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SCS ENGINEERS

TECHNICAL MEMORANDUM

DATE: July 18, 2012

TO: Jim Obereiner and Frank Willmann; Waste Management

FROM: Louis Caruso and David Lamadrid, RG; SCS Engineers

SUBJECT: **Evaluation of Spurious Historical VOC Detections in Groundwater Samples Collected from Site Monitoring Wells: Riverbend Landfill, McMinnville, Oregon (SCS Project No. 04211010.03)**

This memorandum responds to a request for information by the Oregon Department of Environmental Quality (DEQ) regarding spurious historical detections of volatile organic compounds (VOCs) in groundwater samples collected from the site monitoring wells at the Riverbend Landfill (RLF) in McMinnville, Oregon. SCS Engineers (SCS) in Portland, Oregon, prepared the memorandum at the request of Riverbend Landfill Company, Inc. (RLC).

The memorandum provides a table summarizing each VOC detection identified in groundwater samples collected from the current site monitoring wells at RLF (other than those in MW-5A samples). Additionally, the memorandum includes time-concentration diagrams for each VOC detection (provided in Attachment 1) that clearly show the spurious nature of these VOC detections and the fact they are not persistent over time and not confirmed by the numerous additional monitoring data collected after the initial detection was identified. It should be noted that the open circles in the diagrams represent non-detect results (and reporting limit concentration) for the parameter tested.

As is well documented in laboratory analytical programs as comprehensive as the one implemented at RLF, it is common to have a low percentage of false-positive VOC results. There are many sources for false-positive detections, and it is not always possible to pinpoint the source of these detections. This uncertainty is addressed through follow-up sampling, and with the knowledge that true impacts to groundwater resulting from a release from the facility would be persistent and repeatable, and most typically involve several parameters that are detected consistently over time.

Attachments: Table: Historical VOC Detections in Monitoring Well Groundwater Samples
Attachment 1: Time-Concentration Diagrams for Spurious VOC Detections in Groundwater

Table
Historical VOCs Detected in Groundwater Samples
Riverbend Landfill

Monitoring Well	Date	Volatile Organic Compound	Concentration (µg/L)	Comments
MW-12A	12/17/1998	Carbon Disulfide	0.4	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-12A	11/9/2004	HCBD	0.5	A one-time detection that was attributed to laboratory contamination. WM discussed this result with the Oregon Department of Environmental Quality (DEQ) in an email dated December 29, 2004. The DEQ agreed with WM's decision not to resample because the detection was attributed to laboratory contamination.
MW-12B	11/9/2004	HCBD	0.51	A one-time detection that was attributed to laboratory contamination. WM discussed this result with the DEQ in an email dated December 29, 2004. The DEQ agreed with WM's decision not to resample because the detection was attributed to laboratory contamination.
MW-12B	5/8/2007	Carbon Tetrachloride	1.2	A one-time detection that was not verified in a resampling event performed on June 12, 2007.
MW-14A	3/19/1998	Carbon Disulfide	4.8	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-14A	5/13/2003	Acetone	5.3	A one-time detection that was not verified in a resampling event performed on July 8, 2003.
MW-14B	7/23/2002	Chloromethane	0.77	A one-time detection that was not verified in a resampling event performed on September 11, 2002.
MW-14B	5/13/2003	Acetone	5.2	A one-time detection that was not verified in a resampling event performed on July 8, 2003.
MW-14B	4/22/2010	Naphthalene	1.2	A one-time detection that was attributed to laboratory contamination.
MW-15A	11/9/2004	HCBD	0.61	A one-time detection that was attributed to laboratory contamination. WM discussed this result with the DEQ in an email dated December 29, 2004. The DEQ agreed with WM's decision not to resample because the detection was attributed to laboratory contamination.
MW-15A	5/9/2006	Acetone	40	A first-time detection that was attributed to laboratory contamination and reported in the 2006 annual environmental monitoring report (AEMR).
MW-15A	10/18/2006	Acetone	20	A second detection that was attributed to laboratory contamination. This detection that was not verified in a resampling event performed on November 22, 2006.
MW-15B	10/10/2002	Acetone	6	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-15B	11/9/2004	HCBD	0.57	A one-time detection that was attributed to laboratory contamination. WM discussed this result with the DEQ in an email dated December 29, 2004. The DEQ agreed with WM's decision not to resample because the detection was attributed to laboratory contamination.
MW-16A	6/17/1999	Chloroform	3.2	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16A	7/23/2002	Chloromethane	2.0	A one-time detection that was not verified in a resampling event performed on September 11, 2002.
MW-16A	11/9/2004	HCBD	0.59	A one-time detection that was attributed to laboratory contamination. WM discussed this result with the DEQ in an email dated December 29, 2004. The DEQ agreed with WM's decision not to resample because the detection was attributed to laboratory contamination.
MW-16A	5/9/2006	Acetone	19	A one-time detection that was attributed to laboratory contamination.

Table
Historical VOCs Detected in Groundwater Samples
Riverbend Landfill

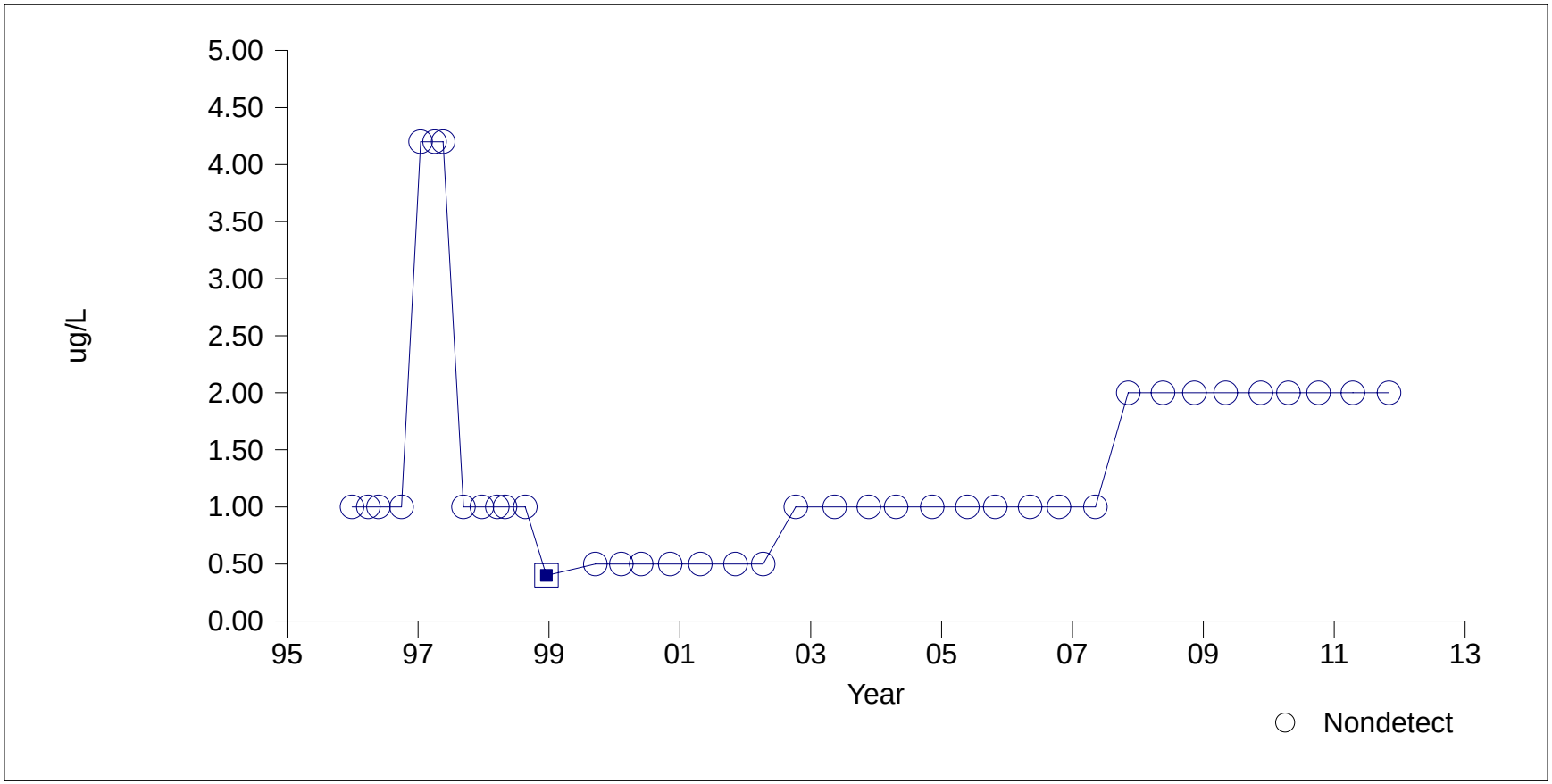
Monitoring Well	Date	Volatile Organic Compound	Concentration (µg/L)	Comments
MW-16A	5/8/2007	1,2-dichlorobenzene	0.65	A one-time detection that is an estimated value less than the laboratory's practical quantification limit (PQL) and above the method detection limit. The PQL was incorrectly entered in the database as 0.5 µg/L and will be changed to 1.0 µg/L which is consistent with the data in final laboratory report included in the 2007 AEMR.
MW-16A	5/8/2007	1,4-dichlorobenzene	0.53	A one-time detection that is an estimated value less than the laboratory's PQL and above the method detection limit. The PQL was incorrectly entered in the database as 0.5 µg/L and will be changed to 1.0 µg/L which is consistent with the data in final laboratory report included in the 2007 AEMR.
MW-16B	12/17/1998	HCBD	0.4	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16B	12/17/1998	Naphthalene	0.6	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16B	12/17/1998	1,2,3-trichlorobenzene	0.6	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16B	1/30/2001	Benzene	7.2	A one-time detection that is likely associated with field contamination (i.e., gasoline fumes).
MW-16B	1/30/2001	Chloroethane	23	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16B	1/30/2001	1,1-dichloroethane	2.6	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16B	1/30/2001	Ethylbenzene	0.77	A one-time detection that is likely associated with field contamination (i.e., gasoline fumes).
MW-16B	1/30/2001	Total Xylenes	3.9	A one-time detection that is likely associated with field contamination (i.e., gasoline fumes).
MW-16B	1/30/2001	Vinyl Chloride	0.66	A one-time detection that has not been detected in subsequent sampling events for over 10 years.
MW-16B	5/9/2006	Acetone	24	A one-time detection that was attributed to laboratory contamination.
MW-19A	4/22/2004	Acetone	6.2	A one-time detection that was attributed to laboratory contamination as noted in the 2004 AEMR.
MW-19A	4/22/2004	Methylene Chloride	1.2	A one-time detection that was attributed to laboratory contamination as noted in the 2004 AEMR.
MW-20A	5/10/2007	Chlorobenzene	0.5	A one-time detection that is an estimated value less than the laboratory's PQL and above the method detection limit. The PQL was incorrectly entered in the database as 0.5 µg/L and will be changed to 1.0 µg/L which is consistent with the data in final laboratory report included in the 2007.
MW-20B	4/22/2004	Methylene Chloride	1.0	A one-time detection that was attributed to laboratory contamination as noted in the 2004 AEMR.
MW-21A	8/28/2001	Acetone	6.0	A one-time detection of a common laboratory contaminant that has not been detected in subsequent sampling events for over 10 years.
MW-21B	8/28/2001	Acetone	15.0	A one-time detection of a common laboratory contaminant that has not been detected in subsequent sampling events for over 10 years.

Notes:
µg/L = micrograms per liter; HCBD = Hexachlorobutadiene.

Attachment 1
Time-Concentration Diagrams for VOCs in Groundwater Samples

Riverbend Landfill [vocs]

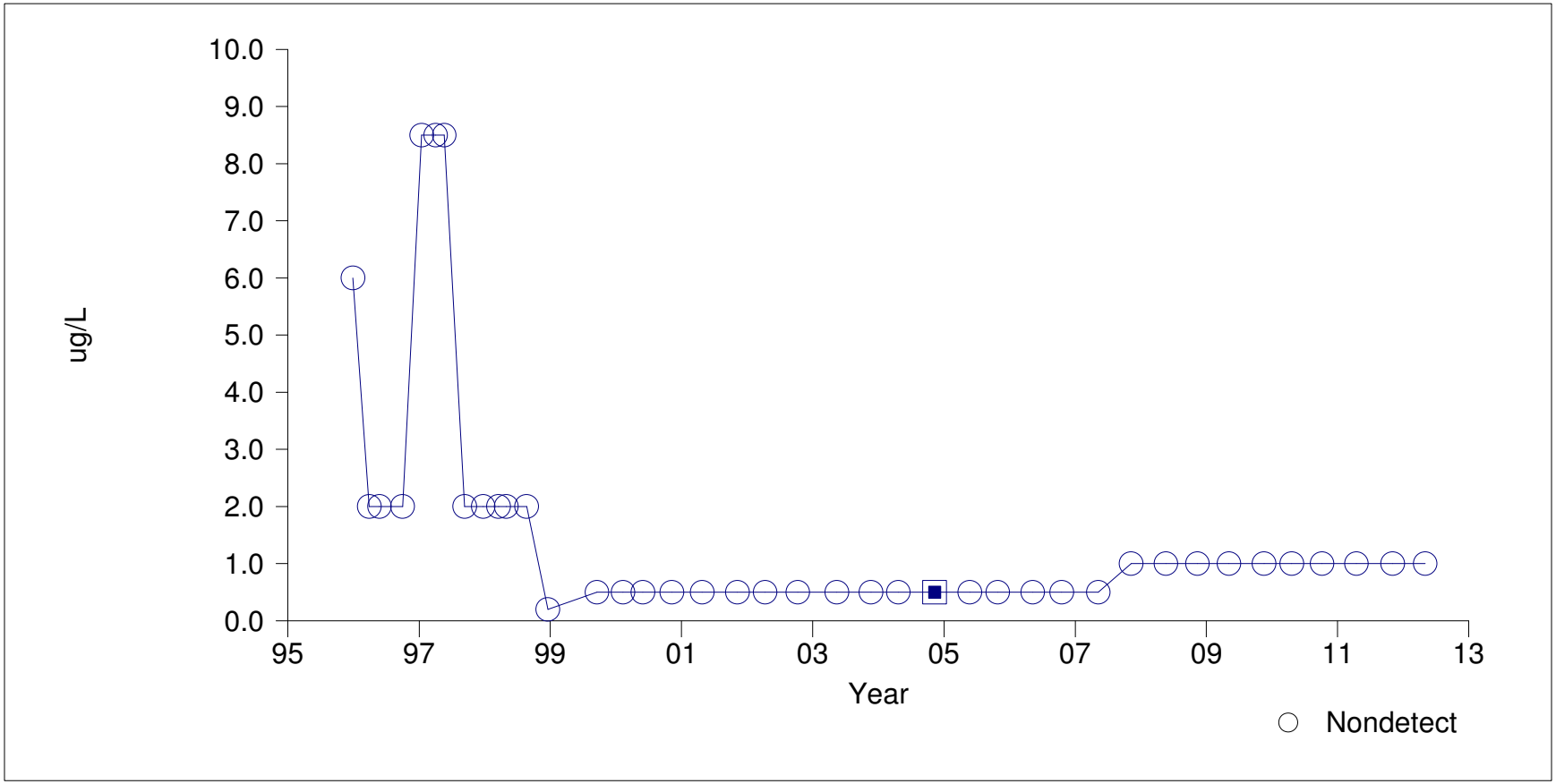
Time Series Plot for MW-12A



Prepared by: SCS Engineers

Riverbend Landfill [VOCs]

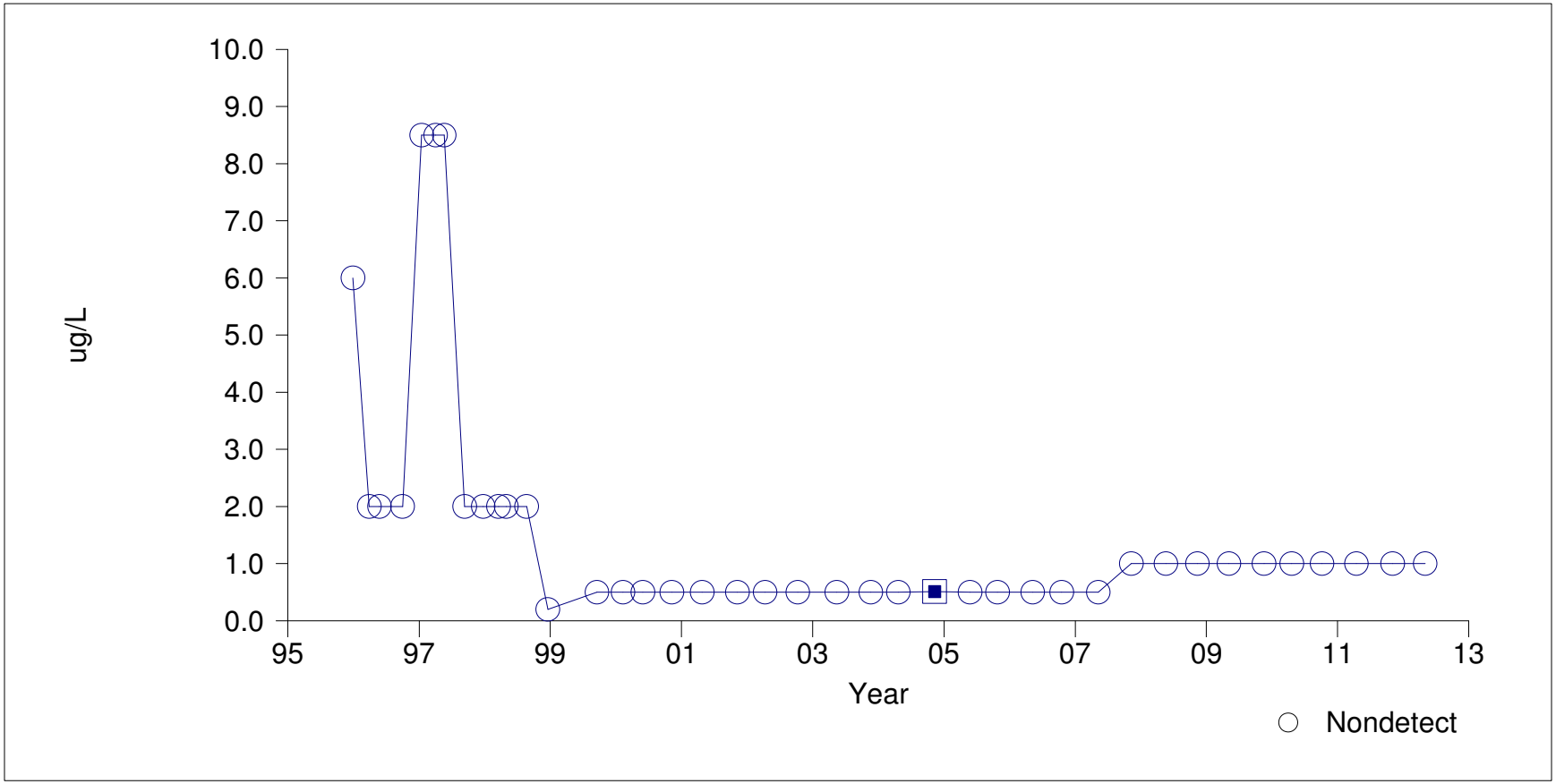
Time Series Plot for MW-12A



Prepared by: GeoChem Applications

Riverbend Landfill [VOCs]

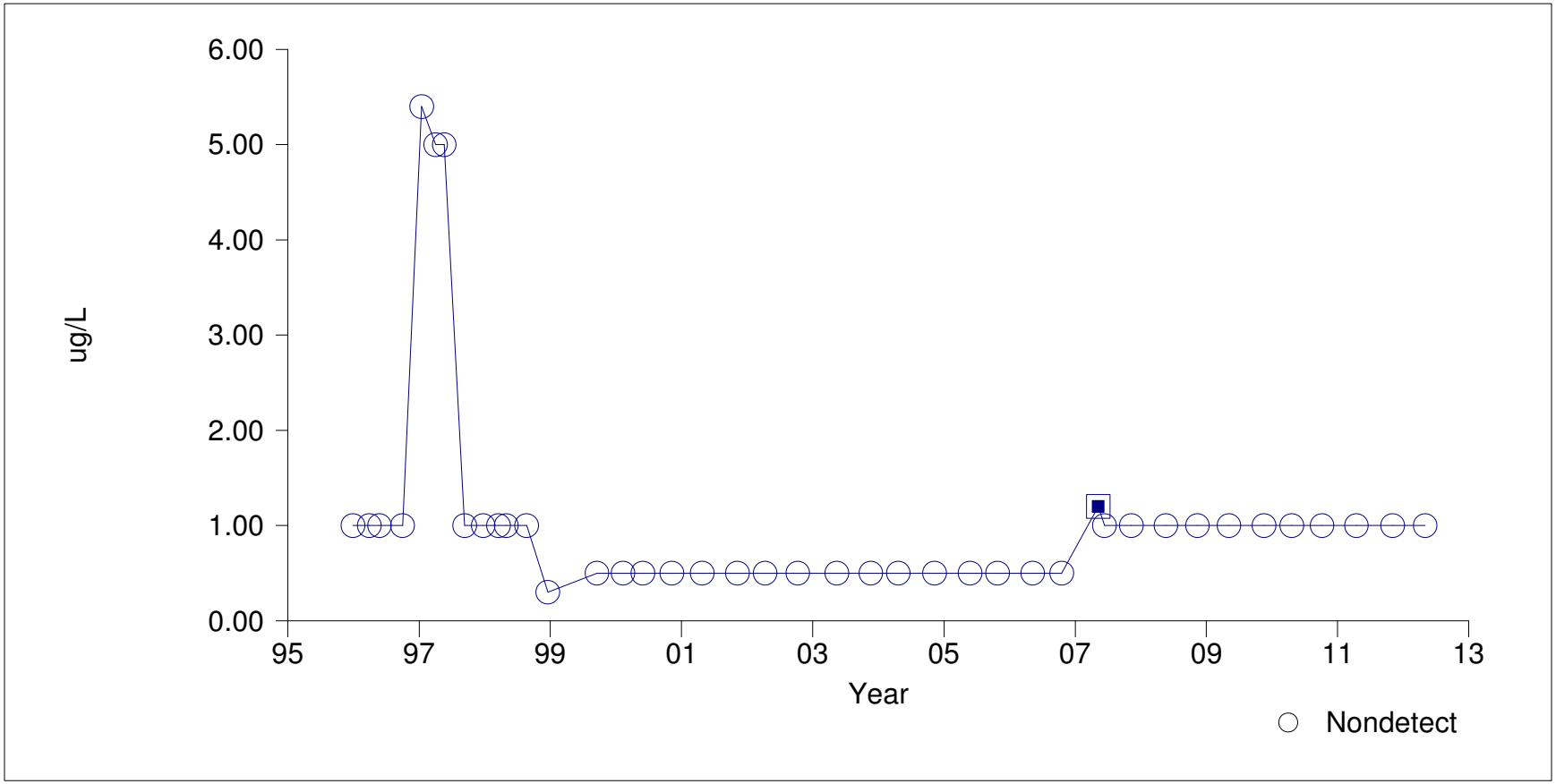
Time Series Plot for MW-12B



Prepared by: GeoChem Applications

Riverbend Landfill [VOCs]

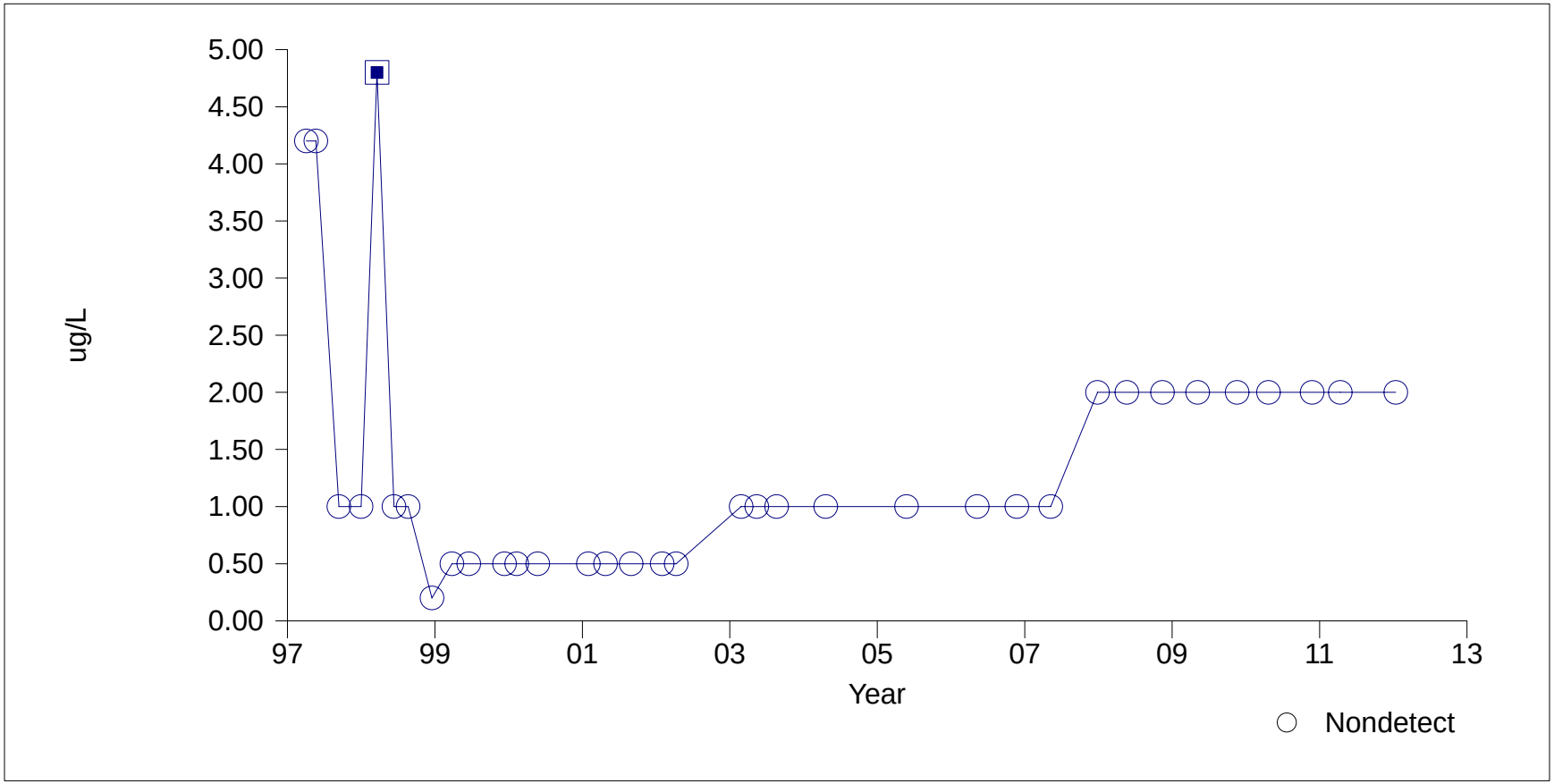
Time Series Plot for MW-12B



Prepared by: GeoChem Applications

Riverbend Landfill [vocs]

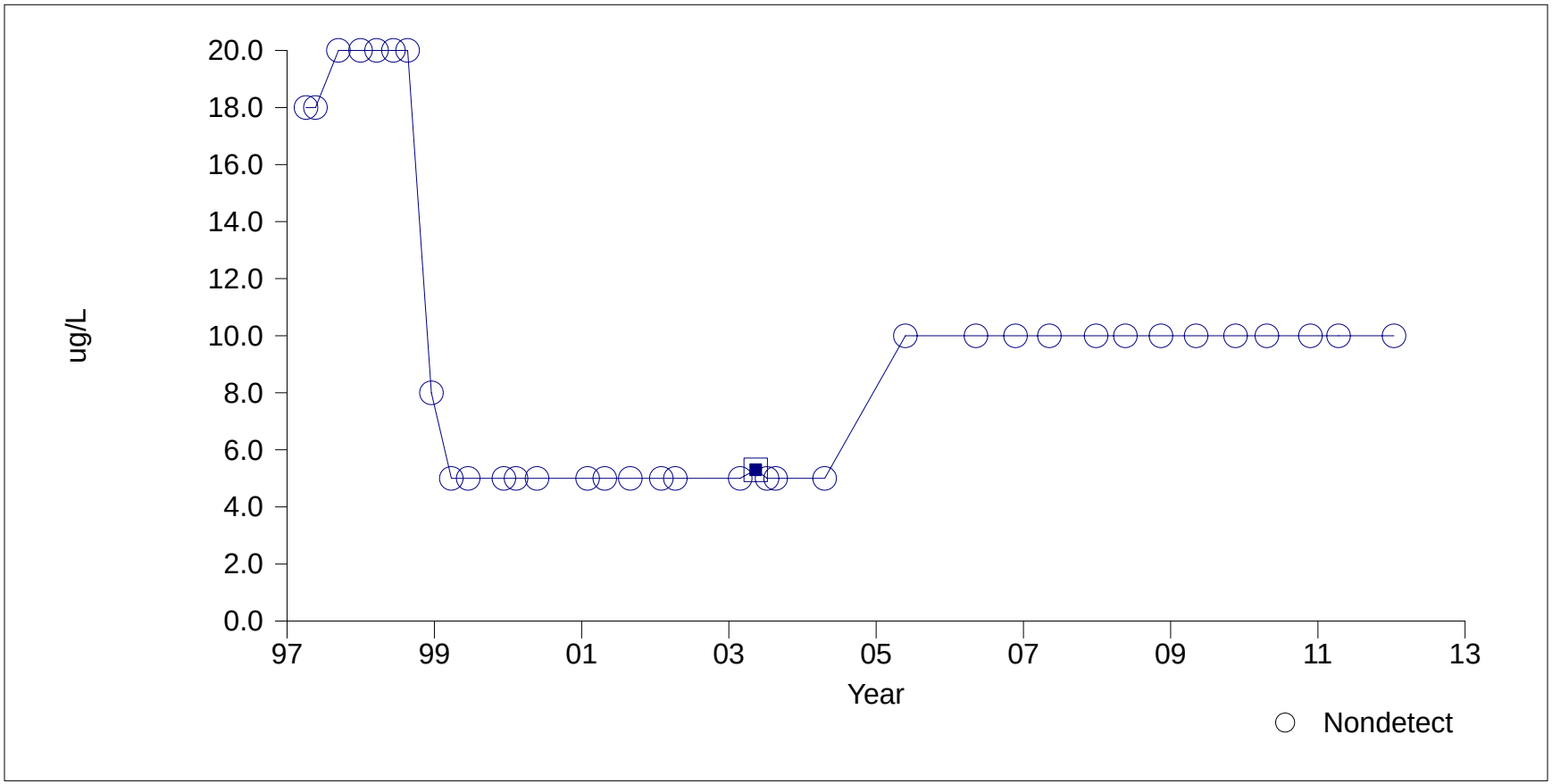
Time Series Plot for MW-14A



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

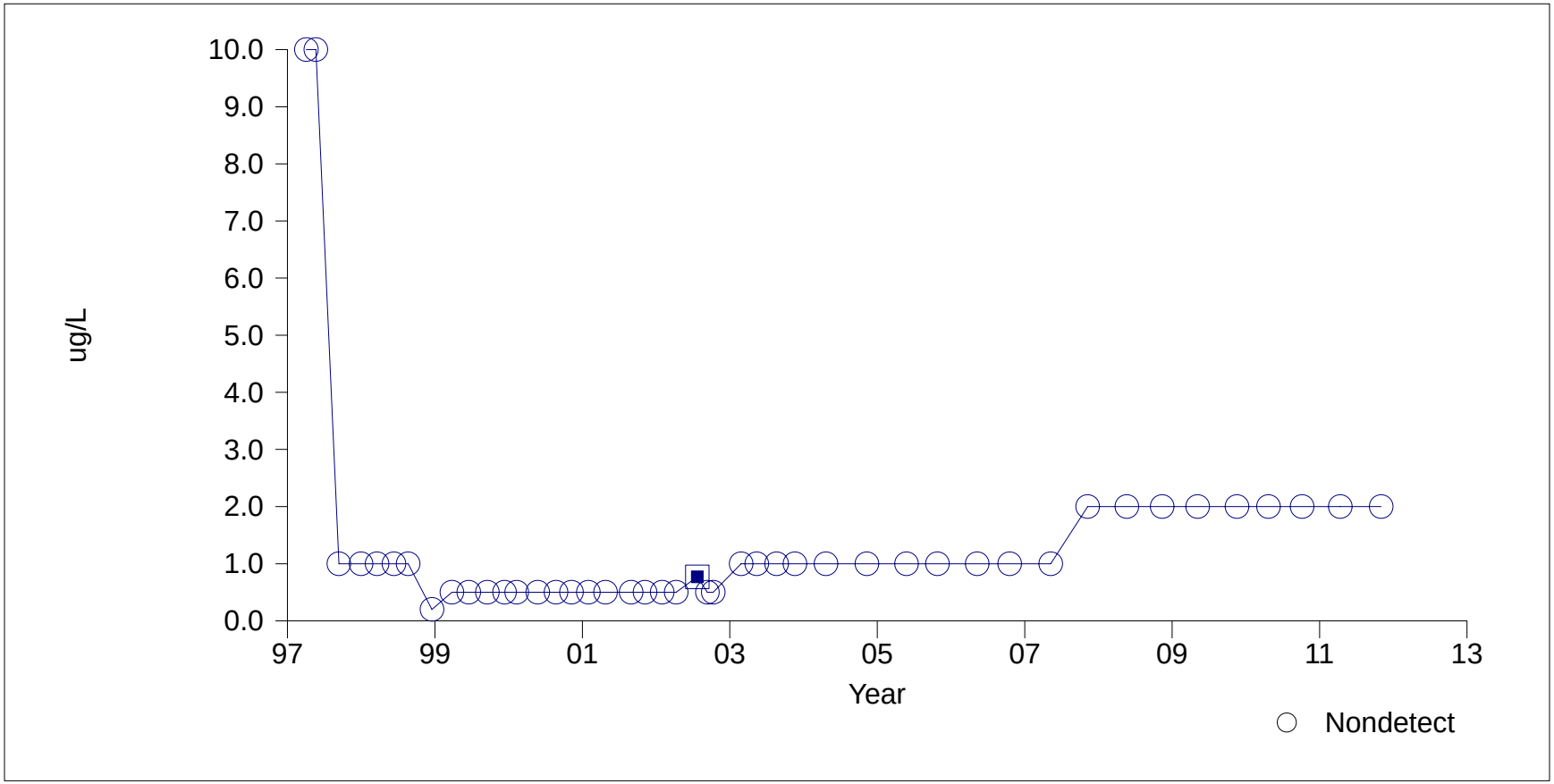
Time Series Plot for MW-14A



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

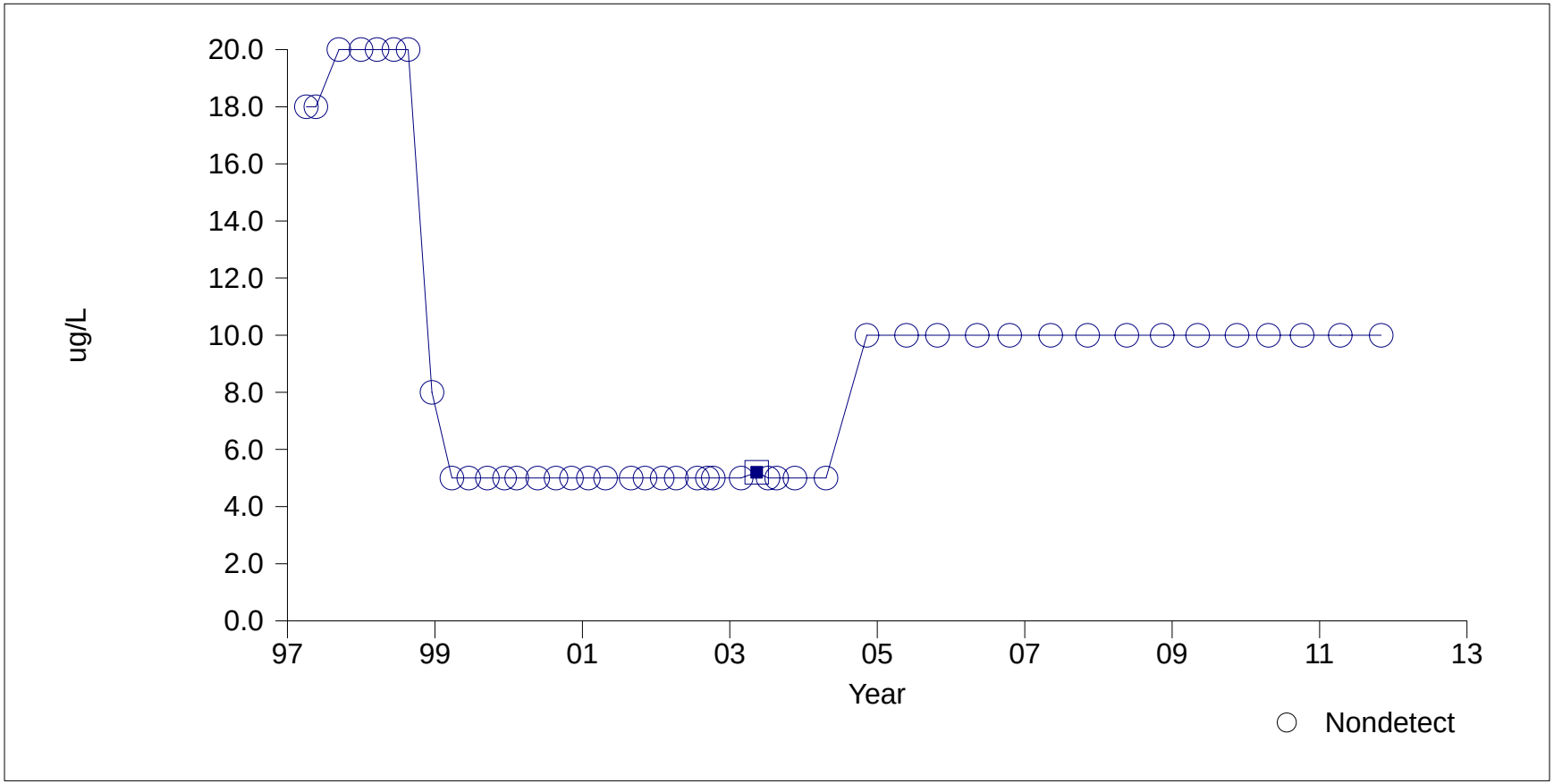
Time Series Plot for MW-14B



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

Time Series Plot for MW-14B



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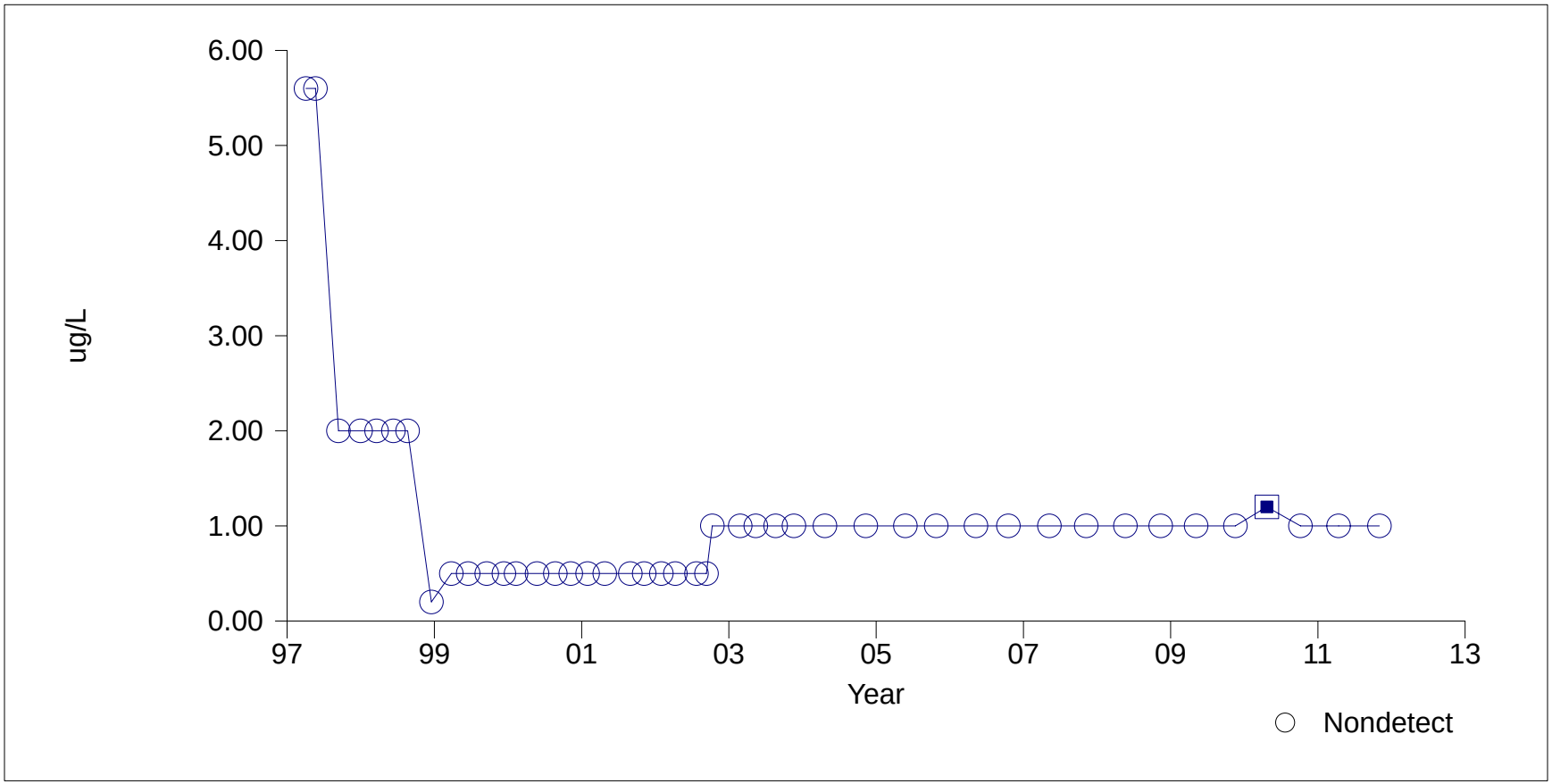
Riverbend Landfill [vocs]

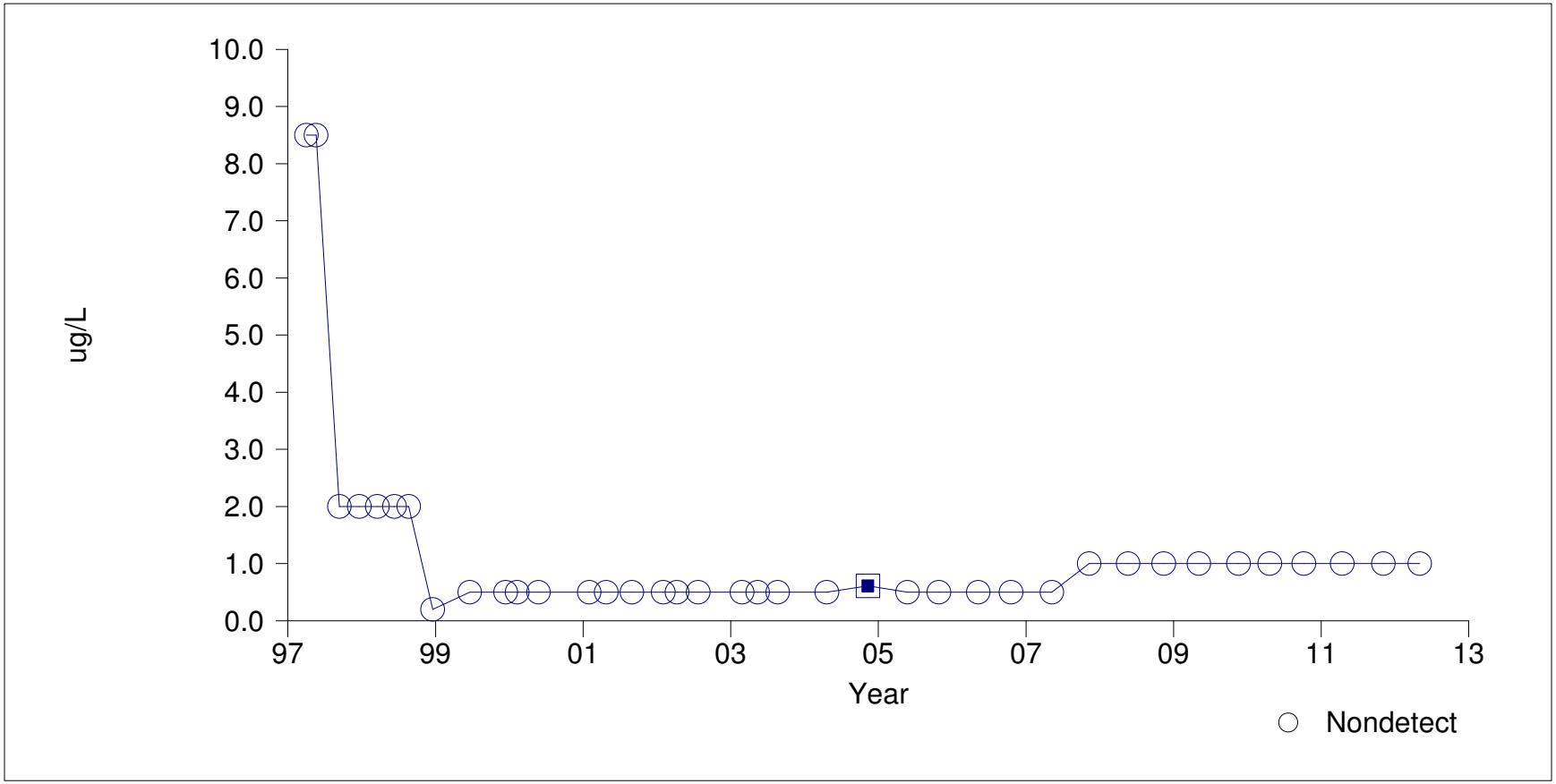
Time Series Plot for MW-14B



Prepared by: SCS Engineers

Riverbend Landfill [VOCs]

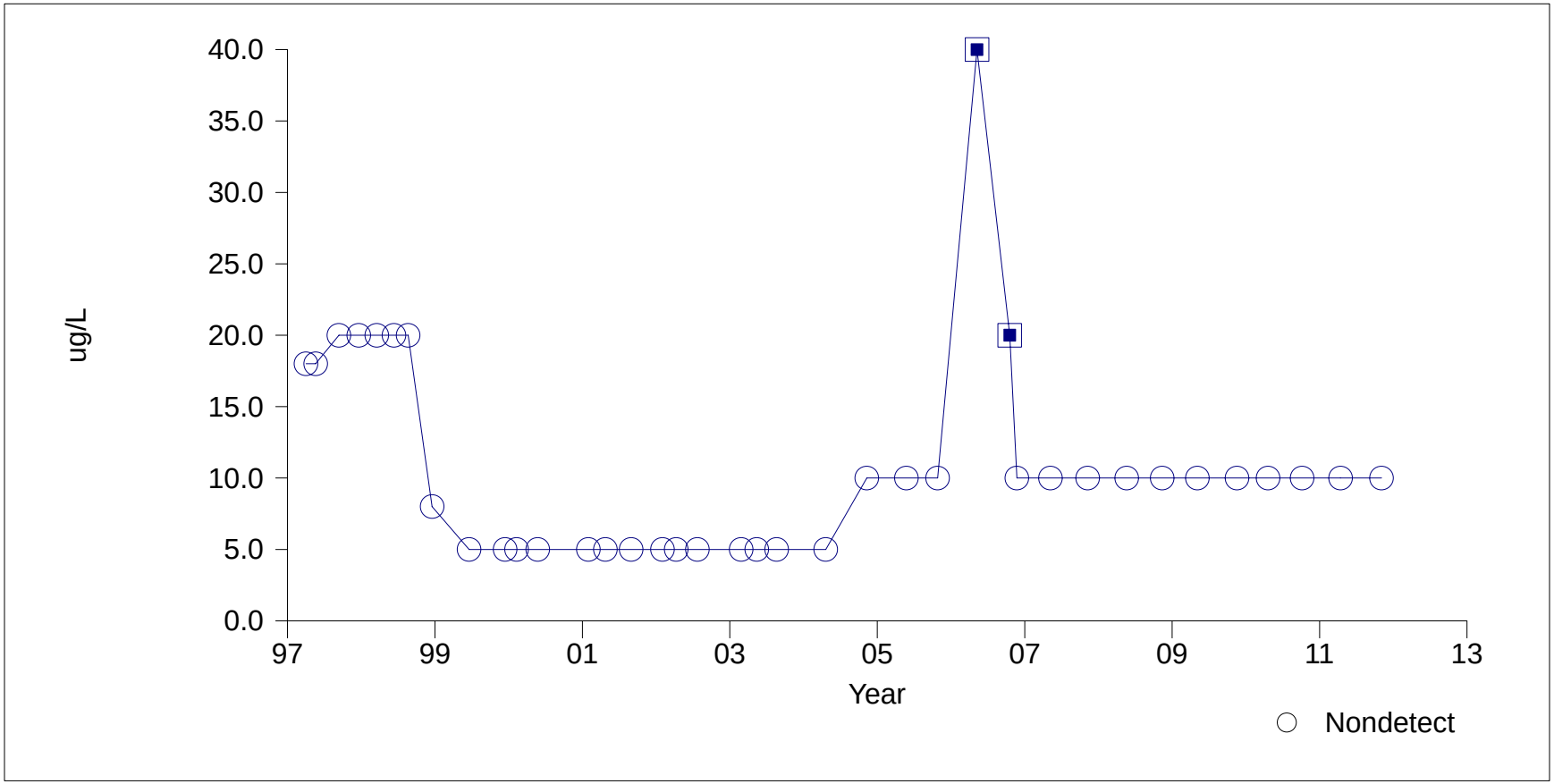
Time Series Plot for MW-15A



Prepared by: GeoChem Applications

Riverbend Landfill [vocs]

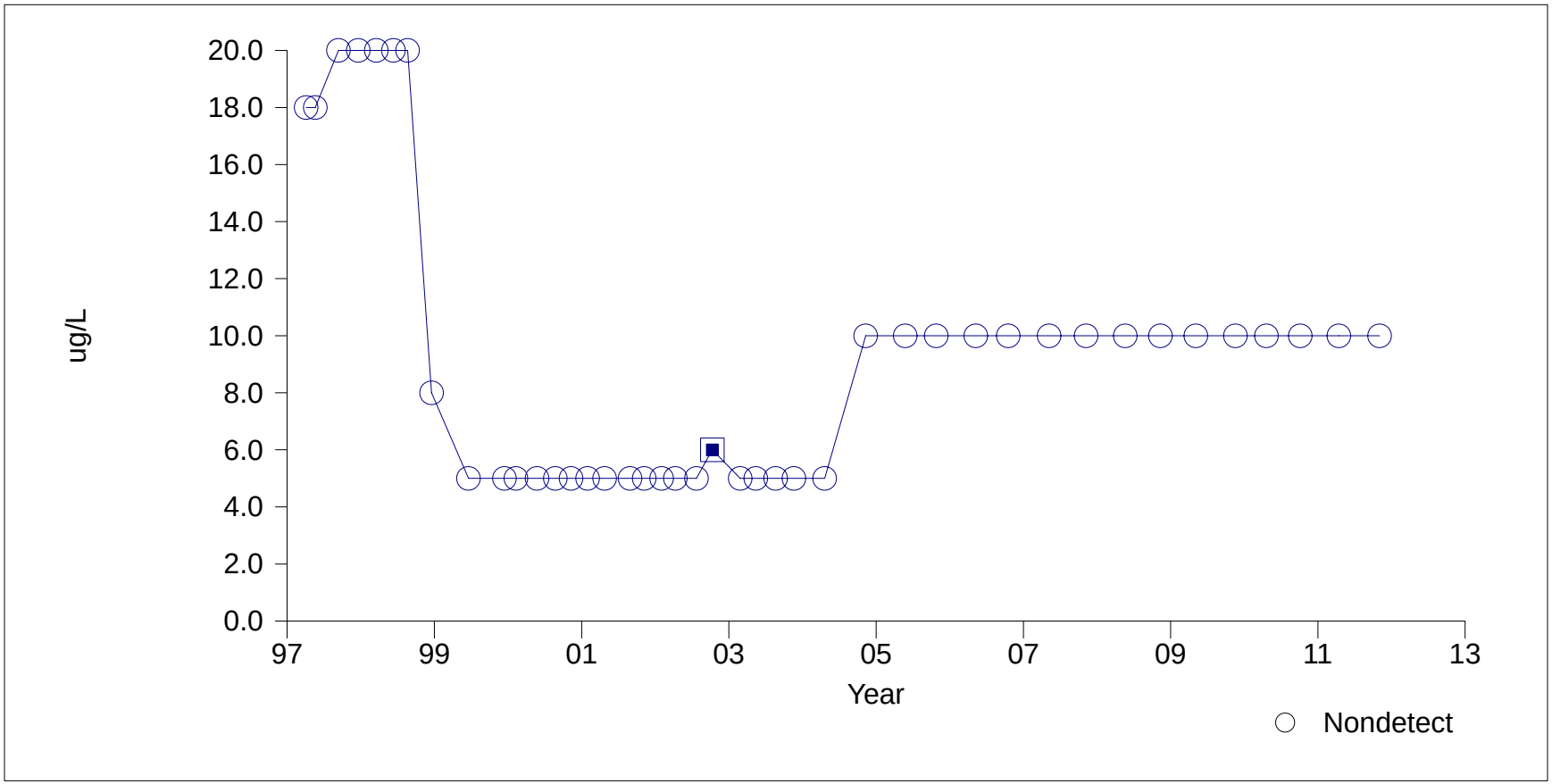
Time Series Plot for MW-15A



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

Time Series Plot for MW-15B



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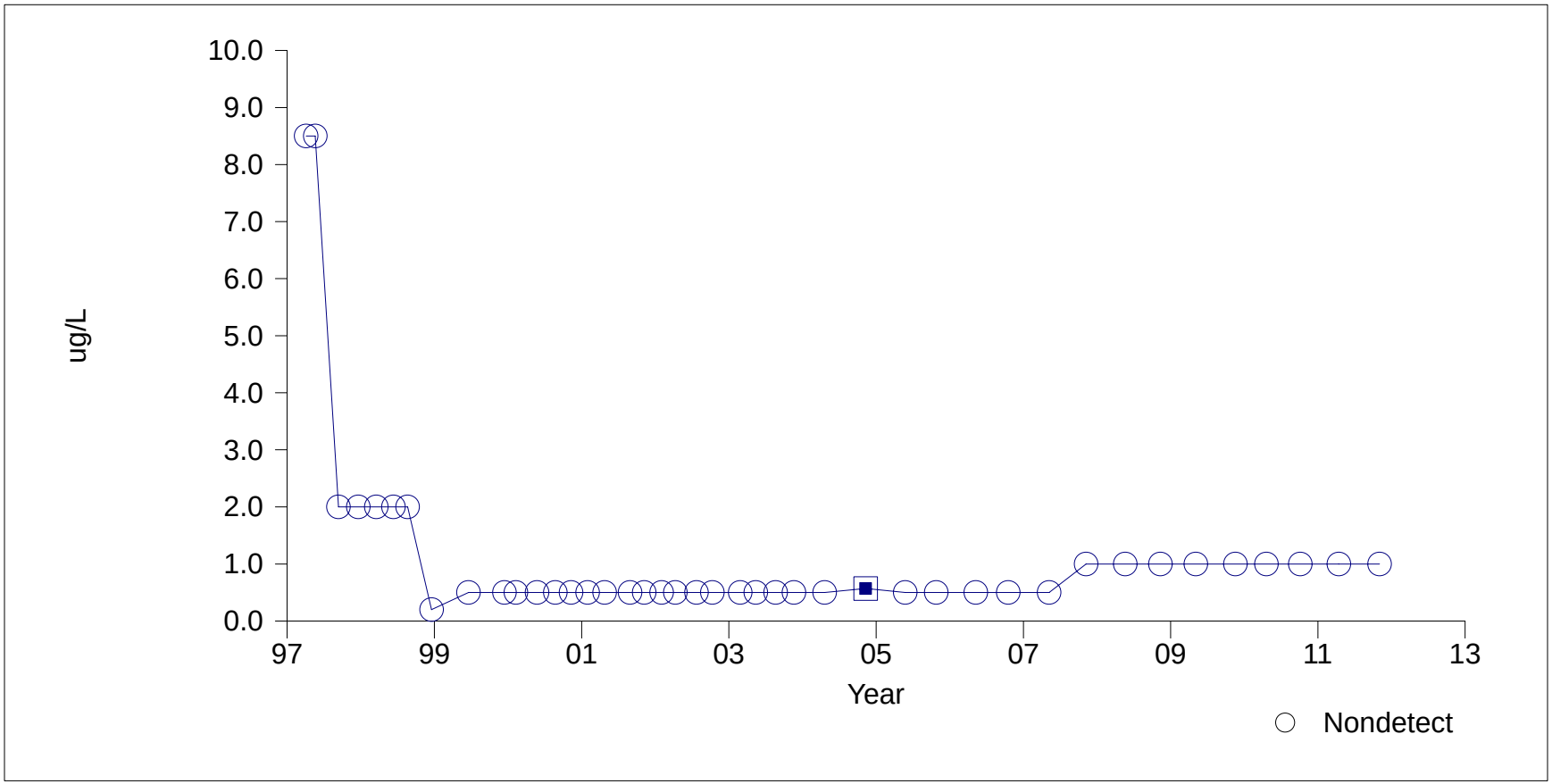

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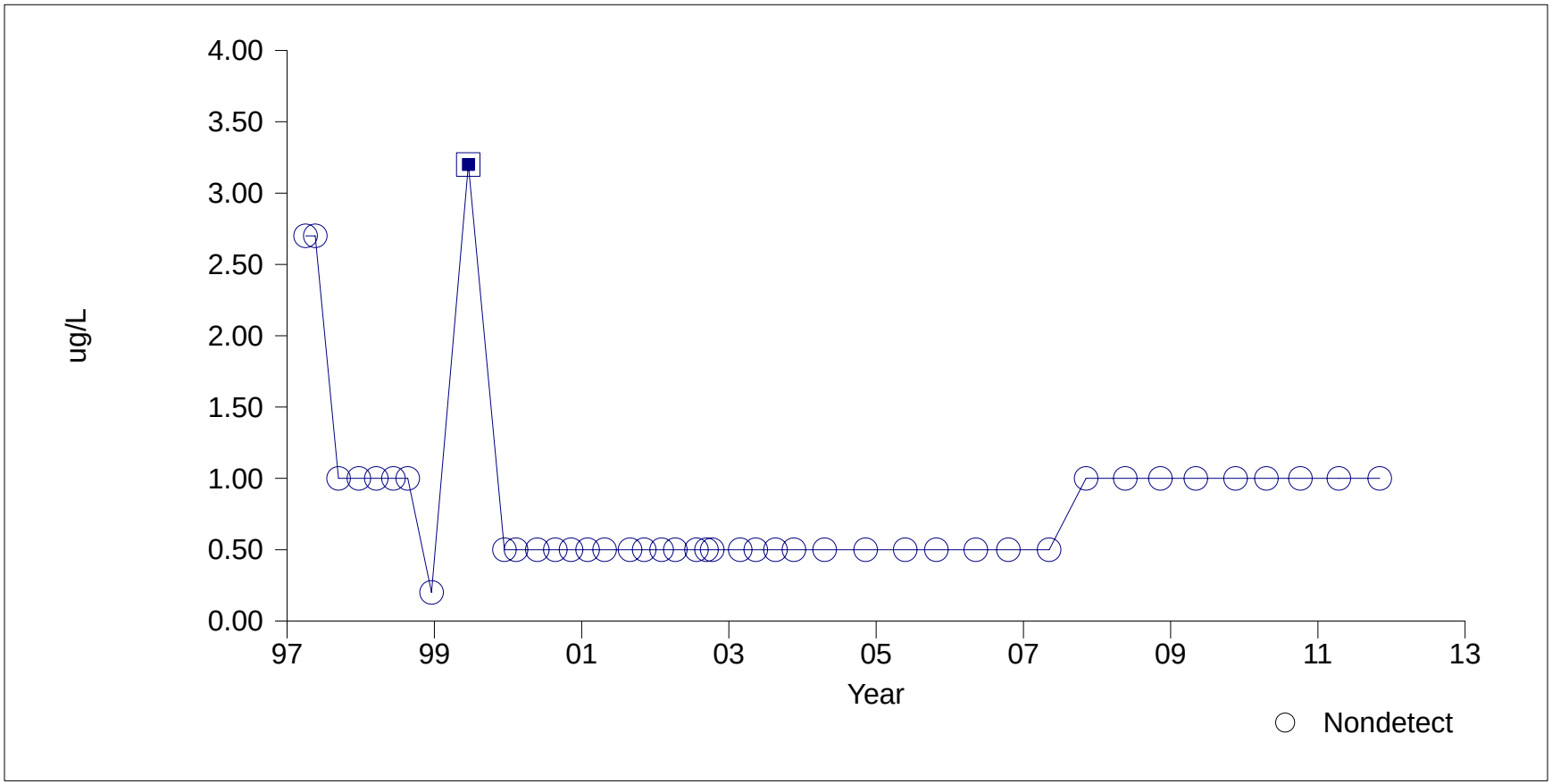
Riverbend Landfill [vocs]

Time Series Plot for MW-16A



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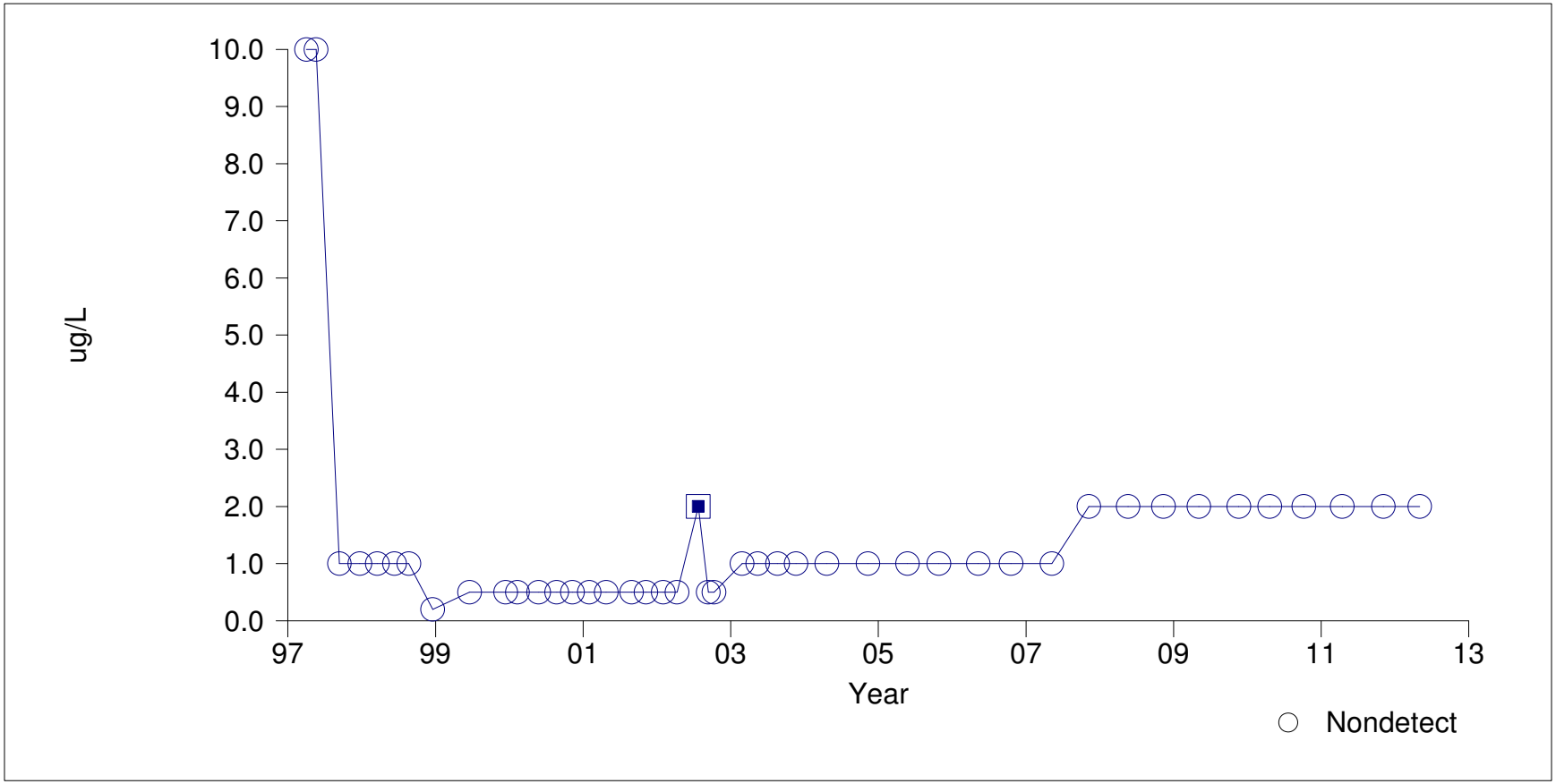

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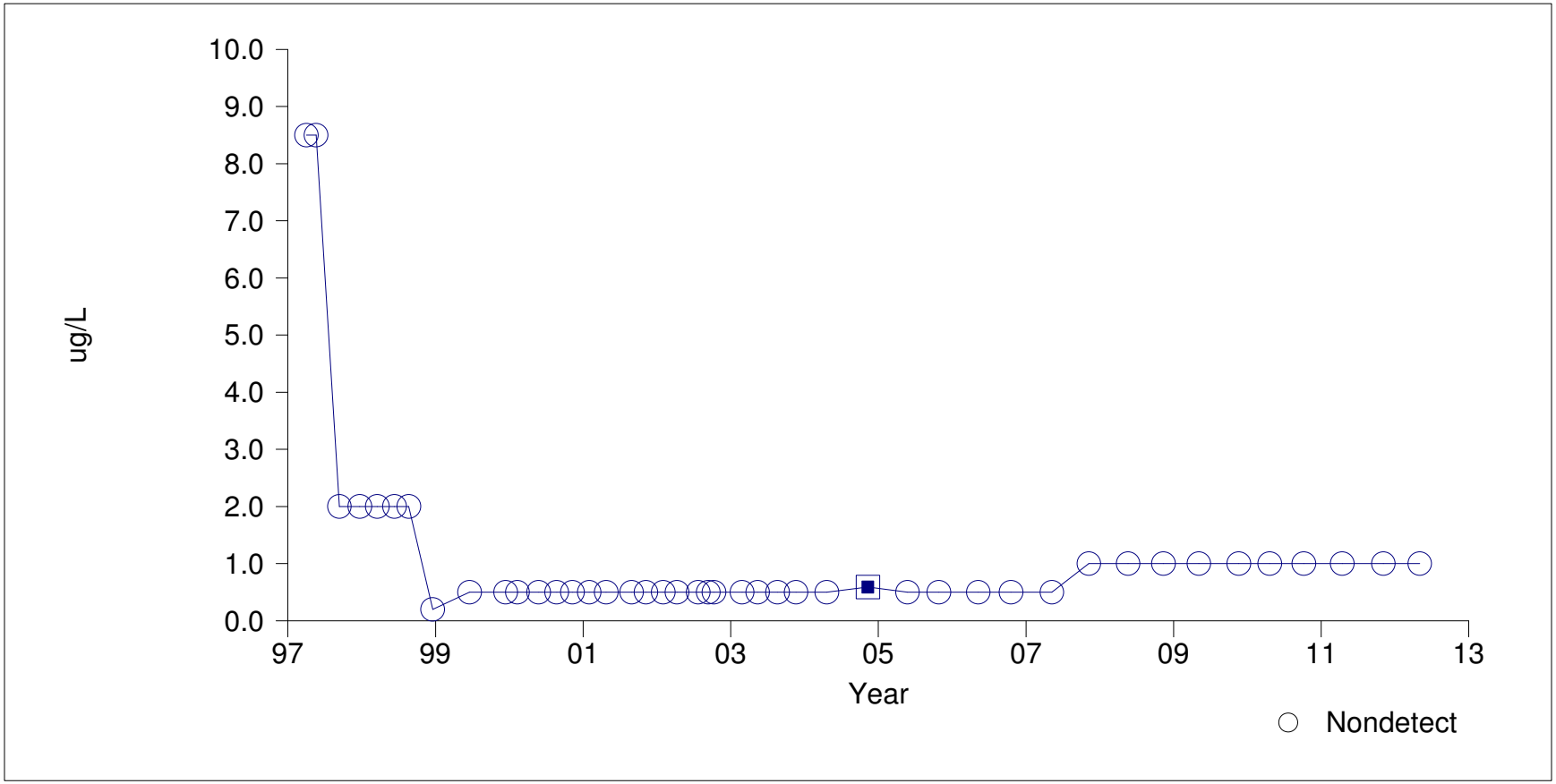

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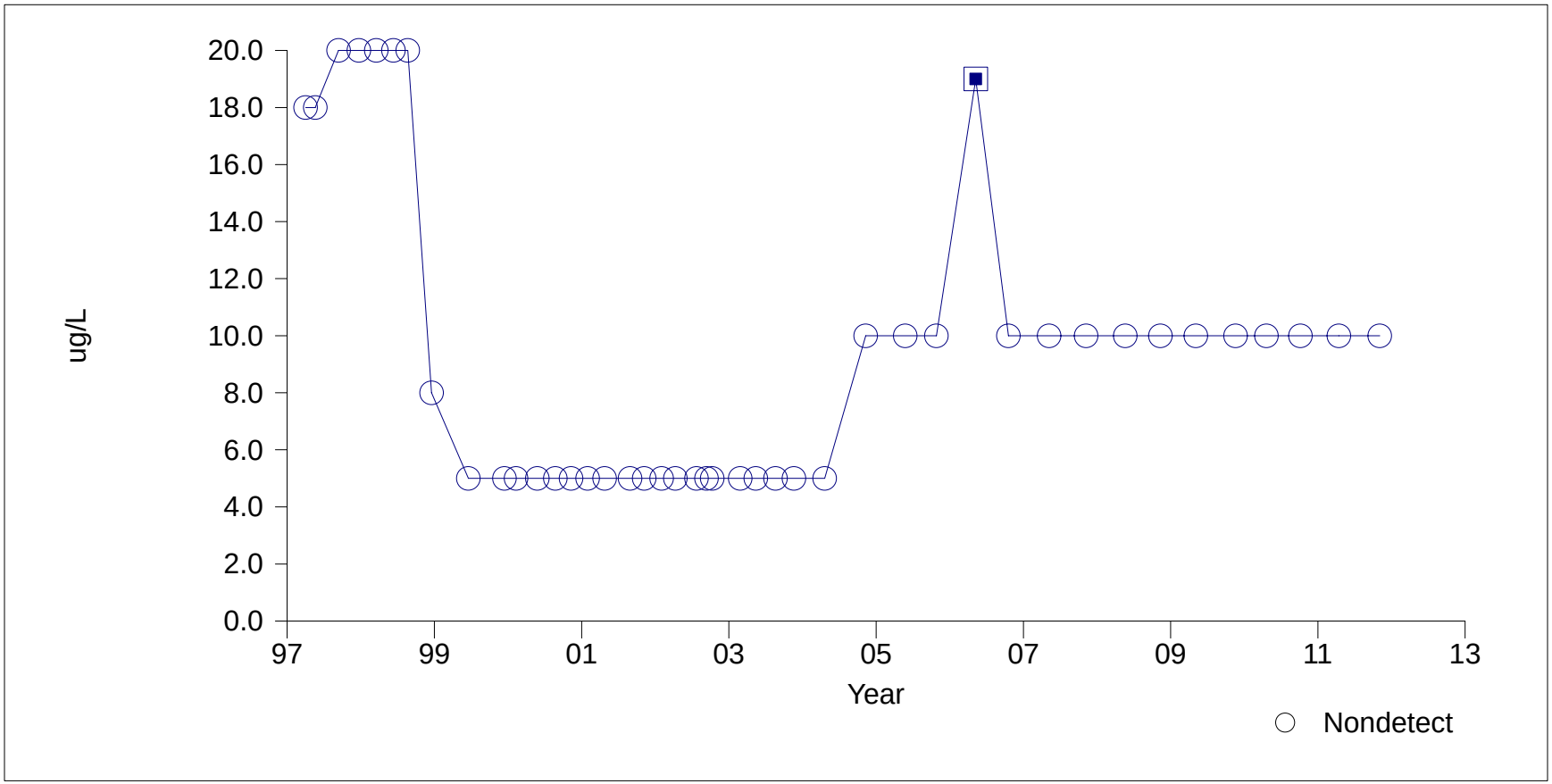

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Riverbend Landfill [VOCs]

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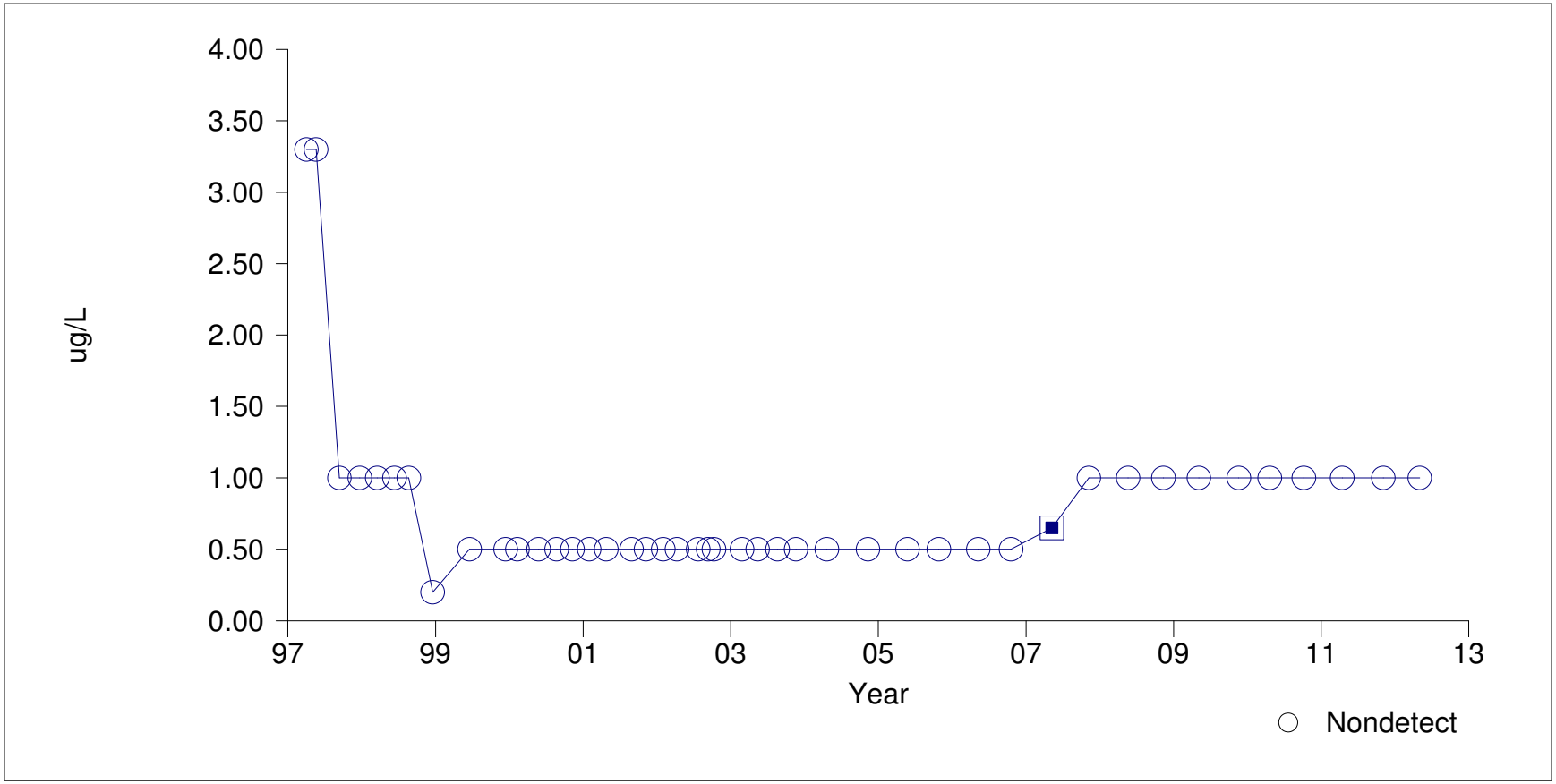

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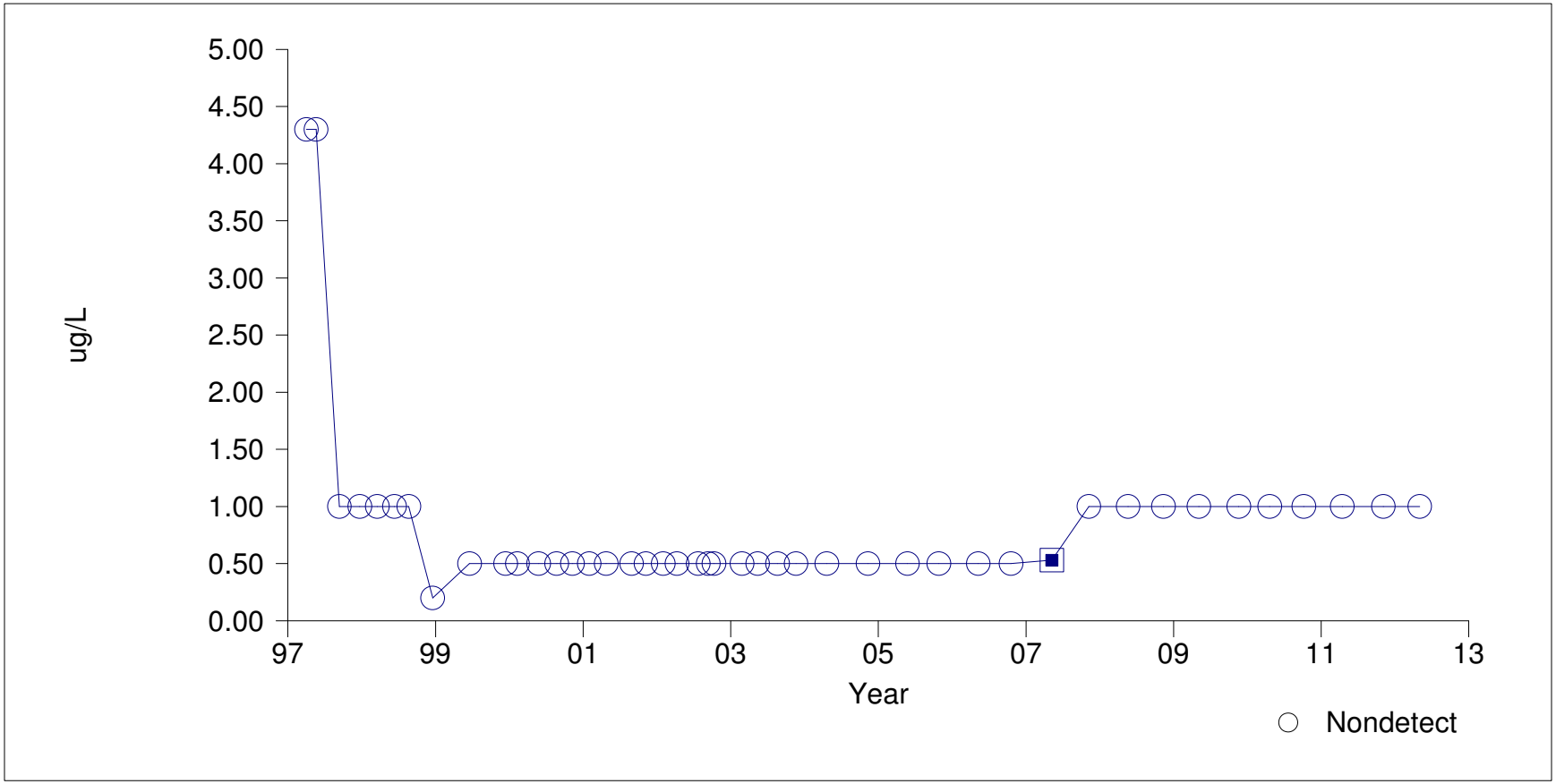

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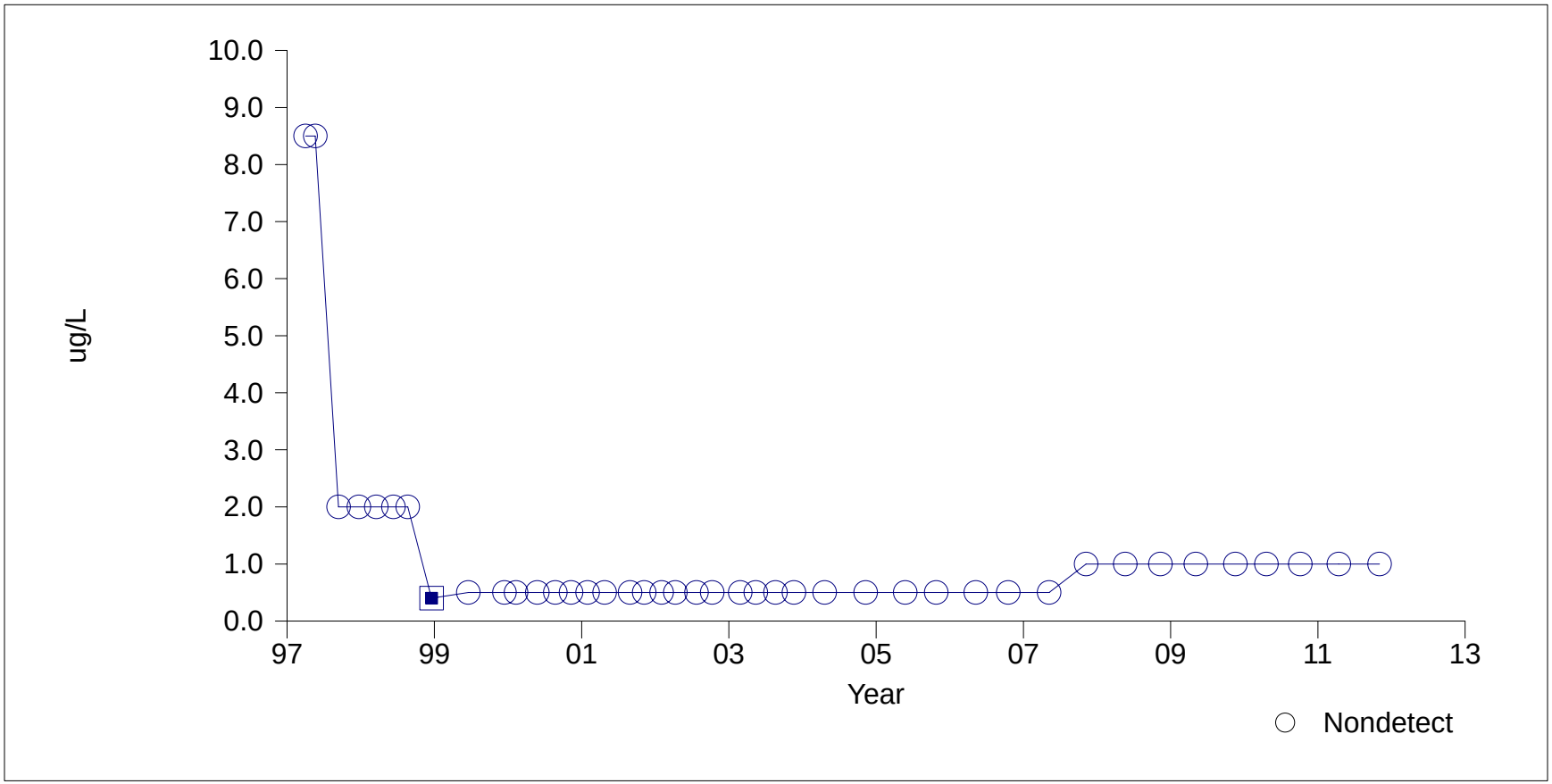
Riverbend Landfill [vocs]

Time Series Plot for MW-16B



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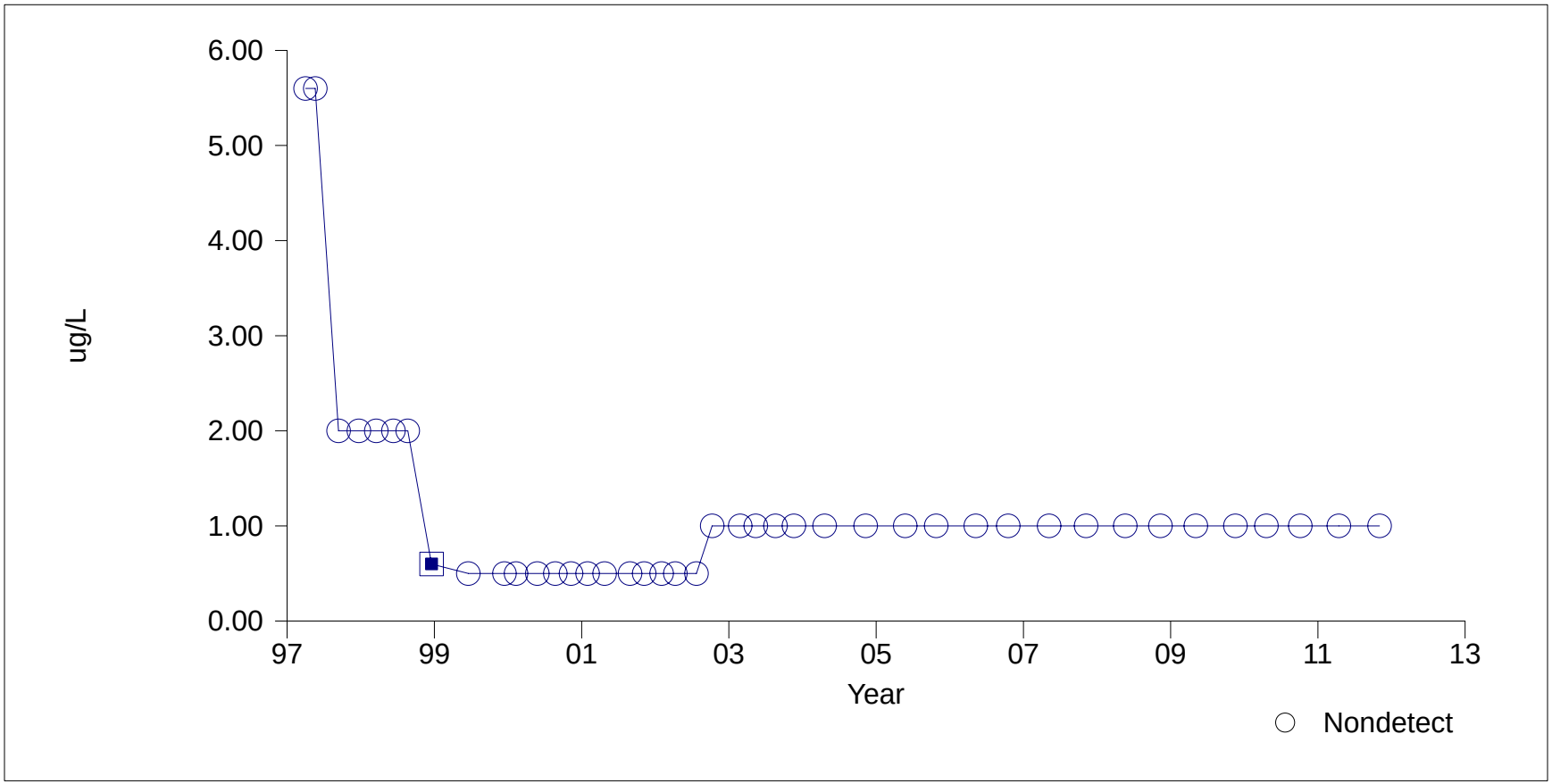
Riverbend Landfill [vocs]

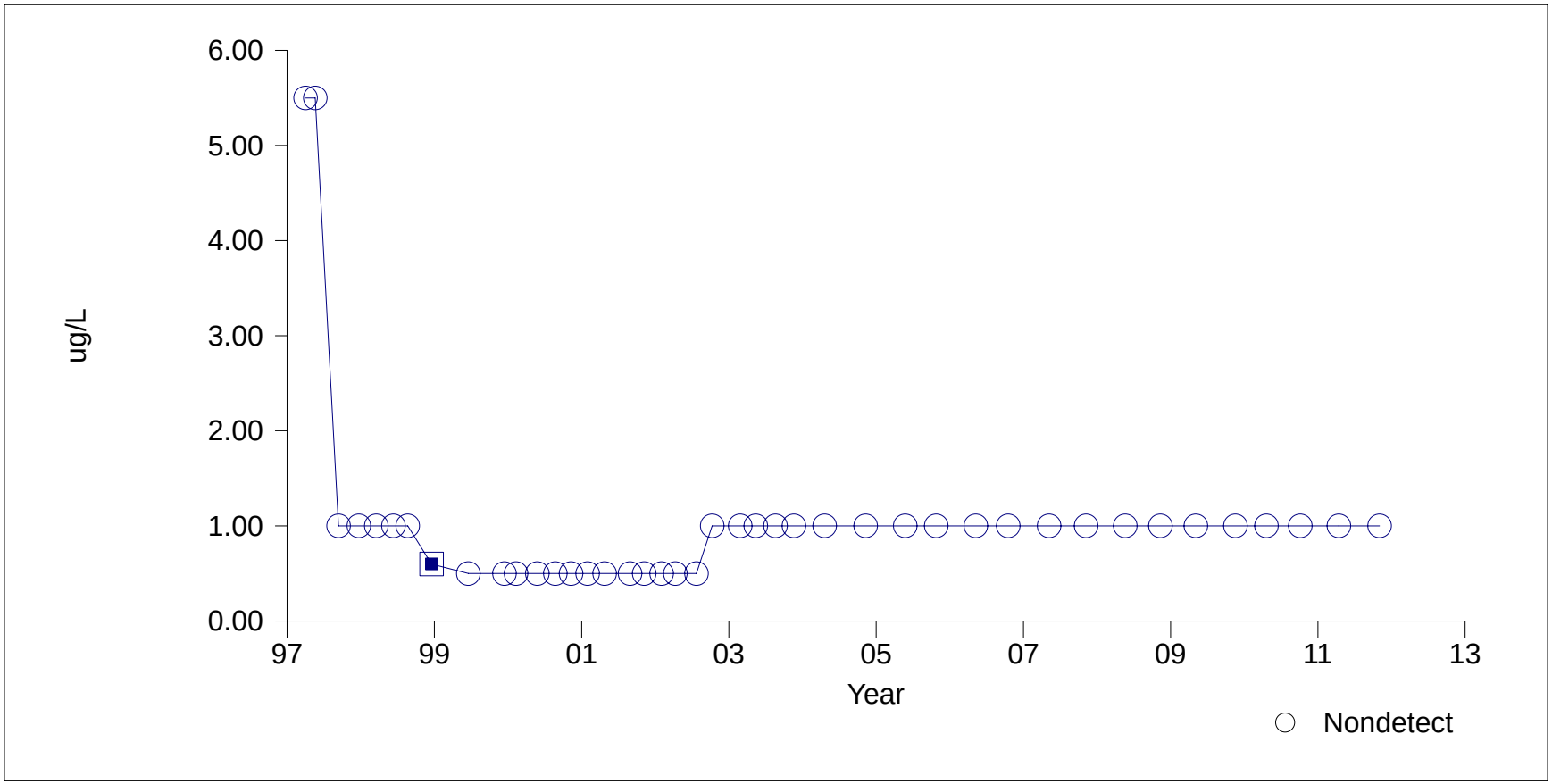
Time Series Plot for MW-16B



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

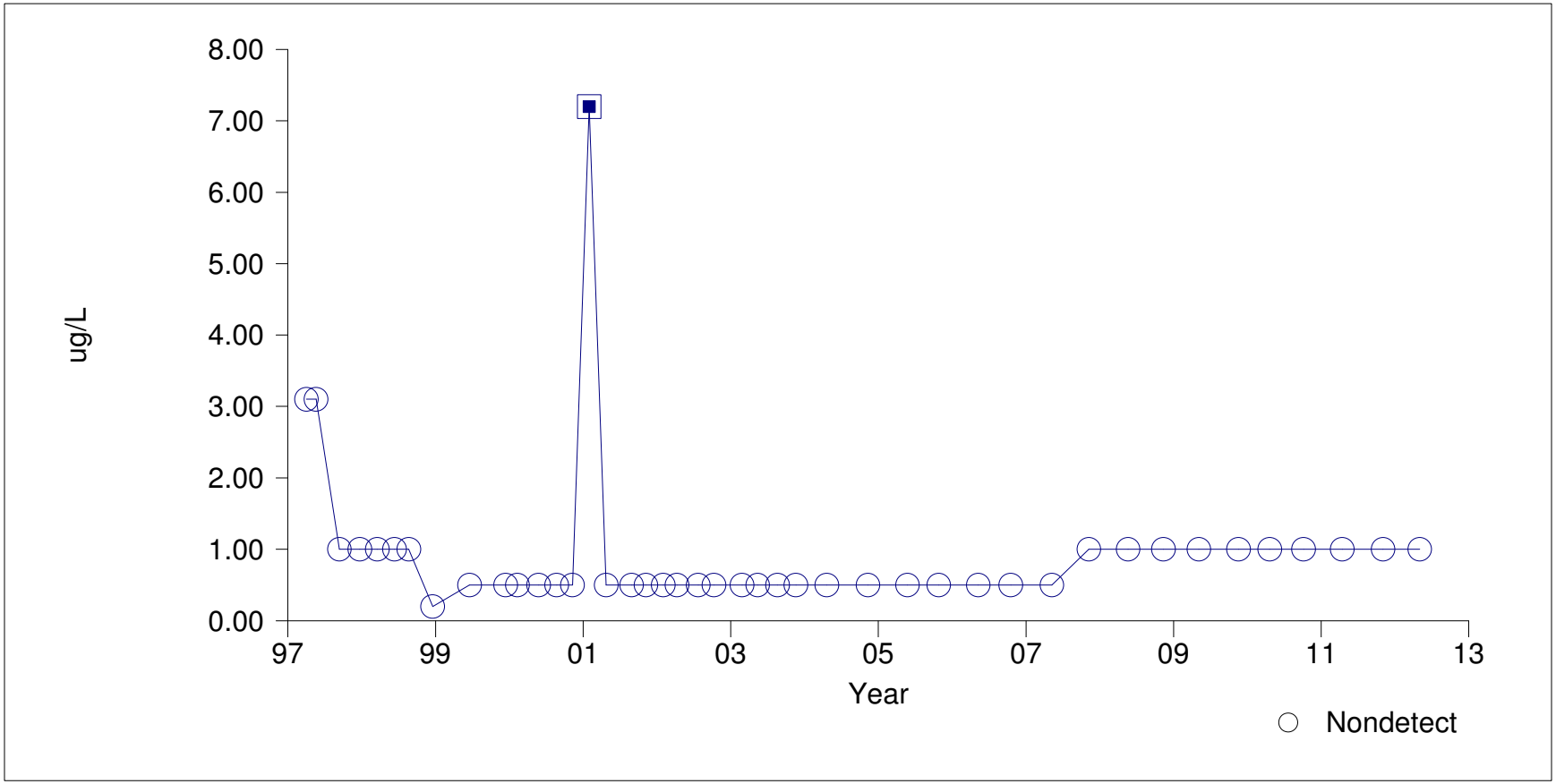
Time Series Plot for MW-16B



Prepared by: SCS Engineers

Riverbend Landfill [VOCs]

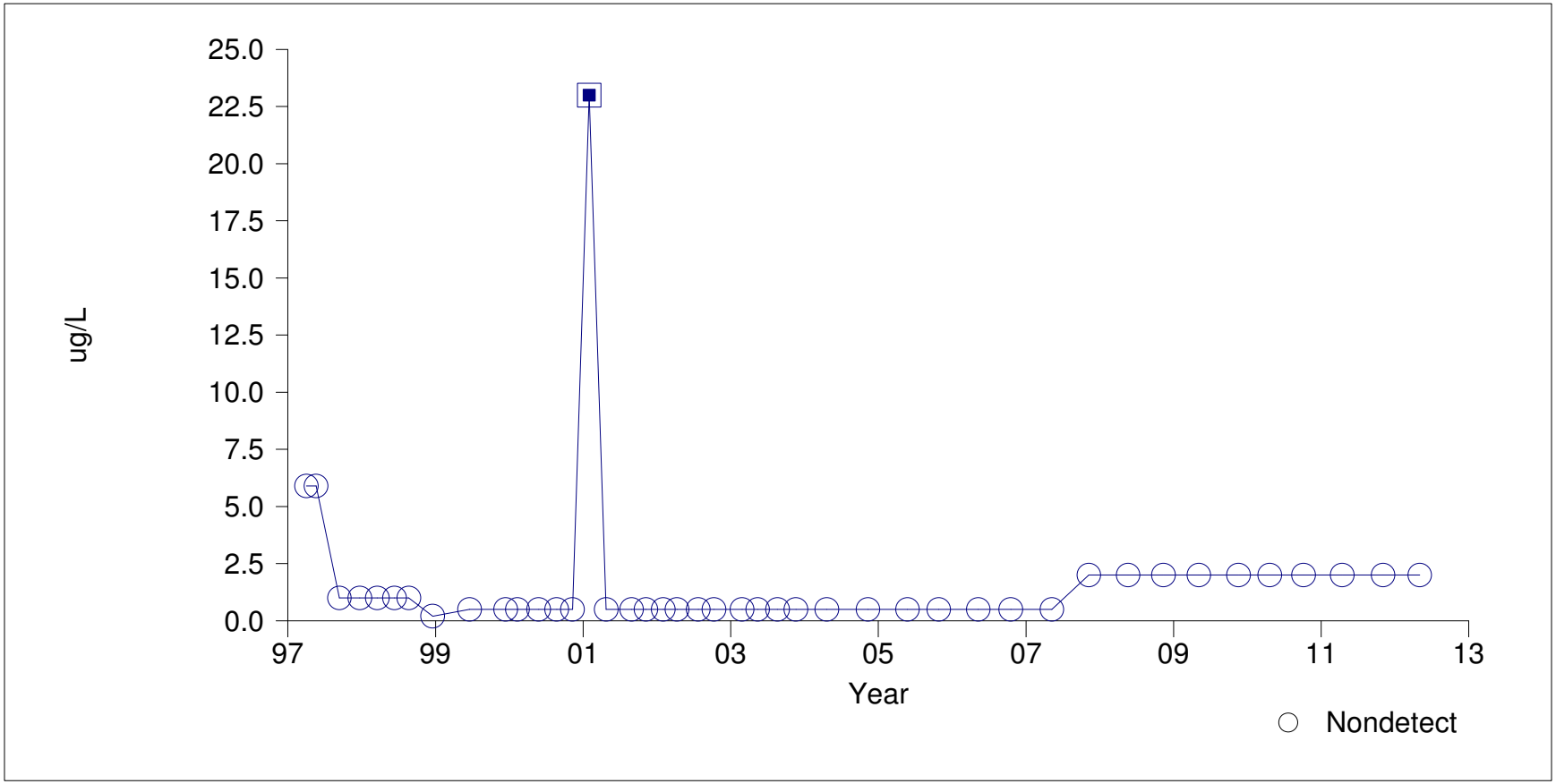
Time Series Plot for MW-16B



Prepared by: GeoChem Applications

Riverbend Landfill [VOCs]

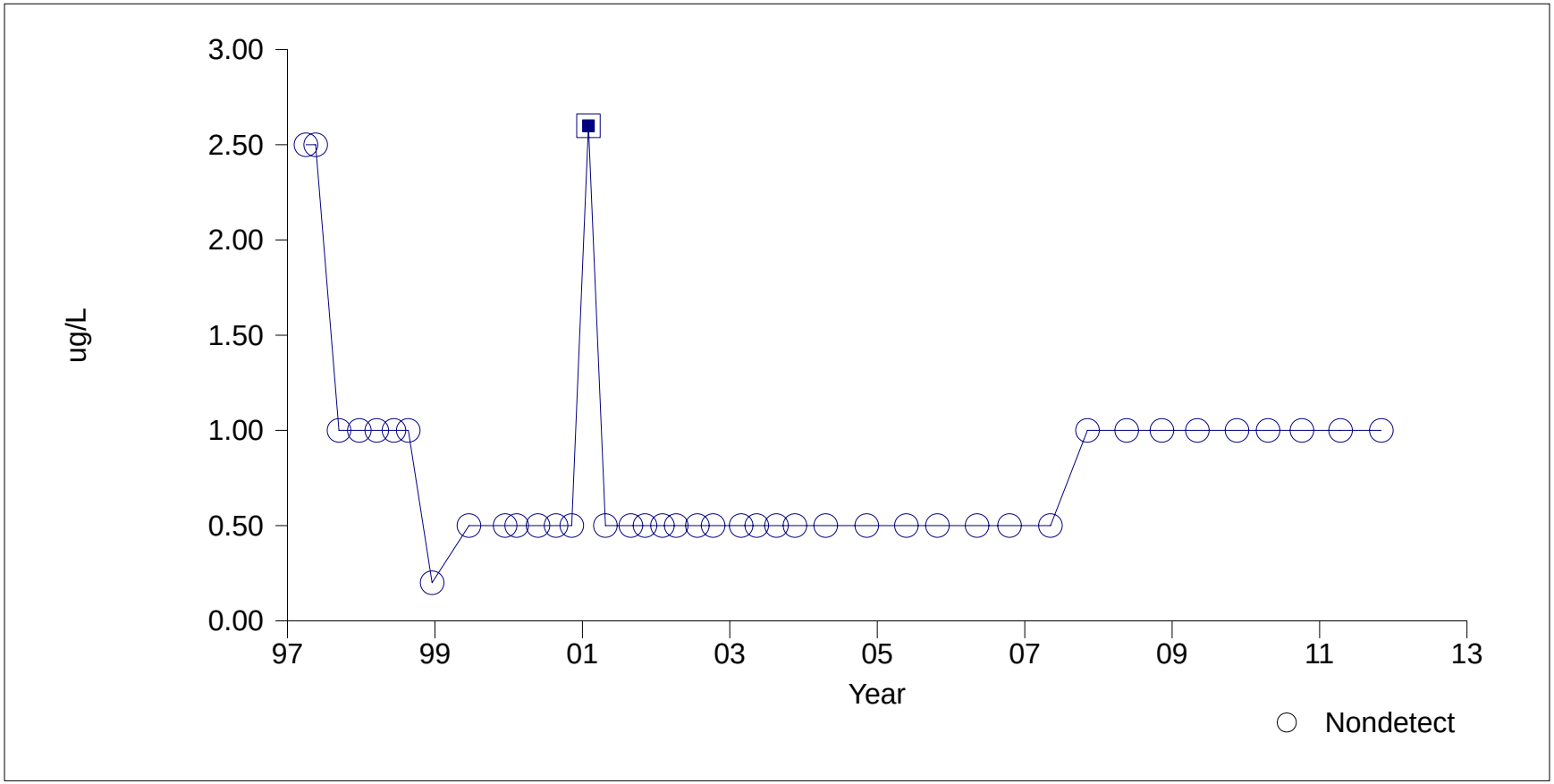
Time Series Plot for MW-16B



Prepared by: GeoChem Applications

Riverbend Landfill [vocs]

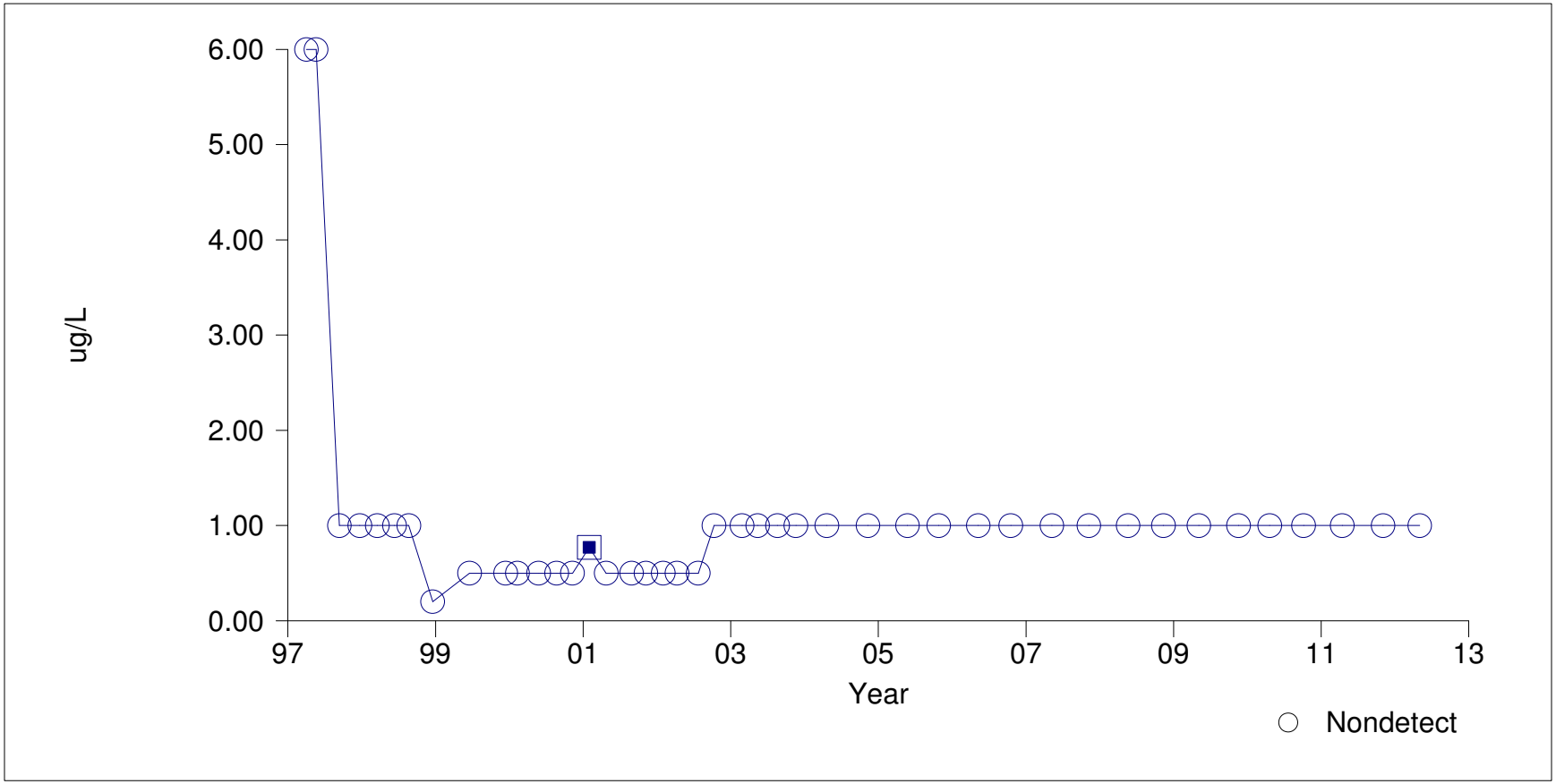
Time Series Plot for MW-16B



Prepared by: SCS Engineers

Riverbend Landfill [VOCs]

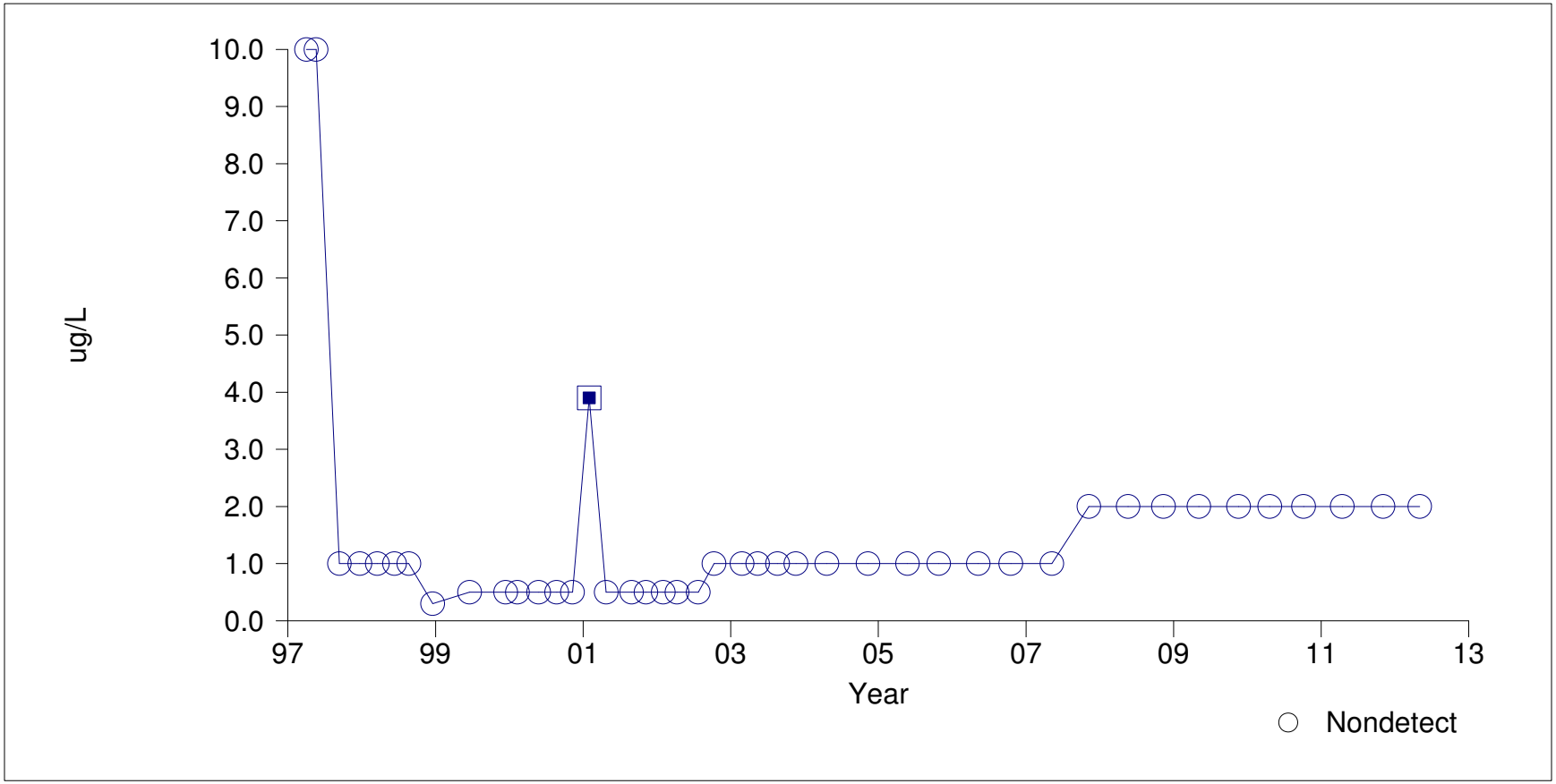
Time Series Plot for MW-16B



Prepared by: GeoChem Applications

Riverbend Landfill [VOCs]

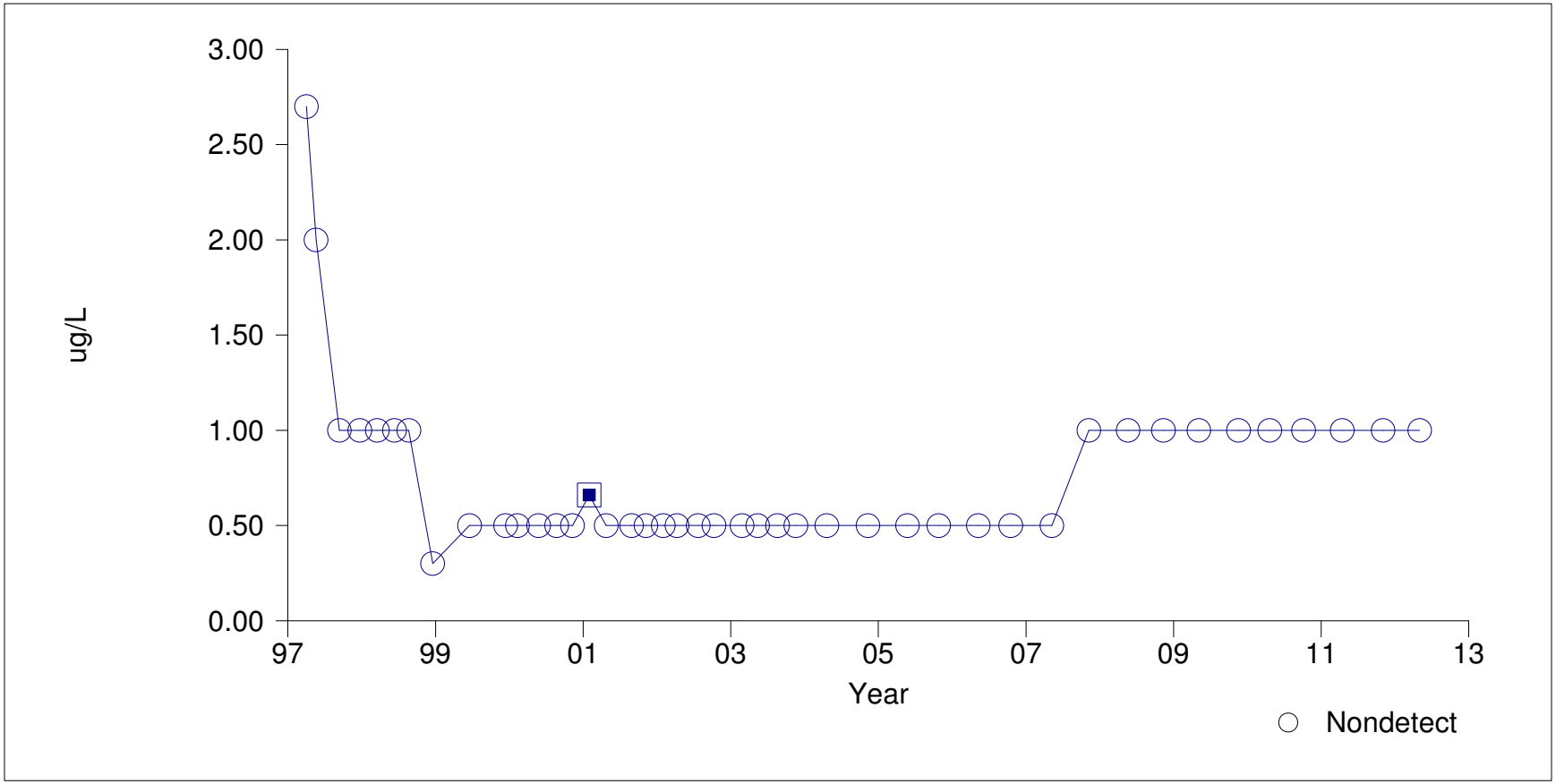
Time Series Plot for MW-16B



Prepared by: GeoChem Applications

Riverbend Landfill [VOCs]

Time Series Plot for MW-16B



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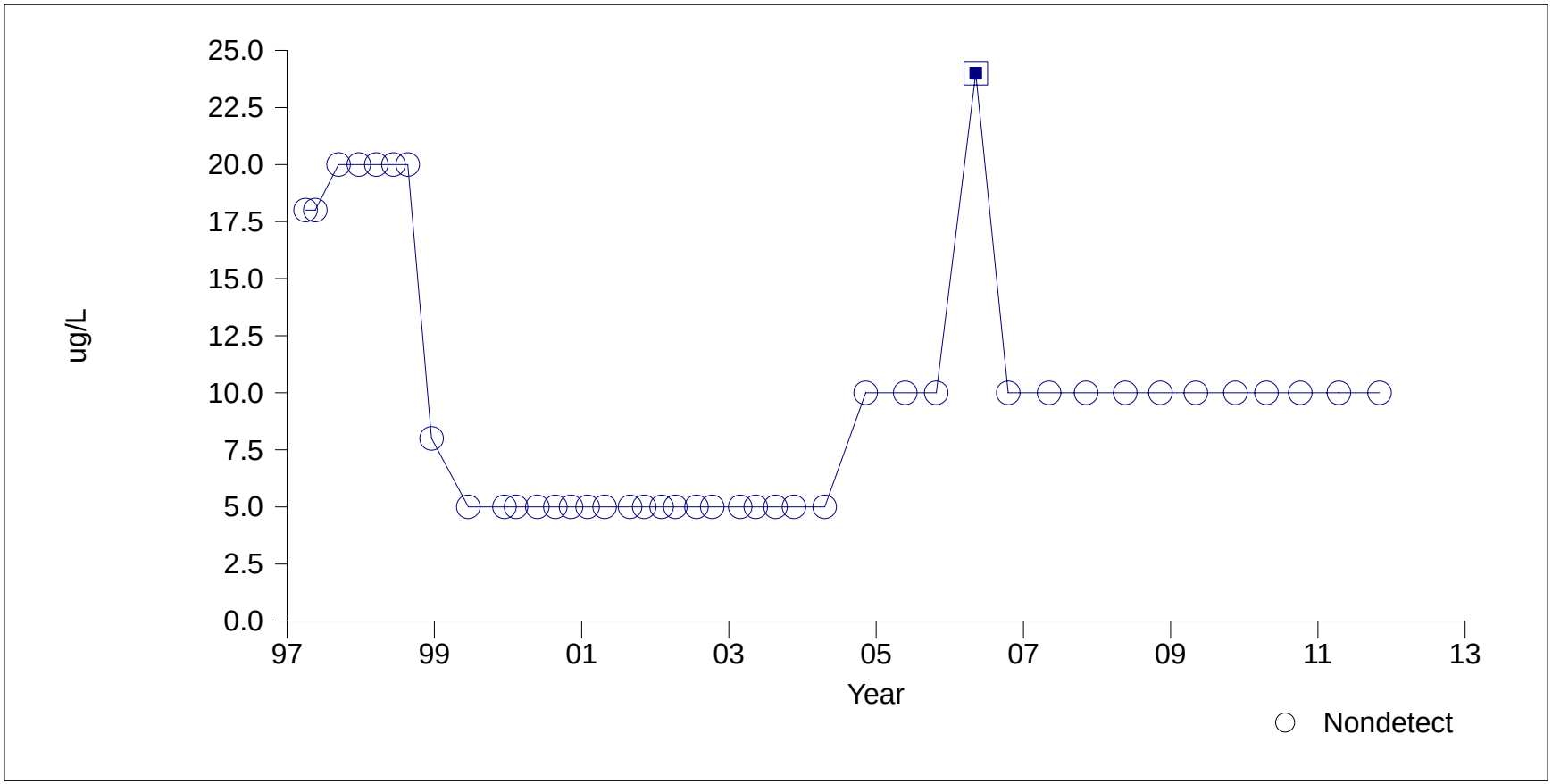
Riverbend Landfill [vocs]

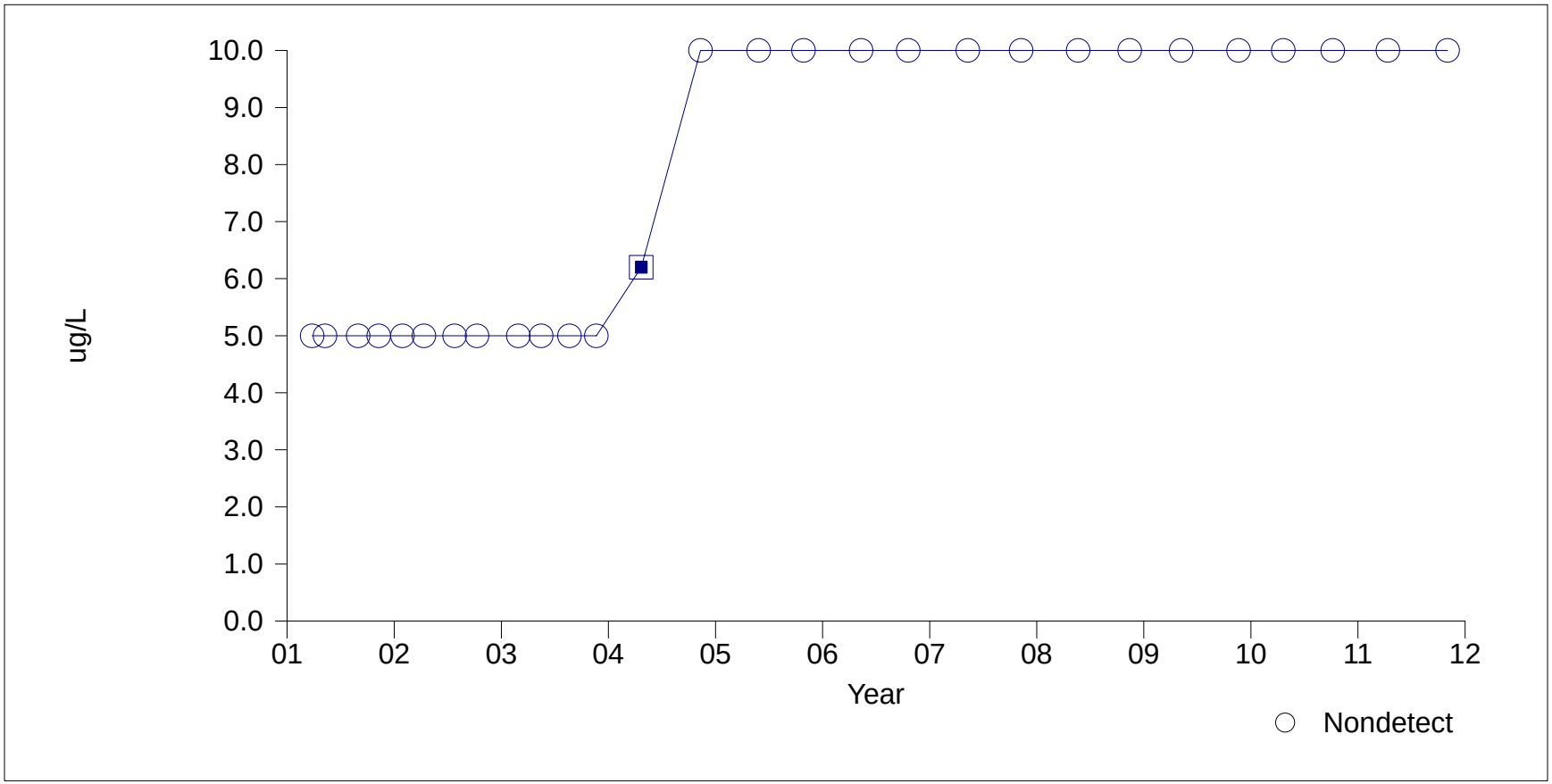
Time Series Plot for MW-16B



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

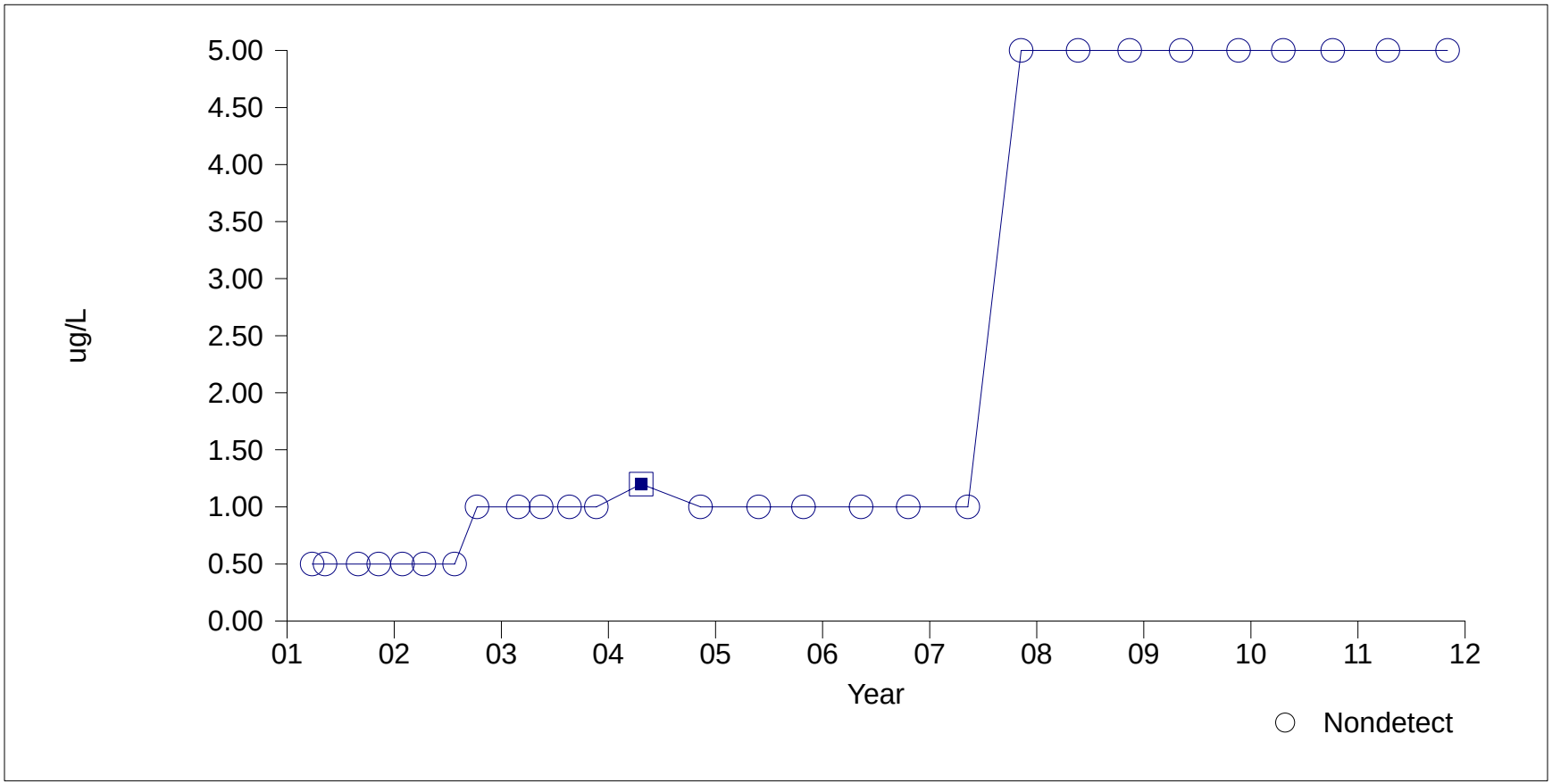
Time Series Plot for MW-19A



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

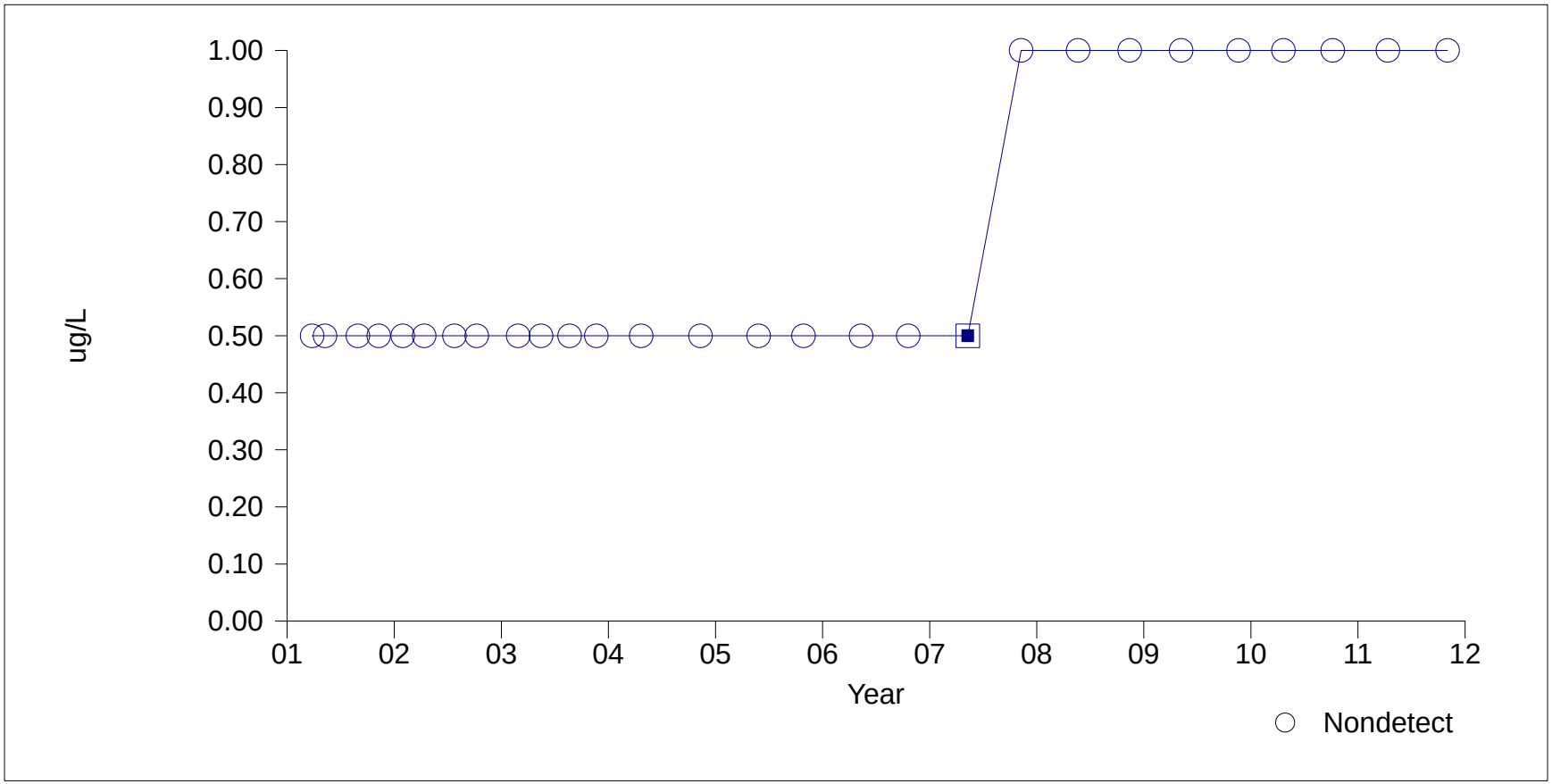
Time Series Plot for MW-19A



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

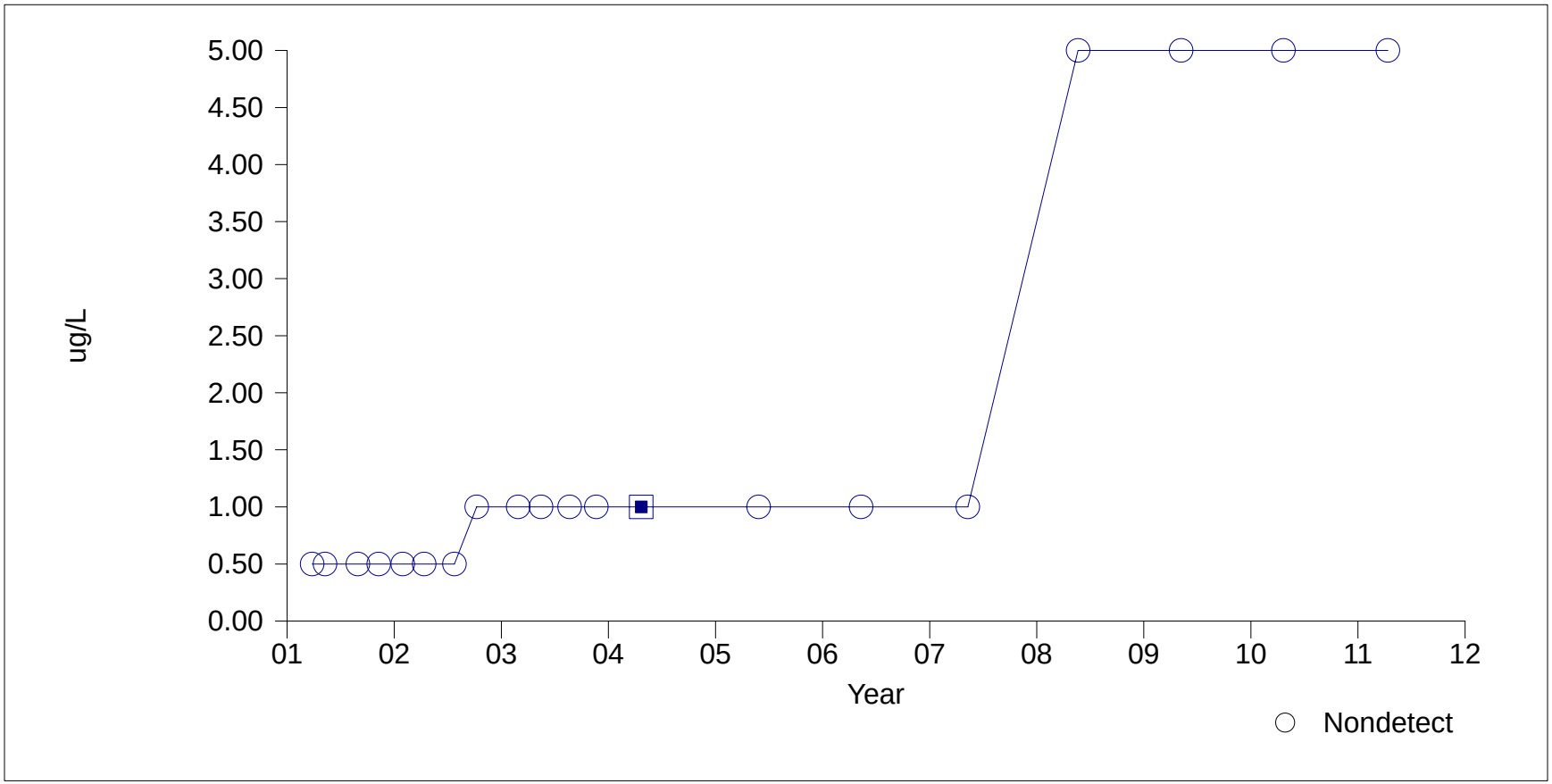
Time Series Plot for MW-20A



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

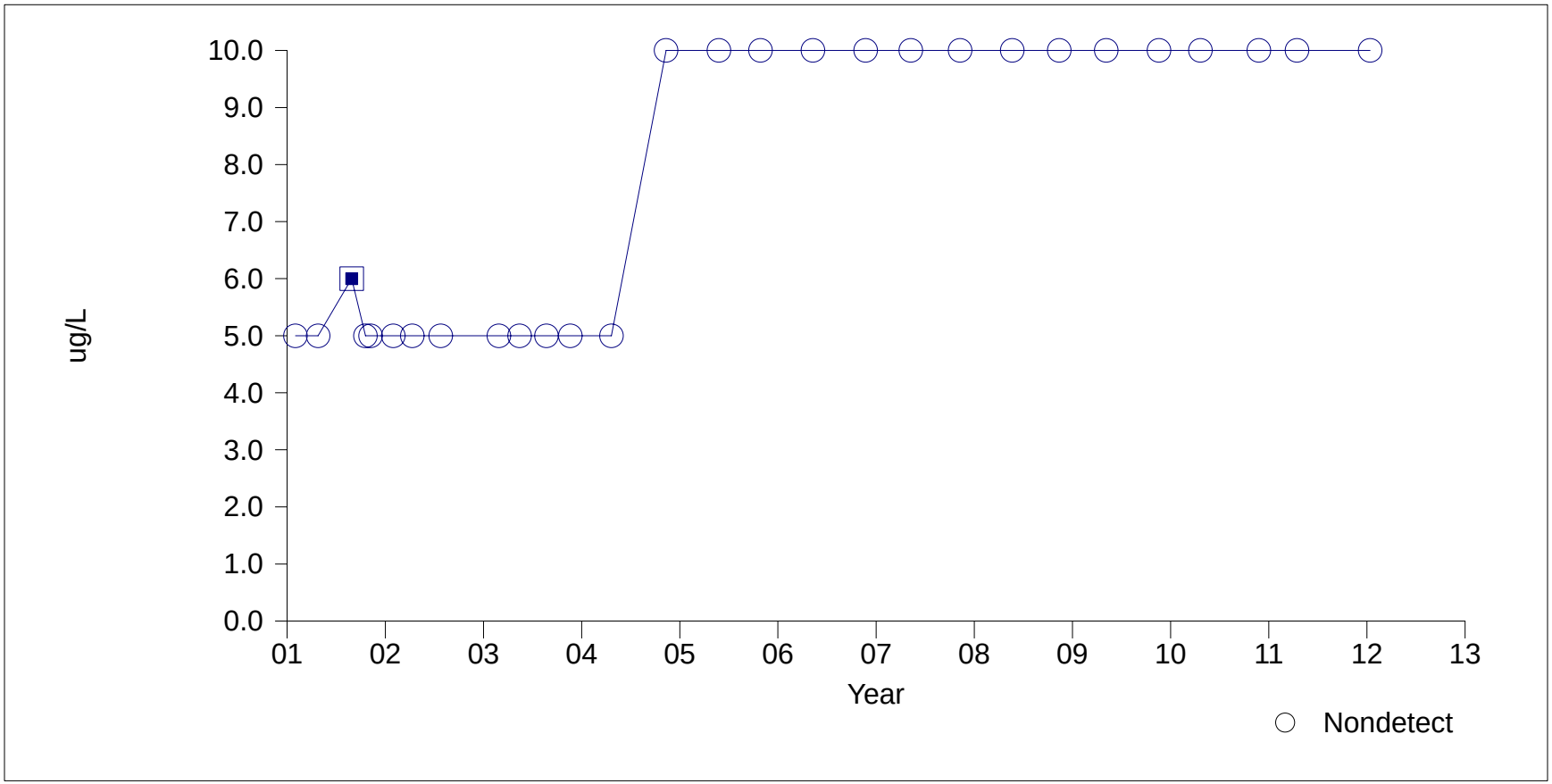
Time Series Plot for MW-20B



Prepared by: SCS Engineers

Riverbend Landfill [vocs]

Time Series Plot for MW-21A



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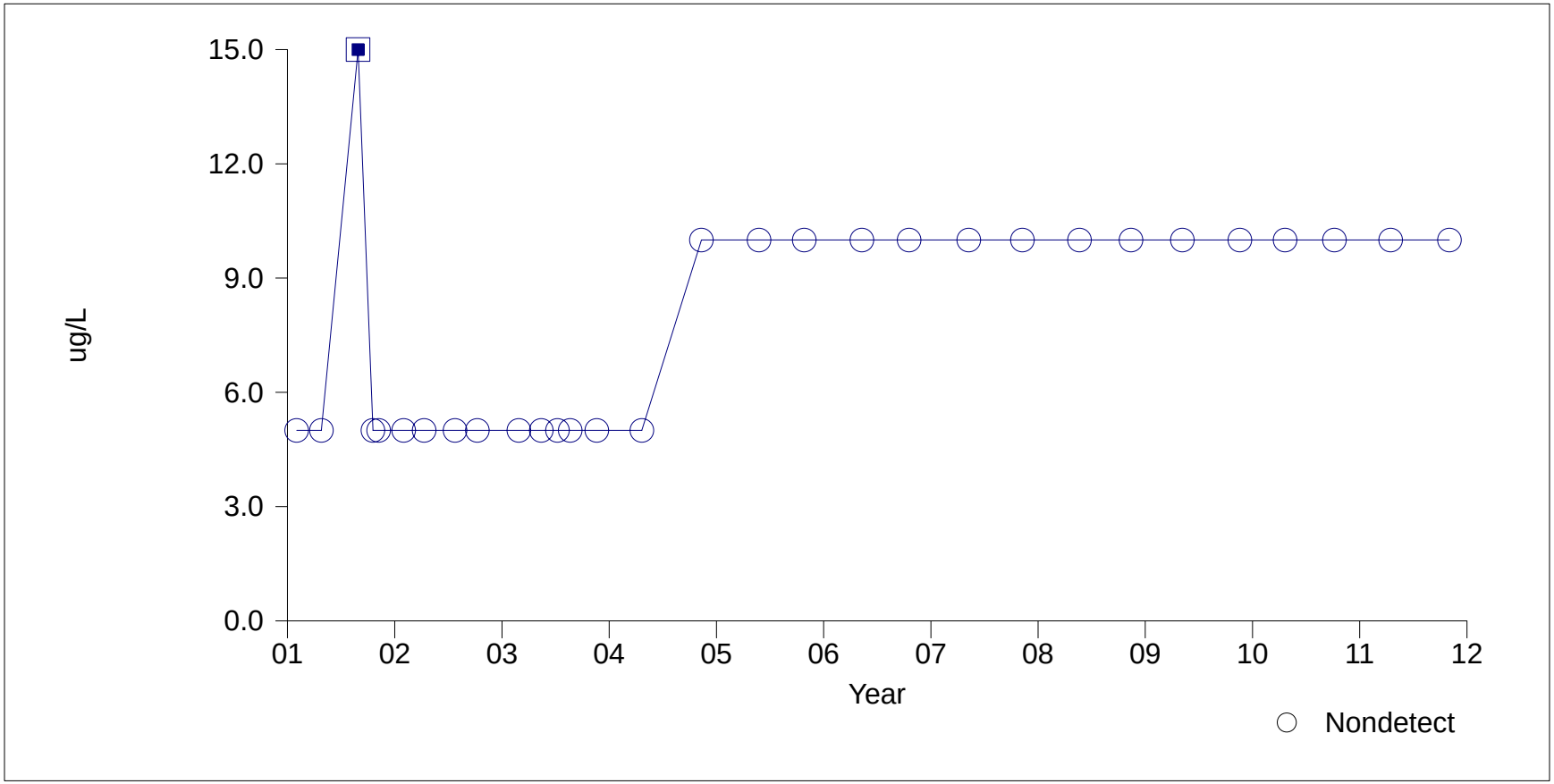
Riverbend Landfill [vocs]

Time Series Plot for MW-21B



Prepared by: SCS Engineers