; RME Case								
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer = 2.32E-01		
	Dichloroethane, 1,1-	--	--	1.3E-03	1.0E-02	--	5.8E-04	--
	Dichloroethene, cis-1,2-	--	--	5.7E-04	5.7E-02	--	--	--
	Dichloroethene, trans-1,2-	--	--	1.9E-04	9.5E-03	--	--	--
	Tetrachloroethene	--	--	1.5E-04	1.5E-02	--	6.6E-05	6.9E-07
	Trichloroethane, 1,1,1-	--	--	7.9E-05	3.8E-04	--	--	--
	Trichloroethene	--	--	1.0E-03	--	--	4.4E-04	3.0E-06
Totals for Adult/Child (Int) Residents of 1185 Tralee Trail Homes; RME Case					9.2E-02			3.7E-06
1186 Tralee Trail								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 3.47E-02			SIF - Cancer =		
	Dichlorodifluoromethane	9.4E-04	2.0E-01	3.3E-05	1.6E-04	NA	--	--
Totals for Ingestion of Water					1.6E-04			--
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 1.86E-01			SIF - Cancer =		
	Dichlorodifluoromethane	9.4E-04	5.7E-02	1.8E-04	3.1E-03	NA	--	--
Totals for Inhalation of Vapors from Tap Water					3.1E-03			--
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 3.21E-01			SIF - Cancer =		
	Dichlorodifluoromethane	9.4E-04	2.0E-01	8.9E-07	4.4E-06	NA	--	--
Totals for Dermal Absorption from Water					4.4E-06			--
Totals by Chemical			SIF - Noncancer = 5.42E-01			SIF - Cancer =		
	Dichlorodifluoromethane	--	--	2.1E-04	3.2E-03	--	--	--
Totals for Adult/Child (Int) Residents of 1186 Tralee Trail Homes; RME Case					3.2E-03			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LAfI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3827 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water							
			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Methylene chloride	5.4E-04	6.0E-02	3.5E-05	5.8E-04	7.5E-03	3.0E-06	2.2E-08
	Vinyl chloride	3.6E-02	NA	2.3E-03	--	1.9E+00	2.0E-04	3.8E-04
	Totals for Ingestion of Water				5.8E-04			3.8E-04
	Pathway 1B: Inhalation of Vapors from Tap Water							
			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Methylene chloride	5.4E-04	8.6E-01	2.1E-04	2.4E-04	1.6E-03	1.8E-05	2.9E-08
	Vinyl chloride	3.6E-02	NA	1.4E-02	--	3.0E-01	1.2E-03	3.6E-04
	Totals for Inhalation of Vapors from Tap Water				2.4E-04			3.6E-04
	Pathway 1C: Dermal Absorption from Water							
			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Methylene chloride	5.4E-04	6.0E-02	3.1E-07	5.1E-06	7.5E-03	2.6E-08	2.0E-10
	Vinyl chloride	3.6E-02	NA	3.4E-05	--	1.9E+00	2.9E-06	5.5E-06
	Totals for Dermal Absorption from Water				5.1E-06			5.5E-06
	Totals by Chemical							
			SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Methylene chloride	--	--	2.4E-04	8.2E-04	--	2.1E-05	5.2E-08
	Vinyl chloride	--	--	1.6E-02	--	--	1.4E-03	7.5E-04
	Totals for Child Residents of 3827 E. Patterson Rd. Homes; RMECase				8.2E-04			7.5E-04

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RFD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	IADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3845 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Dichloroethane, 1,1-	1.4E-03	1.0E-01	9.2E-05	9.2E-04	NA	7.9E-06	--
	Dichloroethene, cis-1,2-	7.1E-03	1.0E-02	4.6E-04	4.6E-02	NA	--	--
	Dichloroethene, trans-1,2-	2.1E-03	2.0E-02	1.3E-04	6.6E-03	NA	--	--
	Vinyl chloride	1.9E-03	NA	1.2E-04	--	1.9E+00	1.0E-05	2.0E-05
	Totals for Ingestion of Water				5.3E-02			2.0E-05
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Dichloroethane, 1,1-	1.4E-03	1.4E-01	5.5E-04	3.9E-03	NA	4.7E-05	--
	Dichloroethene, cis-1,2-	7.1E-03	1.0E-02	2.7E-03	2.7E-01	NA	--	--
	Dichloroethene, trans-1,2-	2.1E-03	2.0E-02	7.9E-04	3.9E-02	NA	--	--
	Vinyl chloride	1.9E-03	NA	7.3E-04	--	3.0E-01	6.2E-05	1.9E-05
	Totals for Inhalation of Vapors from Tap Water				3.2E-01			1.9E-05
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Dichloroethane, 1,1-	1.4E-03	1.0E-01	1.6E-06	1.6E-05	NA	1.4E-07	--
	Vinyl chloride	1.9E-03	NA	1.8E-06	--	1.9E+00	1.5E-07	2.9E-07
	Totals for Dermal Absorption from Water				1.6E-05			2.9E-07
	Totals by Chemical		SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Dichloroethane, 1,1-	--	--	6.5E-04	4.8E-03	--	5.5E-05	--
	Dichloroethene, cis-1,2-	--	--	3.2E-03	3.2E-01	--	--	--
	Dichloroethene, trans-1,2-	--	--	9.2E-04	4.6E-02	--	--	--
	Vinyl chloride	--	--	8.5E-04	--	--	7.3E-05	3.9E-05
	Totals for Child Residents of 3845 E. Patterson Rd. Homes; RME Case				3.7E-01			3.9E-05

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3885 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water							
	Vinyl chloride	1.7E-03	NA	1.1E-04	--	1.9E+00	9.4E-06	1.8E-05
	Totals for Ingestion of Water				--			1.8E-05
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Vinyl chloride	1.7E-03	NA	6.6E-04	--	3.0E-01	5.6E-05	1.7E-05
	Totals for Inhalation of Vapors from Tap Water				--			1.7E-05
	Pathway 1C: Dermal Absorption from Water							
	Vinyl chloride	1.7E-03	NA	1.6E-06	--	1.9E+00	1.4E-07	2.6E-07
	Totals for Dermal Absorption from Water				--			2.6E-07
	Totals by Chemical							
	Vinyl chloride	--	--	7.7E-04	--	--	6.6E-05	3.5E-05
	Totals for Child Residents of 3885 E. Patterson Rd. Homes; RME Case				--			3.5E-05

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3897 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water							
	Vinyl chloride	6.4E-04	NA	4.1E-05	--	1.9E+00	3.5E-06	6.7E-06
	Totals for Ingestion of Water				--			6.7E-06
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Vinyl chloride	6.4E-04	NA	2.5E-04	--	3.0E-01	2.1E-05	6.3E-06
	Totals for Inhalation of Vapors from Tap Water				--			6.3E-06
	Pathway 1C: Dermal Absorption from Water							
	Vinyl chloride	6.4E-04	NA	6.0E-07	--	1.9E+00	5.1E-08	9.7E-08
	Totals for Dermal Absorption from Water				--			9.7E-08
	Totals by Chemical							
	Vinyl chloride	--	--	2.9E-04	--	--	2.5E-05	1.3E-05
	Totals for Child Residents of 3897 E. Patterson Rd. Homes; RME Case				--			1.3E-05

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3898 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Vinyl chloride	4.8E-02	NA	3.1E-03	--	1.9E+00	2.6E-04	5.0E-04
	Totals for Ingestion of Water		--			5.0E-04		
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Vinyl chloride	4.8E-02	NA	1.8E-02	--	3.0E-01	1.6E-03	4.7E-04
	Totals for Inhalation of Vapors from Tap Water		--			4.7E-04		
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Vinyl chloride	4.8E-02	NA	4.5E-05	--	1.9E+00	3.8E-06	7.3E-06
	Totals for Dermal Absorption from Water		--			7.3E-06		
	Totals by Chemical		SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Vinyl chloride	--	--	2.1E-02	--	--	1.8E-03	9.8E-04
	Totals for Child Residents of 3898 E. Patterson Rd. Homes; RMECase		--			9.8E-04		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LDI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3906 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Dichloroethene, cis-1,2-	1.8E-02	1.0E-02	1.1E-03	1.1E-01	NA	--	--
	Methylene chloride	1.6E-03	6.0E-02	1.0E-04	1.7E-03	7.5E-03	8.8E-06	6.6E-08
	Vinyl chloride	1.0E-01	NA	6.6E-03	--	1.9E+00	5.6E-04	1.1E-03
	Totals for Ingestion of Water				1.2E-01			1.1E-03
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Dichloroethene, cis-1,2-	1.8E-02	1.0E-02	6.8E-03	6.8E-01	NA	--	--
	Methylene chloride	1.6E-03	8.6E-01	6.1E-04	7.2E-04	1.6E-03	5.3E-05	8.7E-08
	Vinyl chloride	1.0E-01	NA	4.0E-02	--	3.0E-01	3.4E-03	1.0E-03
	Totals for Inhalation of Vapors from Tap Water				6.8E-01			1.0E-03
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Methylene chloride	1.6E-03	6.0E-02	9.1E-07	1.5E-05	7.5E-03	7.8E-08	5.9E-10
	Vinyl chloride	1.0E-01	NA	9.6E-05	--	1.9E+00	8.2E-06	1.6E-05
	Totals for Dermal Absorption from Water				1.5E-05			1.6E-05
	Totals by Chemical		SIF - Noncancer = 4.47E-01			SIF - Cancer = 3.84E-02		
	Dichloroethene, cis-1,2-	--	--	8.0E-03	8.0E-01	--	--	--
	Methylene chloride	--	--	7.2E-04	2.4E-03	--	6.1E-05	1.5E-07
	Vinyl chloride	--	--	4.6E-02	--	--	4.0E-03	2.1E-03
	Totals for Child Residents of 3906 E. Patterson Rd. Homes; RME Case				8.0E-01			2.1E-03

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3913 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water							
	Chloroform	3.8E-04	1.0E-02	2.4E-05	2.4E-03	6.1E-03	2.1E-06	1.3E-08
	Totals for Ingestion of Water				2.4E-03			1.3E-08
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Chloroform	3.8E-04	1.1E-02	1.4E-04	1.3E-02	8.0E-02	1.2E-05	1.0E-06
	Totals for Inhalation of Vapors from Tap Water				1.3E-02			1.0E-06
	Pathway 1C: Dermal Absorption from Water							
	Chloroform	3.8E-04	1.0E-02	4.2E-07	4.2E-05	6.1E-03	3.6E-08	2.2E-10
	Totals for Dermal Absorption from Water				4.2E-05			2.2E-10
	Totals by Chemical							
	Chloroform	--	--	1.7E-04	1.6E-02	--	1.4E-05	1.0E-06
	Totals for Child Residents of 3913 E. Patterson Rd. Homes; RMECase				1.6E-02			1.0E-06

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RID (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	IADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
3920 E. Patterson Rd.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Benzene	3.8E-04	1.7E-03	2.4E-05	1.4E-02	2.9E-02	2.1E-06	6.0E-08
	Dichloroethane, 1,1-	2.0E-03	1.0E-01	1.3E-04	1.3E-03	NA	1.1E-05	--
	Dichloroethene, 1,1-	7.0E-04	9.0E-03	4.5E-05	5.0E-03	6.0E-01	3.8E-06	2.3E-06
	Dichloroethene, cis-1,2-	7.3E-02	1.0E-02	4.7E-03	4.7E-01	NA	--	--
	Dichloroethene, trans-1,2-	9.9E-04	2.0E-02	6.3E-05	3.2E-03	NA	--	--
	Methylene chloride	1.1E-03	6.0E-02	6.8E-05	1.1E-03	7.5E-03	5.8E-06	4.4E-08
	Vinyl chloride	4.6E-02	NA	2.9E-03	--	1.9E+00	2.5E-04	4.8E-04
	Totals for Ingestion of Water				4.9E-01			4.8E-04
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Benzene	3.8E-04	1.7E-03	1.5E-04	8.5E-02	2.9E-02	1.2E-05	3.6E-07
	Dichloroethane, 1,1-	2.0E-03	1.4E-01	7.6E-04	5.3E-03	NA	6.5E-05	--
	Dichloroethene, 1,1-	7.0E-04	9.0E-03	2.7E-04	3.0E-02	1.7E-01	2.3E-05	4.0E-06
	Dichloroethene, cis-1,2-	7.3E-02	1.0E-02	2.8E-02	2.8E+00	NA	--	--
	Dichloroethene, trans-1,2-	9.9E-04	2.0E-02	3.8E-04	1.9E-02	NA	--	--
	Methylene chloride	1.1E-03	8.6E-01	4.1E-04	4.8E-04	1.6E-03	3.5E-05	5.8E-08
	Vinyl chloride	4.6E-02	NA	1.8E-02	--	3.0E-01	1.5E-03	4.5E-04
	Totals for Inhalation of Vapors from Tap Water				2.9E+00			4.6E-04
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Benzene	3.8E-04	1.7E-03	9.9E-07	5.8E-04	2.9E-02	8.5E-08	2.5E-09
	Dichloroethane, 1,1-	2.0E-03	1.0E-01	2.2E-06	2.2E-05	NA	1.9E-07	--
	Dichloroethene, 1,1-	7.0E-04	9.0E-03	1.4E-06	1.6E-04	6.0E-01	1.2E-07	7.2E-08
	Methylene chloride	1.1E-03	6.0E-02	6.1E-07	1.0E-05	7.5E-03	5.2E-08	3.9E-10
	Vinyl chloride	4.6E-02	NA	4.3E-05	--	1.9E+00	3.7E-06	7.0E-06
	Totals for Dermal Absorption from Water				7.7E-04			7.1E-06

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration ()	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
Totals by Chemical			SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Benzene	--	--	1.7E-04	1.0E-01	--	1.5E-05	4.3E-07
	Dichloroethane, 1,1-	--	--	8.9E-04	6.6E-03	--	7.7E-05	--
	Dichloroethene, 1,1-	--	--	3.1E-04	3.5E-02	--	2.7E-05	6.4E-06
	Dichloroethene, cis-1,2-	--	--	3.3E-02	3.3E+00	--	--	--
	Dichloroethene, trans-1,2-	--	--	4.4E-04	2.2E-02	--	--	--
	Methylene chloride	--	--	4.8E-04	1.6E-03	--	4.1E-05	1.0E-07
	Vinyl chloride	--	--	2.1E-02	--	--	1.8E-03	9.4E-04
Totals for Child Residents of 3920 E. Patterson Rd. Homes; RMECase				3.4E+00				9.5E-04
3928 E. Patterson Rd.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer =		
	Dichloroethene, cis-1,2-	8.6E-03	1.0E-02	5.5E-04	5.5E-02	NA	--	--
Totals for Ingestion of Water				5.5E-02				--
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer =		
	Dichloroethene, cis-1,2-	8.6E-03	1.0E-02	3.3E-03	3.3E-01	NA	--	--
Totals for Inhalation of Vapors from Tap Water				3.3E-01				--
Totals by Chemical			SIF - Noncancer = 4.47E-01			SIF - Cancer =		
	Dichloroethene, cis-1,2-	--	--	3.9E-03	3.9E-01	--	--	--
Totals for Child Residents of 3928 E. Patterson Rd. Homes; RMECase				3.9E-01				--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		Cancer Risk
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	
Current Child Resident; RME Case								
3999 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Benzene	1.0E-03	1.7E-03	6.6E-05	3.9E-02	2.9E-02	5.6E-06	1.6E-07
	Ethylbenzene	5.1E-04	1.0E-01	3.3E-05	3.3E-04	NA	--	--
	Toluene	2.5E-03	2.0E-01	1.6E-04	7.9E-04	NA	--	--
	Xylenes	2.6E-03	2.0E+00	1.7E-04	8.4E-05	NA	--	--
	Totals for Ingestion of Water				4.0E-02			1.6E-07
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Benzene	1.0E-03	1.7E-03	4.0E-04	2.3E-01	2.9E-02	3.4E-05	9.8E-07
	Ethylbenzene	5.1E-04	2.9E-01	2.0E-04	6.8E-04	NA	--	--
	Toluene	2.5E-03	1.1E-01	9.4E-04	8.3E-03	NA	--	--
	Xylenes	2.6E-03	2.0E+00	1.0E-03	5.0E-04	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				2.4E-01			9.8E-07
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Benzene	1.0E-03	1.7E-03	2.7E-06	1.6E-03	2.9E-02	2.3E-07	6.7E-09
	Ethylbenzene	5.1E-04	1.0E-01	4.2E-06	4.2E-05	NA	--	--
	Toluene	2.5E-03	2.0E-01	1.4E-05	6.8E-05	NA	--	--
	Totals for Dermal Absorption from Water				1.7E-03			6.7E-09
	Totals by Chemical		SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Benzene	--	--	4.6E-04	2.7E-01	--	4.0E-05	1.2E-06
	Ethylbenzene	--	--	2.3E-04	1.1E-03	--	--	--
	Toluene	--	--	1.1E-03	9.1E-03	--	--	--
	Xylenes	--	--	1.2E-03	5.9E-04	--	--	--
	Totals for Child Residents of 3999 E. Patterson Rd. Homes; RME Case				2.8E-01			1.2E-06

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
4014 E. Patterson Rd.								
	Pathway 1A: Ingestion of Water		SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Chloroform	3.5E-04	1.0E-02	2.2E-05	2.2E-03	6.1E-03	1.9E-06	1.2E-08
	Xylenes	5.6E-04	2.0E+00	3.6E-05	1.8E-05	NA	--	--
	Totals for Ingestion of Water				2.3E-03			1.2E-08
	Pathway 1B: Inhalation of Vapors from Tap Water		SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Chloroform	3.5E-04	1.1E-02	1.3E-04	1.2E-02	8.0E-02	1.2E-05	9.3E-07
	Xylenes	5.6E-04	2.0E+00	2.1E-04	1.1E-04	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				1.2E-02			9.3E-07
	Pathway 1C: Dermal Absorption from Water		SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Chloroform	3.5E-04	1.0E-02	4.0E-07	4.0E-05	6.1E-03	3.4E-08	2.1E-10
	Totals for Dermal Absorption from Water				4.0E-05			2.1E-10
	Totals by Chemical		SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Chloroform	--	--	1.6E-04	1.4E-02	--	1.3E-05	9.4E-07
	Xylenes	--	--	2.5E-04	1.2E-04	--	--	--
	Totals for Child Residents of 4014 E. Patterson Rd. Homes; RME Case				1.5E-02			9.4E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	I. ADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1162 Fergus Dr.								
	Pathway 1A: Ingestion of Water							
	Trichloroethane, 1,1,1-	2.9E-04	9.0E-02	1.8E-05	2.1E-04	NA	--	--
	Totals for Ingestion of Water				2.1E-04			--
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethane, 1,1,1-	2.9E-04	2.9E-01	1.1E-04	3.9E-04	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				3.9E-04			--
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethane, 1,1,1-	2.9E-04	9.0E-02	6.1E-07	6.8E-06	NA	--	--
	Totals for Dermal Absorption from Water				6.8E-06			--
	Totals by Chemical							
	Trichloroethane, 1,1,1-	--	--	1.3E-04	6.0E-04	--	--	--
	Totals for Child Residents of 1162 Fergus Dr. Homes; RMECase				6.0E-04			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1174 Fergus Dr.								
	Pathway 1A: Ingestion of Water							
	Dichlorodifluoromethane	2.8E-03	2.0E-01	1.8E-04	9.1E-04	NA	--	--
	Totals for Ingestion of Water				9.1E-04			--
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Dichlorodifluoromethane	2.8E-03	5.7E-02	1.1E-03	1.9E-02	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				1.9E-02			--
	Pathway 1C: Dermal Absorption from Water							
	Dichlorodifluoromethane	2.8E-03	2.0E-01	4.3E-06	2.1E-05	NA	--	--
	Totals for Dermal Absorption from Water				2.1E-05			--
	Totals by Chemical							
	Dichlorodifluoromethane	--	--	1.3E-03	2.0E-02	--	--	--
	Totals for Child Residents of 1174 Fergus Dr. Homes; RME Case				2.0E-02			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1145 Kenora Circle								
	Pathway 1A: Ingestion of Water							
	Trichloroethene	2.9E-04	NA	1.8E-05	--	1.1E-02	1.6E-06	1.7E-08
	Totals for Ingestion of Water				--			1.7E-08
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethene	2.9E-04	NA	1.1E-04	--	6.0E-03	9.5E-06	5.7E-08
	Totals for Inhalation of Vapors from Tap Water				--			5.7E-08
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethene	2.9E-04	NA	5.6E-07	--	1.1E-02	4.8E-08	5.3E-10
	Totals for Dermal Absorption from Water				--			5.3E-10
	Totals by Chemical							
	Trichloroethene	--	--	1.3E-04	--	--	1.1E-05	7.5E-08
	Totals for Child Residents of 1145 Kenora Circle Homes; RMECase				--			7.5E-08

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1149 Kenora Circle								
	Pathway 1A: Ingestion of Water							
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	1.4E-04	1.6E-03	NA	--	--
	Totals for Ingestion of Water				1.6E-03			--
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethane, 1,1,1-	2.2E-03	2.9E-01	8.5E-04	3.0E-03	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				3.0E-03			--
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	4.7E-06	5.2E-05	NA	--	--
	Totals for Dermal Absorption from Water				5.2E-05			--
	Totals by Chemical							
	Trichloroethane, 1,1,1-	--	--	1.0E-03	4.6E-03	--	--	--
	Totals for Child Residents of 1149 Kenora Circle Homes; RME Case				4.6E-03			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1152 Kenora Circle								
	Pathway 1A: Ingestion of Water							
	Trichloroethane, 1,1,1-	1.9E-03	9.0E-02	1.2E-04	1.3E-03	NA	--	--
	Totals for Ingestion of Water				1.3E-03			--
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethane, 1,1,1-	1.9E-03	2.9E-01	7.1E-04	2.5E-03	NA	--	--
	Totals for Inhalation of Vapors from Tap Water				2.5E-03			--
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethane, 1,1,1-	1.9E-03	9.0E-02	3.9E-06	4.4E-05	NA	--	--
	Totals for Dermal Absorption from Water				4.4E-05			--
	Totals by Chemical							
	Trichloroethane, 1,1,1-	--	--	8.3E-04	3.8E-03	--	--	--
	Totals for Child Residents of 1152 Kenora Circle Homes; RMECase				3.8E-03			--

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1164 Kenora Circle								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Dichloroethane, 1,1-	1.2E-02	1.0E-01	7.5E-04	7.5E-03	NA	6.4E-05	--
	Dichloroethene, cis-1,2-	5.9E-03	1.0E-02	3.7E-04	3.7E-02	NA	--	--
	Dichloroethene, trans-1,2-	1.4E-03	2.0E-02	8.7E-05	4.3E-03	NA	--	--
	Tetrachloroethene	1.3E-02	1.0E-02	8.5E-04	8.5E-02	5.2E-02	7.3E-05	3.8E-06
	Trichloroethane, 1,1,1-	5.0E-03	9.0E-02	3.2E-04	3.6E-03	NA	--	--
	Trichloroethene	5.9E-03	NA	3.8E-04	--	1.1E-02	3.2E-05	3.6E-07
	Totals for Ingestion of Water				1.4E-01			4.1E-06
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Dichloroethane, 1,1-	1.2E-02	1.4E-01	4.5E-03	3.2E-02	NA	3.9E-04	--
	Dichloroethene, cis-1,2-	5.9E-03	1.0E-02	2.2E-03	2.2E-01	NA	--	--
	Dichloroethene, trans-1,2-	1.4E-03	2.0E-02	5.2E-04	2.6E-02	NA	--	--
	Tetrachloroethene	1.3E-02	1.0E-02	5.1E-03	5.1E-01	2.0E-03	4.4E-04	8.9E-07
	Trichloroethane, 1,1,1-	5.0E-03	2.9E-01	1.9E-03	6.7E-03	NA	--	--
	Trichloroethene	5.9E-03	NA	2.3E-03	--	6.0E-03	1.9E-04	1.2E-06
	Totals for Inhalation of Vapors from Tap Water				8.0E-01			2.1E-06
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Dichloroethane, 1,1-	1.2E-02	1.0E-01	1.3E-05	1.3E-04	NA	1.1E-06	--
	Tetrachloroethene	1.3E-02	1.0E-02	6.5E-05	6.5E-03	5.2E-02	5.6E-06	2.9E-07
	Trichloroethane, 1,1,1-	5.0E-03	9.0E-02	1.1E-05	1.2E-04	NA	--	--
	Trichloroethene	5.9E-03	NA	1.2E-05	--	1.1E-02	9.9E-07	1.1E-08
	Totals for Dermal Absorption from Water				6.8E-03			3.0E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
	Totals by Chemical			SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02	
	Dichloroethane, 1,1-	--	--	5.3E-03	3.9E-02	--	4.5E-04	--
	Dichloroethene, cis-1,2-	--	--	2.6E-03	2.6E-01	--	--	--
	Dichloroethene, trans-1,2-	--	--	6.1E-04	3.0E-02	--	--	--
	Tetrachloroethene	--	--	6.0E-03	6.0E-01	--	5.2E-04	5.0E-06
	Trichloroethane, 1,1,1-	--	--	2.2E-03	1.0E-02	--	--	--
	Trichloroethene	--	--	2.7E-03	--	--	2.3E-04	1.5E-06
	Totals for Child Residents of 1164 Kenora Circle Homes; RMECase				9.4E-01			6.5E-06
1158 Richfield Cntr.								
	Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03	
	Trichloroethene	1.1E-03	NA	7.0E-05	--	1.1E-02	6.0E-06	6.6E-08
	Totals for Ingestion of Water				--			6.6E-08
	Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02	
	Trichloroethene	1.1E-03	NA	4.2E-04	--	6.0E-03	3.6E-05	2.2E-07
	Totals for Inhalation of Vapors from Tap Water				--			2.2E-07
	Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02	
	Trichloroethene	1.1E-03	NA	2.1E-06	--	1.1E-02	1.8E-07	2.0E-09
	Totals for Dermal Absorption from Water				--			2.0E-09
	Totals by Chemical			SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02	
	Trichloroethene	--	--	4.9E-04	--	--	4.2E-05	2.8E-07
	Totals for Child Residents of 1158 Richfield Cntr. Homes; RMECase				--			2.8E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LAADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1148 Rosendale Dr.								
	Pathway 1A: Ingestion of Water							
	Trichloroethene	2.3E-03	NA	1.5E-04	--	1.1E-02	1.3E-05	1.4E-07
	Totals for Ingestion of Water				--			1.4E-07
	Pathway 1B: Inhalation of Vapors from Tap Water							
	Trichloroethene	2.3E-03	NA	8.9E-04	--	6.0E-03	7.7E-05	4.6E-07
	Totals for Inhalation of Vapors from Tap Water				--			4.6E-07
	Pathway 1C: Dermal Absorption from Water							
	Trichloroethene	2.3E-03	NA	4.6E-06	--	1.1E-02	3.9E-07	4.3E-09
	Totals for Dermal Absorption from Water				--			4.3E-09
	Totals by Chemical							
	Trichloroethene	--	--	1.0E-03	--	--	9.0E-05	6.0E-07
	Totals for Child Residents of 1148 Rosendale Dr. Homes; RME Case				--			6.0E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beaver Creek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1.ADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1162 Rosendale Dr.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Dichloroethane, 1,1-	1.9E-03	1.0E-01	1.2E-04	1.2E-03	NA	1.0E-05	--
	Dichloroethene, cis-1,2-	2.9E-03	1.0E-02	1.9E-04	1.9E-02	NA	--	--
	Dichloroethene, trans-1,2-	8.1E-04	2.0E-02	5.2E-05	2.6E-03	NA	--	--
	Tetrachloroethene	4.3E-03	1.0E-02	2.8E-04	2.8E-02	5.2E-02	2.4E-05	1.2E-06
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	1.4E-04	1.6E-03	NA	--	--
	Trichloroethene	5.0E-03	NA	3.2E-04	--	1.1E-02	2.7E-05	3.0E-07
	Totals for Ingestion of Water				5.2E-02			1.5E-06
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Dichloroethane, 1,1-	1.9E-03	1.4E-01	7.1E-04	5.0E-03	NA	6.1E-05	--
	Dichloroethene, cis-1,2-	2.9E-03	1.0E-02	1.1E-03	1.1E-01	NA	--	--
	Dichloroethene, trans-1,2-	8.1E-04	2.0E-02	3.1E-04	1.6E-02	NA	--	--
	Tetrachloroethene	4.3E-03	1.0E-02	1.7E-03	1.7E-01	2.0E-03	1.4E-04	2.9E-07
	Trichloroethane, 1,1,1-	2.2E-03	2.9E-01	8.5E-04	3.0E-03	NA	--	--
	Trichloroethene	5.0E-03	NA	1.9E-03	--	6.0E-03	1.6E-04	9.9E-07
	Totals for Inhalation of Vapors from Tap Water				3.0E-01			1.3E-06
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Dichloroethane, 1,1-	1.9E-03	1.0E-01	2.1E-06	2.1E-05	NA	1.8E-07	--
	Tetrachloroethene	4.3E-03	1.0E-02	2.1E-05	2.1E-03	5.2E-02	1.8E-06	9.5E-08
	Trichloroethane, 1,1,1-	2.2E-03	9.0E-02	4.7E-06	5.2E-05	NA	--	--
	Trichloroethene	5.0E-03	NA	9.8E-06	--	1.1E-02	8.4E-07	9.3E-09
	Totals for Dermal Absorption from Water				2.2E-03			1.0E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
	Totals by Chemical				SIF - Noncancer = 9.59E-01		SIF - Cancer = 8.22E-02	
	Dichloroethane, 1,1-	--	--	8.3E-04	6.2E-03	--	7.1E-05	--
	Dichloroethene, cis-1,2-	--	--	1.3E-03	1.3E-01	--	--	--
	Dichloroethene, trans-1,2-	--	--	3.6E-04	1.8E-02	--	--	--
	Tetrachloroethene	--	--	2.0E-03	2.0E-01	--	1.7E-04	1.6E-06
	Trichloroethane, 1,1,1-	--	--	1.0E-03	4.6E-03	--	--	--
	Trichloroethene	--	--	2.3E-03	--	--	1.9E-04	1.3E-06
	Totals for Child Residents of 1162 Rosendale Dr. Homes; RME Case				3.5E-01			2.9E-06
1182 Rosendale Dr.								
	Pathway 1A: Ingestion of Water				SIF - Noncancer = 6.39E-02		SIF - Cancer = 5.48E-03	
	Trichloroethene	6.8E-03	NA	4.3E-04	--	1.1E-02	3.7E-05	4.1E-07
	Totals for Ingestion of Water				--			4.1E-07
	Pathway 1B: Inhalation of Vapors from Tap Water				SIF - Noncancer = 3.84E-01		SIF - Cancer = 3.29E-02	
	Trichloroethene	6.8E-03	NA	2.6E-03	--	6.0E-03	2.2E-04	1.3E-06
	Totals for Inhalation of Vapors from Tap Water				--			1.3E-06
	Pathway 1C: Dermal Absorption from Water				SIF - Noncancer = 5.11E-01		SIF - Cancer = 4.38E-02	
	Trichloroethene	6.8E-03	NA	1.3E-05	--	1.1E-02	1.1E-06	1.2E-08
	Totals for Dermal Absorption from Water				--			1.2E-08
	Totals by Chemical				SIF - Noncancer = 9.59E-01		SIF - Cancer = 8.22E-02	
	Trichloroethene	--	--	3.0E-03	--	--	2.6E-04	1.8E-06
	Totals for Child Residents of 1182 Rosendale Dr. Homes; RME Case				--			1.8E-06

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1160 Stanwick Dr.								
	Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03	
	Trichloroethene	8.8E-04	NA	5.6E-05	--	1.1E-02	4.8E-06	5.3E-08
	Totals for Ingestion of Water				--			5.3E-08
	Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02	
	Trichloroethene	8.8E-04	NA	3.4E-04	--	6.0E-03	2.9E-05	1.7E-07
	Totals for Inhalation of Vapors from Tap Water				--			1.7E-07
	Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02	
	Trichloroethene	8.8E-04	NA	1.7E-06	--	1.1E-02	1.5E-07	1.6E-09
	Totals for Dermal Absorption from Water				--			1.6E-09
	Totals by Chemical			SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02	
	Trichloroethene	--	--	3.9E-04	--	--	3.4E-05	2.3E-07
	Totals for Child Residents of 1160 Stanwick Dr. Homes; RME Case				--			2.3E-07

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	1. ADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1197 Stanwick Dr.								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Dichloroethane, 1,1-	1.8E-03	1.0E-01	1.1E-04	1.1E-03	NA	9.8E-06	--
	Trichloroethane, 1,1,1-	1.5E-03	9.0E-02	9.4E-05	1.0E-03	NA	--	--
	Vinyl chloride	3.7E-03	NA	2.4E-04	--	1.9E+00	2.0E-05	3.8E-05
Totals for Ingestion of Water			2.2E-03			3.8E-05		
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Dichloroethane, 1,1-	1.8E-03	1.4E-01	6.8E-04	4.8E-03	NA	5.9E-05	--
	Trichloroethane, 1,1,1-	1.5E-03	2.9E-01	5.6E-04	2.0E-03	NA	--	--
	Vinyl chloride	3.7E-03	NA	1.4E-03	--	3.0E-01	1.2E-04	3.6E-05
Totals for Inhalation of Vapors from Tap Water			6.8E-03			3.6E-05		
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Dichloroethane, 1,1-	1.8E-03	1.0E-01	2.0E-06	2.0E-05	NA	1.7E-07	--
	Trichloroethane, 1,1,1-	1.5E-03	9.0E-02	3.1E-06	3.5E-05	NA	--	--
	Vinyl chloride	3.7E-03	NA	3.4E-06	--	1.9E+00	3.0E-07	5.6E-07
Totals for Dermal Absorption from Water			5.5E-05			5.6E-07		
Totals by Chemical			SIF - Noncancer = 9.59E-01			SIF - Cancer = 8.22E-02		
	Dichloroethane, 1,1-	--	--	8.0E-04	5.9E-03	--	6.8E-05	--
	Trichloroethane, 1,1,1-	--	--	6.6E-04	3.1E-03	--	--	--
	Vinyl chloride	--	--	1.7E-03	--	--	1.4E-04	7.5E-05
Totals for Child Residents of 1197 Stanwick Dr. Homes; RME Case			9.0E-03			7.5E-05		

Table D-1
Estimates of Potential Exposures and Risks for the Lammars Barrel Factory, Beavercreek, Ohio
General Residential Groundwater Use

Location	Chemical	Exposure Point Concentration (mg/l)	Noncarcinogenic Effects			Carcinogenic Effects		
			Oral RfD (mg/kg-day)	ADI (mg/kg-day)	Hazard Quotient	Oral SF (mg/kg-day) ⁻¹	LAADI (mg/kg-day)	Cancer Risk
Current Child Resident; RME Case								
1185 Tralee Trail								
Pathway 1A: Ingestion of Water			SIF - Noncancer = 6.39E-02			SIF - Cancer = 5.48E-03		
	Dichloroethane, 1,1-	6.1E-03	1.0E-01	3.9E-04	3.9E-03	NA	3.3E-05	--
	Dichloroethene, cis-1,2-	2.6E-03	1.0E-02	1.6E-04	1.6E-02	NA	--	--
	Dichloroethene, trans-1,2-	8.6E-04	2.0E-02	5.5E-05	2.8E-03	NA	--	--
	Tetrachloroethene	6.8E-04	1.0E-02	4.4E-05	4.4E-03	5.2E-02	3.8E-06	2.0E-07
	Trichloroethane, 1,1,1-	3.6E-04	9.0E-02	2.3E-05	2.5E-04	NA	--	--
	Trichloroethene	4.6E-03	NA	2.9E-04	--	1.1E-02	2.5E-05	2.8E-07
	Totals for Ingestion of Water				2.8E-02			4.7E-07
Pathway 1B: Inhalation of Vapors from Tap Water			SIF - Noncancer = 3.84E-01			SIF - Cancer = 3.29E-02		
	Dichloroethane, 1,1-	6.1E-03	1.4E-01	2.3E-03	1.6E-02	NA	2.0E-04	--
	Dichloroethene, cis-1,2-	2.6E-03	1.0E-02	9.8E-04	9.8E-02	NA	--	--
	Dichloroethene, trans-1,2-	8.6E-04	2.0E-02	3.3E-04	1.7E-02	NA	--	--
	Tetrachloroethene	6.8E-04	1.0E-02	2.6E-04	2.6E-02	2.0E-03	2.3E-05	4.6E-08
	Trichloroethane, 1,1,1-	3.6E-04	2.9E-01	1.4E-04	4.8E-04	NA	--	--
	Trichloroethene	4.6E-03	NA	1.8E-03	--	6.0E-03	1.5E-04	9.1E-07
	Totals for Inhalation of Vapors from Tap Water				1.6E-01			9.6E-07
Pathway 1C: Dermal Absorption from Water			SIF - Noncancer = 5.11E-01			SIF - Cancer = 4.38E-02		
	Dichloroethane, 1,1-	6.1E-03	1.0E-01	6.8E-06	6.8E-05	NA	5.8E-07	--
	Tetrachloroethene	6.8E-04	1.0E-02	3.4E-06	3.4E-04	5.2E-02	2.9E-07	1.5E-08
	Trichloroethane, 1,1,1-	3.6E-04	9.0E-02	7.6E-07	8.4E-06	NA	--	--
	Trichloroethene	4.6E-03	NA	9.0E-06	--	1.1E-02	7.7E-07	8.5E-09
	Totals for Dermal Absorption from Water				4.1E-04			2.4E-08

APPENDIX E

FEDERAL AND STATE LISTS OF SPECIES OF CONCERN IN OHIO



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Biological Services
3150 American Parkway
Reynoldsburg, Ohio 43068

COPIES FOR THE
FEDERAL GOVERNMENT

Federally Listed Species by Ohio Counties July 29, 1996

E = Endangered
T = Threatened
PT = Proposed threatened

<u>County</u>	<u>Species</u>
ADAMS	Indiana bat (E), clubshell mussel (E)
ALLEN	Indiana bat (E)
ASHLAND	Indiana bat (E)
ASHTABULA	Indiana bat (E), bald eagle (T), clubshell mussel (E), piping plover (E)
ATHENS	
AUGLAIZE	Indiana bat (E)
BELMONT	
BROWN	Indiana bat (E), running buffalo clover (E)
BUTLER	Indiana bat (E)
CAPROH	
CHAMPAIGN	Indiana bat (E)
CLARK	Indiana bat (E), eastern prairie fringed orchid (T)
CLEMTON	Indiana bat (E), running buffalo clover (E)
CLINTON	Indiana bat (E)
COLUMBIANA	Indiana bat (E)
COCHRAN	clubshell mussel (E), fanshell mussel (E), purple cat's paw pearly mussel (E), bald eagle (T)
CRAWFORD	Indiana bat (E)
CUYAHOGA	Indiana bat (E), peregrine falcon (E), piping plover (E)
DARKE	Indiana bat (E)
DEFIANCE	Indiana bat (E), copperbelly water snake (PT), clubshell mussel (E)
DELRWARE	Indiana bat (E), clubshell mussel (E), bald eagle (T)

ERIE Indiana bat (E), bald eagle (T), Lake Erie water snake (PT), lakeside daisy (T), piping plover (E)
 FAIRFIELD Indiana bat (E), clubshell mussel (E)
 FAYETTE Indiana bat (E)
 FRANKLIN Indiana bat (E), peregrine falcon (E), Scioto madtom (E), clubshell mussel (E), northern riffleshell mussel (E)
 FULTON Indiana bat (E)
 GALLIA pink mucket pearly mussel (E)
 GAUGA Indiana bat (E), bald eagle (T)
 GREENE Indiana bat (E), clubshell (E) -
 GUERNSEY
 HAMILTON Indiana bat (E), bald eagle (T), peregrine falcon (E), running buffalo clover (E)
 HANCOCK Indiana bat (E), clubshell (E)
 HARDIN Indiana bat (E), copperbelly water snake (PT)
 HARRISON
 HENRY Indiana bat (E)
 HIGHLAND Indiana bat (E)
 HOCKING Indiana bat (E), northern monkshood (T), bald eagle (T), American burying beetle (E)
 HOLMES Indiana bat (E), bald eagle (T), eastern prairie fringed orchid (T)
 HURON Indiana bat (E)
 JACKSON
 JEFFERSON
 KNOX Indiana bat (E)
 LAKE Indiana bat (E), bald eagle (T), piping plover (E)
 LAWRENCE pink mucket pearly mussel (E), running buffalo clover (E)
 LICKING Indiana bat (E)
 LOGAN Indiana bat (E) ~~Indiana bat (E), bald eagle (T), peregrine falcon (E), piping plover (E)~~
 LORAIN Indiana bat (E), bald eagle (T), peregrine falcon (E), piping plover (E)
 LUCAS Indiana bat (E), bald eagle (T), peregrine falcon (E), Karner blue butterfly (E), Hines emerald dragonfly (E), eastern prairie fringed orchid (T), piping plover (E)
 MADISON Indiana bat (E), Scioto madtom (E), clubshell mussel (E), northern riffleshell mussel (E)

MAHONING Indiana bat (E), bald eagle (T)
 MARION Indiana bat (E)
 MEDINA Indiana bat (E)
 MEIGS pink mucket pearly mussel (E)
 MERCER Indiana bat (E), bald eagle (T)
 MIAMI Indiana bat (E)
 MONROE
 MONTGOMERY Indiana bat (E), peregrine falcon (E)
 MORGAN fanshell mussel (E), pink mucket pearly mussel (E)
 MORROW Indiana bat (E)
 MUSKINGUM bald eagle (T)
 NOBLE
 OTTAWA Indiana bat (E), bald eagle (T), Lake Erie water snake (E),
 eastern prairie fringed orchid (T), lakeside daisy (T), piping
 plover (E)
 PAULDING Indiana bat (E)
 PERRY Indiana bat (E)
 PICKAWAY Indiana bat (E), Scioto madtom (E), clubshell mussel (E),
 northern riffleshell mussel (E)
 PIKE Indiana bat (E)
 PORTAGE Indiana bat (E), bald eagle (T), Mitchell's satyr butterfly
 (E), northern monkshood (T)
 PRESLE Indiana bat (E)
 PUTNAM Indiana bat (E)
 RICHLAND Indiana bat (E)
 ROSS Indiana bat (E)
 SANDUSKY Indiana bat (E), bald eagle (T), piping plover (E), eastern
 prairie fringed orchid (T)
 SCIOTO Indiana bat (E), Virginia sparrow (T), small whorled poplar
 (T)
 SENeca Indiana bat (E), bald eagle (T)
 SHELBY Indiana bat (E)
 STARK Indiana bat (E), bald eagle (T)
 SUMMIT Indiana bat (E), bald eagle (T), peregrine falcon (E), northern
 monkshood (T)

TRUMBULL Indiana bat (E), bald eagle (T), clubshell mussel (E)

TUSCARAWAS clubshell mussel (E)

UNION Indiana bat (E), Scioto madtom (E), clubshell mussel (E)

VAN WERT Indiana bat (E)

VINTON

WARREN Indiana bat (E), running buffalo clover (E)

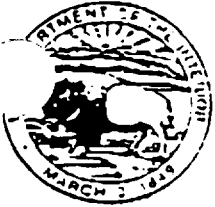
WASHINGTON fanshell mussel (E), pink mucket pearly mussel (E)

WAYNE Indiana bat (E), eastern prairie fringed orchid (T)

WILLIAMS Indiana bat (E), copperbelly water snake (PT), clubshell mussel (E), northern riffleshell mussel (E), white cat's paw pearly mussel (E), Hines emerald dragonfly (E)

WOOD Indiana bat (E)

WYANDOT Indiana bat (E), bald eagle (T)



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6650-H Americana Parkway
Reynoldsburg, Ohio 43068

IN REPLY REFER TO:

FEDERALLY ENDANGERED, THREATENED & PROPOSED SPECIES; OHIO
July 29, 1996

NAME/STATUS

COUNTIES OF CURRENT, RECENT (c. 25 years) AND POSSIBLE DISTRIBUTION

Indiana bat (E)
Myotis sodalis

Adams, Allen, Ashland, Ashtabula, Auglaize, Brown, Butler, Champaign, Clark, Clermont(N), Clinton, Columbiana, Crawford, Cuyahoga, Darke, DeLancey, Delaware, Erie, Fairfield, Fayette, Franklin, Fulton, Geauga, Greene, Hamilton(N), Hancock, Hardin, Henry, Highland, Hocking, Holmes, Huron, Knox, Lake, Licking, Logan, Lorain, Lucas, Madison, Mahoning, Marion, Medina, Mercer, Miami, Montgomery, Morrow, Ottawa, Paulding, Perry, Pickaway, Pike, Portage, Preble(N), Putnam, Richland, Ross, Sandusky, Scioto, Seneca, Shelby, Stark, Summit, Trumbull, Union, Van Wert, Warren(N), Wayne, Williams, Wood, Wyandot

Bald eagle (E)
Haliaeetus
leucocephalus

Ashtabula(N), Delaware, Coshocton(N), Erie(N,W), Geauga (N), Hamilton(W), Hocking(N), Holmes, Linn, Lorain, Lucas(N,W), Mahoning(N), Mercer(N), Muskingum (N), Ottawa(N,W), Portage(N), Sandusky(N,W), Seneca(N), Stark(N), Summit, Trumbull(N), Wyandot(N)

Peregrine falcon (E)
Falco peregrinus

Cuyahoga(N), Franklin(N), Hamilton(N), Lorain(N), Lucas(N), Montgomery(N), Summit(N)

Piping plover (E)
Charadrius melodus

Cuyahoga, Lucas, Ottawa, Sandusky, Erie, Lorain, Lake, Ashtabula

Scioto madtom (E)
Necturus traueutani

Franklin, Madison, Pickaway, Union

Purple cat's paw gearly mussel (E)
Epiplatys obliquata
obliquata

Coshocton

Northern riffleshell (E)
Epiplatys torulosa
torulosa

Franklin, Madison, Pickaway, Williams

Fanshell (E)
Cyprina stans
(=C. stans)

Coshocton, Morgan, Washington

Clubshell mussel (E)
Platystrophia clava

Adams, Ashtabula, Coshocton, DeLancey, Darke, Fairfield, Franklin, Greene, Hancock, Hamilton, Pickaway, Trumbull, Tuscarawas, Union, Williams

White cat's paw gearly mussel (E)
Epiplatys
obliquata torulosa

Williams

Pink mucket pearly mussel (E) <u>Lampsilis abrupta</u> (= <u>L. orbiculata</u>)	Gallia, Morgan, Washington, Lawrence, Meigs
American burying beetle (E) <u>Microphorus americanus</u>	Hocking
Mitchell's satyr (E) <u>Neonympha mitchellii</u> <u>mitchellii</u>	Portage
Karner blue (E) <u>Lycaeides melissa</u> <u>samuelsis</u>	Lucas
Running buffalo clover (E) <u>Trifolium stoloniferum</u>	Brown, Clermont, Hamilton, Lawrence, Warren
Lakeside daisy (T) <u>Hymenoxys herbacea</u> (Formerly <u>H. acutis</u> <u>var. glabra</u>)	Erie, Ottawa
Northern monkshood (T) <u>Aconitum noveboracense</u>	Hocking, Portage, Summit
Eastern prairie fringed orchid (T) <u>Platanthera leucophaea</u>	Clark, Holmes, Lucas, Ottawa, Sandusky, Wayne
Virginia spiraea (T) <u>Spiraea virginiana</u>	Scioto
Small whorled pogonia (T) <u>Isotria medeoloides</u>	Scioto
Lake Erie water snake (PT) <u>Nerodia sipedon insularum</u>	Ottawa, Erie
Copperbelly water snake (PT) <u>Nerodia erythrogaster</u> <u>neglecta</u>	Defiance, Hardin, Williams

STATUS CODES:

E = Endangered

T = Threatened

PE = Proposed to be listed as Federally endangered

PT = Proposed to be listed as Federally threatened

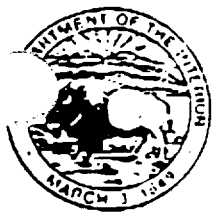
N = Nest site (eagles/peregrine falcons)

H = Hack site (peregrine falcons)

W = Winter use site (eagles)

M = Summer maternity colony located in the county (Indiana bat)

H = Winter hibernacula located in the county (Indiana bat)



IN REPLY REFER TO:

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6050 H. Americana Parkway
Reynoldsburg, Ohio 43068

OTHER SPECIES BEING MONITORED (OHIO)
July 29, 1996

MAMMALS

Eastern small-footed bat, *Myotis subulatus leibii*
Alleghany woodrat, *Neotoma floridana magister*
Rafinesque's (southeastern) big-eared bat, *Plecotus rafinesquii*

BIRDS

Appalachian bewick's wren, *Thryomanes bewickii altus*
Bachman's Sparrow, *Aimophila aestivalis*
Black rail, *Laterallus jamaicensis*
Black tern, *Chlidonias Niger*
Cerulean Warbler, *Dendroica cerulea*
Common Tern, *Sterna Hirundo*
Henslow's Sparrow, *Ammodramus henslowii*
Loggerhead Shrike, *Lanius ludovicianus*
Northern goshawk, *Accipiter gentiles*

REPTILES/AMPHIBIANS

Blanding's Turtle, *Emydoidea blandingii*
Eastern massasauga, *Sistrurus catenatus catenatus*
False map turtle, *Graptemys pseudogeographica*
Hellbender, *Cryptobranchus alleganiensis*
Kirtland's snake, *Clonophis kirtlandii*
Shorthead garter snake, *Thamnophis brachystoma*

FISH

Crystal darter, *Crystallaria asprella*
Eastern sand darter, *Etheostoma pellucidum*
Spotted darter, *Etheostoma maculatum*
Longhead darter, *Percina macrocephala*
Blue sucker, *Cycoreus elongatus*
Greater redhorse, *Moxostoma valenciennesi*
Lake sturgeon, *Acipenser fulvescens*
Paddlefish, *Polydon spathula*

INVERTEBRATES**MUSSELS**

Elktoe mussel, *Alasmidonta marginata*
Pink (pyramid) pigtoe, *Pleurobema pyramidatum*
Purple lilliput mussel, *Toxolasma lividus*
Rabbitsfoot mussel, *Quadrula cylindrica cylindrica*
Rayed bean mussel, *Villosa fabalis*
Salamander mussel, *Simpsoniias ambigua*
Scaleshell mussel, *Leptodea leptodon*
Snuffbox mussel, *Epiclasmus triquetra*
Spectacle case pearly mussel, *Cumberlandia monodonta*

SNAILS

Varicose rocksnail, *Lithasia verrucosa*

INSECTS

Albarufan dagger moth, *Acronicta albaruta*
Black lordichon rove beetle, *Lordichon niger*
Cobblestone tiger beetle, *Cicindela marginipennis*
Diana fritillary, *Speyeria diana*
Elusive clubtail dragonfly, *Gomphus notatus*
Grizzled skipper, *Pyrgus wyandot*
Hebard's noctuid moth, *Tryporodesia hebari*

Kramer's cave beetle, *Pseudanophthalmus krameri*
Laricis tree cricket, *Oecanthus laricis*
Looper moth, *Euchlaena milnei*
Ohio cave beetle, *Pseudanophthalmus ohioensis*
Precious underwing moth, *Catocala pretiosa*
Regal fritillary, *Speyeria idalia*
Sixbanded longhorn beetle, *Dryobius sexnotatus*
Wabash belted skimmer dragonfly, *Macromia wabashensis*

ISOPODS

Fern Cave isopod
(no common name), *Caecidotea filicispeluncae*
Frost Cave isopod
(no common name), *Caecidotea rotunda*

PLANTS

Appalachian oak fern, *Gymnocarpium appalachianum*
Bartley's reed bent grass
(aka Ofer Hollow reed grass), *Calamagrostis porteri* ssp. *insperata*
Bog bluegrass
(aka marsh speargrass), *Poa paludigena*
Butternut tree, *Juglans cinerea*
Cliff-green, *Paxistima canbyi*
Cooper's milk-vetch, *Astragalus neglectus*
Ear-leaf foxglove, *Tomanthera auriculata*, (Formerly, *Agalinus* sp.)
Glade spurge, *Euphorbia purpurea*
Hill's (pasture) thistle, *Cirsium hillii*
Juniper sedge, *Carex juniperorum*
Lake-cress, *Armoracia lacustris*
Purple wood sedge, *Carex purpurifera*
Sand sumac (aka beach sumac), *Rhus aromatica* var. *arenaria*
Sedge (aka "handsome sedge"), *Carex formosa*
Skinner's fox glove, *Tomanthera skinneriana*, (Formerly, *Agalinus* sp.)
Tall larkspur, *Delphinium exaltatum*
Wolf's spikerush, *Eleocharis wolffii*

Species of Animals
That are Considered to be
Endangered, Threatened, of Special Interest,
Extirpated, or Extinct
in Ohio
December 1992

Ohio law (1531.25 ORC) requires that the chief of the Division of Wildlife adopt rules restricting the taking or possession of native wildlife threatened with statewide extinction, such rules to identify the scientific and common names of each endangered species. Ohio's first list of endangered species was adopted in 1974.

For administrative and planning purposes, the Division has established four additional categories: threatened, special interest, extirpated, and extinct.

Definitions of these categories, a summary of the numbers of species and subspecies in each category and the list of species and subspecies in each category follow:

DEFINITIONS

ENDANGERED - A native species or subspecies threatened with extirpation from the state. The danger may result from one or more causes, such as habitat loss, pollution, predation, interspecific competition, or disease.

THREATENED - A species or subspecies whose survival in Ohio is not in immediate jeopardy, but to which a threat exists. Continued or increased stress will result in its becoming endangered.

SPECIAL INTEREST - A species or subspecies which might become threatened in Ohio under continued or increased stress. Also, a species or subspecies for which there is some concern but for which information is insufficient to permit an adequate status evaluation.

EXTIRPATED - A species or subspecies that occurred in Ohio at the time of European settlement and that has since disappeared from the state.

EXTINCT - A species or subspecies that occurred in Ohio at the time of European settlement and that has since disappeared from its entire range.

Table 1. Number of Species in Major Taxa Classified as Endangered, Threatened, Of Special Interest, Extirpated, or Extinct in Ohio, December 1992.

<u>Taxon</u>	<u>Endangered</u>	<u>Threatened</u>	<u>Special Interest</u>	<u>Extirpated</u>	<u>Extinct</u>
Mammals	4	0	7	10	0
Birds	25	1	18	5	2
Reptiles	3	2	8	0	0
Amphibians	5	0	2	0	0
Fishes	25	8	13	5	2
Crayfishes	0	1	2	0	0
Isopods	0	0	2	0	0
Butterflies	7	1	3	2	0
Moths	14	4	23	0	0
Beetles	3	0	6	0	0
Mollusks	<u>30</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>
Total	116	23	90	28	10

Table 2. Species Classified as Endangered, Threatened, of Special Interest, Extirpated, or Extinct in Ohio, December 1992

MAMMALS

Endangered

Indiana myotis	<u>Myotis sodalis</u>
Eastern woodrat	<u>Neotoma floridana</u>
River otter	<u>Lutra canadensis</u>
Bobcat	<u>Felis rufus</u>

Special Interest

Pygmy shrew	<u>Sorex hoyi</u>
Star-nosed mole	<u>Condylura cristata</u>
Southern red-backed vole	<u>Clethrionomys gapperi</u>
Woodland jumping mouse	<u>Napaeozapus insignis</u>
Black bear	<u>Ursus americanus</u>
Badger	<u>Taxidea taxus</u>
Ermine	<u>Mustela erminea</u>

Extirpated

Snowshoe hare	<u>Lepus americanus</u>
Rice rat	<u>Oryzomys palustris</u>
Porcupine	<u>Erethizon dorsatum</u>
Timber wolf	<u>Canis lupus</u>
Marten	<u>Martes americanus</u>
Fisher	<u>Martes pennanti</u>
Mountain lion	<u>Felis concolor</u>
Lynx	<u>Felis canadensis</u>
Wapiti	<u>Cervus canadensis</u>
Bison	<u>Bison bison</u>

BIRDS

Endangered

American bittern	<u>Botaurus lentiginosus</u>
Least bittern	<u>Ixobrychus exilis</u>
Yellow-crowned night-heron	<u>Nyctanassa violacea</u>
Bald eagle	<u>Haliaeetus leucocephalus</u>
Northern harrier	<u>Circus cyaneus</u>
Peregrine falcon	<u>Falco peregrinus</u>
King rail	<u>Rallus elegans</u>
Sandhill crane	<u>Grus canadensis</u>
Piping plover	<u>Charadrius melodus</u>
Common tern	<u>Sterna hirundo</u>
Black tern	<u>Chlidonias niger</u>
Barn owl	<u>Tyto alba</u>
Yellow-bellied sapsucker	<u>Sphyrapicus varius</u>

Bewick's wren	<u>Thryomanes bewickii</u>
Winter wren	<u>Troglodytes troglodytes</u>
Sedge wren	<u>Cistothorus platensis</u>
Hermit thrush	<u>Catharus guttatus</u>
Loggerhead shrike	<u>Lanius ludovicianus</u>
Golden-winged warbler	<u>Vermivora chrysoptera</u>
Magnolia warbler	<u>Dendroica magnolia</u>
Kirtland's warbler	<u>Dendroica kirtlandii</u>
Northern waterthrush	<u>Seiurus noveboracensis</u>
Canada warbler	<u>Wilsonia canadensis</u>
Lark sparrow	<u>Chondestes grammacus</u>
Dark-eyed junco	<u>Junco hyemalis</u>

Threatened

Upland sandpiper	<u>Bartramia longicauda</u>
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Special Interest

Snowy egret	<u>Egretta thula</u>
Little blue heron	<u>Egretta caerulea</u>
Cattle egret	<u>Bubulcus ibis</u>
American black duck	<u>Anas rubripes</u>
Sharp-shinned hawk	<u>Accipiter striatus</u>
Double-crested cormorant	<u>Phalacrocorax auritus</u>
Black vulture	<u>Coragyps atratus</u>
Red-shouldered hawk	<u>Buteo lineatus</u>
Virginia rail	<u>Rallus limicola</u>
Sora	<u>Porzana carolina</u>
Common snipe	<u>Gallinago gallinago</u>
Long-eared owl	<u>Asio otus</u>
Short-eared owl	<u>Asio flammeus</u>
Northern saw-whet owl	<u>Aegolius acadicus</u>
Chuck-will's-widow	<u>Caprimulgus carolinensis</u>
Purple martin	<u>Progne subis</u>
Marsh wren	<u>Cistothorus palustris</u>
Henslow's sparrow	<u>Ammodramus henslowii</u>

Extirpated

American swallow-tailed kite	<u>Elanoides forficatus</u>
Greater prairie chicken	<u>Tympanuchus cupido</u>
Ivory-billed woodpecker	<u>Campephilus principalis</u>
Common raven	<u>Corvus corax</u>
Bachman's sparrow	<u>Aimophila aestivalis</u>

Extinct

Passenger pigeon	<u>Ectopistes migratorius</u>
Carolina parakeet	<u>Conuropsis carolinensis</u>

REPTILES

Endangered

Copperbelly water snake	<u>Nerodia erythrogaster neglecta</u>
Eastern plains garter snake	<u>Thamnophis radix radix</u>
Timber rattlesnake	<u>Crotalus horridus</u>

Threatened

Lake Erie water snake	<u>Nerodia sipedon insularum</u>
Kirtland's snake	<u>Clonophis kirtlandii</u>

Special Interest

Spotted turtle	<u>Clemmys guttata</u>
Blanding's turtle	<u>Emydoidea blandingii</u>
Coal skink	<u>Eumeces anthracinus</u>
Black king snake	<u>Lampropeltis getulus nigra</u>
Common garter snake (melanistic)	<u>Thamnophis sirtalis</u>
Rough green snake	<u>Opheodrys aestivus</u>
Fox snake	<u>Elaphe vulpina</u>
Massasauga	<u>Sistrurus catenatus</u>

AMPHIBIANS

Endangered

Hellbender	<u>Cryptobranchus alleghaniensis</u>
Blue-spotted salamander	<u>Ambystoma laterale</u>
Green salamander	<u>Aneides aeneus</u>
Cave salamander	<u>Eurycea lucifuga</u>
Eastern spadefoot	<u>Scaphiopus holbrookii</u>

Special Interest

Four-toed salamander	<u>Hemidactylium scutatum</u>
Mud salamander	<u>Pseudotriton montanus</u>

FISHES

Endangered

Ohio lamprey	<u>Ichthyomyzon bdellium</u>
Northern brook lamprey	<u>Ichthyomyzon fossor</u>
Mountain brook lamprey	<u>Ichthyomyzon greelevi</u>
Lake sturgeon	<u>Acipenser fulvescens</u>
Shovelnose sturgeon	<u>Scaphirhynchus platyrhynchus</u>
Spotted gar	<u>Lepisosteus oculatus</u>
Cisco	<u>Coregonus artedii</u>
Tonguetied minnow	<u>Exoglossum laurae</u>
Popeye shiner	<u>Notropis ariommus</u>

Bigeye shiner
Pugnose minnow
Blackchin shiner
Blacknose shiner
Mississippi silvery minnow
Blue sucker
Greater redhorse
Longnose sucker
Blue catfish
Mountain madtom
Northern madtom
Scioto madtom
Pirate perch
Western banded killifish
Channel darter
Spotted darter

Notropis boops
Notropis emiliae
Notropis heterodon
Notropis heterolepis
Hybognathus nuchalis
Cycleptus elongatus
Moxostoma valenciennesi
Catostomus catostomus
Ictalurus furcatus
Noturus eleutherus
Noturus stimosus
Noturus trautmani
Aphredoderus sayanus
Fundulus diaphanus menona
Percina copelandi
Etheostoma maculatum

Threatened

Silver lamprey
Paddlefish
Rosyside dace
Bigmouth shiner
Lake chubsucker
River darter
Bluebreast darter
Tippecanoe darter

Ichthyomyzon unicuspis
Polyodon spathula
Clinostomus funduloides
Notropis dorsalis
Erimyzon sucetta
Percina shumardi
Etheostoma camurum
Etheostoma tippecanoe

Special Interest

Shortnose gar
Goldeye
Mooneye
Brook trout
Lake trout
Lake whitefish
Muskellunge
Speckled chub
River redhorse
Eastern sand darter
Slenderhead darter
Iowa darter
Spoonhead sculpin

Lepisosteus platostomus
Hiodon alosoides
Hiodon tergisus
Salvelinus fontinalis
Salvelinus namaycush
Coregonus clupeaformis
Esox masquinongy
Hybopsis aestivalis
Moxostoma carinatum
Ammocrypta pellucida
Percina phoxocephala
Etheostoma exile
Cottus ricei

Extirpated

Alligator gar
Pugnose shiner
Longhead darter
Gilt darter
Crystal darter

Lepisosteus spatula
Notropis anogenus
Percina macrocephala
Percina evides
Ammocrypta asprella

Extinct

Harelip sucker
Blue pike

Lagochila lacera
Stizostedion vitreum glaucum

CRAYFISHES

Threatened

Sloan's crayfish

Orconectes sloanii

Special Interest

Great Lakes crayfish
Northern crayfish

Orconectes propinquus
Orconectes virilis

ISOPODS

Special Interest

Caecidotea filicispeluncae
Caecidotea rotunda

BUTTERFLIES

Endangered

Persius dusky wing
Two-spotted skipper
Frosted elfin
Karner blue
Purplish copper
Swamp metalmark
Regal fritillary

Erynnis persius
Euphyes bimacula
Incisalia irus
Lycaeides melissa samuelis
Lycaena helloides
Calephelis muticum
Speyeria idalia

Threatened

Silver-bordered fritillary

Boloria selene

Special Interest

Grizzled skipper
Olympia marblewing
Edward's hairstreak

Pyrquus centaureae wyandot
Euchloe olympia
Satyrjum edwardsii

Extirpated

Mitchell's satyr
Mustard white

Neonympha mitchellii
Pieris napi

MOTHS

Endangered

Unexpected cynthia
Graceful underwing

Cycnia inopinatus
Catocala gracilis
Spartiniphaga inops
Hypocoena enervata
Papaipema silphii
Papaipema beeriana
Lithophane semiusta
Trichoclea artesta
Tricholita notata
Melanchra assimilis
Epiqlaea apiata
Ufeus plicatus
Ufeus satyricus
Erythroecia hebaridi

Pointed swallow

Threatened

Wayward nymph

Catocala antinympha
Spartiniphaga panatela
Faqitana littera
Faronta rubripennis

The pink-streak

Special Interest

Buck moth
One-eyed sphinx
Slender clearwing

Hemileuca maia
Smerinthus cerisyi
Hemaris gracilis
Macrochilo bivittata
Phalaenostola hanhami
Paectes abrostolella
Capis curvata
Tarachidia binocula
Apamea mixta
Agroperina lutosa
Archanara subflava
Papaipema leucostigma
Papaipema pterisii
Papaipema speciosissima
Chytonix sensilis
Amolita roseola
Homoglaea hircina
Brachylomia algens
Polia purpurissata
Homorthodes f. furfurata
Protorthodes incincta
Trichosilia manifesta
Euchlaena milnei

Subflava sedge borer moth
Columbine borer
Bracken borer moth
Osmunda borer moth

Goat swallow

Purple arches
Scurfy quaker

BEETLES

Endangered

Pseudanophthalmus krameri
Pseudanophthalmus ohioensis
Nicrophorus americanus

Special Interest

Cicindela hirticollis
Cicindela ancocisconensis
Cicindela marginipennis
Cicindela cursitans
Cicindela cuprascens
Cicindela macra

MOLLUSKS

Endangered

Fanshell	<u>Cyprogenia stegaria</u>
Butterfly	<u>Ellipsaria lineolata</u>
Elephant-ear	<u>Elliptio crassidens crassidens</u>
Purple catspaw	<u>Epioblasma o. obliquata</u>
White catspaw	<u>Epioblasma obliquata perobliqua</u>
Northern riffleshell	<u>Epioblasma torulosa ranqiana</u>
Long-solid	<u>Fusconaia maculata maculata</u>
Cracking pearly mussel	<u>Hemistena lata</u>
Pink mucket	<u>Lampsilis orbiculata</u>
Pocketbook	<u>Lampsilis ovata</u>
Yellow sandshell	<u>Lampsilis teres</u>
Eastern pondmussel	<u>Ligumia nasuta</u>
Washboard	<u>Megaloniais nervosa</u>
Hickorynut	<u>Obovaria olivaria</u>
Ring pink	<u>Obovaria retusa</u>
White wartyback	<u>Plethobasus cicatricosus</u>
Orange-footed pearly mussel	<u>Plethobasus cooperianus</u>
Sheepnose	<u>Plethobasus cyphus</u>
Clubshell	<u>Pleurobema clava</u>
Ohio pigtoe	<u>Pleurobema cordatum</u>
Rough pigtoe	<u>Pleurobema plenum</u>
Pyramid pigtoe	<u>Pleurobema rubrum</u>
Fat pocketbook	<u>Potamilus capax</u>
Rabbitsfoot	<u>Quadrula cylindrica cylindrica</u>
Winged maple leaf	<u>Quadrula fragosa</u>
Monkeyface	<u>Quadrula metanevra</u>
Wartyback	<u>Quadrula nodulata</u>
Purple lilliput	<u>Toxolasma lividus</u>
Rayed bean	<u>Villosa fabalis</u>
Little spectaclecase	<u>Villosa lienosa</u>

Threatened

Snuffbox	<u>Epioblasma triquetra</u>
Ebonysshell	<u>Fusconaia ebena</u>
Black sandshell	<u>Ligumia recta</u>
Threehorn wartyback	<u>Obliquaria reflexa</u>
Fawnsfoot	<u>Truncilla donaciformis</u>
Pondhorn	<u>Unio merus tetralasmus</u>

Special Interest

Flat floater	<u>Anodonta suborbiculata</u>
Purple wartyback	<u>Cyclonaias tuberculata</u>
Wavy-rayed lampmussel	<u>Lamprolaima fasciola</u>
Round pig-toe	<u>Pleurobema sintoxia</u>
Salamander mussel	<u>Simpsonaias ambigua</u>
Deertoe	<u>Truncilla truncata</u>

Extirpated

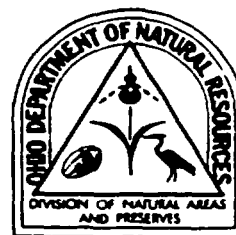
Mucket	<u>Actinonaias l. ligamentina</u>
Rock pocketbook	<u>Arcidens confragosus</u>
Spectaclecase	<u>Cumberlandia monodonta</u>
Scale shell	<u>Leptodea leptodon</u>
Western sand shell	<u>Ligumia subrostrata</u>
Ellipse	<u>Venustaconcha e. ellipsiformis</u>

Extinct

Leaf shell	<u>Epioblasma flexuosa</u>
Fork shell	<u>Epioblasma lewisi</u>
Round snuffbox	<u>Epioblasma personata</u>
	<u>Epioblasma phillipsi</u>
Tubercled blossom	<u>Epioblasma t. torulosa</u>
Scioto pigtoe	<u>Pleurobema bournianum</u>

isn659.mis
4/6/92

Ohio Department of Natural Resources
Division of Natural Areas & Preserves
1889 Fountain Square Court
Columbus, Ohio 43224
(614) 265-6453 ♦ (614) 267-3096 (FAX)
<http://www.dnr.ohio.gov/odnr/dnap/dnap.html>



George V. Voinovich • Governor
Donald C. Anderson • Director

RARE NATIVE OHIO PLANTS 1996-97 Status List

The attached list of Ohio endangered, threatened, potentially threatened, and presumed extirpated native plant taxa was determined by the Division of Natural Areas and Preserves with the advice and guidance of the Ohio Rare Plant Advisory Committee. The list was compiled pursuant to Ohio Revised Code Chapter 1518 which directs the Chief of the Division of Natural Areas and Preserves to adopt criteria for listing and to compile lists of plants that are endangered and threatened in Ohio. This list replaces the 1994-95 status list.

The list is divided into six phylogenetic groups: Lichens, Bryophytes, Pteridophytes, Gymnosperms, Monocotyledons, Dicotyledons. Within each group, families and their associated taxa are arranged in alphabetic order. Taxonomy and nomenclature of vascular plants generally follow Gleason and Cronquist (1991). A taxon can be located in Gleason and Cronquist by the listed name or by the synonym in parentheses. Vascular taxa not included in Gleason and Cronquist are so identified and followed by a specific reference. Taxonomy and nomenclature of the non-vascular plants follow Anderson, Crum and Buck (1990) and Anderson (1990) for bryophytes and Hale (1979) for lichens. The numbers in the "Count Guide" column refer to features on the criteria list for measuring plant population size. The columns marked "OH" and "US" indicate status of the taxon as assigned by the Ohio Division of Natural Areas and Preserves (Ohio Administrative Rules 1501:18-1-01 through 1501:18-2-05) and by the U.S. Fish and Wildlife Service.

The 1996-97 plant list was formally revised by administrative rule-making procedure in June, 1996, based upon information in the Natural Heritage data base as of January, 1996. This list will be revised again in 1998. The 1996-97 list contains 103 presumed extirpated, 213 endangered, 153 threatened and 162 potentially threatened taxa, plus 23 plant taxa with no assigned status. Only data from 1976 through January, 1996 were considered in assigning endangerment status.

Information on these 654 plants is contained in the Division's Natural Heritage data base and is generally accessible for research or environmental review through the Data Services Program. Application forms and a brochure may be obtained from the Division. Upon request, the Division can also provide a completely alphabetic status list of rare Ohio plants.

In the last two years, several presumed extirpated plants, and many additional locations of other rare plants, have been discovered by Ohio's professional and amateur botanists and naturalists. These discoveries help the Division make preservation and land acquisition decisions. Field work leading to improvements in this list was supported in part by the Ohio Income Tax Checkoff Program. The Division would appreciate additional information that would improve the accuracy of this list, including information on newly discovered occurrences of these plants and current sizes of known populations. Please contact the Division of Natural Areas and Preserves if you have questions or information concerning these species.



OHIO STATUS DESIGNATION CRITERIA

- "E" **Endangered Species:** A native Ohio plant species may be designated endangered if, based on its known status in Ohio, one or more of the following criteria apply:
- (1) The species is a federal endangered species extant in Ohio.
 - (2) The natural populations of the species in Ohio are limited to three or fewer occurrences.
 - (3) The distribution of the natural populations of the species in Ohio is limited to a geographic area delineated by three or fewer United States Geological Survey 7.5 minute quadrangle maps.
 - (4) The number of plants in all the natural populations of the species in Ohio is limited to one hundred or fewer individual, physically unconnected plants.
- "T" **Threatened Species:** A native Ohio plant species may be designated threatened if, based on its known status in Ohio, one or more of the following criteria apply:
- (1) The species is a federal threatened species extant in Ohio but not on the state endangered species list.
 - (2) The natural populations of the species in Ohio are limited to no less than four nor more than ten occurrences.
 - (3) The distribution of the natural populations of the species in Ohio is limited to a geographic area delineated by no less than four nor more than seven United States Geological Survey 7.5 minute quadrangle maps.
- "X" **Presumed Extirpated Species:** A native Ohio plant species may be designated presumed extirpated when no natural populations of the species have been documented since 1974.
- "P" **Potentially Threatened Species:** A native Ohio plant species may be designated potentially threatened if one or more of the following criteria apply:
- (1) The species is extant in Ohio and does not qualify as a state endangered or threatened species, but it is a proposed federal endangered or threatened species or a species listed in the Federal Register as under review for such proposal.
 - (2) The natural populations of the species are imperiled to the extent that the species could conceivably become a threatened species in Ohio within the foreseeable future.
 - (3) The natural populations of the species, even though they are not threatened in Ohio at the time of designation, are believed to be declining in abundance or vitality at a significant rate throughout all or large portions of the state.
- "A" **Added Species:** A native Ohio plant species which has recently been added to the Natural Heritage Program rare plant inventory. Sufficient information has not yet been obtained to determine the Ohio endangerment status.

NOTE: Data must be in the Natural Heritage Program data base to be considered for determination of species status.

Recommended citation: Ohio Division of Natural Areas and Preserves. 1996. Rare native Ohio plants: 1996-97 status list. Ohio Department of Natural Resources, Columbus, OH. 29 pp.

FEDERAL LISTED OHIO PLANT SPECIES

Source: October 31, 1995. U.S. Fish & Wildlife Service, "Endangered and Threatened Wildlife and Plants," 50 CFR 17.11 & 17.12.

Ohio-selected scientific and common names are listed first. Federal-selected names are shown in parentheses if they differ from the names on the Ohio list.

E = Federal endangered

T = Federal threatened

NOTE: Starting in July 1995, the U.S. Fish & Wildlife Service began to revise their procedures and terminology for species proposed as candidates for listing as federal endangered and federal threatened. The Category 2 and Category 3 species lists were eliminated. Former Category 1 species are now called federal candidate species. This new policy and the candidate species list were published in the February 28, 1996 Federal Register, Vol. 61, No. 40, pp. 7595-7613, "Endangered and Threatened Wildlife and Plants; Review of Plant and Animal Taxa That Are Candidates for Listing as Endangered or Threatened Species." At this time, there are no Ohio plants on the federal candidate species list.

<u>US Status</u>	<u>OH Status</u>	<u>Scientific Name</u>	<u>Common Name(s)</u>
T	E	<i>Aconitum noveboracense</i>	Northern Monkshood (Northern Wild Monkshood)
T	E	<i>Hymenoxys herbacea</i>	Lakeside Daisy
E	E	<i>Isotria medeoloides</i>	Small Whorled Pogonia
T	T	<i>Platanthera leucophaea</i>	Prairie Fringed Orchid (Eastern Prairie Fringed Orchid)
T	E	<i>Spiraea virginiana</i>	Appalachian Spiraea (Virginia Spiraea)
E	E	<i>Trifolium stoloniferum</i>	Running Buffalo Clover

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- Hitchcock, A.S. 1971. Manual of the Grasses of the United States. 2 vols., Second ed., Dover Publications, Inc., New York, N.Y. 1051 pp.
- Pryer, K.M. and C.H. Haufler. 1993. Isozymic and chromosomal evidence for the allotetraploid origin of Gymnocarpium dryopteris (Dryopteridaceae). Systematic Botany, 18(1): 150-172.
- Radford, A.E., H.E. Ahles and C.R. Bell. 1968. Manual of the vascular flora of the Carolinas. The University of North Carolina Press, Chapel Hill, N.C. 1183 pp.
- Voss, E.G. 1972. Michigan flora, Part I, Gymnosperms and Monocots. Cranbrook Inst. of Sci. Bull. 55 and Univ. of Michigan Herbarium, Ann Arbor, MI. 488 pp.
- Wagner, W.H., Jr. and J.M. Beitel. 1993. Lycopodiaceae Mirbel, Club-moss Family. In: Flora of North America, Vol. 2, Oxford University Press, New York, N.Y. 475 pp.

DIVISION OF NATURAL AREAS AND PRESERVES
RARE NATIVE OHIO PLANTS
1996 - 1997 STATUS LIST

Lichens

	<u>Count</u>	<u>Status</u>
	<u>Guide</u>	<u>OH US</u>
BAEOMYCETACEAE.		
Baeomyces absolutus, Pink Dot Lichen	(6)	E
COLLEMATACEAE.		
Collema bachmanianum, Bachman's Pulp Lichen	(6)	A
Collema coccophorum, Soil Pulp Lichen	(6)	E
Collema conglomeratum, Dotted Pulp Lichen	(6)	E
Collema crispum, Crinkled Pulp Lichen	(6)	X
Collema fuscovirens (C. tuniforme), Dusky Jelly Lichen	(6)	A
PARMELIACEAE.		
Canoparmelia texana (Pseudoparmelia texana), Buzzardroost Rock Lichen	(6)	E
Parmotrema madagascariaceum, Madagascar Shield Lichen	(6)	E
Punctelia perreticulata (Parmelia perreticulata), Reticulate Shield Lichen	(6)	A
RAMALINACEAE.		
Ramalina farinacea, Dotted Twig Lichen	(6)	E
Ramalina intermedia, Sandstone Twig Lichen	(6)	E
Ramalina petrina, Appalachian Trail Lichen	(6)	T
Ramalina pollinaria, Powdery Twig Lichen	(6)	T
STICTACEAE.		
Sticta weigelii, Weigel's Leather Lichen	(6)	E
VERRUCARIACEAE.		
Catapyrenium lachneum (Dermatocarpon lachneum), Liver Lichen ...	(6)	A
Bryophytes		
AMBLYSTEGIUM.		
Scorpidium scorpioides, Turgid Brown Worm Moss	(6)	X
ANDREAEACEAE.		
Andreaea rupestris var. rupestris, Black Rock Moss	(6)	X
ANOMODONTACEAE.		
Anomodon viticulosus, Long Tail Moss	(6)	A

	Count	Status
	<u>Guide</u>	<u>OH US</u>
BRACHYTHECIACEAE.		
<i>Tomentypnum nitens</i> , Fuzzy Hypnum Moss	(6)	A
BRYACEAE.		
<i>Anomobryum filiforme</i> , Common Silver Moss	(6)	A
BUXBAUMIACEAE.		
<i>Buxbaumia minakatae</i> , Ethereal Elf Cap Moss	(6)	E
DIPHYSCIACEAE.		
<i>Diphyscium cumberlandianum</i> , Cumberland Grain O' Wheat Moss	(6)	E
FISSIDENTACEAE.		
<i>Fissidens hyalinus</i> , Filmy Fissidens	(6)	E
PLAGIOTHECIACEAE.		
<i>Plagiothecium latebricola</i> , Lurking Leskea	(6)	E
POTTIACEAE.		
<i>Barbula indica</i> var. <i>indica</i> , Twisted Teeth Moss	(6)	A
<i>Tortella inclinata</i> , Curved Tortella	(6)	E
<i>Weissia sharpii</i> , Sharp's Green-cushioned Moss	(6)	A
PTYCHOMITRIACEAE.		
<i>Campylostelium saxicola</i> , Rock-loving Swan-necked Moss	(6)	E
<i>Ptychomitrium drummondii</i> , Drummond's Ptychomitrium	(6)	E
SPHAGNACEAE.		
<i>Sphagnum bartlettianum</i> , Bartlett's Peat Moss	(6)	A
<i>Sphagnum riparium</i> , Shore-growing Peat Moss	(6)	E
THUIDIACEAE.		
<i>Thuidium allenii</i> , Allen's Fern Moss	(6)	X

Pteridophytes

ASPLENIACEAE. Spleenwort Family		
<i>Asplenium bradleyi</i> , Bradley's Spleenwort	(5)	T
<i>Asplenium resiliens</i> , Black-stem Spleenwort	(5)	X
<i>Asplenium ruta-muraria</i> , Wall-rue	(5)	T
<i>Cystopteris tennesseensis</i> (not in Gleason and Cronquist 1991, see Cranfill 1980), Tennessee Bladder Fern	(3)	P
<i>Dryopteris clintoniana</i> , Clinton's Wood Fern	(2)	T

	Count	Status
	Guide	OH US
ASPLENIACEAE. Spleenwort Family (Cont'd.)		
Gymnocarpium appalachianum (not in Gleason and Cronquist 1991, see Pryer and Haufler 1993), Appalachian Oak Fern	(2)	X
Gymnocarpium dryopteris, Oak Fern	(3)	T
Phegopteris connectilis (Thelypteris phegopteris), Long Beech-fern	(3)	P
Woodsia ilvensis, Rusty Woodsia	(1)	X
BLECHNACEAE. Deer-fern Family		
Woodwardia areolata, Netted Chain-fern	(3)	P
Woodwardia virginica, Virginia Chain-fern	(3)	P
EQUISETACEAE. Horsetail Family		
Equisetum sylvaticum, Woodland Horsetail	(3)	T
Equisetum variegatum, Variegated Scouring-rush	(3)	P
HYMENOPHYLLACEAE. Filmy Fern Family		
Trichomanes boschianum, Appalachian Filmy Fern	(6)	E
ISOETACEAE. Quillwort Family		
Isoetes echinospora, Spiny-spored Quillwort	(5)	X
Isoetes engelmannii, Appalachian Quillwort	(5)	E
LYCOPODIACEAE. Clubmoss Family		
Lycopodiella margueritae (not in Gleason and Cronquist 1991, see Wagner and Beitel 1993), Northern Prostrate Clubmoss	(6)	A
Lycopodium appressum, Southern Clubmoss	(5)	E
OPHIOGLOSSACEAE. Adder's-tongue Family		
Botrychium biternatum, Sparse-lobe Grape-fern	(2)	T
Botrychium lanceolatum, Triangle Grape-fern	(2)	X
Botrychium multifidum, Leathery Grape-fern	(2)	T
Botrychium simplex, Least Grape-fern	(2)	X
Ophioglossum engelmannii, Limestone Adder's-tongue	(1)	E
POLYPODIACEAE. Polypody Family		
Polypodium polypodioides, Little Gray Polypody	(6)	E
SELAGINELLACEAE. Selaginella Family		
Selaginella eclipses (S. apoda in part, see Buck 1977), Midwest Spikemoss	(6)	T

	Count	Status
	<u>Guide</u>	<u>OH US</u>
SELAGINELLACEAE. Selaginella Family (Cont'd.)		
Selaginella rupestris, Rock Spikemoss	(6)	E
Gymnosperms		
CUPRESSACEAE. Cypress Family		
Juniperus communis, Ground Juniper	(6)	T
Thuja occidentalis, Arbor Vitae	(1)	P
PINACEAE. Pine Family		
Larix laricina, Tamarack	(1)	P
Angiosperms - Monocotyledons		
AGAVACEAE. Agave Family		
Agave virginica, American Aloe	(1)	T
ALISMATACEAE. Water-plantain Family		
Alisma triviale, Northern Water-plantain	(1)	T
Echinodorus rostratus (E. berteroi var. lanceolatus), Bur-head	(2)	E
Lophotocarpus calycinus (Sagittaria calycina), Southern Wapato	(2)	T
Sagittaria australis, Long-beaked Arrowhead	(2)	P
Sagittaria cuneata, Wapato	(2)	E
Sagittaria graminea, Grass-leaf Arrowhead	(2)	E
Sagittaria latifolia var. pubescens, Hairy Arrowhead	(2)	P
Sagittaria rigida, Deer's-tongue Arrowhead	(2)	T
ARACEAE. Arum Family		
Calla palustris, Wild Calla	(6)	P
CYPERACEAE. Sedge Family		
Carex abscondita, Southern Leafy Wood Sedge	(5)	T
Carex alata, Broad-winged Sedge	(5)	P
Carex albicans var. emmonsii, Emmons' Sedge	(5)	T
Carex albolutescens, Pale Straw Sedge	(5)	T
Carex alopecoidea, Northern Fox Sedge	(6)	A
Carex aquatilis, Leafy Tussock Sedge	(5)	T
Carex arctata, Drooping Wood Sedge	(2)	E
Carex argyrantha, Silvery Sedge	(2)	P
Carex atherodes, Wheat Sedge	(4)	P
Carex atlantica var. capillacea, Howe's Sedge	(5)	P
Carex aurea (sensu Voss 1972), Golden-fruited Sedge	(5)	P

	Count	Status
	Guide	OH US
CYPERACEAE. Sedge Family (Cont'd.)		
Carex bebbii, Bebb's Sedge	(5)	P
Carex bicknellii, Bicknell's Sedge	(5)	T
Carex brunnescens, Brownish Sedge	(5)	T
Carex bushii, Bush's Sedge	(6)	A
Carex cephaloidea (C. sparganioides var. cephaloidea), Thin-leaf Sedge	(5)	E
Carex conoidea, Field Sedge	(6)	T
Carex crawei, Crawe's Sedge	(4)	P
Carex crus-corvi, Raven-foot Sedge	(5)	E
Carex cryptolepis, Little Yellow Sedge	(5)	P
Carex debilis var. debilis, Weak Sedge	(2)	P
Carex decomposita, Cypress-knee Sedge	(5)	E
Carex deweyana, Dewey's Sedge	(5)	X
Carex diandra, Lesser Panicked Sedge	(5)	P
Carex disperma, Two-seeded Sedge	(5)	E
Carex echinata (C. cephalantha), Little Prickly Sedge	(2)	E
Carex flava, Yellow Sedge	(5)	P
Carex formosa, Handsome Sedge	(4)	X
Carex garberi (sensu Voss 1972), Garber's Sedge	(2)	E
Carex haydenii, Hayden's Sedge	(5)	X
Carex juniperorum (not in Gleason and Cronquist 1991, see Catling et al. 1993), Juniper Sedge	(2)	T
Carex lasiocarpa, Slender Sedge	(5)	P
Carex limosa, Mud Sedge	(4)	E
Carex longii, Long's Sedge	(5)	E
Carex louisianica, Louisiana Sedge	(4)	E
Carex lucorum, Fire Sedge	(2)	E
Carex lupuliformis, False Hop Sedge	(4)	T
Carex merritt-fernaldii (C. brevior in part, see Voss 1972), Fernald's Sedge	(6)	E
Carex mesochorea (C. cephalophora var. mesochorea), Midland Sedge	(5)	T
Carex oligosperma, Few-seeded Sedge	(4)	T
Carex pallescens, Pale Sedge	(2)	T
Carex peckii, Peck's Sedge	(2)	X
Carex projecta, Necklace Sedge	(5)	T
Carex pseudocyperus, Northern Bearded Sedge	(6)	E
Carex purpurifera, Purple Wood Sedge	(5)	E
Carex radiata, Radiate Sedge	(5)	P
Carex retroflexa var. retroflexa, Reflexed Sedge	(5)	P
Carex retrorsa, Reflexed Bladder Sedge	(5)	E
Carex richardsonii, Richardson's Sedge	(2)	X
Carex sartwellii, Sartwell's Sedge	(4)	P

	Count	Status
	Guide	OH US
CYPERACEAE. Sedge Family (Cont'd.)		
<i>Carex siccata</i> , Hay Sedge	(6)	E
<i>Carex sprengei</i> , Sprengel's Sedge	(2)	T
<i>Carex sterilis</i> , Fen Sedge	(5)	P
<i>Carex straminea</i> , Straw Sedge	(5)	P
<i>Carex striatula</i> , Lined Sedge	(5)	E
<i>Carex styloflexa</i> , Lowland Wood Sedge	(5)	X
<i>Carex suberecta</i> , Prairie Straw Sedge	(5)	P
<i>Carex tenuiflora</i> , Thin-flowered Sedge	(1)	X
<i>Carex utriculata</i> , Beaked Sedge	(5)	P
<i>Carex viridula</i> , Little Green Sedge	(5)	P
<i>Cladium mariscoides</i> , Twig-rush	(6)	P
<i>Cyperus acuminatus</i> , Pale Umbrella-sedge	(5)	E
<i>Cyperus diandrus</i> , Low Umbrella-sedge	(5)	P
<i>Cyperus dipsaciformis</i> (<i>C. retrofractus</i>), Teasel-sedge	(2)	E
<i>Cyperus houghtonii</i> , Houghton's Umbrella-sedge	(2)	X
<i>Cyperus lancastris</i> , Many-flowered Umbrella-sedge	(2)	E
<i>Cyperus refractus</i> , Reflexed Umbrella-sedge	(2)	E
<i>Cyperus schweinitzii</i> , Schweinitz's Umbrella-sedge	(2)	P
<i>Eleocharis caribaea</i> , Caribbean Spikerush	(5)	E
<i>Eleocharis compressa</i> , Flat-stem Spikerush	(5)	T
<i>Eleocharis engelmannii</i> (<i>E. ovata</i> in part), Engelmann's Spikerush	(5)	E
<i>Eleocharis intermedia</i> , Matted Spikerush	(5)	P
<i>Eleocharis olivacea</i> (<i>E. flavescens</i> var. <i>olivacea</i>), Olivaceous Spikerush	(5)	P
<i>Eleocharis ovata</i> , Ovate Spikerush	(2)	E
<i>Eleocharis parvula</i> , Least Spikerush	(2)	E
<i>Eleocharis pauciflora</i> , Few-flowered Spikerush	(5)	T
<i>Eleocharis quadrangulata</i> , Four-angled Spikerush	(5)	P
<i>Eleocharis wolfii</i> , Wolf's Spikerush	(5)	E
<i>Eriophorum gracile</i> , Slender Cottongrass	(2)	X
<i>Eriophorum virginicum</i> , Tawny Cottongrass	(2)	P
<i>Eriophorum viridi-carinatum</i> , Green Cottongrass	(2)	P
<i>Lipocarpa drummondii</i> (<i>Hemicarpha micrantha</i> var. <i>aristulata</i>), Drummond's Dwarf Bulrush	(1)	E
<i>Lipocarpa micrantha</i> (<i>Hemicarpha micrantha</i> var. <i>micrantha</i>), Dwarf Bulrush	(5)	T
<i>Rhynchospora alba</i> , White Beak-rush	(5)	P
<i>Rhynchospora globularis</i> , Grass-like Beak-rush	(5)	E
<i>Scirpus expansus</i> , Woodland Bulrush	(2)	T
<i>Scirpus purshianus</i> (sensu Fernald 1950), Pursh's Bulrush	(5)	P
<i>Scirpus smithii</i> , (sensu Fernald 1950), Smith's Bulrush	(5)	E
<i>Scirpus subterminalis</i> , Swaying Rush	(6)	E

	Count	Status
	Guide	OH US
CYPERACEAE. Sedge Family (Cont'd.)		
<i>Scirpus torreyi</i> , Torrey's Bulrush	(5)	X
<i>Scleria oligantha</i> , Tubercled Nut-rush	(5)	E
<i>Scleria pauciflora</i> , Few-flowered Nut-rush	(4)	T
<i>Scleria triglomerata</i> , Tall Nut-rush	(5)	P
<i>Scleria verticillata</i> , Low Nut-rush	(5)	P
ERIOCAULACEAE. Pipewort Family		
<i>Eriocaulon septangulare</i> (<i>E. aquaticum</i>), White-buttons	(5)	E
IRIDACEAE. Iris Family		
<i>Iris brevicaulis</i> , Leafy Blue Flag	(1)	E
<i>Iris verna</i> , Dwarf Iris	(5)	T
<i>Sisyrinchium atlanticum</i> , Atlantic Blue-eyed-grass	(2)	E
<i>Sisyrinchium montanum</i> , Northern Blue-eyed-grass	(2)	E
<i>Sisyrinchium mucronatum</i> , Narrow-leaved Blue-eyed-grass	(2)	E
JUNCACEAE. Rush Family		
<i>Juncus alpinus</i> (<i>J. alpinoarticulatus</i>), Alpine Rush	(5)	T
<i>Juncus balticus</i> (<i>J. arcticus</i> in part), Baltic Rush	(4)	P
<i>Juncus diffusissimus</i> , Diffuse Rush	(5)	E
<i>Juncus greenei</i> , Greene's Rush	(5)	E
<i>Juncus interior</i> (<i>J. tenuis</i> in part), Inland Rush	(5)	T
<i>Juncus platyphyllus</i> (<i>J. tenuis</i> in part), Flat-leaved Rush	(5)	E
<i>Juncus secundus</i> , One-sided Rush	(5)	T
<i>Luzula bulbosa</i> , Southern Woodrush	(5)	T
JUNCAGINACEAE. Arrow-grass Family		
<i>Triglochin maritimum</i> , Seaside Arrow-grass	(2)	T
<i>Triglochin palustre</i> , Marsh Arrow-grass	(2)	P
LEMNACEAE. Duckweed Family		
<i>Lemna valdiviana</i> , Pale Duckweed	(6)	X
<i>Wolffiella floridana</i> , Wolffiella	(6)	T
LILIACEAE. Lily Family		
<i>Clintonia borealis</i> , Bluebead-lily	(5)	E
<i>Clintonia umbellulata</i> , Speckled Wood-lily	(5)	T
<i>Disporum maculatum</i> , Nodding Mandarin	(2)	T
<i>Erythronium rostratum</i> (not in Gleason and Cronquist 1991, see Braun 1967), Goldenstar	(4)	E
<i>Lilium philadelphicum</i> , Wood-lily	(2)	T
<i>Lilium superbum</i> , Turk's-cap Lily	(2)	P
<i>Melanthium virginicum</i> , Bunchflower	(2)	T

	Count	Status
	Guide	OH US
LILIACEAE. Lily Family (Cont'd.)		
Nothoscordum bivalve, False Garlic	(2)	T
Smilacina trifolia, Three-leaved Solomon's-seal	(2)	X
Stenanthium gramineum, Feather-bells	(2)	T
Streptopus roseus, Rose Twisted-stalk	(2)	E
Tofieldia glutinosa, False Asphodel	(2)	T
Trillium cernuum, Nodding Trillium	(2)	X
Trillium nivale, Snow Trillium	(2)	P
Trillium recurvatum, Prairie Wake-robin	(2)	P
Trillium undulatum, Painted Trillium	(2)	T
Veratrum woodii, Wood's Hellebore	(1)	T
Zigadenus elegans var. glaucus, Wand-lily	(2)	P
NAJADACEAE. Water-nymph Family		
Najas gracillima, Thread-like Naiad	(6)	E
ORCHIDACEAE. Orchid Family		
Arethusa bulbosa, Dragon's-mouth	(2)	E
Calopogon tuberosus, Grass-pink	(2)	P
Coeloglossum viride (Habenaria viridis), Long-bracted Orchid	(2)	E
Corallorhiza maculata, Spotted Coral-root	(2)	P
Corallorhiza trifida, Early Coral-root	(2)	E
Corallorhiza wisteriana, Spring Coral-root	(2)	T
Cypripedium calceolus var. parviflorum, Small Yellow Lady's-slipper	(2)	E
Cypripedium calceolus var. pubescens, Large Yellow Lady's-slipper	(2)	P
Cypripedium candidum, White Lady's-slipper	(2)	T
Cypripedium reginae, Showy Lady's-slipper	(2)	T
Goodyera tessellata, Checkered Rattlesnake-plantain	(5)	X
Hexalectris spicata, Crested Coral-root	(4)	T
Isotria medeoloides, Small Whorled Pogonia	(1)	E E
Listera cordata, Heartleaf Twayblade	(2)	X
Malaxis unifolia, Green Adder's-mouth	(2)	P
Platanthera blephariglottis (Habenaria blephariglottis), White Fringed Orchid	(2)	E
Platanthera ciliaris (Habenaria ciliaris), Yellow Fringed Orchid	(2)	T
Platanthera clavellata (Habenaria clavellata), Green Woodland Orchid	(2)	P
Platanthera flava (Habenaria flava), Tubercled Rein-orchid	(2)	P

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ORCHIDACEAE. Orchid Family (Cont'd.)			
Platanthera grandiflora (Habenaria psycodes var. grandiflora), Large Purple Fringed Orchid	(2)	X	
Platanthera hookeri (Habenaria hookeri), Hooker's Orchid	(2)	X	
Platanthera hyperborea (Habenaria hyperborea), Tall Northern Green Orchid	(2)	X	
Platanthera leucophaea (Habenaria leucophaea), Prairie Fringed Orchid	(2)	T	T
Platanthera orbiculata (Habenaria orbiculata), Large Round-leaved Orchid	(2)	P	
Platanthera psycodes (Habenaria psycodes var. psycodes), Small Purple Fringed Orchid	(2)	E	
Pogonia ophioglossoides, Rose Pogonia	(2)	T	
Spiranthes lucida, Shining Ladies'-tresses	(2)	P	
Spiranthes magnicamporum, Great Plains Ladies'-tresses	(2)	P	
Spiranthes ovalis, Lesser Ladies'-tresses	(2)	P	
Spiranthes romanzoffiana, Hooded Ladies'-tresses	(2)	T	
Triphora trianthophora, Three-birds-orchid	(2)	T	
POACEAE. Grass Family			
Agrostis eliottiana, Elliott's Bent-grass	(5)	X	
Ammophila breviligulata, American Beach Grass	(6)	T	
Andropogon virginicus var. abbreviatus, Bushy Beardgrass	(5)	A	
Aristida necopina (A. longespica var. geniculata), False Arrow-feather	(2)	E	
Aristida purpurascens, Purple Triple-awned Grass	(6)	P	
Calamagrostis porteri spp. insperata, (C. insperata), Bartley's Reed Bent Grass	(5)	E	
Cinna latifolia, Northern Wood-reed	(5)	E	
Danthonia compressa, Flattened Wild Oat Grass	(5)	P	
Deschampsia caespitosa, Tufted Hairgrass	(5)	P	
Deschampsia flexuosa, Crinkled Hairgrass	(5)	P	
Digitaria filiformis, Slender Finger-grass	(5)	X	
Elymus trachycaulus, Bearded Wheat Grass	(5)	T	
Glyceria acutiflora, Sharp-glumed Manna-grass	(5)	E	
Glyceria borealis, Northern Manna-grass	(5)	X	
Glyceria grandis, Tall Manna-grass	(6)	P	
Gymnopogon ambiguus, Beardgrass	(5)	X	
Koeleria macrantha (K. pyramidata), Junegrass	(5)	E	
Leersia lenticularis, Catchfly Grass	(4)	E	
Melica nitens, Three-flowered Melic	(5)	E	
Muhlenbergia capillaris, Hairgrass	(5)	X	

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POACEAE. Grass Family (Cont'd.)		
Muhlenbergia cuspidata, Plains Muhlenbergia	(5)	E
Oryzopsis asperifolia, Large-leaved Mountain-rice	(5)	E
Oryzopsis racemosa, Mountain-rice	(5)	E
Panicum bicknellii (sensu Fernald 1950), Bicknell's Panic-grass	(5)	T
Panicum boreale (sensu Fernald 1950), Northern Panic-grass	(5)	T
Panicum calliphyllosum (sensu Fernald 1950), Tall Green Panic-grass	(5)	X
Panicum columbianum, American Panic-grass	(5)	P
Panicum commonsianum, Commons' Panic-grass	(5)	E
Panicum laxiflorum, Pale Green Panic-grass	(5)	P
Panicum leibergii, Leiberg's Panic-grass	(5)	E
Panicum lindheimeri (P. languinosum var. lindheimeri), Lindheimer's Panic-grass	(5)	A
Panicum longifolium, Long-leaved Panic-grass	(5)	X
Panicum meridionale (P. leucothrix), Southern Hairy Panic-grass	(5)	E
Panicum perlongum (P. depauperatum and P. linearifolium in part), Long-panicled Panic-grass	(5)	E
Panicum philadelphicum (sensu Hitchcock 1971), Philadelphia Panic-grass	(4)	T
Panicum praecocius (P. villosissimum in part, see Hitchcock 1971), Early Panic-grass	(5)	A
Panicum spretum, Narrow-headed Panic-grass	(5)	E
Panicum tuckermanii (P. philadelphicum in part, see Hitchcock 1971), Tuckerman's Panic-grass	(4)	A
Panicum verrucosum, Warty Panic-grass	(5)	X
Panicum villosissimum (sensu Hitchcock 1971), Villous Panic-grass	(5)	E
Panicum yadkinense, Spotted Panic-grass	(5)	E
Paspalum fluitans, Riverbank Paspalum	(6)	T
Piptochaetium avenaceum, Blackseed Needle Grass	(5)	X
Poa languida, Weak Spear-grass	(5)	P
Poa paludigena, Marsh Spear-grass	(5)	T
Poa saltuensis, Pasture Bluegrass	(5)	E
Poa wolfii, Wolf's Bluegrass	(5)	X
Saccharum alopecuroideum (Erianthus alopecuroides), Silver Plume Grass	(5)	X
Schizachne purpurascens, False Melic	(5)	E
Schizachyrium scoparium var. littorale, Coastal Little Bluestem	(5)	E
Sphenopholis obtusata var. obtusata, Prairie Wedgegrass	(2)	T
Sphenopholis pensylvanica, Swamp Oats	(5)	P
Sporobolus cryptandrus, Sand Dropseed	(5)	P

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POACEAE. Grass Family (Cont'd.)		
Sporobolus heterolepis, Prairie Dropseed	(5)	T
Stipa spartea, Porcupine Grass	(5)	T
Triplasis purpurea, Purple Sand-grass	(5)	P
Zizania aquatica, Wild Rice	(2)	T
PONTEDERIACEAE. Water-hyacinth Family		
Heteranthera reniformis, Mud-plantain	(6)	E
POTAMOGETONACEAE. Pondweed Family		
Potamogeton filiformis, Filiform Pondweed	(6)	X
Potamogeton friesii, Fries' Pondweed	(6)	E
Potamogeton gramineus, Grass-like Pondweed	(6)	E
Potamogeton hillii, Hill's Pondweed	(6)	E
Potamogeton natans, Floating Pondweed	(6)	P
Potamogeton perfoliatus, Red-head Pondweed	(6)	X
Potamogeton praelongus, White-stem Pondweed	(6)	E
Potamogeton pulcher, Spotted Pondweed	(6)	T
Potamogeton richardsonii, Richardson's Pondweed	(6)	P
Potamogeton robbinsii, Robbins' Pondweed	(6)	E
Potamogeton spirillus, Spiral Pondweed	(6)	E
Potamogeton strictifolius, Straight-leaved Pondweed	(6)	X
Potamogeton tennesseensis (not in Gleason and Cronquist 1991, see Braun 1967), Tennessee Pondweed	(6)	E
Potamogeton vaseyi, Vasey's Pondweed	(6)	X
Potamogeton zosteriformis, Flat-stem Pondweed	(6)	P
SCHEUCHZERIAE. Scheuchzeria Family		
Scheuchzeria palustris, Scheuchzeria	(1)	E
SMILACACEAE. Catbrier Family		
Smilax herbacea var. lasioneura, Pale Carrion-flower	(6)	T
Smilax herbacea var. pulverulenta, Downy Carrion-flower	(2)	E
SPARGANIACEAE. Bur-reed Family		
Sparganium androcladum, Keeled Bur-reed	(2)	P
Sparganium chlorocarpum, Small Bur-reed	(2)	X
XYRIDACEAE. Yellow-eyed-grass Family		
Xyris difformis, Carolina Yellow-eyed-grass	(5)	E
Xyris torta, Twisted Yellow-eyed-grass	(5)	T

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Angiosperms - Dicotyledons		
ACANTHACEAE. Acanthus Family		
Ruellia caroliniensis, Carolina Ruellia	(2)	P
ACERACEAE. Maple Family		
Acer pensylvanicum, Striped Maple	(1)	E
AMARANTHACEAE. Amaranth Family		
Froelichia floridana, Cottonweed	(1)	E
ANACARDIACEAE. Cashew Family		
Rhus aromatica var. arenaria, Beach Sumac	(2)	X
Toxicodendron rydbergii, Northern Poison-ivy	(6)	E
APIACEAE. Carrot Family		
Eryngium yuccifolium, Rattlesnake-master	(1)	P
Hydrocotyle americana, American Water-pennywort	(6)	P
Hydrocotyle umbellata, Navelwort	(6)	E
Ligusticum canadense, American Lovage	(2)	X
Perideridia americana, Perideridia	(2)	X
APOCYNACEAE. Dogbane Family		
Apocynum sibiricum, Claspingleaf Dogbane	(2)	E
AQUIFOLIACEAE. Holly Family		
Nemopanthus mucronatus, Catberry	(1)	P
ARALIACEAE. Ginseng Family		
Aralia hispida, Bristly Sarsaparilla	(1)	E
ASCLEPIADACEAE. Milkweed Family		
Asclepias amplexicaulis, Bluntleaf Milkweed	(1)	P
Asclepias variegata, White Milkweed	(2)	P
Asclepias viridiflora, Green Milkweed	(2)	P
Asclepias viridis, Spider Milkweed	(2)	P
Matelea obliqua, Angle-pod	(6)	P
ASTERACEAE. Aster Family		
Antennaria virginica, Shale Barren Pussy-toes	(6)	T
Artemisia campestris, Beach Wormwood	(2)	T
Aster acuminatus, Mountain Aster	(4)	E
Aster drummondii, Drummond's Aster	(2)	T
Aster dumosus, Bushy Aster	(2)	T

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ASTERACEAE. Aster Family (Cont'd.)		
Aster oblongifolius, Shale Barren Aster	(2)	T
Aster ontarionis, Bottomland Aster	(5)	A
Aster solidagineus, Narrow-leaved Aster	(5)	T
Aster surculosus, Creeping Aster	(5)	X
Cacalia plantaginea, Fen Indian-plantain	(1)	P
Chrysogonum virginianum, Golden-knees	(6)	T
Chrysopsis graminifolia, Silkgrass	(5)	E
Cirsium carolinianum, Carolina Thistle	(2)	T
Conyza ramosissima, Bushy Horseweed	(2)	E
Eupatorium album, White Thoroughwort	(2)	T
Eupatorium aromaticum, Small White Snakeroot	(2)	T
Eupatorium hyssopifolium, Hyssop Thoroughwort	(1)	E
Eupatorium incarnatum, Pink Thoroughwort	(2)	P
Euthamia gymnospermoides (E. remota), Great Plains Goldenrod	(4)	T
Gnaphalium viscosum (G. macounii), Winged Cudweed	(2)	X
Helianthus mollis, Ashy Sunflower	(2)	T
Helianthus occidentalis, Western Sunflower	(2)	P
Hieracium canadense (H. kalmii var. fasciculatum), Canada Hawkweed	(2)	T
Hieracium longipilum, Long-bearded Hawkweed	(4)	E
Hymenoxys herbacea, Lakeside Daisy	(1)	E T
Krigia dandelion, Potato-dandelion	(1)	T
Krigia virginica, Dwarf Dandelion	(2)	T
Lactuca hirsuta, Hairy Tall Lettuce	(2)	A
Liatris cylindracea, Slender Blazing-star	(2)	T
Liatris squarrosa, Scaly Blazing-star	(2)	P
Megalodonta beckii (Bidens beckii), Water-marigold	(5)	X
Pluchea camphorata, Camphorweed	(2)	E
Prenanthes aspera, Rough Rattlesnake-root	(2)	E
Prenanthes crepidinea, Nodding Rattlesnake-root	(2)	E
Prenanthes racemosa, Prairie Rattlesnake-root	(2)	P
Senecio pauperculus, Balsam Squaw-weed	(2)	T
Silphium laciniatum, Compass-plant	(1)	E
Solidago arguta, Cut-leaf Goldenrod	(2)	X
Solidago odora, Sweet Goldenrod	(1)	T
Solidago ohioensis, Ohio Goldenrod	(2)	P
Solidago ptarmicoides, White Upland Goldenrod	(2)	X
Solidago puberula, Dusty Goldenrod	(4)	A
Solidago sphacelata, False Goldenrod	(4)	A
Solidago squarrosa, Leafy Goldenrod	(2)	P
Verbesina helianthoides, Hairy Wing-stem	(2)	P
Verbesina occidentalis, Yellow Crownbeard	(2)	E

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ASTERACEAE. Aster Family (Cont'd.)		
Vernonia fasciculata, Prairie Ironweed	(2)	P
Vernonia missurica, Missouri Ironweed	(2)	E
Vernonia noveboracensis, New York Ironweed	(2)	X
BETULACEAE. Birch Family		
Betula populifolia, Gray Birch	(1)	P
Betula pumila, Swamp Birch	(1)	T
Corylus cornuta, Beaked Hazel	(1)	X
BIGNONIACEAE. Trumpet-creeper Family		
Bignonia capreolata, Cross-vine	(6)	P
BORAGINACEAE. Borage Family		
Cynoglossum virginianum var. boreale, Northern Wild		
Comfrey	(2)	X
Hackelia deflexa, Northern Stickseed	(2)	X
Lithospermum carolinense (L. croceum), Plains Puccoon	(2)	T
Onosmodium hispidissimum (O. molle var. hispidissimum), False Gromwell	(2)	P
BRASSICACEAE. Mustard Family		
Arabis divaricarpa, Limestone Rock-cress	(2)	E
Arabis drummondii, Drummond's Rock-cress	(2)	E
Arabis hirsuta var. adpressipilis, Southern Hairy Rock-cress	(2)	P
Arabis hirsuta var. pycnocarpa, Western Hairy Rock-cress	(2)	E
Arabis lyrata, Lyre-leaf Rock-cress	(2)	P
Arabis patens, Spreading Rock-cress	(2)	E
Armoracia lacustris, Lake-cress	(2)	T
Cakile edentula, Inland Sea-rocket	(2)	P
Cardamine dissecta, Narrow-leaved Toothwort	(4)	P
Cardamine pratensis var. palustris, American Cuckoo-flower	(2)	E
Descurainia pinnata, Tansy-mustard	(2)	T
Draba brachycarpa, Little Whitlow-grass	(2)	E
Draba cuneifolia, Wedge-leaf Whitlow-grass	(2)	T
Draba reptans, Carolina Whitlow-grass	(2)	E
Erysimum arkansanum (E. asperum), Western Wall-flower	(2)	E
Leavenworthia uniflora, Michaux's Leavenworthia	(2)	T
CACTACEAE. Cactus Family		
Opuntia humifusa, Prickly Pear	(6)	P

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CALLITRICHACEAE. Water-starwort Family		
<i>Callitriche verna</i> (C. palustris), Water-starwort	(6)	T
CALYCANTHACEAE. Strawberry-shrub Family		
<i>Calycanthus fertilis</i> (C. floridus var. glaucus), Sweet-shrub	(1)	X
CAMPANULACEAE. Bellflower Family		
<i>Campanula rotundifolia</i> , Harebell	(2)	T
CAPRIFOLIACEAE. Honeysuckle Family		
<i>Linnaea borealis</i> , American Twinflower	(5)	X
<i>Lonicera flava</i> , Pale Yellow Honeysuckle	(2)	X
<i>Lonicera oblongifolia</i> , Swamp Fly-honeysuckle	(2)	X
<i>Lonicera prolifera</i> , Grape Honeysuckle	(6)	P
<i>Lonicera villosa</i> (L. caerulea var. villosa), Mountain Fly-honeysuckle	(2)	X
<i>Symphoricarpos albus</i> var. albus, Snowberry	(2)	X
<i>Viburnum alnifolium</i> , Hobblebush	(1)	P
<i>Viburnum molle</i> , Soft-leaved Arrow-wood	(1)	T
<i>Viburnum opulus</i> var. americanum, Highbush-cranberry	(1)	T
<i>Viburnum rufidulum</i> , Southern Black-haw	(1)	P
CARYOPHYLLACEAE. Pink Family		
<i>Arenaria lateriflora</i> , Grove Sandwort	(2)	T
<i>Arenaria patula</i> , Spreading Sandwort	(2)	E
<i>Arenaria stricta</i> , Rock Sandwort	(5)	P
<i>Sagina decumbens</i> , Southern Pearlwort	(5)	X
<i>Silene caroliniana</i> var. <i>pennsylvanica</i> , Carolina Catchfly	(5)	T
<i>Silene caroliniana</i> var. <i>wherryi</i> (not in Gleason and Cronquist 1991, see Fernald 1950), Wherry's Catchfly	(5)	E
<i>Silene nivea</i> , Snowy Champion	(4)	T
<i>Silene regia</i> , Royal Catchfly	(2)	P
<i>Silene rotundifolia</i> , Round-leaved Catchfly	(5)	P
CELASTRACEAE. Staff-tree Family		
<i>Paxistima canbyi</i> , Cliff-green	(6)	E
CHENOPODIACEAE. Goosefoot Family		
<i>Chenopodium capitatum</i> , Strawberry-blite	(2)	X
<i>Chenopodium leptophyllum</i> , Slender Goosefoot	(2)	X

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CISTACEAE. Rockrose Family		
<i>Helianthemum bicknellii</i> , Plains Frostweed	(2)	T
<i>Helianthemum canadense</i> , Canada Frostweed	(2)	P
<i>Hudsonia tomentosa</i> , Beach-heather	(6)	E
<i>Lechea intermedia</i> , Round-fruited Pinweed	(2)	T
<i>Lechea minor</i> , Thyme-leaf Pinweed	(2)	T
<i>Lechea pulchella</i> , Leggett's Pinweed	(2)	P
<i>Lechea tenuifolia</i> , Narrow-leaved Pinweed	(2)	E
<i>Lechea villosa</i> (L. mucronata), Hairy Pinweed	(2)	T
CLUSIACEAE. Mangosteen Family		
<i>Hypericum boreale</i> , Northern St. John's-wort	(2)	E
<i>Hypericum canadense</i> , Canadian St. John's-wort	(2)	T
<i>Hypericum denticulatum</i> , Coppery St. John's-wort	(1)	E
<i>Hypericum ellipticum</i> , Few-flowered St. John's-wort	(4)	T
<i>Hypericum gymnanthum</i> , Least St. John's-wort	(2)	E
<i>Hypericum kalmianum</i> , Kalm's St. John's-wort	(2)	T
<i>Hypericum majus</i> , Tall St. John's-wort	(2)	P
<i>Triadenum tubulosum</i> , Marsh St. John's-wort	(2)	T
<i>Triadenum walteri</i> , Walter's St. John's-wort	(2)	E
CORNACEAE. Dogwood Family		
<i>Cornus canadensis</i> , Bunchberry	(3)	T
<i>Cornus rugosa</i> , Round-leaved Dogwood	(2)	P
CUSCUTACEAE. Dodder Family		
<i>Cuscuta compacta</i> , Sessile Dodder	(6)	X
<i>Cuscuta coryli</i> , Hazel Dodder	(6)	E
<i>Cuscuta glomerata</i> , Glomerate Dodder	(6)	T
<i>Cuscuta pentagona</i> , Five-angled Dodder	(6)	X
DROSERACEAE. Sundew Family		
<i>Drosera intermedia</i> , Spathulate-leaved Sundew	(2)	E
<i>Drosera rotundifolia</i> , Round-leaved Sundew	(1)	P
ELAEAGNACEAE. Oleaster Family		
<i>Shepherdia canadensis</i> , Canadian Buffalo-berry	(1)	P
ELATINACEAE. Waterwort Family		
<i>Elatine triandra</i> , Elatine	(6)	X
ERICACEAE. Heath Family		
<i>Andromeda glaucophylla</i> , Bog-rosemary	(3)	X
<i>Arctostaphylos uva-ursi</i> , Bearberry	(6)	X

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ERICACEAE. Heath Family (Cont'd.)			
<i>Chamaedaphne calyculata</i> , Leather-leaf	(5)		P
<i>Gaultheria hispidula</i> , Creeping Snowberry	(6)		X
<i>Ledum groenlandicum</i> , Labrador-tea	(6)		E
<i>Lyonia ligustrina</i> , Maleberry	(3)		X
<i>Rhododendron calendulaceum</i> , Flame Azalea	(2)		E
<i>Rhododendron maximum</i> , Great Rhododendron	(6)		T
<i>Rhododendron nudiflorum</i> var. <i>nudiflorum</i> (<i>R. periclymenoides</i>), Pinxter-flower	(2)		T
<i>Rhododendron nudiflorum</i> var. <i>roseum</i> (<i>R. prinophyllum</i>), Northern Rose Azalea	(2)		P
<i>Vaccinium macrocarpon</i> , Large Cranberry	(6)		P
<i>Vaccinium myrtilloides</i> , Velvet-leaf Blueberry	(6)		T
<i>Vaccinium oxycoccos</i> , Small Cranberry	(6)		T
EUPHORBIACEAE. Spurge Family			
<i>Acalypha virginica</i> var. <i>deamii</i> (<i>A. deamii</i>), Deam's Three-seeded Mercury	(2)		X
<i>Croton glandulosus</i> , Northern Croton	(2)		E
<i>Euphorbia polygonifolia</i> , Seaside Spurge	(6)		P
<i>Euphorbia purpurea</i> , Glade Spurge	(5)		E
<i>Euphorbia serpens</i> , Roundleaf Spurge	(6)		E
<i>Phyllanthus caroliniensis</i> , Carolina Leaf-flower	(2)		E
FABACEAE. Pea or Bean Family			
<i>Astragalus neglectus</i> , Cooper's Milk-vetch	(2)		E
<i>Baptisia australis</i> , Blue False Indigo	(2)		E
<i>Baptisia lactea</i> , Prairie False Indigo	(2)		P
<i>Clitoria mariana</i> , Butterfly-pea	(1)		P
<i>Dalea purpurea</i> , Purple Prairie-clover	(2)		X
<i>Desmodium illinoense</i> , Prairie Tick-trefoil	(2)		X
<i>Desmodium pauciflorum</i> , Few-flowered Tick-trefoil	(2)		P
<i>Desmodium sessilifolium</i> , Sessile Tick-trefoil	(2)		E
<i>Galactia volubilis</i> , Milk-pea	(6)		E
<i>Lathyrus japonicus</i> (<i>L. maritimus</i>), Inland Beach-pea	(2)		T
<i>Lathyrus ochroleucus</i> , Yellow Vetchling	(2)		T
<i>Lathyrus venosus</i> , Wild Pea	(1)		E
<i>Lupinus perennis</i> , Wild Lupine	(1)		P
<i>Orbexilum pedunculatum</i> , False Scurf-pea	(4)		P
<i>Phaseolus polystachios</i> , Wild Kidney Bean	(6)		P
<i>Trifolium reflexum</i> , Buffalo Clover	(1)		E
<i>Trifolium stoloniferum</i> , Running Buffalo Clover	(5)		E E

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FAGACEAE. Beech Family		
<i>Castanea dentata</i> , American Chestnut ¹	(2)	P
<i>Quercus falcata</i> , Spanish Oak	(1)	E
<i>Quercus marilandica</i> , Blackjack Oak	(1)	P
FUMARIACEAE. Fumitory Family		
<i>Adlumia fungosa</i> , Mountain-fringe	(6)	T
<i>Corydalis sempervirens</i> , Rock-harlequin	(2)	P
GENTIANACEAE. Gentian Family		
<i>Gentiana alba</i> (<i>G. flavida</i>), Yellowish Gentian	(2)	T
<i>Gentiana clausa</i> , Closed Gentian	(2)	P
<i>Gentiana puberulenta</i> , Prairie Gentian	(1)	E
<i>Gentiana saponaria</i> , Soapwort Gentian	(2)	E
<i>Gentiana villosa</i> , Sampson's Snakeroot	(2)	E
<i>Gentianopsis crinita</i> , Fringed Gentian	(2)	P
<i>Gentianopsis procera</i> , Small Fringed Gentian	(2)	P
GERANIACEAE. Geranium Family		
<i>Geranium bicknellii</i> , Bicknell's Crane's-bill	(1)	E
GROSSULARIACEAE. Gooseberry Family		
<i>Ribes glandulosum</i> , Skunk Currant	(2)	X
<i>Ribes missouriense</i> , Missouri Gooseberry	(2)	E
<i>Ribes triste</i> , Swamp Red Currant	(6)	E
HALORAGACEAE. Water-milfoil Family		
<i>Myriophyllum heterophyllum</i> , Two-leaved Water-milfoil	(6)	E
<i>Myriophyllum sibiricum</i> , American Water-milfoil	(6)	T
<i>Myriophyllum verticillatum</i> , Green Water-milfoil	(6)	E
HYDROPHYLLACEAE. Waterleaf Family		
<i>Phacelia bipinnatifida</i> , Fern-leaf Scorpion-weed	(2)	P
<i>Phacelia dubia</i> , Small-flowered Scorpion-weed	(2)	X
<i>Phacelia ranunculacea</i> , Blue Scorpion-weed	(2)	X
JUGLANDACEAE. Walnut Family		
<i>Juglans cinerea</i> , Butternut	(1)	P
LAMIACEAE. Mint Family		
<i>Collinsonia verticillata</i> , Early Stoneroot	(2)	E
<i>Hedeoma hispidum</i> , Rough Pennyroyal	(2)	T

¹Includes only fruiting trees.

	Count	Status
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LAMIACEAE. Mint Family (Cont'd.)		
Monarda punctata, Dotted Horsemint	(2)	X
Pycnanthemum muticum, Blunt Mountain-mint	(2)	P
Pycnanthemum verticillatum var. pilosum, Hoary Mountain-mint	(4)	E
Satureja arkansana (S. glabella var. angustifolia), Limestone Savory	(2)	T
Scutellaria integrifolia, Hyssop Skullcap	(2)	P
Scutellaria saxatilis, Rock Skullcap	(2)	P
Scutellaria serrata, Showy Skullcap	(2)	P
Trichostema dichotomum var. lineare (T. setaceum), Narrow-leaved Bluecurls	(2)	E
LENTIBULARIACEAE. Bladderwort Family		
Utricularia cornuta, Horned Bladderwort	(2)	E
Utricularia geminiscapa, Two-scaped Bladderwort	(6)	E
Utricularia intermedia, Flat-leaved Bladderwort	(2)	T
Utricularia minor, Lesser Bladderwort	(2)	P
LINACEAE. Flax Family		
Linum sulcatum, Grooved Flax	(2)	P
MAGNOLIACEAE. Magnolia Family		
Magnolia macrophylla, Bigleaf Magnolia	(1)	E
Magnolia tripetala, Umbrella Magnolia	(1)	P
MALVACEAE. Mallow Family		
Sida hermaphrodita, Virginia Mallow	(6)	P
MELASTOMATACEAE. Melastome Family		
Rhexia virginica, Virginia Meadow-beauty	(2)	P
MENYANTHACEAE. Buckbean Family		
Menyanthes trifoliata, Buckbean	(3)	T
MYRICACEAE. Bayberry Family		
Comptonia peregrina, Sweet-fern	(6)	T
Myrica pensylvanica, Bayberry	(1)	E
NYMPHAEACEAE. Water-lily Family		
Nuphar variegata, Bullhead Lily	(2)	E
OLEACEAE. Olive Family		
Chionanthus virginicus, Fringe-tree	(2)	T

	Count	Status
	Guide	OH US
OLEACEAE. Olive Family (Cont'd.)		
<i>Fraxinus tomentosa</i> (F. profunda), Pumpkin Ash	(1)	P
ONAGRACEAE. Evening-primrose Family		
<i>Epilobium angustifolium</i> , Fireweed	(2)	E
<i>Epilobium strictum</i> , Simple Willow-herb	(2)	T
<i>Oenothera clelandii</i> , Cleland's Evening-primrose	(2)	A
<i>Oenothera parviflora</i> , Small-flowered Evening-primrose	(2)	E
OROBANCHACEAE. Broom-rape Family		
<i>Orobanche ludoviciana</i> , Louisiana Broom-rape	(2)	X
OXALIDACEAE. Wood-sorrel Family		
<i>Oxalis montana</i> (O. acetosella), White Wood-sorrel	(2)	E
PASSIFLORACEAE. Passion-flower Family		
<i>Passiflora incarnata</i> , Passion-flower	(6)	T
PLANTAGINACEAE. Plantain Family		
<i>Plantago cordata</i> , Heart-leaf Plantain	(1)	E
<i>Plantago patagonica</i> , Woolly Plantain	(1)	E
PODOSTEMACEAE. Riverweed Family		
<i>Podostemum ceratophyllum</i> , Riverweed	(1)	E
POLEMONIACEAE. Phlox Family		
<i>Phlox glaberrima</i> , Smooth Phlox	(2)	P
<i>Phlox latifolia</i> (P. ovata), Mountain Phlox	(2)	T
POLYGALACEAE. Milkwort Family		
<i>Polygala cruciata</i> , Cross-leaved Milkwort	(2)	E
<i>Polygala curtissii</i> , Curtiss' Milkwort	(2)	E
<i>Polygala incarnata</i> , Pink Milkwort	(2)	T
<i>Polygala paucifolia</i> , Gay-wings	(6)	E
<i>Polygala polygama</i> , Racemed Milkwort	(2)	T
POLYGONACEAE. Smartweed Family		
<i>Polygonum careyi</i> , Carey's Smartweed	(2)	X
<i>Polygonum cilinode</i> , Mountain Bindweed	(6)	T
<i>Polygonum robustius</i> , Coarse Smartweed	(1)	T
<i>Polygonum setaceum</i> var. <i>interjectum</i> (not in Gleason and Conquist 1991, see Fernald 1950), Bristly Smartweed	(6)	E

	Count	Status	
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PRIMULACEAE. Primrose Family			
Androsace occidentalis, Western Rock Jasmine	(6)	T	
Hottonia inflata, Featherfoil	(6)	E	
PYROLACEAE. Shinleaf Family			
Chimaphila umbellata, Pipsissewa	(4)	T	
Moneses uniflora, One-flowered Wintergreen	(2)	E	
Pyrola chlorantha, Green-flowered Wintergreen	(2)	E	
Pyrola secunda, One-sided Wintergreen	(4)	X	
RANUNCULACEAE. Buttercup Family			
Aconitum noveboracense, Northern Monkshood	(3)	E	T
Aconitum uncinatum, Southern Monkshood	(1)	E	
Actaea rubra, Red Baneberry	(2)	T	
Anemone cylindrica, Prairie Thimbleweed	(2)	T	
Clematis occidentalis, Purple Virgin's-bower	(2)	X	
Delphinium exaltatum, Tall Larkspur	(2)	P	
Ranunculus fascicularis, Early Buttercup	(2)	P	
Ranunculus pusillus, Low Spearwort	(2)	E	
Trollius laxus, Spreading Globe-flower	(5)	E	
RHAMNACEAE. Buckthorn Family			
Ceanothus herbaceus (C. ovatus), Prairie Redroot	(1)	E	
Rhamnus caroliniana, Carolina Buckthorn	(1)	P	
ROSACEAE. Rose Family			
Amelanchier sanguinea, Rock Serviceberry	(2)	E	
Crataegus brainerdii, Brainerd's Hawthorn	(2)	X	
Crataegus uniflora, Dwarf Hawthorn	(2)	E	
Dalibarda repens, Robin-run-away	(5)	T	
Geum rivale, Water Avens	(2)	P	
Porteranthus trifoliatus, Bowman's-root	(2)	P	
Potentilla arguta, Tall Cinquefoil	(2)	E	
Potentilla palustris, Marsh Fivefinger	(4)	P	
Potentilla paradoxa, Bushy Cinquefoil	(2)	T	
Prunus mexicana, Bigtree Plum	(1)	X	
Prunus nigra, Canada Plum	(2)	X	
Prunus pumila var. cuneata (P. susquehanae), Sand Cherry	(1)	T	
Prunus pumila var. pumila, Great Lakes Sand Cherry	(2)	X	
Pyrus angustifolia, Narrow-leaved Crab	(2)	X	
Rosa arkansana, Arkansas Rose	(2)	X	
Rosa blanda, Smooth Rose	(1)	T	
Rubus setosus, Small Bristleberry	(6)	X	
Rubus trivialis, Southern Dewberry	(2)	X	

	Count	Status
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Sorbus decora, Western Mountain-ash	(2)	E
Spiraea alba var. latifolia, Northern Meadow-sweet	(2)	X
Spiraea virginiana, Appalachian Spiraea	(3)	E T
RUBIACEAE. Madder Family		
Galium labradoricum, Bog Bedstraw	(2)	E
Galium palustre, Marsh Bedstraw	(6)	E
Hedyotis nigricans, Narrow-leaved Summer Bluets	(2)	P
Spermacoce glabra, Smooth Buttonweed	(6)	P
SALICACEAE. Willow Family		
Populus balsamifera, Balsam Poplar	(3)	T
Populus heterophylla, Swamp Cottonwood	(3)	P
Salix candida, Hoary Willow	(2)	P
Salix caroliniana, Carolina Willow	(2)	T
Salix cordata, Sand-dune Willow	(5)	X
Salix myricoides, Blue-leaved Willow	(5)	P
Salix pedicellaris, Bog Willow	(5)	E
Salix petiolaris, Slender Willow	(2)	T
Salix serissima, Autumn Willow	(2)	P
SARRACENIACEAE. Pitcher-plant Family		
Sarracenia purpurea, Pitcher-plant	(1)	P
SAXIFRAGACEAE. Saxifrage Family		
Heuchera longiflora, Long-flowered Alumroot	(2)	X
Heuchera parviflora, Small-flowered Alumroot	(6)	P
Heuchera villosa, Hairy Alumroot	(6)	T
Sullivantia sullivantii, Sullivantia	(6)	P
SCROPHULARIACEAE. Figwort Family		
Agalinis auriculata, Ear-leaf Foxglove	(1)	E
Agalinis gattingeri, Gattinger's Foxglove	(2)	X
Agalinis purpurea var. parviflora, Small Purple Foxglove	(2)	E
Agalinis skinneriana, Skinner's Foxglove	(2)	E
Aureolaria pedicularia var. ambigens, Prairie Fern-leaf False Foxglove	(2)	E
Aureolaria pedicularia var. pedicularia, Woodland Fern-leaf False Foxglove	(2)	E
Besseyia bullii, Besseyia	(1)	X
Buchnera americana, Bluehearts	(2)	T
Gratiola virginiana, Round-fruited Hedge-hyssop	(6)	P
Gratiola viscidula, Short's Hedge-hyssop	(6)	P
Linaria canadensis, Old-field Toadflax	(2)	E

	Count	Status
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SCROPHULARIACEAE. Figwort Family (Cont'd.)		
Melampyrum lineare, Cow-wheat	(5)	P
Penstemon canescens, Gray Beard-tongue	(2)	T
Penstemon laevigatus, Smooth Beard-tongue	(2)	E
Penstemon pallidus, Downy White Beard-tongue	(2)	T
Penstemon tubaeiflorus, White-wand Beard-tongue	(2)	X
SOLANACEAE. Nightshade Family		
Physalis virginiana, Virginia Ground-cherry	(4)	A
STYRACACEAE. Storax Family		
Halesia carolina (H. tetraptera), Silverbell	(2)	X
Styrax americanus, Snowbell	(2)	X
Styrax grandifolius, Bigleaf Snowbell	(2)	X
ULMACEAE. Elm Family		
Celtis tenuifolia, Dwarf Hackberry	(1)	P
Ulmus thomasii, Rock Elm	(2)	T
URTICACEAE. Nettle Family		
Urtica chamaedryoides, Spring Nettle	(2)	E
VALERIANACEAE. Valerian Family		
Valeriana ciliata (V. edulis var. ciliata), Prairie Valerian	(2)	E
Valeriana uliginosa, Swamp Valerian	(2)	X
VIOLACEAE. Violet Family		
Viola lanceolata, Lance-leaved Violet	(2)	P
Viola missouriensis (V. sororia in part, see Fernald 1950), Missouri Violet	(2)	E
Viola nephrophylla, Northern Bog Violet	(2)	E
Viola pedata, Bird-foot Violet	(2)	T
Viola pedatifida (V. palmata var. pedatifida), Prairie Violet	(2)	X
Viola primulifolia, Primrose-leaved Violet	(2)	E
Viola tripartita var. glaberrima (not in Gleason and Cronquist 1991, see Radford et al. 1968), Wedge-leaf Violet	(2)	E
Viola tripartita var. tripartita (not in Gleason and Cronquist 1991, see Radford et al. 1968), Three-parted Violet	(2)	X
Viola walteri, Walter's Violet	(4)	E

Count Status
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VITACEAE. Grape Family

Vitis cinerea, Pigeon Grape	(6)	P
Vitis labrusca, Northern Fox Grape	(6)	P

APPENDIX F

OHIO DEPARTMENT OF NATURAL RESOURCES
NATURAL HERITAGE DATA SEARCH RESULTS



George V. Voinovich • Governor
Donald C. Anderson • Director

April 21, 1997

Andrew J. Chartrand
Ecology & Environment, Inc.
6777 N. Engle Rd.
Suite N
Middleburg Hts., OH 44130

Dear Mr. Chartrand:

I have reviewed our Natural Heritage maps and files for the Lammars Barrel Factory Superfund Site in Beavercreek, Greene County on the Bellbrook Quad, including a 1 & ½ mile radius. The numbers on the list below correspond to the areas marked in red on the accompanying map. A dot represents an exact location, a triangle a general location within a square mile, and a square a general location within greater than a square mile. Exactness is determined by the accuracy and detail of information provided by the surveyor. Common name, scientific name and status are given for each species.

BELLBROOK QUAD

1. Lot at 7558 Old Xenia Pike
Cacalia plantaginea - Fen Indian-plantain, potentially threatened
Scleria verticillata - Low Nut-rush, potentially threatened
2. North of Zimmerman Prairie
Prenanthes racemosa - Prairie Rattlesnake-root, potentially threatened
Solidago ohioensis - Ohio Goldenrod, potentially threatened
3. Zimmerman Prairie State Nature Preserve - ODNR, Division of Natural Areas & Preserves
Clemmys guttata - Spotted Turtle, special interest
Solidago ohioensis - Ohio Goldenrod, potentially threatened
4. *Opheodrys aestivus* - Rough Green Snake, special interest

There are no existing or proposed scenic rivers at the project site. We are also unaware of any geologic features, breeding or non-breeding animal concentrations, champion trees, or state parks, forests or wildlife areas in the project vicinity.

rew J. Chartrand
April 21, 1997
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Our inventory program has not completely surveyed Ohio and relies on information supplied by many individuals and organizations. Therefore, a lack of records for any particular area is not a statement that rare species or unique features are absent from that area. Please note that although we inventory all types of plant communities, we only maintain records on the highest quality areas. Also, we do not have data for all Ohio wetlands. For additional information on wetlands, please contact the Division of Wildlife at 614-265-6300.

Please contact me at 614-265-6818 if I can be of further assistance.

Sincerely,

A handwritten signature in cursive script that reads "Debbie Woischke".

Debbie Woischke, Ecological Analyst
Division of Natural Areas & Preserves

BELLBROOK QUAD

