Environmental Functional Area

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Lawrence Livermore National Laboratory (LLNL) Experimental Test Site (Site 300)

Compliance Monitoring Program for Closed Pit 1 Landfill

Annual/Fourth Quarter Report for 2010

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Summary

This combined fourth quarter and annual report for 2010 summarizes compliance activities performed at the Lawrence Livermore National Laboratory (LLNL) Experimental Test Site (Site 300) landfill known as Pit 1 following monitoring and reporting provisions of Central Valley Regional Water Quality Control Board (CVRWQCB) Waste Discharge Requirements (WDR) 93-100, Resource Conservation and Recovery Act (RCRA) closure and post closure plans, and California Code of Regulations (CCR) Title 23, Chapter 15. The pit was closed to meet the requirements of the California Department of Health Services, now the Department of Toxic Substances Control approved (RCRA) closure and post closure plans using the LLNL Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Federal Facility Agreement (FFA) process. Compliance activities at the pit consist of ground water sampling and analysis, pit cap inspections, annual subsidence surveys, and reporting of analytical results. Ground water measurements for the third quarter of 2010 are contained in **Appendix A, Tables A-1** to **A-4**.

This document is prepared according to the CVRWQCB Revised Pit 1 Monitoring and Reporting Program (MRP) for Permit WDR 93-100, dated February 18, 2010. Statistical limits (SL) are not calculated for the evaluation monitoring wells. Rather, the evaluation method prescribed by the CVRWQCB in the Pit 1 MRP is to conduct annual trend analyses of perchlorate and tritium in samples from these wells and report in this Pit 1 annual/fourth quarter report. All of these requirements are discussed in the "Description of Report Contents" or the "Summary of Analytical Results" sections of this report.

During the fourth quarter monitoring period, no new releases of constituents of concern to ground water from Pit 1 are evident in the data. Analytical results indicate that total uranium was the only constituent of concern that was detected above SL at the Pit 1 detection monitoring wells. Analytical results above the SL for total uranium do not represent a statistically significant evidence of a release from Pit 1. An evaluation of the data as reported to the CVRWQCB in a 90-day letter on October 22, 2010 indicates that total uranium activities have natural uranium signatures, are within background ranges, and are lower than activities in upgradient detection monitoring wells. The CVRWQCB concurred with these finding in a letter response to LLNL on December 14, 2010.

The routine fourth quarter visual inspection of the Pit 1 cap was performed and no deficiencies were noted. In addition, three post-rain visual inspections were conducted and no deficiencies were noted. The pit cap continues to function adequately.

Introduction

This combined fourth quarter and annual report for 2010 summarizes compliance monitoring results for a closed landfill known as Pit 1 at LLNL's Site 300. Site 300 is a 30.3 square kilometer (km^2) (11.8 square miles [mi^2]) site located in the Altamont Hills approximately 10.5 km (6.5 mi) southwest of downtown Tracy, California (**Figure 1**). The landfill is located in the northern portion of the site (**Figure 2**). Closure of this unlined Class I waste management unit was completed with waste in place in December 1992 following a California Department of Health Services (now Department of Toxic Substances Control, or DTSC) approved RCRA Closure and Post-Closure Plan (PCP) using the LLNL CERCLA FFA process. Site 300 is owned by the U.S. Department of Energy (U.S. DOE) and is operated by Lawrence Livermore National Security, LLC.

Figure 1. Location of LLNL Site 300.

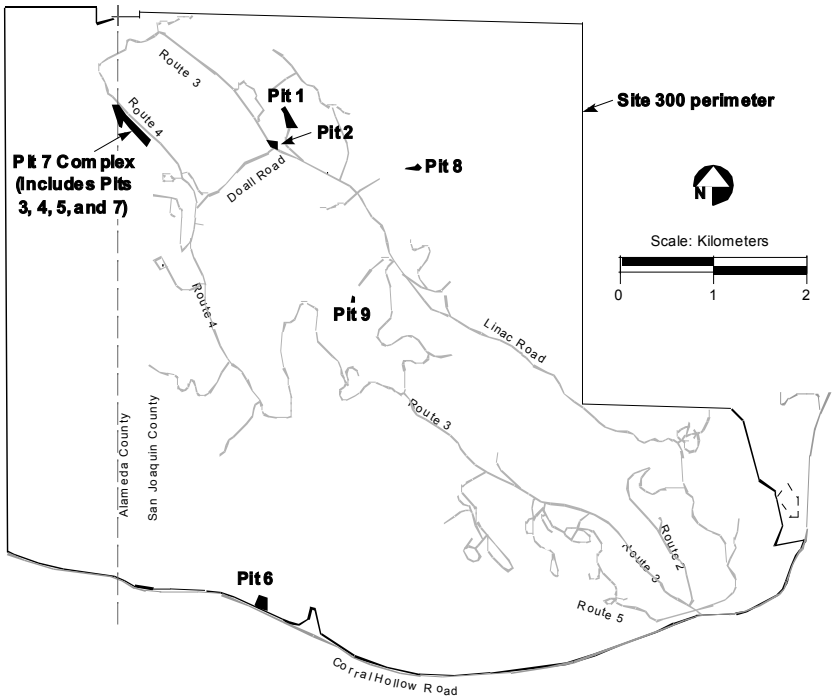

Figure 2. Location of closed landfill Pit 1 at LLNL Site 300.

Pit 1 is located in the Elk Ravine drainage area, about 300 meters (m) or 984 feet (ft) above mean sea level (MSL). Ground water generally flows in an east-northeast direction beneath Pit 1 **(Figure 3)**, following the inclination (dip) of underlying Miocene-age sedimentary rocks (Webster-Scholten, 1994).

The current monitoring network at Pit 1 consists of twelve monitoring wells. These include eight detection monitoring wells and four evaluation monitoring wells (**Figure 3)**. The detection monitoring wells that are used to sample the ground water in the vicinity of Pit 1 include: wells K1-01C and K1-07 located hydrologically up-gradient from Pit 1; down-gradient wells K1-02B, K1-04, K1-05, and W-PIT1-2326; and cross-gradient wells K1-08 and K1-09. The primary objective of the detection monitoring wells is to detect any new release of constituents of concern to ground water. Constituents of concern, as defined by Title 23 of the CCR, Chapter 15, are waste constituents, reaction products, and hazardous constituents that are reasonably expected to be in or derived from waste buried in the Pit 1 Landfill. LLNL collects, analyzes, and statistically evaluates one sample quarterly from each detection monitoring well.

The evaluation monitoring wells are all down-gradient of Pit 1 wells and include K1-06, W-PIT1-02, W-PIT1-2209, and W-865-2005 as required by the MRP. These evaluation monitoring wells were added to Pit 1 monitoring and reporting requirements to track existing plumes of perchlorate and tritium from an up-gradient source. LLNL collects and analyzes one sample quarterly from each evaluation monitoring well and annually conducts trend analyses for tritium and perchlorate. Trend analysis of these wells is presented in the **Summary of Analytical Results** section of this report.

All of these wells are screened in the uppermost water-bearing zone in the Neroly Formation lower blue sandstone unit ($Tnbs_1$/$Tnbs_0$). The Neroly Formation contains the main aquifer beneath Site 300. **Figure 3** shows a generalized northeast ground water flow direction. However, **Figure A-1** in **Appendix A** shows the potentiometric surface contours that indicate flow directions ranging from northeast to north in the vicinity of Pit 1. Pit 2, which was closed before RCRA was enacted, is hydrologically up-gradient from Pit 1. In 1992, a 2.4 m (8 ft) thick RCRA cap containing an impermeable layer of clay that is 0.6 m (2 ft) thick was constructed over Pit 1. The cap prevents rainwater from percolating through the waste buried in the pit. A water diversion channel was constructed around the pit cap to remove storm water runoff. The diversion channel empties into the adjacent arroyo, the headwater of Elk Ravine.

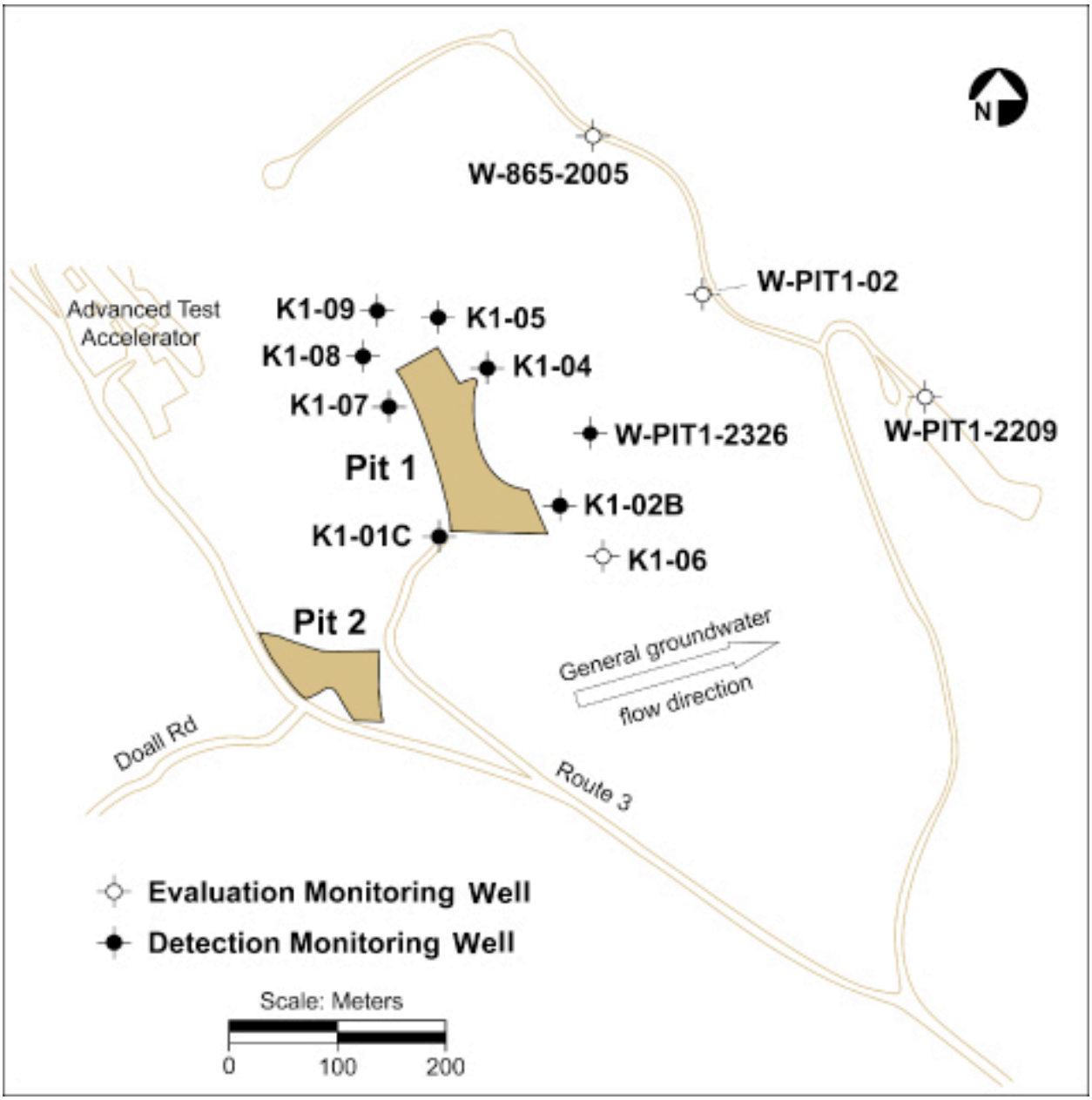

Figure 3. Locations of Pit 1 compliance monitoring wells.

Compliance Monitoring Program Overview

This report fulfills quarterly and annual requirements set forth in the following two documents: (1) WDR Order 93-100 and the February 18, 2010, MRP No. 93-100, administered by the California CVRWQCB (CVRWQCB 1993 and 2010) and (2) LLNL Site 300 RCRA Closure and Post-Closure Plans, Landfill Pits 1 and 7 (Rogers/Pacific Corporation 1990). The PCP was approved by the California Department of Health Services (currently the California Department of Toxic Substances Control). The combined requirements include quarterly ground water sampling and analyses to detect potential releases of constituents of concern from the landfill, quarterly and post-rain visual inspections of pit cap integrity, repairs as necessary to maintain the integrity of the landfills and their water-diversion systems, annual measurements of cap survey markers to detect subsidence, an annual inspection of the caps by an independent engineer, and quarterly written monitoring reports.

Quality Assurance

To ensure quality data, LLNL works within the established Quality Assurance (QA) program of the LLNL Environmental Functional Area (EFA). LLNL uses protocols and procedures that cover all aspects of ground water sampling, sample tracking, and data management. These written protocols and procedures are contained in the *LLNL Livermore Site and Site 300 Environmental Restoration Project Standard Operating Procedures (SOPs)* (Goodrich and Lorega, 2009), and the *Environmental Monitoring Plan* (Woods, 2009). SOPs are used to minimize inadvertent sample contamination and maintain sample integrity from the well to the analytical laboratory. Data management SOPs ensure that all laboratory measurements are received, accurately recorded, and properly stored both in a computer database and in hardcopy format.

Each quarter, a duplicate (collocated) set of ground water samples is collected from each monitoring network and a set of blank samples is prepared from a randomly chosen well. In addition, equipment blanks are prepared and analyzed to ensure that sampling equipment is properly cleaned before use. Each day, when samples are collected for volatile organic compound (VOC) analysis, a trip blank (prepared at the analytical laboratory) is carried into the field. It is returned unopened to the analytical laboratory for VOC analysis. If VOCs are detected in a trip blank and in any of the routine samples obtained that day, sample results may be discounted and new sampling may be performed.

As required by DOE Order 241.1, measurements are reported in *Système Internationale* (SI) units. The SI unit for radioactivity is the becquerel (Bq), equal to 1 nuclear disintegration per second. The more commonly used unit, picocurie (pCi), is equal to 1 nuclear disintegration per 27 seconds. As a convenience, maximum contaminant levels (MCLs) for radioactivity in drinking water are given in both becquerels per liter (Bq/L) and picocuries per liter (pCi/L) in **Table 1** below. Note that MCLs are provided for reference only, because this report does not involve wells used for potable domestic, livestock, or industrial water supply.

Table 1. MCLs for radioactivity in drinking water.

Radiological parameter	**MCL** (Bq/L)	**MCL** (pCi/L)
Gross alpha	0.555	15
Gross beta	1.85	50
Tritium	740	20,000
Radium (total)	0.185	5
Uranium (total)	0.74	20

Description of Report Contents

The "Summary of Analytical Results" section reviews any constituents of concern detected in ground water during the fourth quarter of 2010 from detection monitoring and perchlorate and tritium in evaluation monitoring wells. Constituents of concern measurements that exceeded SLs or MCLs in drinking water are discussed in this report.

Appendix A contains the ground water analytical measurements for the fourth quarter of 2010. Pit 1 data are in **Tables A-1**, **A-2**, and **A-3**. **Table A-4** shows the sample dates for Pit 1. Note that the **Appendix A** tables may include some small negative values for radioactivity measurements. These are below the method RLs and are calculated values. They simply indicate that the radioactivity for that ground water sample is less than a low reference standard. **Appendix A** also contains a ground water elevation contour map for the Tnbs1/Tnbs0 hydrostratigraphic unit (HSU) **Figure A-1**.

Appendix B explains the methods used to determine the SL of concentration for a constituent of concern. Requirements for statistical treatment of ground water data are established in the CCR, Title 23, Division 3, Chapter 15, Section 2550.7. LLNL uses a statistical prediction limit method to implement intrawell comparisons. The method uses the average and standard deviation of historical measurements to calculate a SL value. If a routine quarterly constituent of concern measurement exceeds its SL and is confirmed by retesting, it is reported to the CVRWQCB as statistically significant evidence of a release.

Appendix C contains the results for QA sample analyses performed during the fourth quarter of 2010 at Pit 1 (**Table C-1**).

Appendix D consists of **Table D-1** summarizing constituents of concern and the sampling frequencies in the monitoring network for the pit. The regulatory drivers for each constituent of concern are also included in **Table D-1**.

Appendix E consists of **Table E-1** and presents well specification and construction details for detection monitoring and evaluation monitoring wells.

Appendix F consists of **Table F-1** that displays hydrographs for all compliance monitoring wells.

Appendix G consists of **Table G-1** and includes field logs for all compliance monitoring wells.

Appendix H consists of Statistical Limits and Graphs of Ground Water Measurements, and **Table H-1**, that provides detection monitoring constituents of concern, monitoring wells, statistical methods, concentration limits, and statistical limits at Pit 1.

Summary of Analytical Results

This section summarizes the analytical results for Pit 1 for the fourth quarter of 2010 and reports on the requirements of the CVRWQCB Pit 1 MRP and post closure plan requirements. During the fourth quarter monitoring period, no new releases of constituents of concern to ground water from the pit are evident in the data. As part of the MRP, statistical limits (SLs) used to monitor ground water constituents of concern are shown on **Table A-1**. The MRP requires that two confirmation samples be collected from wells with constituents of concern exceeding SLs. If either of the two confirmation samples exceed the statistical limit, a finding of statistically significant evidence of a release is confirmed and a seven-day notification letter must be submitted to the CVRWQCB. The statistical tests used to evaluate this data are those identified in **Appendix B**. In addition to the quarterly monitoring required by the MRP, a study reviewing perchlorate and tritium levels in the Pit 1 vicinity will be prepared by the LLNL Environmental Restoration Department (ERD) and presented to the CVRWQCB on June 1, 2011.

Detection Monitoring Wells

This quarter, total uranium again was detected above the SL in routine fourth quarter samples from wells K1-04 and W-PIT1-2326. The routine sample for well K1-04 was collected on October 11, 2010 with an activity of (0.086 Bq/L, [2.32 pCi/L]). The SL for well K1-04 is (0.085 Bq/L, [2.29 pCi/L]). The well was retested on January 5 and January 26, 2011. The total uranium activity for the January 5 sample was (0.070 Bq/L, [1.90 pCi/L]); below the SL for this well. The results for the January 26 sample are pending.

The total uranium SL was also exceeded in detection monitoring well W-PIT1-2326 (SL=0.115 Bq/L, [3.12 pCi/L]), with an activity of (0.119 Bq/L, [3.21 pCi/L]). However, SL exceedences in well W-PIT1-2326 also occurred last quarter and were reported to the CVRWQCB in a 90-day letter sent to the board on October 22, 2010. As described in the letter, and concurred by a letter response from the CVRWQCB on December 14, 2010 (Dominic, 2010), the well W-PIT1-2326 SL exceedances of total uranium appear to be independent of contributions from Pit 1. This is based on atom ratios of uranium-235 and uranium-238 that indicate that total uranium in W-PIT1-2326 is of natural origin and is not the result of discharge from Pit 1. This is supported by the fact that the total uranium activities in W-PIT1-2326 are lower then the upgradient well, K1-01C.

Similarly, even though the total uranium activity seen in the initial sample in well K1-04 this quarter exceeded the SL, LLNL does not believe that the SL exceedance indicates a significant evidence of a release from Pit 1, especially since the total uranium activity for January retest sample was below the SL. This is further supported by the fact that the total uranium activities in

this well are of natural origin based on uranium-235 and uranium-238 atom ratios and are also lower in activity than upradient well K1-01C. The total uranium trends for wells W-PIT1-2326, K1-01C, K1-04, and K1-05 are shown on **Figure 4**. All of these wells have uranium 235/238 atom ratios that indicate natural origin and do not indicate a release of total uranium from Pit 1. However, there is an increasing trend in the data. LLNL will continue to monitor and evaluate total uranium activities at Pit 1 and will review the retest data from well K1-04 and report findings to the CVRWQCB.

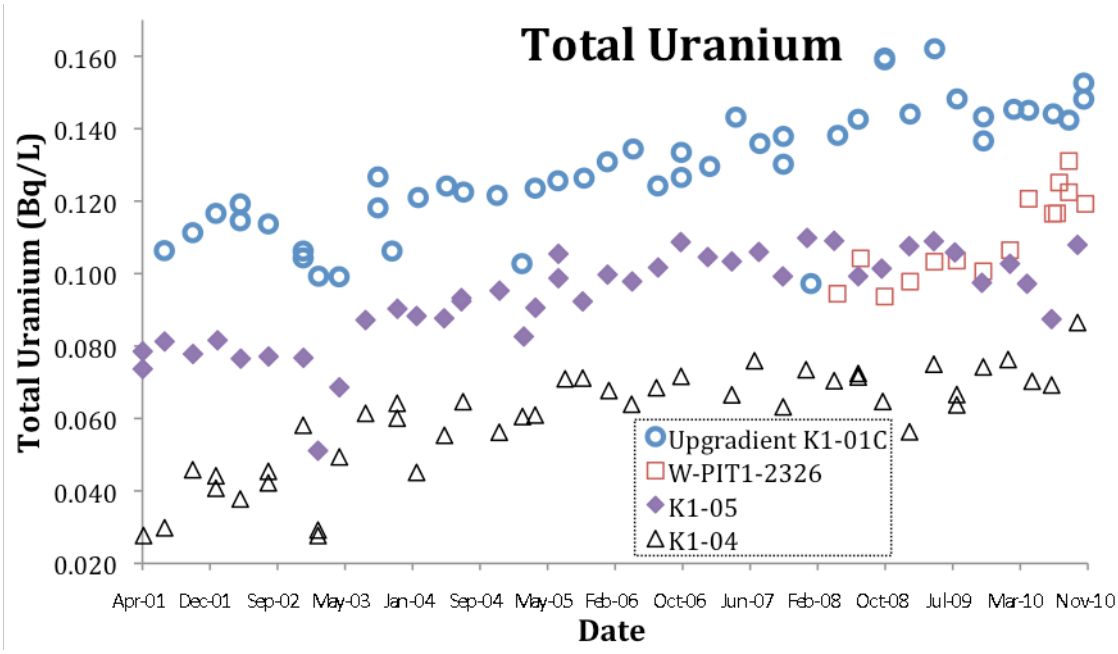

Figure 4. Total uranium concentrations in water samples collected from detection monitoring ground water wells around Pit 1.

In addition to the normal reporting on constituents of concern with statistical limits, this report evaluates additional constituents that historically have elevated concentrations and are monitored under the post closure plan or under LLNL's surveillance monitoring program under DOE Order 450.1

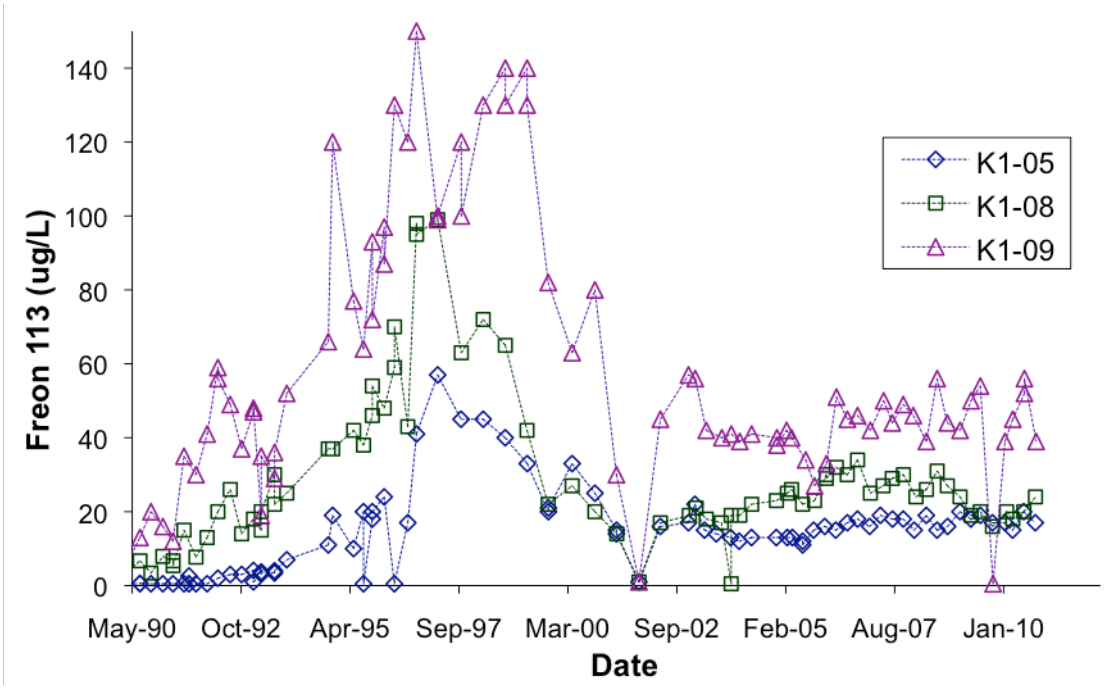

Figure 5. Freon-113 concentrations on water samples collected from detection ground water monitoring wells around Pit 1.

Perchlorate is also identified as a constituent of concern in the MRP and is monitorined in samples from the detection monitoring wells (**Table A-2**). This quarter, perchlorate was detected in samples from two down-gradient detection monitor wells: K1-02B (6.2 µg/L, [SL=10 µg/L]) and W-PIT1-2326 (5.8 µg/L, [SL=7.8 µg/L]). The detections were above the reporting limit (4.0 µg/L) but were below the SLs for the wells and were slightly lower than the concentrations reported last quarter. LLNL is conducting a detailed evaluation study of perchlorate from the Pit 1 detection monitoring wells in an effort to evaluate the potential for a release of perchorate from the pit and will present the analysis to the regulatory agencies upon completion.

The concentrations of selected volatile organic compounds (VOCs) detected in ground water samples from detection monitoring wells are summarized and presented as Total VOCs (TVOCs) (**Table A-2**). TVOCs were detected in the ground water samples from down-gradient well K1-05 (20 µg/L) and cross-gradient wells K1-08 (20 µg/L) and K1-09 (52 µg/L). The only VOC observed in these samples was freon-113 which is discussed below.

For this annual report, Freon-113 results for ground waste samples collected from monitoring wells K1-05. K1-08, and K1-09 are plotted on **Figure 5**. The values for the fourth quarter 2010 are shown on **Table A-2**. Freon-113 arises from a source at Building 865, about 300 m (984 ft) west of Pit 1 (Ferry and Holtzapple, 2006). While Freon-113 is not a constituent of concern for Pit 1, concentrations have decreased from historic maxima. In the past few years, the concentrations appear to be generally stable.

Evaluation Monitoring Wells

Evaluation monitoring wells were added to the monitoring network in the first quarter 2010 as required by the MRP. Sample analytical results from these wells are shown on **Table A-3**, which lists physical parameters as well as the results of perchlorate and tritium analyses. These wells are used to track existing plumes of perchlorate and tritium from an up-gradient source. All evaluation monitoring wells are required by the MRP to be evaluated in this annual report with detailed trend analyses graphs for both percholorate and tritium. These graphs are presented below in **Figure 6 and Figure 7**, respectively.

The fourth quarter 2010 analytical results indicate that perchlorate concentrations in two of the four evaluation monitoring wells, K1-06 (6.4 µg/L) and W-PIT1-02 (5.9 µg/L), exceeded the reporting limit of 4.0 µg/L and the K1-06 concentration exceeded the 6.0 µg/L MCL. Based on the trend data presented in **Figure 6,** a slight increase in recent perchlorate concentrations in wells W-PIT-02 and K1-06 is apparent. LLNL will continue to monitor perchlorate concentrations in these wells.

Tritium activities in samples from two of the four evaluation monitoring wells, K1-06 (111 Bq/L, [3000 pCi/L]) and W-PIT1-02 (48.8 Bq/L [1318 pCi/L]), exceeded the detection limit of 3.7 Bq/L [100 pCi/L]. These tritium activities are slightly lower then reported last quarter. These analytical results are consistent with historical data. Based on the data presented in **Figure 7**, no significant trends are apparent; however, a slight overall decrease in tritium activity is present at well K1-06, and a general increase over the last four years at well PIT1-02 followed by a decrease is indicated. LLNL will continue to monitor tritium activities in these wells.

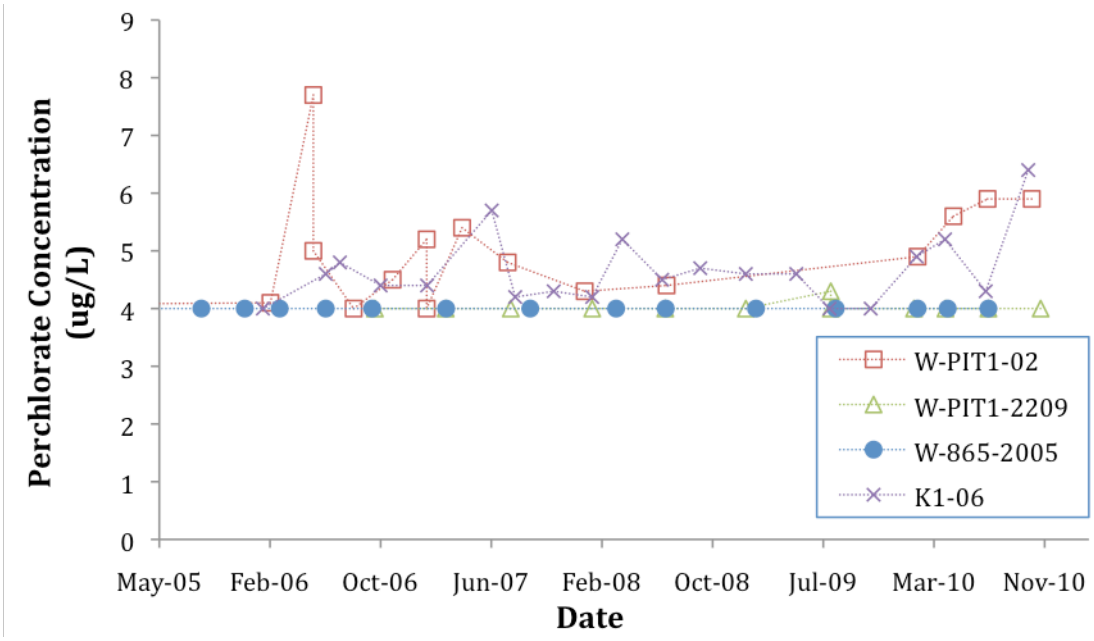

Figure 6. Perchlorate concentrations in water samples collected from evaluation ground water monitoring wells around Pit 1.

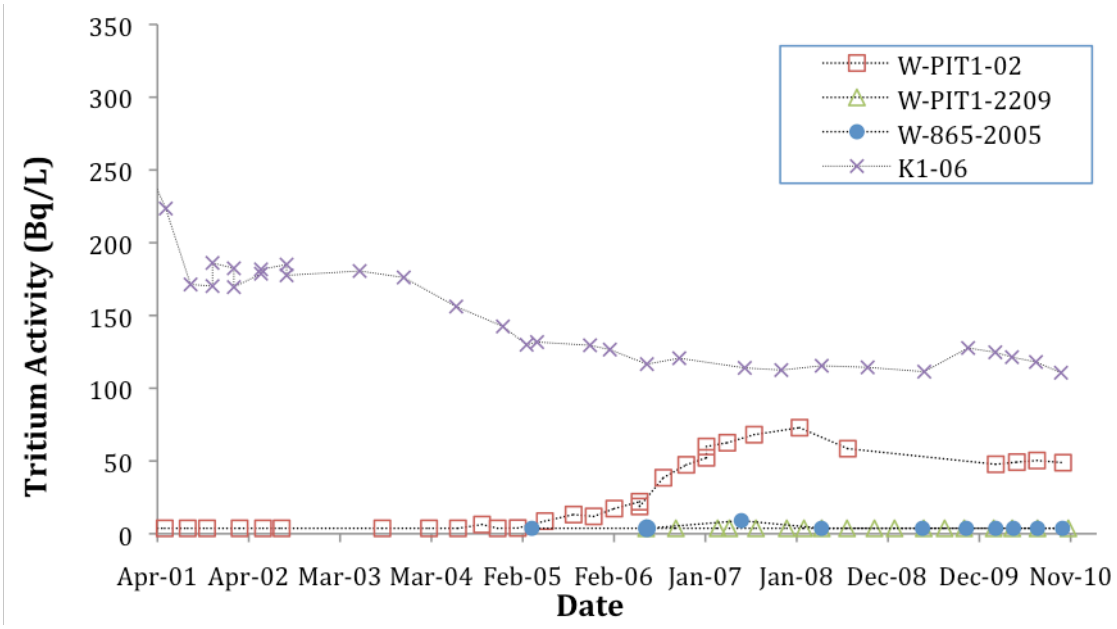

Figure 7. Tritium activities in water samples collected from evaluation ground water monitoring wells around Pit 1.

Inspection and Maintenance Summary

The fourth quarter visual inspection of the Pit 1 cap was performed on October 1, 2010 by LLNL staff and no deficiencies were noted on the condition of the pit cap. In addition, three post-rain inspections (October 25, December 20, 2010, and December 28, 2010) were performed as required by the MRP after major storm events. These inspections demonstrated the continued functional and structural integrity of the cap, vegetative cover, and drainage structures. The Pit 1 cap continues to function adequately.

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Acknowledgments

The compliance monitoring program for Pit 1 could not be conducted without the dedicated efforts of many people. Rosanne Depue provided essential administrative and editorial assistance. Don MacQueen provided detailed analytical information. Suzie Chamberlain performed quality reviews and data table preparation. Eric Walter coordinated the sampling activities. Mario Silva sampled the monitoring wells and packaged the samples for shipment. Della Burruss, Connie Wells, and Becky Goodrich provided excellent data management support and ensured data quality. Off-site analytical support was provided by BC Laboratories, Inc. and Gel Laboratory. We thank John Scott, Karen Folks, and Dawn Chase at Site 300 for their cooperation in this effort. A draft of this report was reviewed by LLNL peers, including Suzie Chamberlain, Karen Folks, and Leslie Ferry whose suggestions and improvements were incorporated.

Abbreviations and Acronyms

Bq	becquerel (international unit of radioactivity equal to 27 pCi)
CCR	California Code of Regulations
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CVRWQCB	Central Valley Regional Water Quality Control Board
DOE	U.S. Department of Energy
DTSC	Department of Toxic Substances Control (California)
EFA	Environmental Functional Area (LLNL)
ERD	Environmental Restoration Department
FFA	Federal Facility Agreement
ft	foot (used as a measure of elevation above MSL)
HSU	Hydrostratigraphic Unit
km	kilometer
km^2	square kilometer
L	liter
LLNL	Lawrence Livermore National Laboratory
m	meter
m^2	square meter
MCL	maximum contaminant level (for drinking water)
mg	milligram
MRP	Monitoring and Reporting Plan
MSL	mean sea level (datum for elevation measurements)
µg	microgram
pCi	picocurie (unit of radioactivity equal to 0.037 Bq)
PCP	post-closure plan
QA	quality assurance
RCRA	Resource Conservation and Recovery Act
RL	reporting limit (contractual concentration near zero)
SI	*Système Internationale* (units of measurement)
Site 300	Experimental Test Site, LLNL
SL	statistically determined concentration limit
SOP	standard operating procedure
$Tnbs_0$	Neroly Formation basal sandstone

$Tnbs_1$	Neroly Formation lower blue sandstone
TVOC	total volatile organic compounds
VOC	volatile organic compound
WDR	Waste Discharge Requirements (permit)

Appendix A

Tables and Figures of Ground Water Measurements

Table A-1. Pit 1 detection monitoring wells, constituents of concern, SLs, and quarterly analytical results for 2010.

Quarter			1	2	3	4
COC (units)	**Well**	**SL**	**Result**	**Result**	**Result**	**Result**
Arsenic (µg/L)	K1-01C	–[(a)]	12	12	12	12
	K1-07	–[(a)]	14	12	12	13
	K1-02B	15	13	11	13	12
	K1-04	16	12	10	12	9.4
	K1-05	18	15	14	15	13
	K1-08	17	14	12	15	14
	K1-09	16	14	12	13	13
	W-PIT1-2326	14	12	12	12	10
Barium (µg/L)	K1-01C	–	<25	<25	<25	<25
	K1-07	–	29	30	29	29
	K1-02B	26	<25	26, 27, 26, 26	<25	25
	K1-04	32	27	30	28	26
	K1-05	43	37	41	39	38
	K1-08	49	45	44	43	41
	K1-09	51	44	45	45	44
	W-PIT1-2326	46	35	31	34	36
Beryllium (µg/L)	K1-01C	–	<0.5	<0.5	<0.5	<2
	K1-07	–	<0.5	<0.5	<0.5	<0.5
	K1-02B	0.5	<0.5	<0.5	<0.5	<0.5
	K1-04	0.5	<0.5	<0.5	<0.5	<0.5
	K1-05	0.5	<0.5	<0.5	<0.5	<0.5
	K1-08	0.5	<0.5	<0.5	<0.5	<0.5
	K1-09	0.5	<0.5	<0.5	<0.5	<0.5
	W-PIT1-2326	0.5	<0.5	<0.5	<0.5	<2
Cadmium (µg/L)	K1-01C	–	<0.5	<0.5	<0.5	<0.5
	K1-07	–	<0.5	<0.5	<0.5	<0.5
	K1-02B	0.52	<0.5	<0.5	<0.5	<0.5
	K1-04	0.5	<0.5	<0.5	<0.5	<0.5
	K1-05	0.5	<0.5	<0.5	<0.5	<0.5
	K1-08	0.5	<0.5	<0.5	<0.5	<0.5
	K1-09	0.5	<0.5	<0.5	<0.5	<0.5
	W-PIT1-2326	0.5	<0.5	<0.5	<0.5	<0.5
Cobalt (µg/L)	K1-01C	–	<25	<25	<25	<25
	K1-07	–	<25	<25	<25	<25
	K1-02B	25	<25	<25	<25	<25
	K1-04	25	<25	<25	<25	<25
	K1-05	25	<25	<25	<25	<25
	K1-08	25	<25	<25	<25	<25
	K1-09	25	<25	<25	<25	<25
	W-PIT1-2326	25	<25	<25	<25	<25
Copper (µg/L)	K1-01C	–	<10	<10	<10	<10
	K1-07	–	<10	<10	<10	<10
	K1-02B	60	<10	<10	10	28
	K1-04	10	<10	<10	<10	<10
	K1-05	30	<10	<10	<10	<10
	K1-08	10	<10	<10	<10	<10
	K1-09	10	<10	<10	<10	<10
	W-PIT1-2326	10	<10	<10	<10	<10

continued

Table A-1. Pit 1 detection monitoring wells, constituents of concern, SLs, and quarterly analytical results for 2010.

Quarter			1	2	3	4
COC (units)	**Well**	**SL**	**Result**	**Result**	**Result**	**Result**
Lead (µg/L)	K1-01C	–	<2	<2	<2	<2
	K1-07	–	<2	<2	<2	<2
	K1-02B	2	<2	<2	<2	<2
	K1-04	2	<2	<2	<2	<2
	K1-05	2	<2	<2	<2	<2
	K1-08	2	<2	<2	<2	<2
	K1-09	2	<2	<2	<2	<2
	W-PIT1-2326	2	<2	<2	<2	<2
Nickel (µg/L)	K1-01C	–	<5	<5	<5	<5
	K1-07	–	6.8	5.2	5.7	<5
	K1-02B	9	<5	<5	<5	<5
	K1-04	5	<5	<5	<5	<5
	K1-05	13	<5	<5	<5	<5
	K1-08	5	<5	<5	<5	<5
	K1-09	5	<5	<5	<5	<5
	W-PIT1-2326	5	<5	<5	<5	<5
Vanadium (µg/L)	K1-01C	–	67	61	62	60
	K1-07	–	70	66	63	60
	K1-02B	59	51	49	49	44
	K1-04	46	39	31	34	34
	K1-05	79	66	66	66	75
	K1-08	78	62	64	63	56
	K1-09	69	61	58	57	55
	W-PIT1-2326	63	50	45	45	44
Zinc (µg/L)	K1-01C	–	<20	<20	<20	<20
	K1-07	–	<20	<20	<20	<20
	K1-02B	98	<20	<20	<20	29
	K1-04	51	<20	27	<20	36
	K1-05	24	<20	<20	<20	<20
	K1-08	20	<20	<20	<20	<20
	K1-09	20	<20	<20	<20	<20
	W-PIT1-2326	48	<20	<20	<20	<20
Radium 226 (Bq/L)[b]	K1-01C	–	0.008	0.004	0.022, 0.006	0.008
	K1-07	–	0.003	0.006	0.007, 0.002	0.001
	K1-02B	0.012	0.004	0.007	0.005	0.002
	K1-04	0.012	0.003	0.017, 0.012, 0.003	0.006	0.003
	K1-05	0.012	0.004	0.013[c], 0.009[c], 0.023[c]	0.028[c], 0.003[d]0.002[d]	0.006
	K1-08	0.009	0.004	0.007	0.002	0
	K1-09	0.012	0.008	0.009	0.002	0.003
	W-PIT1-2326	0.019	0.008	0.005	0.011	0.006
Tritium (Bq/L)	K1-01C	–	37.4	36.4	27.3	31.3
	K1-07	–	3.54	0.659	3.64	2
	K1-02B	158	149	159, 157, 146	148	135
	K1-04	19.2	18	58.8, 20.3, 18.2	16.7	14.4
	K1-05	11.4	6.25	7.44	8.47	7.81
	K1-08	10.7	6.7	9.88	9.4	5.85
	K1-09	8.66	10.6	9.84, 3.70, -0.844	5.11	6.22
	W-PIT1-2326	133	120	119	89.5	10

continued

Table A-1. Pit 1 detection monitoring wells, constituents of concern, SLs, and quarterly analytical results for 2010.

Quarter			1	2	3	4
COC (units)	**Well**	**SL**	**Result**	**Result**	**Result**	**Result**
Uranium (total, Bq/L)	K1-01C	–	0.145	0.201	0.144, 0.142	0.149
	K1-07	–	0.111	0.086	0.105	0.101
	K1-02B	0.145	0.129	0.116	0.132	0.141
	K1-04	0.085	0.076	0.07	0.069	0.086, 0.07
	K1-05	0.115	0.103	0.097	0.087	0.108
	K1-08	0.149	0.118	0.122	0.119	0.121
	K1-09	0.137	0.137	0.131	0.128	0.12
	W-PIT1-2326	0.115	0.106	0.121	0.117, 0.117, 0.125, 0.131	0.119
Thorium 228 (Bq/L)	K1-01C	–	0	0	-0.001	0
	K1-07	–	-0.001	-0.001	0.002	0.001
	K1-02B	0.003	0	0	0.001	0
	K1-04	0.005	0.001	0	0	0
	K1-05	0.003	0	0	0	0
	K1-08	0.004	0	0	0	0
	K1-09	0.008	-0.001	0	0.001	0
	W-PIT1-2326	0.005	0	0.001	0	0
Thorium 232 (Bq/L)	K1-01C	–	0	0	0	0.002
	K1-07	–	0	0	0	0.002
	K1-02B	0.004	0	0	0	0.001
	K1-04	0.001	0	0	0	0
	K1-05	0.004	0	0	0.001	0.002
	K1-08	0.004	0	0	0	0.001
	K1-09	0.002	0	0	0	0.001
	W-PIT1-2326	0.001	0	0	0	0
HMX (µg/L)	K1-01C	–	<1	<1	<1	–[e]
	K1-07	–	<1	<1	<1	<1
	K1-02B	1	<1	<1	<1	<1
	K1-04	1	<1	<1	<1	<1
	K1-05	1	<1	<1	<1	<1
	K1-08	1	<1	<1	<1	<1
	K1-09	1	<1	<1	<1	<1
	W-PIT1-2326	1	<1	<1	<1	<1
RDX (µg/L)	K1-01C	–	<1	<1	<1	–[e]
	K1-07	–	<1	<1	<1	<1
	K1-02B	1	<1	<1	<1	<1
	K1-04	1	<1	<1	<1	<1
	K1-05	1	<1	<1	<1	<1
	K1-08	1	<1	<1	<1	<1
	K1-09	1	<1	<1	<1	<1
	W-PIT1-2326	1	<1	<1	<1	<1
Perchlorate (µg/L)	K1-01C	–	<4	<4	<4	<4
	K1-07	–	<4	<4	<4	<4
	K1-02B	10	6.5	6.9	6.8	6.2
	K1-04	4	<4	<4	<4	<4
	K1-05	4	<4	<4	<4	<4
	K1-08	4	<4	<4	<4	<4
	K1-09	4	<4	<4	<4	<4
	W-PIT1-2326	7.8	6.4	5.9	6.1	5.7

(a) Wells K1-01C and K1-07 have no release detection SLs for COCs, because they are upgradient of Pit 1. concluded

(b) Radioactivity measurements are corrected for the background radioactivity inside the measurement chamber.

A negative result for radioactivity indicates that the sample measured lower than the background by the amount shown. Radioactivity values shown as 0.000 measured les than 0.0005 Bq/L.

(c) Rejected data: Contract analytical proceedures were not followed.

(d) Retest Data: Data confirm no statistical limit exceedance and no release. Cause for retest related to anayltical proceedure (Schultz, 90-Day letter, Oct. 22, 2010).

(e) Rejected data: Contract analytical proceedures were not followed.

Table A-2. Pit 1 additional PCP constituents for the fourth quarter 2010 analytical results for detection monitoring wells.

	Monitoring Well							
Constituent (units)	**K1-01C**	**K1-07**	**K1-02B**	**K1-04**	**K1-05**	**K1-08**	**K1-09**	**W-PIT1-2326**
Dates Sampled	**3-Nov**	**12-Oct**	**12-Oct**	**11-Oct**	**11-Oct**	**12-Oct**	**18-Oct**	**9-Nov**
Depth to water (ft)	108.18	141.83	135.95	159.92	171.87	155.72	162.02	183.7
Ground water elevation (ft above MSL)	973.76	967.8	971.28	962.75	958.99	967.02	964.66	964.09
Field pH (Units)	7.7	7.54	7.57	7.57	7.63	7.57	7.63	7.56
Field Specific Conductance (umhos/cm)	692	604	727	605	624	634	639	705
Field Temperature (Degrees C)	20.7	22.4	21.2	22.1	22.9	22.5	22.1	21.1
Gross alpha (Bq/L)	0.092	0.051	0.113	0.059	0.141	0.142	0.1	0.072
Gross beta (Bq/L)	0.104	0.132	0.138	0.08	0.173	0.098	0.276	0.076
Nitrate (as NO_3) (mg/L)	35	30	34	34	37	34	34	33
Perchlorate (µg/L)	<4	<4	6.2	<4	<4	<4	<4	5.7
Total VOCs (µg/L)	ND	ND	ND	ND	17	24	39	ND
Freon 113	<0.5	<0.5	<0.5	<0.5	17	24	39	<0.5

Note:

ND = Not detected above reporting limit. Reporting limits vary with individual VOCs.

Table A-3. Pit 1 evaluation monitoring wells, constituents of concern, physical parameters, and analytical results for the fourth quarter of 2010.

	Monitoring Well			
Constituent (units)	**K1-06**	**W-PIT1-02**	**W-PIT1-2209**	**W-865-2005**
Dates Sampled	**12-Oct**	**20-Oct**	**9-Nov**	**18-Oct**
Depth to water (ft)	115.8	231.7	215.3	326.65
Ground water elevation (ft above MSL)	973.74	949.6	950.75	948.22
Field pH (Units)	21.4	22.7	21.3	21.7
Field Specific Conductance (µmhos/cm)	8.04	9.91	7.78	7.7
Field Temperature (Degrees C)	745	571	580	591
Tritium (Bq/L)	111	48.8	-1.02	0.4
Perchlorate (µg/L)	6.4	5.9	<4	<4

Table A-4. Pit 1 ground water well routine sampling dates.

Location	Quarter	Sample Date
K1-01C	1	17-Feb-2010
	2	13-Apr-2010
	3	13-Jul-2010
	4	3-Nov-2010
K1-02B	1	1-Feb-2010
	2	7-Apr-2010
	3	8-Jul-2010
	4	12-Oct-2010
K1-04	1	27-Jan-2010
	2	26-Apr-2010
	3	7-Jul-2010
	4	11-Oct-2010
K1-05	1	3-Feb-2010
	2	7-Apr-2010
	3	7-Jul-2010
	4	11-Oct-2010
K1-07	1	27-Jan-2010
	2	7-Apr-2010
	3	19-Jul-2010
	4	12-Oct-2010
K1-08	1	16-Feb-2010
	2	8-Apr-2010
	3	8-Jul-2010
	4	12-Oct-2010
K1-09	1	2-Feb-2010
	2	8-Apr-2010
	3	13-Jul-2010
	4	18-Oct-2010
W-PIT1-2326	1	3-Feb-2010
	2	13-Apr-2010
	3	12-Jul-2010
	4	9-Nov-2010
K1-06	1	2-Feb-2010
	2	7-Apr-2010
	3	8-Jul-2010
	4	12-Oct-2010
W-PIT1-2209	1	27-Jan-2010
	2	8-Apr-2010
	3	14-Jul-2010
	4	9-Nov-2010
W-PIT1-02	1	4-Feb-2010
	2	26-Apr-2010
	3	12-Jul-2010
	4	20-Oct-2010
W-865-2005	1	4-Feb-2010
	2	13-Apr-2010
	3	14-Jul-2010
	4	18-Oct-2010

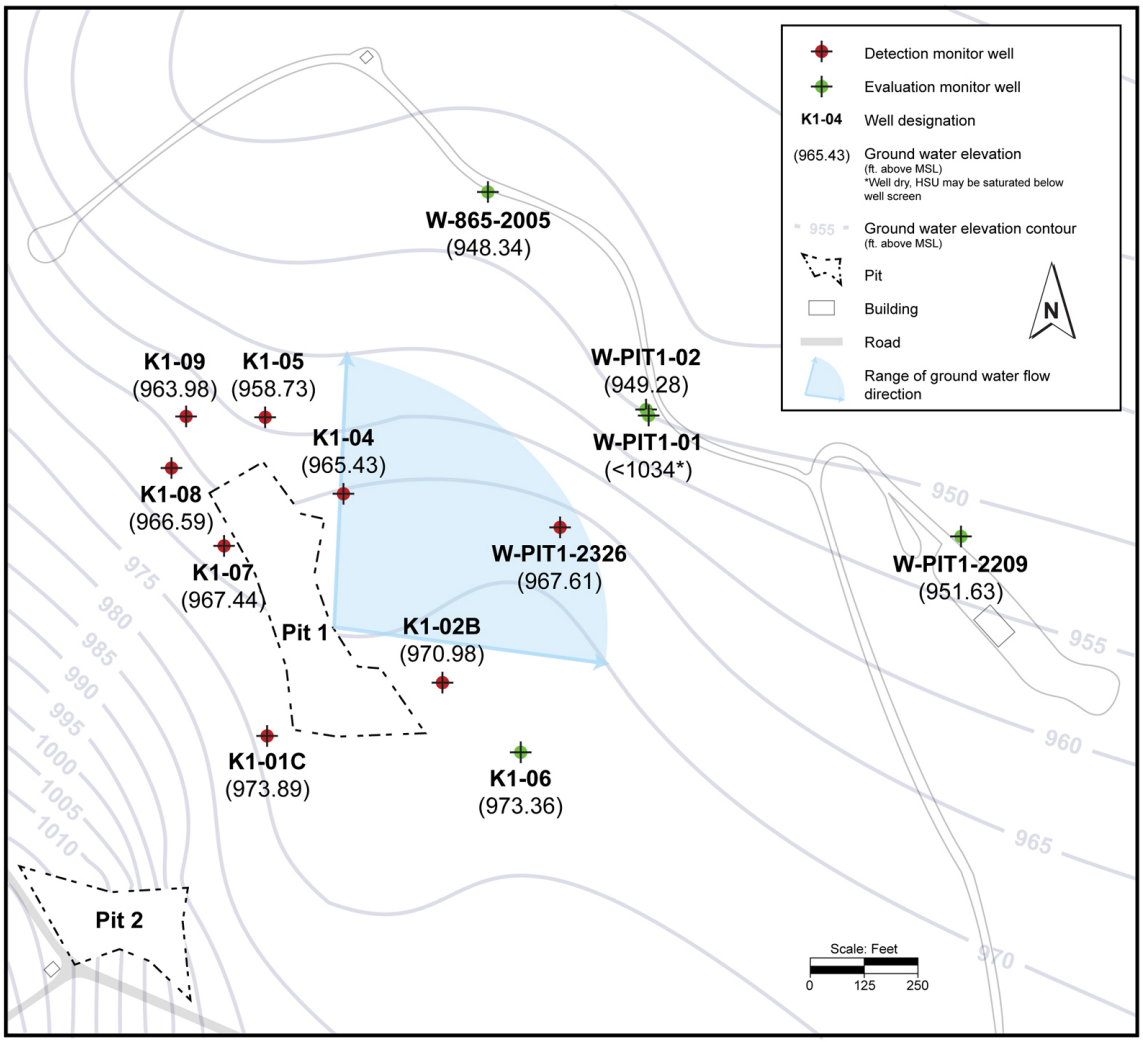


Figure A-1. Ground water elevation contour map for the $Tnbs_1/Tnbs_0$ HSU at Pit 1.

Appendix B

Statistical Methods for Release Detection

Appendix B

Statistical Methods for Release Detection

Statistical monitoring of the RCRA closure and PCP for the Pit 1 landfill is described in the Revised MRP No. 93-100 (February 18, 2010) to satisfy the provisions of CCR Title 23, Chapter 15, Section 2550.7.

LLNL uses an intrawell comparison for each analyte at each down-gradient and cross-gradient well to detect potential releases of constituents of concern to ground water. Intrawell tests compare each measurement at a well to past measurements at that well in order to detect increases in concentration that statistically exceed the variation historically seen at that well.

Where sufficient detections are available, LLNL uses a statistical prediction limit method to implement intrawell comparisons. The method uses the average and standard deviation of historical measurements to calculate a SL value. The SL is calculated so that it will be exceeded by approximately one percent of individual measurements when there has not been a release. When too few detections are available, either the analytical reporting limit or maximum recent detection is used as an SL. The SLs currently in use are documented in the MRP.

Each quarter, each measurement is compared with its associated SL. The SL comparison is augmented by a verification procedure containing two discreet retests, in accordance with CCR Title 23, Chapter 15, Section 2550.7. This protects against false positives due to other causes, such as analytical error in the laboratory. Retests are used when the original measurement exceeds the SL. If either or both of the retests also exceed the SL, the result is considered to be a "statistically significant evidence of a release."

Based on the MRP, monitoring is conducted to evaluate SL detections for all constituents of concern in **Table A-1** detection monitoring wells. In addition, sampling is performed to evaluate whether tritium and perchlorate results for ground water samples collected from evaluation monitoring wells near Pit 1 indicate a release from Pit 1 or another source.

Appendix C

Quality Assurance Samples

Table C-1. Pit 1 quality assurance for routine, duplicate, and field blank samples for the fourth quarter of 2010.

Constituent*	K1-01C Routine (Nov 3)	K1-01C Duplicate (Nov 3)	PIT1FB Field blank (Oct 12)	Units
Arsenic	12	11	<2	µg/L
Barium	<25	<25	<25	µg/L
Beryllium	<2	<2	<0.5	µg/L
Cadmium	<0.5	<0.5	<0.5	µg/L
Cobalt	<25	<25	<25	µg/L
Copper	<10	<10	<10	µg/L
Lead	<2	<2	<2	µg/L
Nickel	<5	<5	<5	µg/L
Vanadium	60	58	<25	µg/L
Zinc	<20	<20	<20	µg/L
Nitrate (as NO3)	35	35	<0.5	mg/L
Perchlorate	<4	<4	<4	µg/L
He compounds				
HMX	–	–	<1	µg/L
RDX	–	–	<1	µg/L
Radioactivity				
Radium 226[a]	0.008 ± 0.004	0.004 ± 0.003	0.004 ± 0.004	Bq/L
Tritium	31.3 ± 8.07	31.4 ± 8.10	2.85 ± 1.99	Bq/L
Uranium (total)	0.149 ± 0.021	0.152 ± 0.021	0.001 ± 0.003	Bq/L
Thorium 228	0.000 ± 0.001	0.001 ± 0.001	0.001 ± 0.002	Bq/L
Thorium 230	0.002 ± 0.002	0.000 ± 0.001	-0.001 ± 0.001	Bq/L
Thorium 232	0.000 ± 0.001	0.000 ± 0.001	0.000 ± 0.001	Bq/L
Gross alpha	0.092 ± 0.057	0.108 ± 0.061	0.017 ± 0.035	Bq/L
Gross beta	0.104 ± 0.044	0.353 ± 0.080	0.001 ± 0.032	Bq/L

Note: – = Data rejected.

[a] Radioactivity is corrected for the background radioactivity inside the measurement apparatus. Negative activity indicates that the sample contained less than the background activity by the amount shown. Radioactivity equal to or less than the 2-sigma uncertainty shown is considered to be a nondetection.

* As standard QA protocol, trip blanks were submitted with all samples in Table C-1. This quarter, all trip blank analyses were non-detects.

Table C-1. Pit 1 quality assurance for routine, duplicate, and field blank samples for the fourth quarter of 2010.

Constituent*	K1-01C Routine (Nov 3)	K1-01C Duplicate (Nov 3)	PIT1FB Field blank (Oct 12)	Units
Arsenic	12	11	<2	µg/L
Barium	<25	<25	<25	µg/L
Beryllium	<2	<2	<0.5	µg/L
Cadmium	<0.5	<0.5	<0.5	µg/L
Cobalt	<25	<25	<25	µg/L
Copper	<10	<10	<10	µg/L
Lead	<2	<2	<2	µg/L
Nickel	<5	<5	<5	µg/L
Vanadium	60	58	<25	µg/L
Zinc	<20	<20	<20	µg/L
Nitrate (as NO3)	35	35	<0.5	mg/L
Perchlorate	<4	<4	<4	µg/L
He compounds				
HMX	–	–	<1	µg/L
RDX	–	–	<1	µg/L
Radioactivity				
Radium 226[a]	0.008 ± 0.004	0.004 ± 0.003	0.004 ± 0.004	Bq/L
Tritium	31.3 ± 8.07	31.4 ± 8.10	2.85 ± 1.99	Bq/L
Uranium (total)	0.149 ± 0.021	0.152 ± 0.021	0.001 ± 0.003	Bq/L
Thorium 228	0.000 ± 0.001	0.001 ± 0.001	0.001 ± 0.002	Bq/L
Thorium 230	0.002 ± 0.002	0.000 ± 0.001	-0.001 ± 0.001	Bq/L
Thorium 232	0.000 ± 0.001	0.000 ± 0.001	0.000 ± 0.001	Bq/L
Gross alpha	0.092 ± 0.057	0.108 ± 0.061	0.017 ± 0.035	Bq/L
Gross beta	0.104 ± 0.044	0.353 ± 0.080	0.001 ± 0.032	Bq/L

Note: – = Data rejected.

[a] Radioactivity is corrected for the background radioactivity inside the measurement apparatus. Negative activity indicates that the sample contained less than the background activity by the amount shown. Radioactivity equal to or less than the 2-sigma uncertainty shown is considered to be a nondetection.

* As standard QA protocol, trip blanks were submitted with all samples in Table C-1. This quarter, all trip blank analyses were non-detects.

Appendix D

Constituents of Concern and Monitoring Frequencies

Table D-1. Pit 1 constituents of concern and monitoring frequencies.[a]

Constituent	WDR[b]	PCP[c]	Pit 1
Arsenic	X		Q
Barium	X		Q
Beryllium	X		Q
Cadmium	X		Q
Chloride		X	A
Chromium		X	SA
Cobalt	X		Q
Copper	X		Q
Iron		X	SA
Lead	X		Q
Manganese		X	SA
Mercury		X	SA
Nickel	X		Q
Nitrate		X	SA
Selenium		X	SA
Silver		X	SA
Sodium		X	SA
Sulfate		X	A
Vanadium	X		Q
Zinc	X		Q
Total organic carbon (TOC)		X	A
Total organic halides (TOX)		X	A
EPA Method 601		X	
EPA Method 624		X	A
EPA Method 625		X	A
EPA Method 608		X	A
Gross alpha and gross beta		X	SA
Radium 226	X		Q
Thorium 228	X		Q
Thorium 232	X		Q
Tritium	X		Q
Perchlorate	X		Q
Uranium (total)	X		Q
HMX	X		Q
RDX	X		Q
Ground water elevation		X	SA
Ground water temperature		X	SA
pH		X	SA
Specific conductance		X	SA

[a] Monitoring frequencies are: Q (quarterly); SA (semiannually); A (annually).

[b] Constituents of concern required to be monitored by WDR 93-100 (CVRWQCB, 2010).

[c] Additional constituents of concern required to be monitored by the post-closure plan (Rogers/Pacific Corporation, 1990).

Appendix E

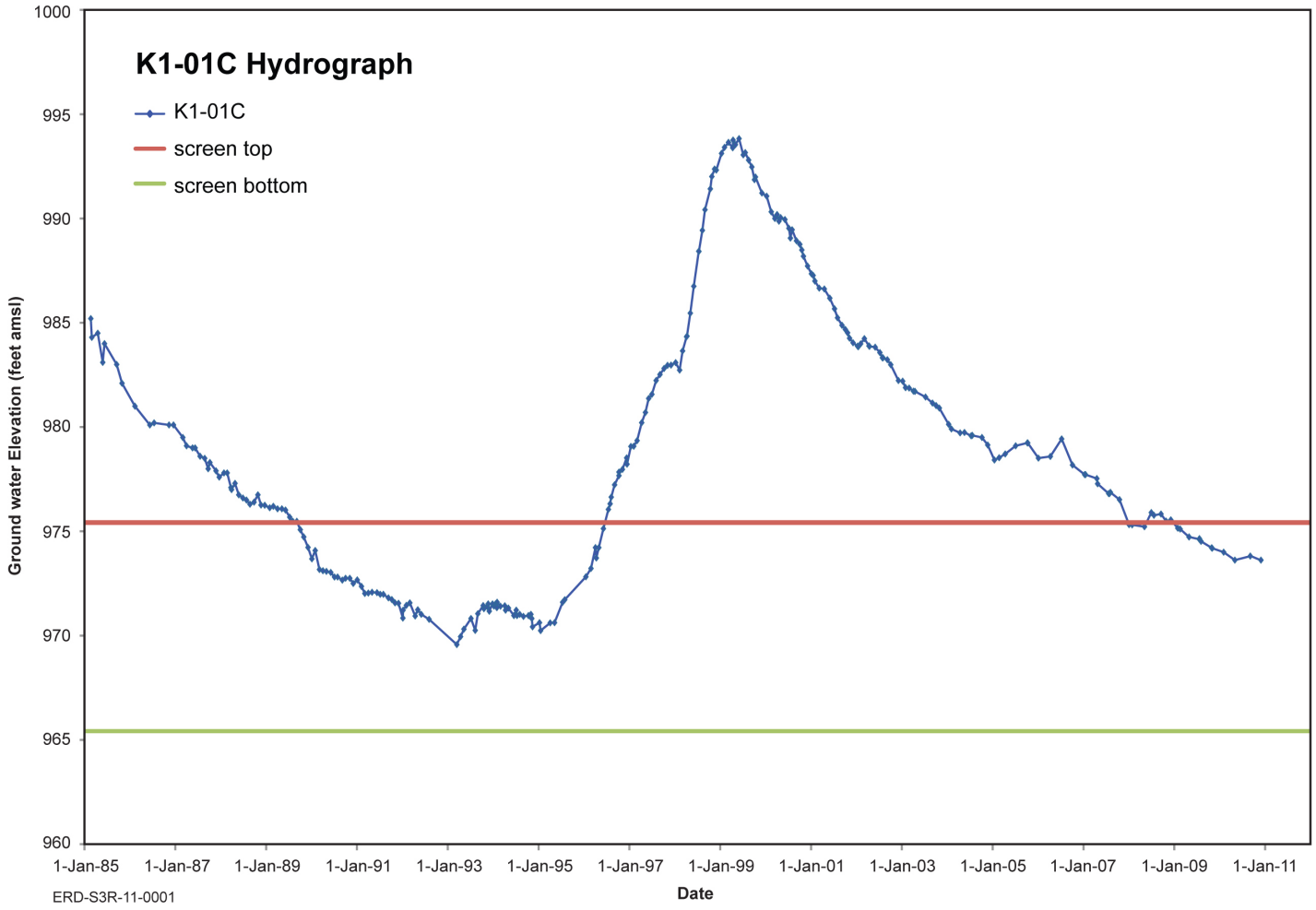
Well Specification and Construction Details for Detection Monitoring and Evaluation Monitoring Wells

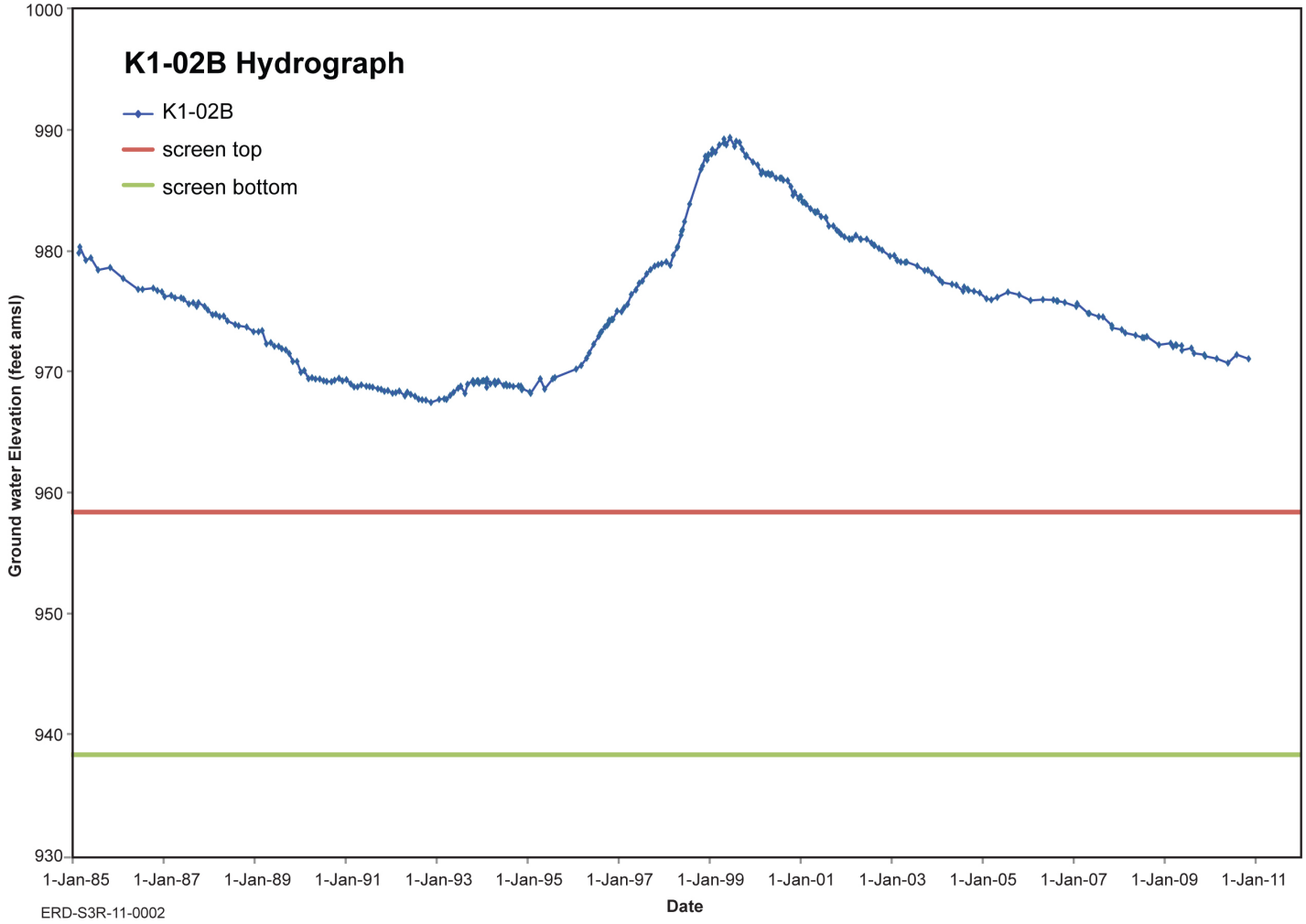
Table E-1. Well specification and construction details of the Pit 1 monitoring network.

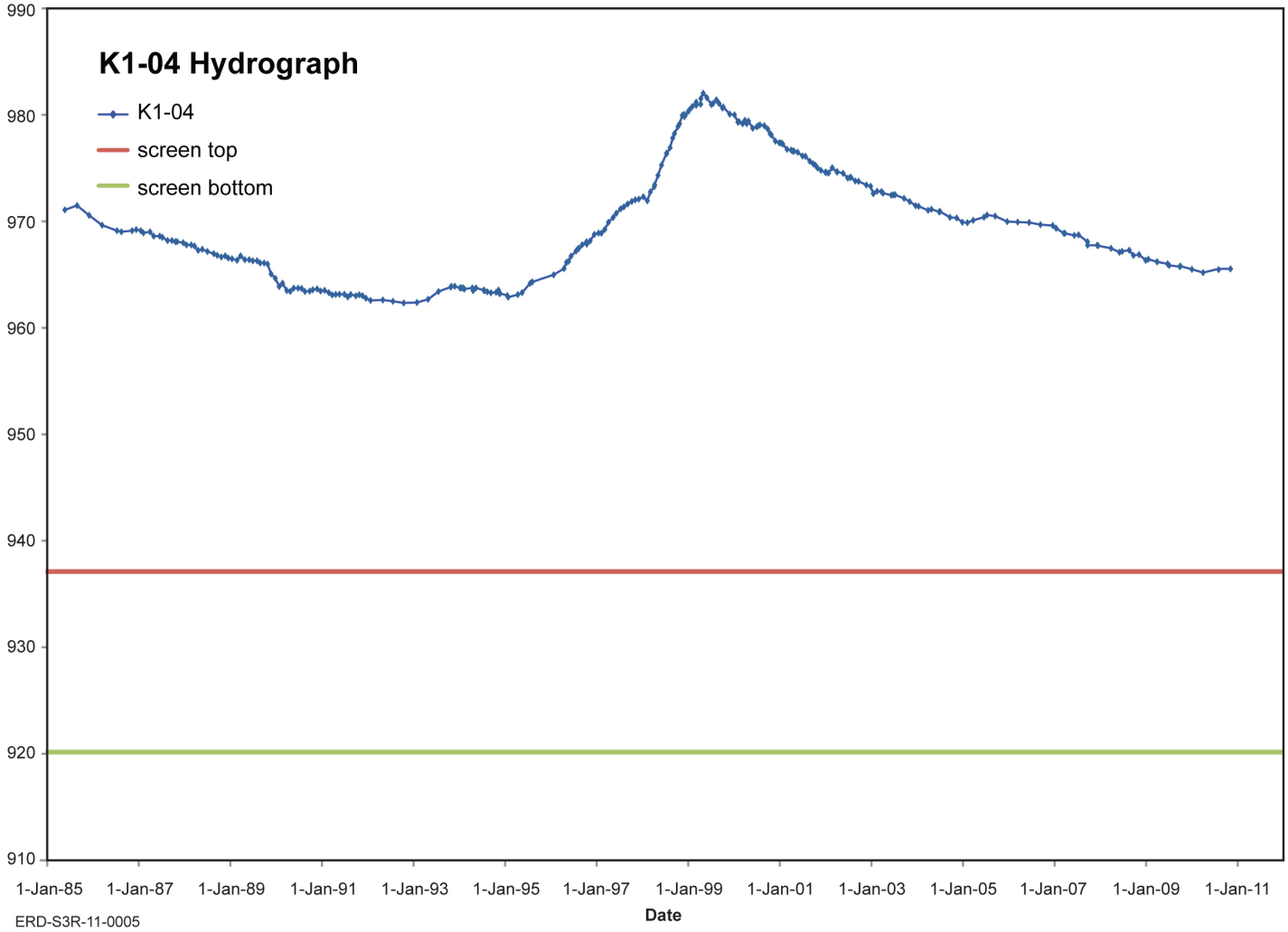
Well	HSU	Northing	Easting	Ground Surface Evaluation	Reference Evaluation	Elevation of Screen Top	Elevation of Screen Bottom	Elevation of Bentonite Top	Elevation of Bentonite Bottom	Elevation of Filter Pack Top	Elevation of Filter Pack Bottom	Elevation of Casing Bottom
K1-01C	$Tnbs_1/Tnbs_0$	427774.28	1699062.3	1078.92	1081.94	975.42	965.42	998.92	986.92	986.92	955.92	965.42
K1-02B	$Tnbs_1/Tnbs_0$	427893.78	1699452.58	1105.23	1107.23	958.73	938.73	985.23	982.13	982.13	932.73	938.73
K1-04	$Tnbs_1/Tnbs_0$	428315.51	1699231.7	1120	1122.67	937	920	978	968	968	919	919
K1-05	$Tnbs_1/Tnbs_0$	428485.47	1699057.58	1128.86	1130.86	965.86	944.86	None	None	972.86	941.86	944.86
K1-06	$Tnbs_1/Tnbs_0$	427736.68	1699627.38	1087.54	1089.54	982.54	972.54	None	None	995.54	971.54	972.54
K1-07	$Tnbs_1/Tnbs_0$	428199.97	1698965.54	1106.63	1109.63	978.63	958.63	985.63	983.93	983.93	956.63	956.63
K1-08	$Tnbs_1/Tnbs_0$	428373.1	1698848.94	1120.72	1122.74	979.72	954.72	991.22	985.72	985.72	952.72	952.72
K1-09	$Tnbs_1/Tnbs_0$	428488.09	1698880.26	1124.68	1126.68	969.68	934.68	978.18	975.68	975.68	932.68	932.68
W-865-2005	$Tnbs_1/Tnbs_0$	428990.64	1699555.36	1272.87	1274.87	942.87	922.87	954.87	950.87	950.87	919.87	921.87
W-PIT1-02	$Tnbs_1/Tnbs_0$	428494.39	1699912.16	1179.3	1181.3	929.3	919.3	942.3	934.3	934.3	911.3	918.3
W-PIT1-2209	$Tnbs_1/Tnbs_0$	428221.94	1700615.69	1164.05	1166.05	919.05	899.05	939.05	929.05	929.05	896.05	898.05
W-PIT1-2326	$Tnbs_1/Tnbs_0$	428240.21	1699717.26	1145.79	1147.79	930.79	911.09	960.79	949.79	949.79	905.79	910.67

Appendix F

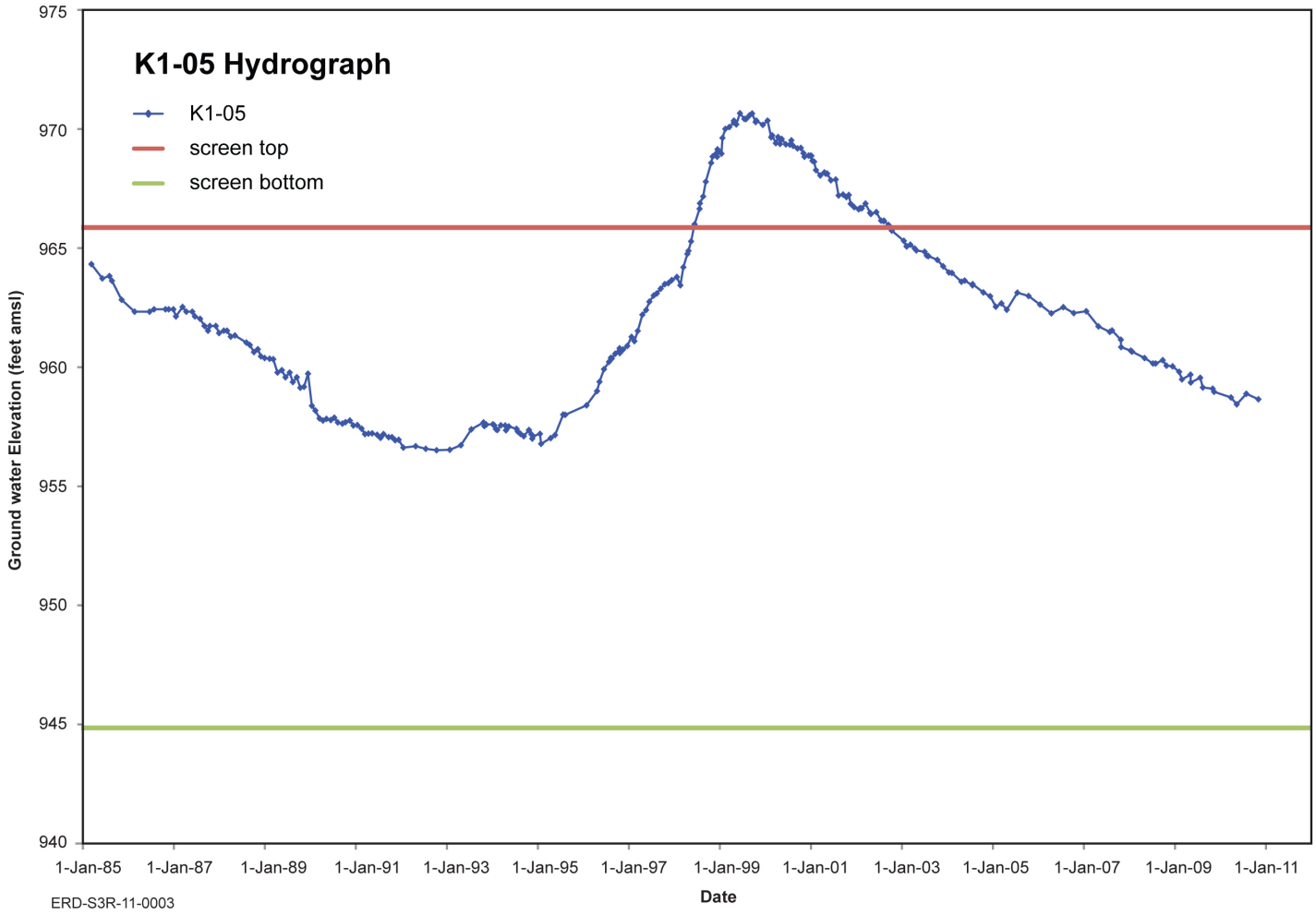
Hydrographs for All Compliance Monitoring Wells

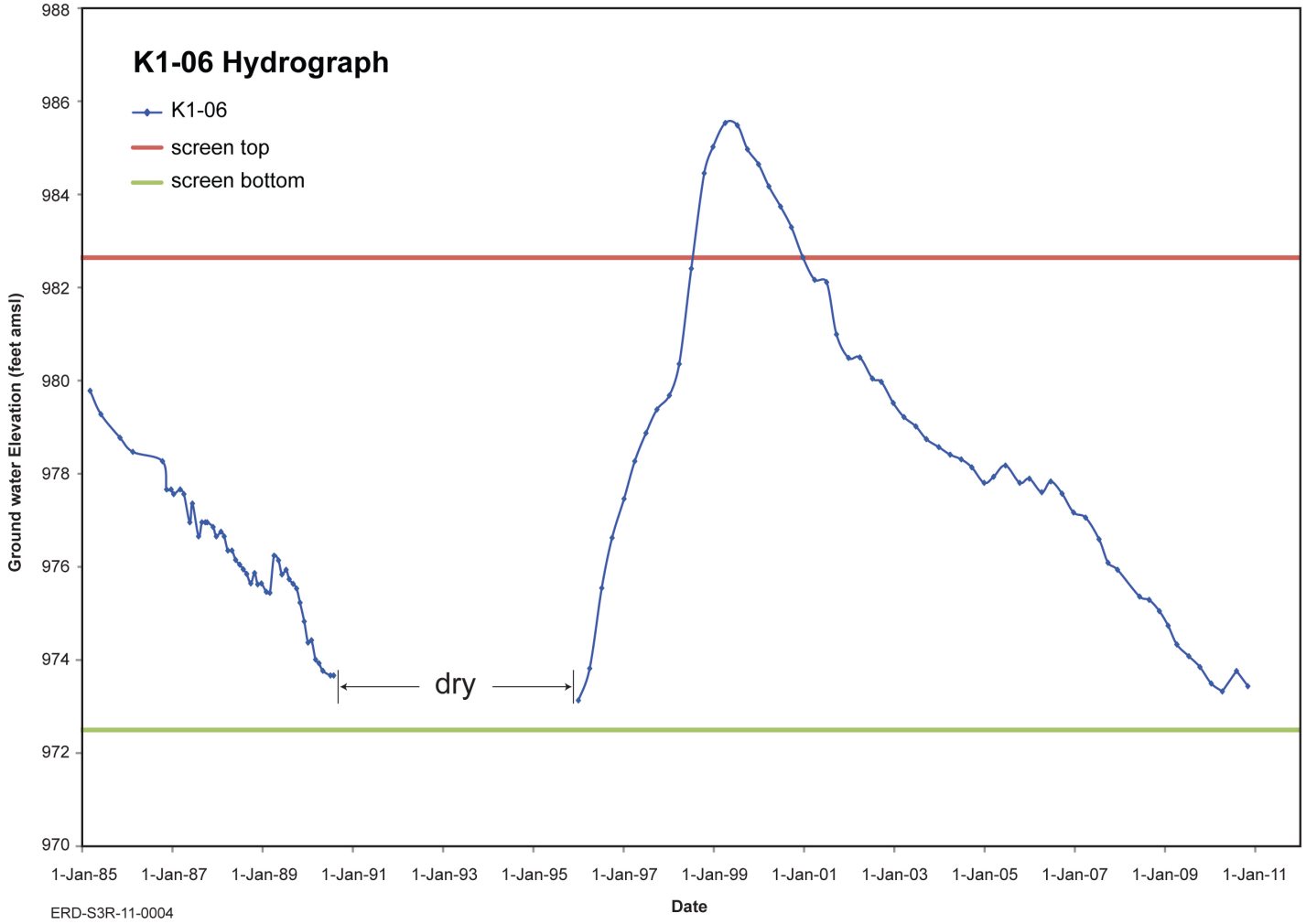

K1-01C Hydrograph
K1-01C
screen top
screen bottom
Ground water Elevation (feet amsl)
1000
995
990
985
980
975
970
965
960
1-Jan-85
1-Jan-87
1-Jan-89
1-Jan-91
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
Date
ERD-S3R-11-0001


K1-02B Hydrograph
K1-02B
screen top
screen bottom
Ground water Elevation (feet amsl)
1000
990
980
970
960
950
940
930
1-Jan-85
1-Jan-87
1-Jan-89
1-Jan-91
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
Date
ERD-S3R-11-0002

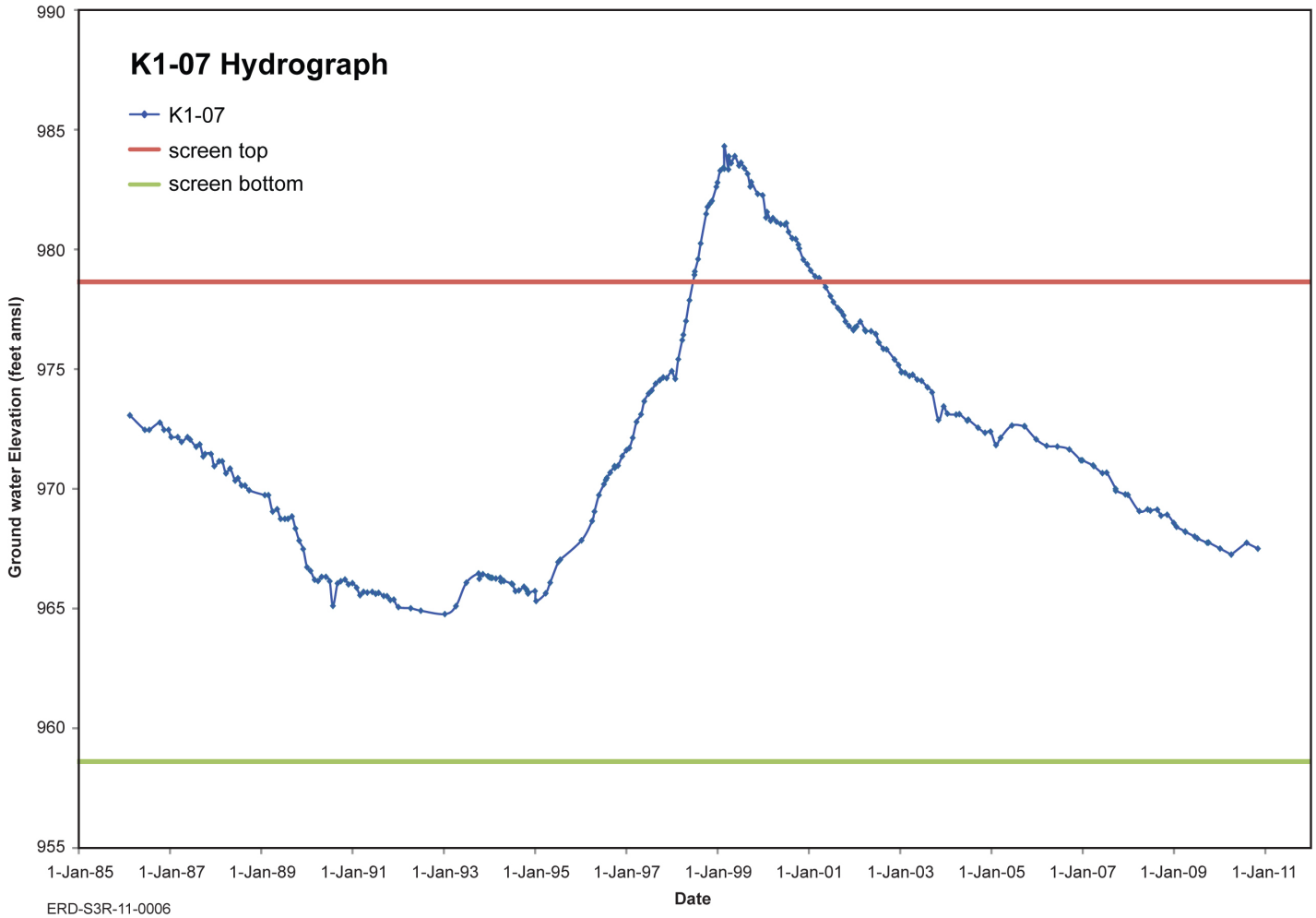


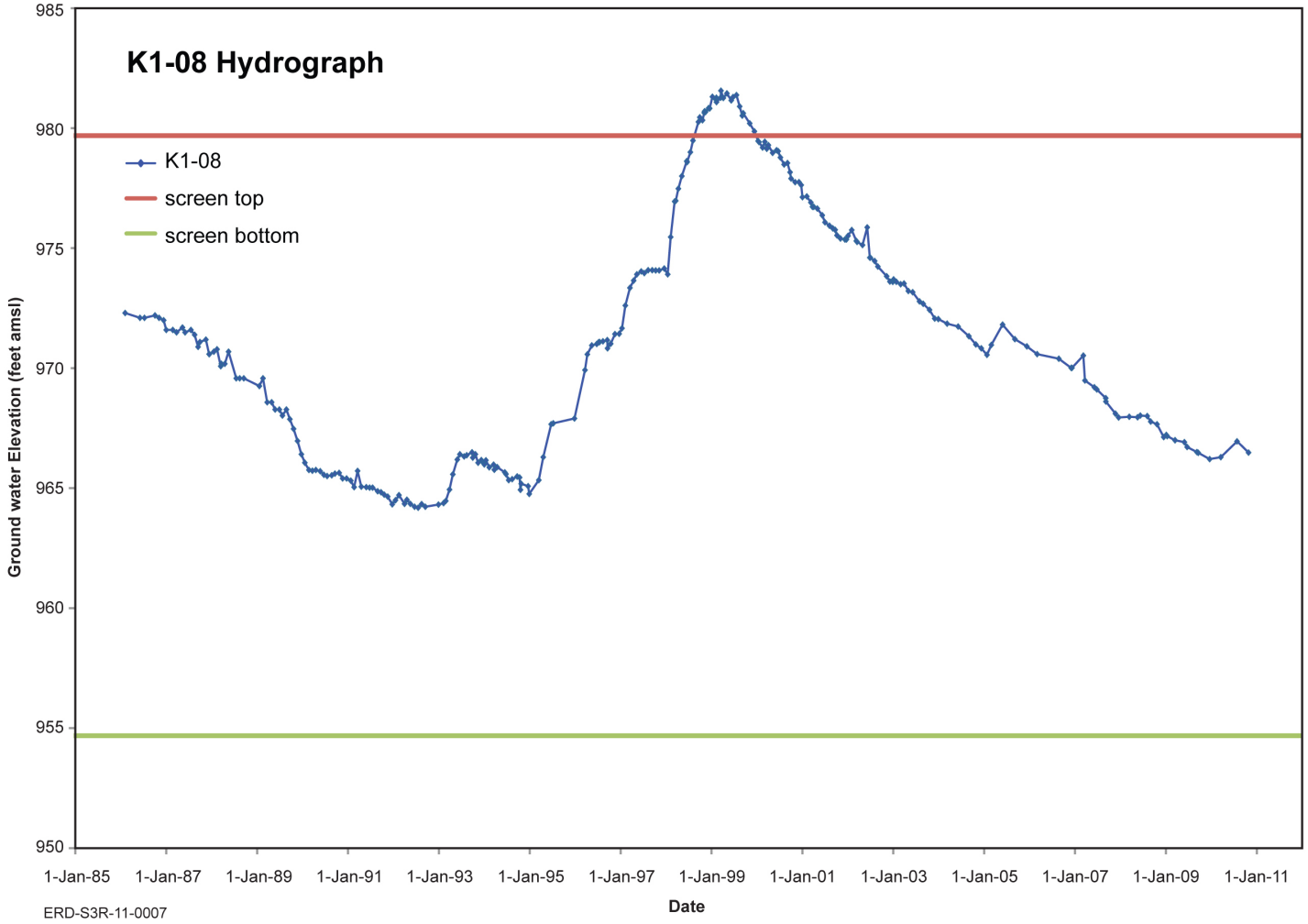
ERD-S3R-11-0005

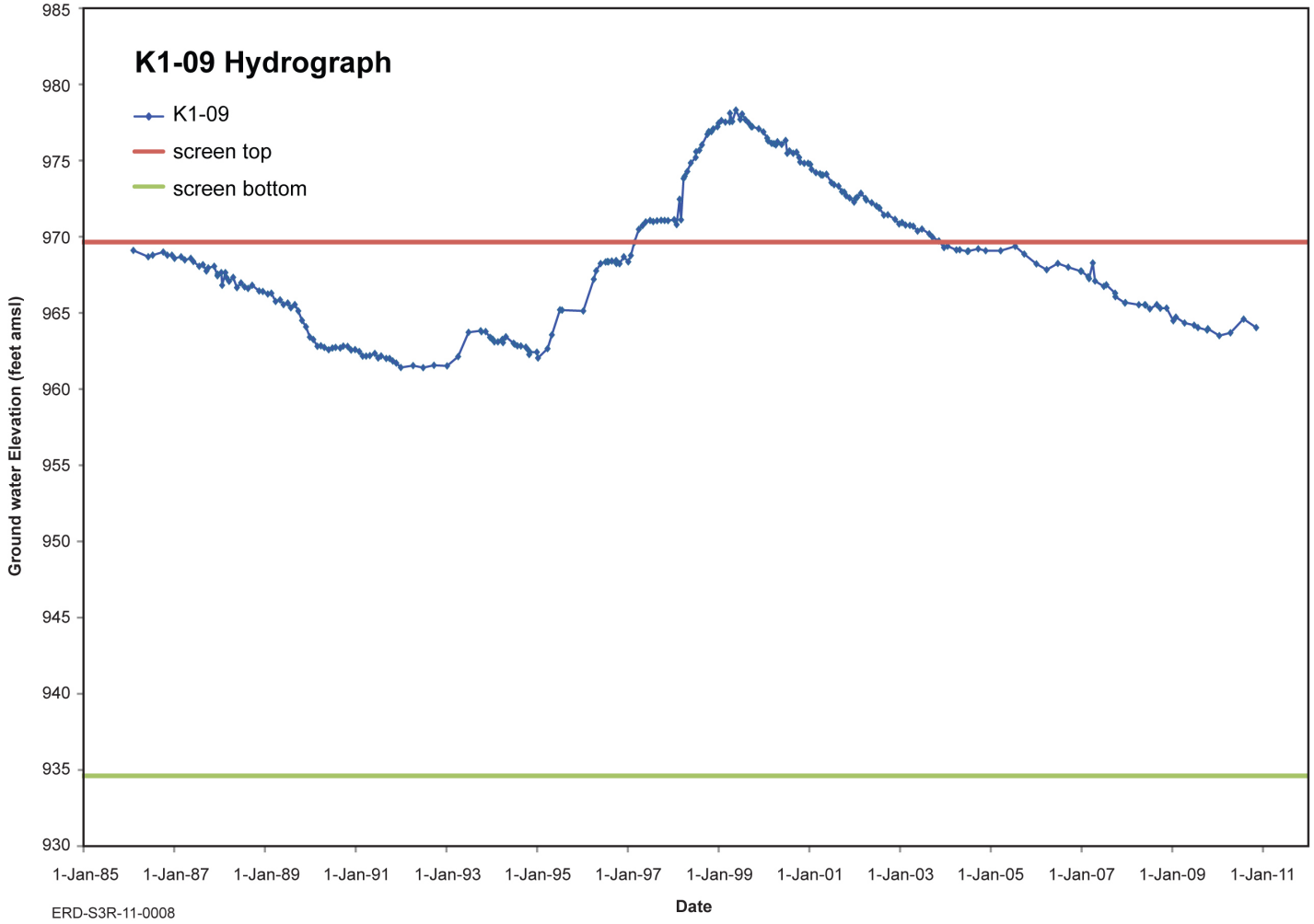

K1-05 Hydrograph
K1-05
screen top
screen bottom
Ground water Elevation (feet amsl)
975
970
965
960
955
950
945
940
1-Jan-85
1-Jan-87
1-Jan-89
1-Jan-91
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
Date
ERD-S3R-11-0003

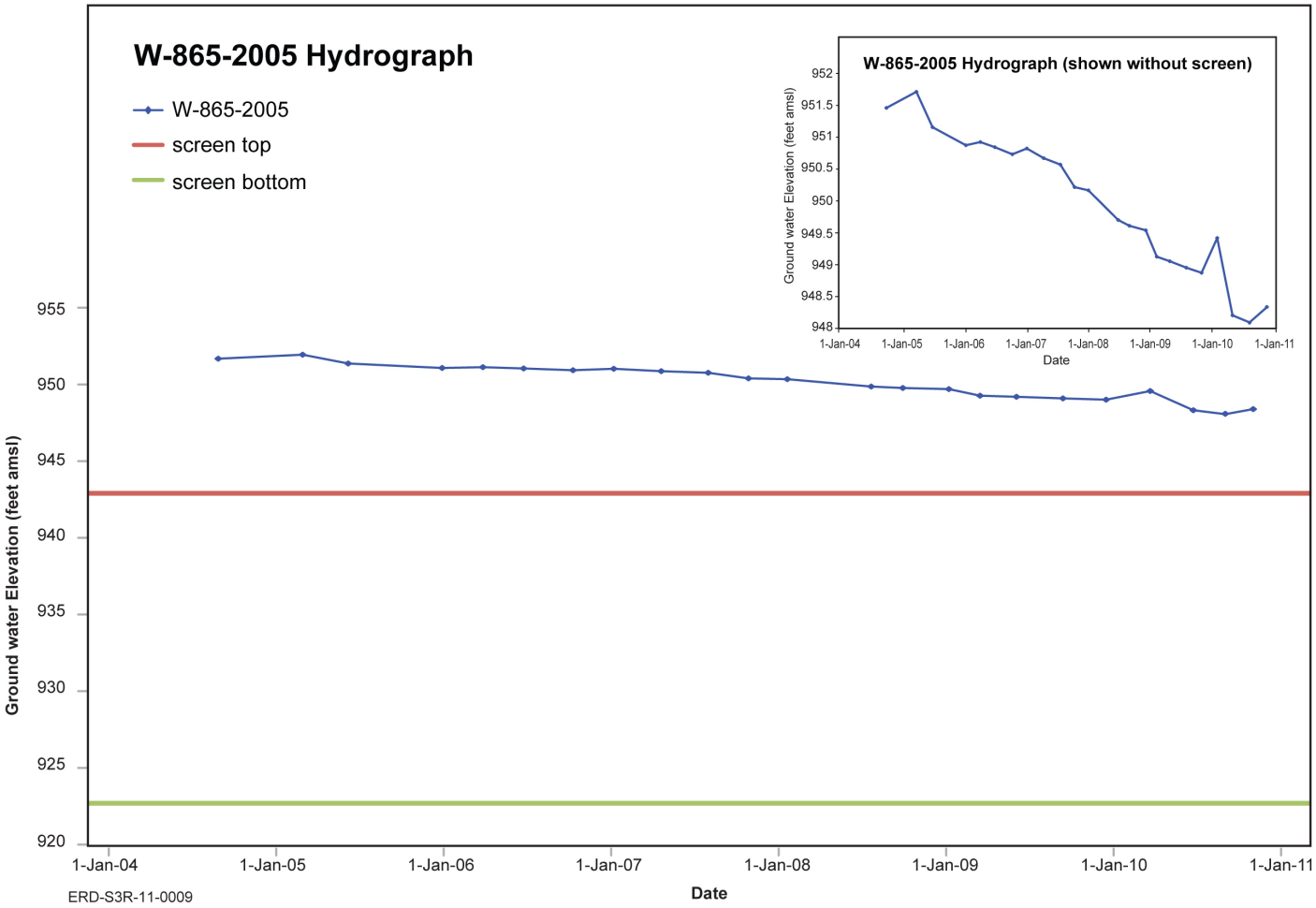


ERD-S3R-11-0004

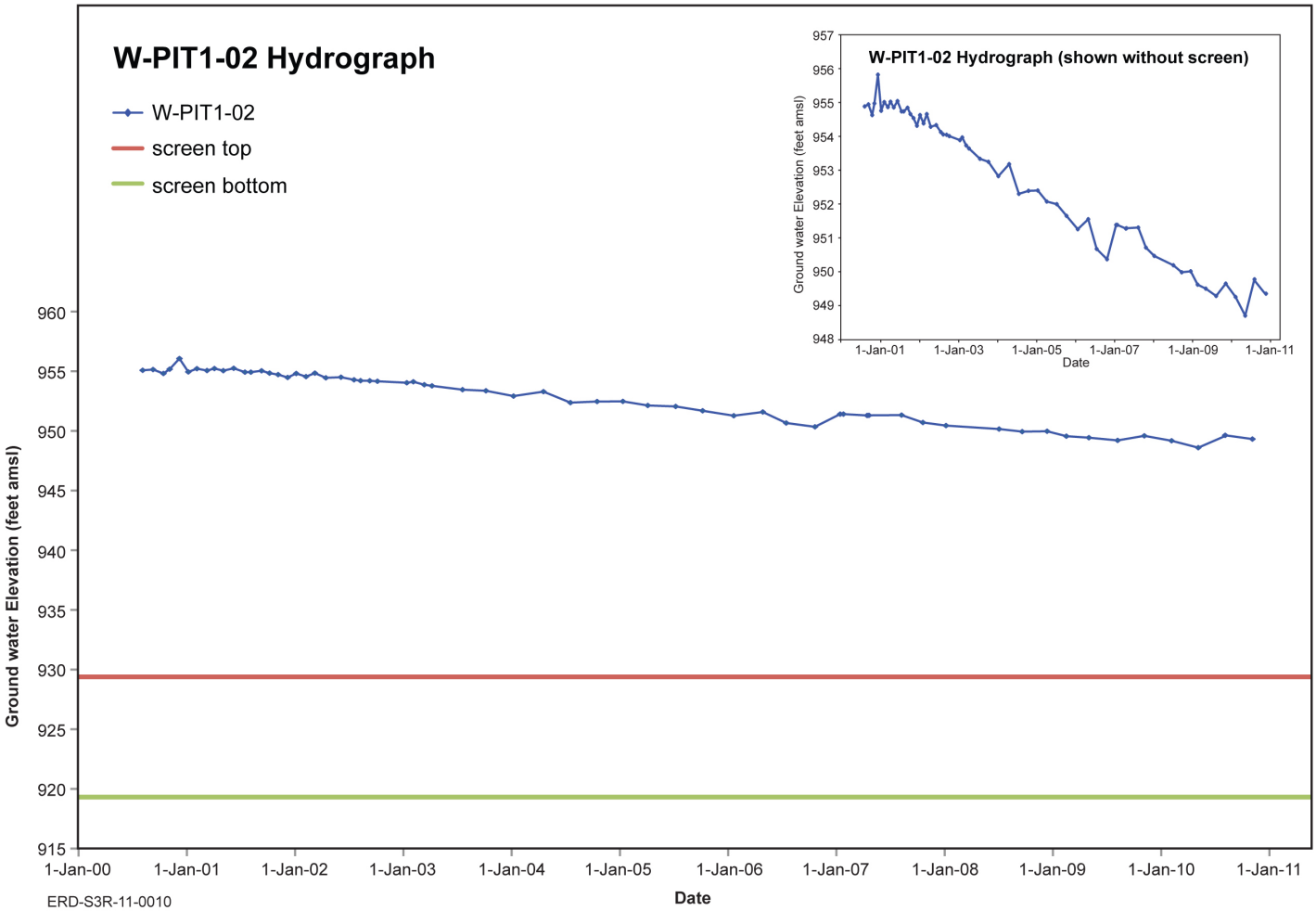

K1-07 Hydrograph
K1-07
screen top
screen bottom
Ground water Elevation (feet amsl)
990
985
980
975
970
965
960
955
1-Jan-85
1-Jan-87
1-Jan-89
1-Jan-91
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
Date
ERD-S3R-11-0006


K1-08 Hydrograph
K1-08
screen top
screen bottom
Ground water Elevation (feet amsl)
985
980
975
970
965
960
955
950
1-Jan-85
1-Jan-87
1-Jan-89
1-Jan-91
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
Date
ERD-S3R-11-0007

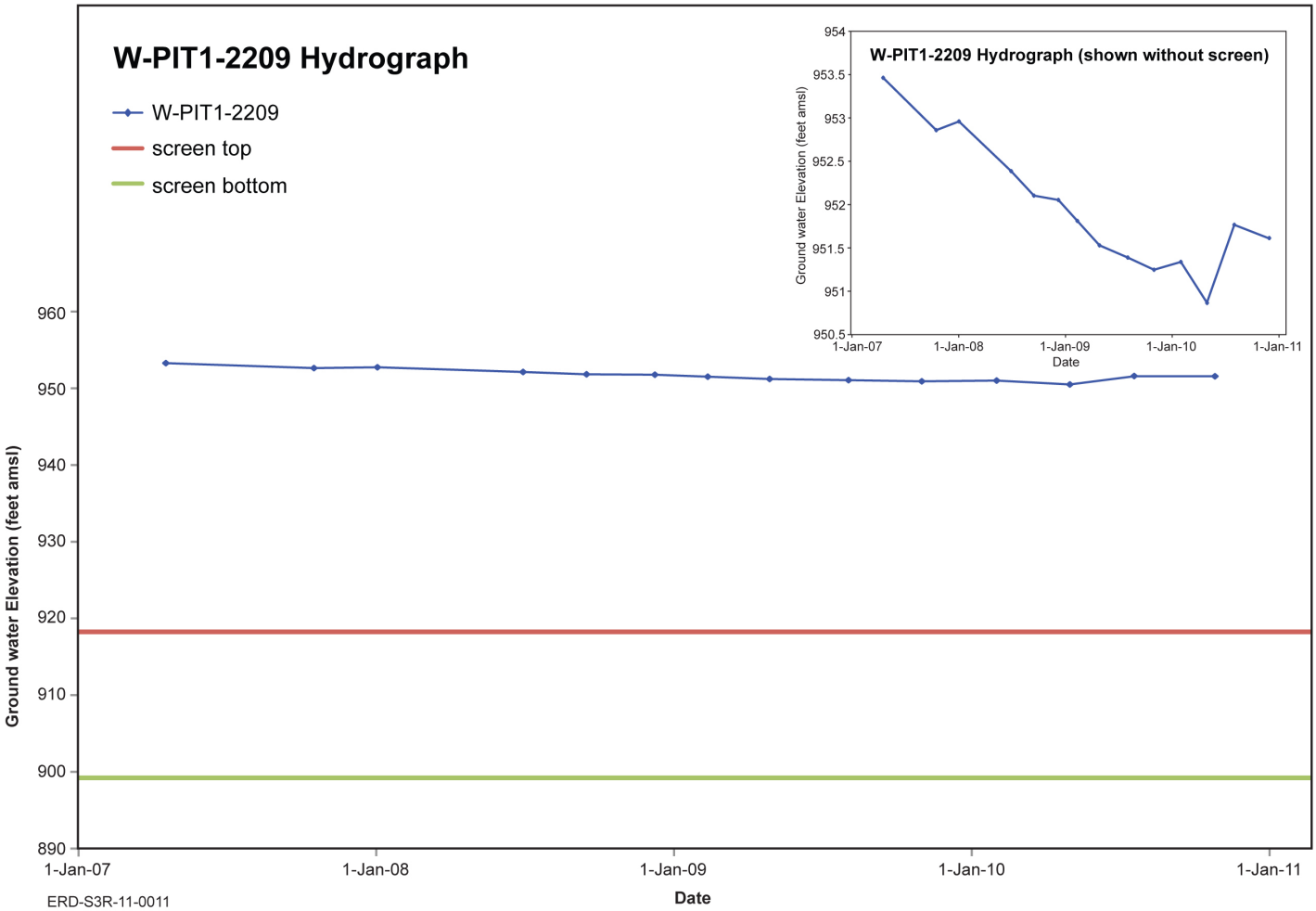

K1-09 Hydrograph
K1-09
screen top
screen bottom
Ground water Elevation (feet amsl)
985
980
975
970
965
960
955
950
945
940
935
930
1-Jan-85
1-Jan-87
1-Jan-89
1-Jan-91
1-Jan-93
1-Jan-95
1-Jan-97
1-Jan-99
1-Jan-01
1-Jan-03
1-Jan-05
1-Jan-07
1-Jan-09
1-Jan-11
Date
ERD-S3R-11-0008

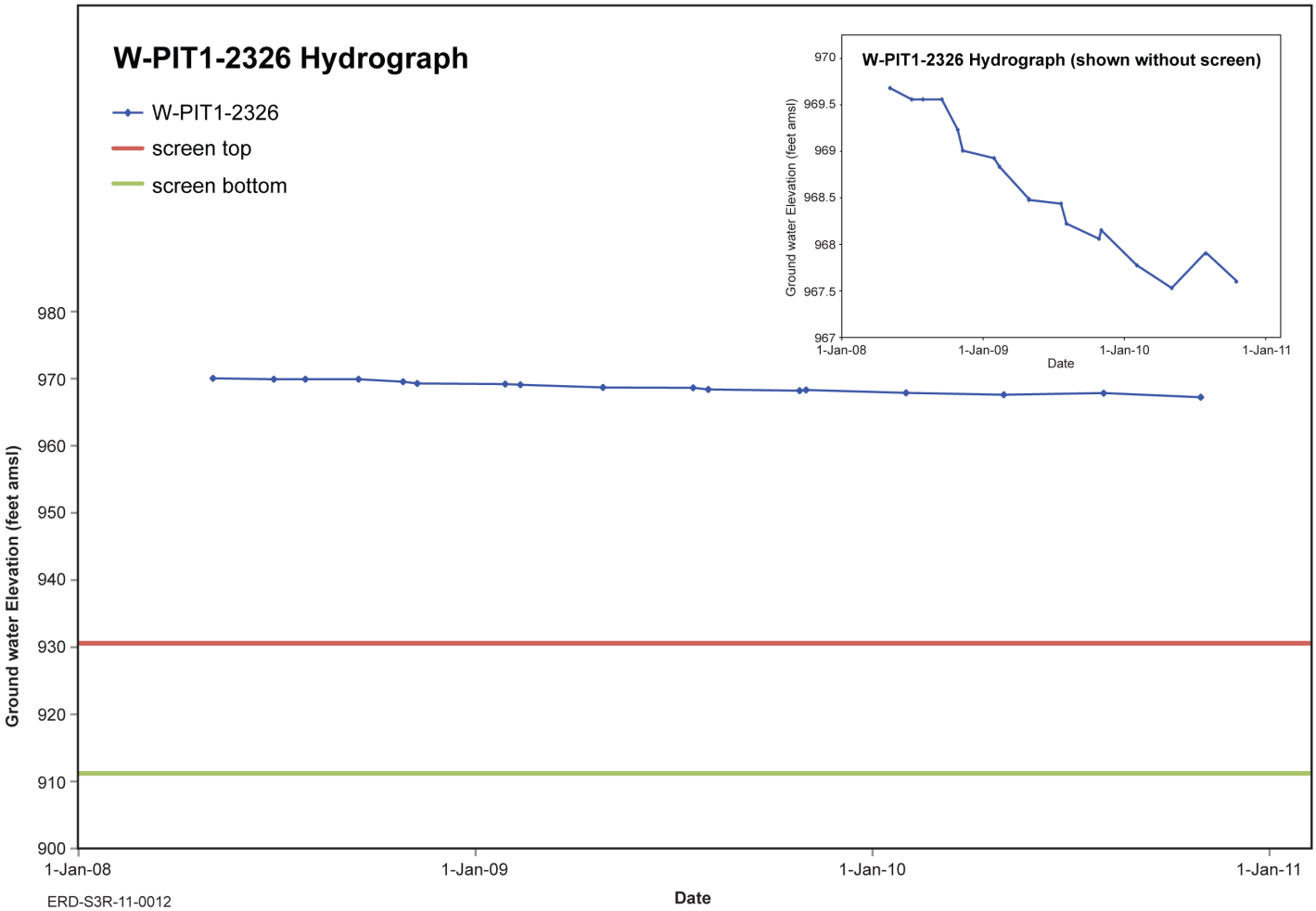


ERD-S3R-11-0009



ERD-S3R-11-0010


W-PIT1-2209 Hydrograph
W-PIT1-2209
screen top
screen bottom
W-PIT1-2209 Hydrograph (shown without screen)
Ground water Elevation (feet amsl)
954
953.5
953
952.5
952
951.5
951
950.5
1-Jan-07
1-Jan-08
1-Jan-09
1-Jan-10
1-Jan-11
Date
Ground water Elevation (feet amsl)
960
950
940
930
920
910
900
890
1-Jan-07
1-Jan-08
1-Jan-09
1-Jan-10
1-Jan-11
Date
ERD-S3R-11-0011


W-PIT1-2326 Hydrograph
W-PIT1-2326
screen top
screen bottom
W-PIT1-2326 Hydrograph (shown without screen)
Ground water Elevation (feet amsl)
970
969.5
969
968.5
968
967.5
967
1-Jan-08
1-Jan-09
1-Jan-10
1-Jan-11
Date
Ground water Elevation (feet amsl)
980
970
960
950
940
930
920
910
900
1-Jan-08
1-Jan-09
1-Jan-10
1-Jan-11
Date
ERD-S3R-11-0012

Appendix G

Field Logs for Compliance Monitoring and Evaluation Monitoring Wells

All Ground Water Sampling Data

WGMD

Target Sample Date: 03-Nov-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-01C AREA INFO: S300/EWFA/PIT1

DATE: 03-Nov-2010 LOG BOOK (DOCUMENT CONTROL) #: AA21012

PURGE METHOD/SAMPLE METHOD: RF / GRVS CONTAMINANT PRESENT: NO3-37/3H<1000 pCi/L

SCREENED INTERVAL: 106.82 - 116.82 PUMP INTAKE DEPTH: 112.30

DEPTH OF CASING: 116.82 CASING DIAMETER: 3.50

DEPTH TO WATER: 108.18 VOLUME FACTOR: 0.500

WATER IN CASING (ft): 8.64 CASING VOL (Gal/Time): 4.32 x

TIME PUMP ON: 1048 INITIAL FLOW RATE (Q=GPM):

TIME PUMP OFF: 1105 MEASURED BY:FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1050		—	~~7.70~~	~~20.7~~	69T.				
		—	—	7.70	20.7	691.6	125	1	

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG 3CMP

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: K1-78Y QC LAB(S): BCLABS-BAK, GEL QC SAMPLE TIME: 1012

SAMPLE ID (VERIFY): K1-01C / GRVS TIME COLLECTED: 1105

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

All Ground Water Sampling Data

WGW17

Target Sample Date: 12-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-02B AREA INFO: S300/EWFA/PIT1

DATE: 12-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA19159

PURGE METHOD/SAMPLE METHOD: ST / 3VES CONTAMINANT PRESENT NO3-33/PERC-6.4/H3>1000 PCi/L

SCREENED INTERVAL: 148.80 - 168.80 PUMP INTAKE DEPTH: 147.30

DEPTH OF CASING: 168.80 CASING DIAMETER: 3.50

DEPTH TO WATER: 135.95 VOLUME FACTOR: 0.500

WATER IN CASING (ft): 32.85 CASING VOL (Gal/Time): 16.4 x 3cv = 49.2 Gal

TIME PUMP ON: 1154 INITIAL FLOW RATE (Q=GPM): 2.0

TIME PUMP OFF: 1231 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1202		16.4	1	7.60	21.7	699.7	124	1	140.11
1210		32.8	2	7.64	21.4	718.8	151	1	140.30
1218		49.2	3	7.59	21.5	726.1	142	1	140.33
1220				7.57	21.2	727.2	136	1	
1224									

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG 3CMP

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: PIT1FB QC LAB(S): BCLABS-BAK, GEL QC SAMPLE TIME: 1231

SAMPLE ID (VERIFY): K1-02B/3VES TIME COLLECTED: 1231

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

Revision: 02/05/2010

Gave extra label for 3cmp for E906 & PRC
Will Delete extra COC's

All Ground Water Sampling Data

WGMD

Target Sample Date: 11-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-04 AREA INFO: S300/EWFA/PIT1

DATE: 11-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA19158

PURGE METHOD/SAMPLE METHOD: ST / 3VES CONTAMINANT PRESENT: NO3-28

SCREENED INTERVAL: 185.97 - 202.97 PUMP INTAKE DEPTH: 186.00

DEPTH OF CASING: 203.97 CASING DIAMETER: 3.50

DEPTH TO WATER: 159.92 VOLUME FACTOR: 0.500

WATER IN CASING (ft): 44.05 CASING VOL (Gal/Time): 22.0 x 3cv = 66 Gal

TIME PUMP ON: 1242 INITIAL FLOW RATE (Q=GPM): 1.6

TIME PUMP OFF: MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1256		22	1	7.64	22.3	584.3	-16	1	169.32
1310		44	2	7.70	21.7	599.3	14	1	169.22
1324		66	3	7.64	21.6	606.6	14	1	
1326				7.56	21.6	606.1	3	1	
1328				7.57	22.1	605.3	2	1	

METER	SERIAL #	CALIBRATED
pH :	604547	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: N/A

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-04 / 3VES TIME COLLECTED: 1340

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

All Ground Water Sampling Data

Target Sample Date: 05-Jan-2011 Month: Norm Qtr: 1 Norm Year: 2011

WELL ID: K1-04 AREA INFO: S300/EMFA/PIT1

DATE: 05-Jan-2011 LOG BOOK (DOCUMENT CONTROL) #: AA21033

PURGE METHOD/SAMPLE METHOD: ST / 3VES CONTAMINANT PRESENT: NO3-28

SCREENED INTERVAL: 185.97 - 202.97 PUMP INTAKE DEPTH: 186.00

DEPTH OF CASING: 203.97 CASING DIAMETER: 3.50

DEPTH TO WATER: 157.44 VOLUME FACTOR: 0.500

WATER IN CASING (ft): 46.53 CASING VOL (Gal/Time): 23.3 x 3 = 69.9

TIME PUMP ON: 1339 INITIAL FLOW RATE (Q=GPM): 2.5 Q

TIME PUMP OFF: MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1350		23.3	1	7.49	20.7	595.2	526	1	174.75
1359		46.6	2	7.45	20.3	603.8	183	1	176.13
1409		69.9	3	7.46	19.9	618.8	14	1	176.28
1411				7.45	19.9	619.3	14	1	
1414				7.47	20.1	620.2	15	1	

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-04/ 3VES TIME COLLECTED: 1429

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
* 3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E608	~~3~~ ~~2~~	1L Amber glass
3EMG	BCLABS-BAK	E625	~~2~~ ~~3~~ 2	1L Amber Glass
3EMG	BCLABS-BAK	E8082A	~~3~~ 2	1L Amber Glass
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	~~3~~ 2	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	BCLABS-BAK	E9060	1	4 oz Amber Glass
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC

Revision: 10/29/2010

* This routine sample will also be considered a retest sample for 4th Qtr. 2010

All Ground Water Sampling Data

WGMD

Target Sample Date: 05-Jan-2011 Month: Norm Qtr: 1 Norm Year: 2011

WELL ID: K1-04 AREA INFO: S300/EWFA/PIT1

DATE: 05-Jan-2011 LOG BOOK (DOCUMENT CONTROL) #: AA21033

PURGE METHOD/SAMPLE METHOD: ST / 3VES CONTAMINANT PRESENT: NO3-28

SCREENED INTERVAL: 185.97 - 202.97 PUMP INTAKE DEPTH: 186.00

DEPTH OF CASING: 203.97 CASING DIAMETER: 3.50

DEPTH TO WATER: 157.44 VOLUME FACTOR: 0.500

WATER IN CASING (ft): 46.53 CASING VOL (Gal/Time): 23.3 x3 = 69.9

TIME PUMP ON: 1339 INITIAL FLOW RATE (Q=GPM): 2.5 G

TIME PUMP OFF: 1429 MEASURED BY:FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW

METER	SERIAL #	CALIBRATED
pH :	604342	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: ND

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-04 | 3VES TIME COLLECTED: 1429

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	BCLABS-BAK	SW9020B	1	1L Amber glass
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET2	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET2:FILTER	0	1L Polyethylene

All Ground Water Sampling Data 2nd Retest

WAMD

Target Sample Date: 26-Jan-2011 Month: Norm Qtr: 1 Norm Year: 2011

WELL ID: K1-04 AREA INFO: S300/EWFA/PIT1

DATE: 26-Jan-2011 LOG BOOK (DOCUMENT CONTROL) #: AA21042

PURGE METHOD/SAMPLE METHOD: ST / 3VES CONTAMINANT PRESENT: NO3-28

SCREENED INTERVAL: 185.97 - 202.97 PUMP INTAKE DEPTH: 186.00

DEPTH OF CASING: 203.97 CASING DIAMETER: 3.50

DEPTH TO WATER: 157.38 VOLUME FACTOR: 0.500

WATER IN CASING (ft): 46.59 CASING VOL (Gal/Time): 23.3 X 3cv = 69.9

TIME PUMP ON: 1201 INITIAL FLOW RATE (Q=GPM): 2.5 Q

TIME PUMP OFF: 1238 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1210		23.3	1	7.40	21.0	591.7	530	1	175.93
1219		46.6	2	7.34	21.2	600.5	121	1	176.98
1230		69.9	3	7.36	21.1	606.8	17	1	176.28
1232				7.35	21.1	607.2	5	1	
1234				7.38	21.0	611.3	8	1	

METER SERIAL # CALIBRATED

pH : 604397 YES/NO

SC : YES/NO

mV : YES/NO

H2O: YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: N/A

QC SAMPLE ID: K1-04 QC LAB(S): GEL QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-04 / 3VES TIME COLLECTED: 1238

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:UISO	2	1L Polyethylene

All Ground Water Sampling Data

Target Sample Date: 11-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-05 AREA INFO: S300/EWFA/PIT1

DATE: 11-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA19158

PURGE METHOD/SAMPLE METHOD: GF / 3VES CONTAMINANT PRESENT: FREON 113-19.0/NO3-37

SCREENED INTERVAL: 165.30 - 186.30 INTAKE DEPTH: 0.00

DEPTH OF CASING: 186.30 CASING DIAMETER: 5.00

DEPTH TO WATER: 171.87 VOLUME FACTOR: 1.020

WATER IN CASING (ft): 14.43 CASING VOL (Gal/Time): 14.7 x 3 = 44.1

TIME PUMP ON: 1126 INITIAL FLOW RATE (Q=GPM): .8 Q

TIME PUMP OFF: MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1143		14.7	1	7.41	23.3	616.6	116	1	177.30
1158		29.4	2	7.58	22.7	622.0	111	1	NO WL
1213		44.1	3	7.67	23.0	622.9	66	1	NO WL
1214				7.59	23.1	626.7	59	1	
1216				7.63	22.9	623.8	60	1	

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-05 / 3VES TIME COLLECTED: 1229

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

All Ground Water Sampling Data

WGMD

Target Sample Date: 12-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-06 AREA INFO: S300/EWFA/PIT1

DATE: 12-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA19159

PURGE METHOD/SAMPLE METHOD: PB / GRBA CONTAMINANT PRESENT: 3H>1000pCi/L

SCREENED INTERVAL: 107.30 - 117.30 INTAKE DEPTH: 0.00

DEPTH OF CASING: 117.30 CASING DIAMETER: 5.00

DEPTH TO WATER: 115.80 VOLUME FACTOR: 1.020

WATER IN CASING (ft): 1.5 CASING VOL (Gal/Time): —

TIME PUMP ON: — INITIAL FLOW RATE (Q=GPM): —

TIME PUMP OFF: — MEASURED BY:FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1302		—	—	8.04	21.4	745.2	125	1	—

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-06/GRBA TIME COLLECTED: 1307

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	CALTEST	E300.0:PERC	1	250 mL Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER

NOTE:
Purge rate/time: N/A since est_sus_flow = 0
Purge Volume: 0 gal.

Revision: 02/05/2010

All Ground Water Sampling Data

WGMD

Target Sample Date: 12-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-07 AREA INFO: S300/EWFA/PIT1

DATE: 12-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA19159

PURGE METHOD/SAMPLE METHOD: GF / 3VES CONTAMINANT PRESENT: NO3-34

SCREENED INTERVAL: 131.30 - 151.30 INTAKE DEPTH: 0.00

DEPTH OF CASING: 153.30 CASING DIAMETER: 4.50

DEPTH TO WATER: 141.83 VOLUME FACTOR: 0.826

WATER IN CASING (ft): 11.47 CASING VOL (Gal/Time): 9.5 x 3cv = 28.5 Gal

TIME PUMP ON: 0950 INITIAL FLOW RATE (Q=GPM): 1.0

TIME PUMP OFF: 1033 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1000		9.5	1	7.21	21.8	598.3	-87	1	143.87
1004		19	2	7.49	22.4	601.5	-81	1	144.08
1020		28.5	3	7.53	~~602~~ 22.6	602.7	-61	1	144.10
1022				7.48	22.5	602.1	-58	1	
1024				7.54	22.4	604.2	-56	1	

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-07/3VES TIME COLLECTED: 1033

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

All Ground Water Sampling Data

WGMD

Target Sample Date: 12-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-08 AREA INFO: S300/EWFA/PIT1

DATE: 12-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA19159

PURGE METHOD/SAMPLE METHOD: GF / 3VES CONTAMINANT PRESENT: FREON 113-37/NO3-36

SCREENED INTERVAL: 143.32 - 168.32 INTAKE DEPTH: 0.00

DEPTH OF CASING: 170.32 CASING DIAMETER: 4.50

DEPTH TO WATER: 155.72 VOLUME FACTOR: 0.826

WATER IN CASING (ft): 14.6 CASING VOL (Gal/Time): 12 x 3cu = 36 Gal

TIME PUMP ON: 1049 INITIAL FLOW RATE (Q=GPM): 1.1

TIME PUMP OFF: 1138 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1100		12	1	7.76	23.2	626.3	48	1	NM
1111		24	2	7.59	23.3	628.1	23	1	NM
1122		36	3	7.53	23.3	633.1	11	1	NM
1124				7.56	23.0	634.0	11		
1126				7.57	22.5	634.1	4		

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-08/3VES TIME COLLECTED: 1138

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

Revision: 02/05/2010 Probe Sticking

All Ground Water Sampling Data

WGMD

Target Sample Date: 18-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: K1-09 AREA INFO: S300/EWFA/PIT1

DATE: 18-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA21002

PURGE METHOD/SAMPLE METHOD: GF / 3VES CONTAMINANT PRESENT: FREON 113-120.0

SCREENED INTERVAL: 157.30 - 192.30 INTAKE DEPTH: 0.00

DEPTH OF CASING: 194.30 CASING DIAMETER: 4.50

DEPTH TO WATER: 162.02 VOLUME FACTOR: 0.826

WATER IN CASING (ft): 32.28 CASING VOL (Gal/Time): 26.7 x 3 = 80.1

TIME PUMP ON: 1022 INITIAL FLOW RATE (Q=GPM): 1.8

TIME PUMP OFF: 1120 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1037		26.7	1	7.33	21.4	654.9	20	1	NM *
1052		53.4	2	7.67	21.9	653.1	42	1	NM
1107		80.1	3	7.62	22.1	649.1	49	1	NM
1109				7.63	22.0	640.8	47	1	
1111				7.63	22.1	638.9	45	1	

METER	SERIAL #	CALIBRATED
pH :	60744	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): K1-09/3VES TIME COLLECTED: 1120

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

Revision: 02/05/2010

Probe Sticking

All Ground Water Sampling Data

WGMD

Target Sample Date: 09-Nov-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: W-PIT1-2326 AREA INFO: S300/EWFA/PIT1

DATE: 09-Nov-2010 LOG BOOK (DOCUMENT CONTROL) #: AA21013

PURGE METHOD/SAMPLE METHOD: / 3VES CONTAMINANT PRESENT:

SCREENED INTERVAL: 217.30 - 237.02 INTAKE DEPTH: 0.00

DEPTH OF CASING: 237.42 CASING DIAMETER: 5.00

DEPTH TO WATER: 183.70 VOLUME FACTOR: 1.020

WATER IN CASING (ft): 53.72 CASING VOL (Gal/Time): 54.8 x 3.00 = 164.4

TIME PUMP ON: 0831 INITIAL FLOW RATE (Q=GPM): 3.0

TIME PUMP OFF: 0943 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
0850		54.8	1	7.63	20.6	715.7	82	1	186.74
0908		109.6	2	7.57	21.1	709.3	90	1	187.21
0927		164.4	3	7.59	21.4	705.6	82	1	187.43
0929				7.55	21.2	705.3	80	1	
0931				7.56	21.1	705.0	80	1	

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): W-PIT1-2326 TIME COLLECTED: 0943

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	GEL	AS:FILTER	0	1L Polyethylene
3EMG	GEL	AS:THISO	2	1L Polyethylene
3EMG	GEL	AS:UISO	2	1L Polyethylene
3EMG	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E8260	3	40 mL Glass VOA vial
3EMG	BCLABS-BAK	E8330:R+H	3	1L Amber Glass
3EMG	GEL	E900	1	1L Polyethylene
3EMG	GEL	E900:FILTER	0	1L Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER
3EMG	GEL	RA226	2	1L PLASTIC
3EMG	GEL	RA226:FILTER	0	1L PLASTIC
3EMG	BCLABS-BAK	WGMGMET1	1	1L Polyethylene
3EMG	BCLABS-BAK	WGMGMET1:FILTER	0	1L Polyethylene

All Ground Water Sampling Data

WGMD

Target Sample Date: 20-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: W-PIT1-02 AREA INFO: S300/EWFA/PIT1

DATE: 20-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA21004

PURGE METHOD/SAMPLE METHOD: ~~Grunfos~~ PB / ~~JVES~~ GRBA CONTAMINANT PRESENT: UNK

SCREENED INTERVAL: 252.30 - 262.30 PUMP INTAKE DEPTH: 262.05

DEPTH OF CASING: 263.60 CASING DIAMETER: 5.00

DEPTH TO WATER: 231.70 VOLUME FACTOR: 1.020

WATER IN CASING (ft): CASING VOL (Gal/Time): —

TIME PUMP ON: T INITIAL FLOW RATE (Q=GPM): —

TIME PUMP OFF: — MEASURED BY:FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1207		—	—	9.91	22.7	5709	59	9	—

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG 3GIV

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): W-Pit1-02/ GRBA TIME COLLECTED: 1212

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	CALTEST	E300.0:PERC	1	250 mL Polyethylene
3GIV	CALTEST	E601	3	40 mL Glass VOA vial
3EMG	GEL	E906	1	250mL GLASS-AMBER

Drilling New well about 20 yds South of this well

All Ground Water Sampling Data

WGMD

Target Sample Date: 09-Nov-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: W-PIT1-2209 AREA INFO: S300/EWFA/PIT1

DATE: 09-Nov-2010 LOG BOOK (DOCUMENT CONTROL) #: AA21013

PURGE METHOD/SAMPLE METHOD: GF / 3VES CONTAMINANT PRESENT:

SCREENED INTERVAL: 247.30 - 267.30 PUMP INTAKE DEPTH: 265.20

DEPTH OF CASING: 268.20 CASING DIAMETER: 5.00

DEPTH TO WATER: 215.30 VOLUME FACTOR: 1.020

WATER IN CASING (ft): 52.90 CASING VOL (Gal/Time): 54.0 x 3cv = 162 Gal

TIME PUMP ON: 1428 INITIAL FLOW RATE (Q=GPM): 3.0 q

TIME PUMP OFF: 1534 MEASURED BY: FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
1447		54	1	7.69	21.5	587.7	98	1	230.60
1505		108	2	7.73	21.1	591.8	52	1	231.05
1523		162	3	7.75	21.4	589.1	39	1	N.m Sticking
1525				7.77	21.4	583.2	39	1	
1527				7.78	21.3	580.1	43	1	

METER	SERIAL #	CALIBRATED
pH :	604347	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG 3CMP 3GIV

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: — QC LAB(S): — QC SAMPLE TIME: —

SAMPLE ID (VERIFY): W-Pit1-2209/3VES TIME COLLECTED: 1534

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3CMP	GEL	AS:FILTER	0	1L Polyethylene
3CMP	GEL	AS:UISO	2	1L Polyethylene
3CMP	BCLABS-BAK	E300.0:NO3	1	250 mL Polyethylene
3EMG	BCLABS-BAK	E300.0:PERC	1	250 mL Polyethylene
3GIV	BCLABS-BAK	E601	3	40 mL Glass VOA vial
3EMG	GEL	E906	1	250mL GLASS-AMBER

All Ground Water Sampling Data

WGMS

Target Sample Date: 18-Oct-2010 Month: Norm Qtr: 4 Norm Year: 2010

WELL ID: W-865-2005 AREA INFO: S300/EWPA/865

DATE: 18-Oct-2010 LOG BOOK (DOCUMENT CONTROL) #: AA21002

PURGE METHOD/SAMPLE METHOD: PB / ~~SVES~~ GRBA CONTAMINANT PRESENT:

SCREENED INTERVAL: 332.30 - 352.30 INTAKE DEPTH: 0.00

DEPTH OF CASING: 353.20 CASING DIAMETER: 5.00

DEPTH TO WATER: 326.65 VOLUME FACTOR: 1.020

WATER IN CASING (ft): 26.55 CASING VOL (Gal/Time): —

TIME PUMP ON: — INITIAL FLOW RATE (Q=GPM): —

TIME PUMP OFF: — MEASURED BY:FLOW METER/ GRAD CYL./ BUCKET/ OTHER

TIME	Q	GAL PURGED	VOLUMES	pH	TEMP C	SC	mV	OG	DTW
			~~7.70~~	~~21.7~~	~~5~~				
1139		—	—	7.70	21.7	5908	77	1	—

METER	SERIAL #	CALIBRATED
pH :	604342	YES/NO
SC :		YES/NO
mV :		YES/NO
H2O:		YES/NO

SAMPLER /EMPLOYER: silva90

PROJECT: 3EMG

SAMPLE PRESERVATION/AMT of REAGENT: NA

QC SAMPLE ID: W-865-65Y 865FB QC LAB(S): GEL, CALTEST QC SAMPLE TIME: ~~1145~~ 1249

SAMPLE ID (VERIFY): W-865-2005 / GRBA TIME COLLECTED: 1145

PROJECT	/ ANALYTICAL LAB	/REQUESTED ANALYSIS/	QUANTITY	/TYPE OF CONTAINERS
3EMG	CALTEST	E300.0:PERC	1	250 mL Polyethylene
3EMG	GEL	E906	1	250mL GLASS-AMBER

No "ES" in well used Bailer to obtain sample

Appendix H

Statistical Limits and Graphs of Ground Water Measurements

Table H-1. Analytical results from 2010 that were onitted from the Appendix H plots due to the use of specially reduced Y-axis plot limits.

Pit Area	Constituent	Monitoring Well	Date Sampled	Result[a]	Units
Pit 1	Arsenic	W-PIT1-2326	7/29/08	<50	µg/L
Pit 1	Barium	K1-04	4/18/03	<100	µg/L
Pit 1	Barium	K1-05	4/18/03	<100	µg/L
Pit 1	Cobalt	K1-04	4/18/03	<50	µg/L
Pit 1	Cobalt	K1-05	4/18/03	<50	µg/L
Pit 1	Nickel	W-PIT1-2326	7/29/08	<100	µg/L
Pit 1	Lead	K1-04	4/18/03	<5	µg/L
Pit 1	Lead	K1-05	4/18/03	<5	µg/L
Pit 1	Lead	W-PIT1-2326	7/29/08	<5	µg/L

[a] Results labled as "<" had high reporing limits (RLs) for that particular analytical result. These values were not included in the plots. These resluts if plotted, would have significantly altered the y-axis scale.

Table H-2. Detection monitoring constituents of concern, monitoring wells, statistical methods, concentration limits, and statistical limits at Pit 1.

Constituents of Concern (units)	Well	Statistical Method	Concentration Limit[a]	Statistical Limit[b]
Metals (μg/L)				
Arsenic	K1-02B	Intrawell Prediction Limit	12	15
	K1-04	Intrawell Prediction Limit	10	16
	K1-05	Intrawell Prediction Limit	14	18
	K1-08	Intrawell Prediction Limit	14	17
	K1-09	Intrawell Prediction Limit	13	16
	W-PIT1-2326	Intrawell Prediction Limit	12	14
Barium	K1-02B	Intrawell Prediction Limit	24	26
	K1-04	Intrawell Prediction Limit	27	32
	K1-05	Intrawell Prediction Limit	36	43
	K1-08	Intrawell Prediction Limit	40	49
	K1-09	Intrawell Prediction Limit	43	51
	W-PIT1-2326	Intrawell Prediction Limit	33	46
Beryllium	K1-02B	Reporting Limit	NA[2.]	0.5
	K1-04	Reporting Limit	NA	0.5
	K1-05	Reporting Limit	NA	0.5
	K1-08	Reporting Limit	NA	0.5
	K1-09	Reporting Limit	NA	0.5
	W-PIT1-2326	Reporting Limit	0.5	0.5
Cadmium	K1-02B	Intrawell Prediction Limit	0.40	0.52
	K1-04	Reporting Limit	NA	0.50
	K1-05	Reporting Limit	NA	0.50
	K1-08	Reporting Limit	NA	0.50
	K1-09	Reporting Limit	NA	0.50
	W-PIT1-2326	Reporting Limit	0.50	0.50
Cobalt	K1-02B	Reporting Limit	NA	25
	K1-04	Reporting Limit	NA	25
	K1-05	Reporting Limit	NA	25
	K1-08	Reporting Limit	NA	25
	K1-09	Reporting Limit	NA	25
	W-PIT1-2326	Reporting Limit	25	25
Copper	K1-02B	Intrawell Prediction Limit	16	60
	K1-04	Reporting Limit	NA	10
	K1-05	Intrawell Prediction Limit	8	30
	K1-08	Reporting Limit	NA	10
	K1-09	Reporting Limit	NA	10
	W-PIT1-2326	Reporting Limit	10	10
Lead	K1-02B	Reporting Limit	NA	2
	K1-04	Reporting Limit	NA	2
	K1-05	Reporting Limit	NA	2
	K1-08	Reporting Limit	NA	2
	K1-09	Reporting Limit	NA	2
	W-PIT1-2326	Reporting Limit	2	2
Nickel	K1-02B	Intrawell Prediction Limit	4	9
	K1-04	Reporting Limit	NA	5
	K1-05	Intrawell Prediction Limit	3	13
	K1-08	Reporting Limit	NA	5
	K1-09	Reporting Limit	NA	5
	W-PIT1-2326	Reporting Limit	5	5

Table H-2. Detection monitoring constituents of concern, monitoring wells, statistical methods, concentration limits, and statistical limits at Pit 1.

Constituents of Concern (units)	Well	Statistical Method	Concentration Limit[a]	Statistical Limit[b]
Vanadium	K1-02B	Intrawell Prediction Limit	52	59
	K1-04	Intrawell Prediction Limit	37	46
	K1-05	Intrawell Prediction Limit	69	79
	K1-08	Intrawell Prediction Limit	68	78
	K1-09	Intrawell Prediction Limit	61	69
	W-PIT1-2326	Intrawell Prediction Limit	50	63
Zinc	K1-02B	Intrawell Prediction Limit	24	98
	K1-04	Intrawell Prediction Limit	12	51
	K1-05	Intrawell Prediction Limit	9	24
	K1-08	Reporting Limit	NA	20
	K1-09	Reporting Limit	NA	20
	W-PIT1-2326	Reporting Limit	15	48
Perchlorate and Energetic Materials (µg/L)				
Perchlorate	K1-02B	Intrawell Prediction Limit	7	10
	K1-04	Reporting Limit	NA	4
	K1-05	Reporting Limit	NA	4
	K1-08	Reporting Limit	NA	4
	K1-09	Reporting Limit	NA	4
	W-PIT1-2326	Intrawell Prediction Limit	6	8
HMX	K1-02B	Reporting Limit	NA	1
	K1-04	Reporting Limit	NA	1
	K1-05	Reporting Limit	NA	1
	K1-08	Reporting Limit	NA	1
	K1-09	Reporting Limit	NA	1
	W-PIT1-2326	Reporting Limit	1	1
RDX	K1-02B	Reporting Limit	NA	1
	K1-04	Reporting Limit	NA	1
	K1-05	Reporting Limit	NA	1
	K1-08	Reporting Limit	NA	1
	K1-09	Reporting Limit	NA	1
	W-PIT1-2326	Reporting Limit	1	1
Radioisotopes (pCi/L)				
Radium 226	K1-02B	Intrawell Prediction Limit	0.111	0.315
	K1-04	Intrawell Prediction Limit	0.070	0.313
	K1-05	Intrawell Prediction Limit	0.114	0.331
	K1-08	Intrawell Prediction Limit	0.056	0.240
	K1-09	Intrawell Prediction Limit	0.078	0.335
	W-PIT1-2326	Intrawell Prediction Limit	0.118	0.511
Thorium 228	K1-02B	Intrawell Prediction Limit	0.016	0.076
	K1-04	Intrawell Prediction Limit	0.009	0.090
	K1-05	Intrawell Prediction Limit	0.011	0.133
	K1-08	Intrawell Prediction Limit	0.015	0.086
	K1-09	Intrawell Prediction Limit	0.025	0.098
	W-PIT1-2326	Intrawell Prediction Limit	0.012	0.145
Thorium 232	K1-02B	Intrawell Prediction Limit	0.012	0.121
	K1-04	Intrawell Prediction Limit	0.006	0.037
	K1-05	Intrawell Prediction Limit	0.014	0.109
	K1-08	Intrawell Prediction Limit	0.014	0.116
	K1-09	Intrawell Prediction Limit	0.005	0.049
	W-PIT1-2326	Intrawell Prediction Limit	-0.0026	0.023

Table H-2. Detection monitoring constituents of concern, monitoring wells, statistical methods, concentration limits, and statistical limits at Pit 1.

Constituents of Concern (units)	Well	Statistical Method	Concentration Limit[a]	Statistical Limit[b]
Tritium	K1-02B	Intrawell Prediction Limit	3940	4280
	K1-04	Intrawell Prediction Limit	280	520
	K1-05	Intrawell Prediction Limit	157	307
	K1-08	Intrawell Prediction Limit	174	288
	K1-09	Intrawell Prediction Limit	145	234
	W-PIT1-2326	Intrawell Prediction Limit	2940	3590
Uranium (calculated total)	K1-02B	Intrawell Prediction Limit	3.32	3.91
	K1-04	Intrawell Prediction Limit	1.88	2.29
	K1-05	Intrawell Prediction Limit	2.81	3.11
	K1-08	Intrawell Prediction Limit	2.99	4.04
	K1-09	Intrawell Prediction Limit	3.02	3.71
	W-PIT1-2326	Intrawell Prediction Limit	2.72	3.12

[a] Concentration limit refers to observed mean value for historical data.

[b] All SL values revised in May 2009.

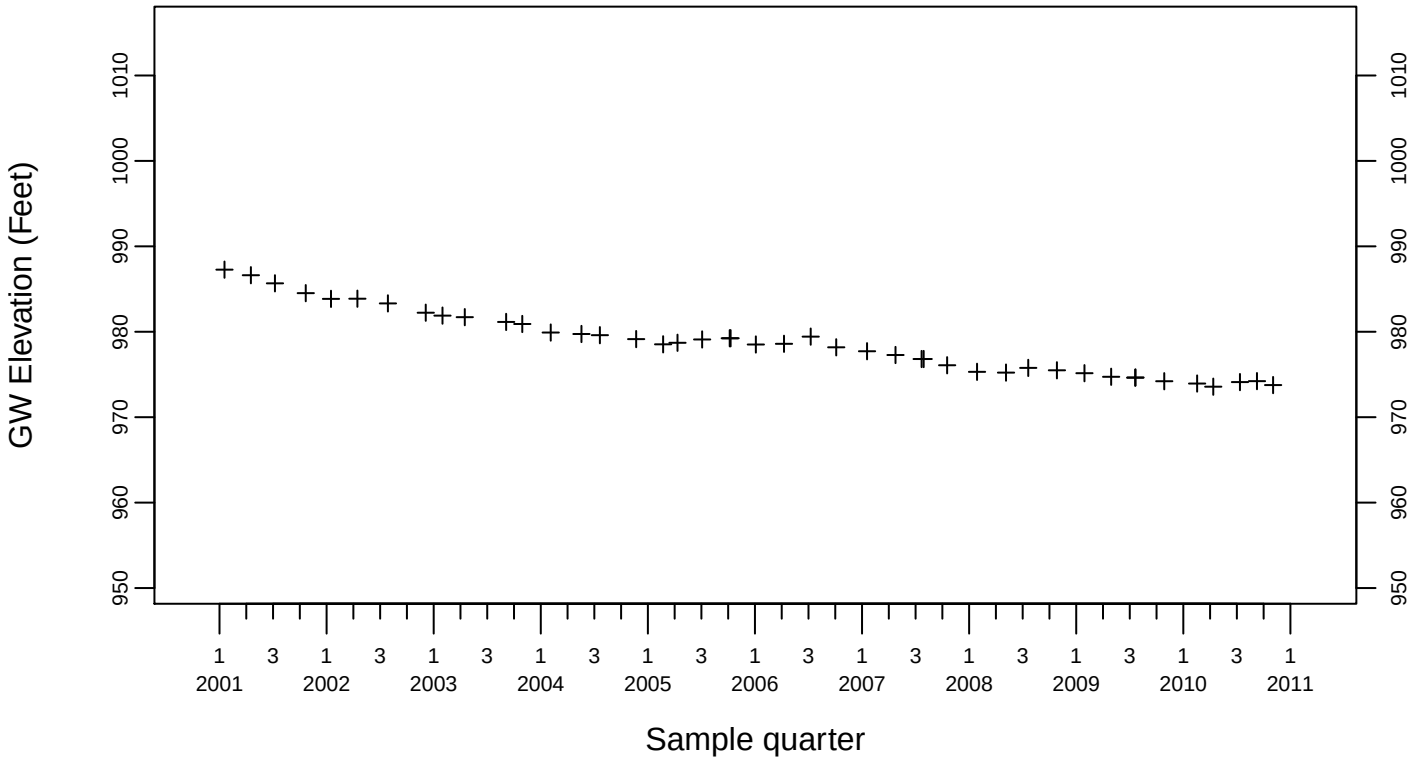
Notes:

Values have been rounded in a manner consistent with previous SLs from WDR No. 93-100.

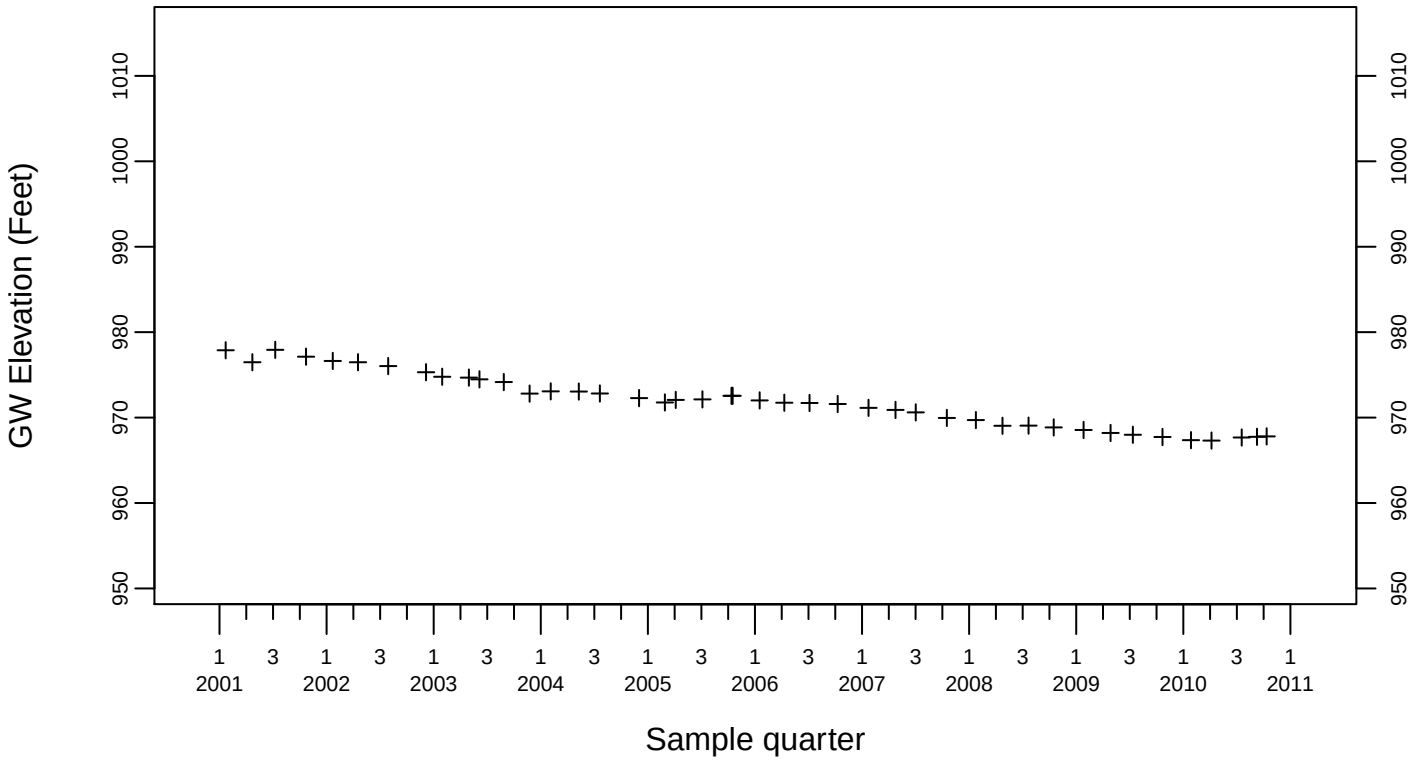
NA = Not applicable.

Pit 1 Area
GW Elevation (Feet)

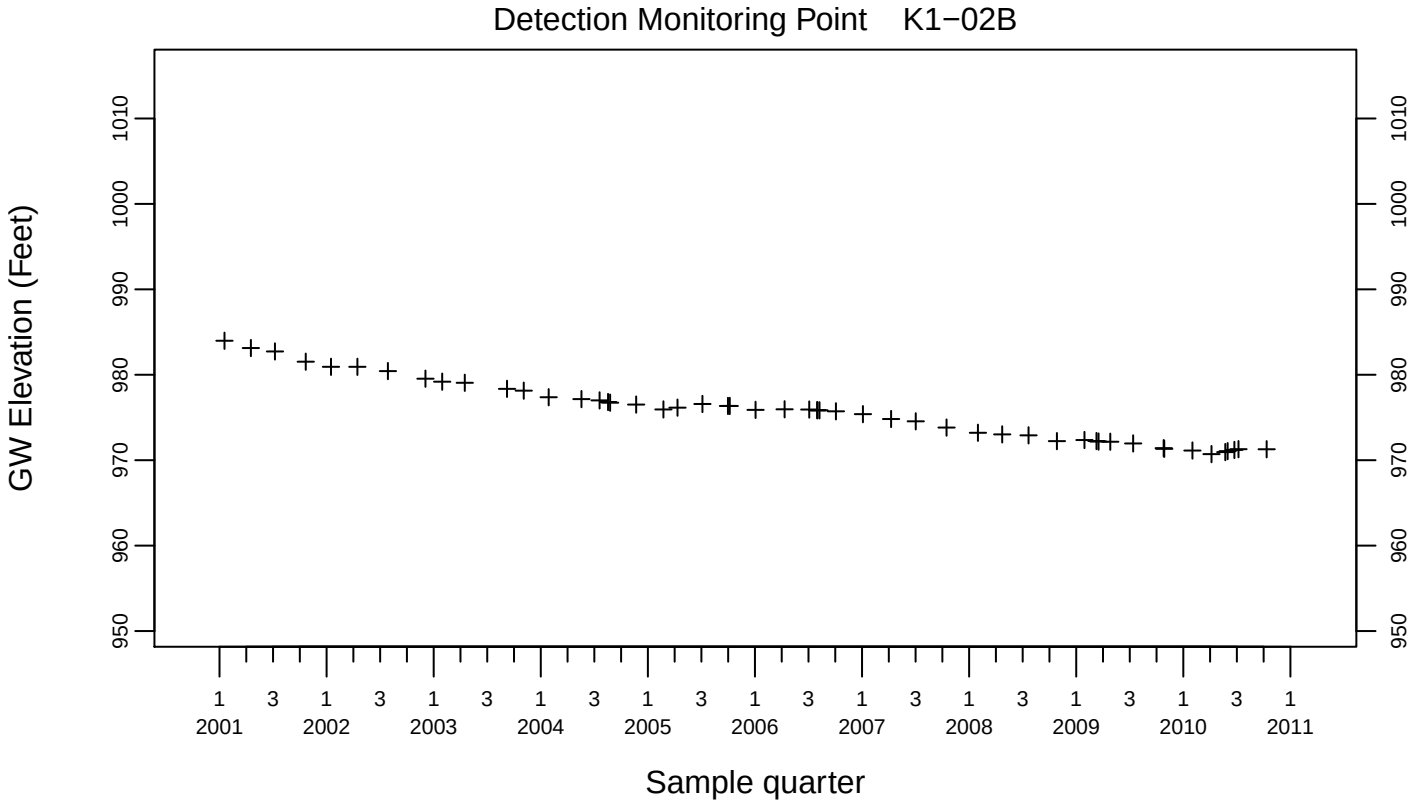
Background Monitoring Point K1−01C

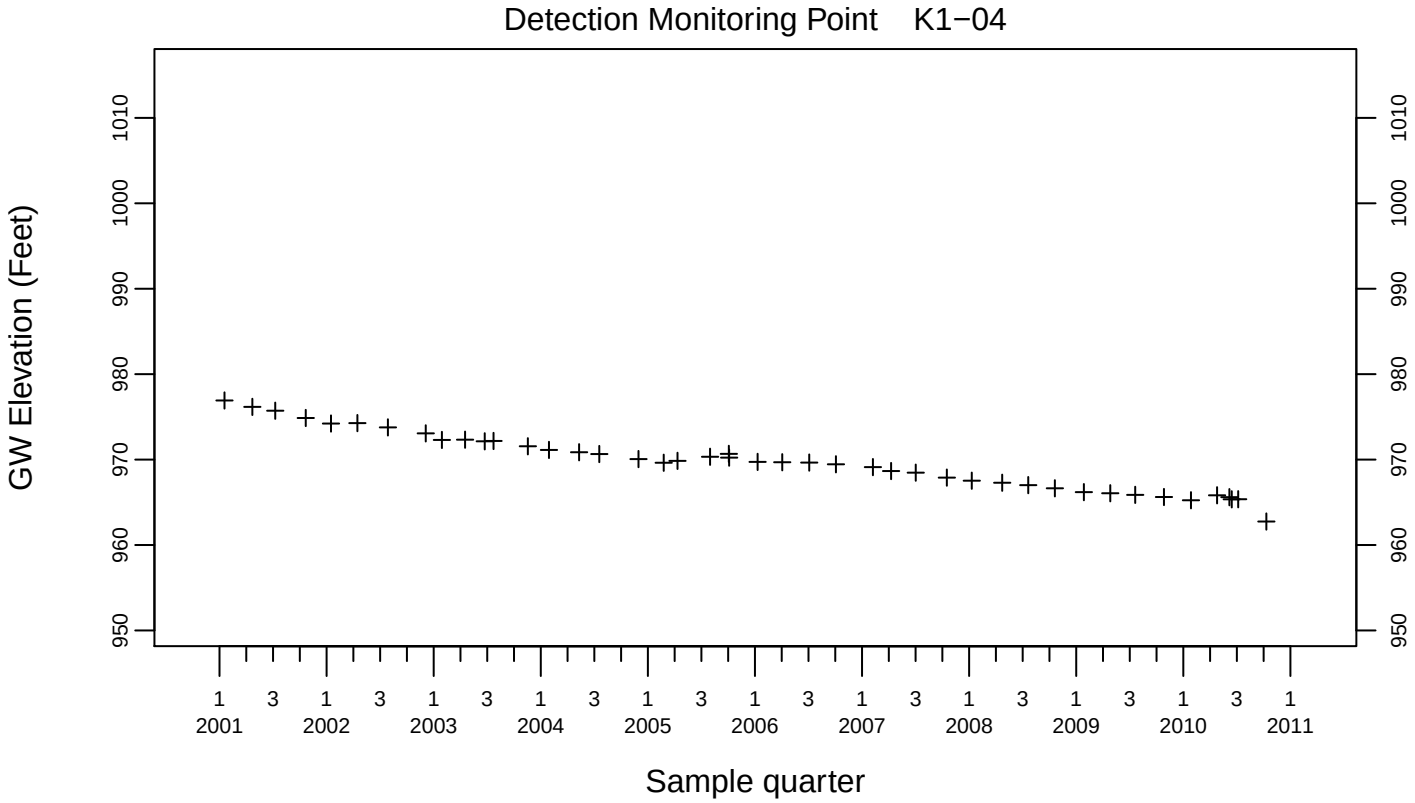


Background Monitoring Point K1−07

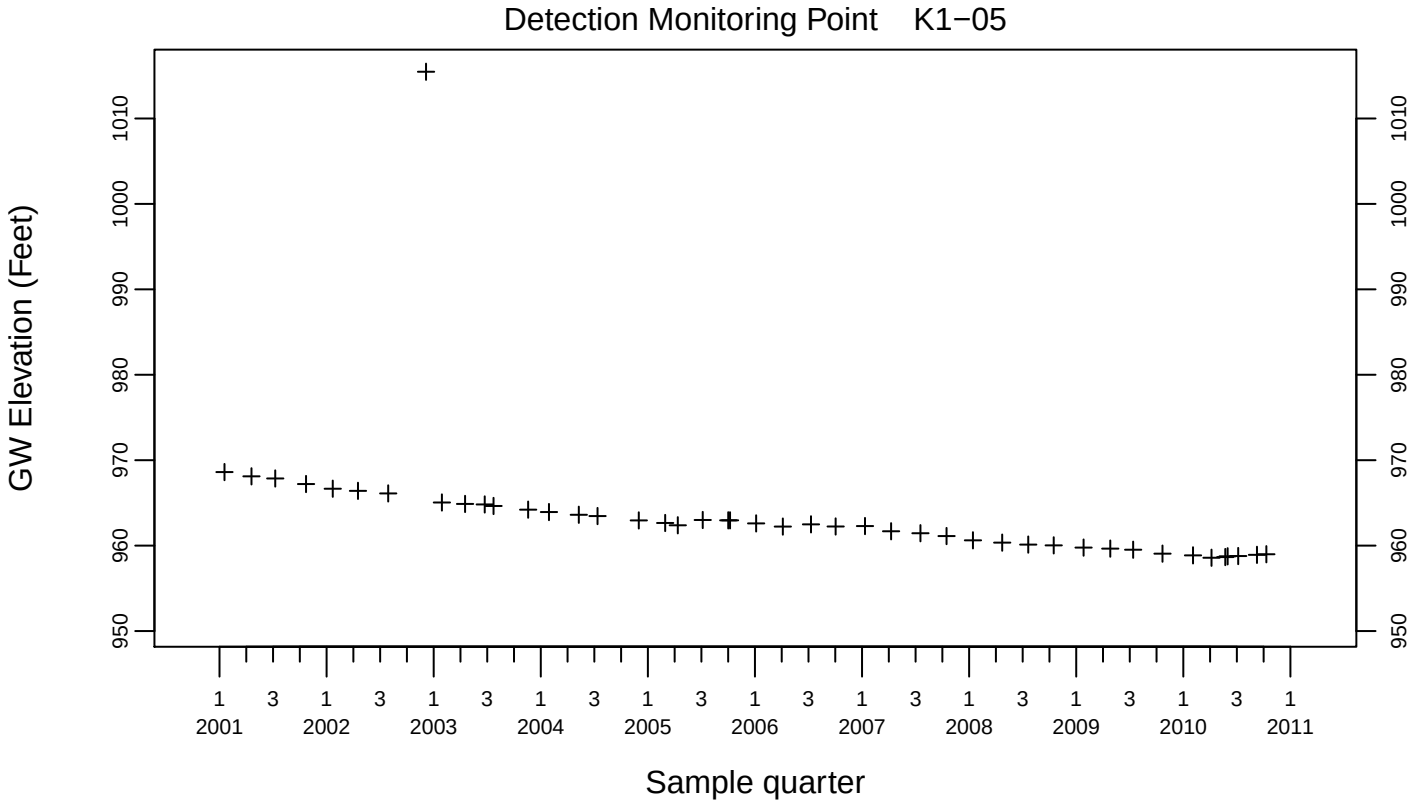


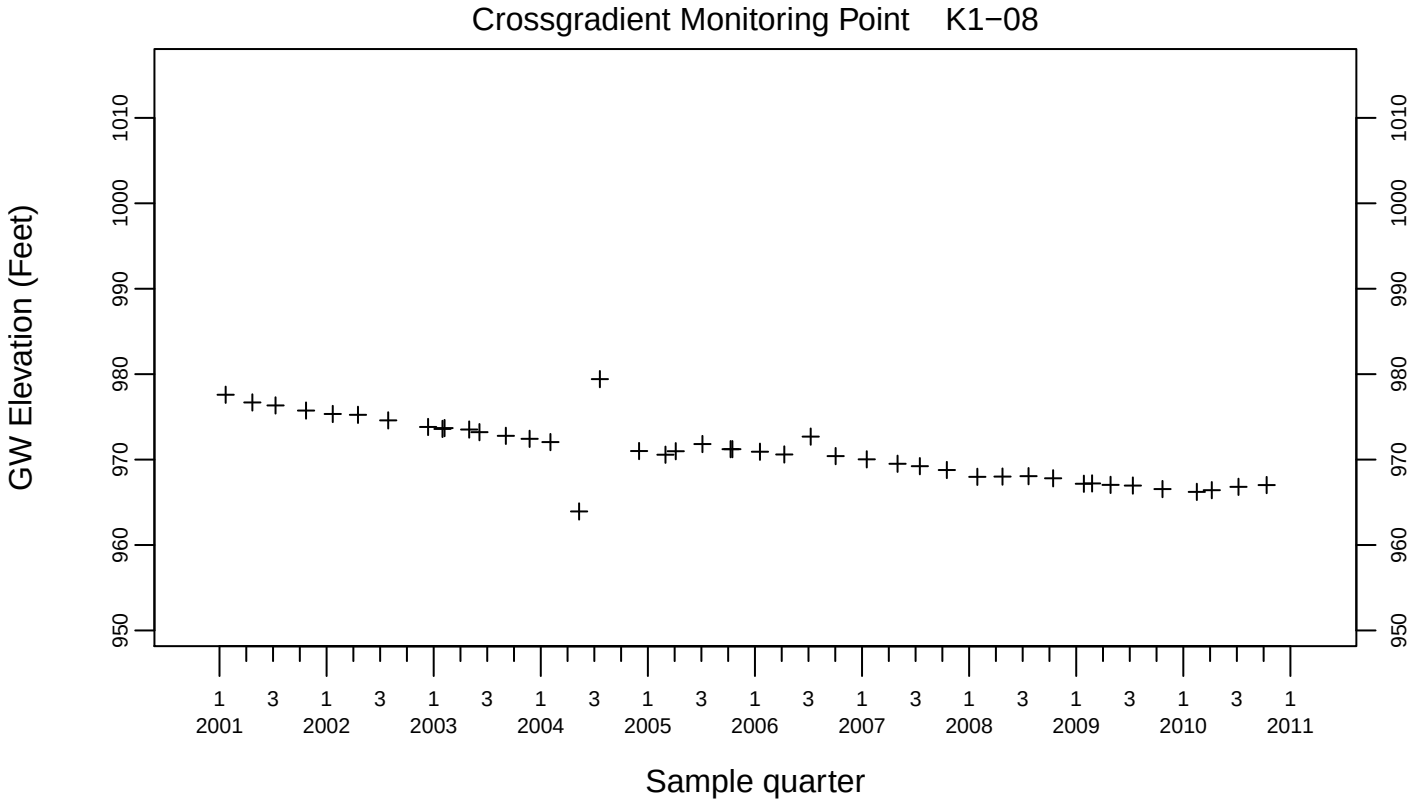
Pit 1 Area
GW Elevation (Feet)



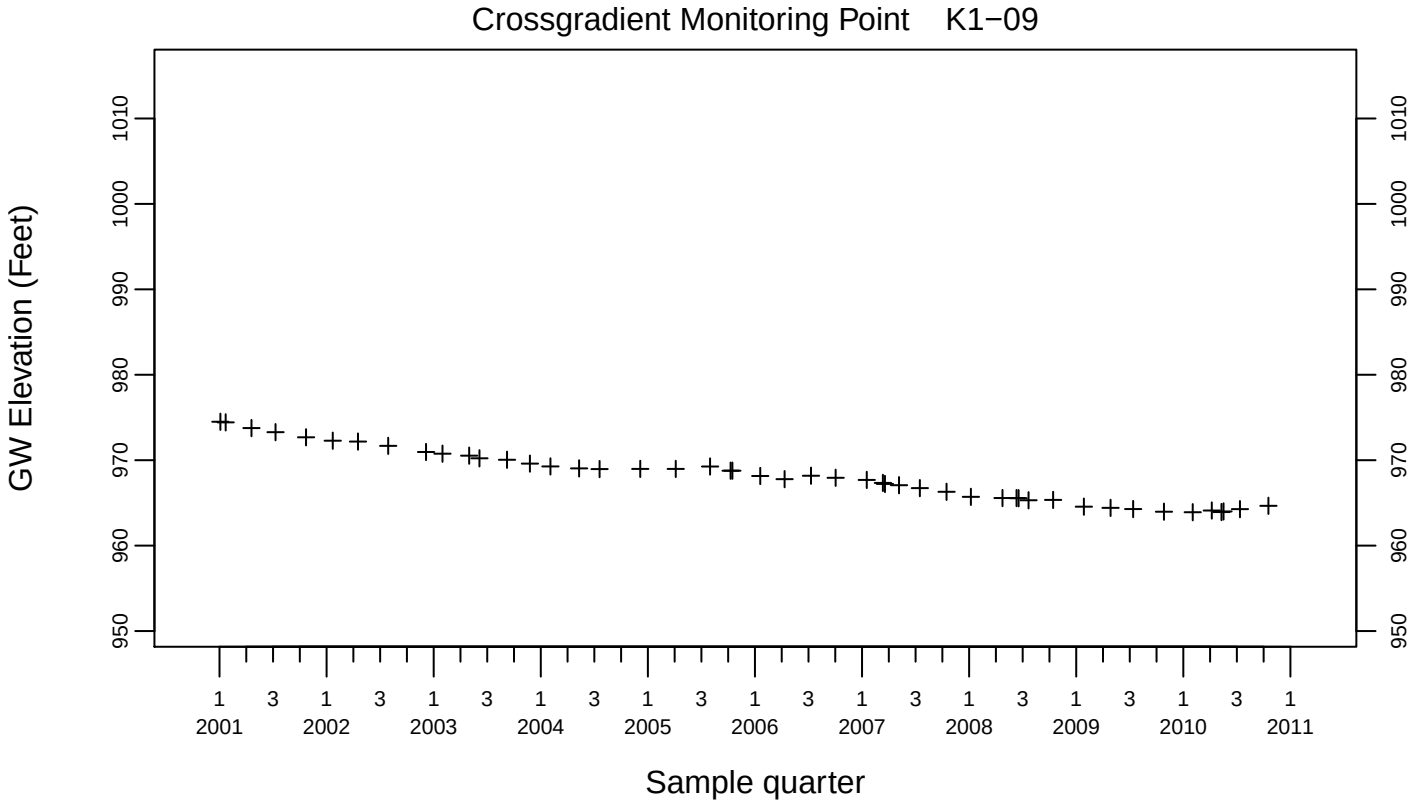


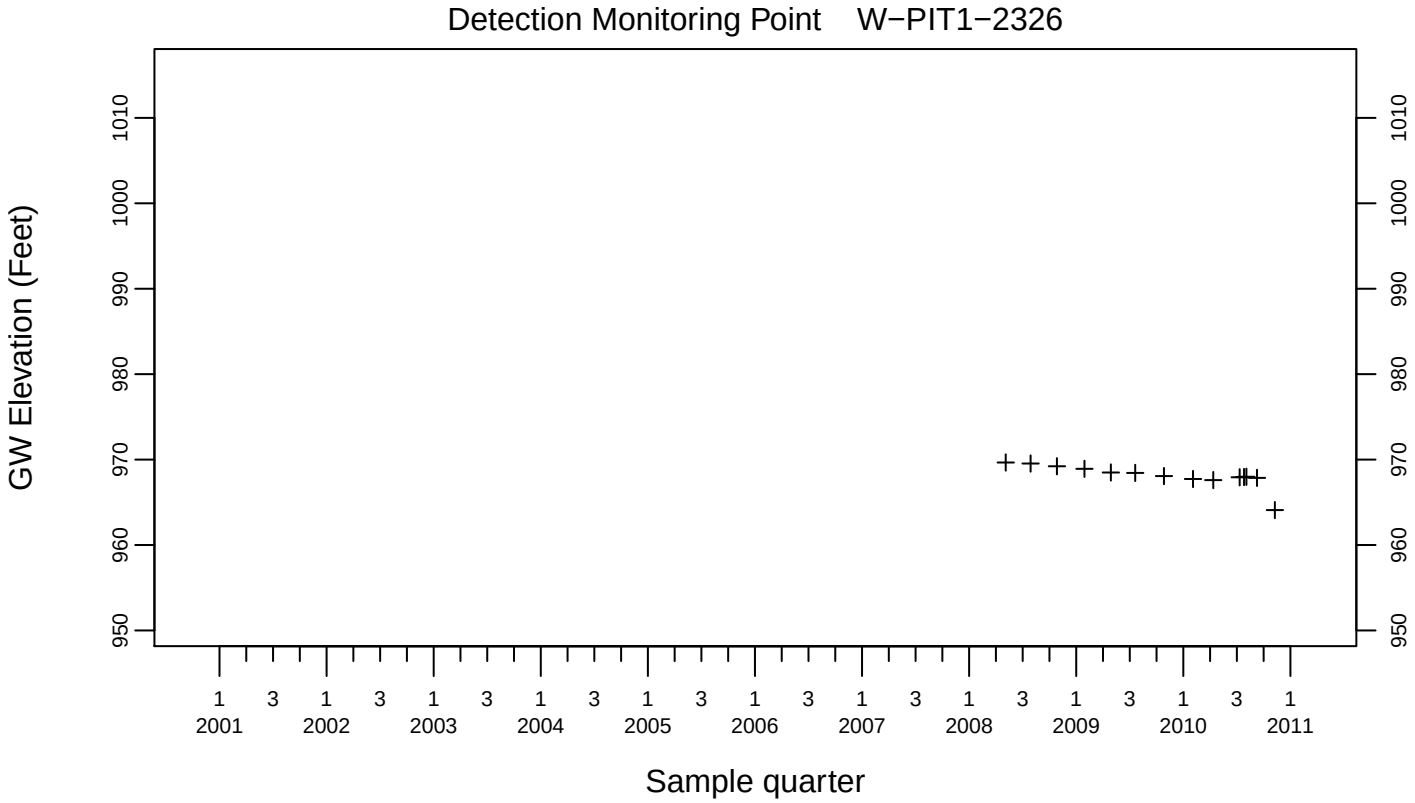
Pit 1 Area
GW Elevation (Feet)



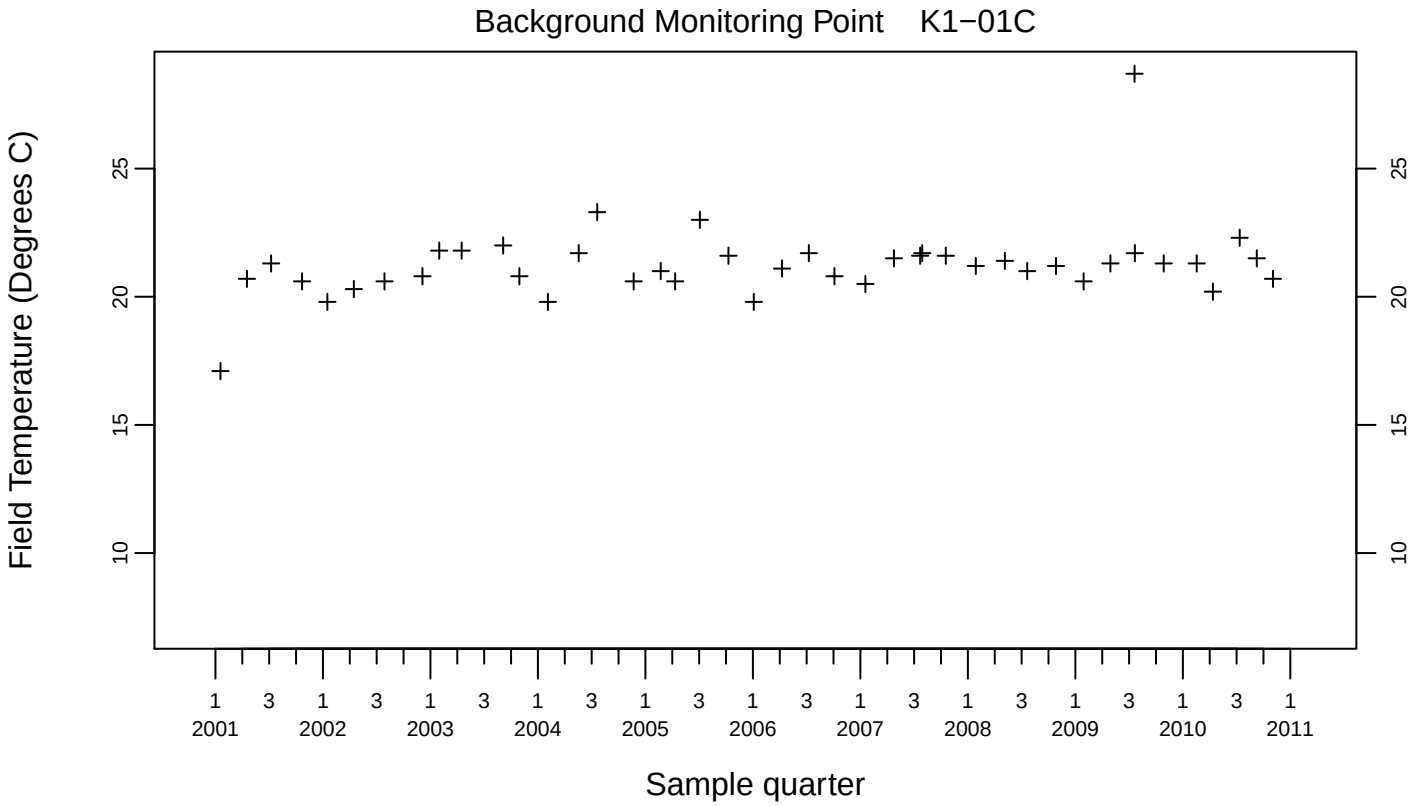


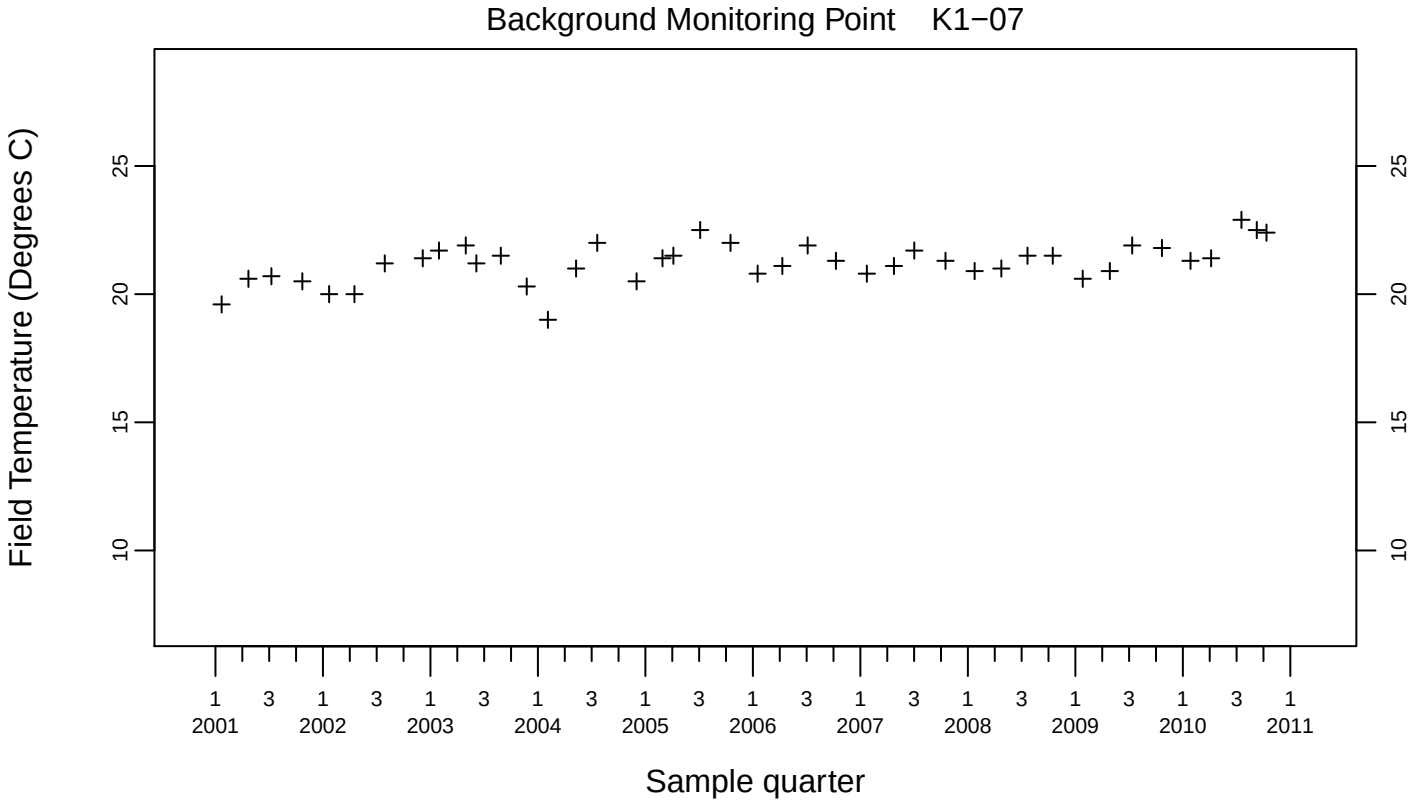
Pit 1 Area
GW Elevation (Feet)



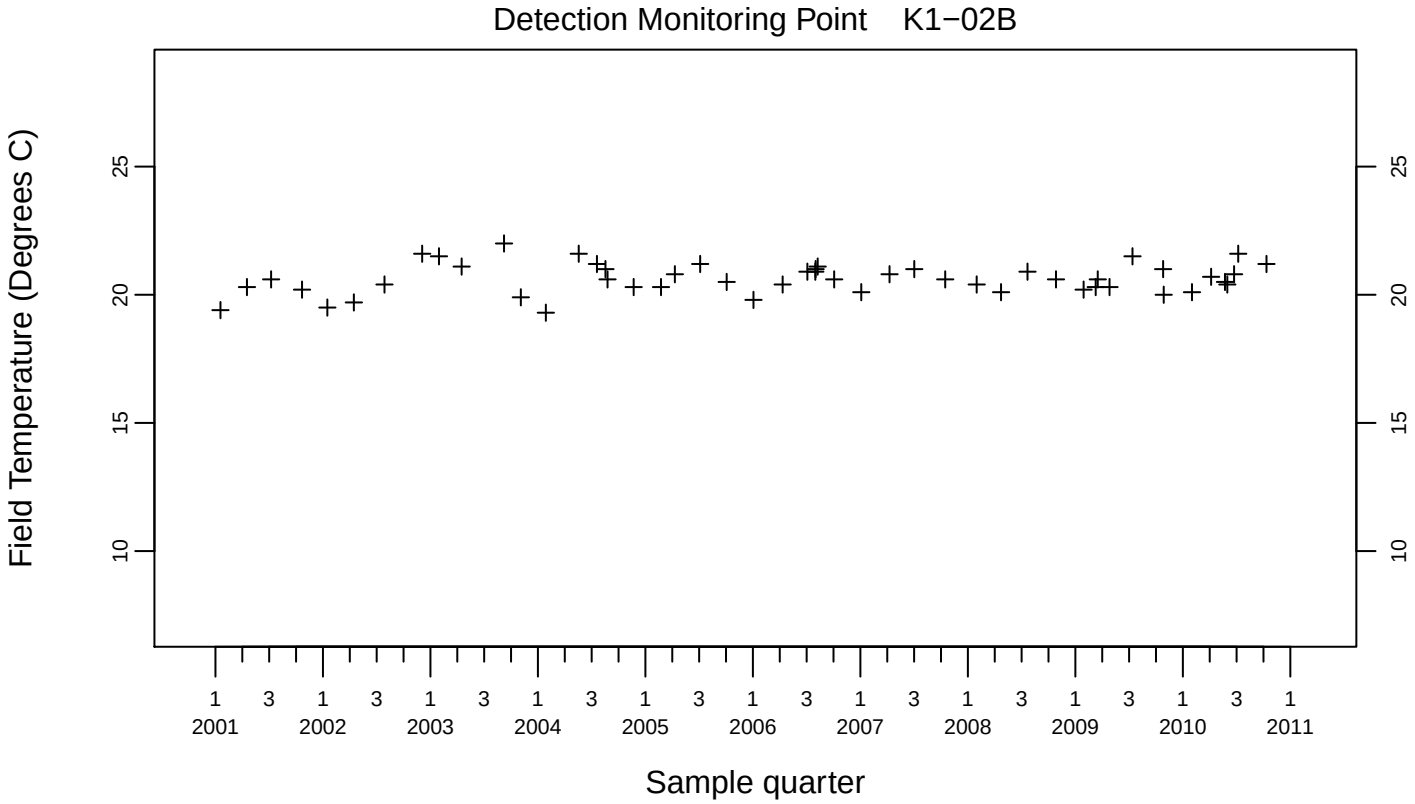


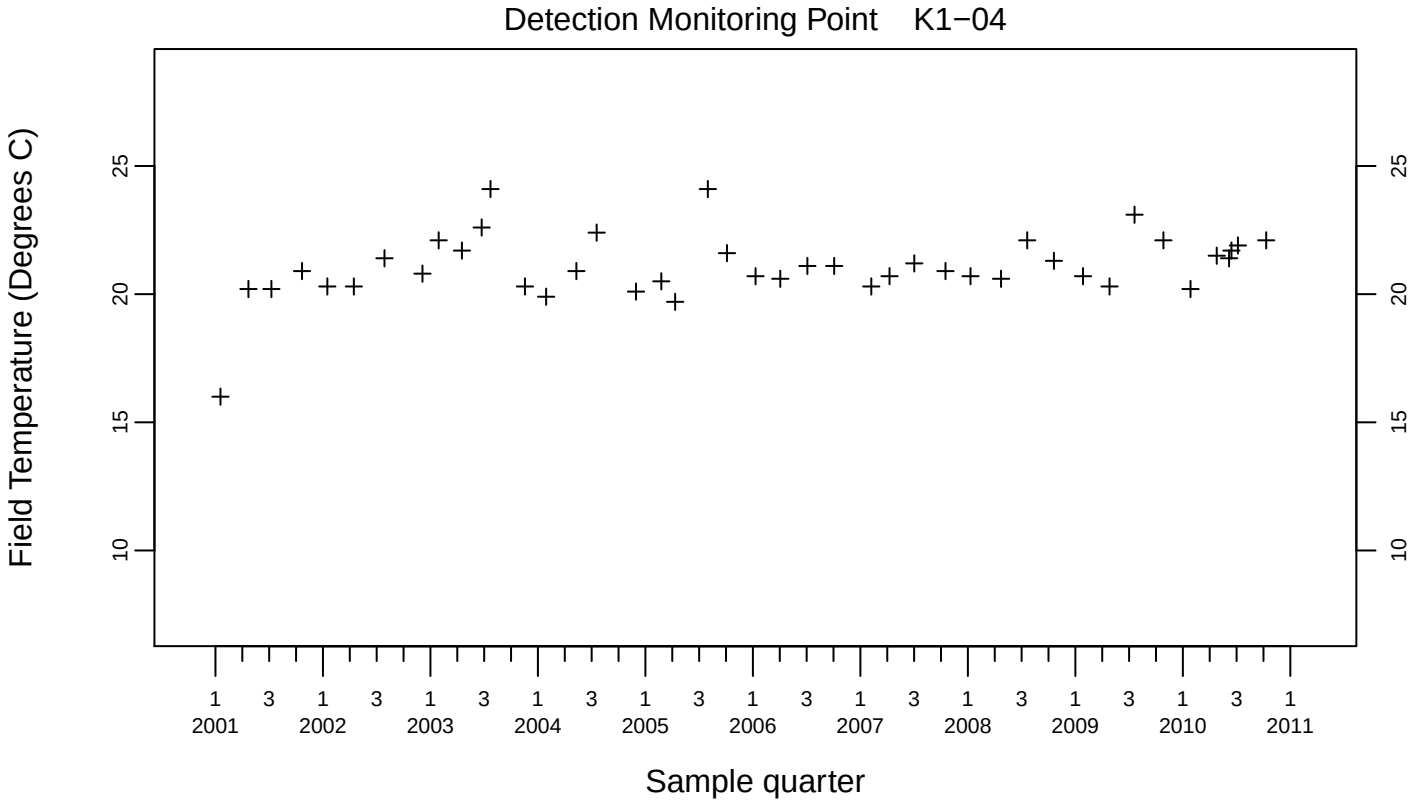
Pit 1 Area
Field Temperature (Degrees C)



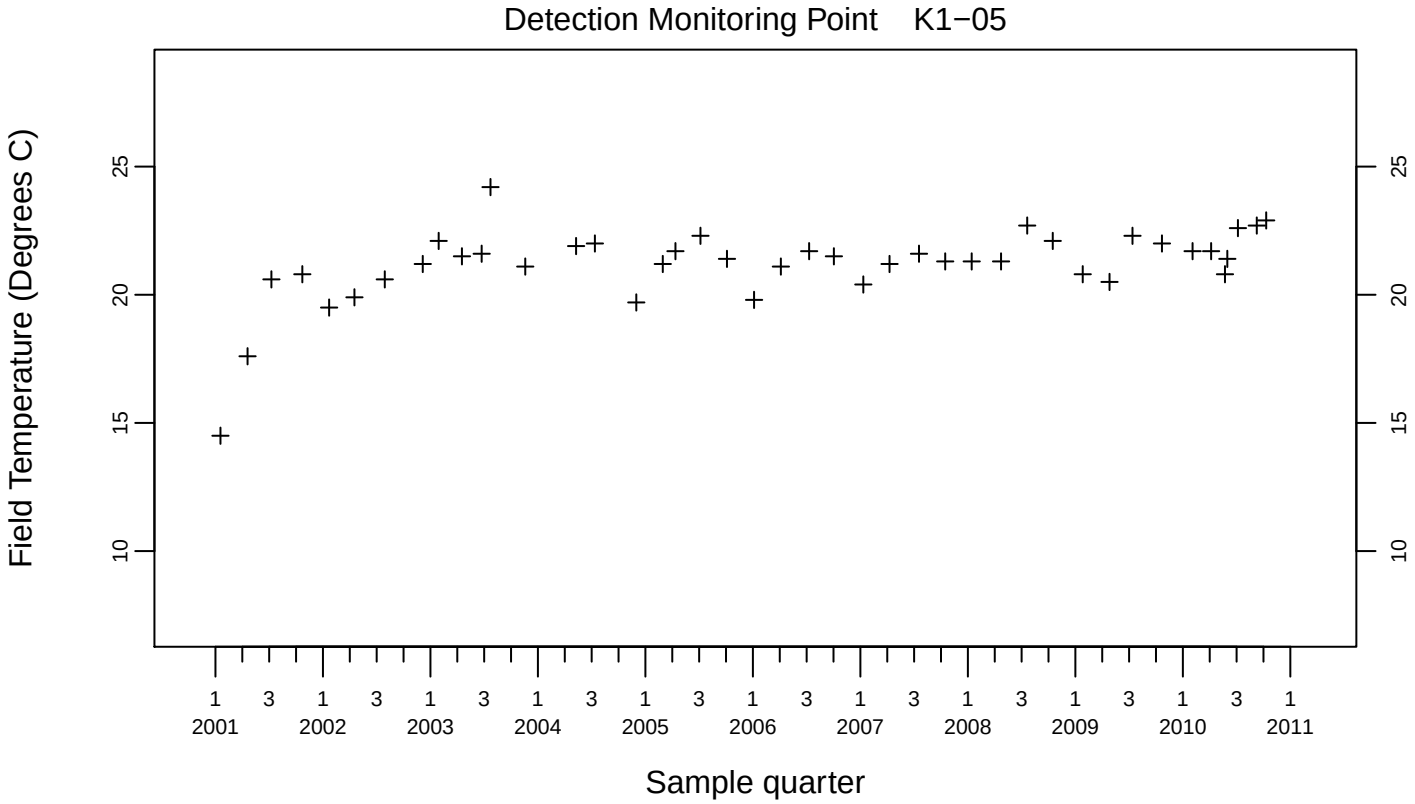


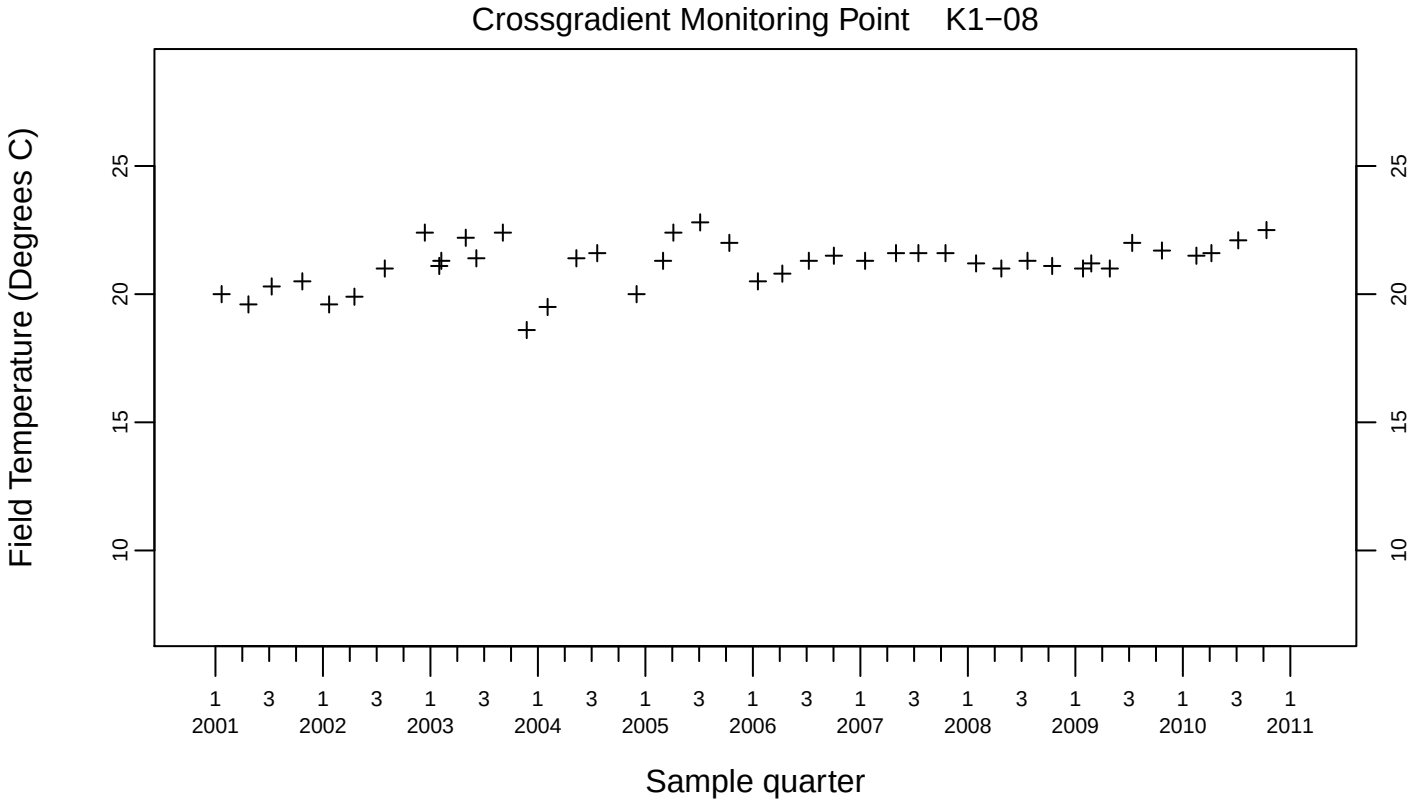
Pit 1 Area
Field Temperature (Degrees C)



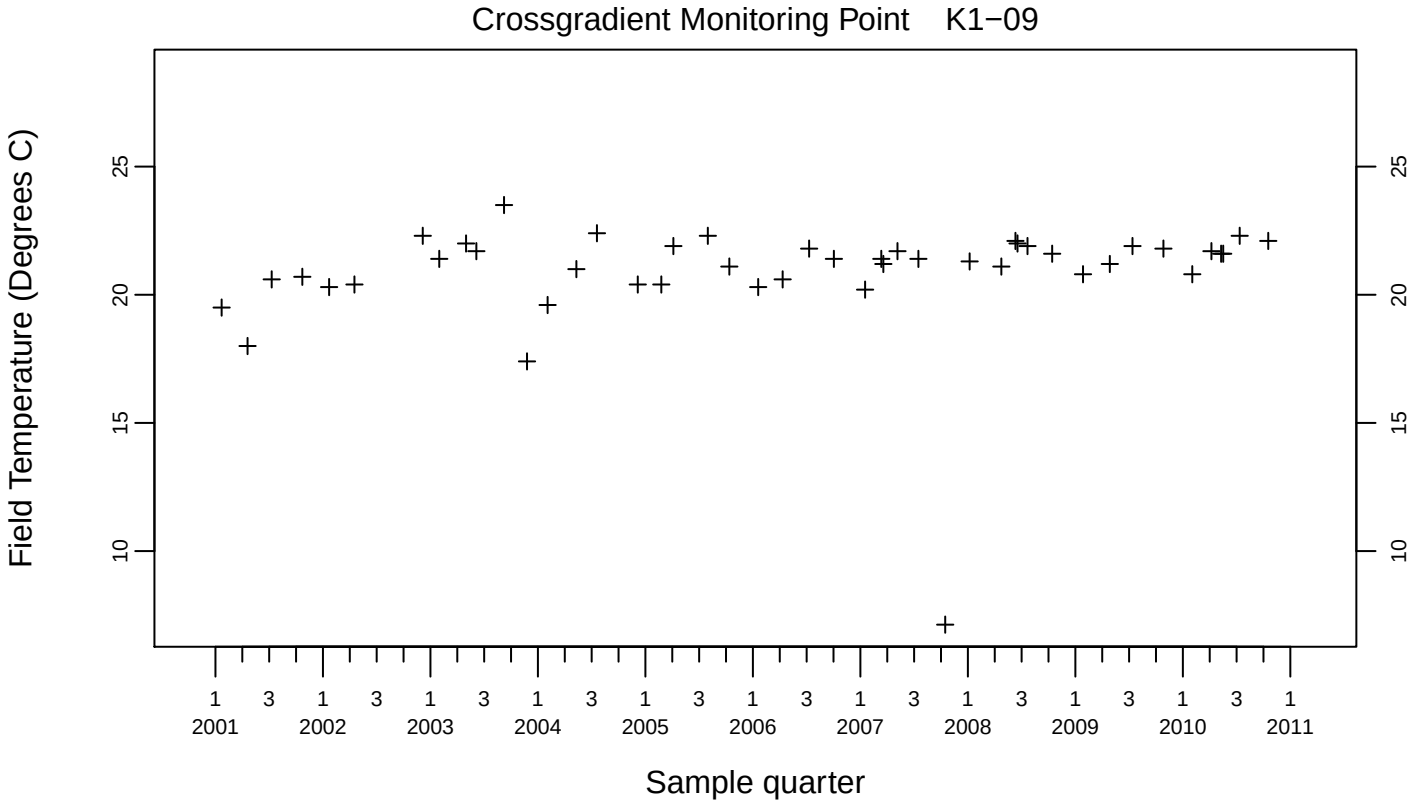


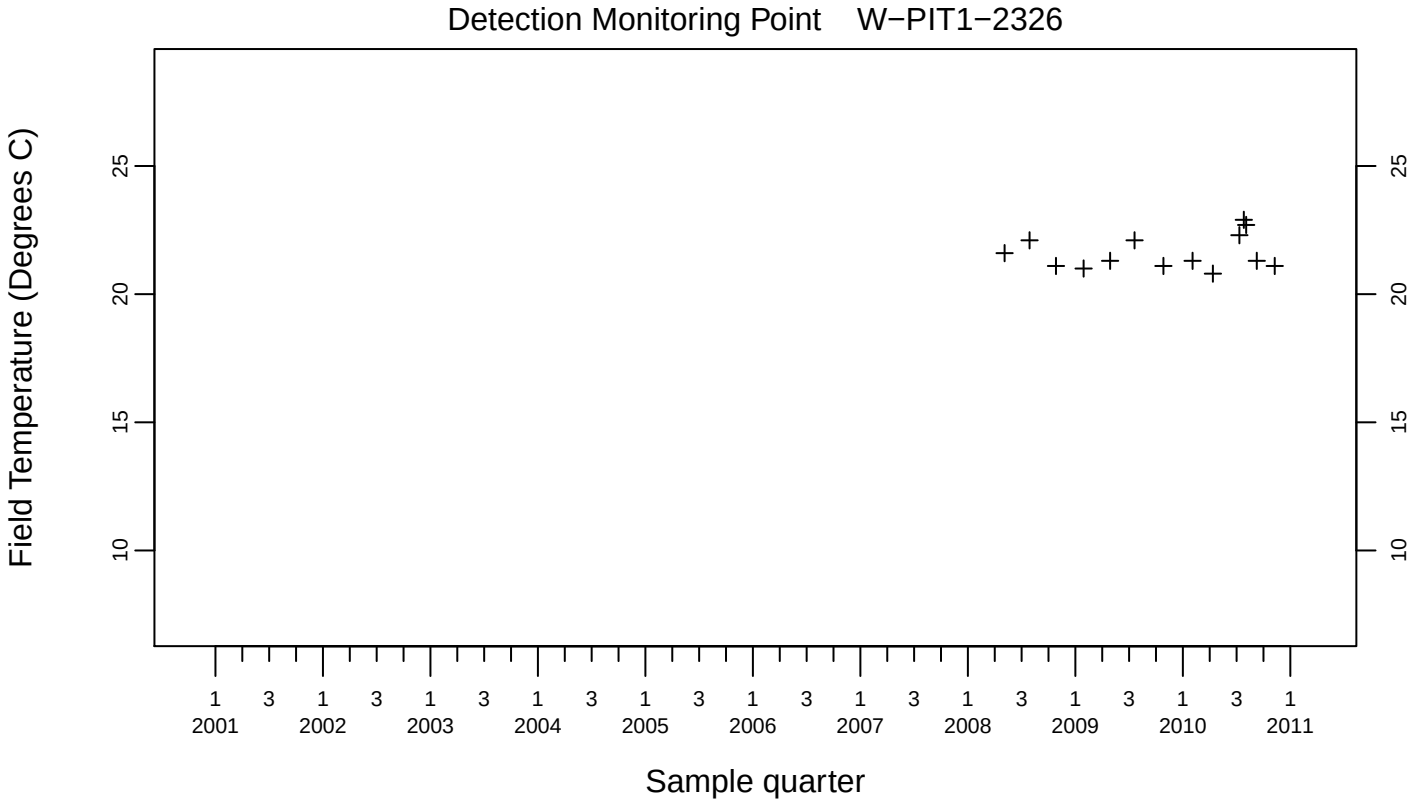
Pit 1 Area
Field Temperature (Degrees C)

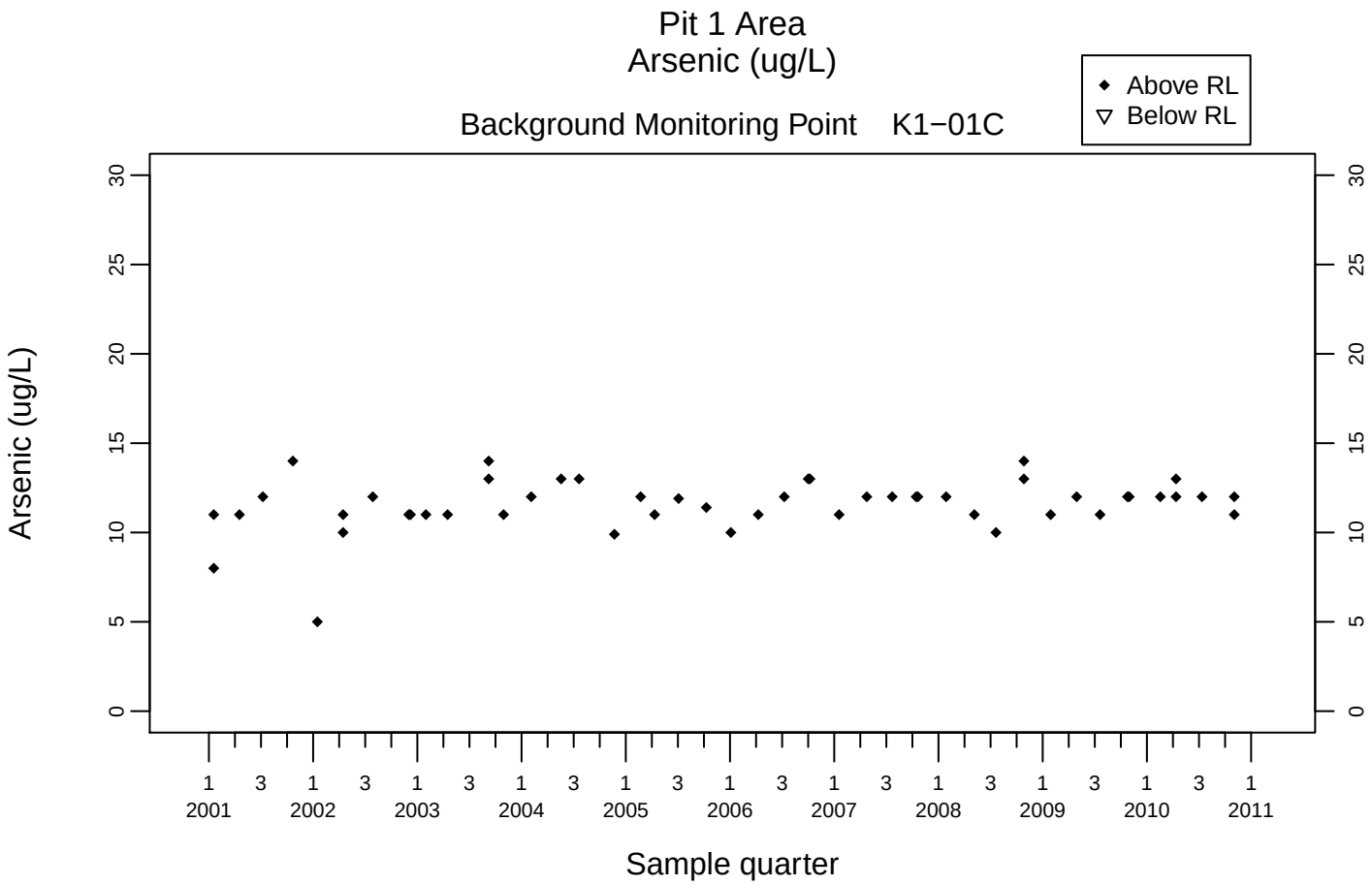


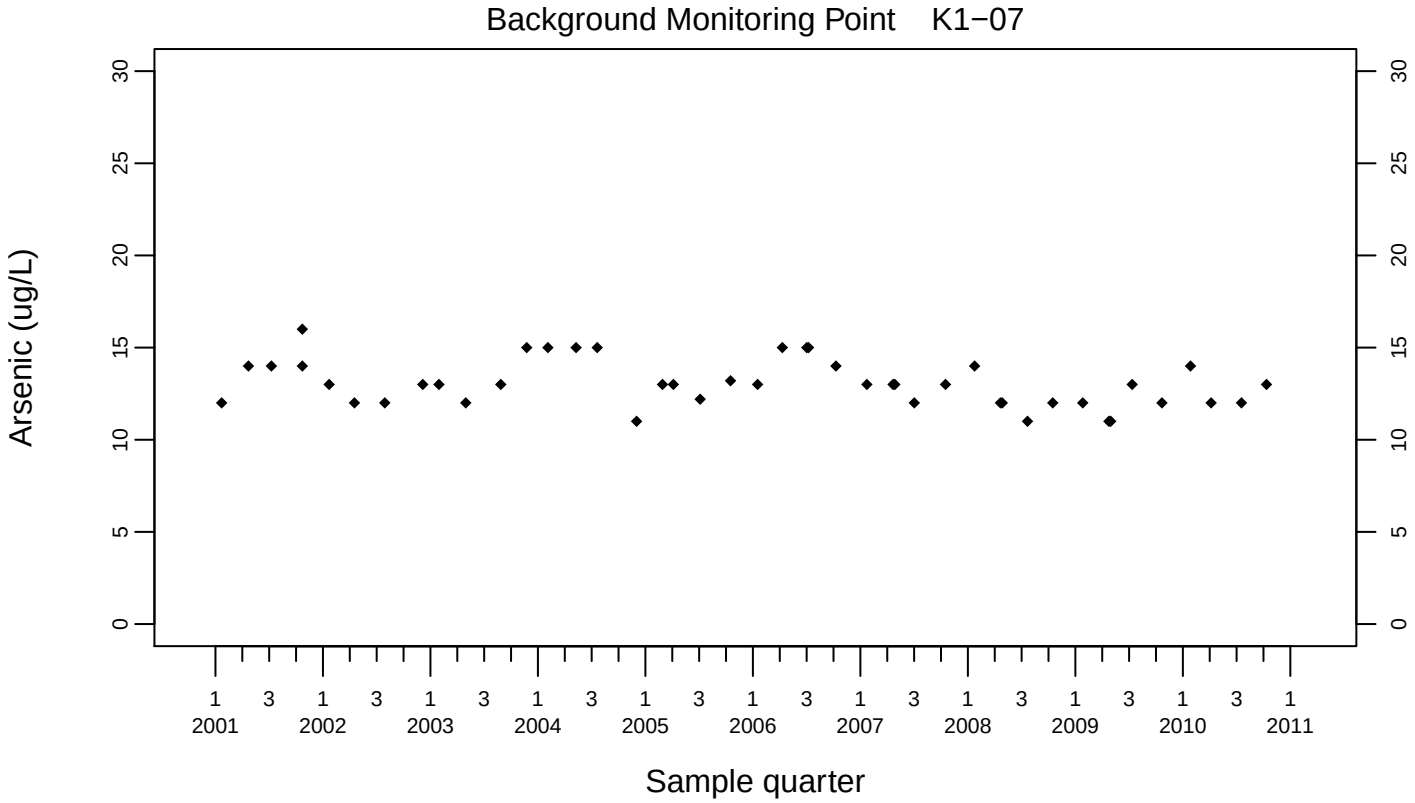


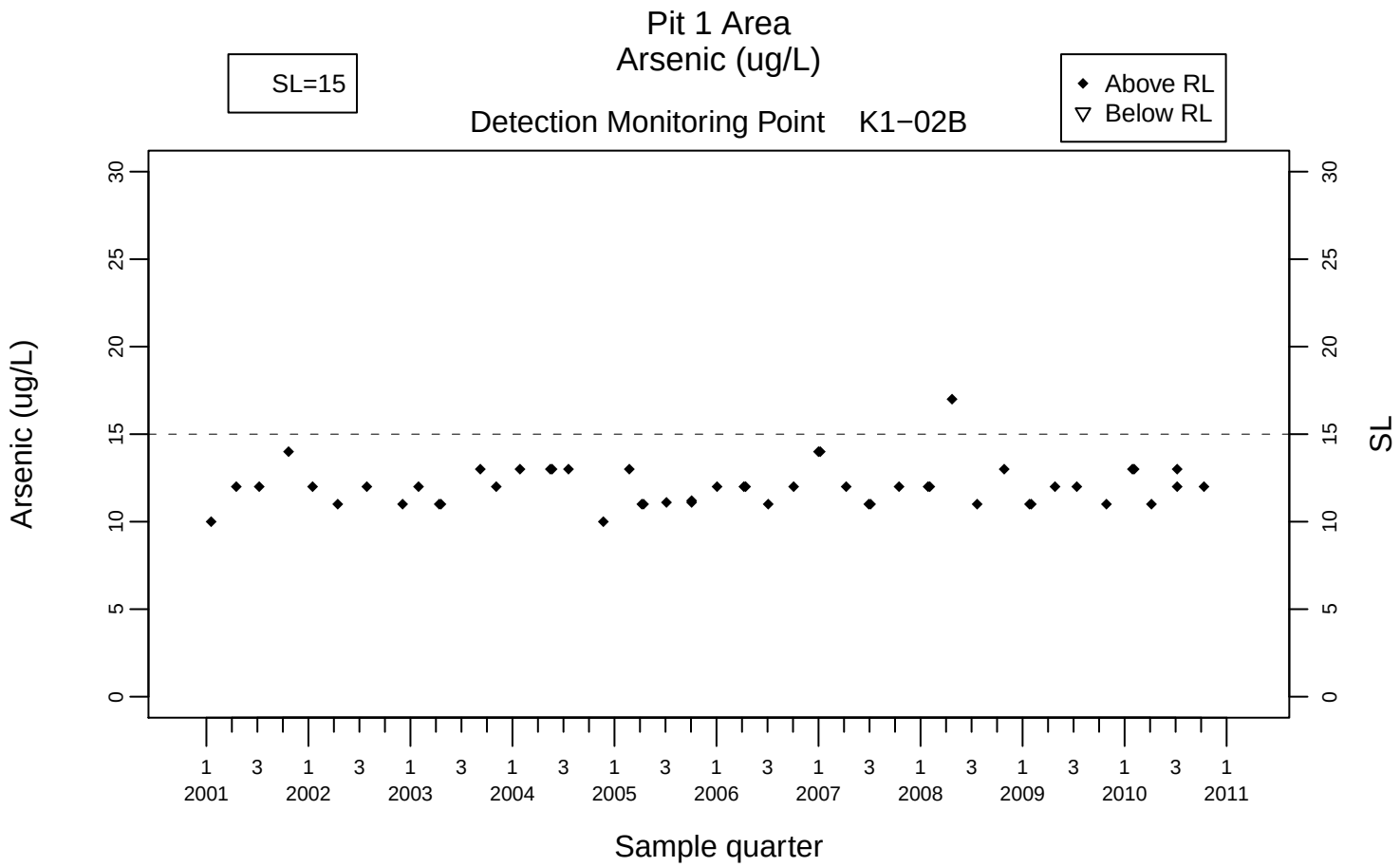
Pit 1 Area
Field Temperature (Degrees C)

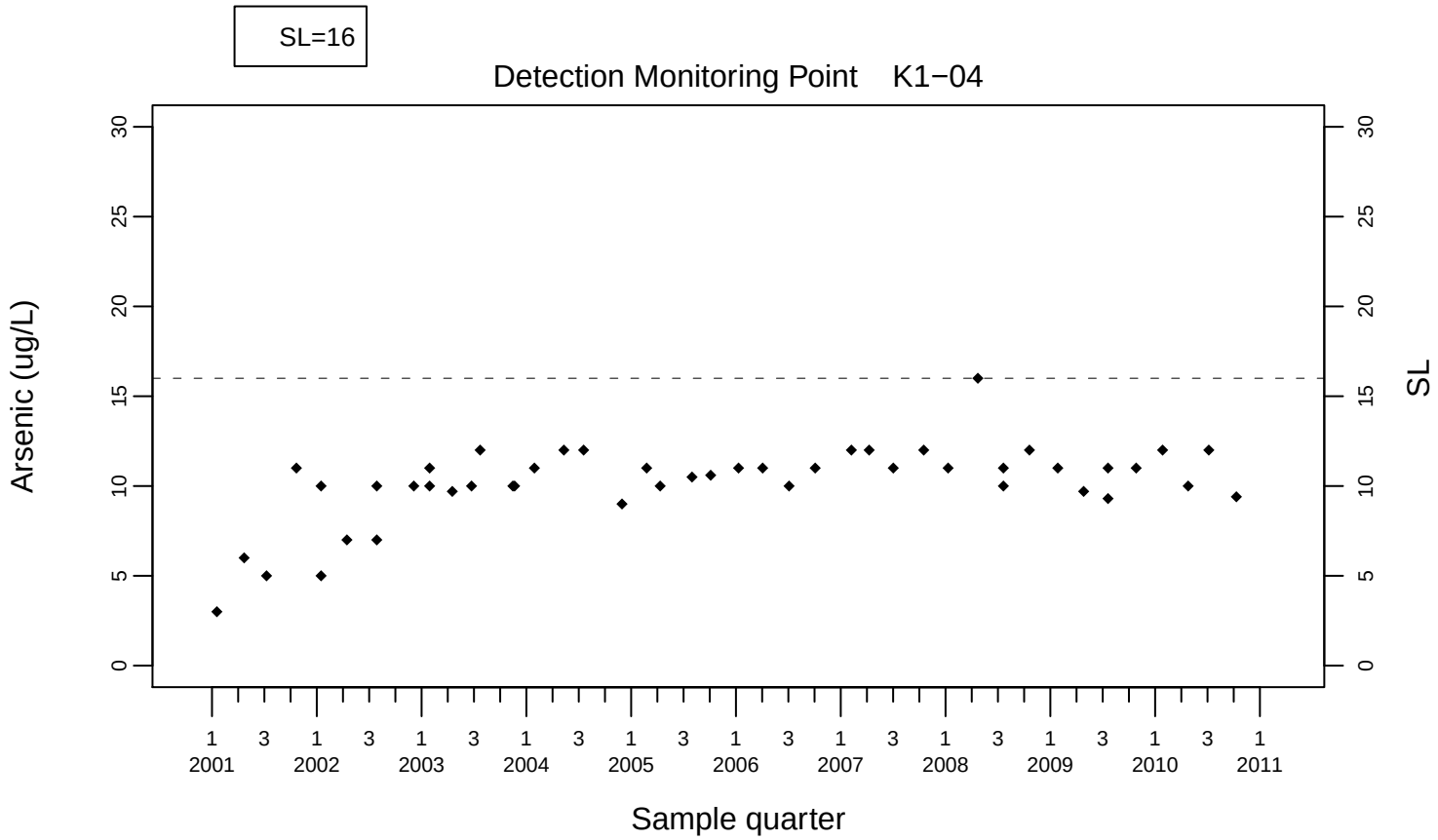


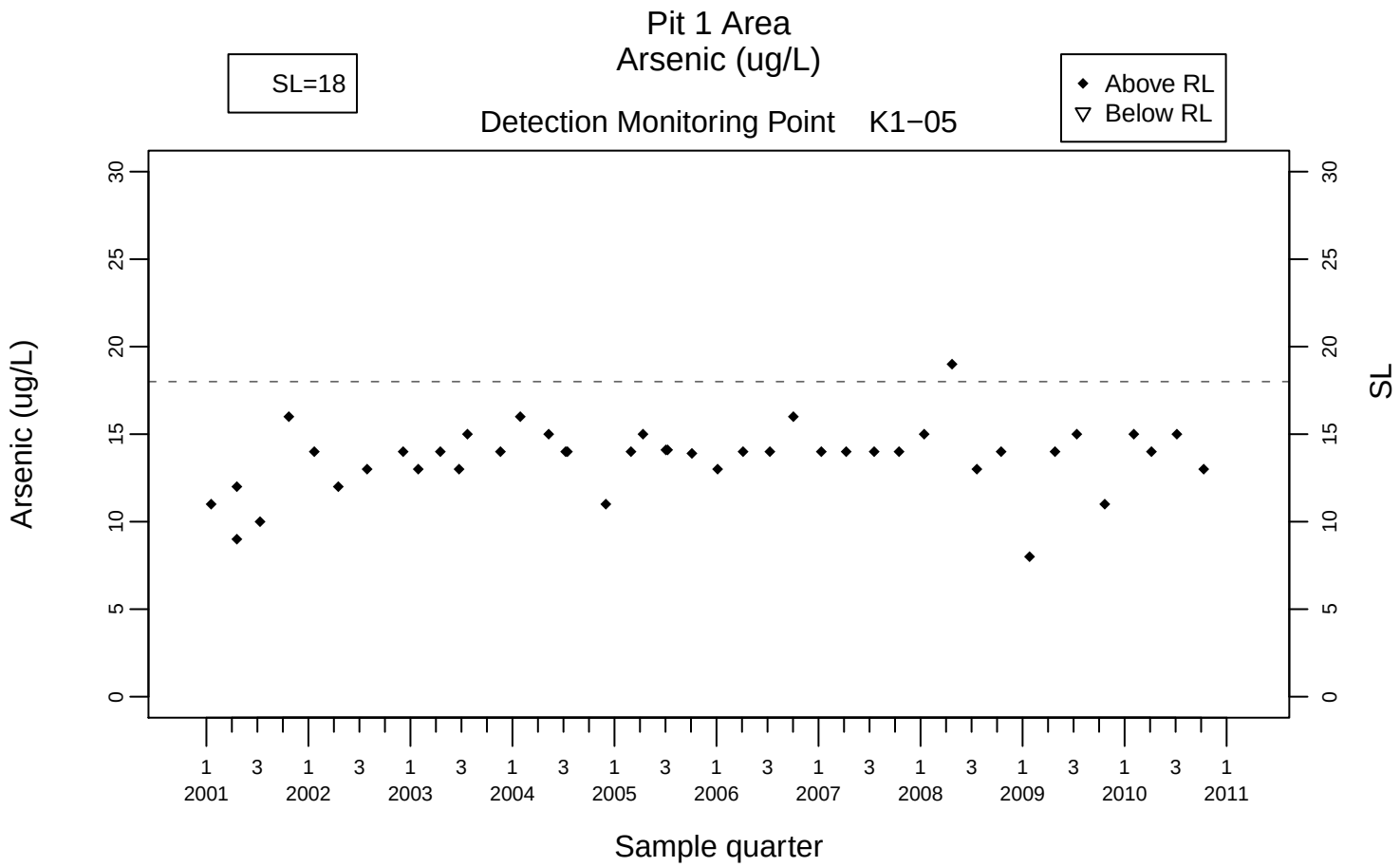


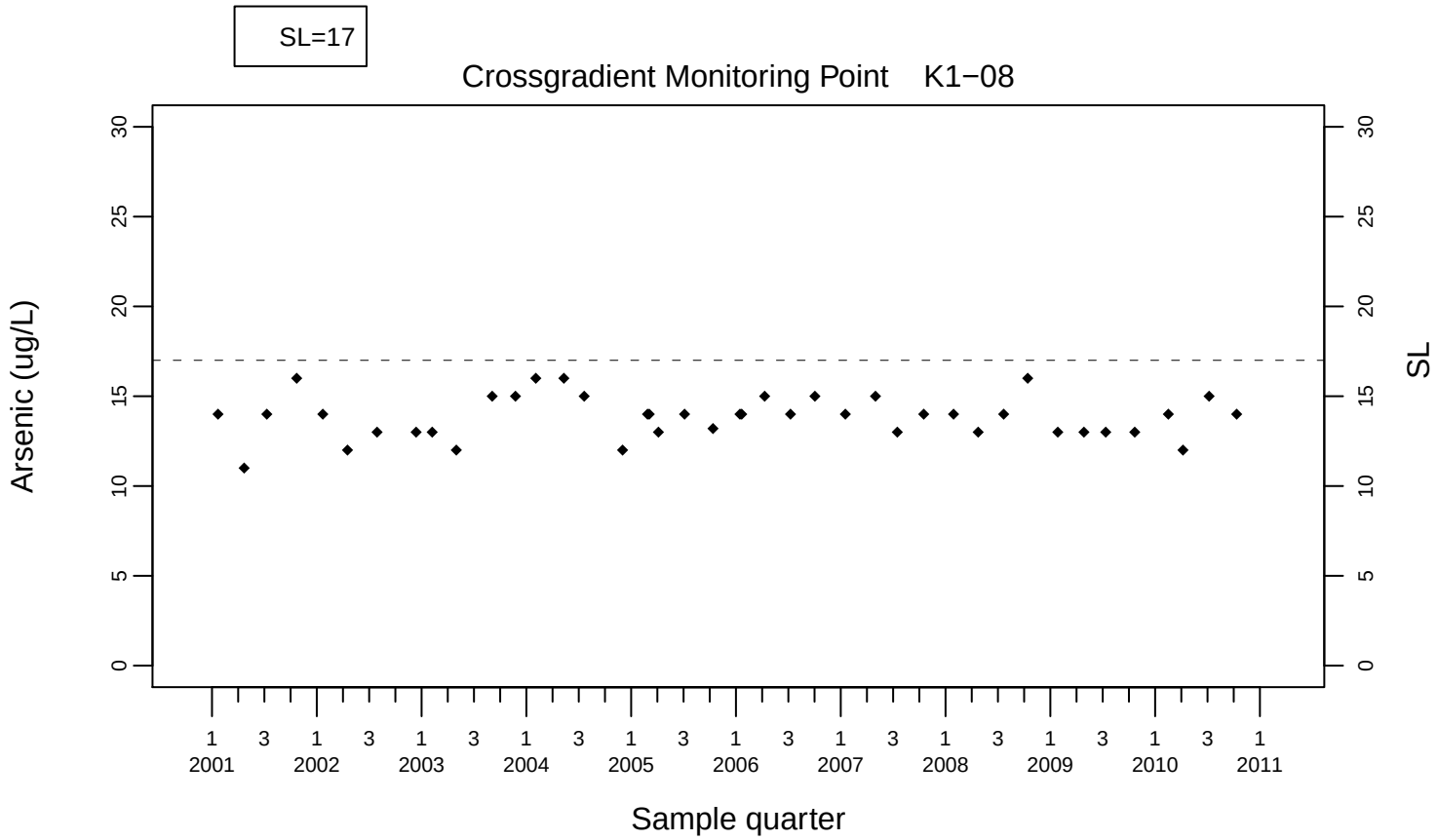

Pit 1 Area
Arsenic (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Arsenic (ug/L)
0
5
10
15
20
25
30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

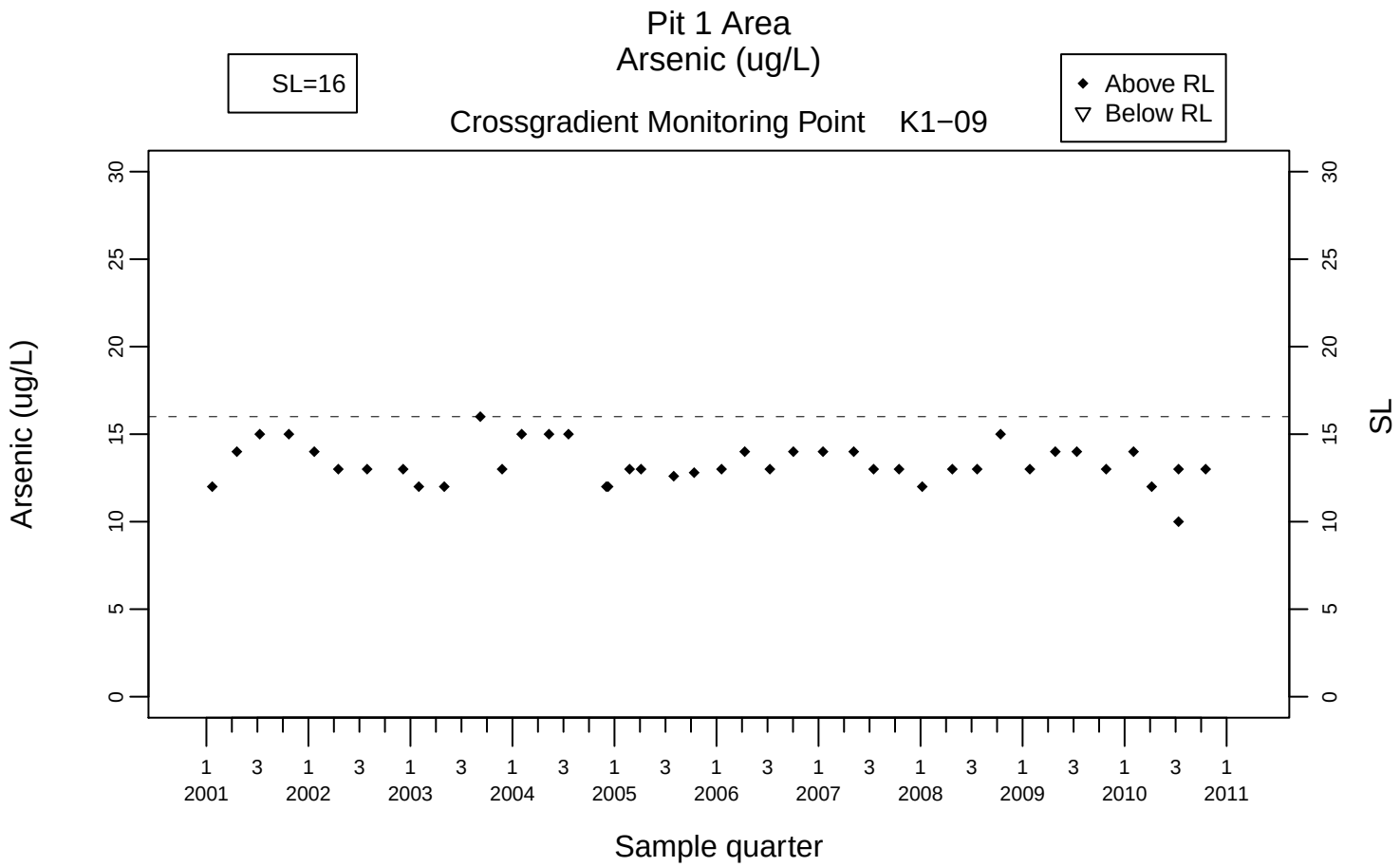

Background Monitoring Point K1−07
Arsenic (ug/L)
0
5
10
15
20
25
30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

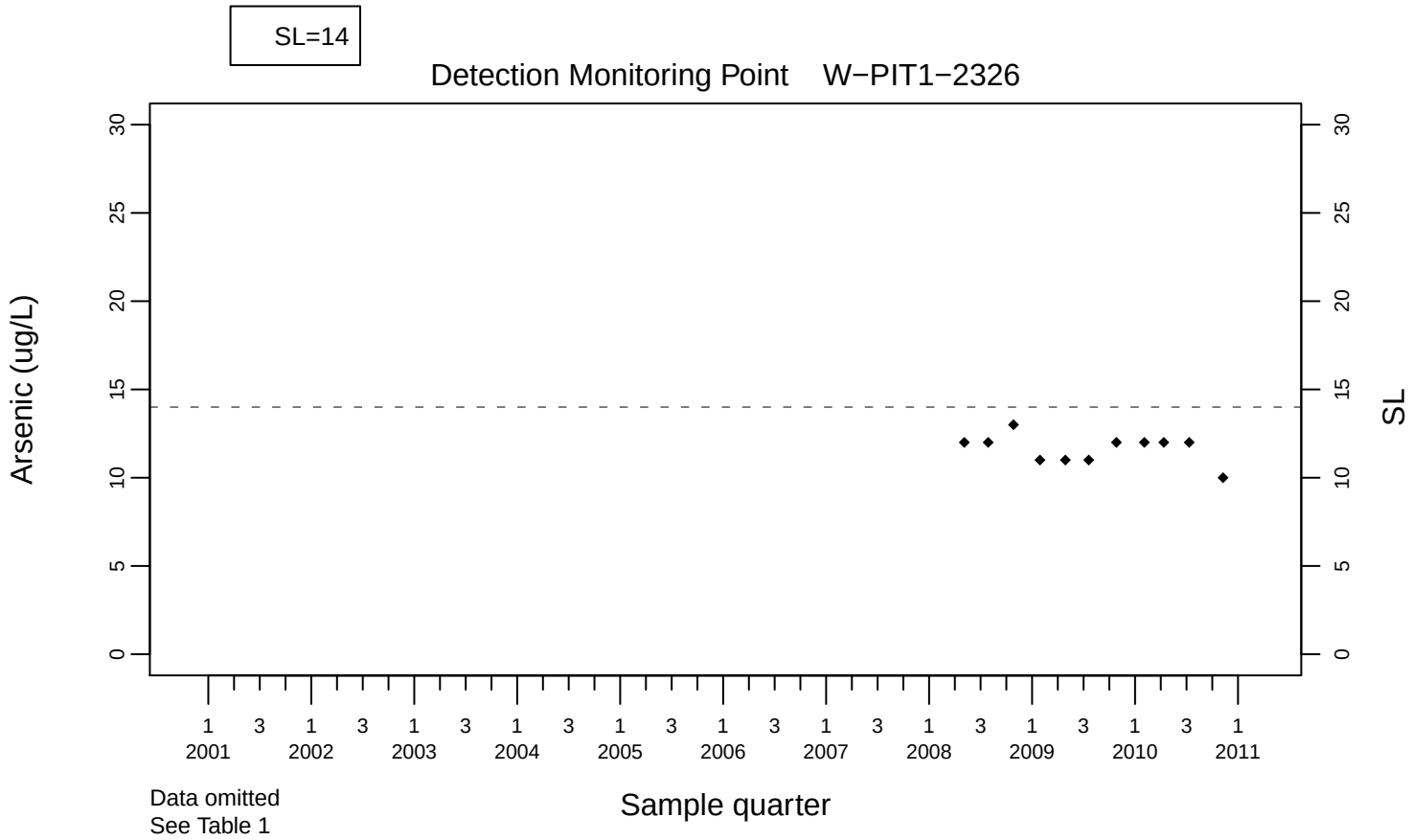

Pit 1 Area
Arsenic (ug/L)
SL=15
Above RL
Below RL
Detection Monitoring Point K1−02B
Arsenic (ug/L)
SL
Sample quarter
1 2001
3
1 2002
3
1 2003
3
1 2004
3
1 2005
3
1 2006
3
1 2007
3
1 2008
3
1 2009
3
1 2010
3
1 2011


SL=16
Detection Monitoring Point K1−04
Arsenic (ug/L)
SL
Sample quarter
1 2001
3
1 2002
3
1 2003
3
1 2004
3
1 2005
3
1 2006
3
1 2007
3
1 2008
3
1 2009
3
1 2010
3
1 2011

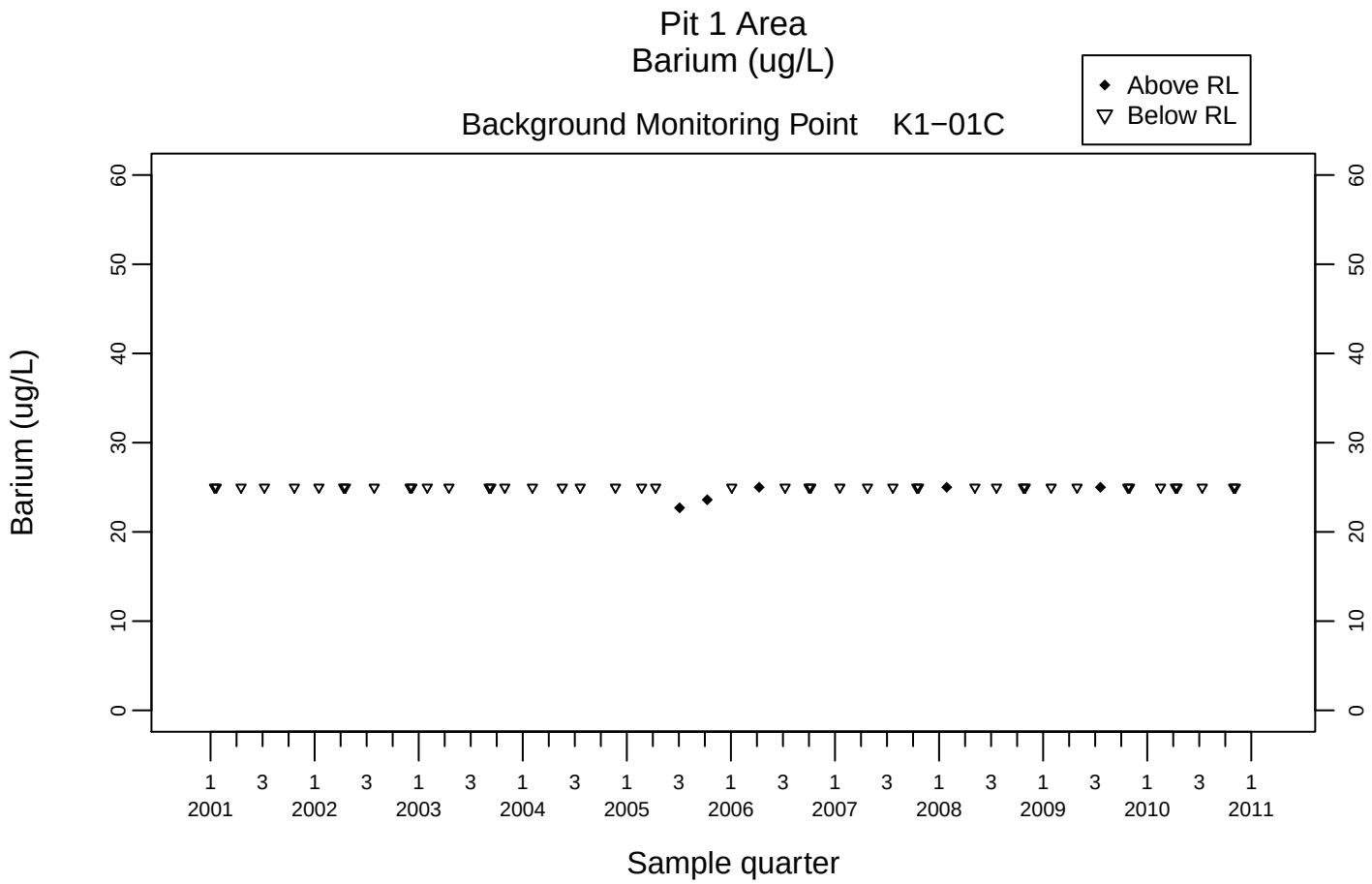

Pit 1 Area
Arsenic (ug/L)
SL=18
Above RL
Below RL
Detection Monitoring Point K1−05
Arsenic (ug/L)
SL
Sample quarter
0
5
10
15
20
25
30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

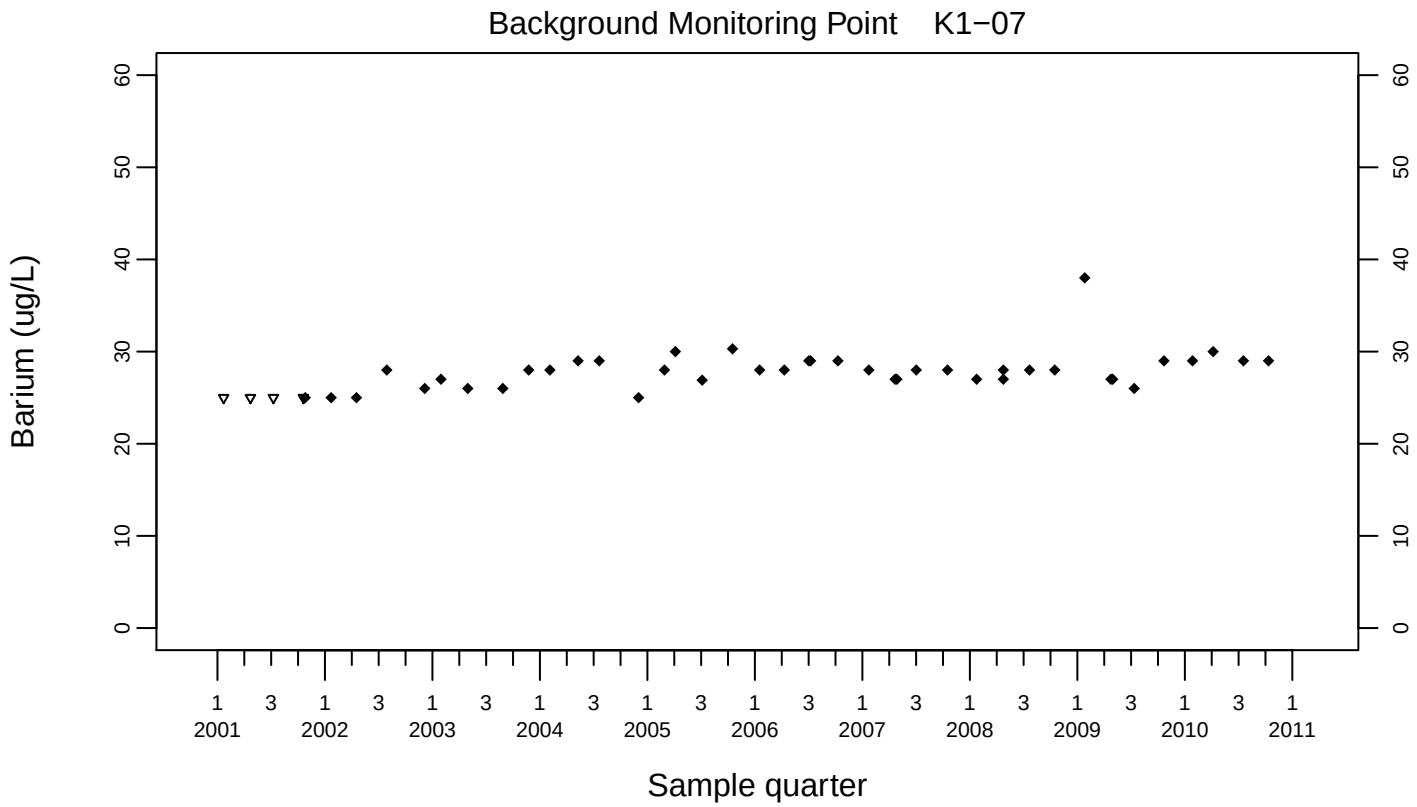

SL=17
Crossgradient Monitoring Point K1−08
Arsenic (ug/L)
SL
Sample quarter
0
5
10
15
20
25
30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

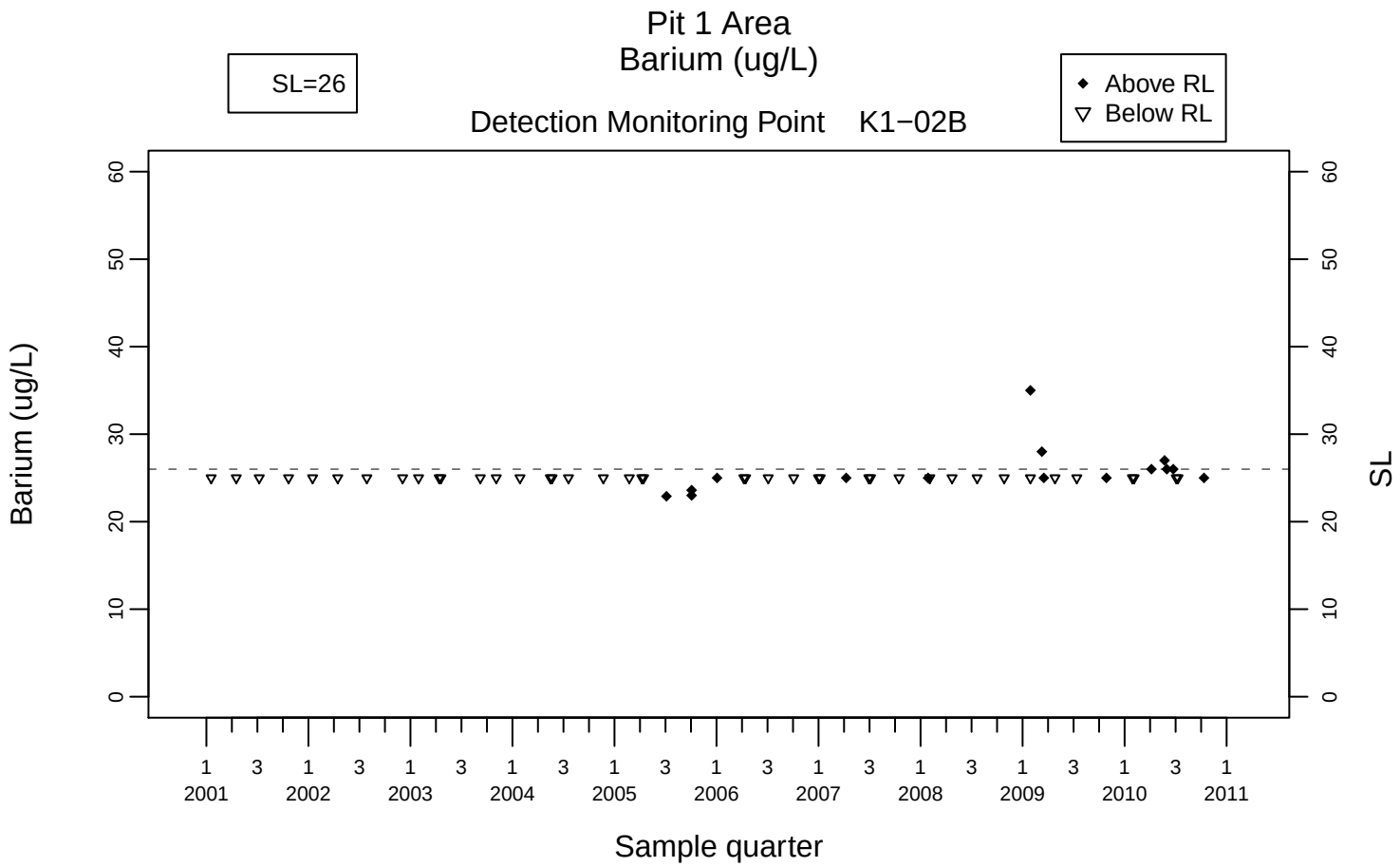


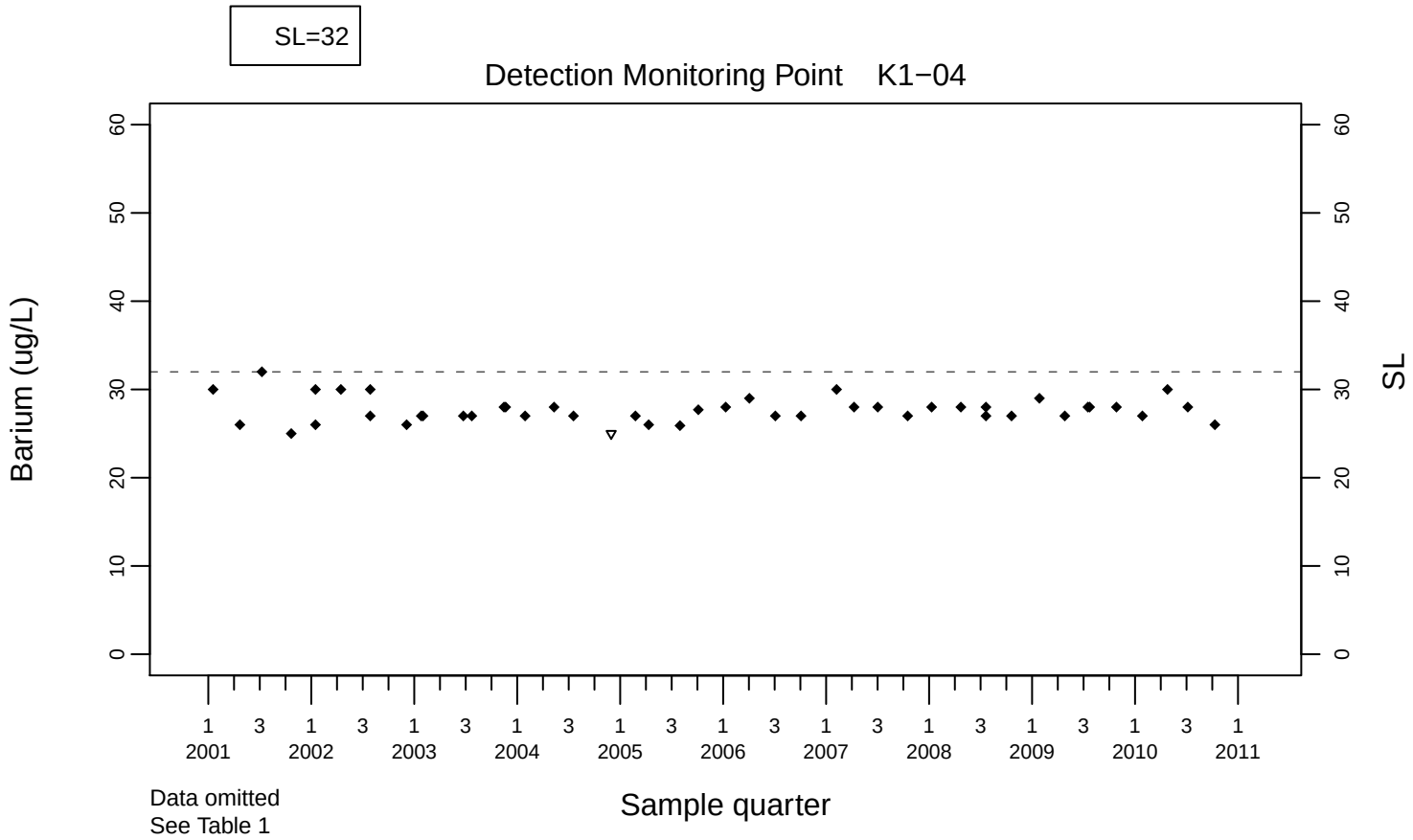


Data omitted
See Table 1

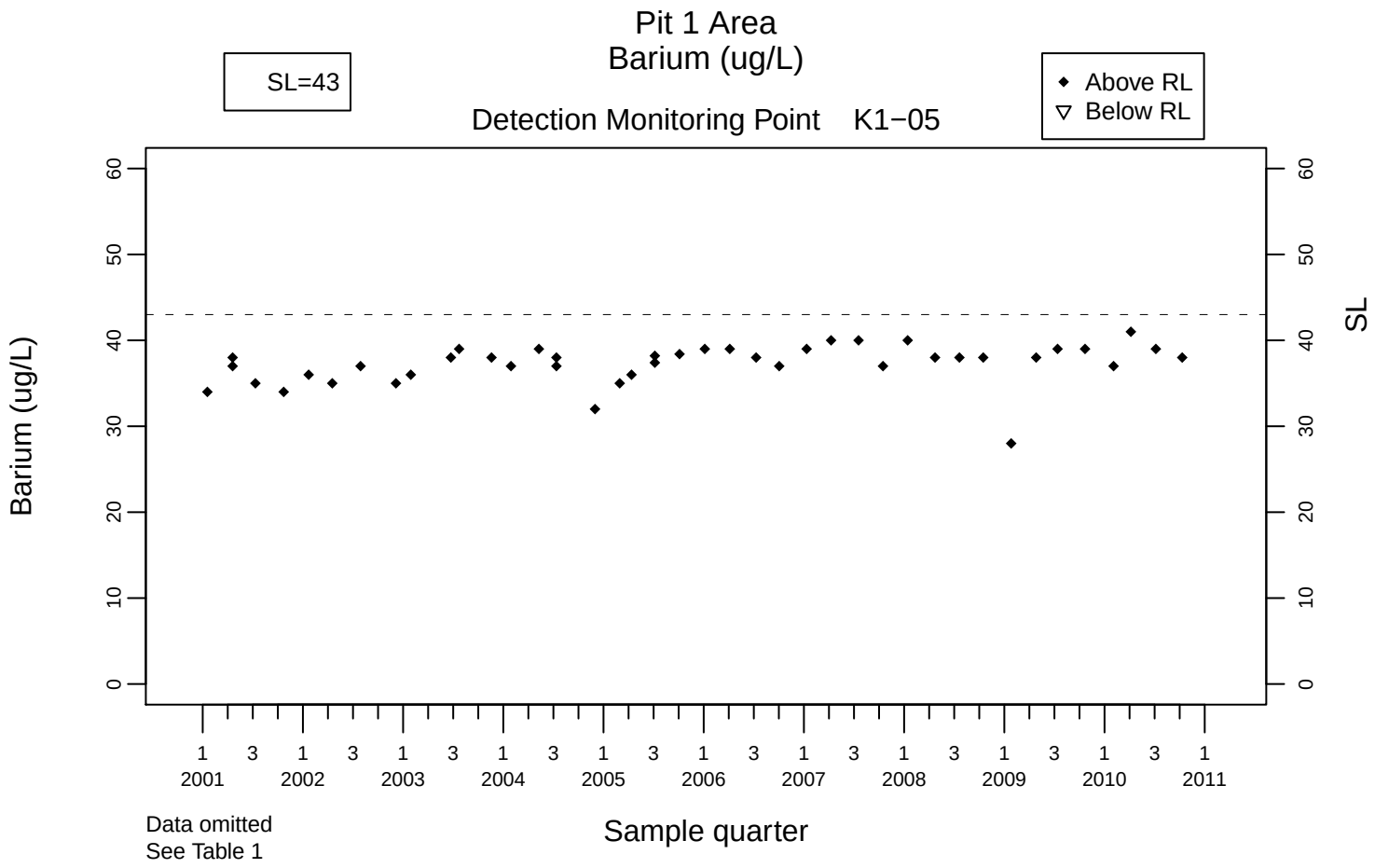

Pit 1 Area
Barium (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Barium (ug/L)
0
10
20
30
40
50
60
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

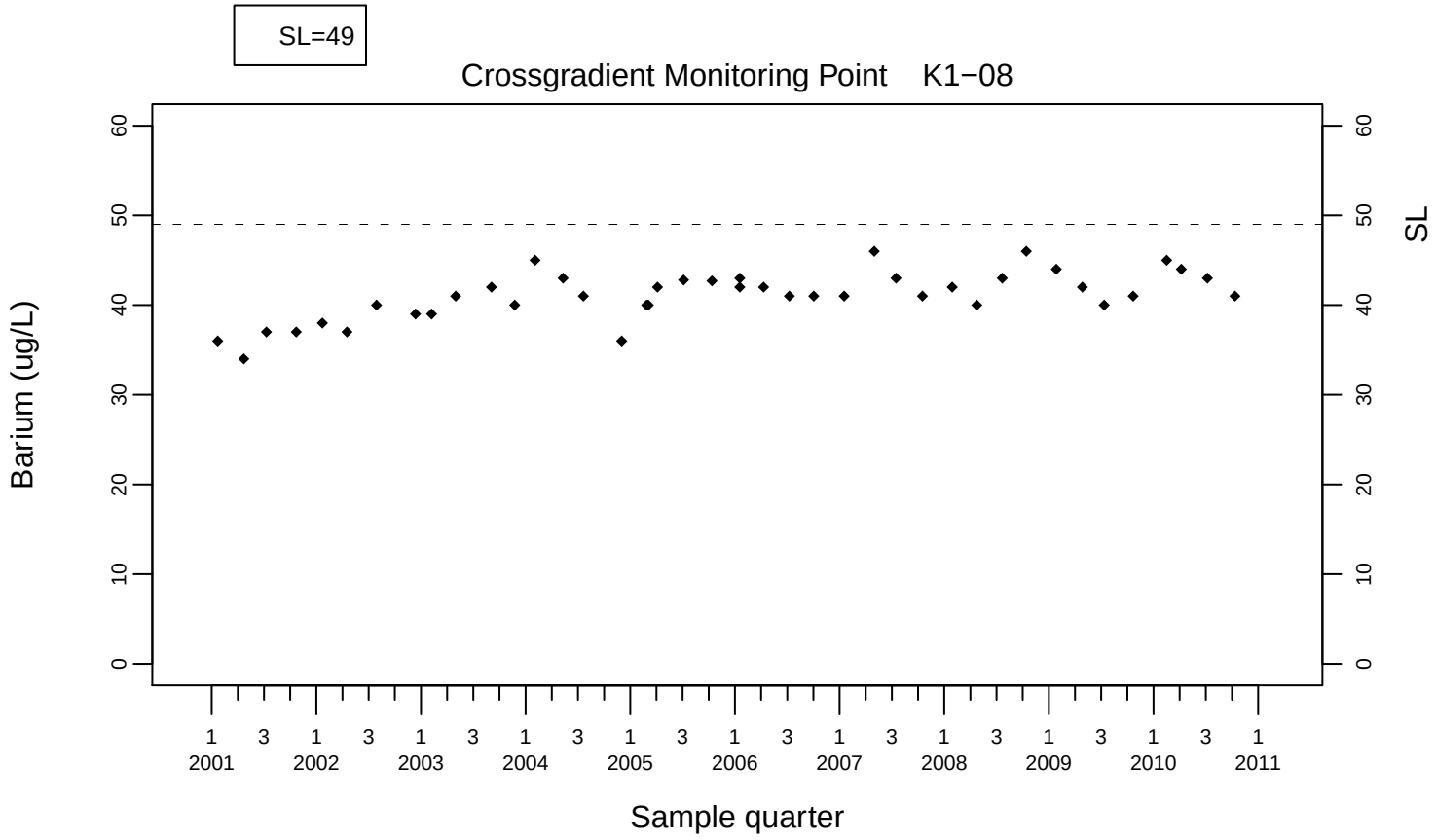

Background Monitoring Point K1−07
Barium (ug/L)
0
10
20
30
40
50
60
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

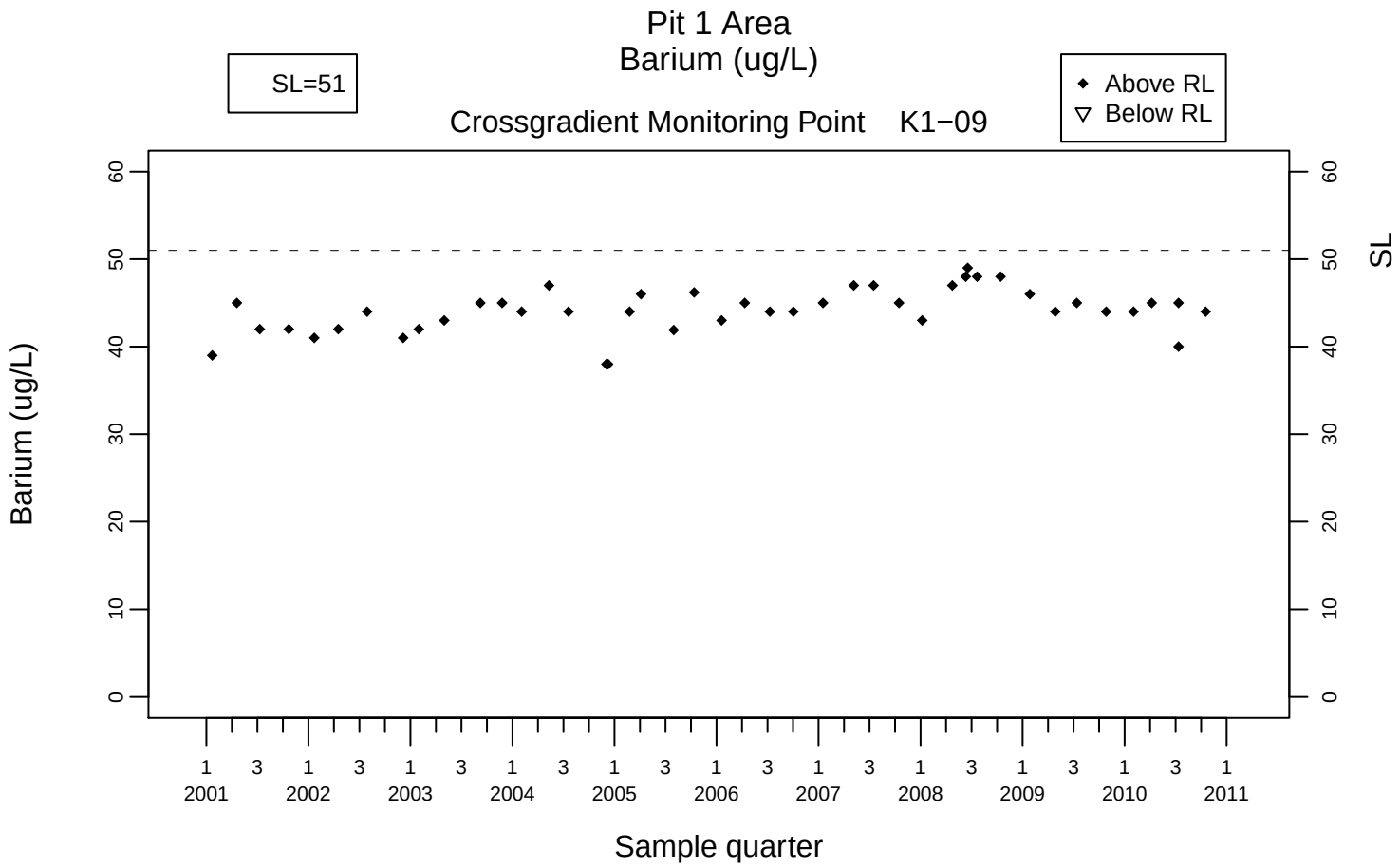


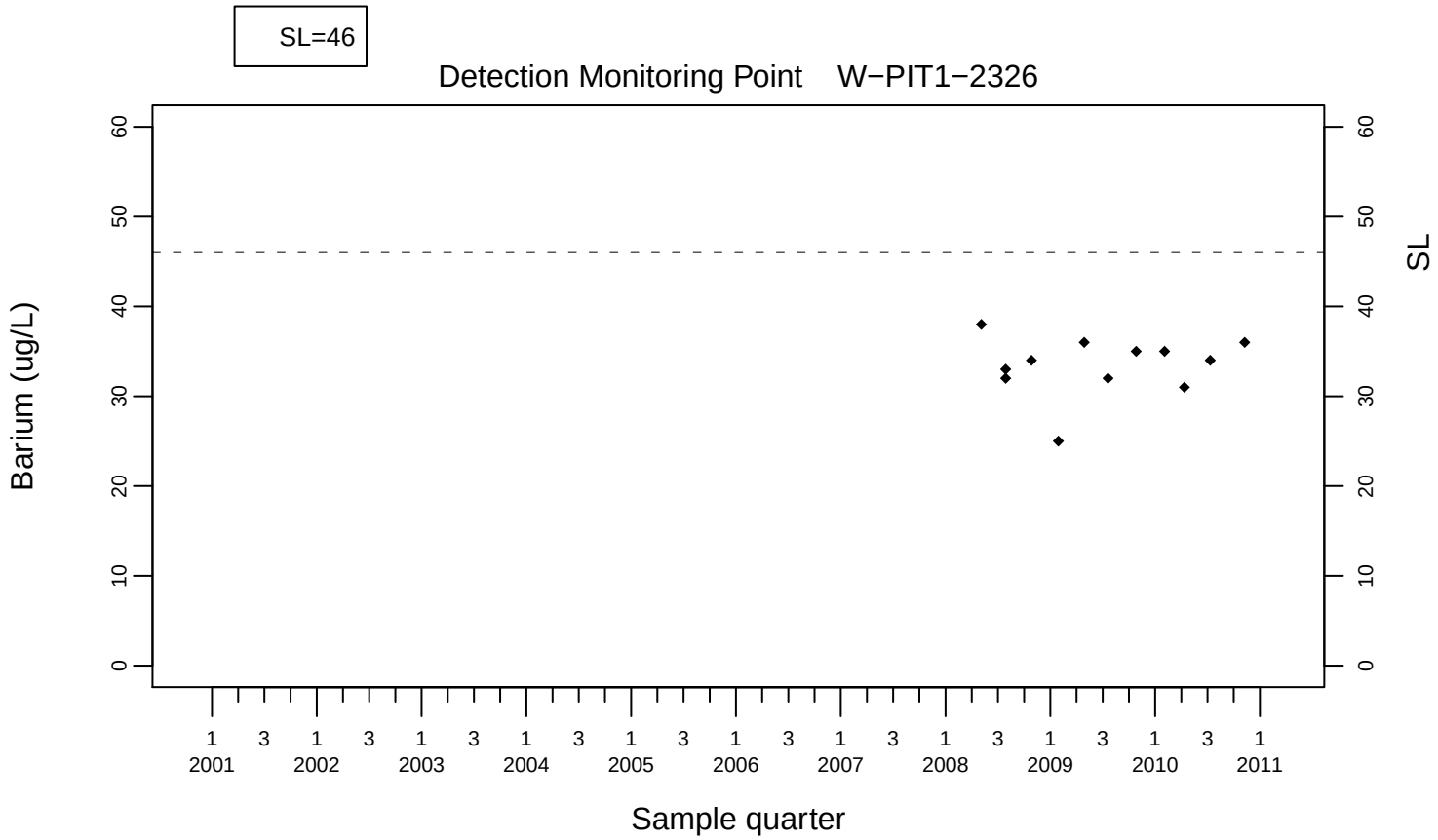


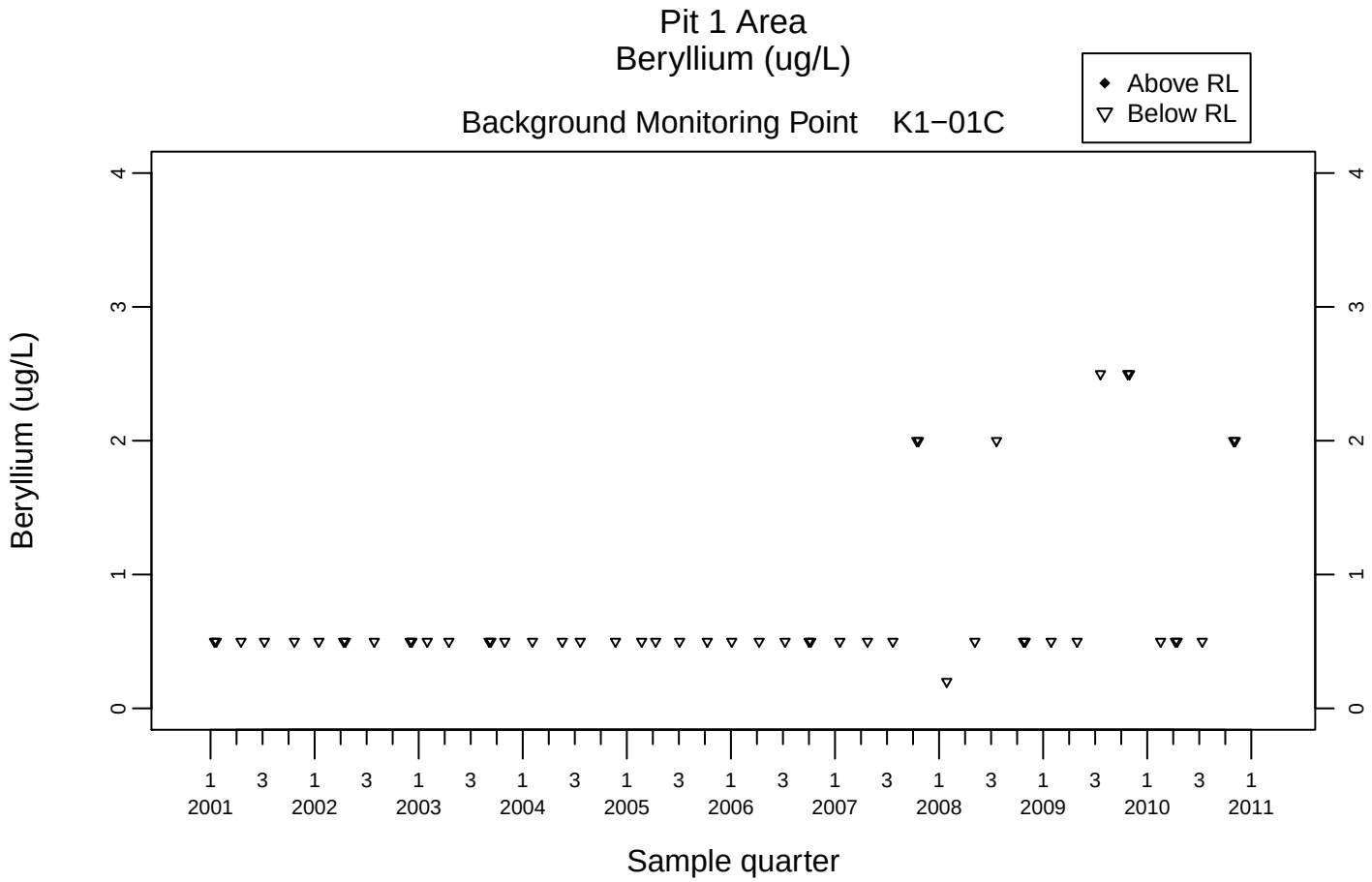
Data omitted
See Table 1

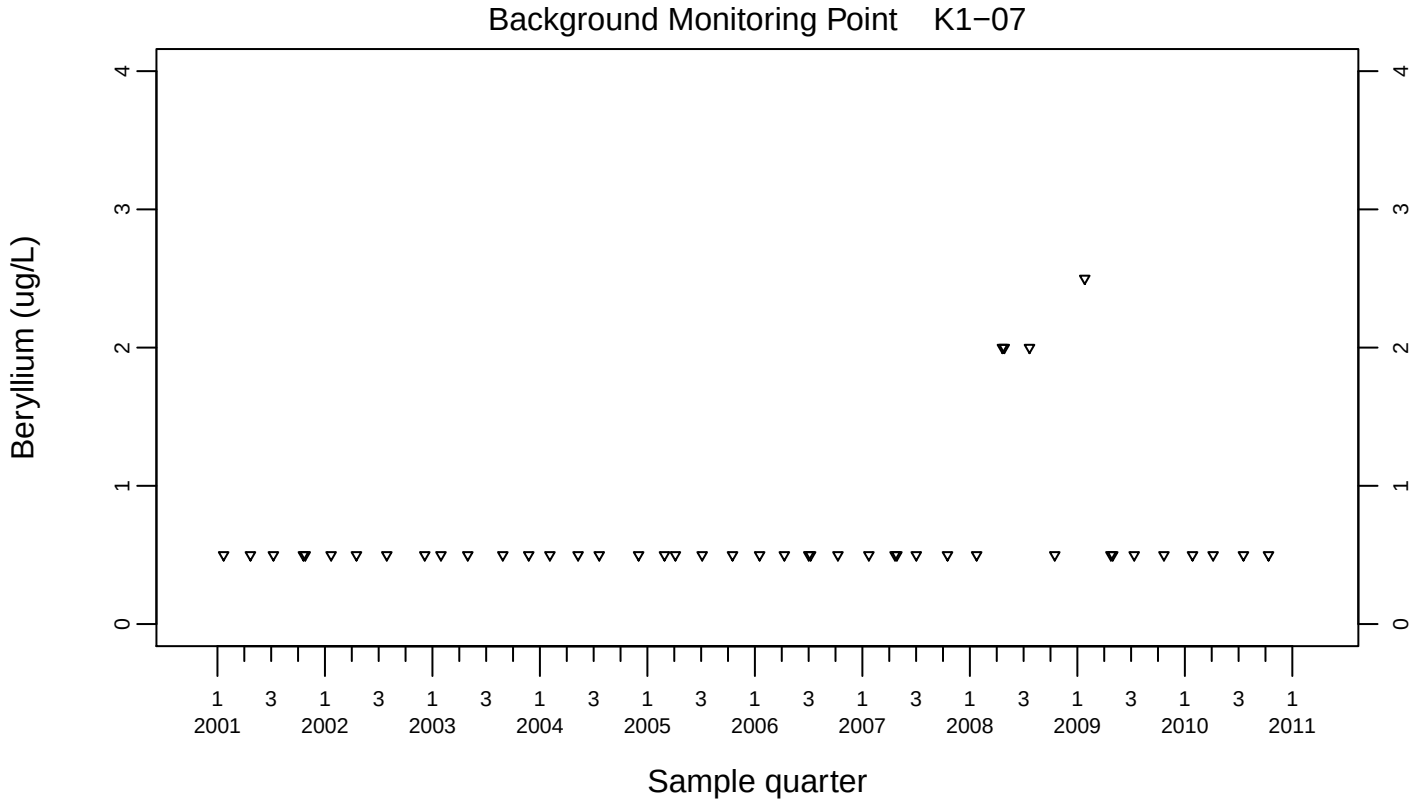

Pit 1 Area
Barium (ug/L)
SL=43
Above RL
Below RL
Detection Monitoring Point K1−05
Barium (ug/L)
SL
Sample quarter
Data omitted
See Table 1

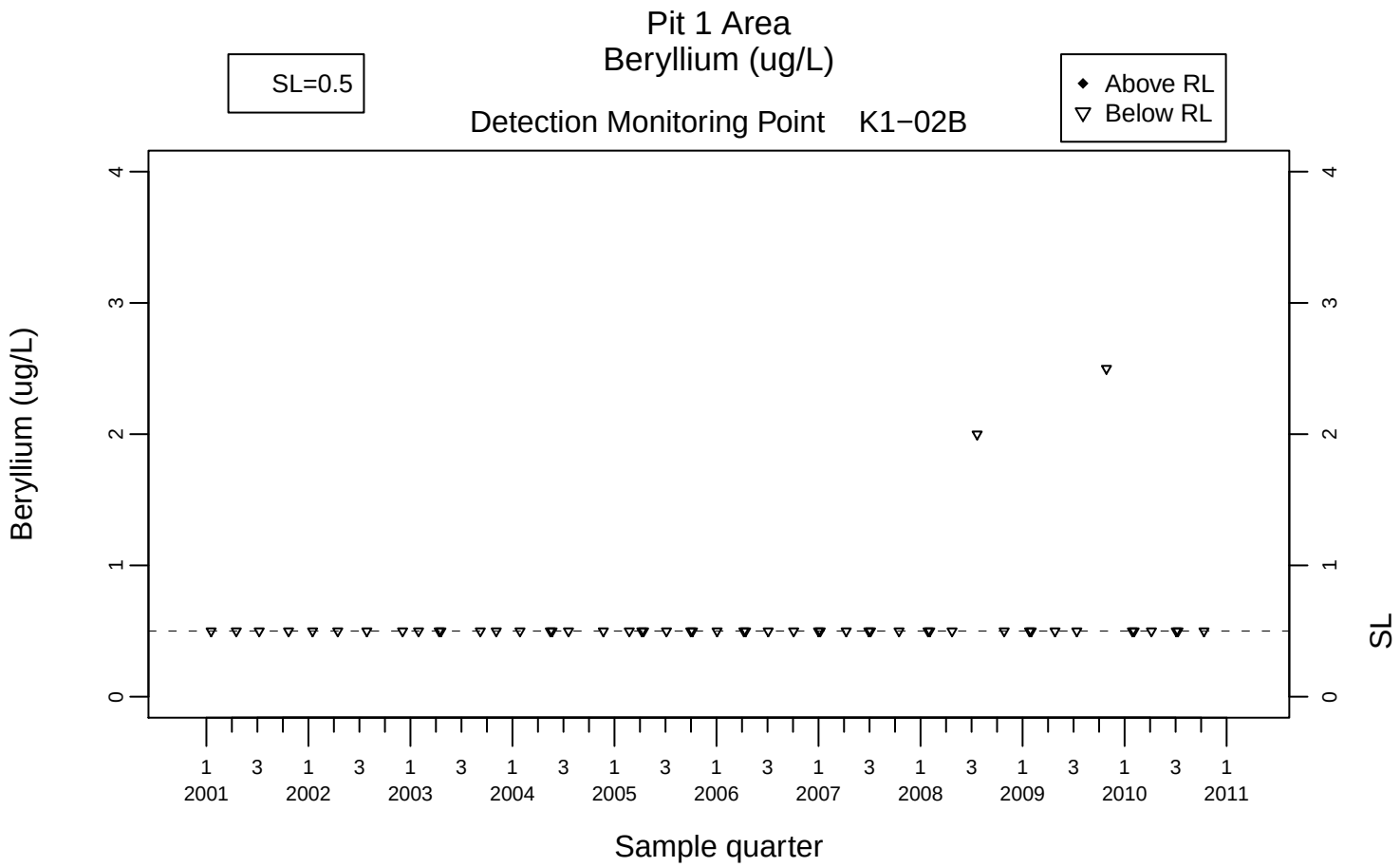

SL=49
Crossgradient Monitoring Point K1−08
Barium (ug/L)
SL
Sample quarter

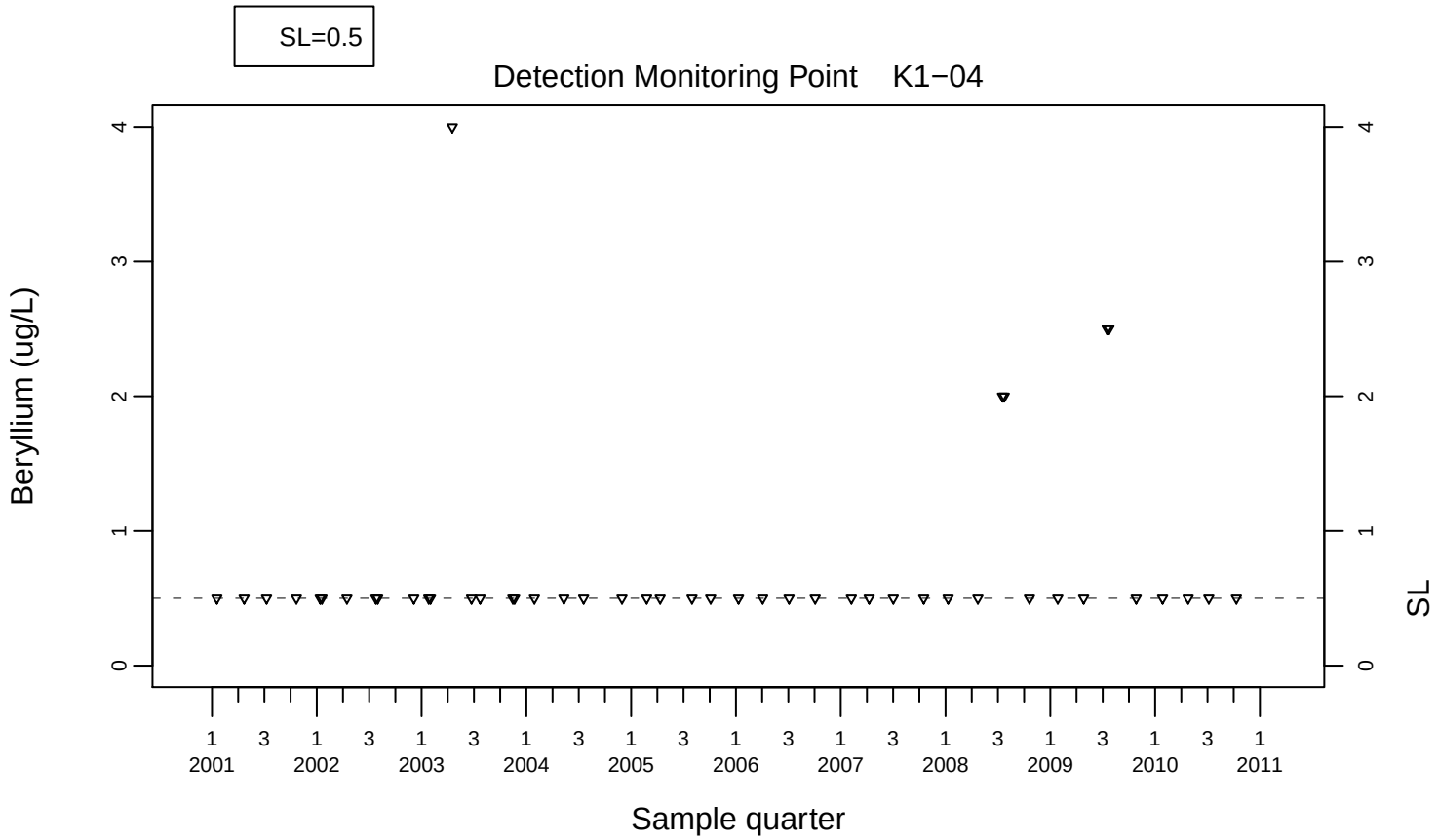

Pit 1 Area
Barium (ug/L)
SL=51
Above RL
Below RL
Crossgradient Monitoring Point K1−09
Barium (ug/L)
SL
0
10
20
30
40
50
60
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

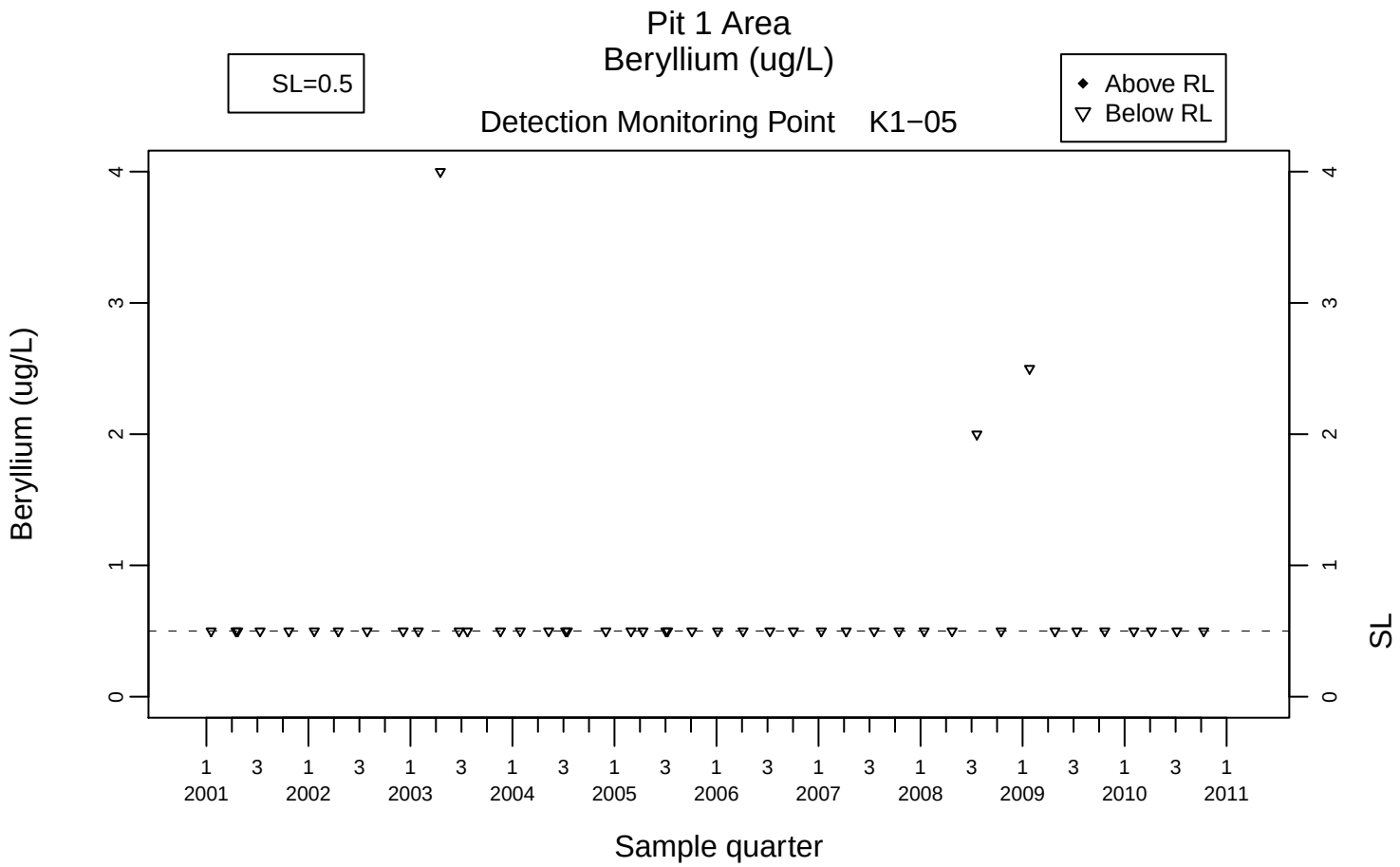

SL=46
Detection Monitoring Point W−PIT1−2326
Barium (ug/L)
SL
0
10
20
30
40
50
60
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

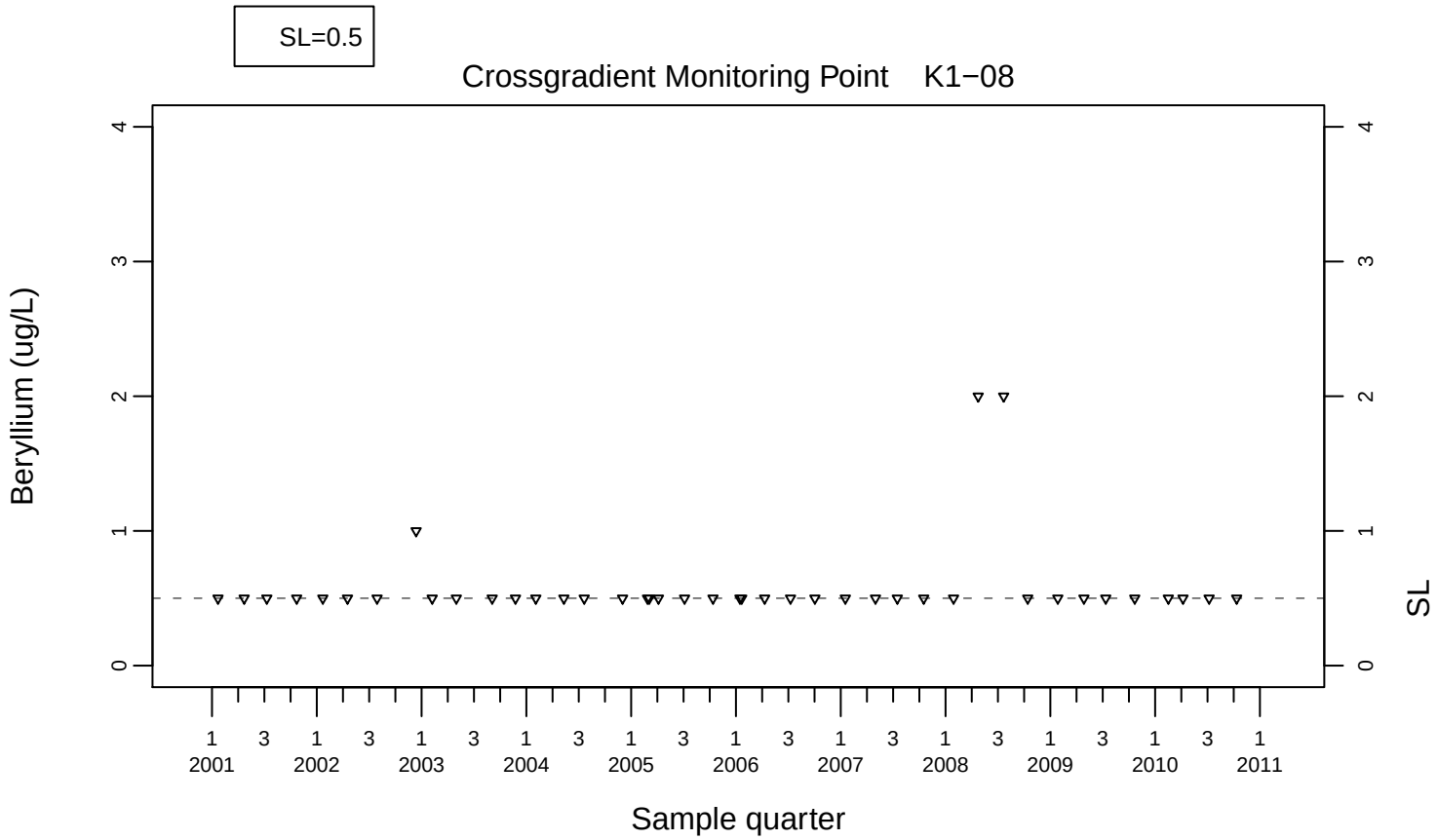

Pit 1 Area
Beryllium (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Beryllium (ug/L)
0
1
2
3
4
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

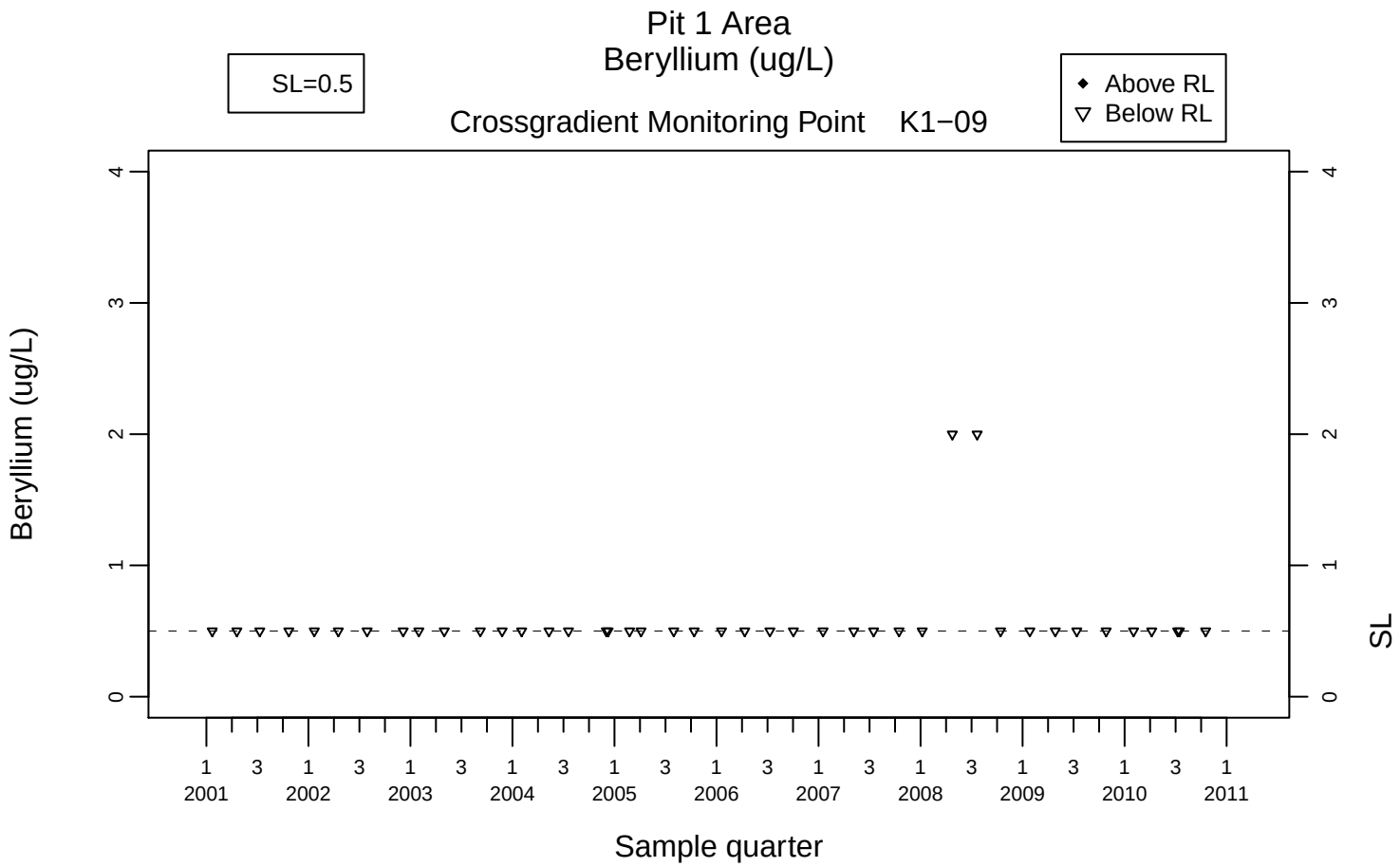

Background Monitoring Point K1−07
Beryllium (ug/L)
0
1
2
3
4
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

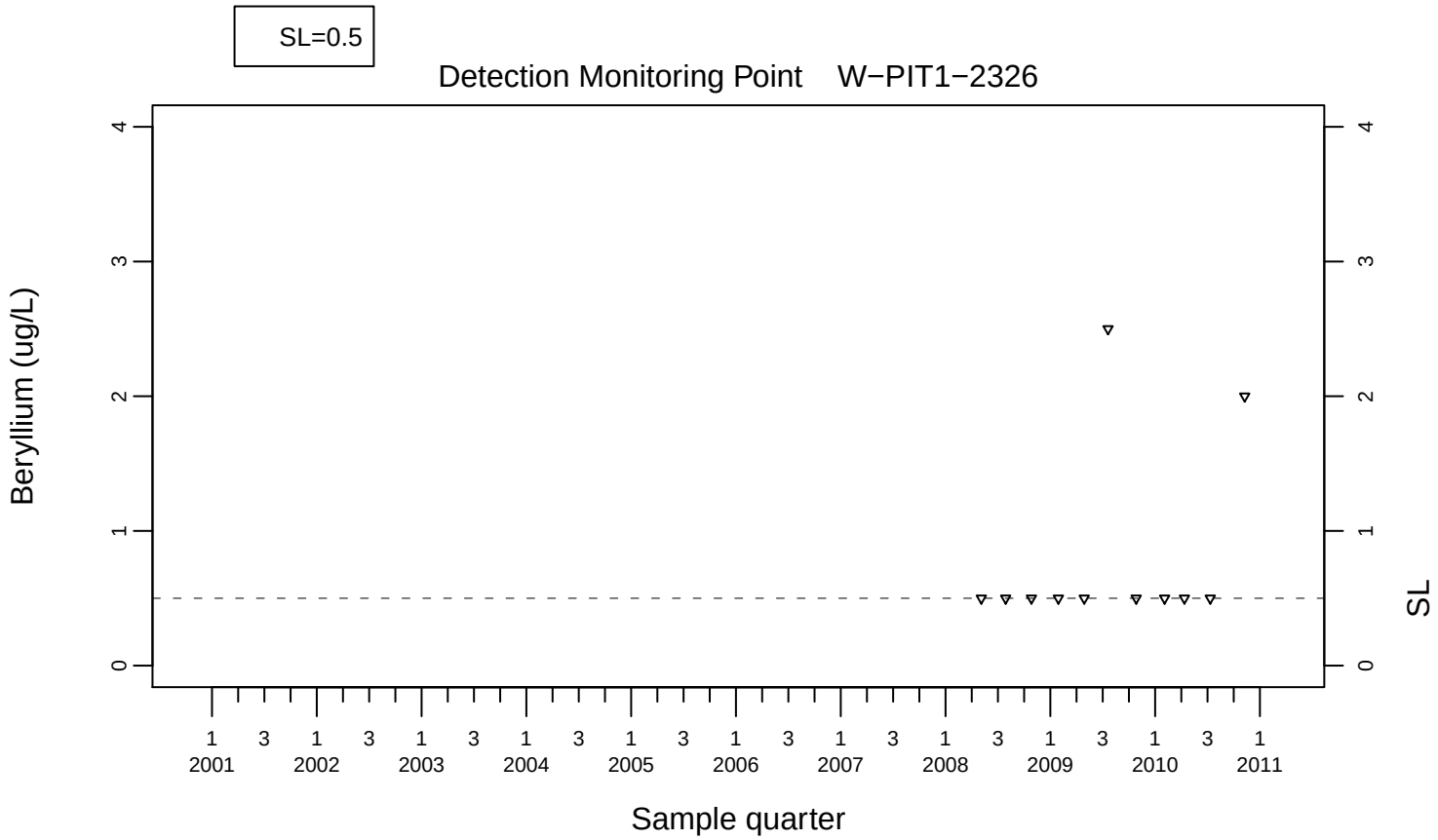

Pit 1 Area
Beryllium (ug/L)
SL=0.5
Above RL
Below RL
Detection Monitoring Point K1−02B
Beryllium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

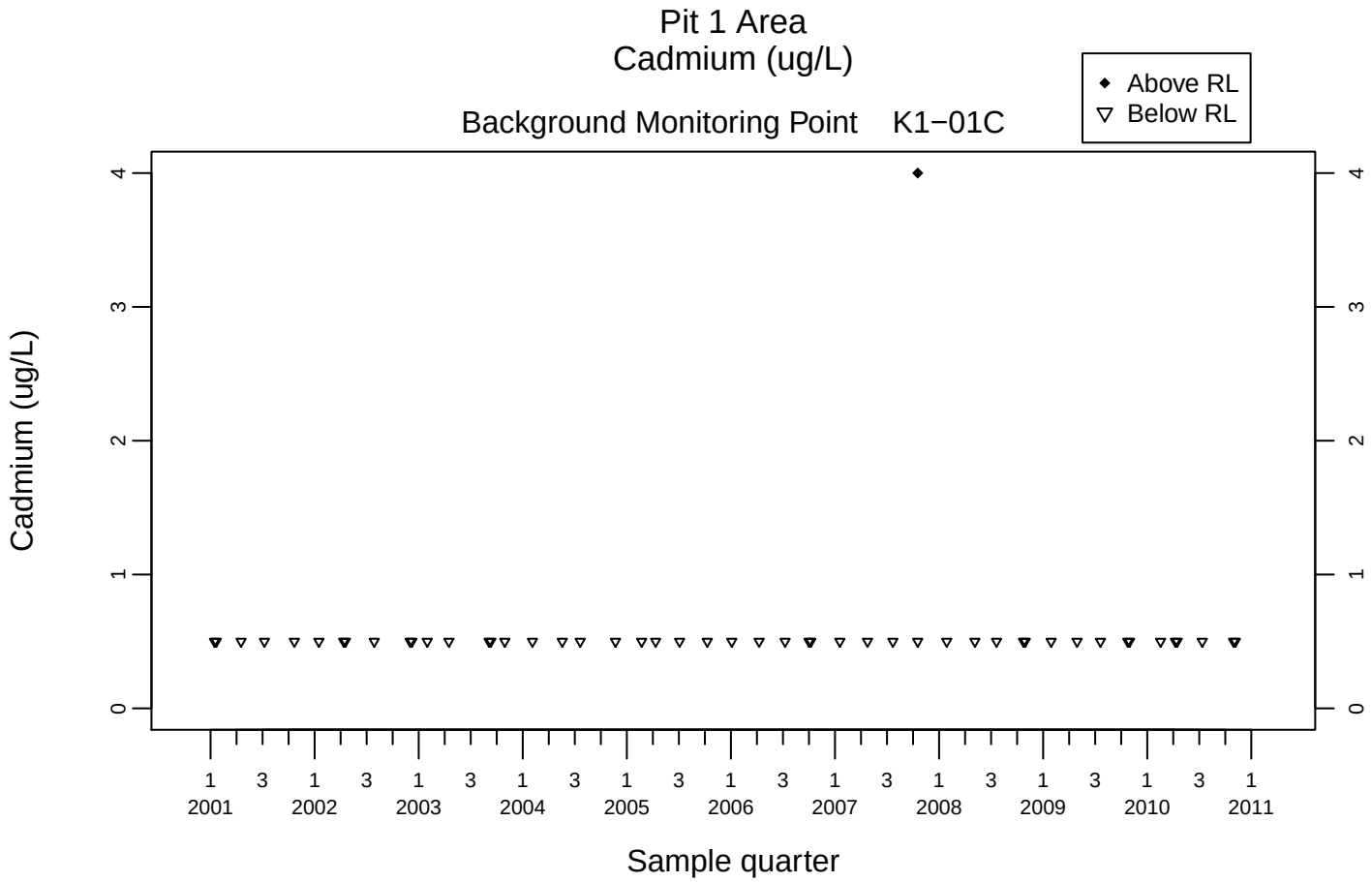

SL=0.5
Detection Monitoring Point K1−04
Beryllium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

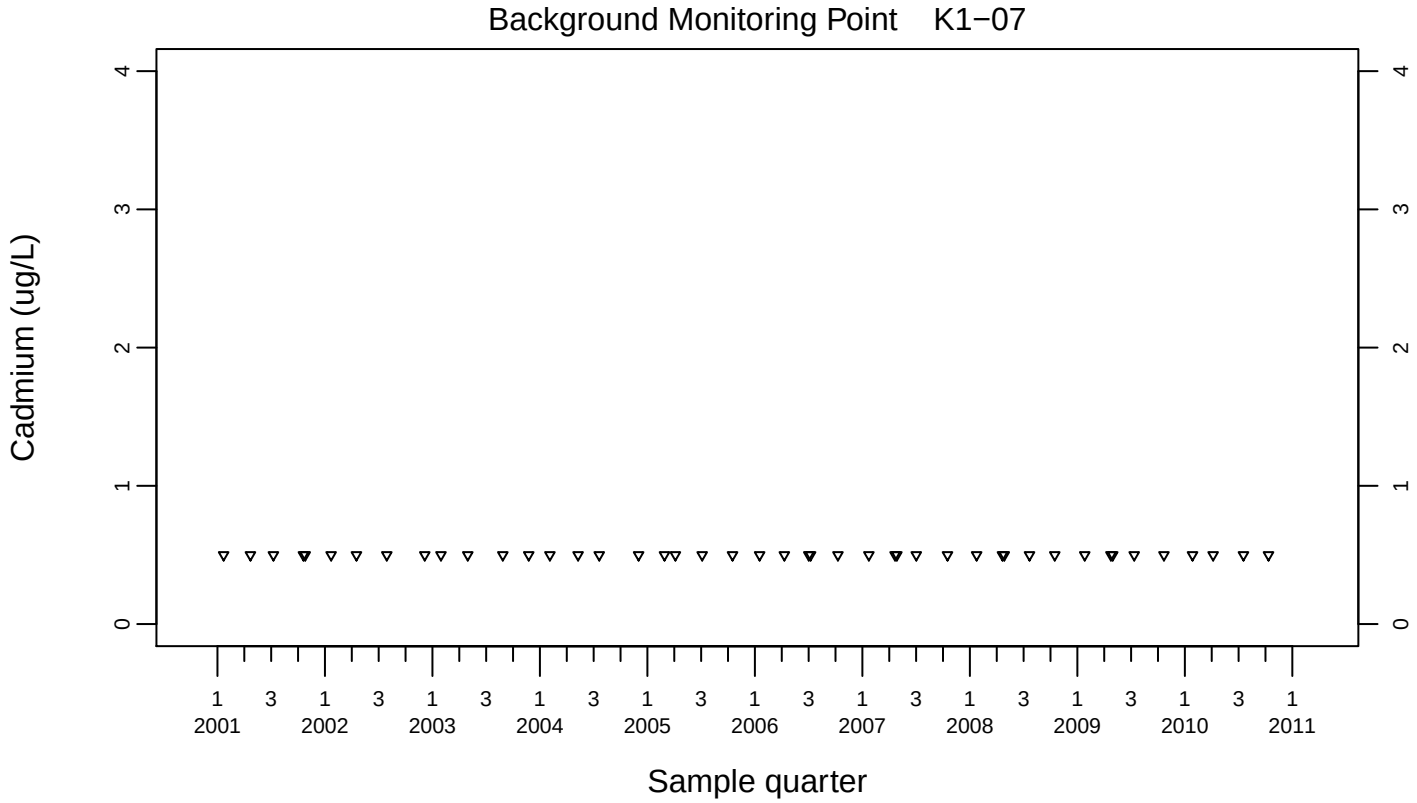

Pit 1 Area
Beryllium (ug/L)
SL=0.5
Above RL
Below RL
Detection Monitoring Point K1−05
Beryllium (ug/L)
SL
Sample quarter
1 2001
3
1 2002
3
1 2003
3
1 2004
3
1 2005
3
1 2006
3
1 2007
3
1 2008
3
1 2009
3
1 2010
3
1 2011

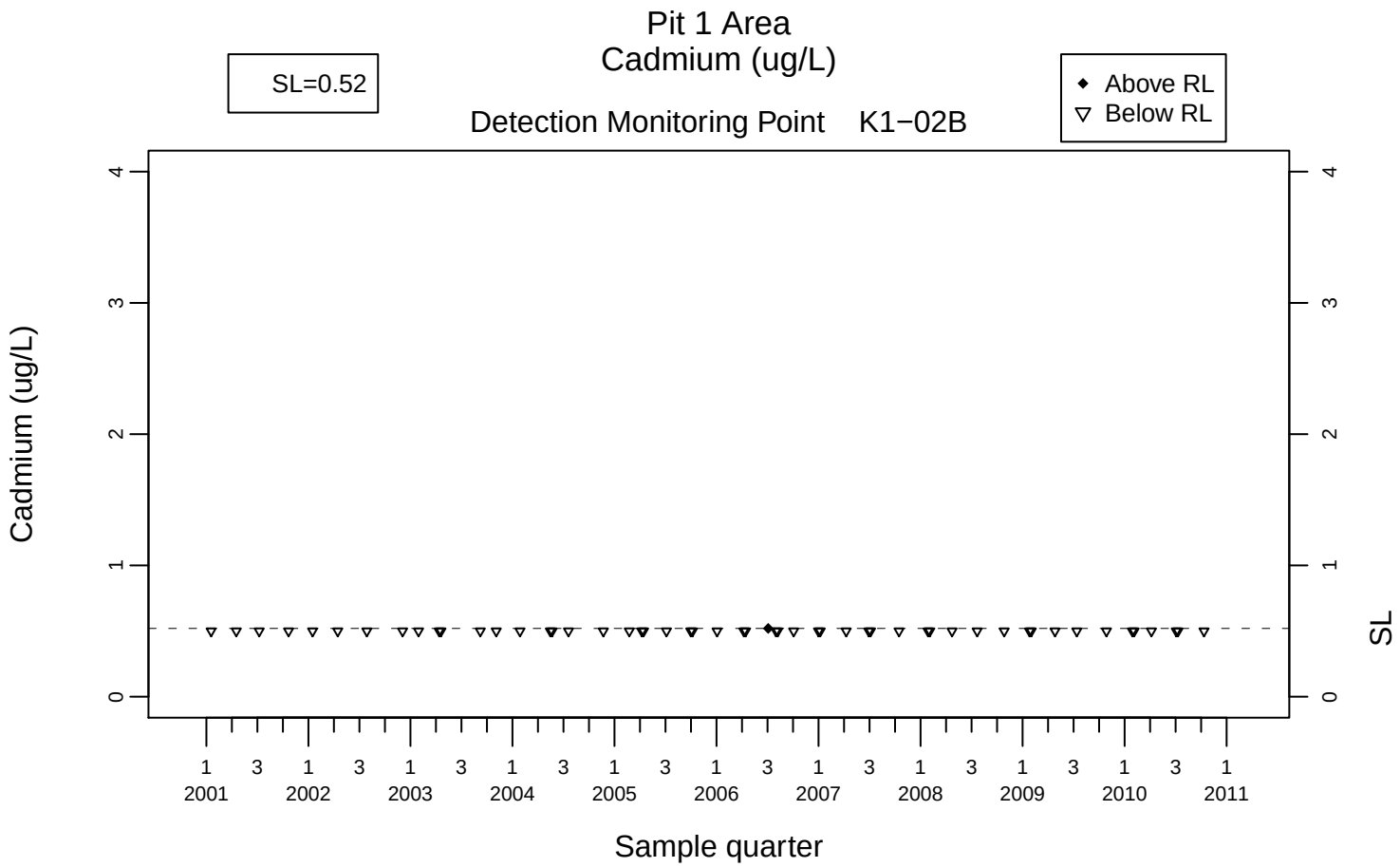

SL=0.5
Crossgradient Monitoring Point K1−08
Beryllium (ug/L)
SL
Sample quarter
1 2001
3
1 2002
3
1 2003
3
1 2004
3
1 2005
3
1 2006
3
1 2007
3
1 2008
3
1 2009
3
1 2010
3
1 2011

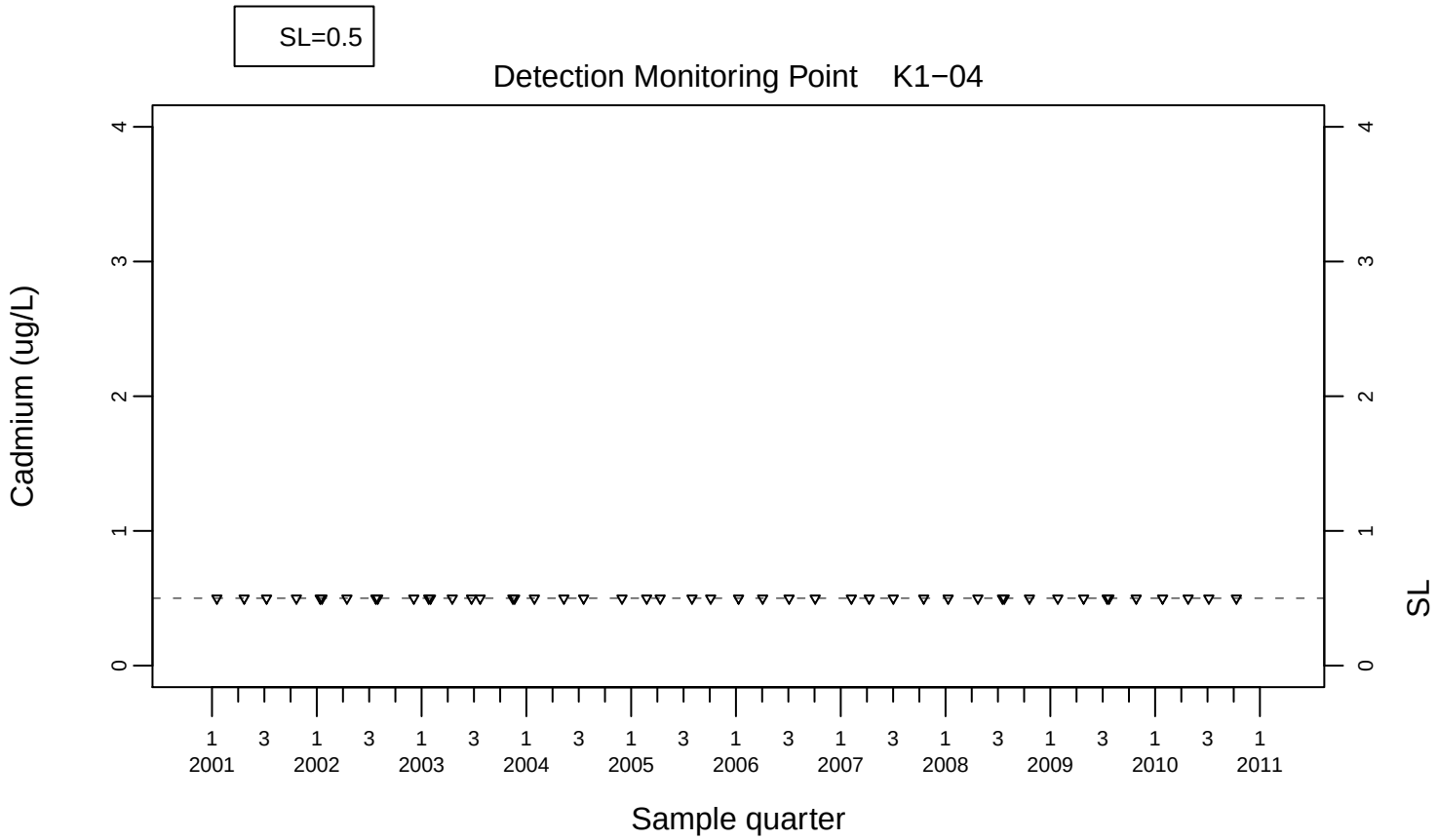

Pit 1 Area
Beryllium (ug/L)
SL=0.5
Crossgradient Monitoring Point K1−09
Above RL
Below RL
Beryllium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

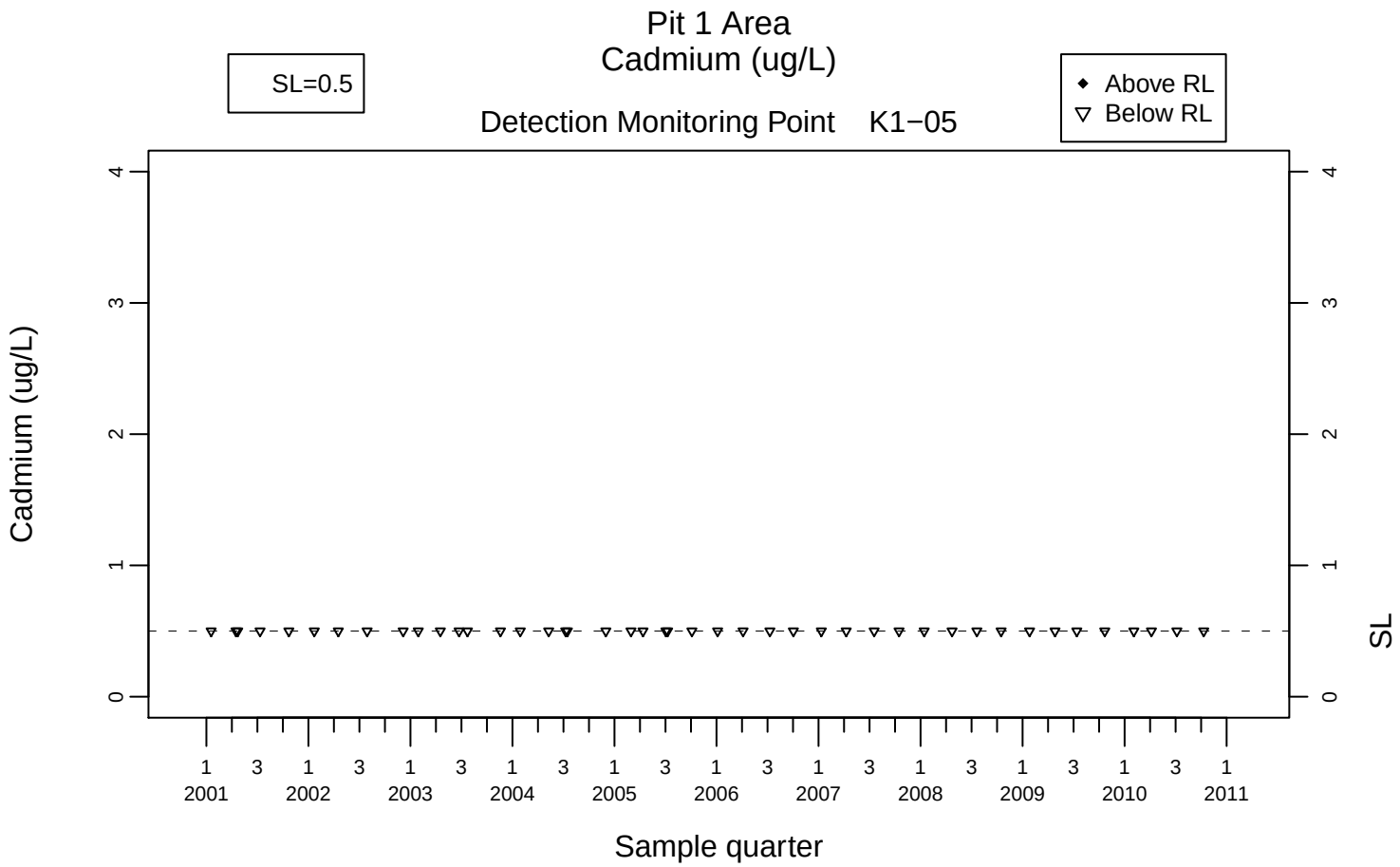

SL=0.5
Detection Monitoring Point W−PIT1−2326
Beryllium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

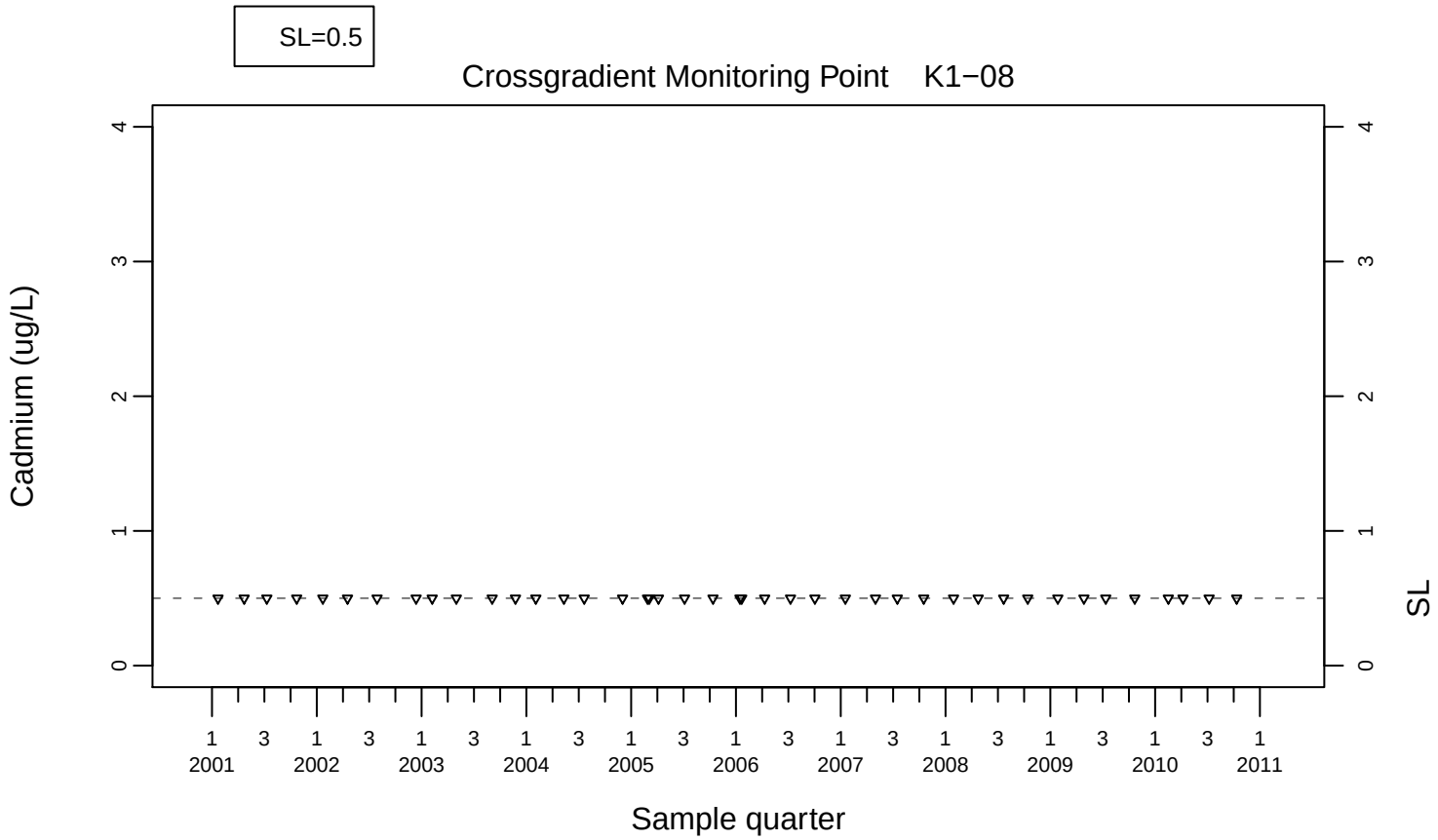

Pit 1 Area
Cadmium (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Cadmium (ug/L)
0
1
2
3
4
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

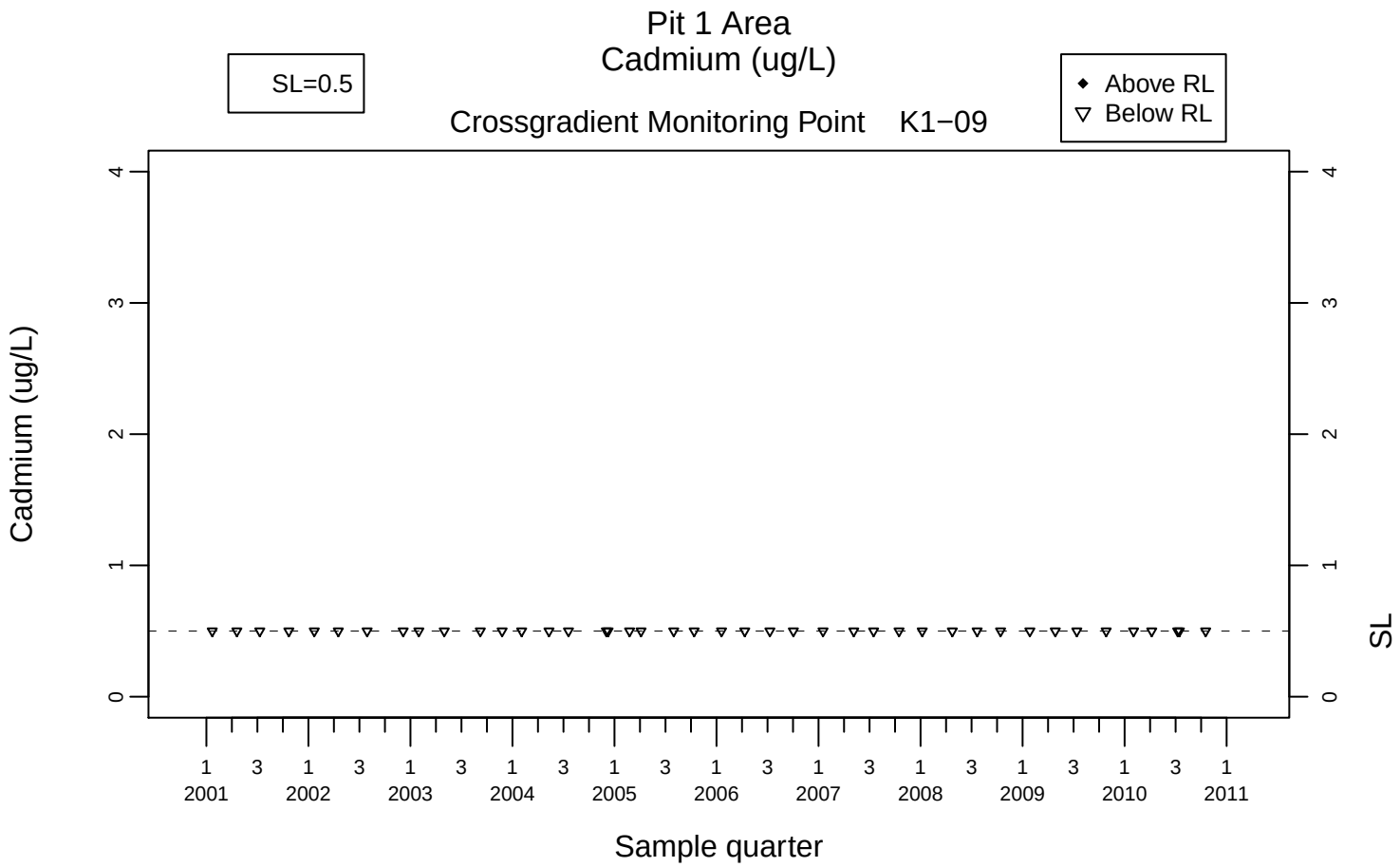

Background Monitoring Point K1−07
Cadmium (ug/L)
0
1
2
3
4
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

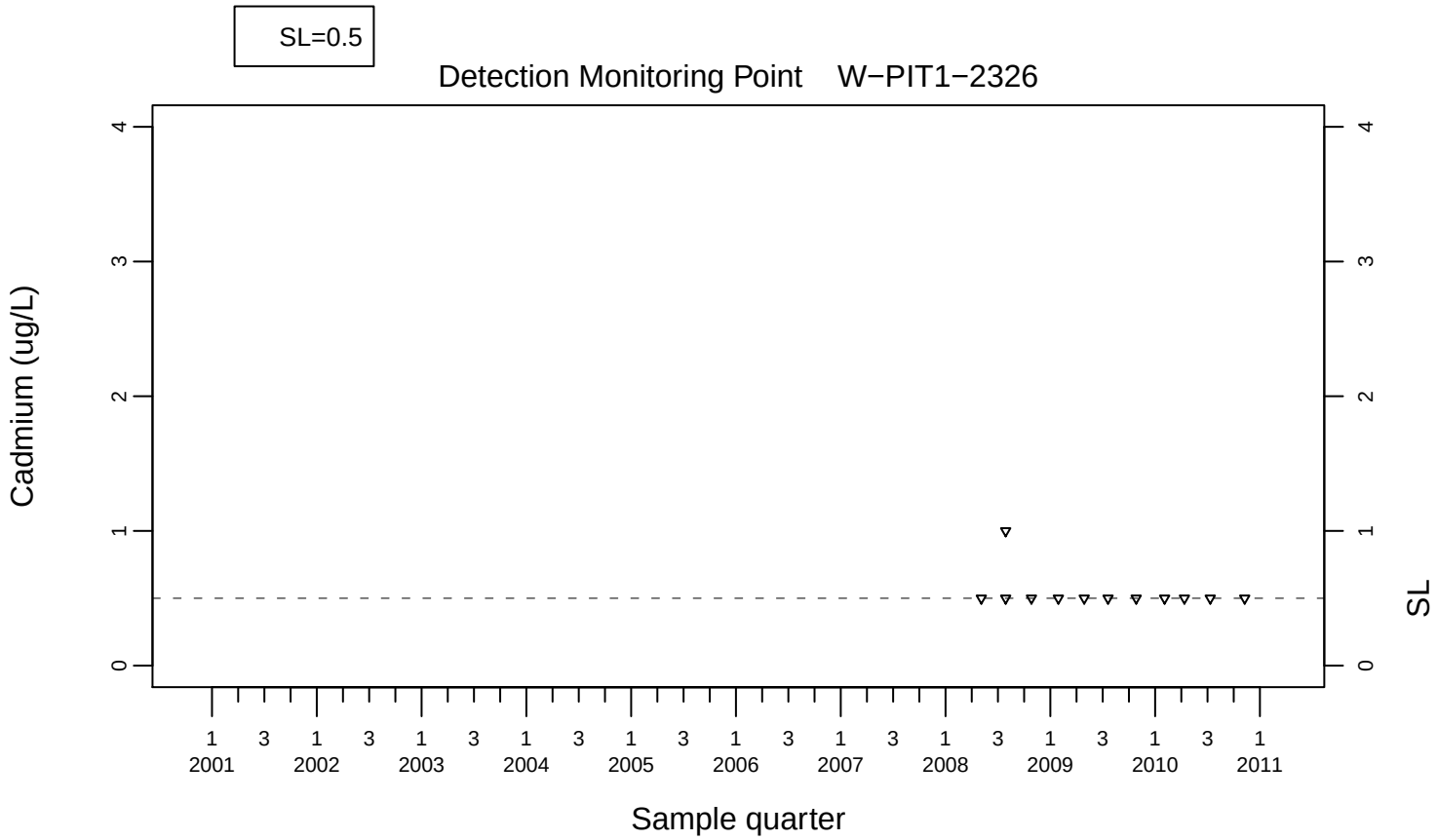

Pit 1 Area
Cadmium (ug/L)
SL=0.52
Above RL
Below RL
Detection Monitoring Point K1−02B
Cadmium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

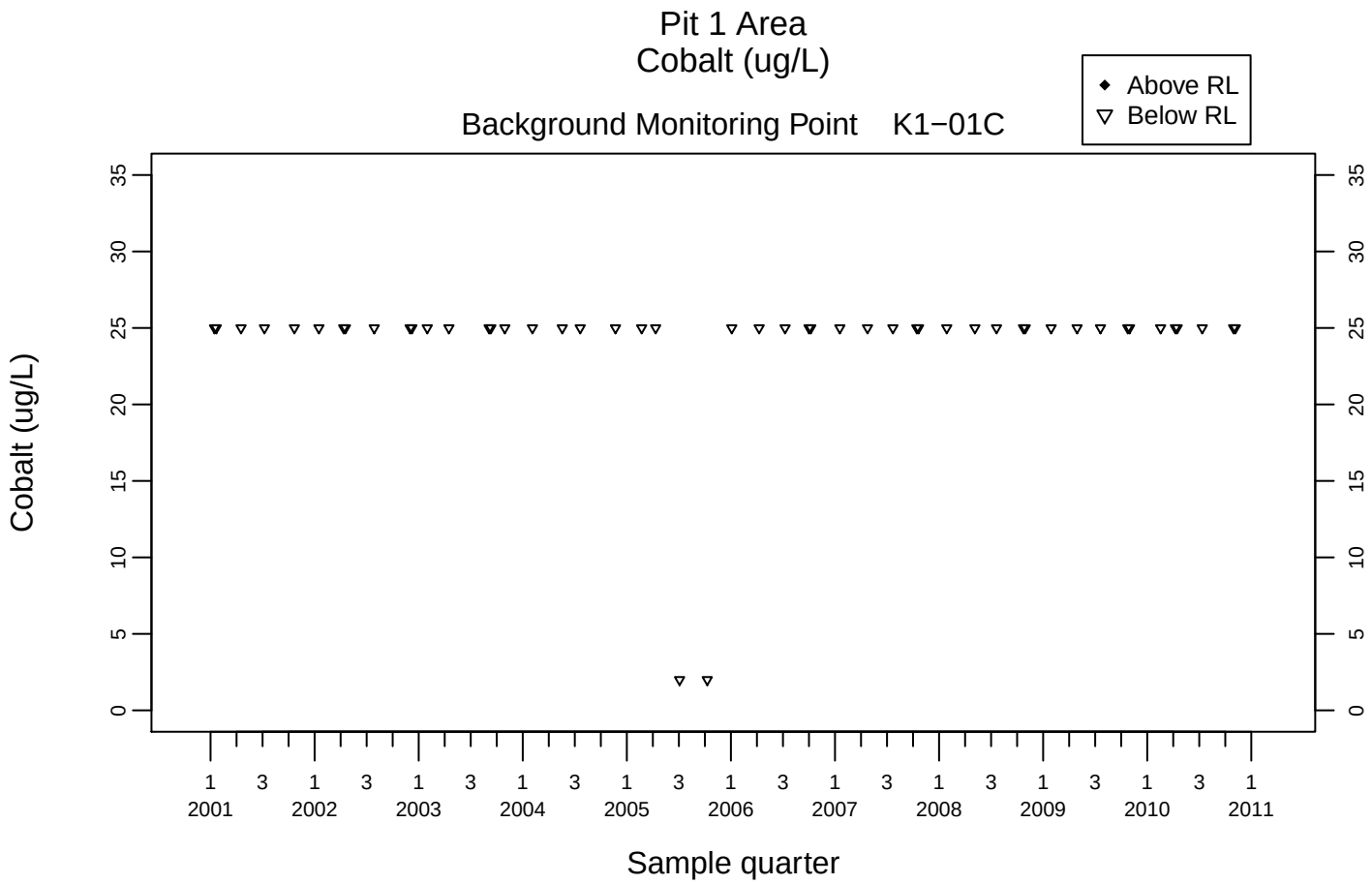

SL=0.5
Detection Monitoring Point K1−04
Cadmium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

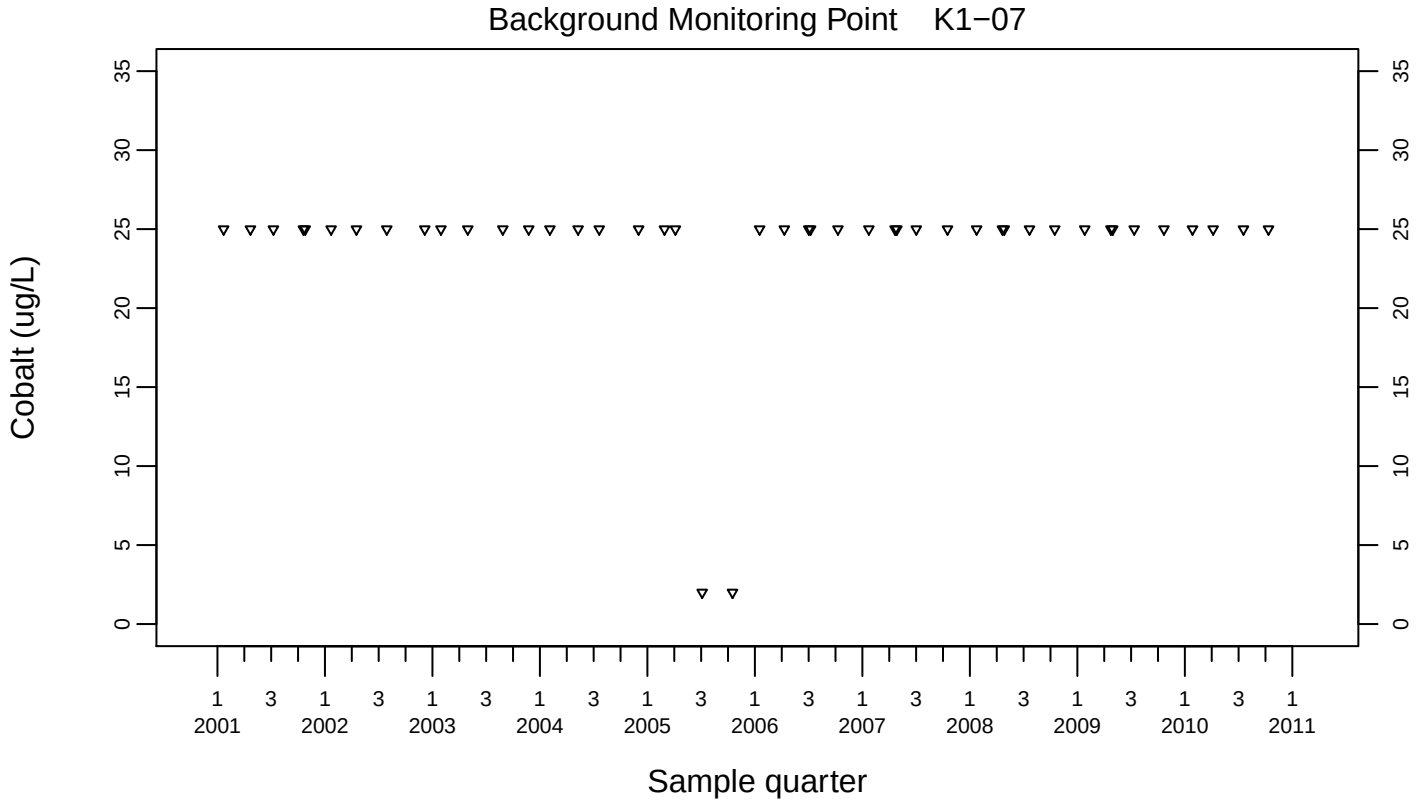

Pit 1 Area
Cadmium (ug/L)
SL=0.5
Above RL
Below RL
Detection Monitoring Point K1−05
Cadmium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

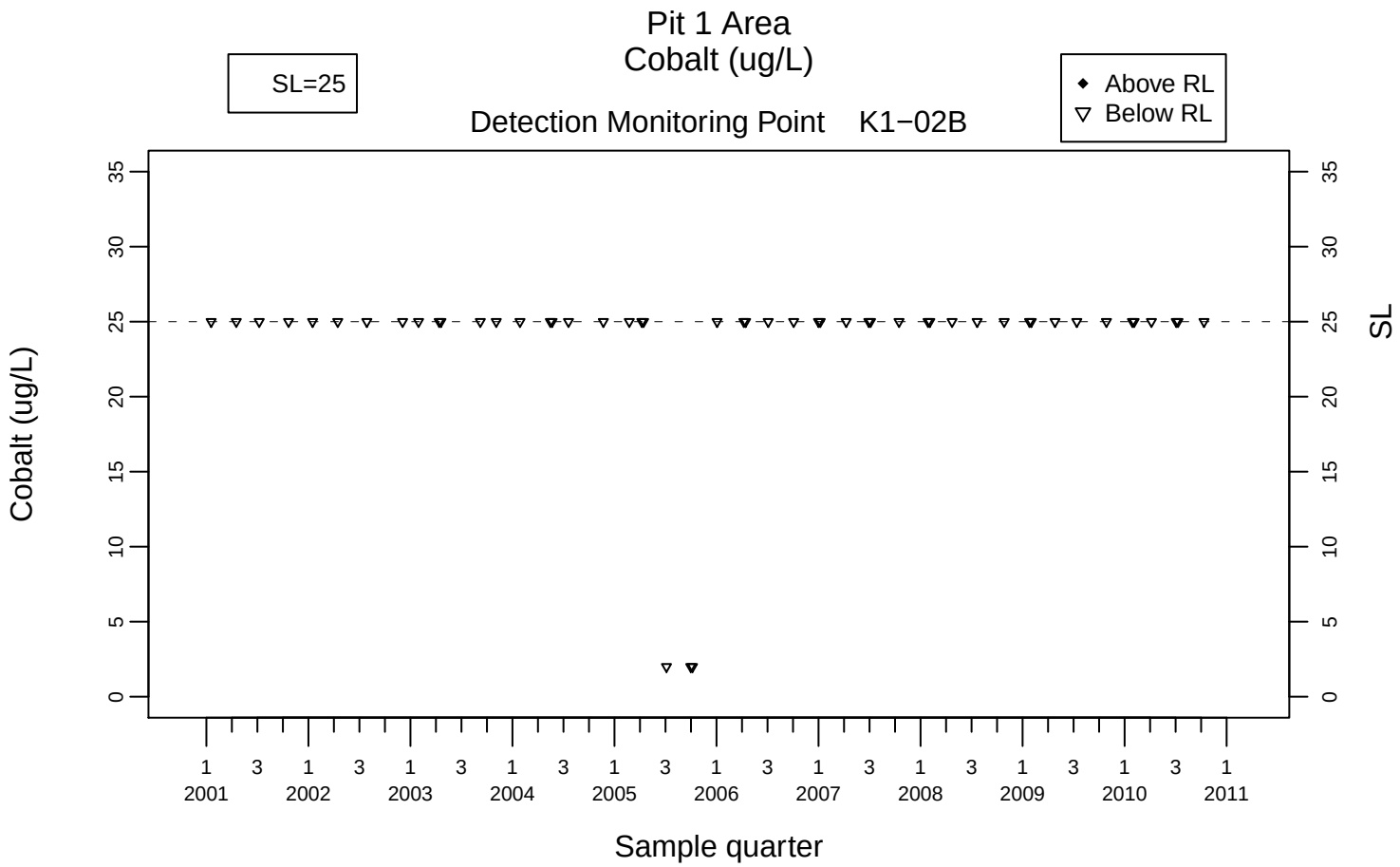

SL=0.5
Crossgradient Monitoring Point K1−08
Cadmium (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

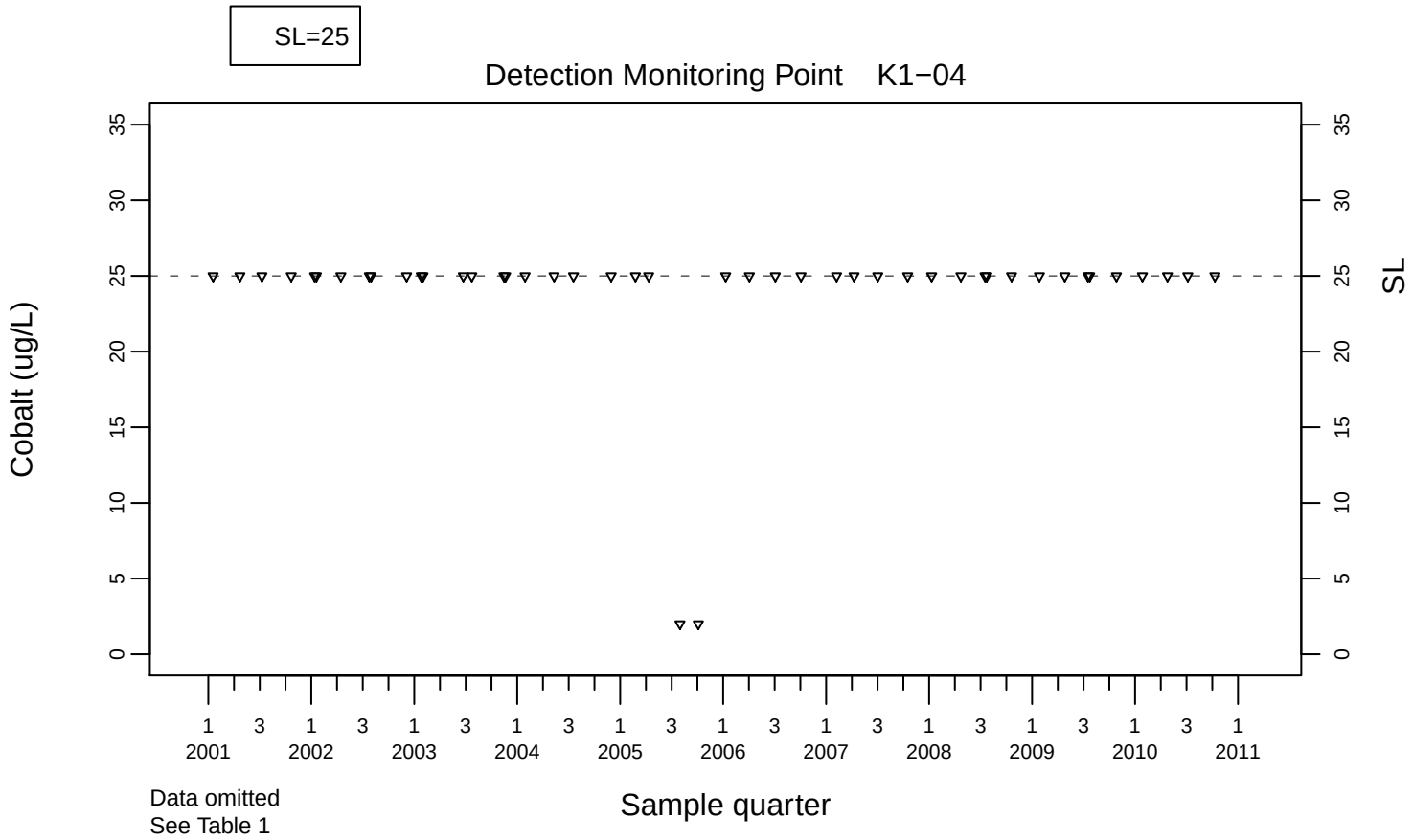

Pit 1 Area
Cadmium (ug/L)
SL=0.5
Crossgradient Monitoring Point K1−09
Above RL
Below RL
Cadmium (ug/L)
SL
Sample quarter
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


SL=0.5
Detection Monitoring Point W−PIT1−2326
Cadmium (ug/L)
SL
Sample quarter
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

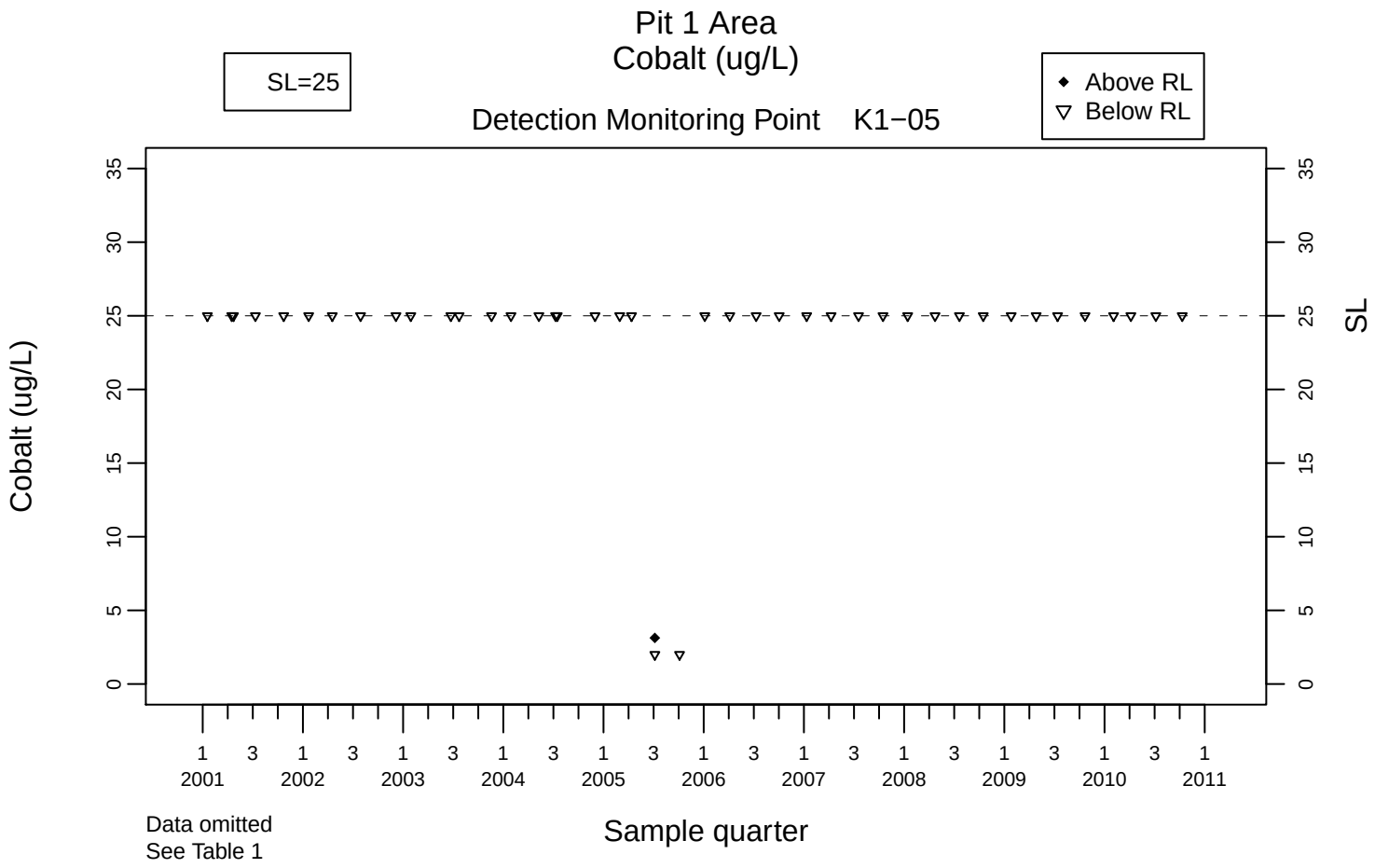

Pit 1 Area
Cobalt (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Cobalt (ug/L)
0
5
10
15
20
25
30
35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

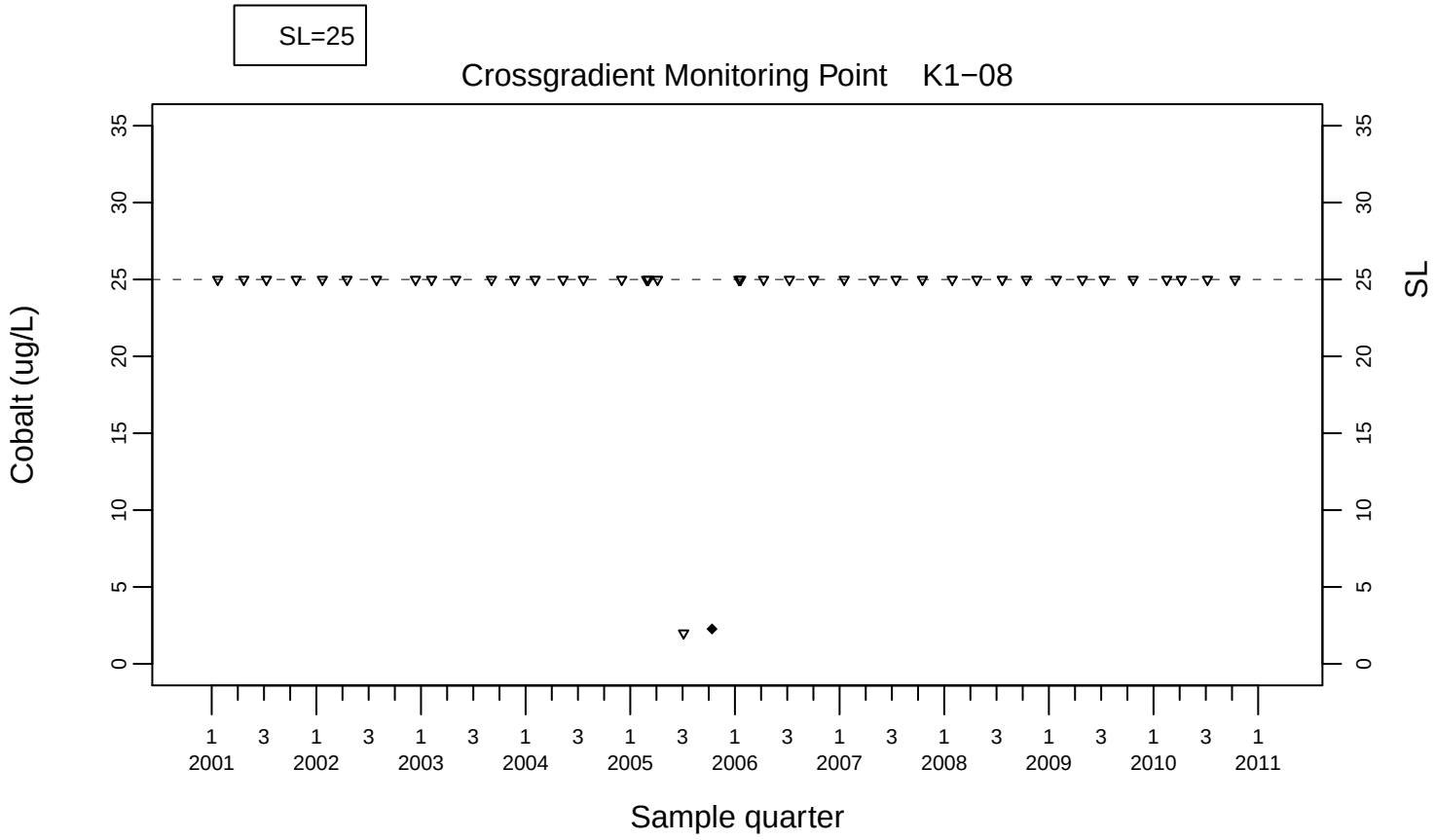

Background Monitoring Point K1−07
Cobalt (ug/L)
0
5
10
15
20
25
30
35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

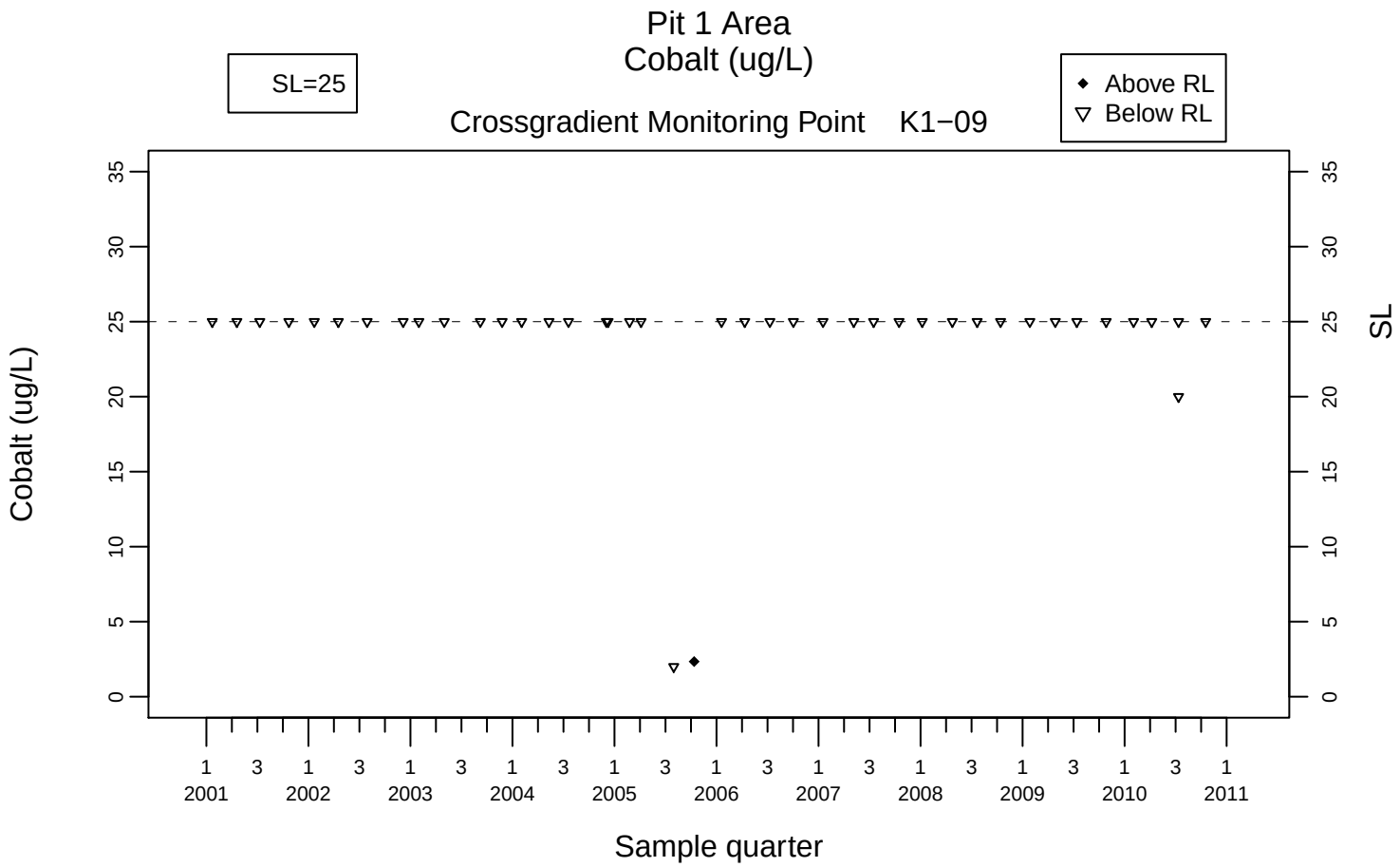


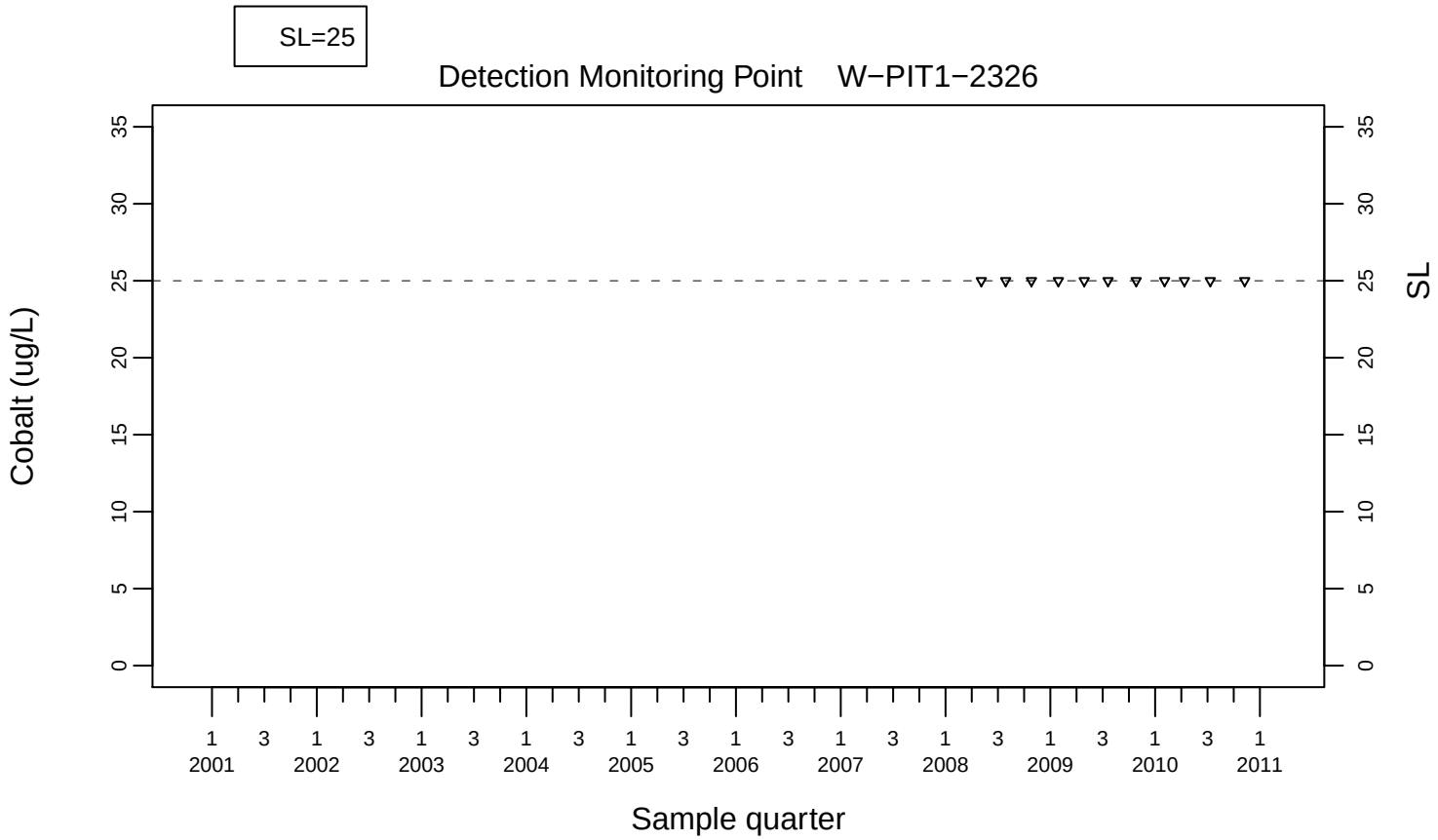


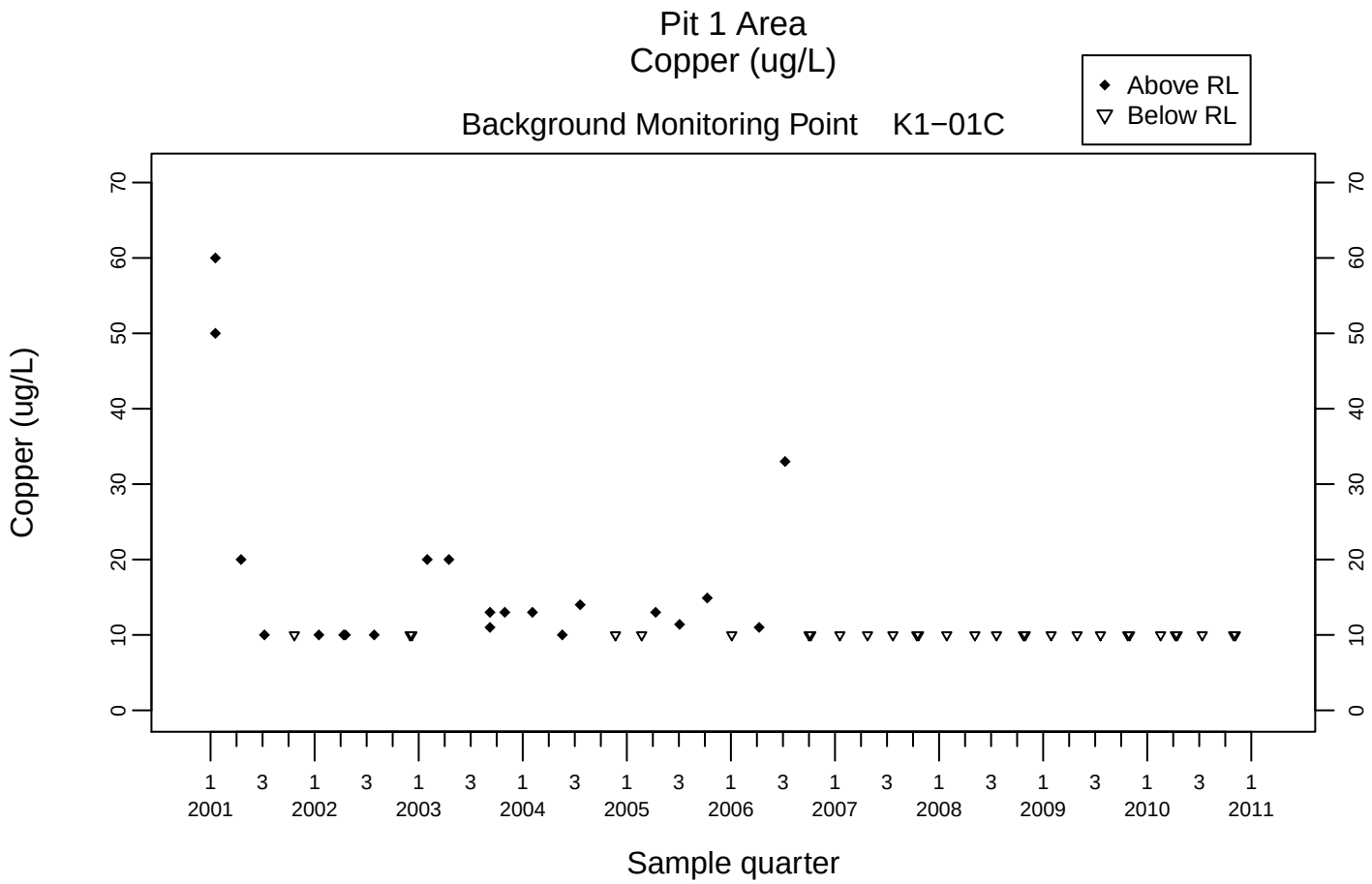
Data omitted
See Table 1

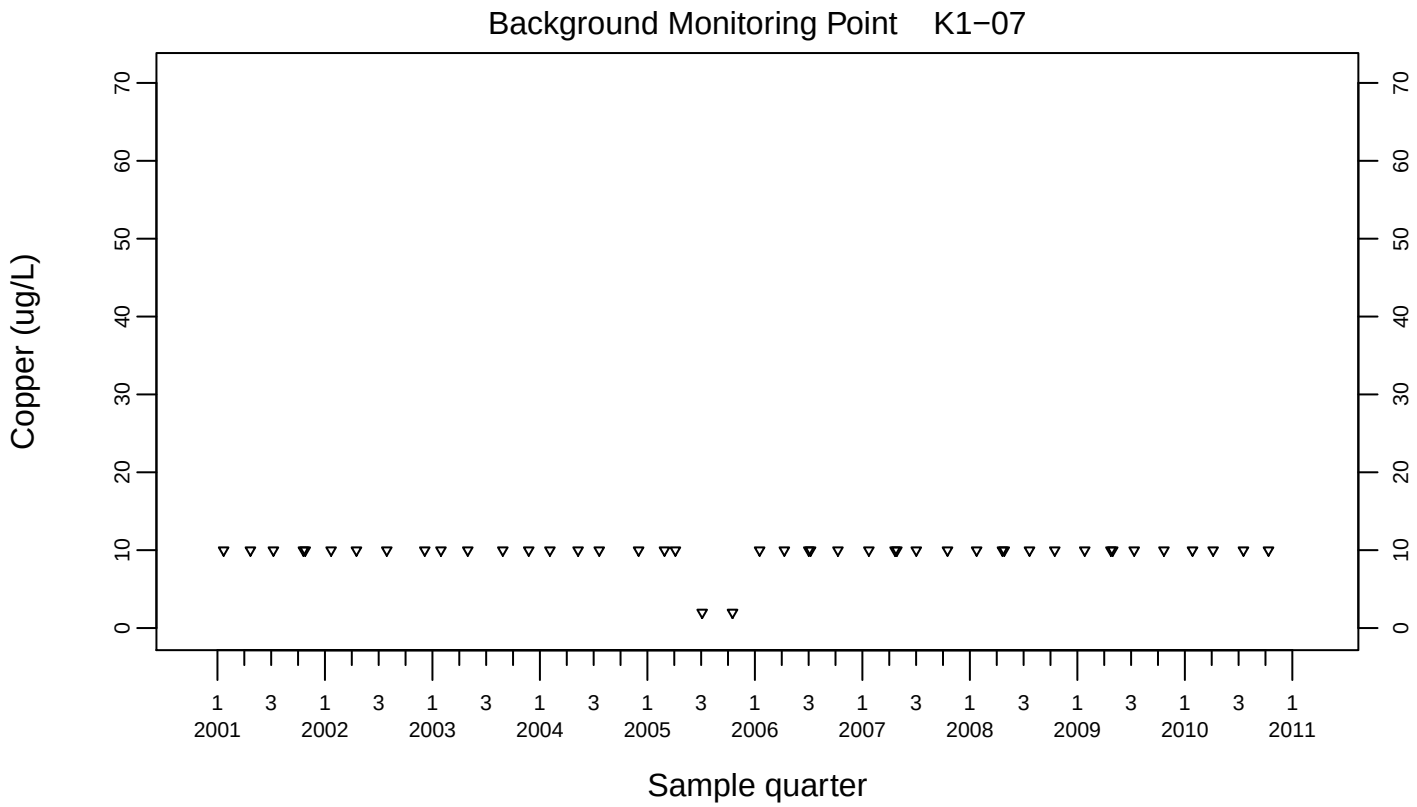

Pit 1 Area
Cobalt (ug/L)
SL=25
Above RL
Below RL
Detection Monitoring Point K1−05
Cobalt (ug/L)
SL
Sample quarter
Data omitted
See Table 1

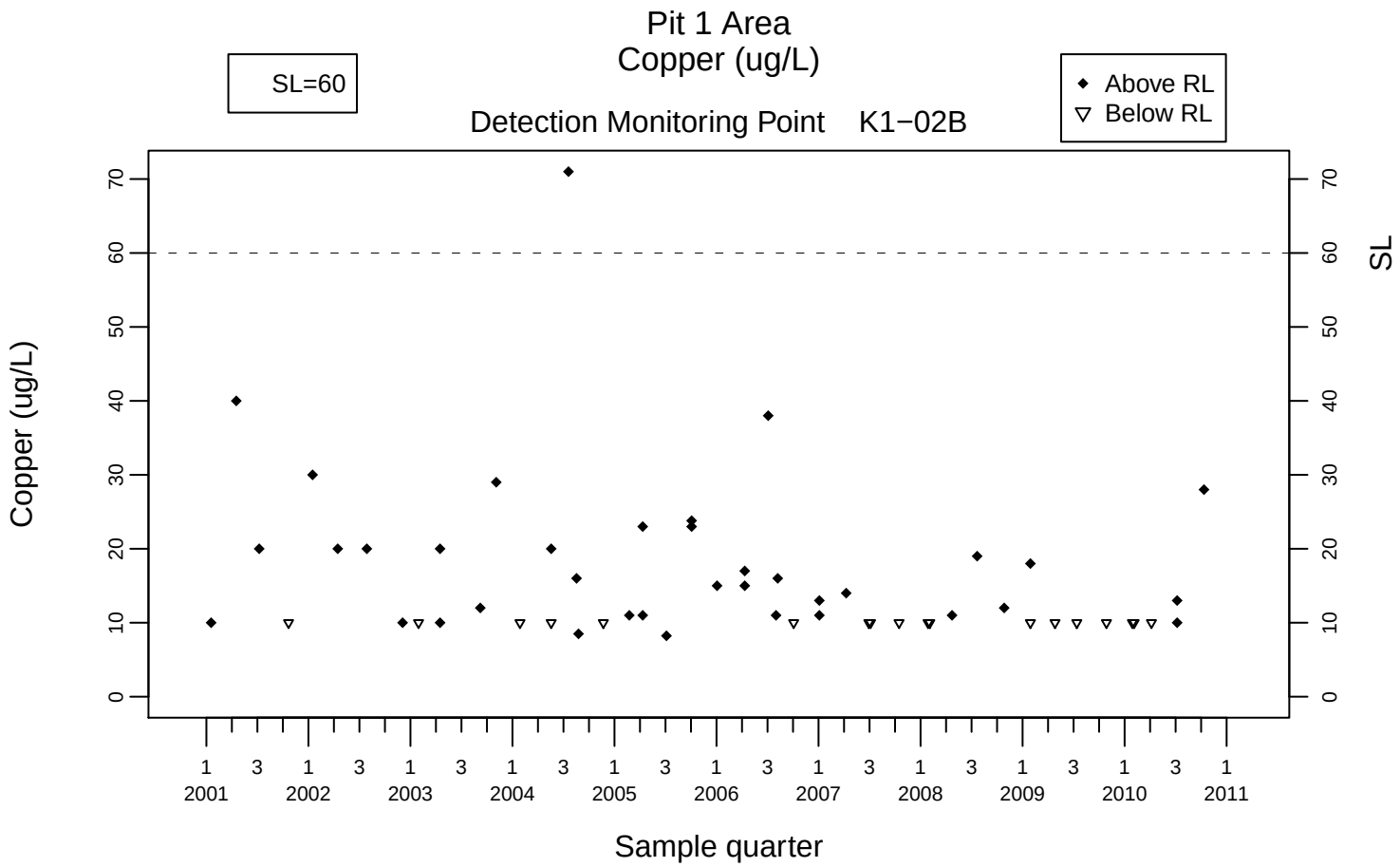

SL=25
Crossgradient Monitoring Point K1−08
Cobalt (ug/L)
SL
Sample quarter

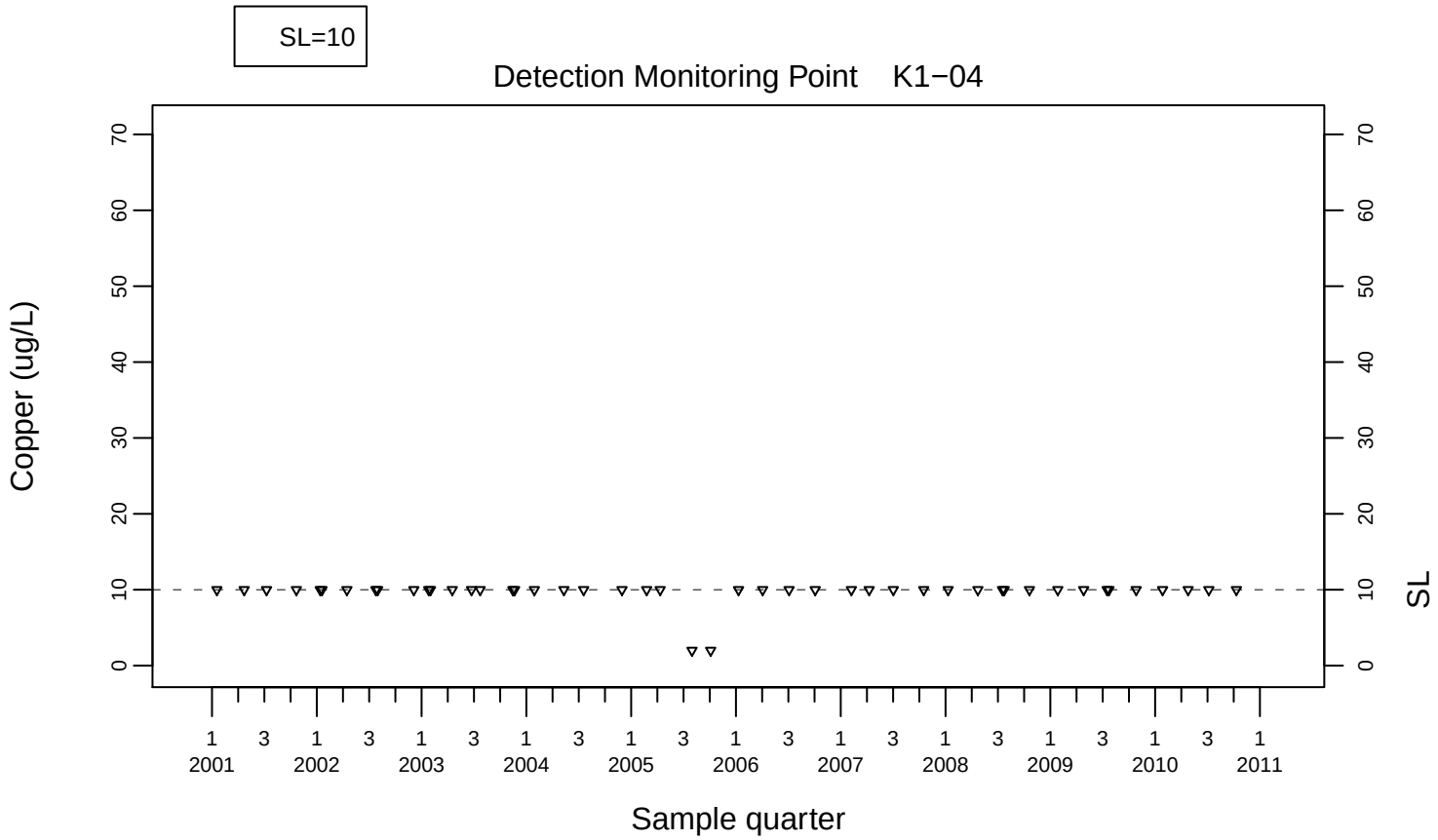

Pit 1 Area
Cobalt (ug/L)
SL=25
Above RL
Below RL
Crossgradient Monitoring Point K1−09
Cobalt (ug/L)
SL
Sample quarter
0
5
10
15
20
25
30
35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

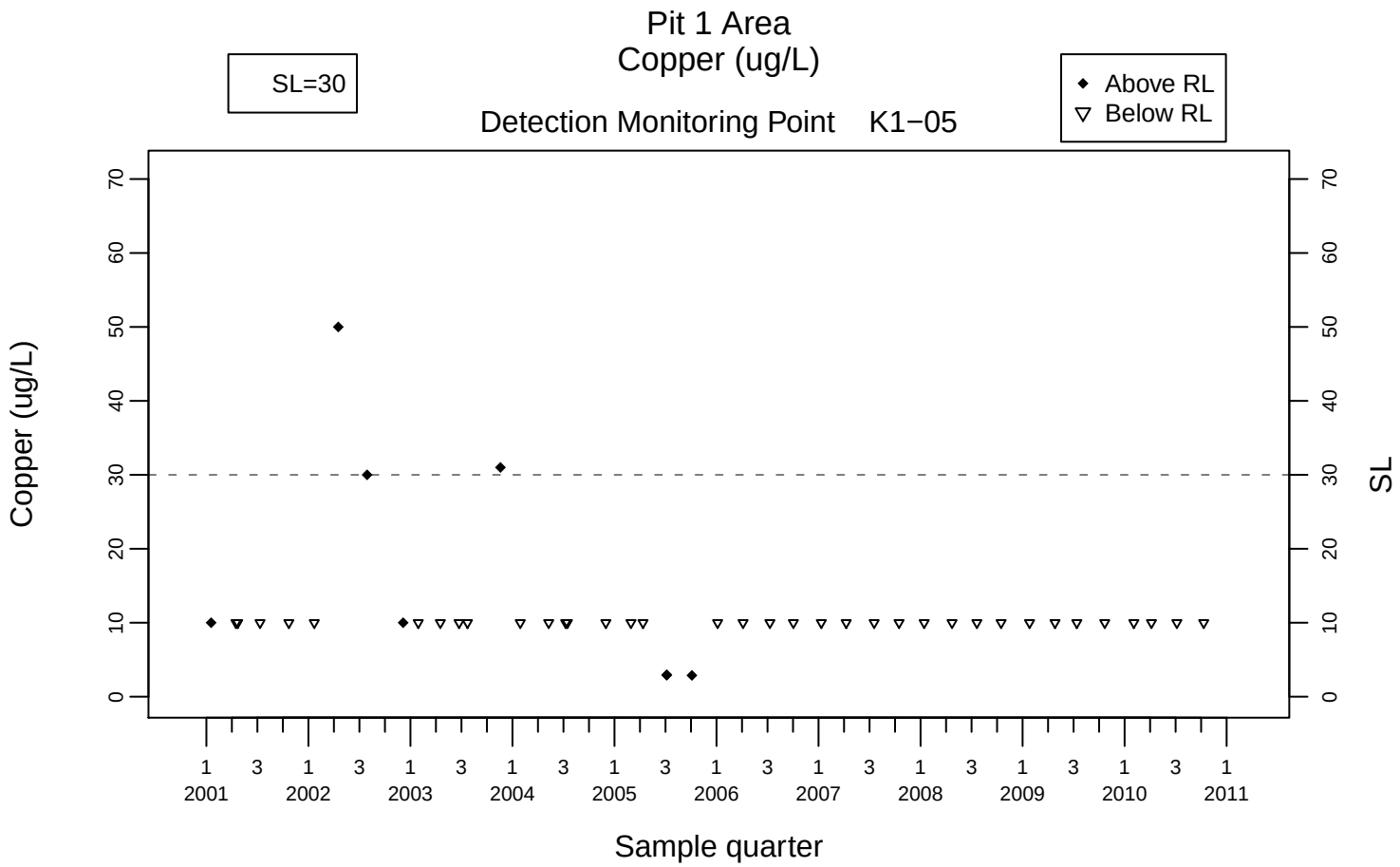

SL=25
Detection Monitoring Point W−PIT1−2326
Cobalt (ug/L)
SL
Sample quarter
0
5
10
15
20
25
30
35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

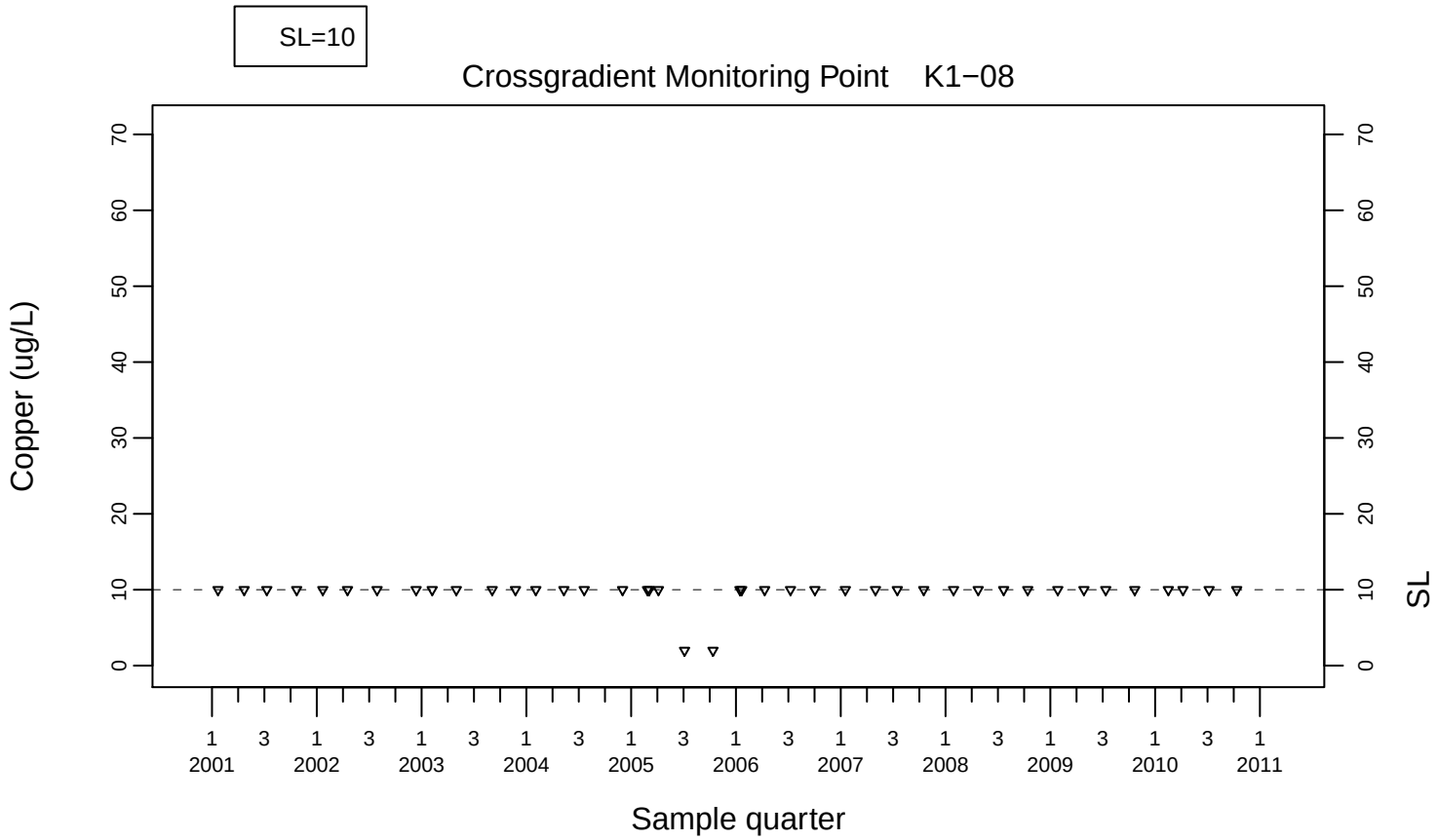

Pit 1 Area
Copper (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Copper (ug/L)
0
10
20
30
40
50
60
70
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

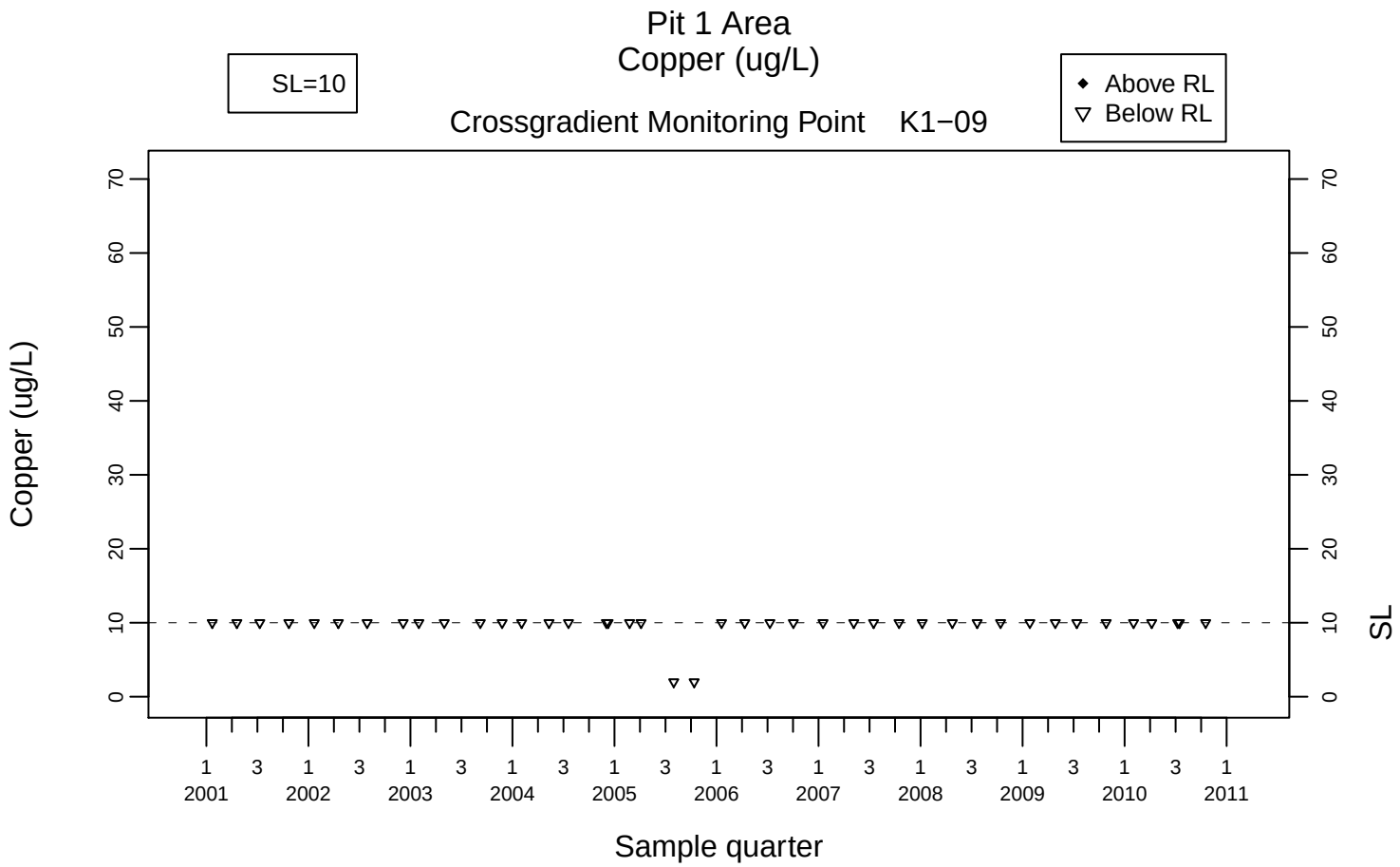

Background Monitoring Point K1−07
Copper (ug/L)
0
10
20
30
40
50
60
70
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

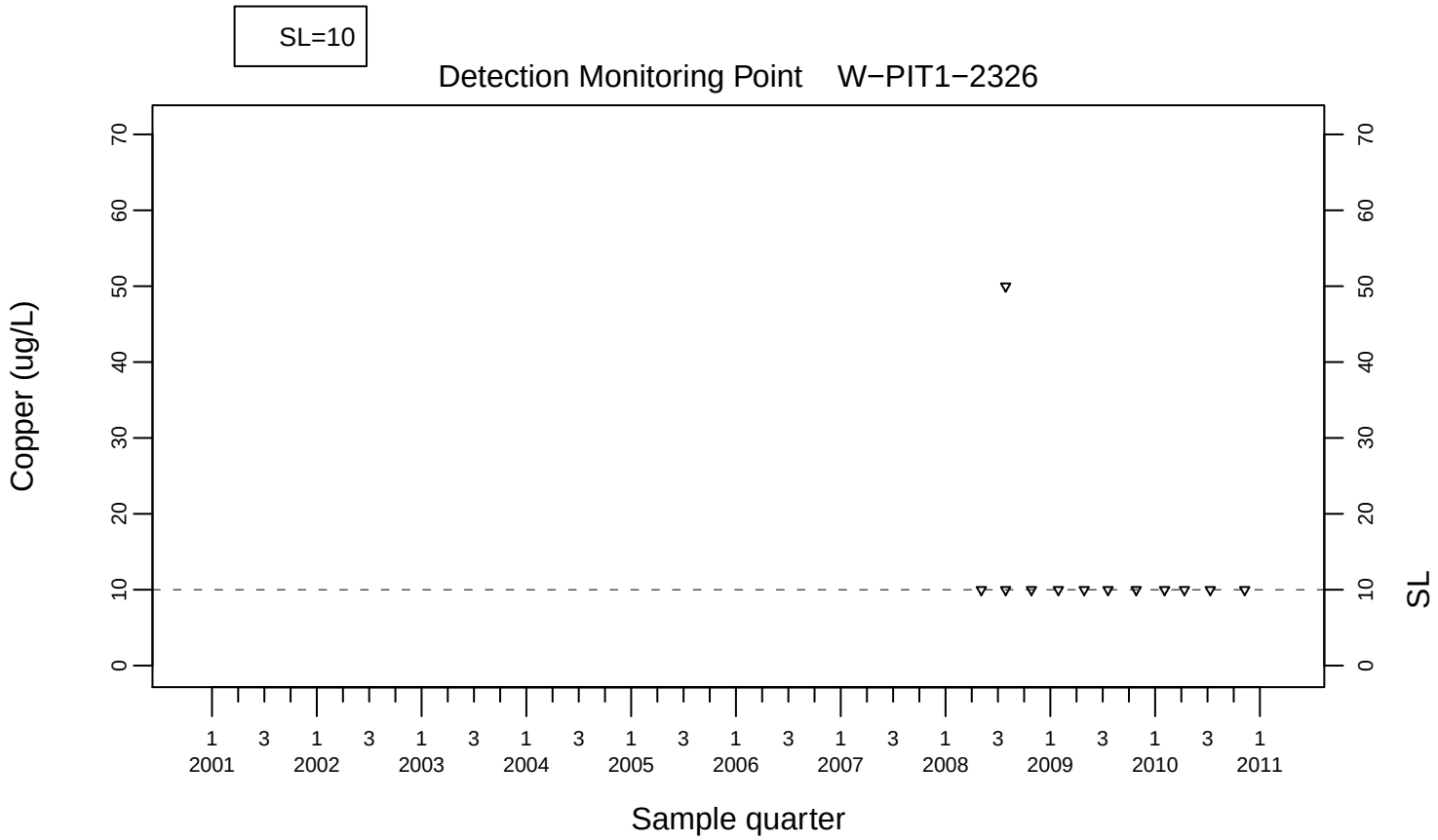

Pit 1 Area
Copper (ug/L)
SL=60
Above RL
Below RL
Detection Monitoring Point K1−02B
Copper (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

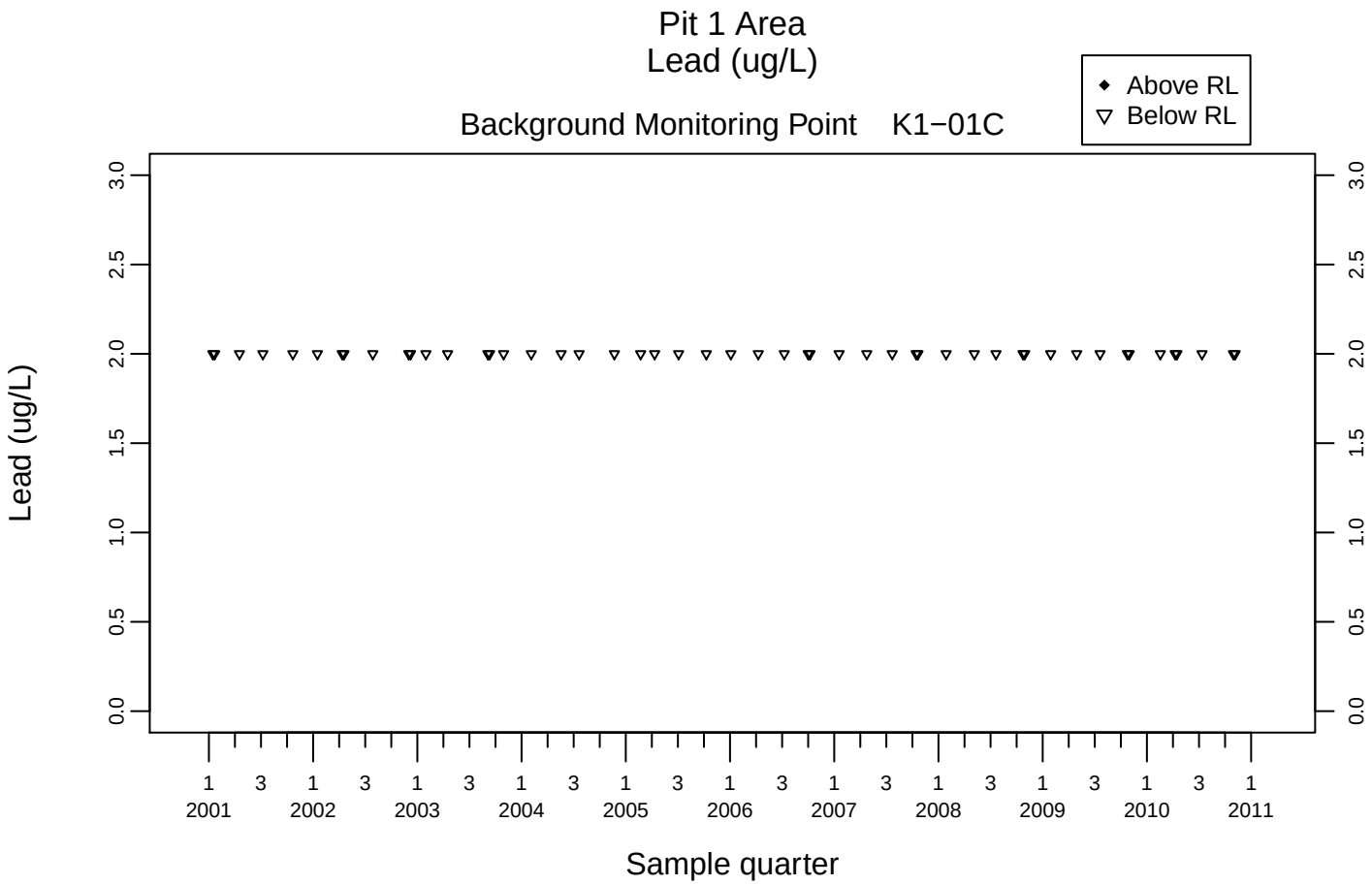

SL=10
Detection Monitoring Point K1−04
Copper (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

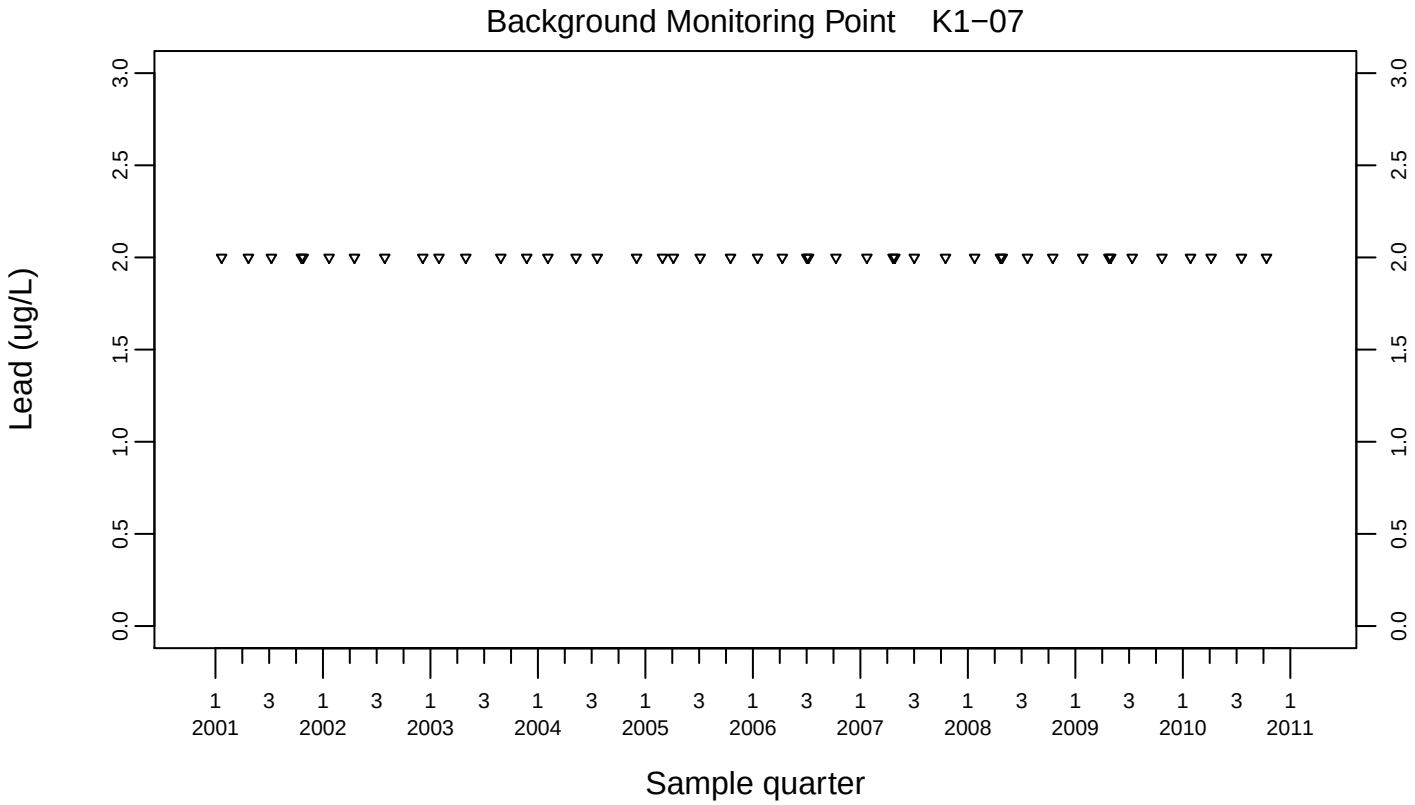

Pit 1 Area
Copper (ug/L)
Detection Monitoring Point K1−05
SL=30
Above RL
Below RL
Copper (ug/L)
SL
Sample quarter
0
10
20
30
40
50
60
70
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

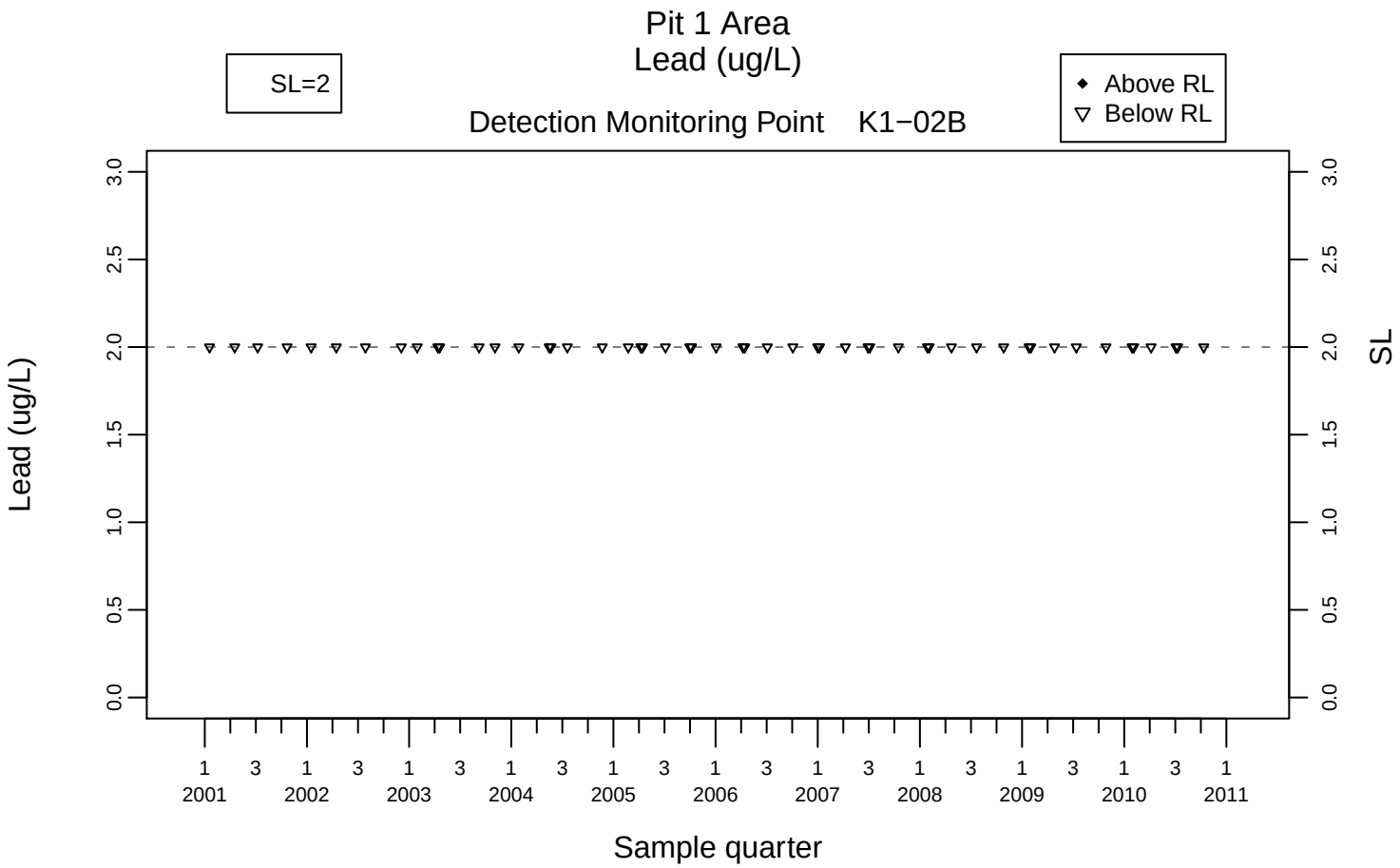

Crossgradient Monitoring Point K1−08
SL=10
Copper (ug/L)
SL
Sample quarter
0
10
20
30
40
50
60
70
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

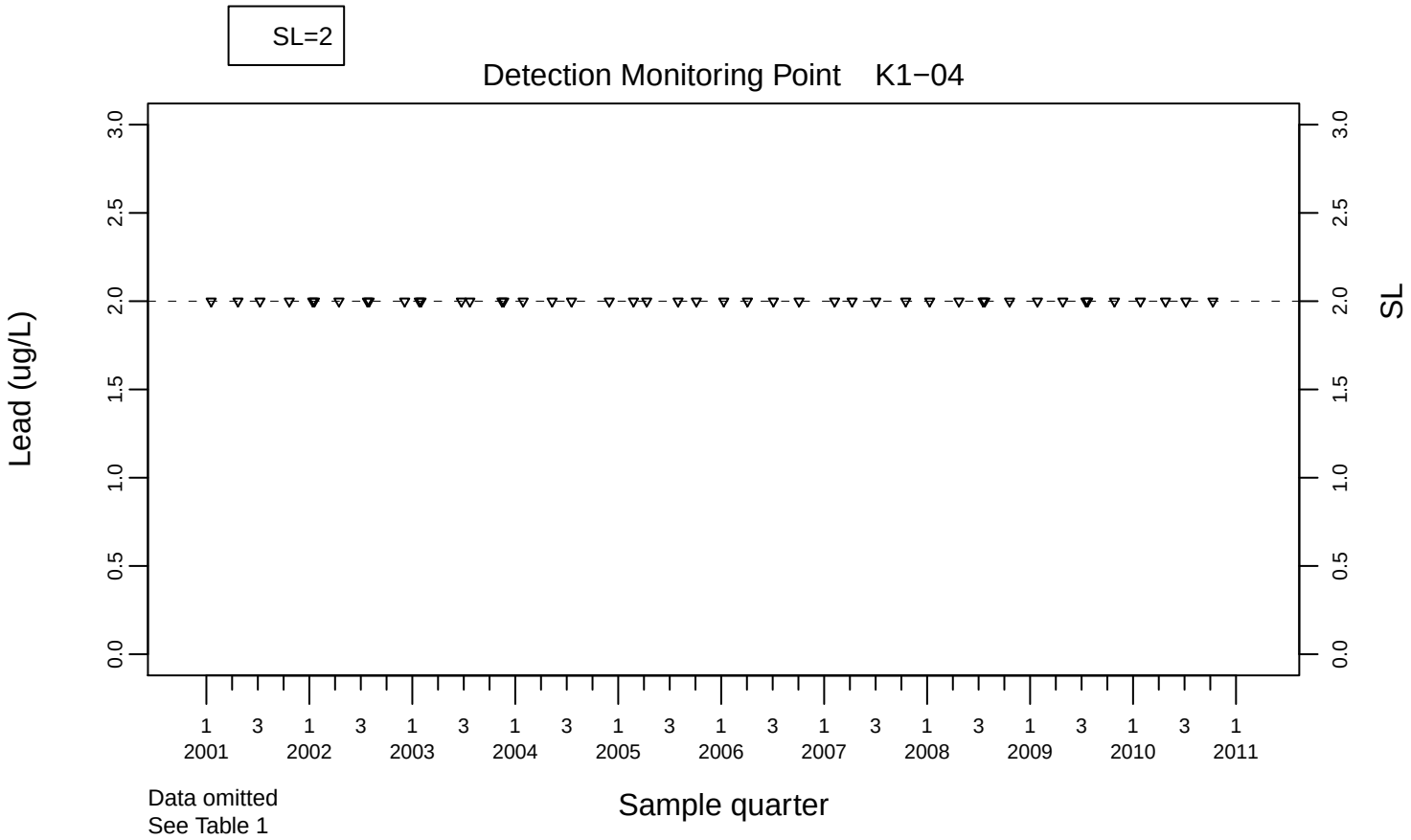

Pit 1 Area
Copper (ug/L)
Crossgradient Monitoring Point K1−09
SL=10
Above RL
Below RL
Copper (ug/L)
SL
Sample quarter
0
10
20
30
40
50
60
70
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


SL=10
Detection Monitoring Point W−PIT1−2326
Copper (ug/L)
SL
Sample quarter
0
10
20
30
40
50
60
70
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

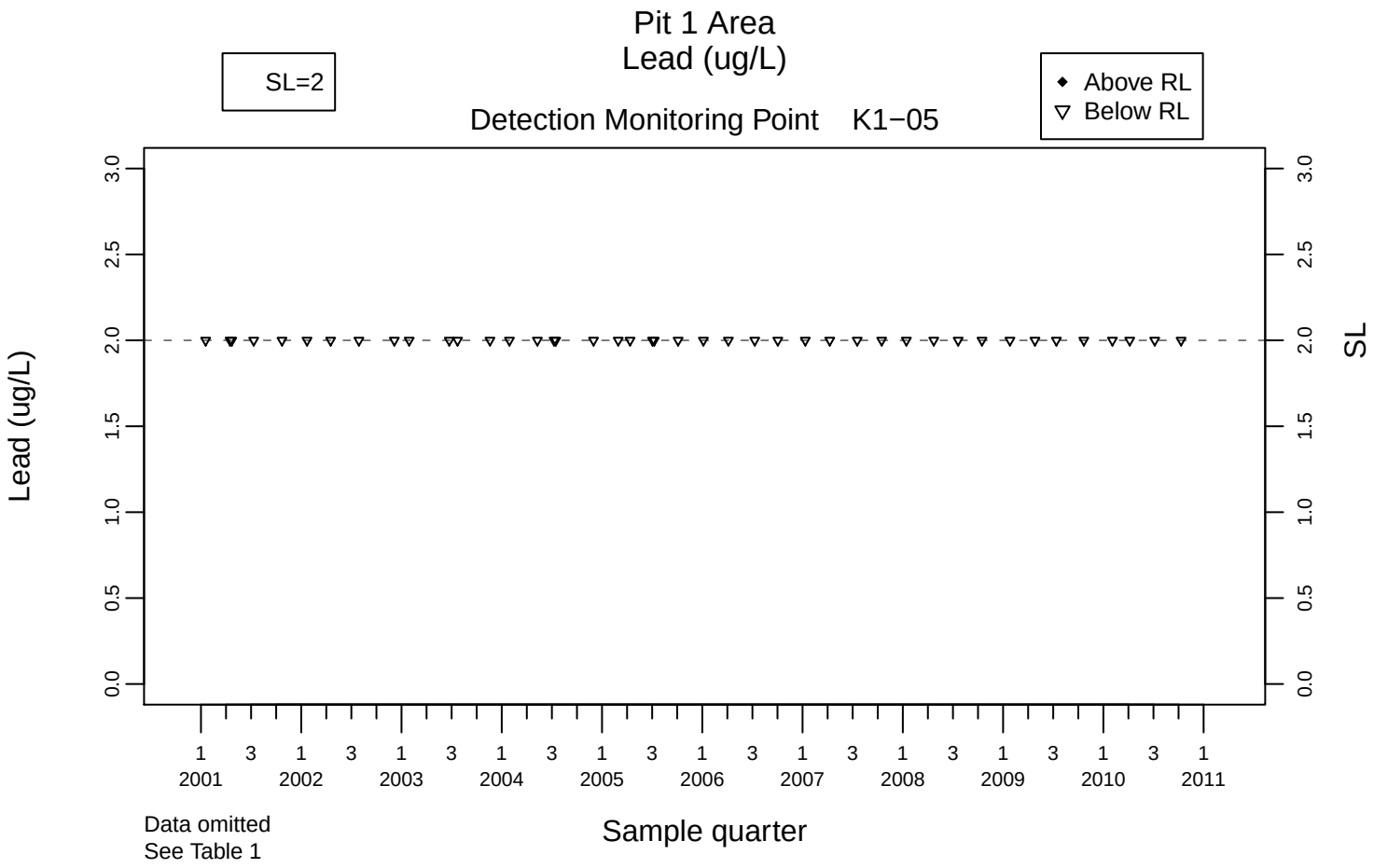

Pit 1 Area
Lead (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Lead (ug/L)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

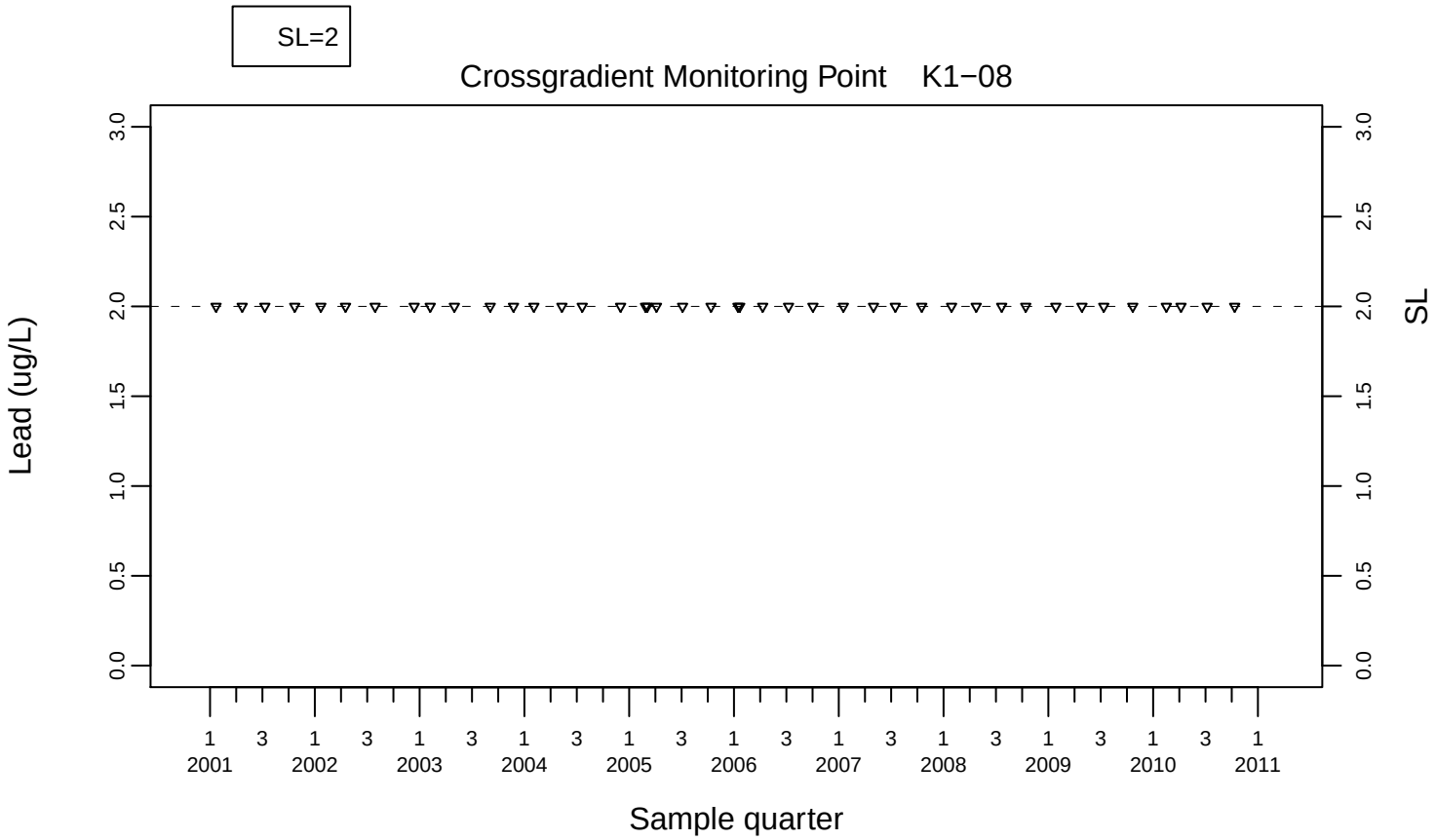

Background Monitoring Point K1−07
Lead (ug/L)
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

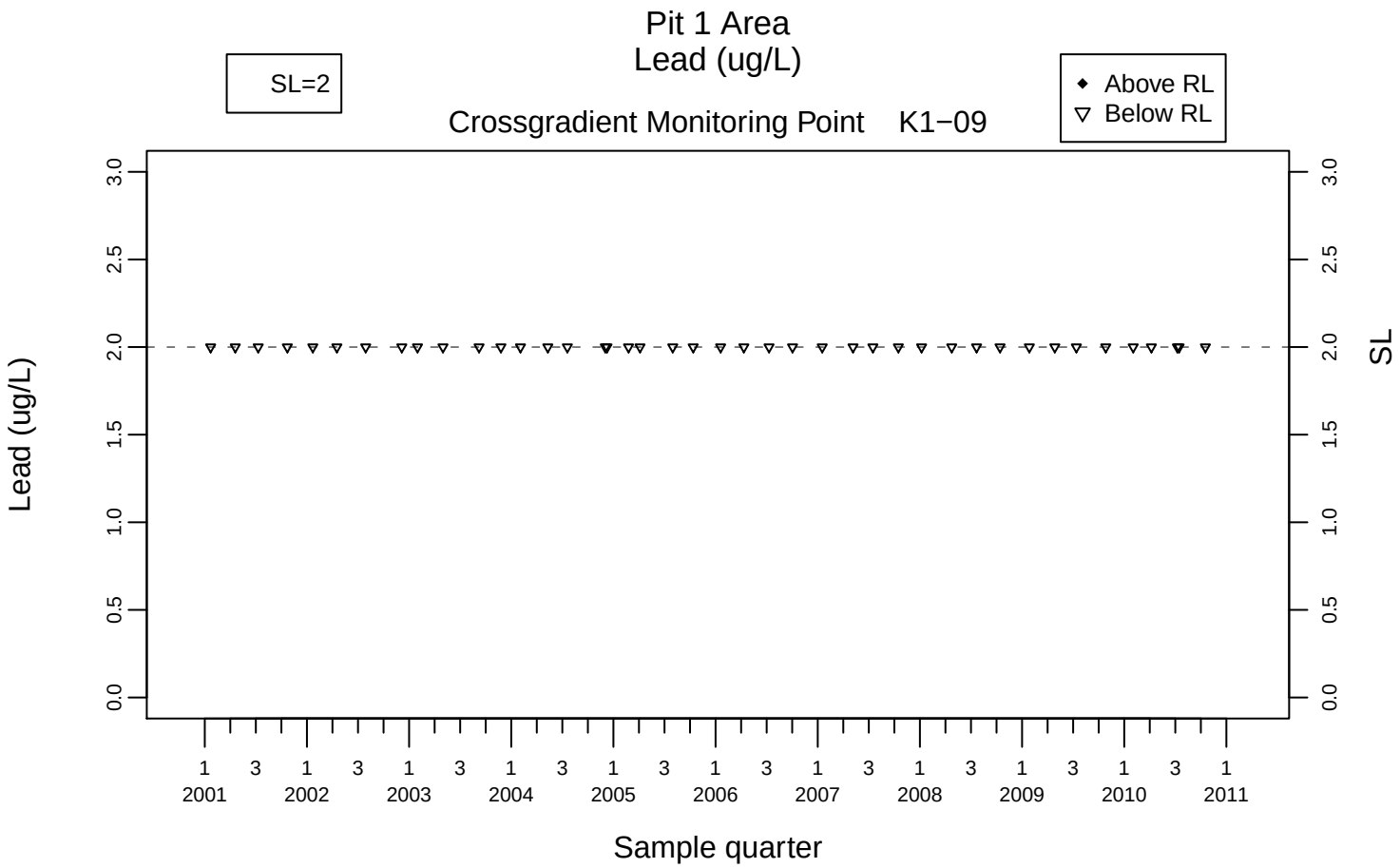


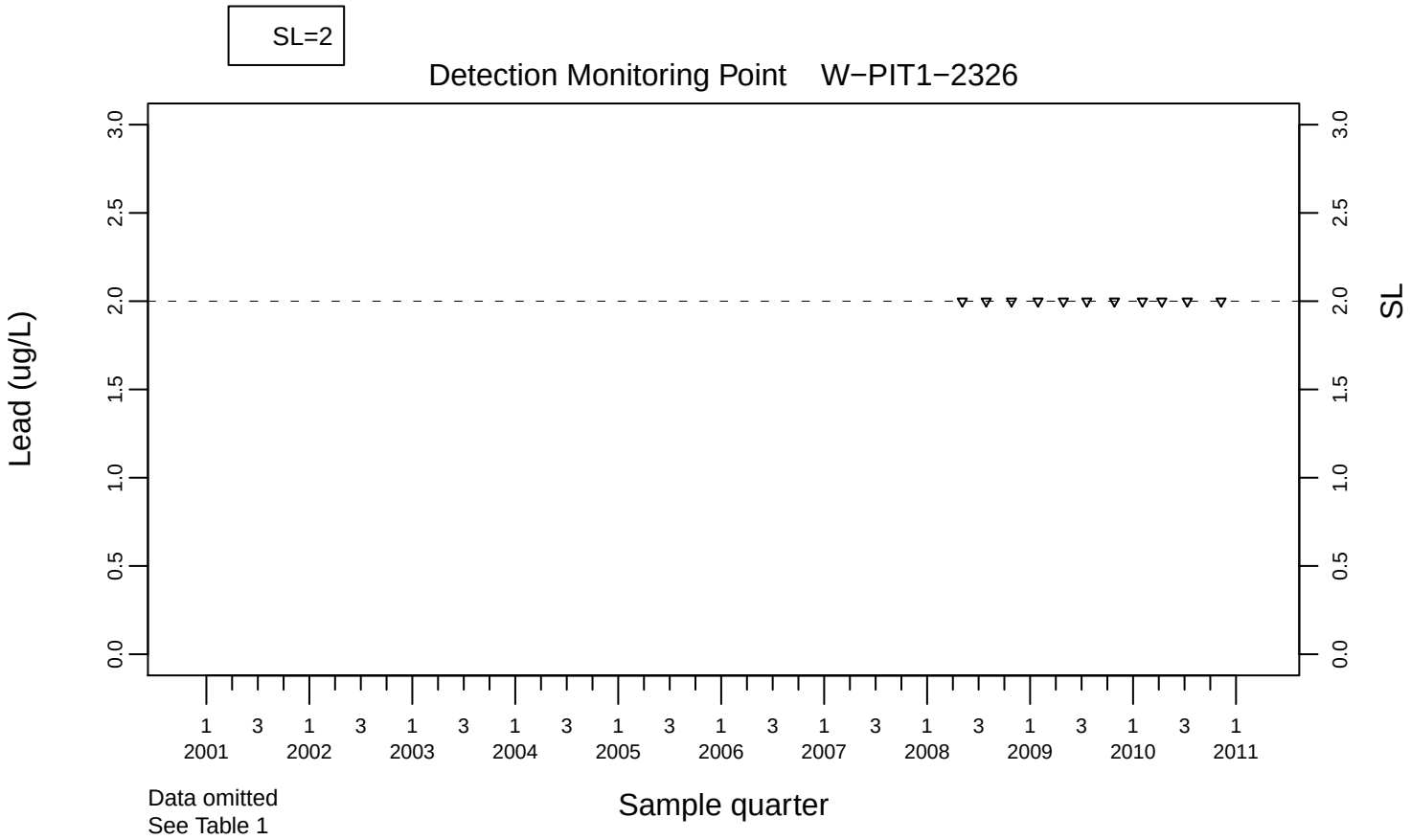


Data omitted
See Table 1

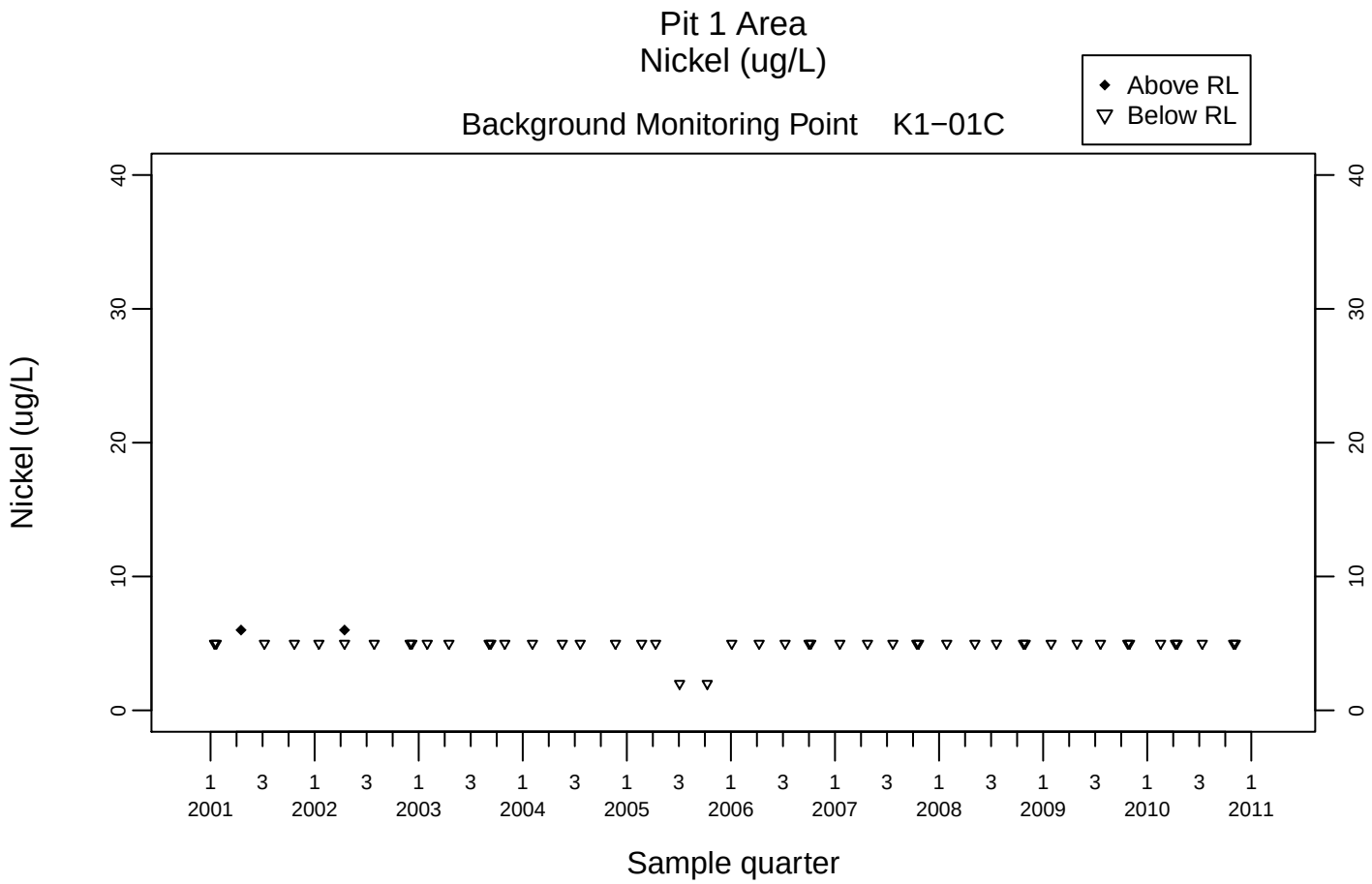

Pit 1 Area
Lead (ug/L)
SL=2
Above RL
Below RL
Detection Monitoring Point K1−05
Lead (ug/L)
SL
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Data omitted
See Table 1
Sample quarter

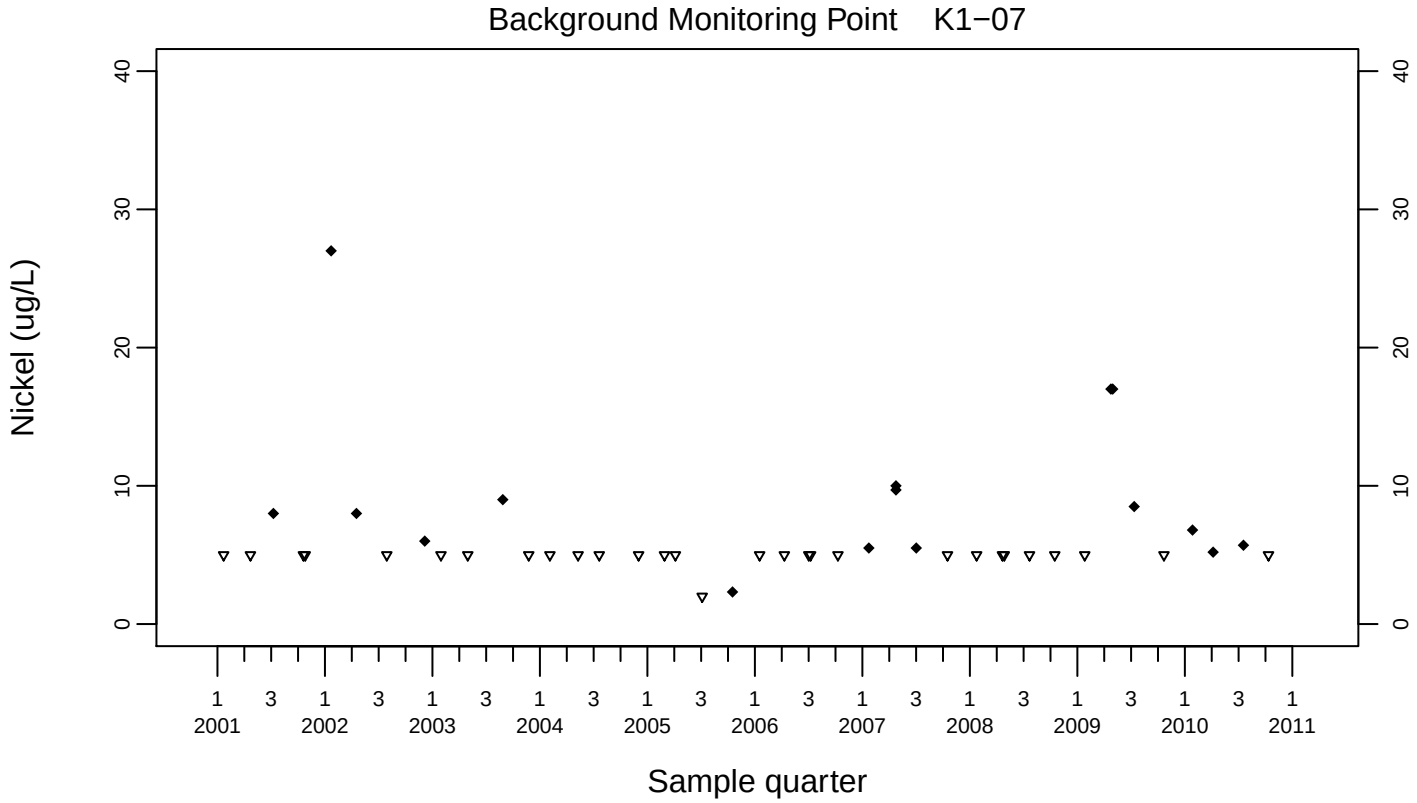

SL=2
Crossgradient Monitoring Point K1−08
Lead (ug/L)
SL
0.0
0.5
1.0
1.5
2.0
2.5
3.0
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

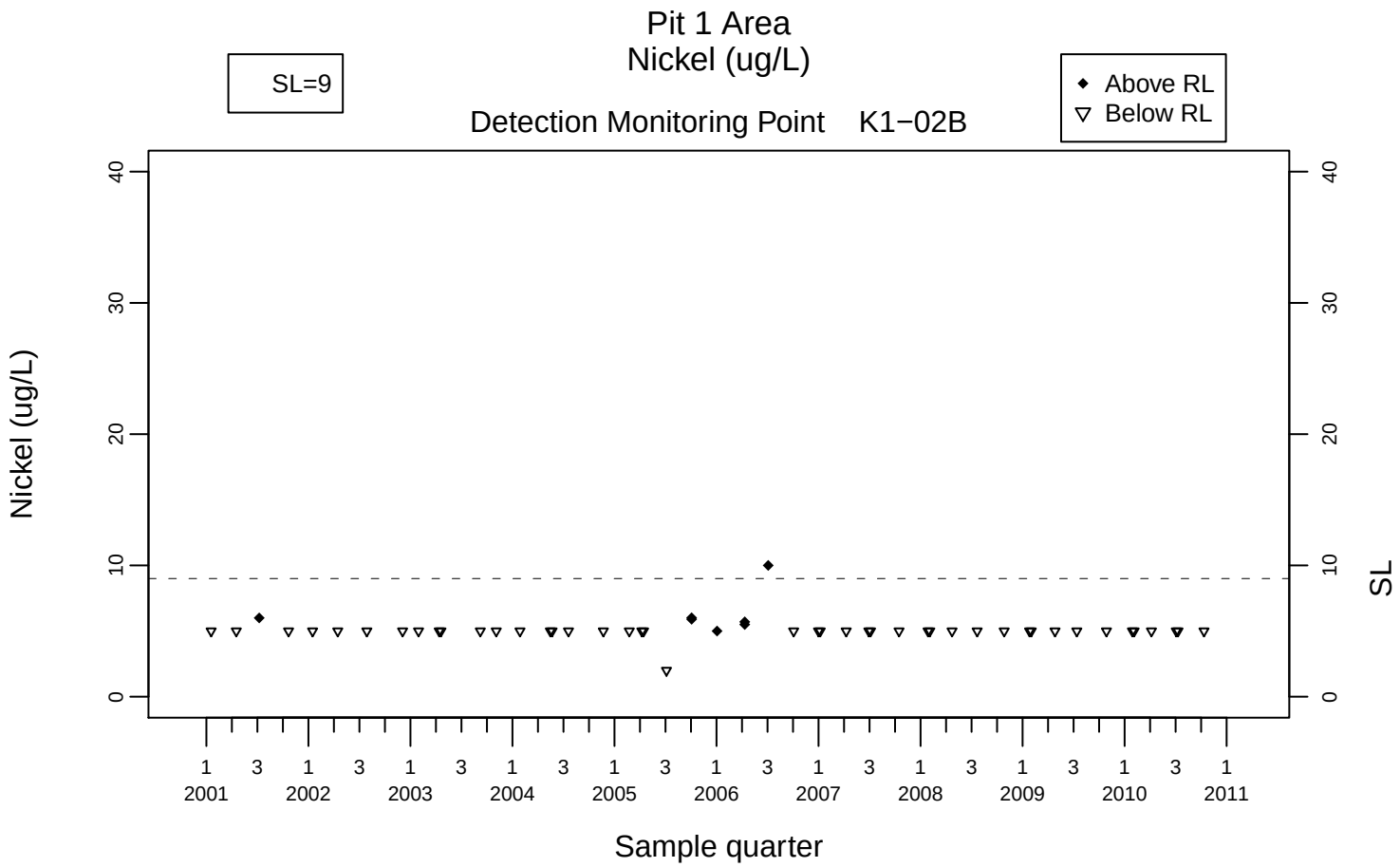


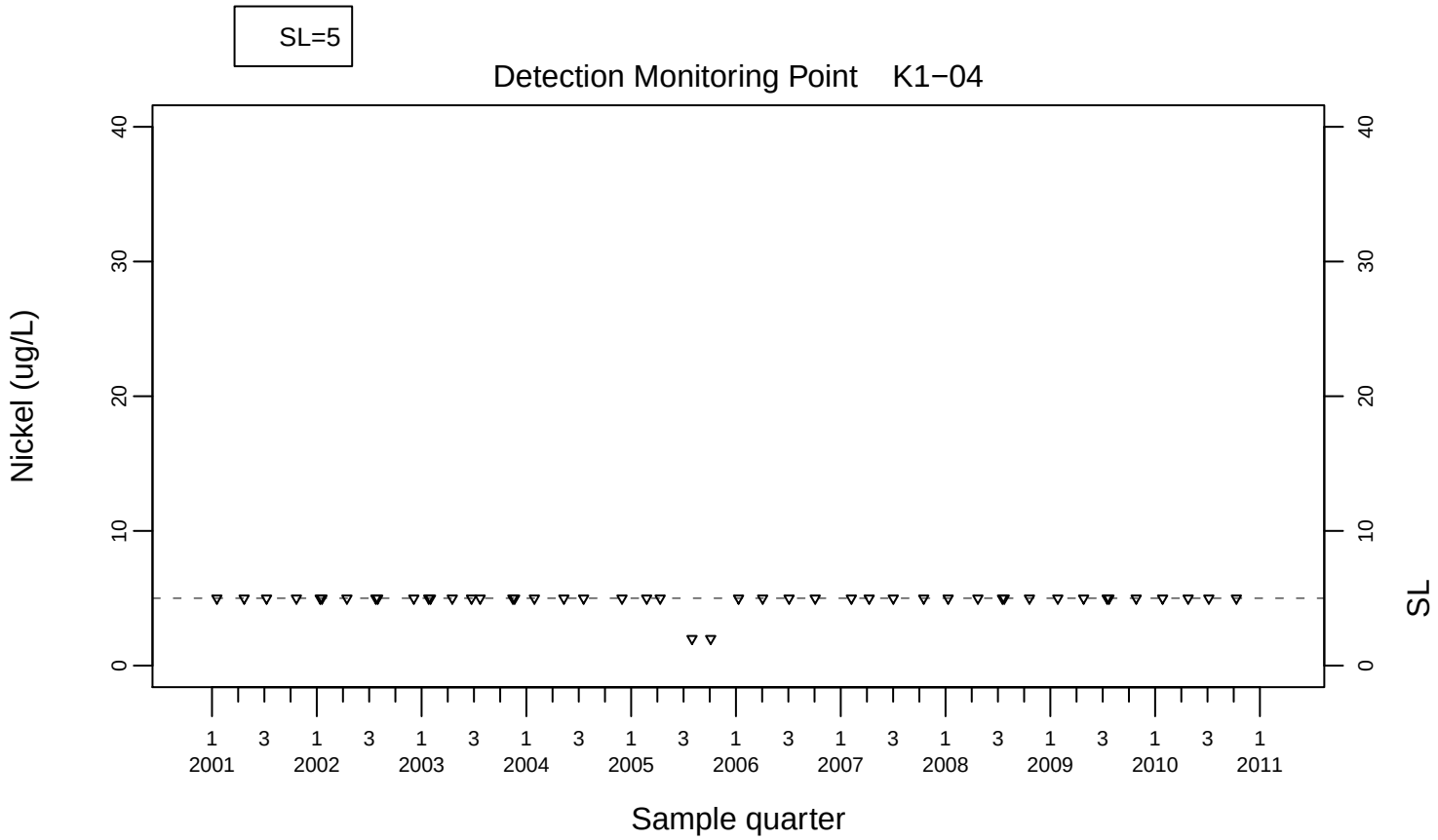


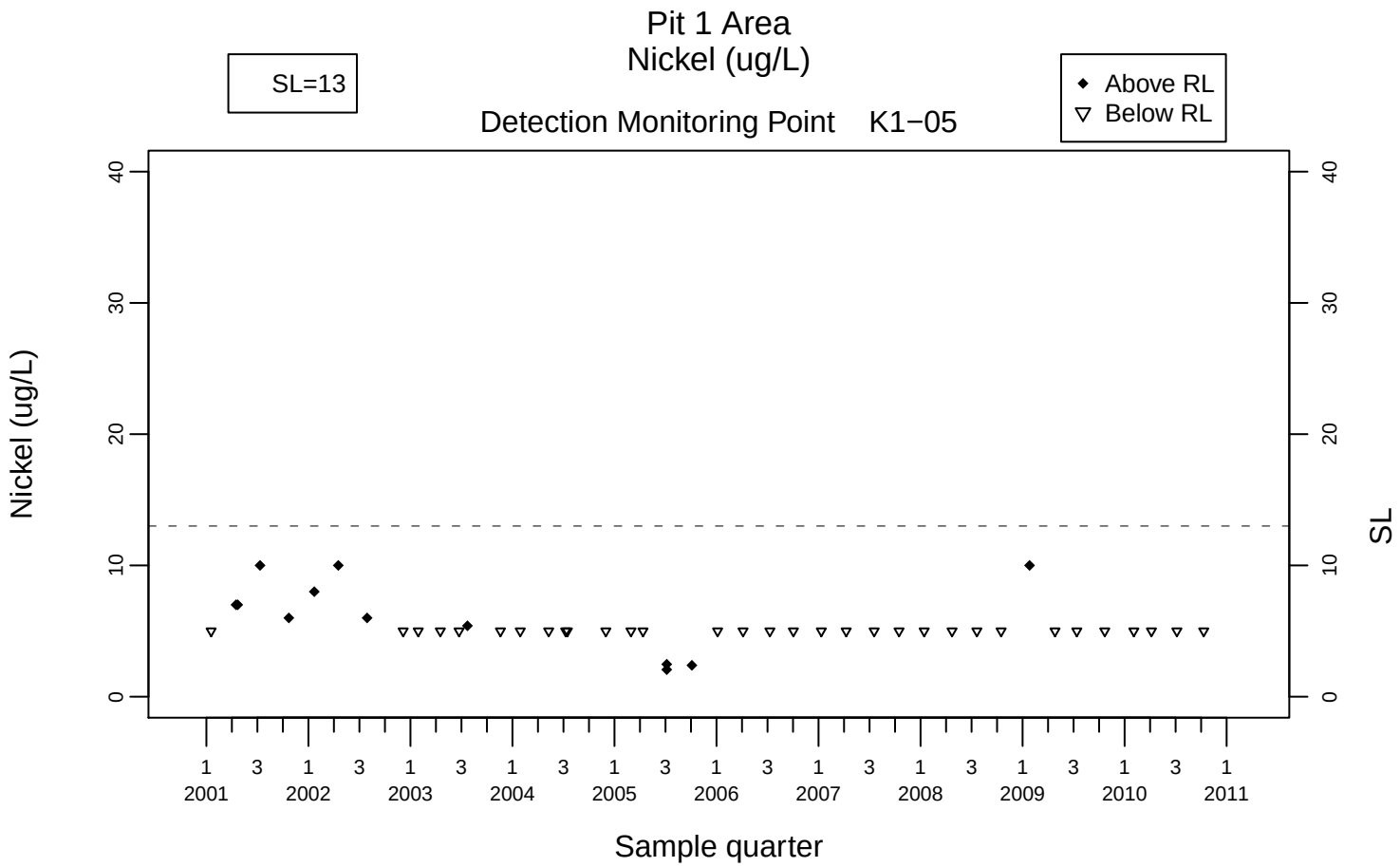
Data omitted
See Table 1

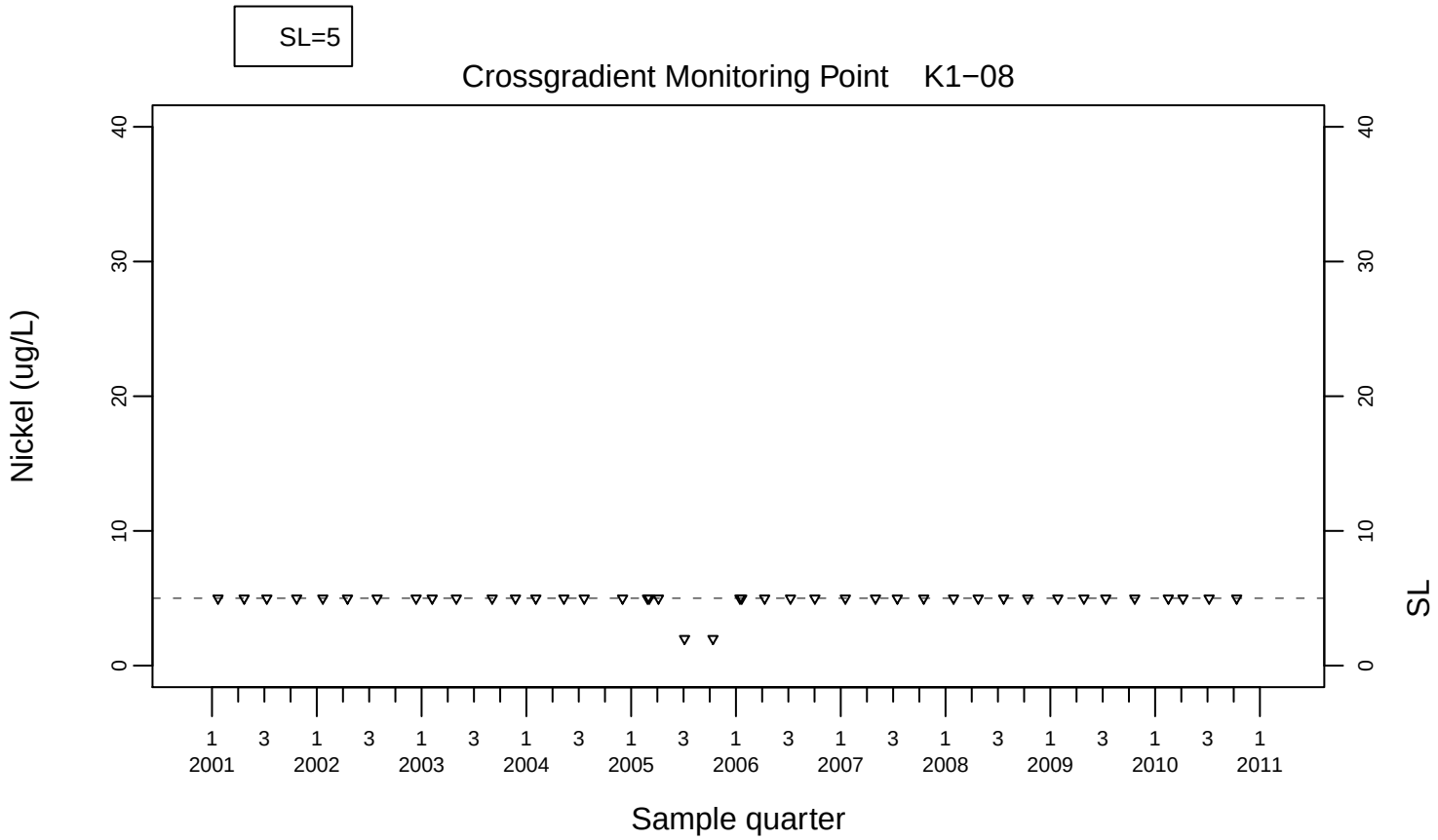

Pit 1 Area
Nickel (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Nickel (ug/L)
0
10
20
30
40
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

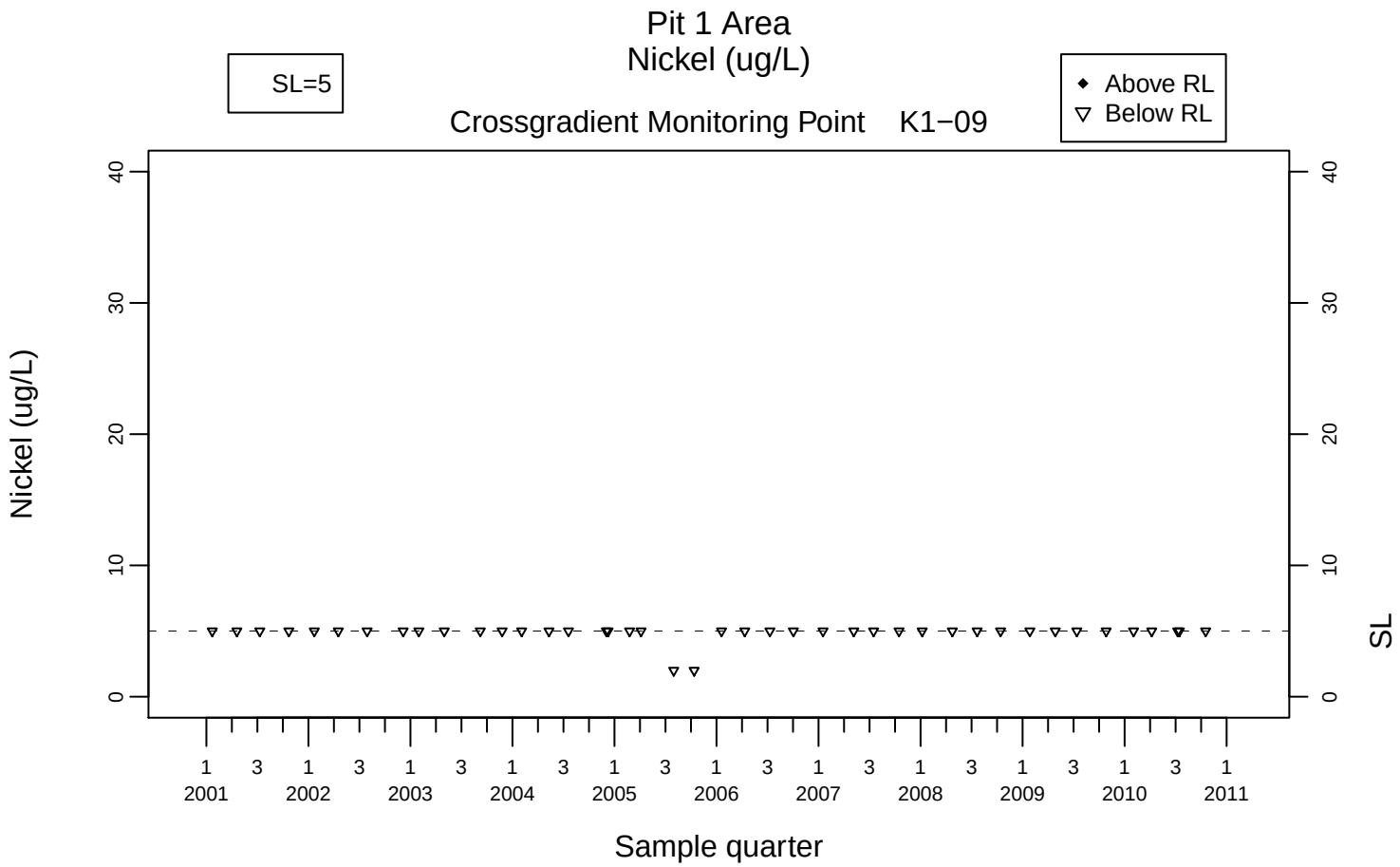

Background Monitoring Point K1−07
Nickel (ug/L)
0
10
20
30
40
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

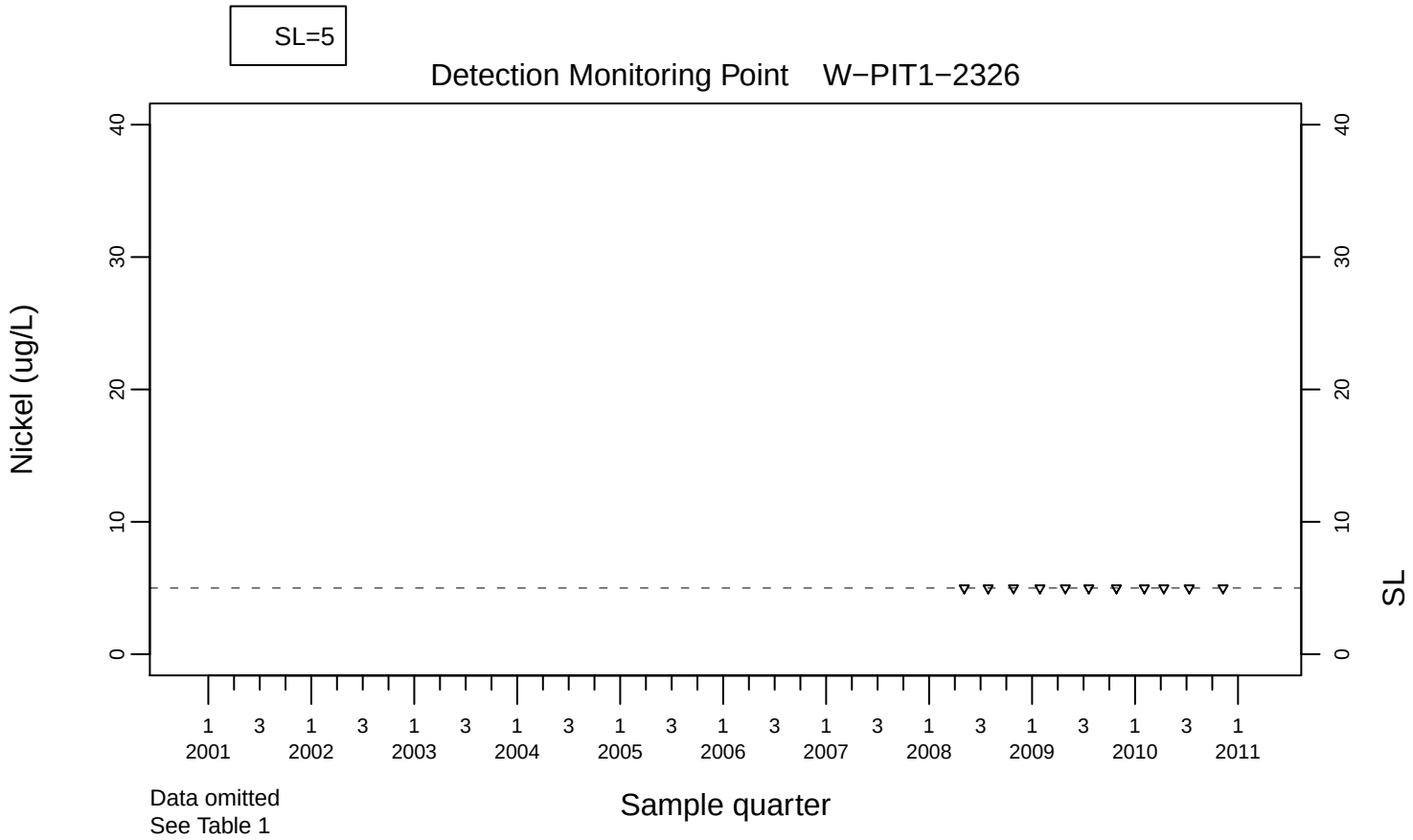

Pit 1 Area
Nickel (ug/L)
SL=9
Above RL
Below RL
Detection Monitoring Point K1−02B
Nickel (ug/L)
SL
0
10
20
30
40
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter


SL=5
Detection Monitoring Point K1−04
Nickel (ug/L)
SL
0
10
20
30
40
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

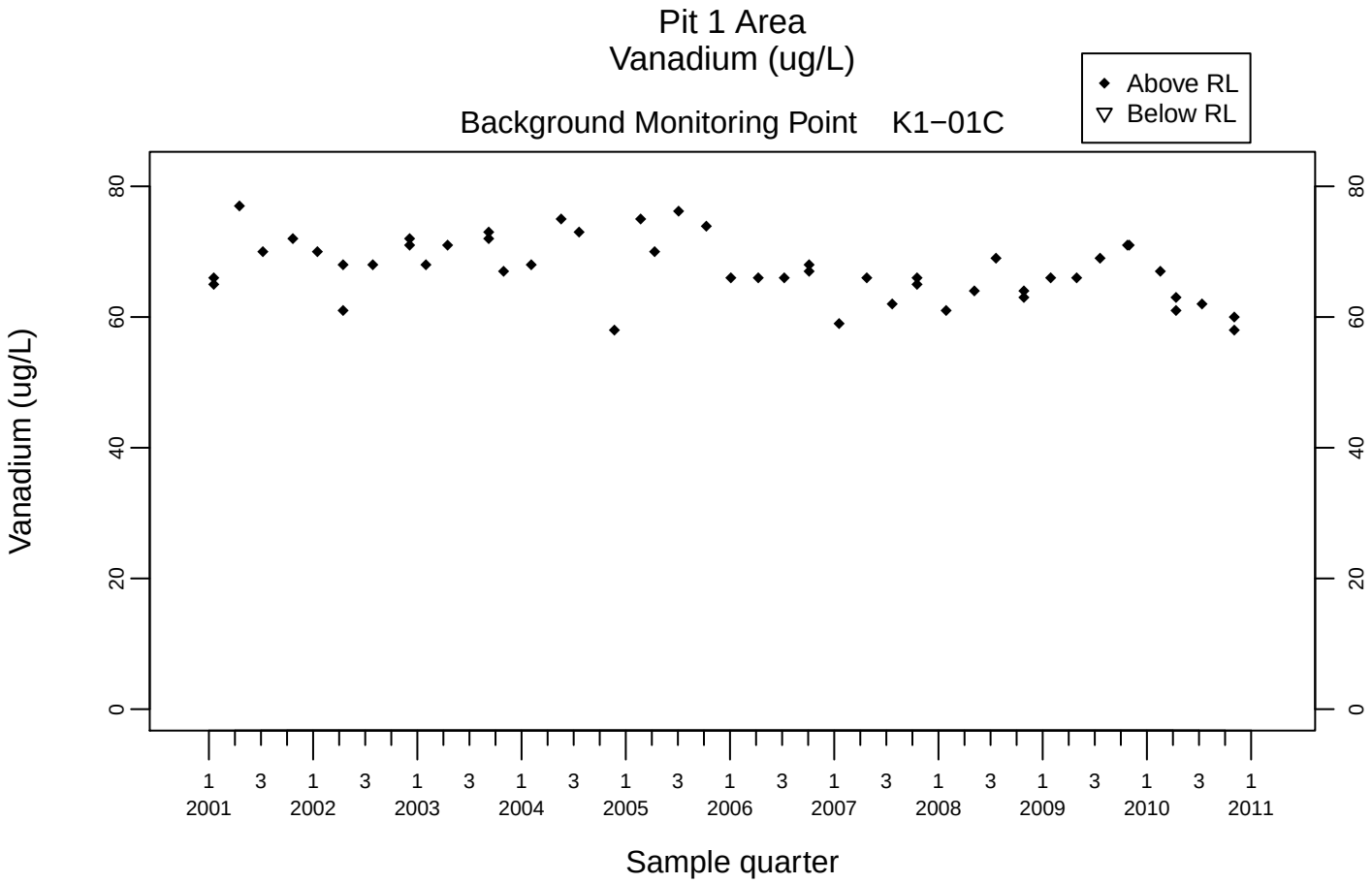

Pit 1 Area
Nickel (ug/L)
SL=13
Above RL
Below RL
Detection Monitoring Point K1−05
Nickel (ug/L)
SL
Sample quarter
0
10
20
30
40
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

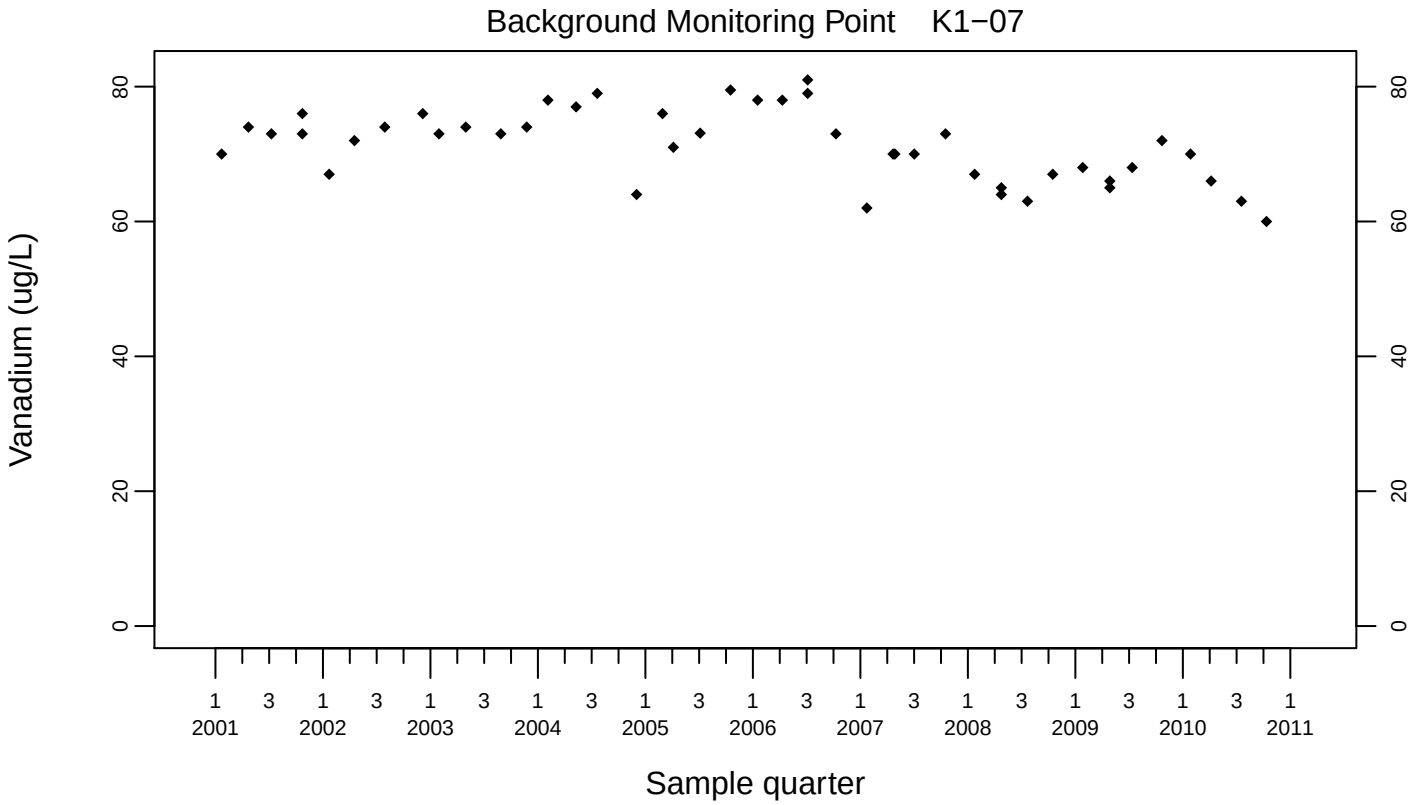

SL=5
Crossgradient Monitoring Point K1−08
Nickel (ug/L)
SL
Sample quarter
0
10
20
30
40
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

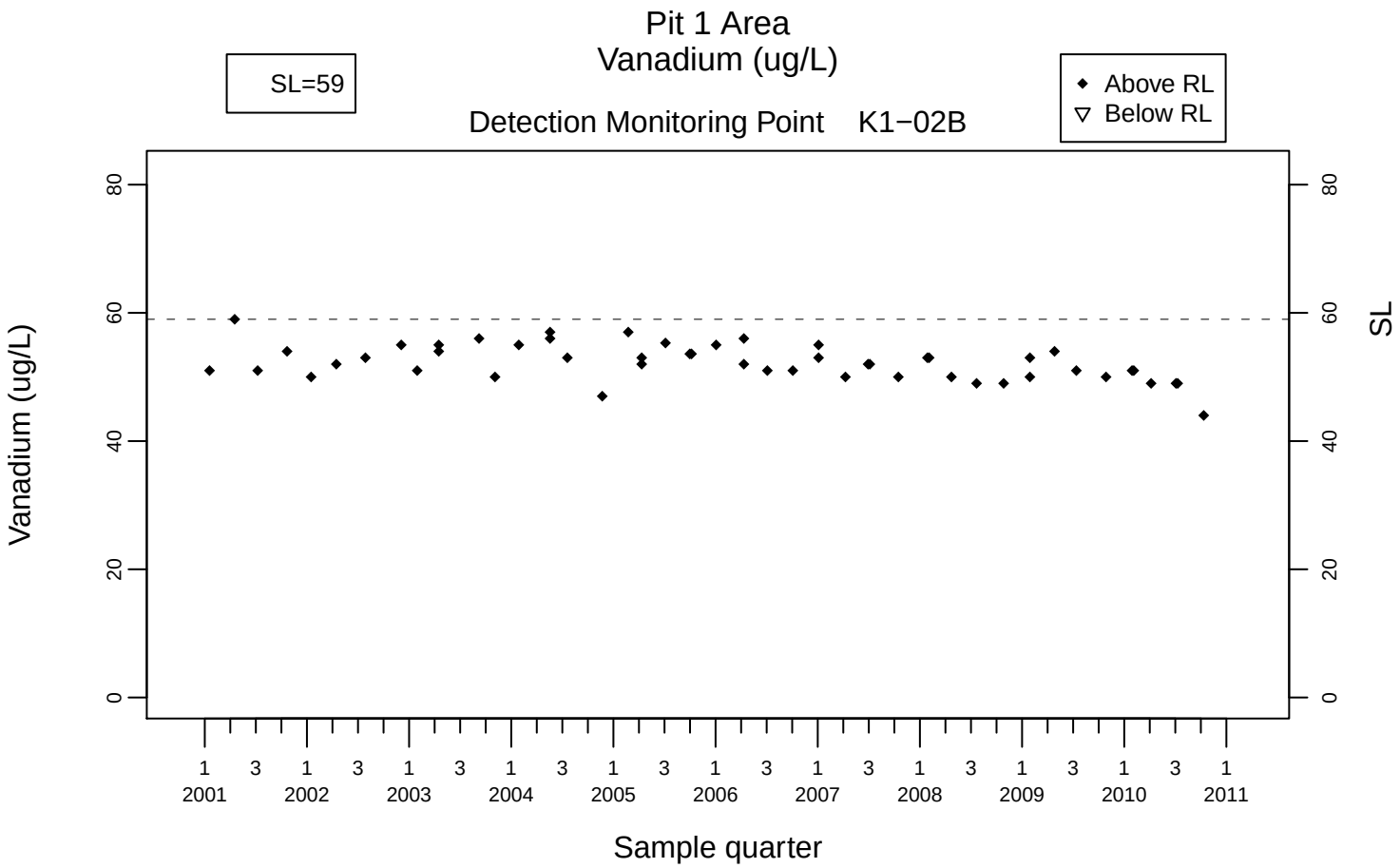


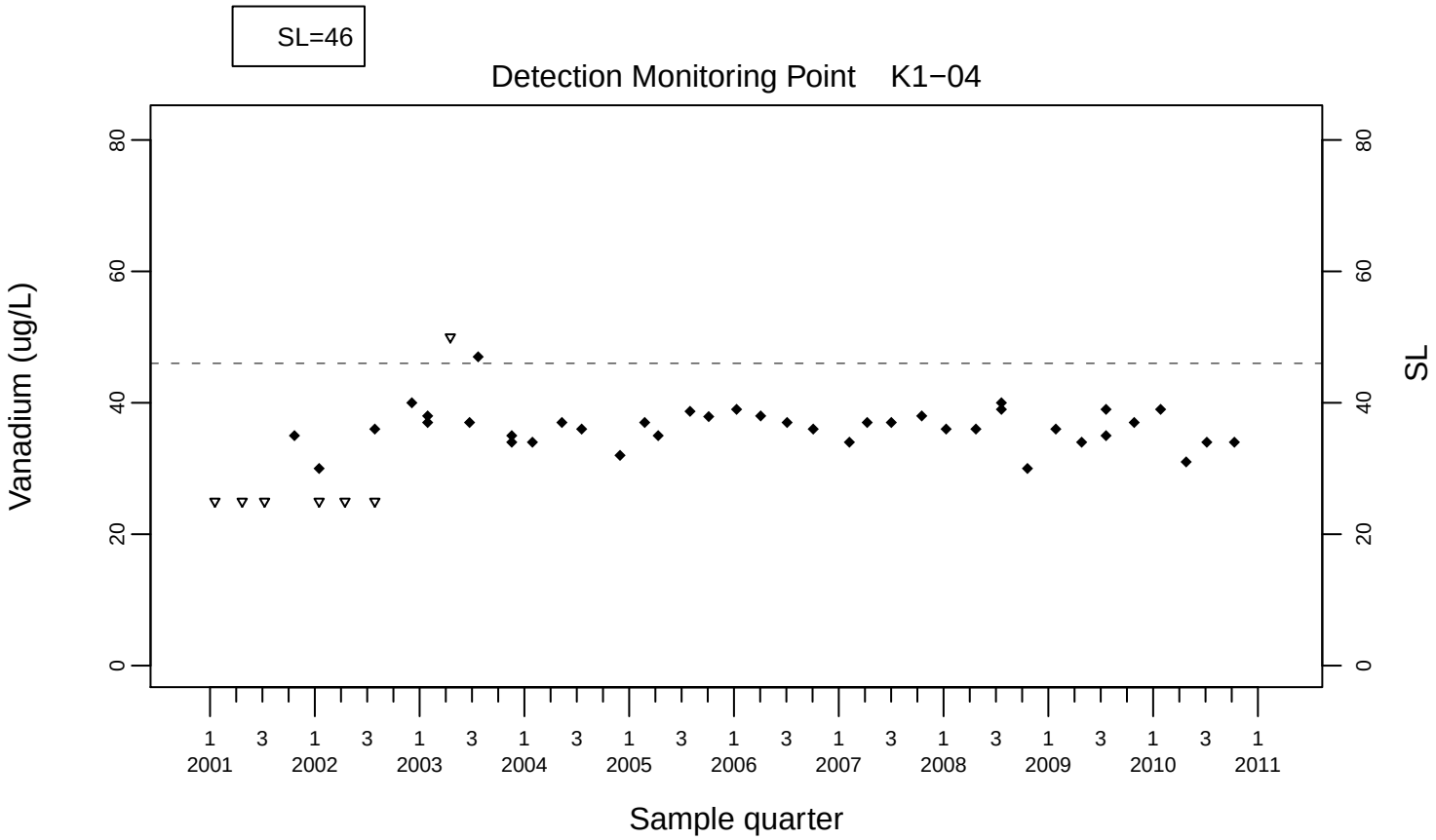


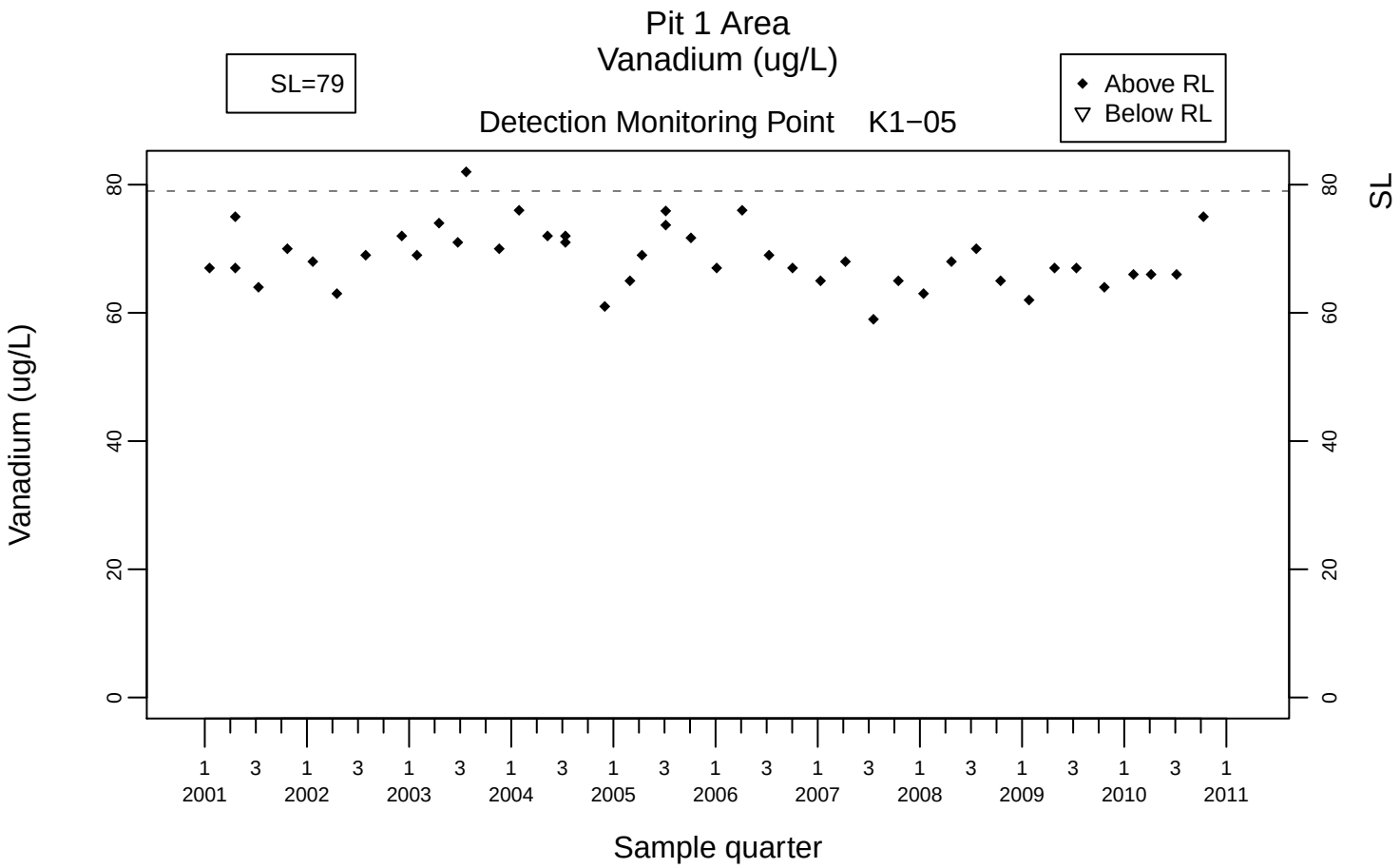
Data omitted
See Table 1

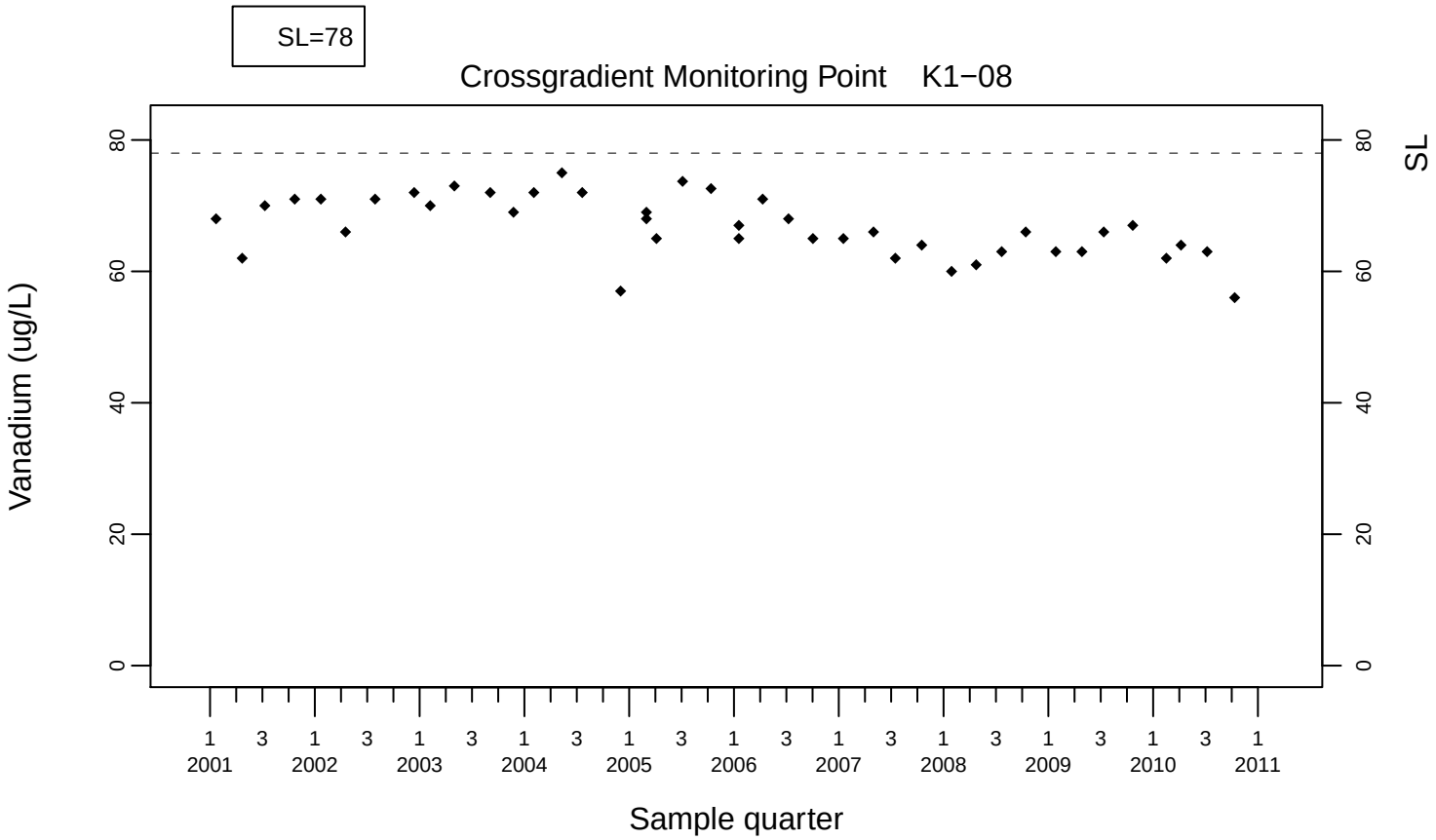

Pit 1 Area
Vanadium (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Vanadium (ug/L)
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

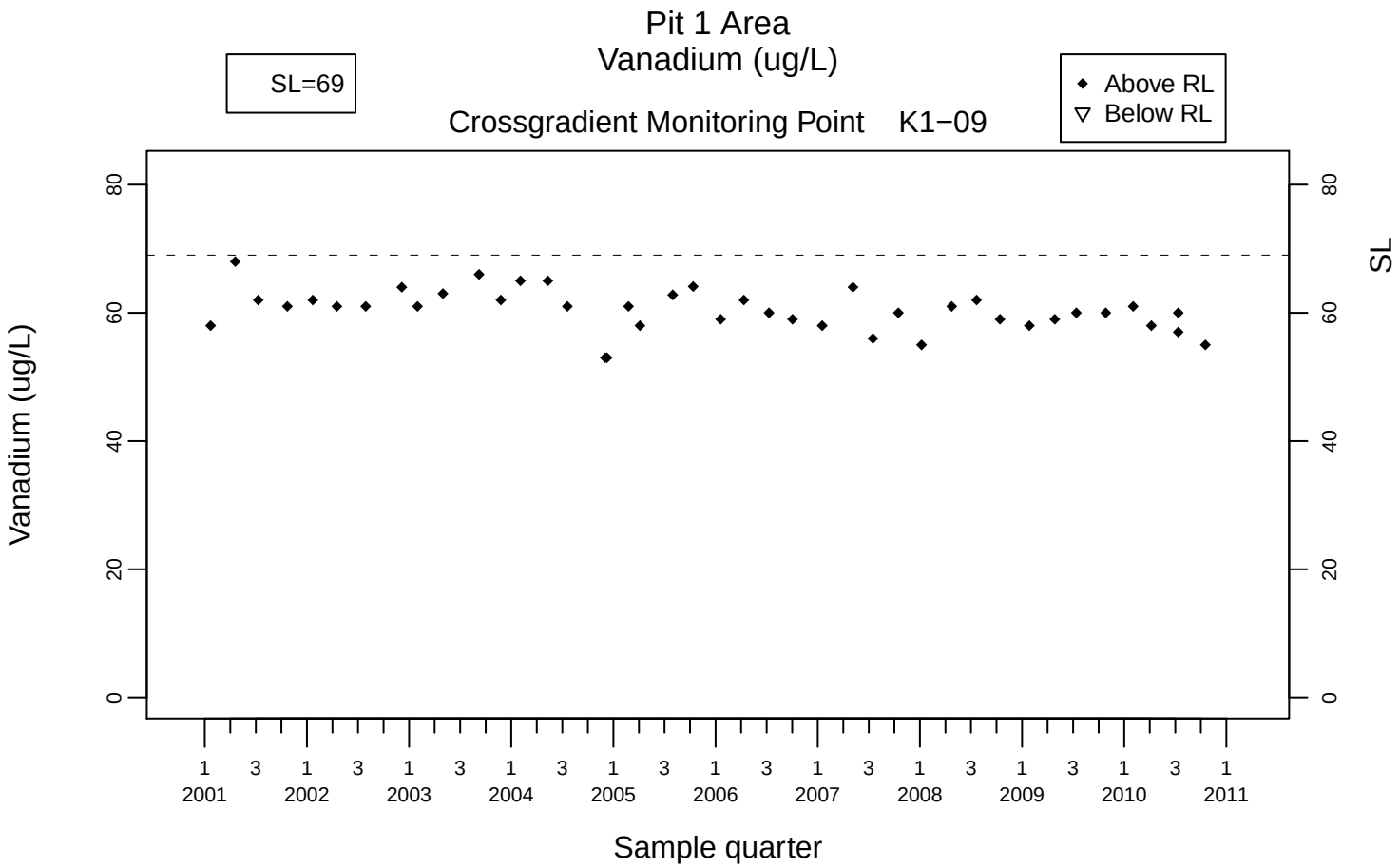

Background Monitoring Point K1−07
Vanadium (ug/L)
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

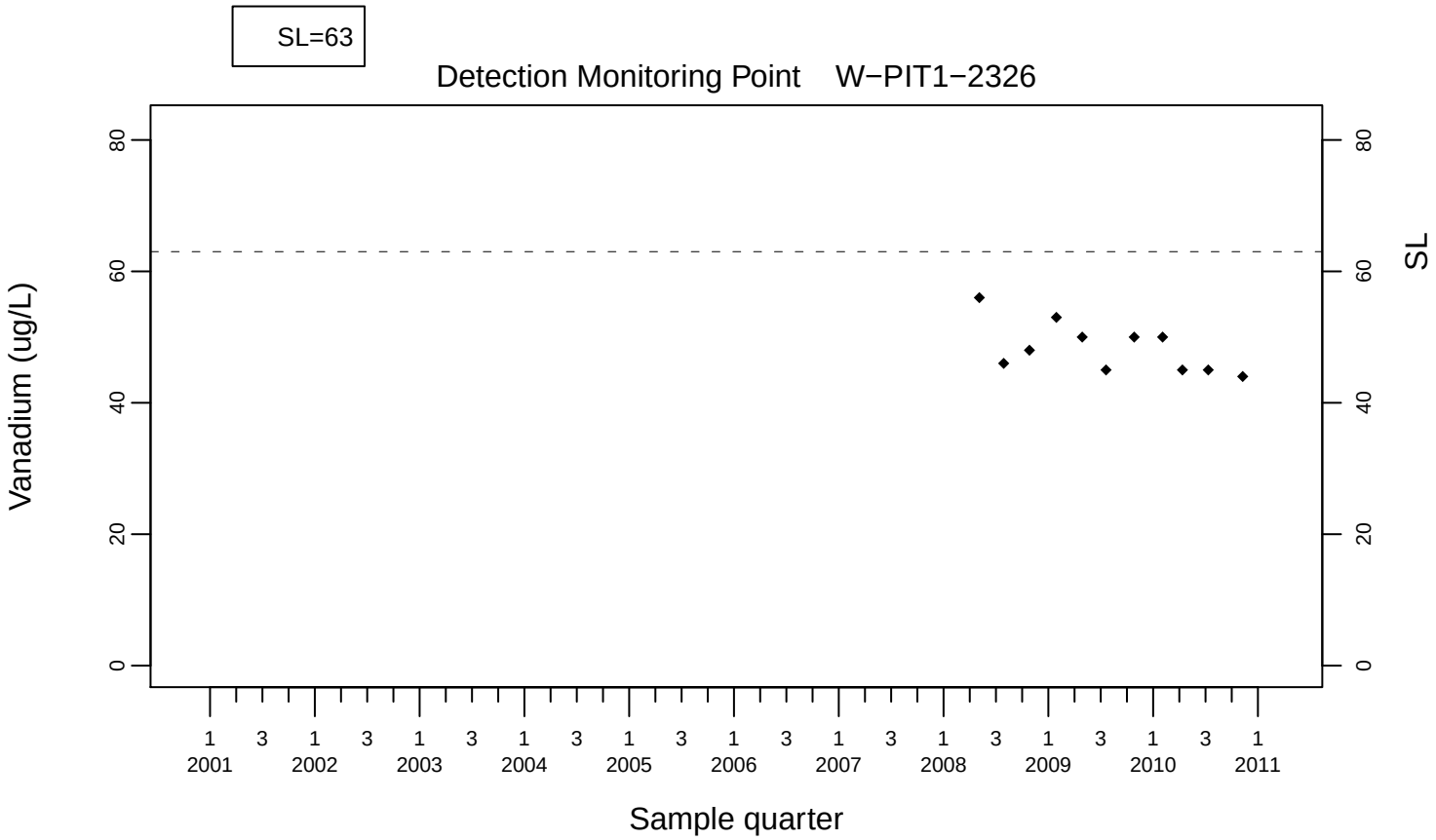

Pit 1 Area
Vanadium (ug/L)
SL=59
Above RL
Below RL
Detection Monitoring Point K1−02B
Vanadium (ug/L)
SL
Sample quarter
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

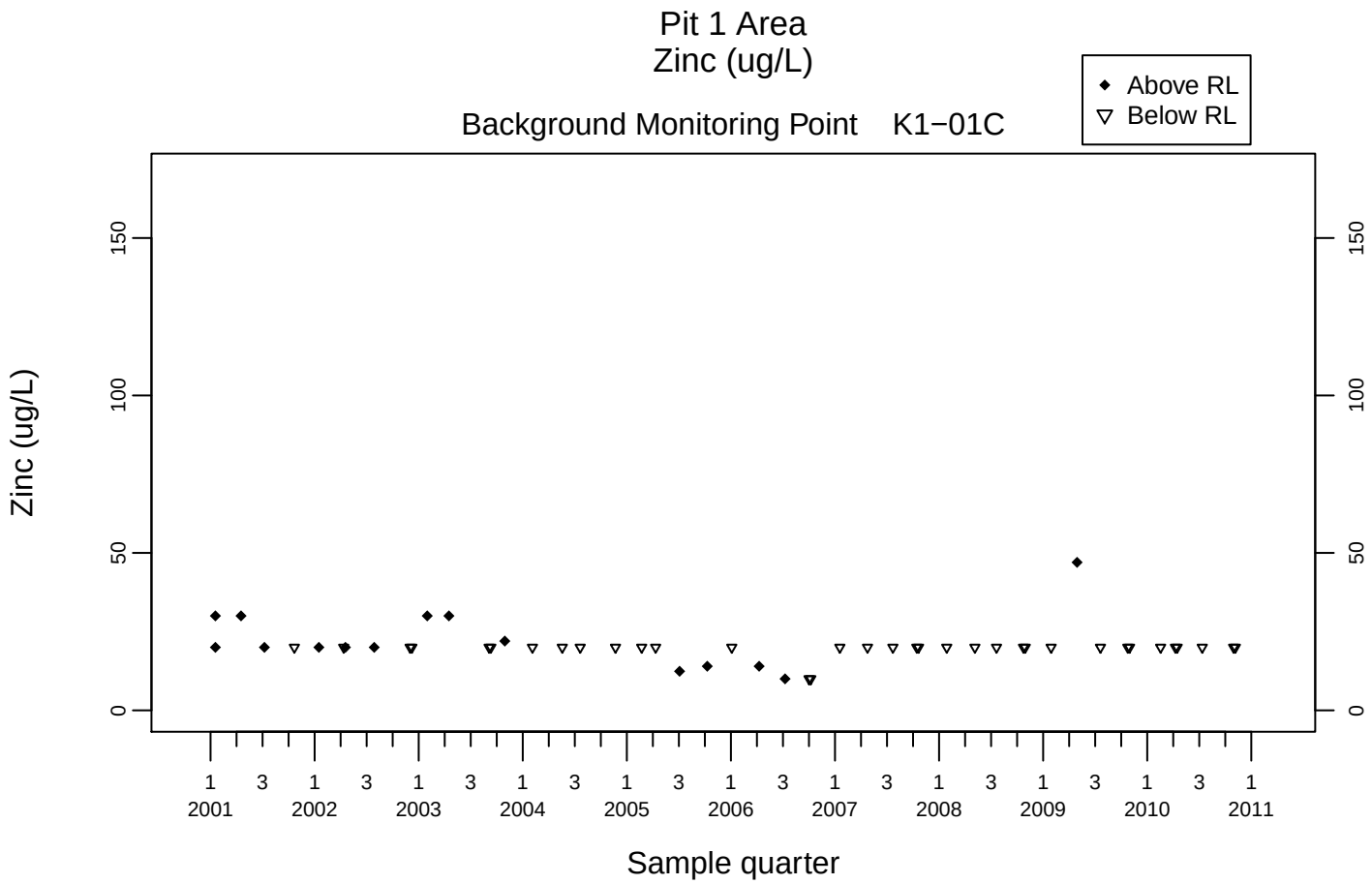

SL=46
Detection Monitoring Point K1−04
Vanadium (ug/L)
SL
Sample quarter
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

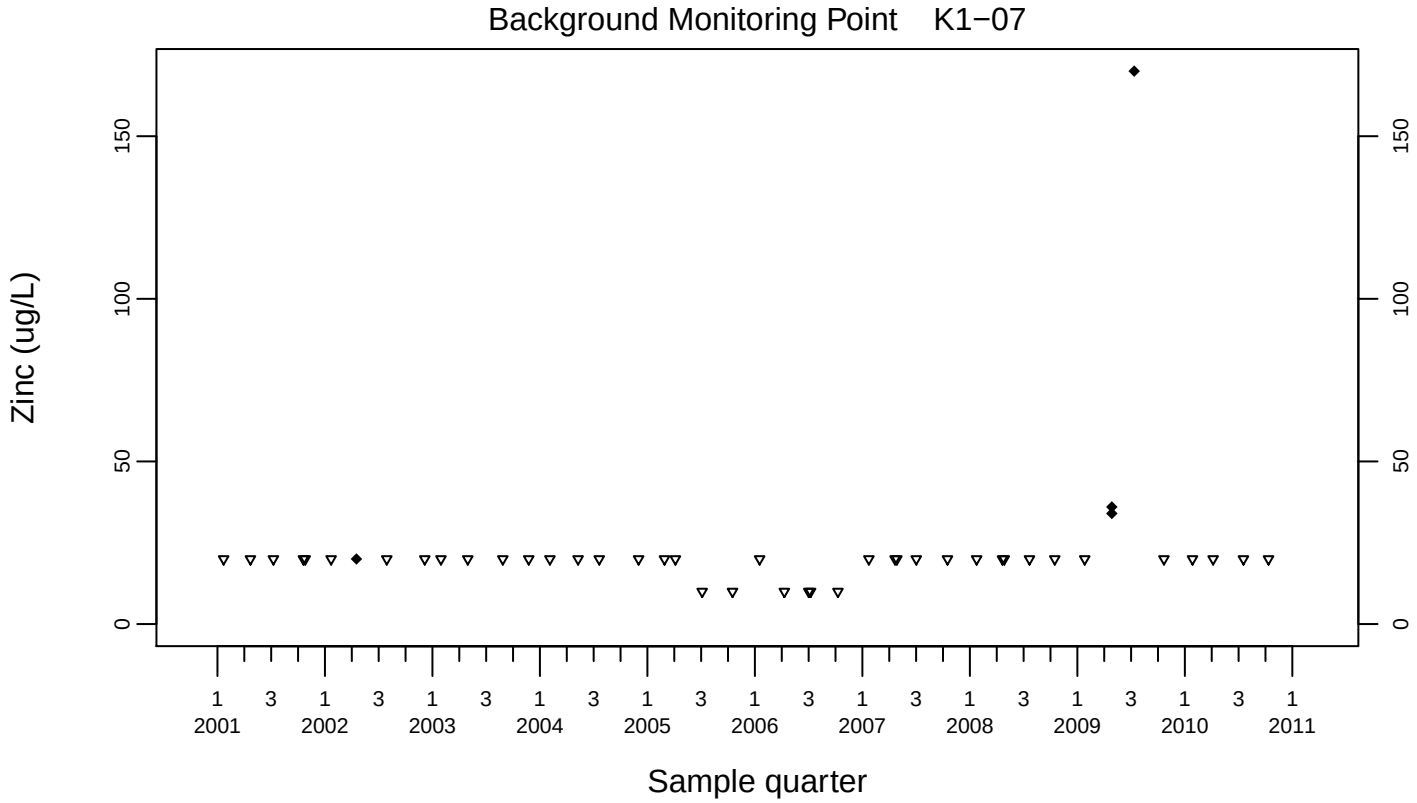

Pit 1 Area
Vanadium (ug/L)
SL=79
Above RL
Below RL
Detection Monitoring Point K1−05
Vanadium (ug/L)
SL
Sample quarter
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

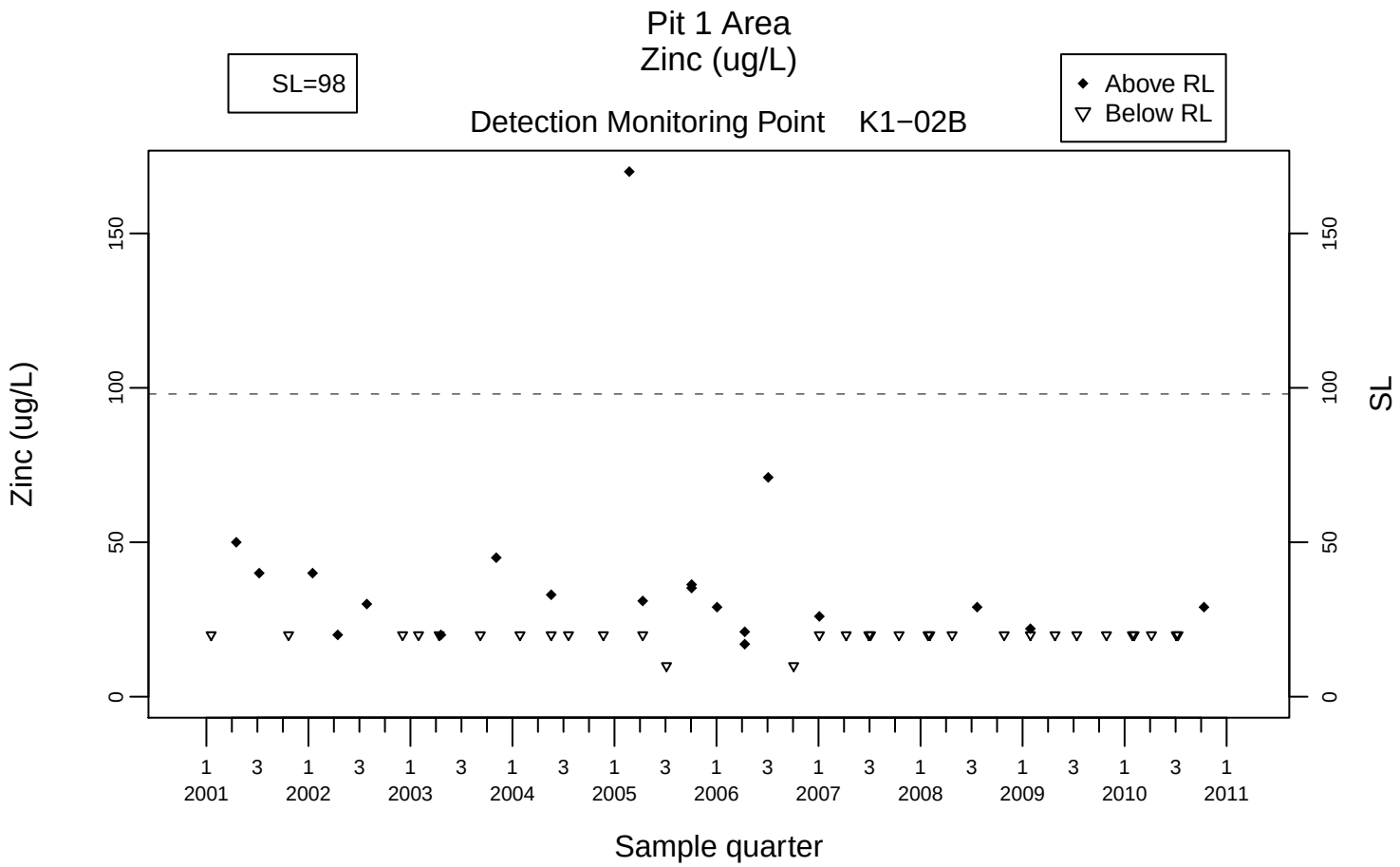

SL=78
Crossgradient Monitoring Point K1−08
Vanadium (ug/L)
SL
Sample quarter
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

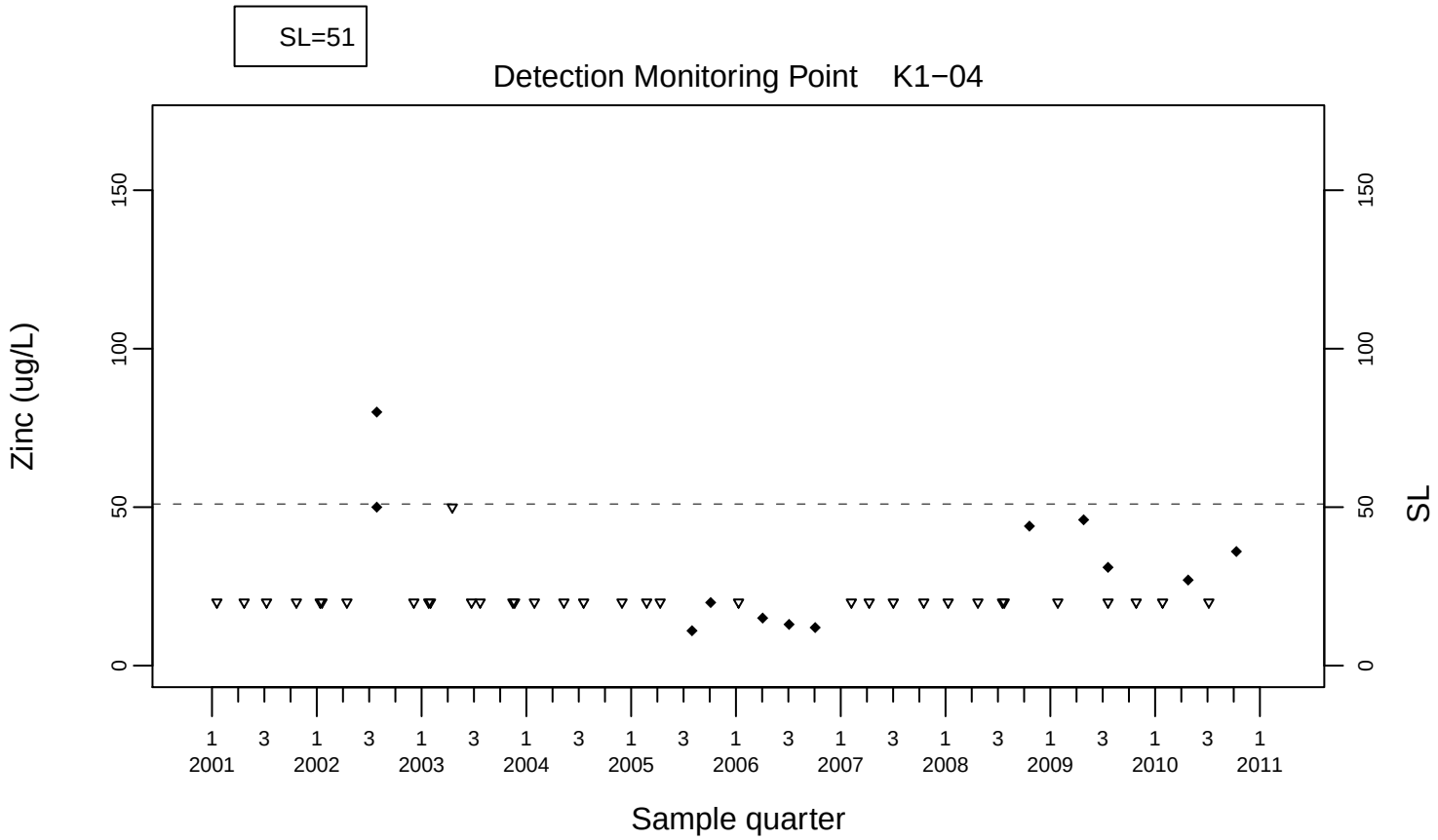

Pit 1 Area
Vanadium (ug/L)
SL=69
Above RL
Below RL
Crossgradient Monitoring Point K1−09
Vanadium (ug/L)
SL
Sample quarter
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

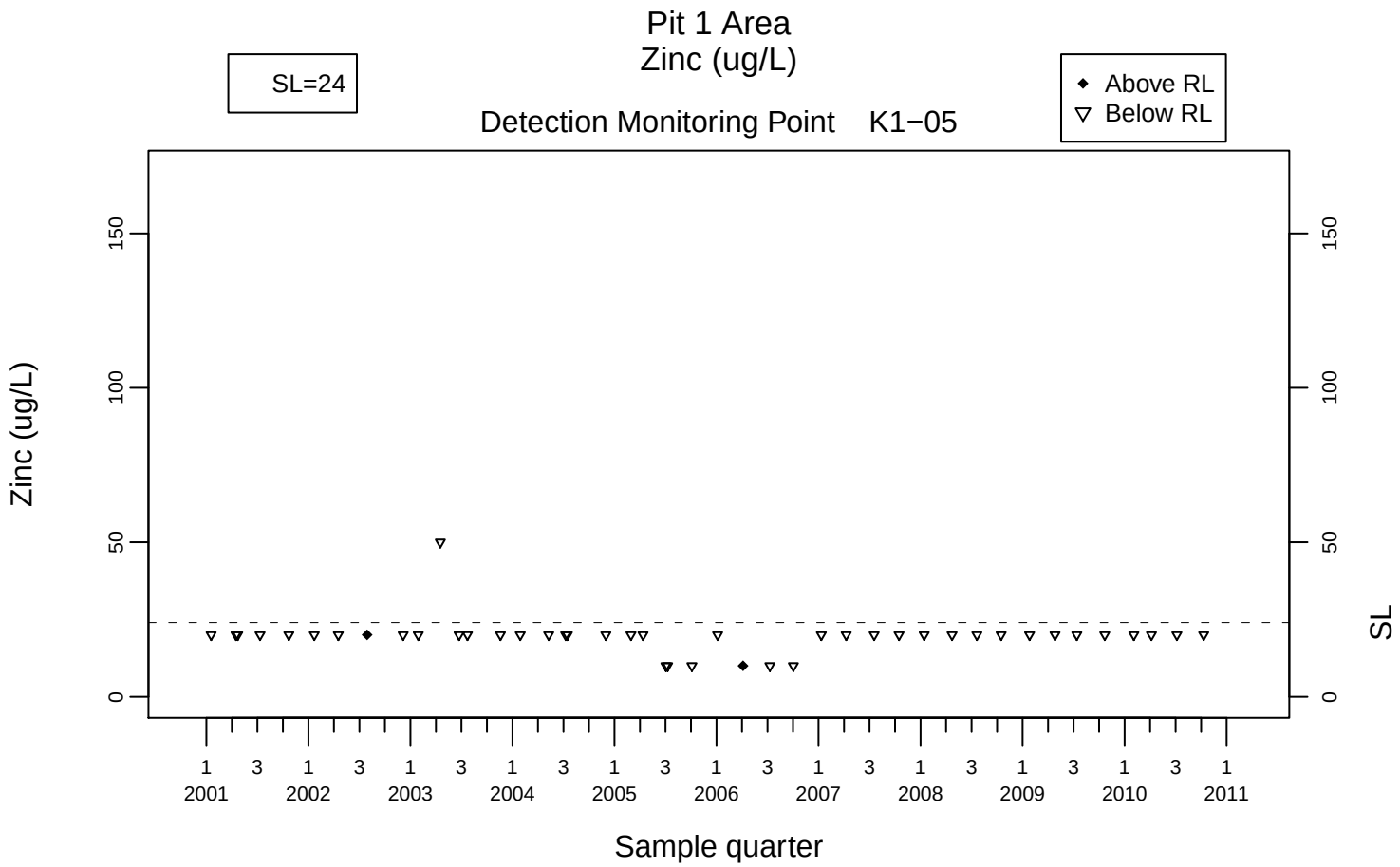

SL=63
Detection Monitoring Point W−PIT1−2326
Vanadium (ug/L)
SL
Sample quarter
0
20
40
60
80
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

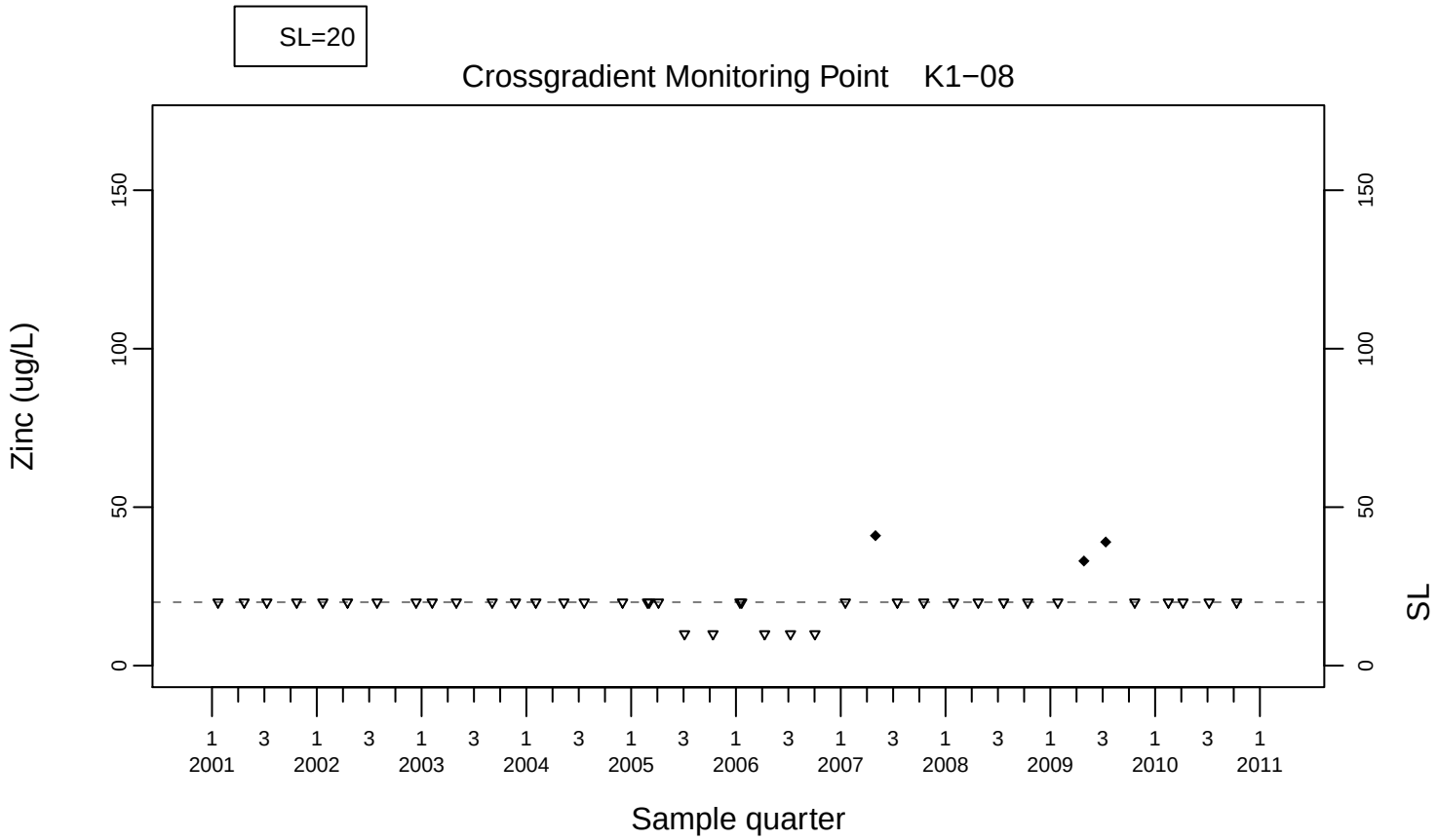

Pit 1 Area
Zinc (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Zinc (ug/L)
0
50
100
150
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

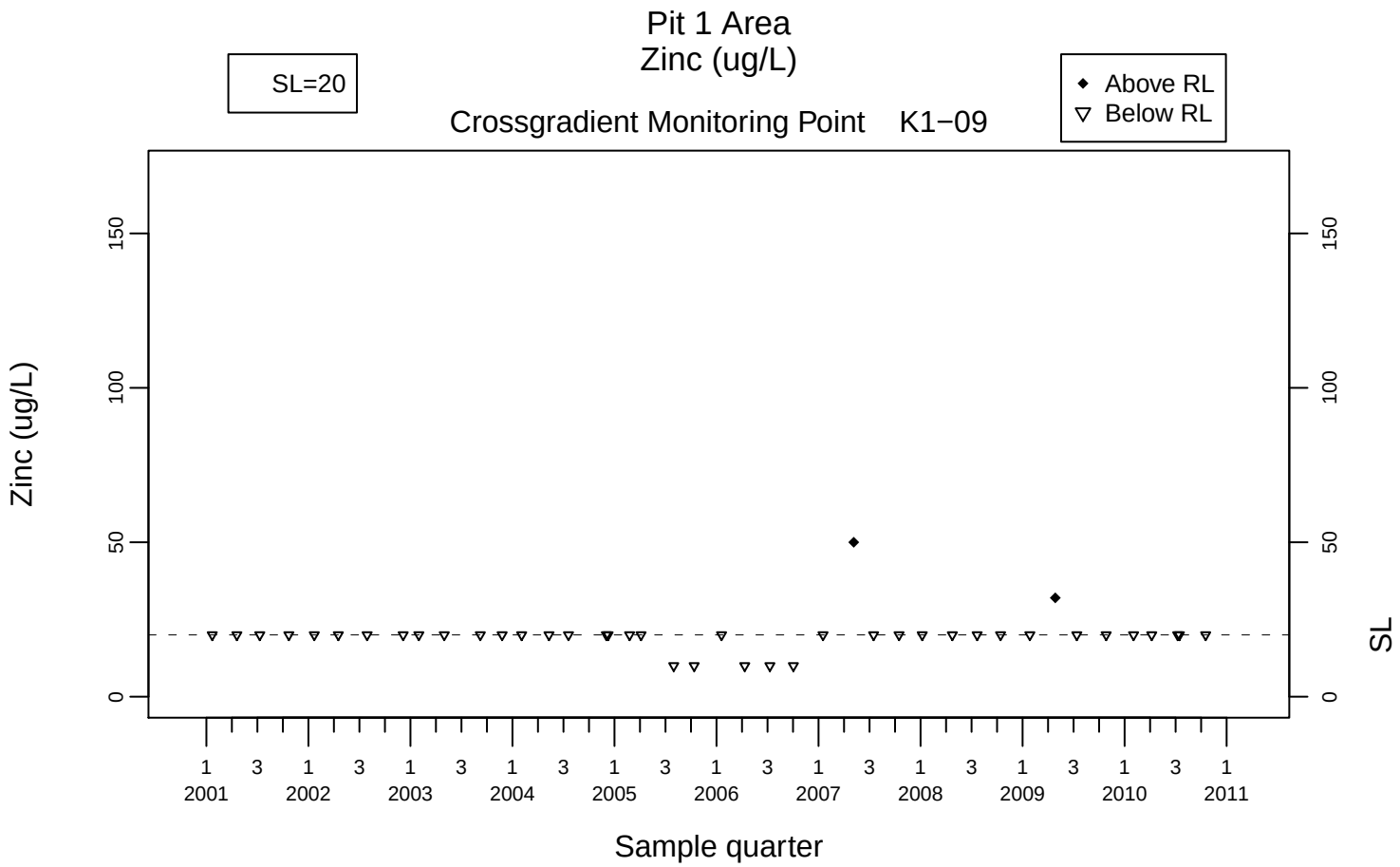

Background Monitoring Point K1−07
Zinc (ug/L)
0
50
100
150
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

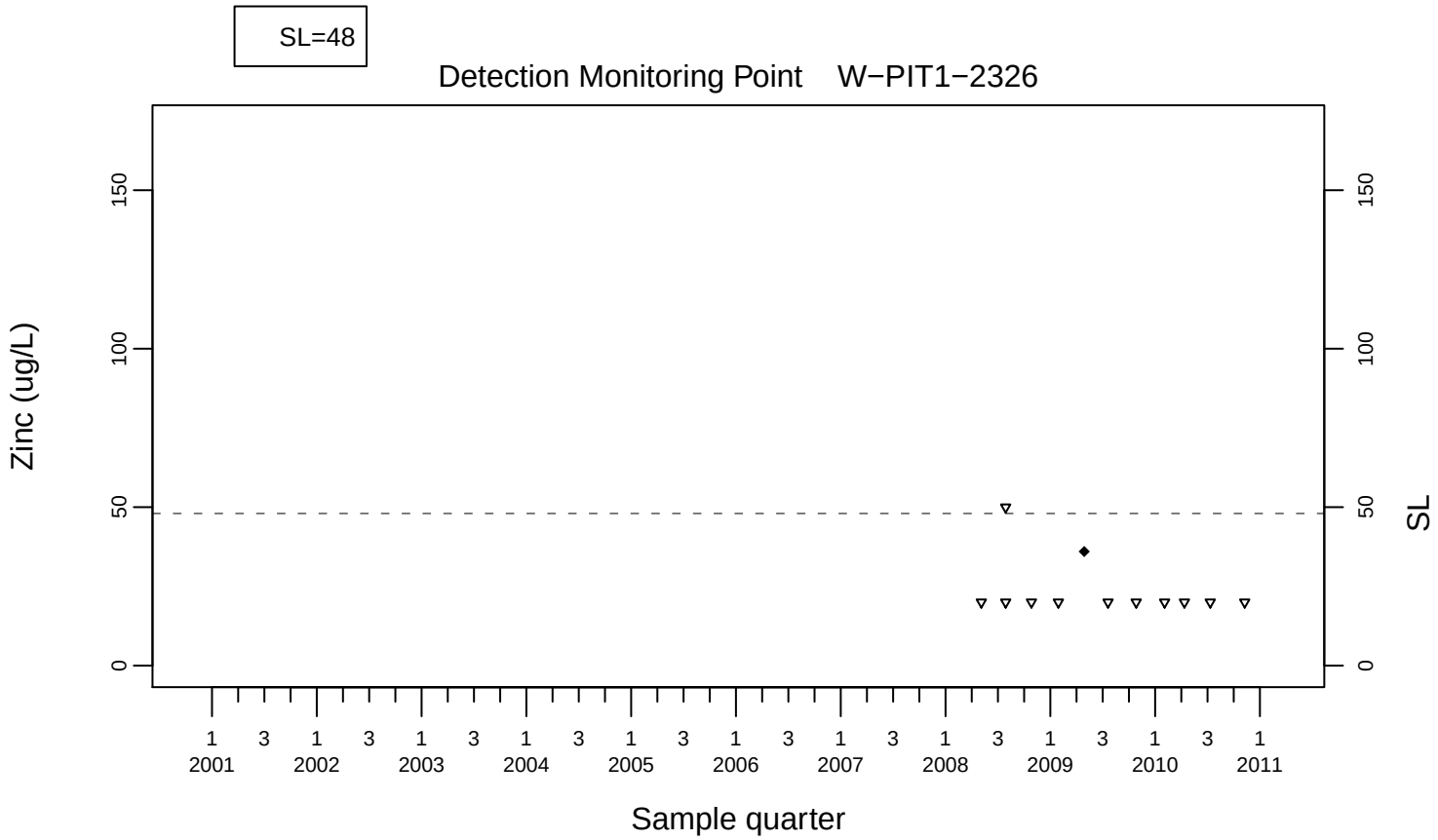

Pit 1 Area
Zinc (ug/L)
SL=98
Above RL
Below RL
Detection Monitoring Point K1−02B
Zinc (ug/L)
SL
0
50
100
150
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

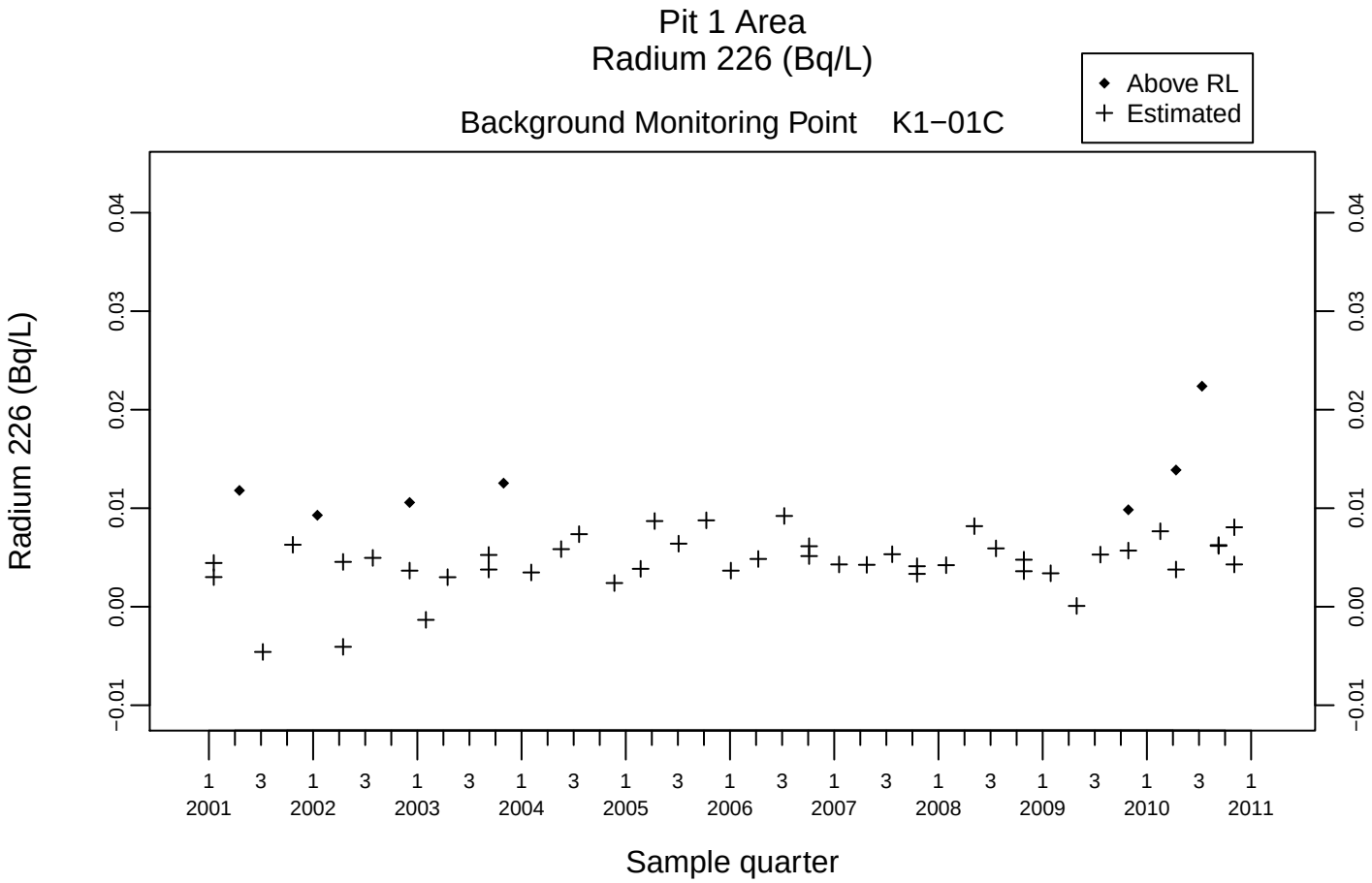

SL=51
Detection Monitoring Point K1−04
Zinc (ug/L)
SL
0
50
100
150
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

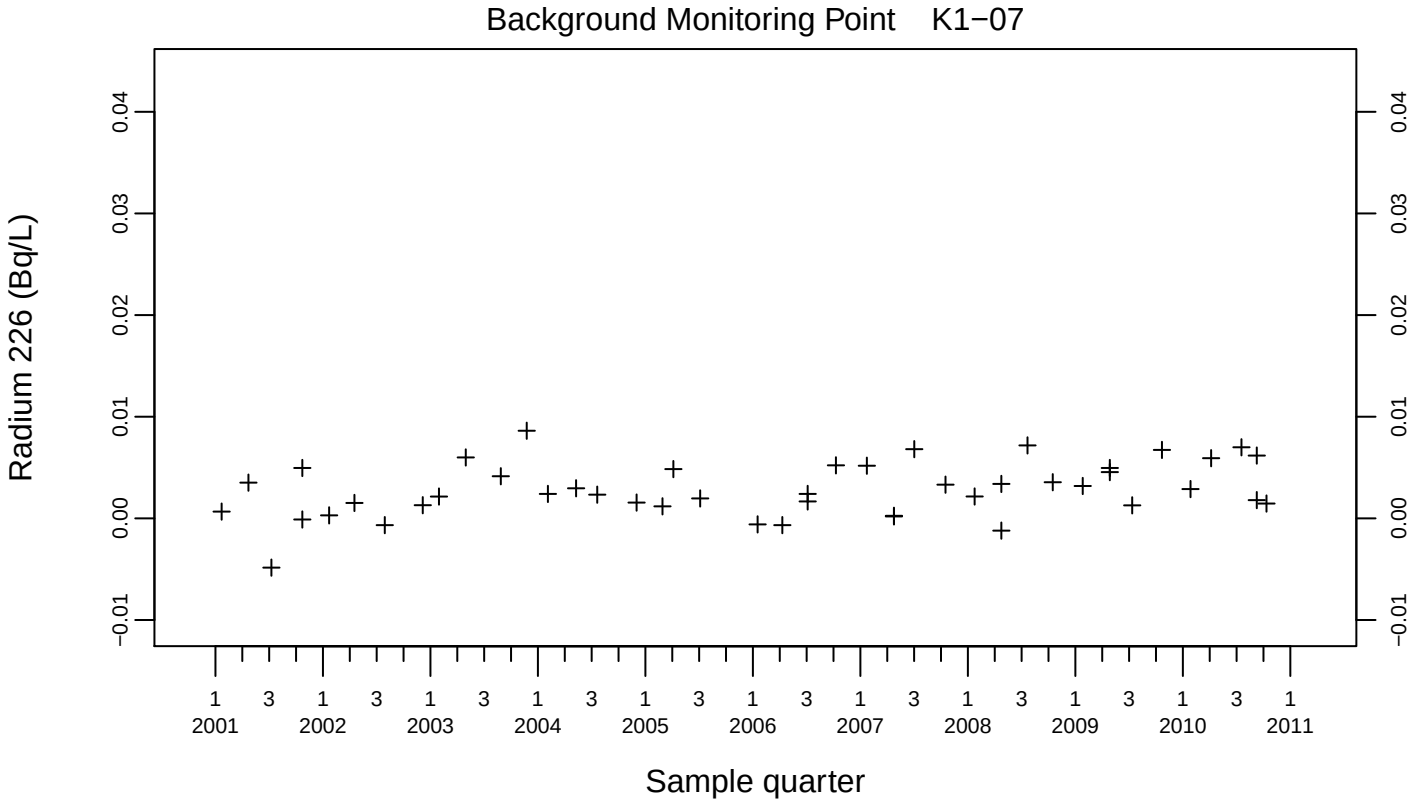

Pit 1 Area
Zinc (ug/L)
SL=24
Above RL
Below RL
Detection Monitoring Point K1−05
Zinc (ug/L)
SL
Sample quarter
0
50
100
150
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

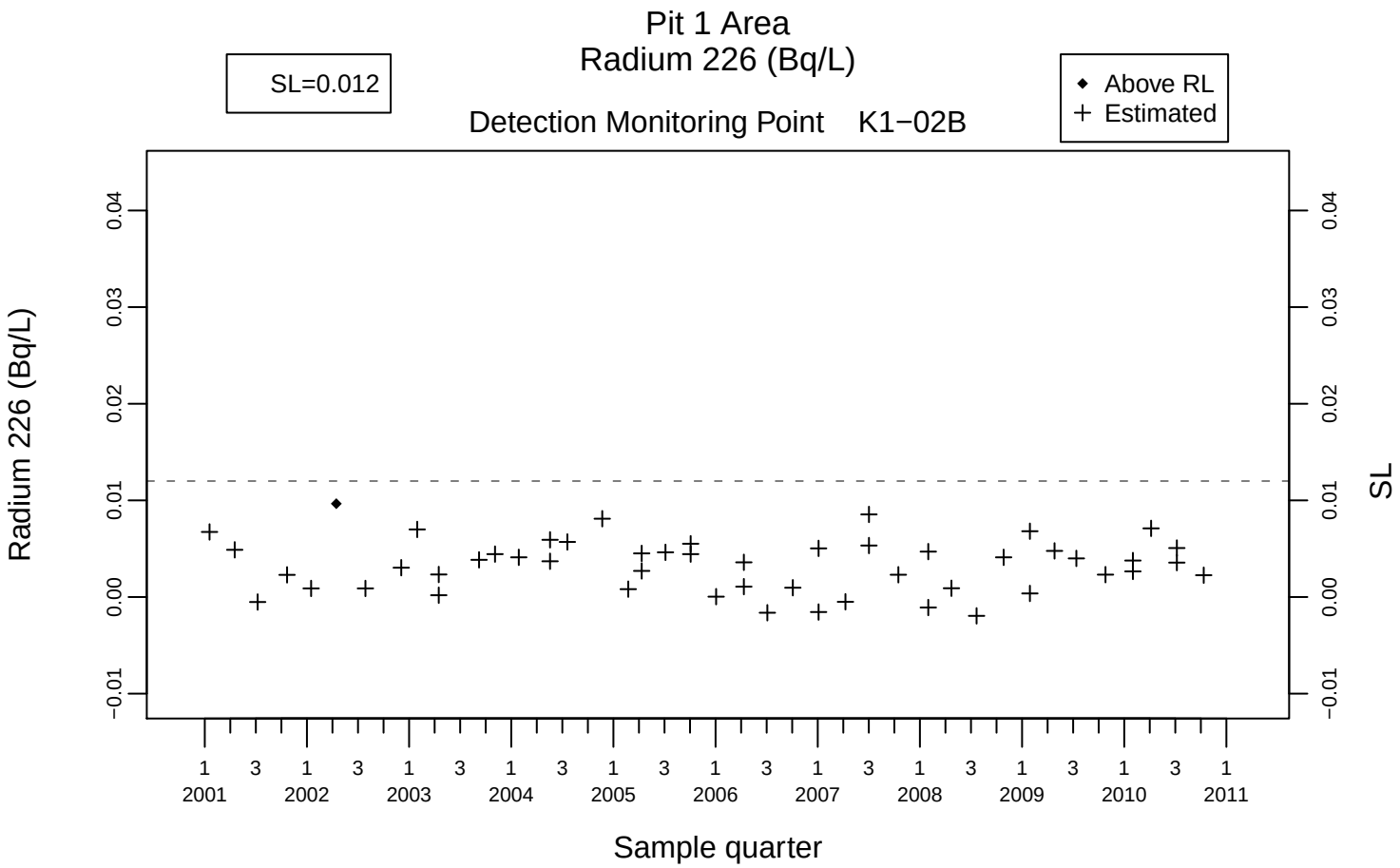

SL=20
Crossgradient Monitoring Point K1−08
Zinc (ug/L)
SL
Sample quarter
0
50
100
150
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

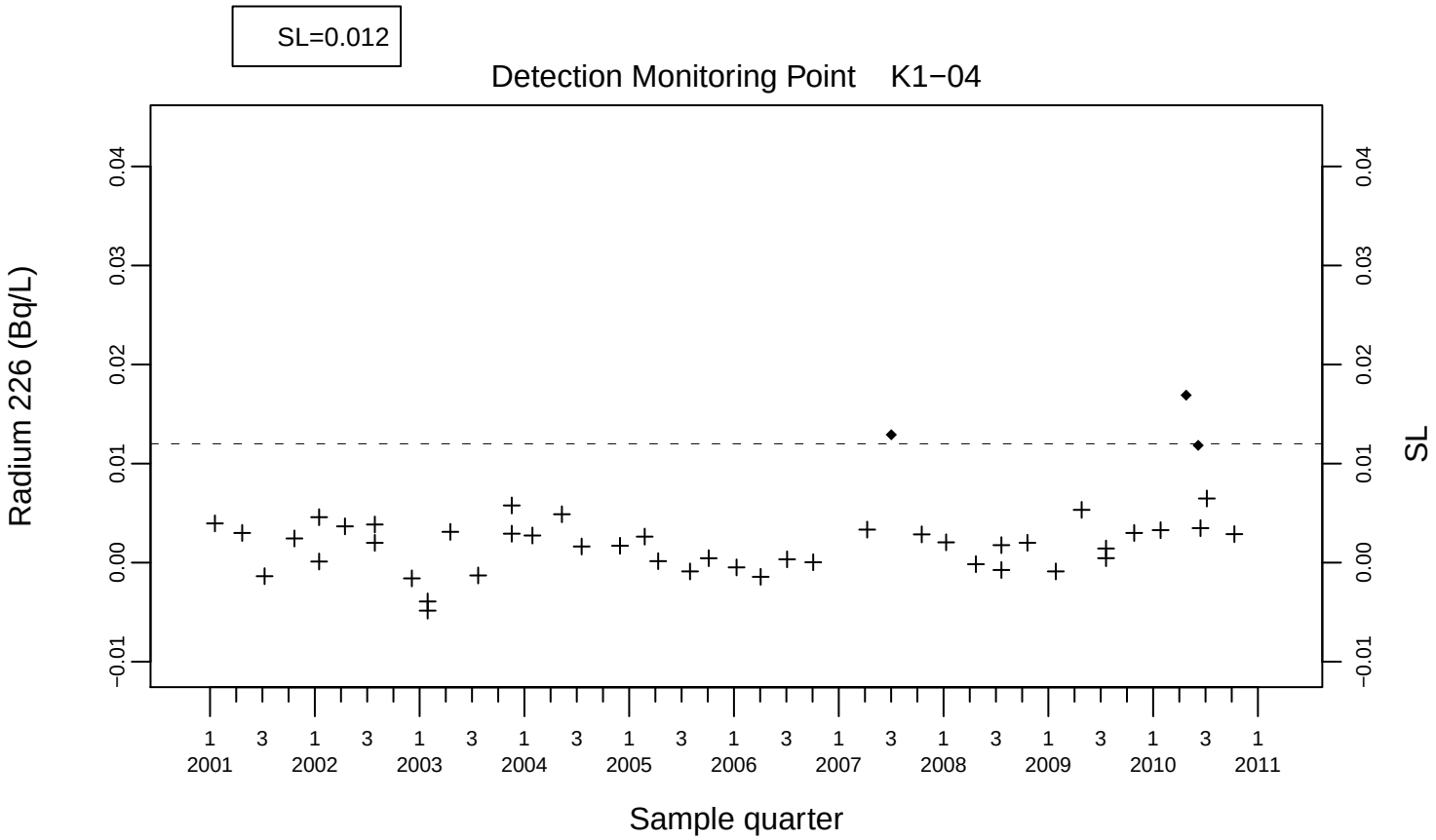

Pit 1 Area
Zinc (ug/L)
SL=20
Crossgradient Monitoring Point K1−09
Above RL
Below RL
Zinc (ug/L)
SL
Sample quarter

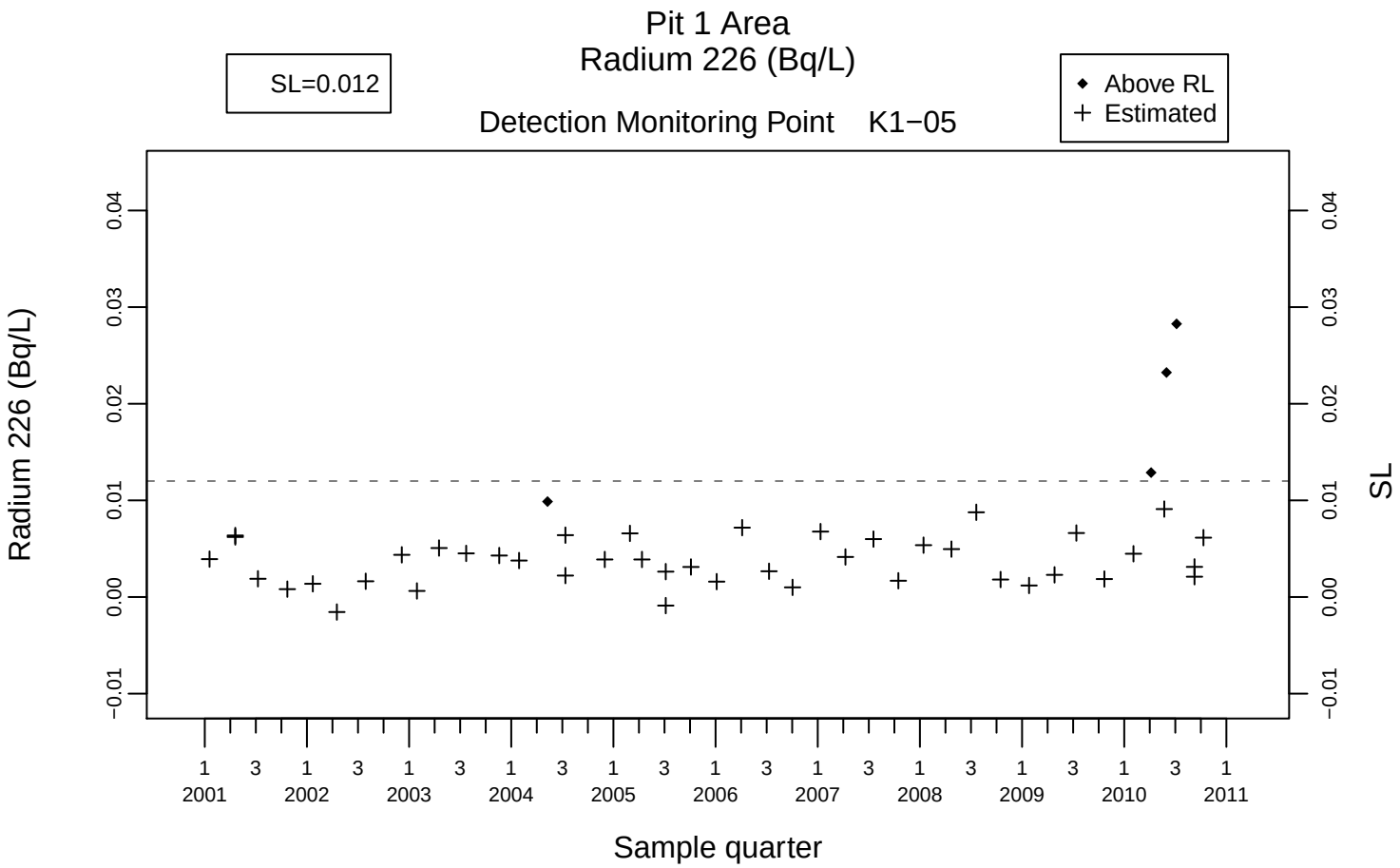

SL=48
Detection Monitoring Point W−PIT1−2326
Zinc (ug/L)
SL
Sample quarter

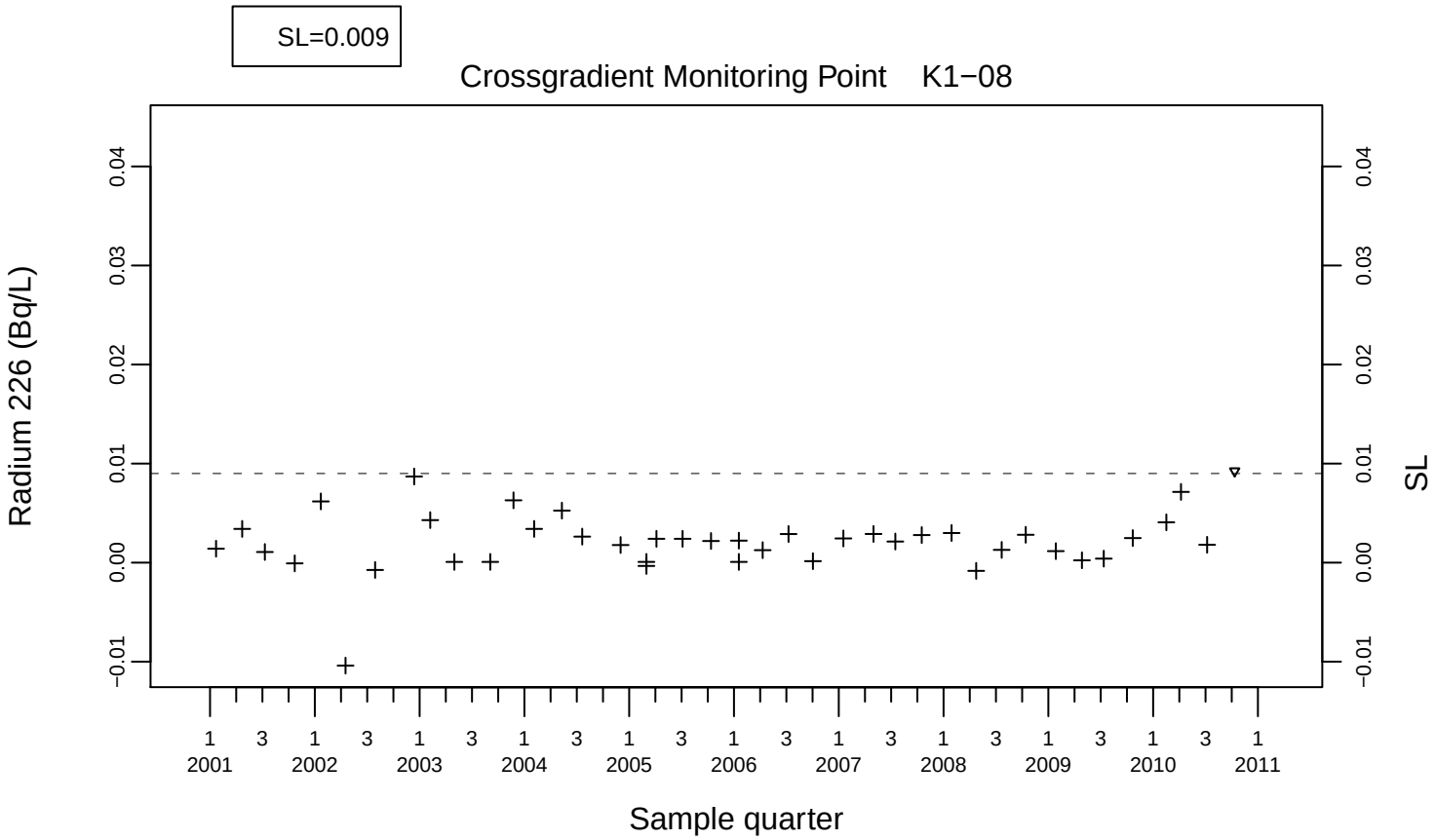

Pit 1 Area
Radium 226 (Bq/L)
Above RL
Estimated
Background Monitoring Point K1−01C
Radium 226 (Bq/L)
0.04
0.03
0.02
0.01
0.00
−0.01
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

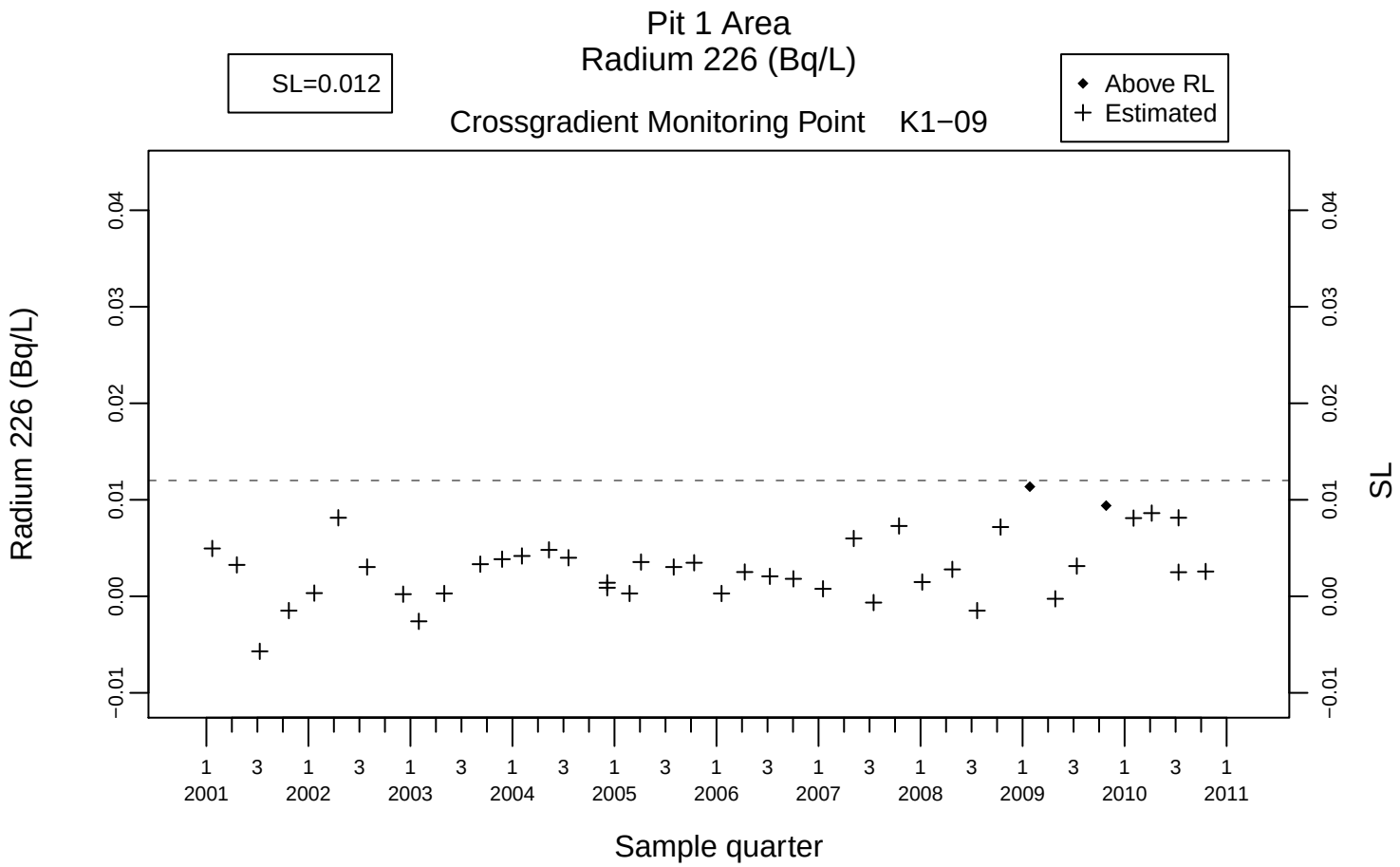

Background Monitoring Point K1−07
Radium 226 (Bq/L)
0.04
0.03
0.02
0.01
0.00
−0.01
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

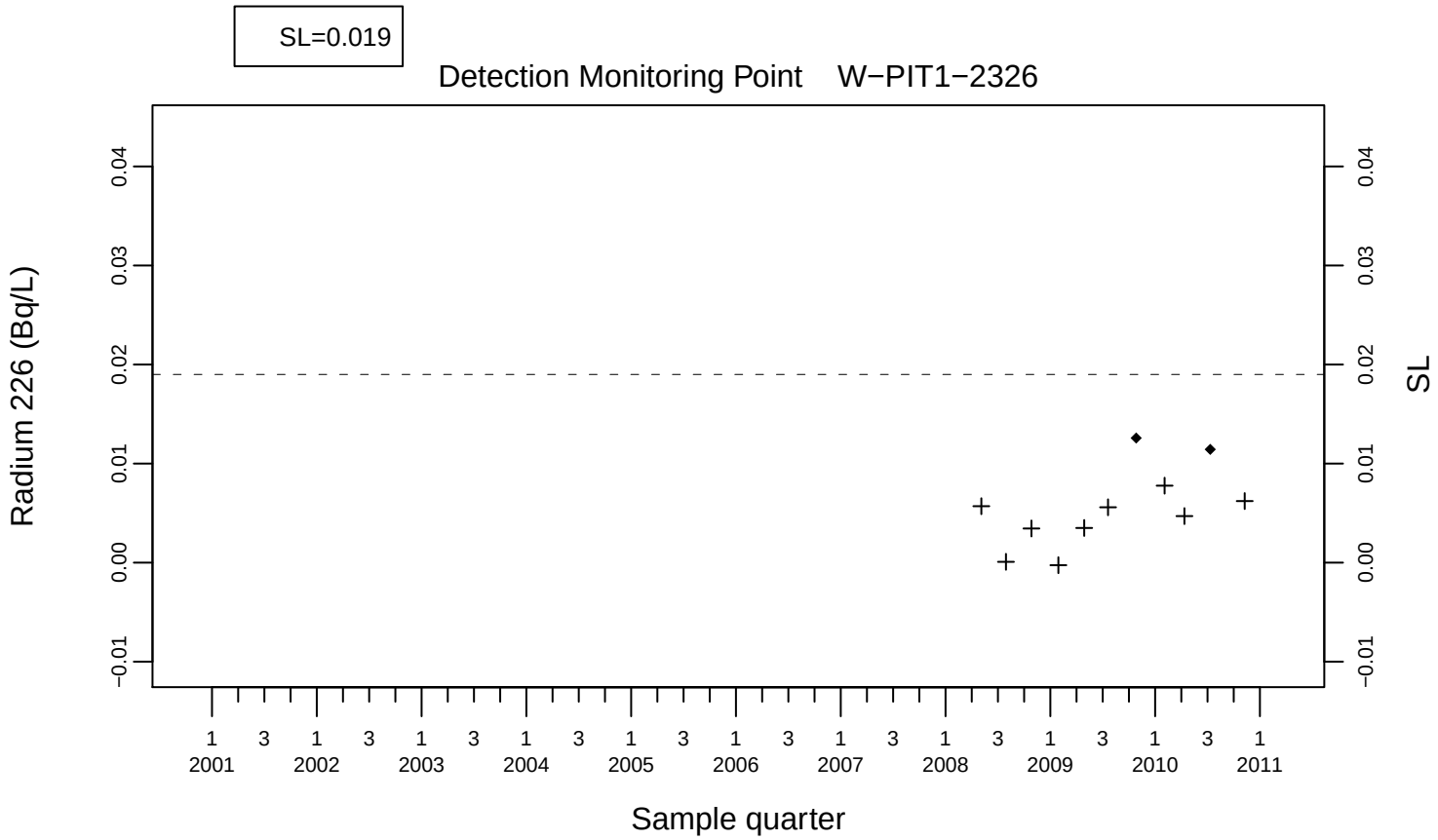

Pit 1 Area
Radium 226 (Bq/L)
SL=0.012
Above RL
Estimated
Detection Monitoring Point K1−02B
Radium 226 (Bq/L)
SL
Sample quarter

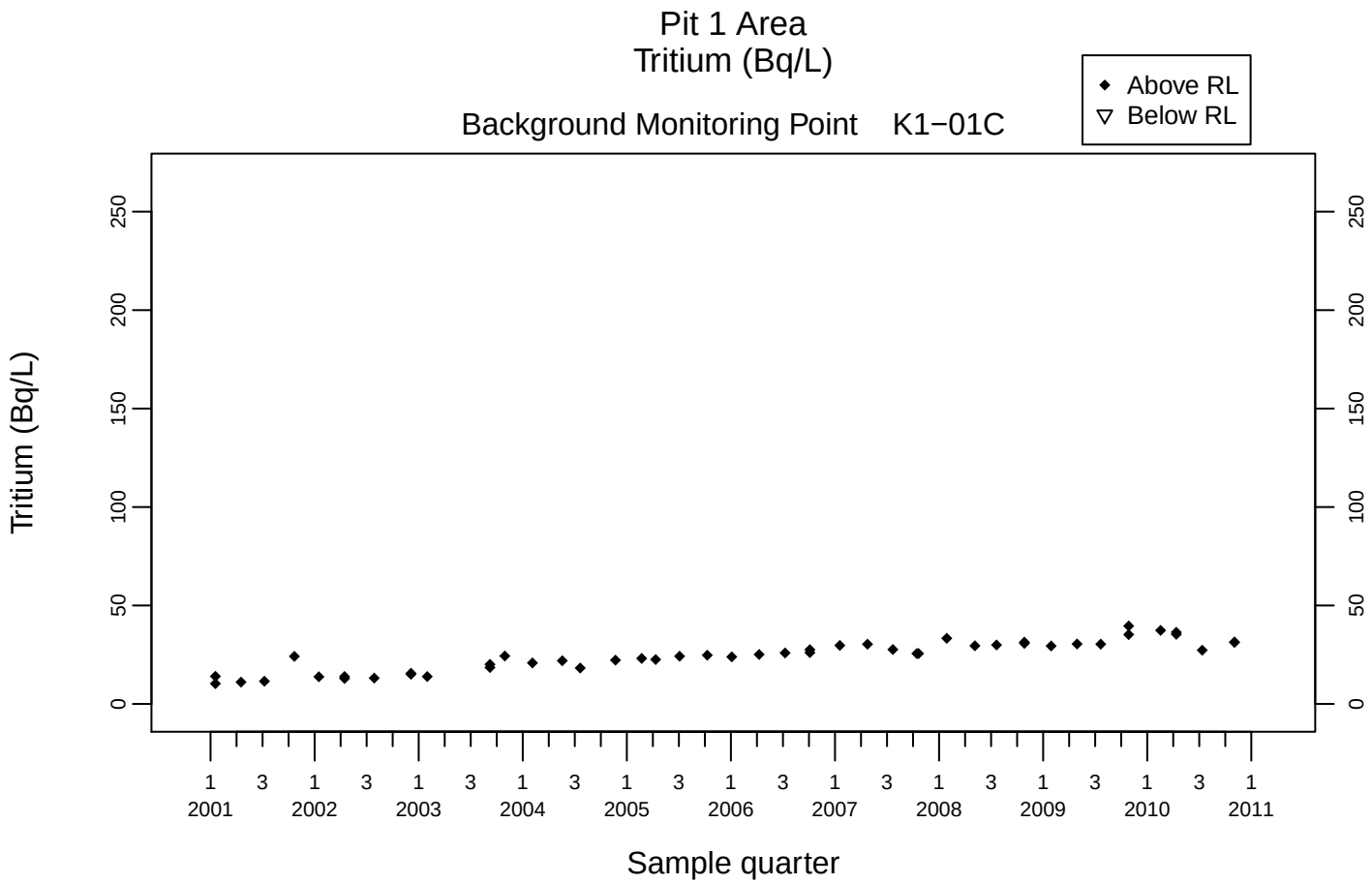

SL=0.012
Detection Monitoring Point K1−04
Radium 226 (Bq/L)
SL
Sample quarter

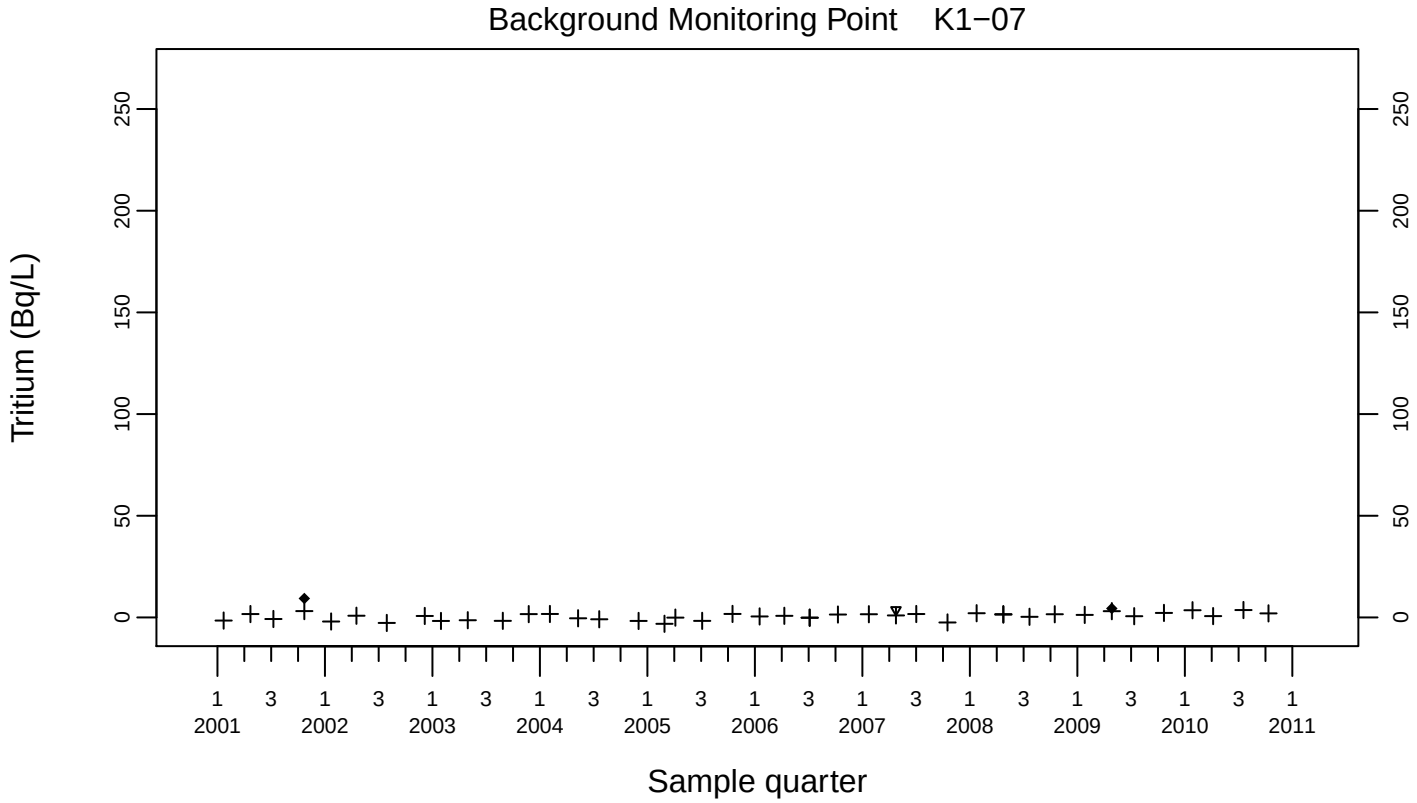

Pit 1 Area
Radium 226 (Bq/L)
SL=0.012
Above RL
Estimated
Detection Monitoring Point K1−05
Radium 226 (Bq/L)
SL
Sample quarter

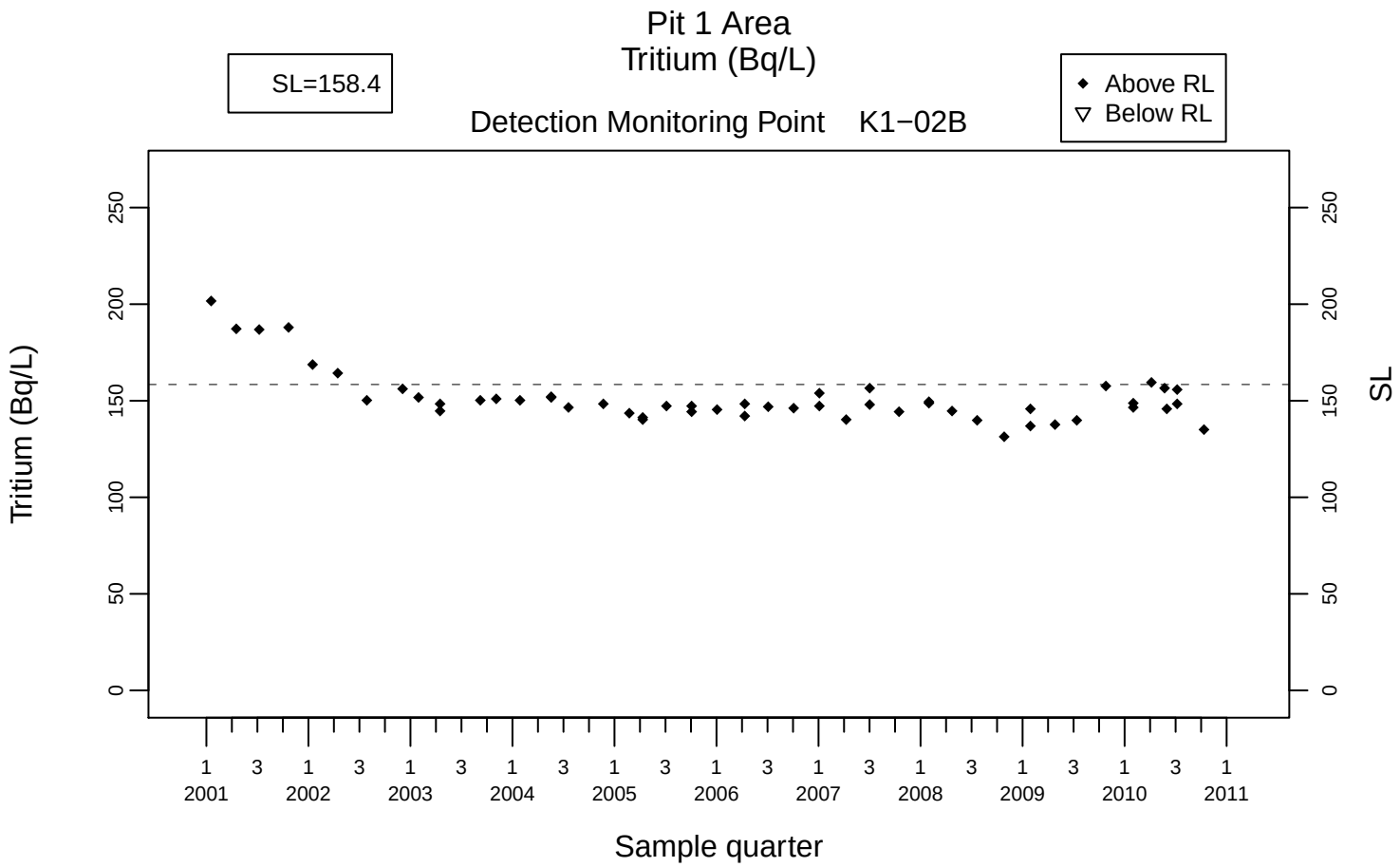

SL=0.009
Crossgradient Monitoring Point K1−08
Radium 226 (Bq/L)
SL
Sample quarter

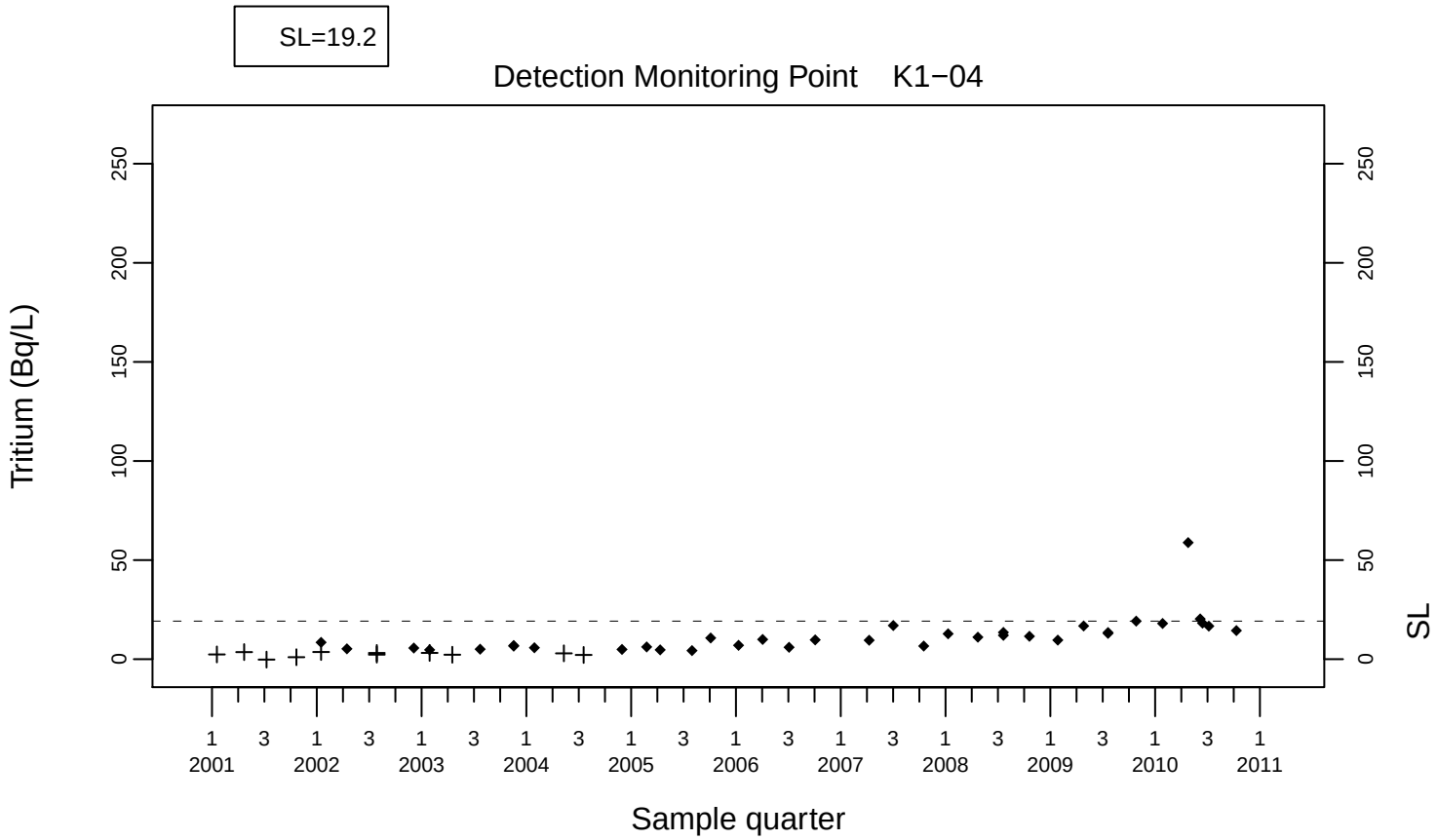

Pit 1 Area
Radium 226 (Bq/L)
SL=0.012
Above RL
Estimated
Crossgradient Monitoring Point K1−09
Radium 226 (Bq/L)
SL
Sample quarter

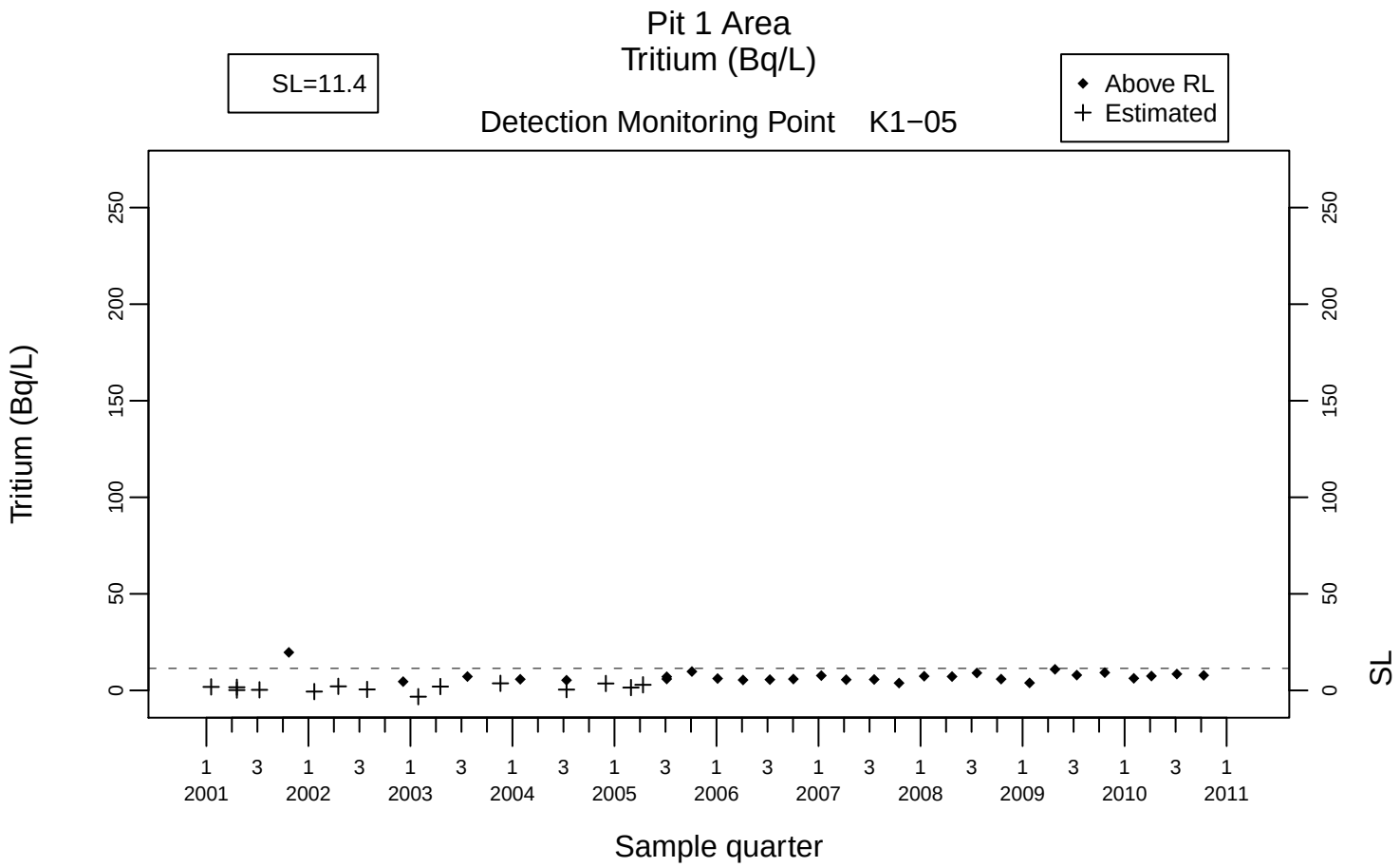

SL=0.019
Detection Monitoring Point W−PIT1−2326
Radium 226 (Bq/L)
SL
Sample quarter

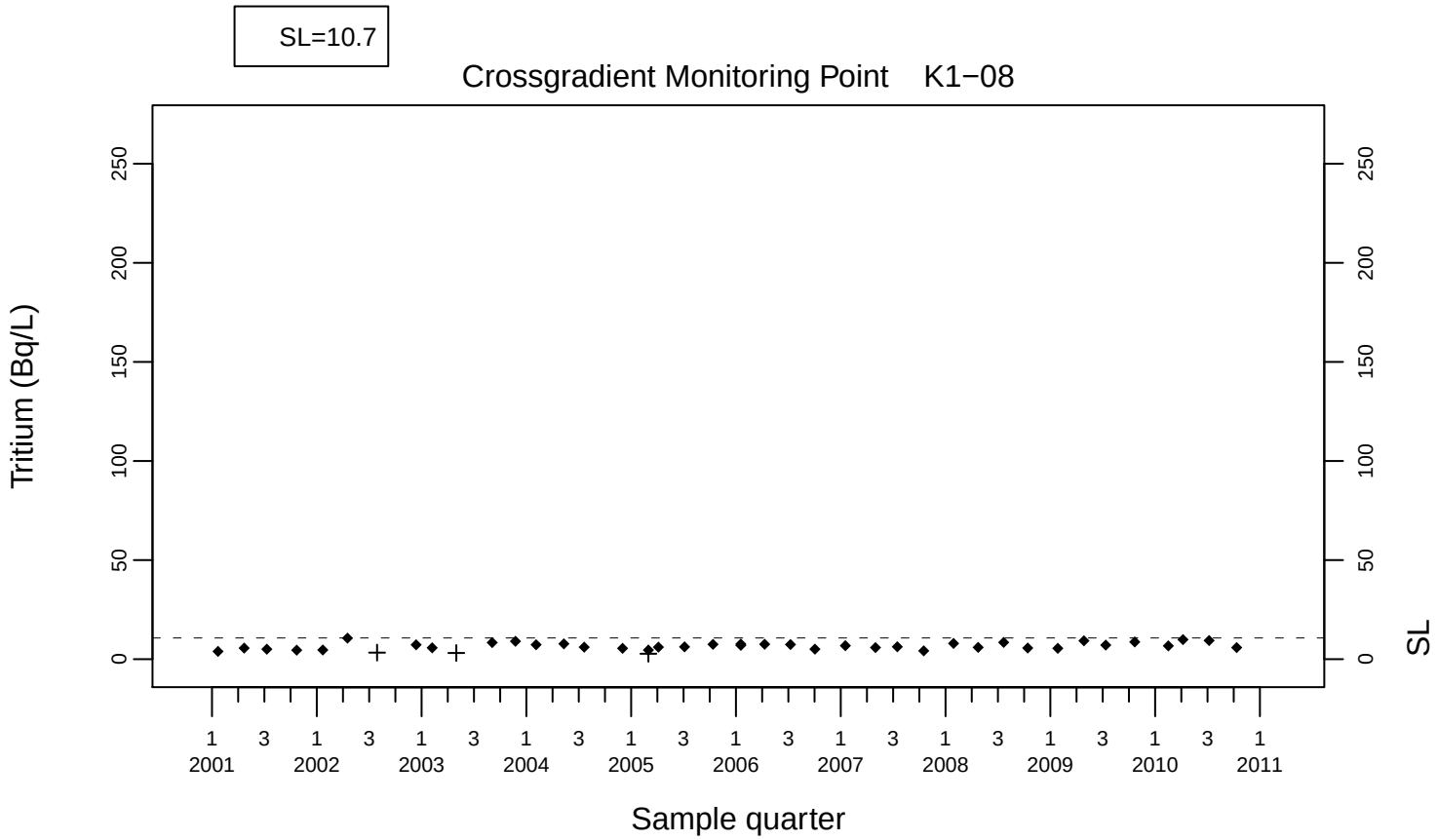

Pit 1 Area
Tritium (Bq/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Tritium (Bq/L)
0
50
100
150
200
250
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

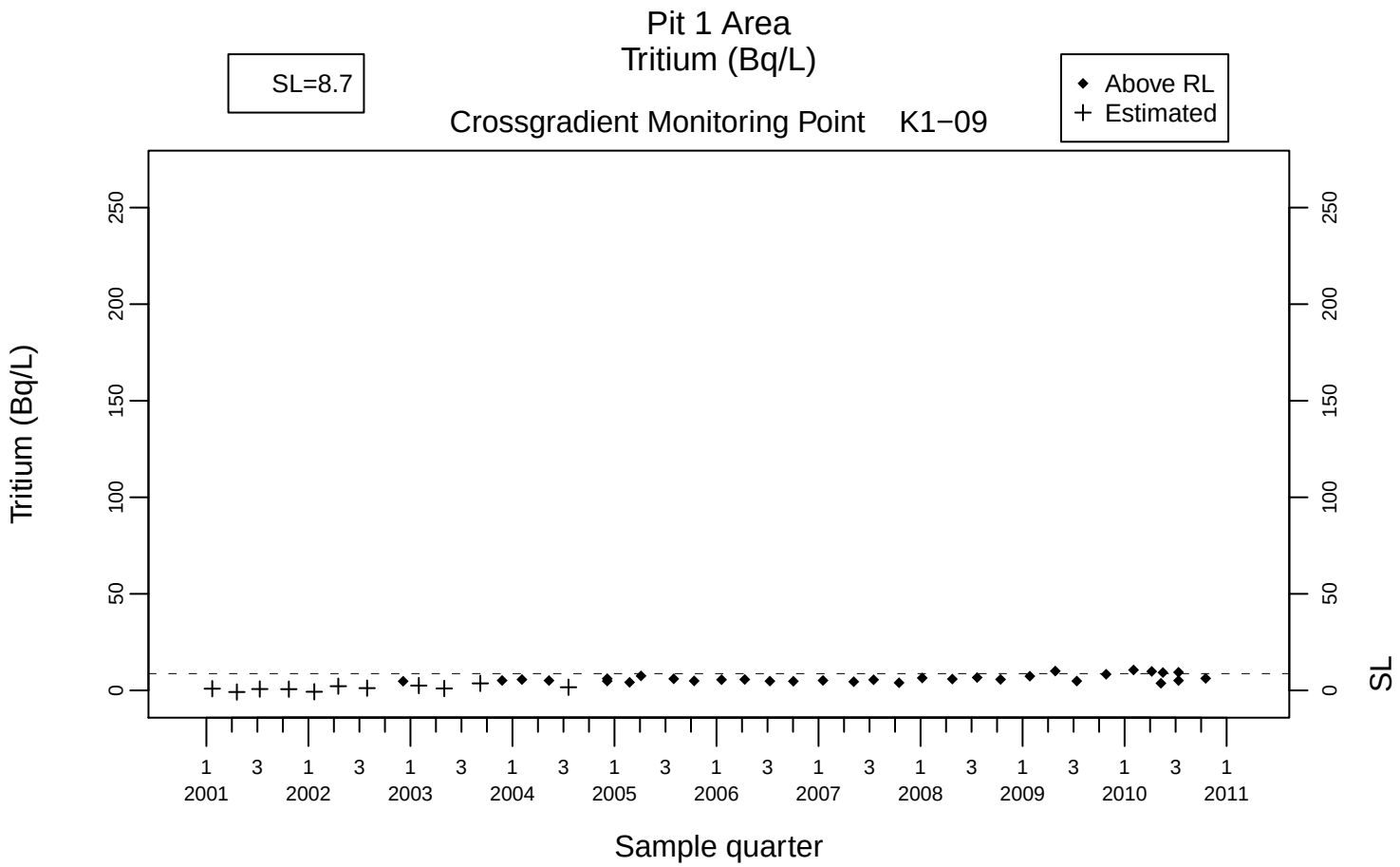

Background Monitoring Point K1−07
Tritium (Bq/L)
0
50
100
150
200
250
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

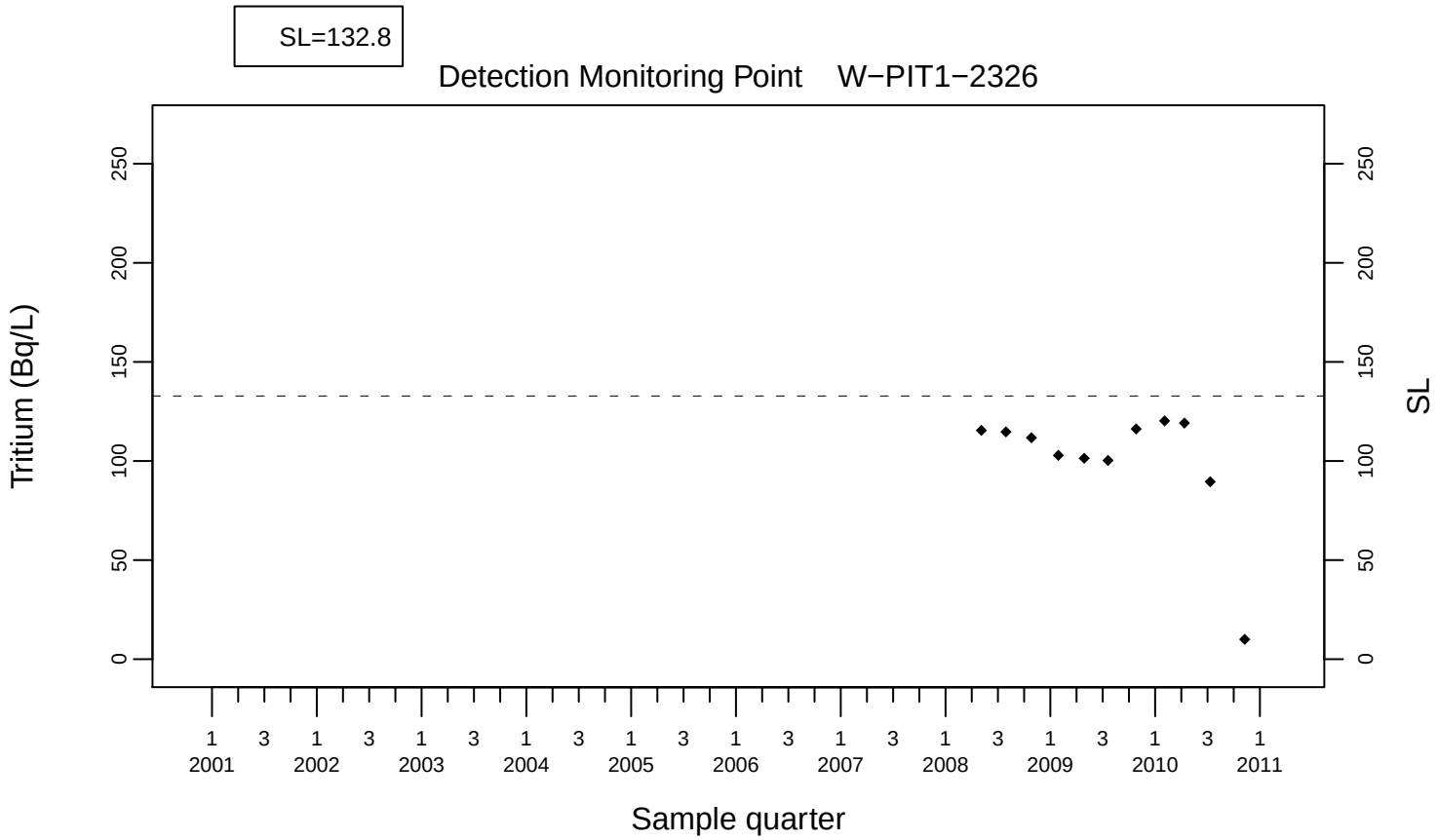

Pit 1 Area
Tritium (Bq/L)
SL=158.4
Above RL
Below RL
Detection Monitoring Point K1−02B
Tritium (Bq/L)
SL
Sample quarter

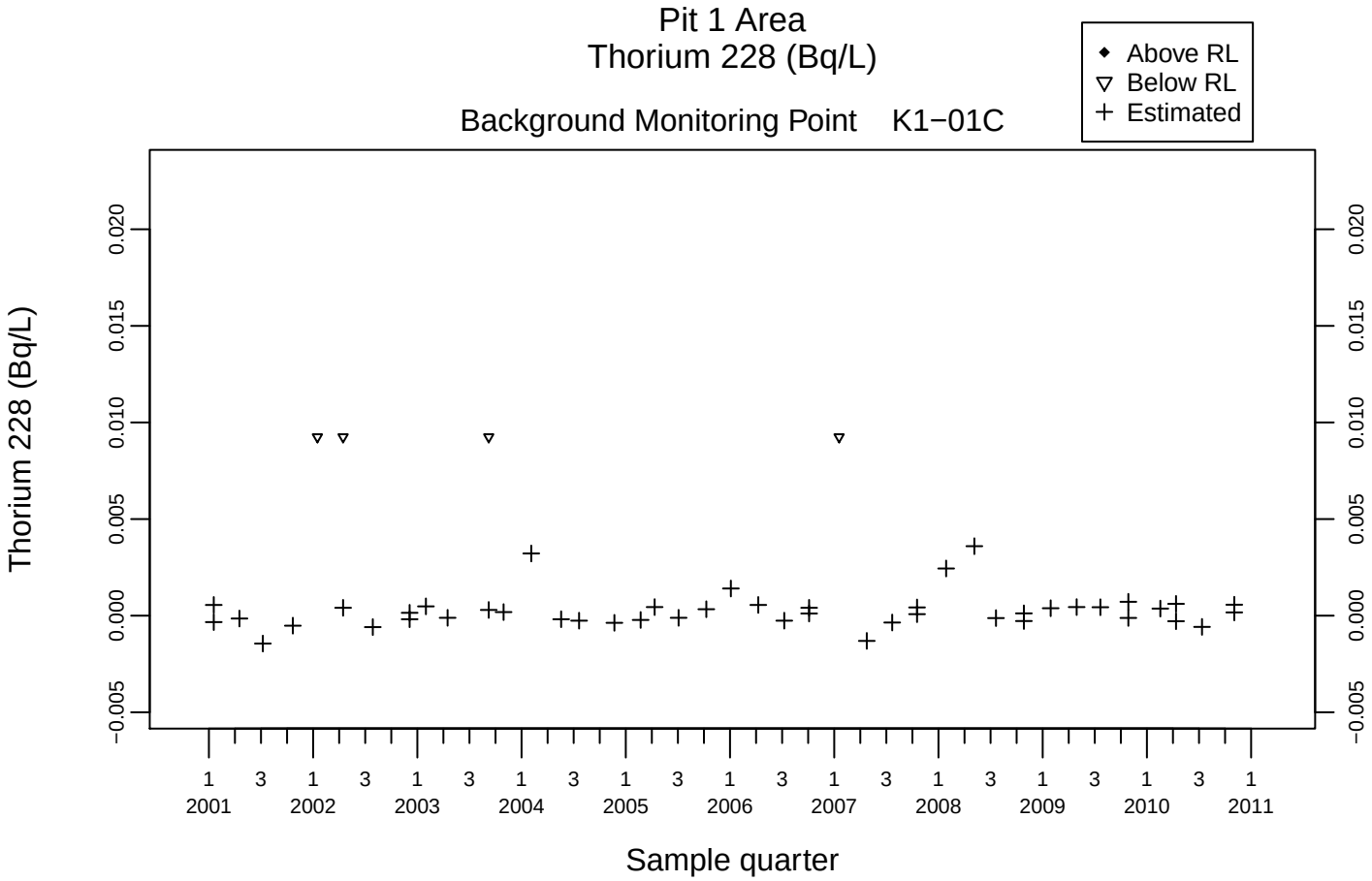

SL=19.2
Detection Monitoring Point K1−04
Tritium (Bq/L)
SL
Sample quarter

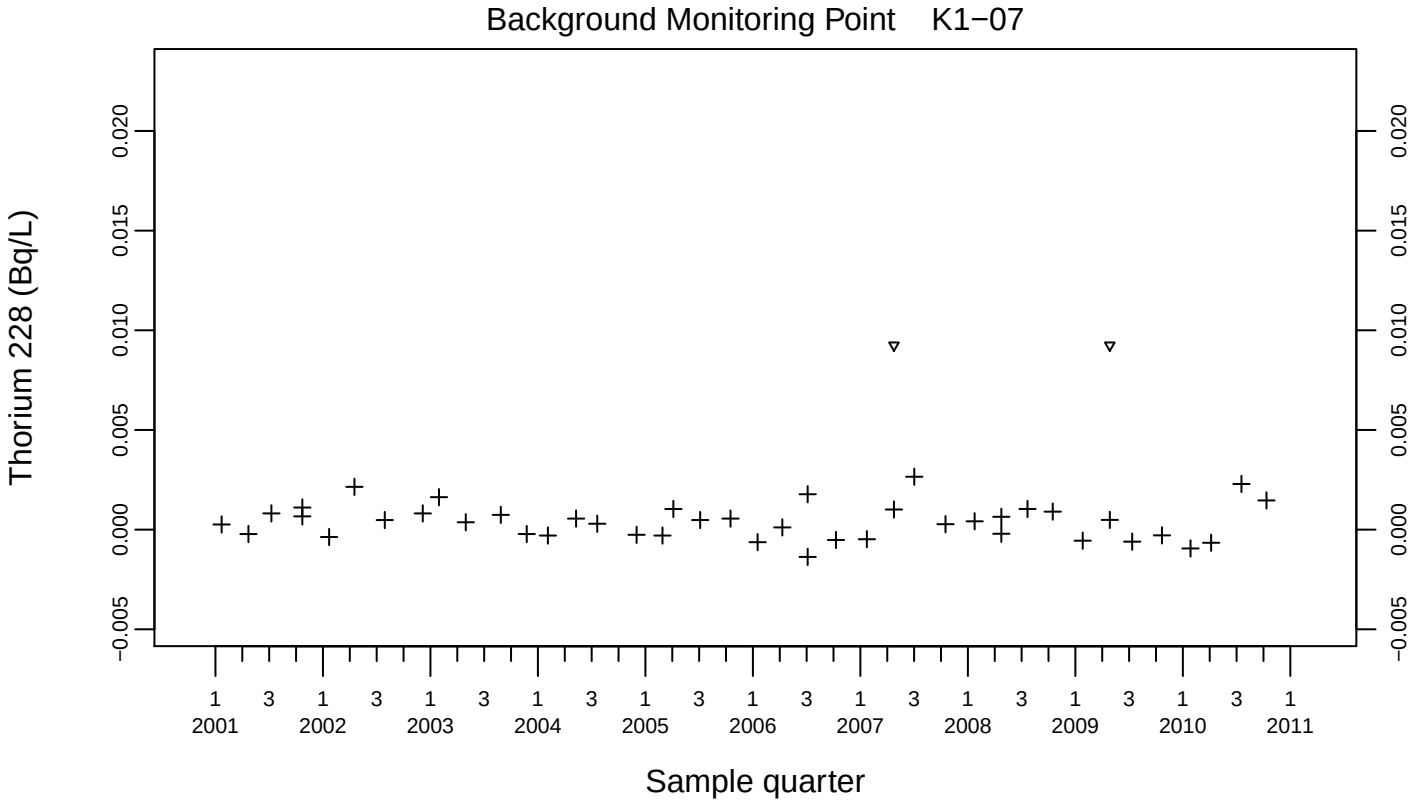

Pit 1 Area
Tritium (Bq/L)
SL=11.4
Above RL
Estimated
Detection Monitoring Point K1−05
Tritium (Bq/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

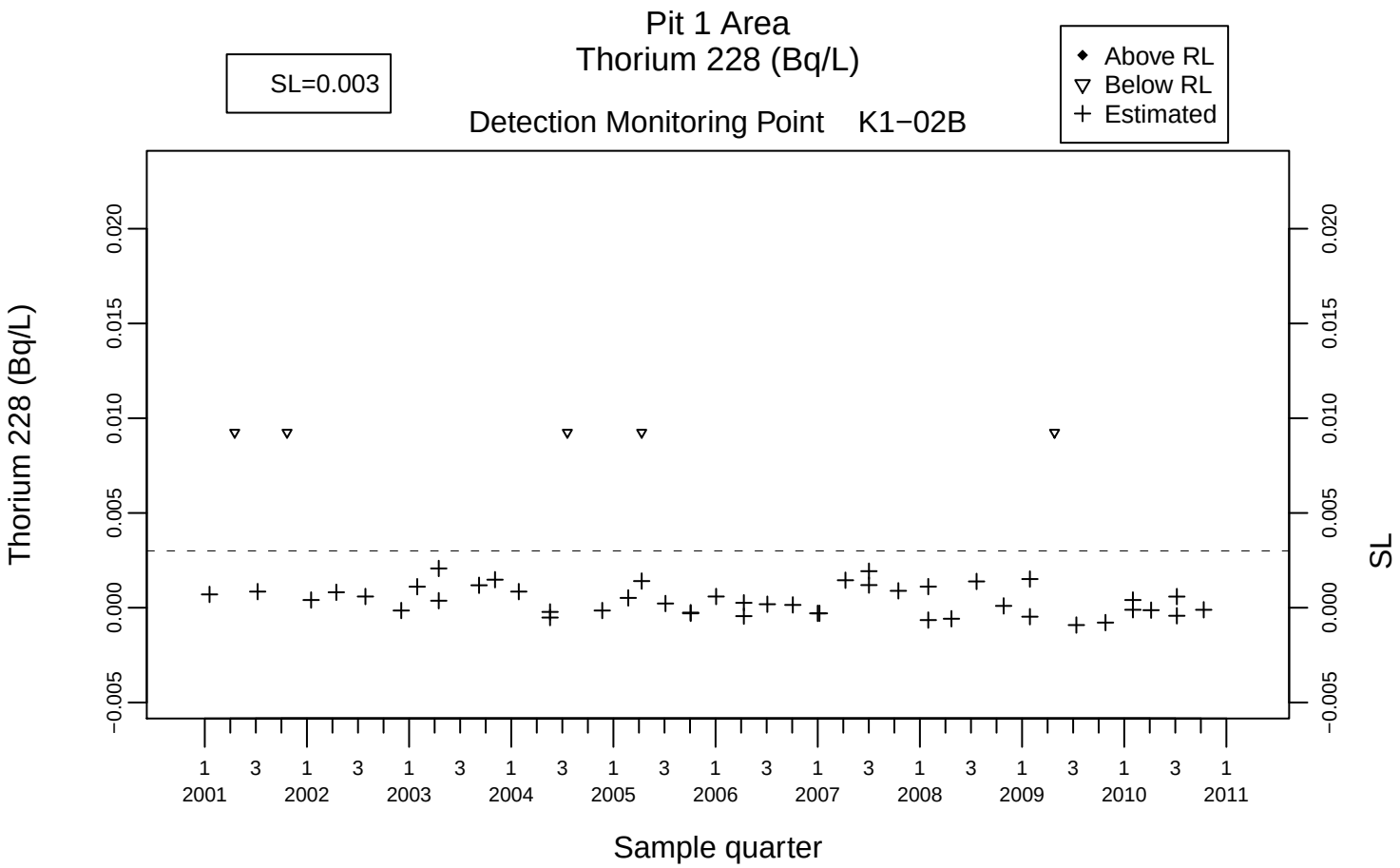

SL=10.7
Crossgradient Monitoring Point K1−08
Tritium (Bq/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

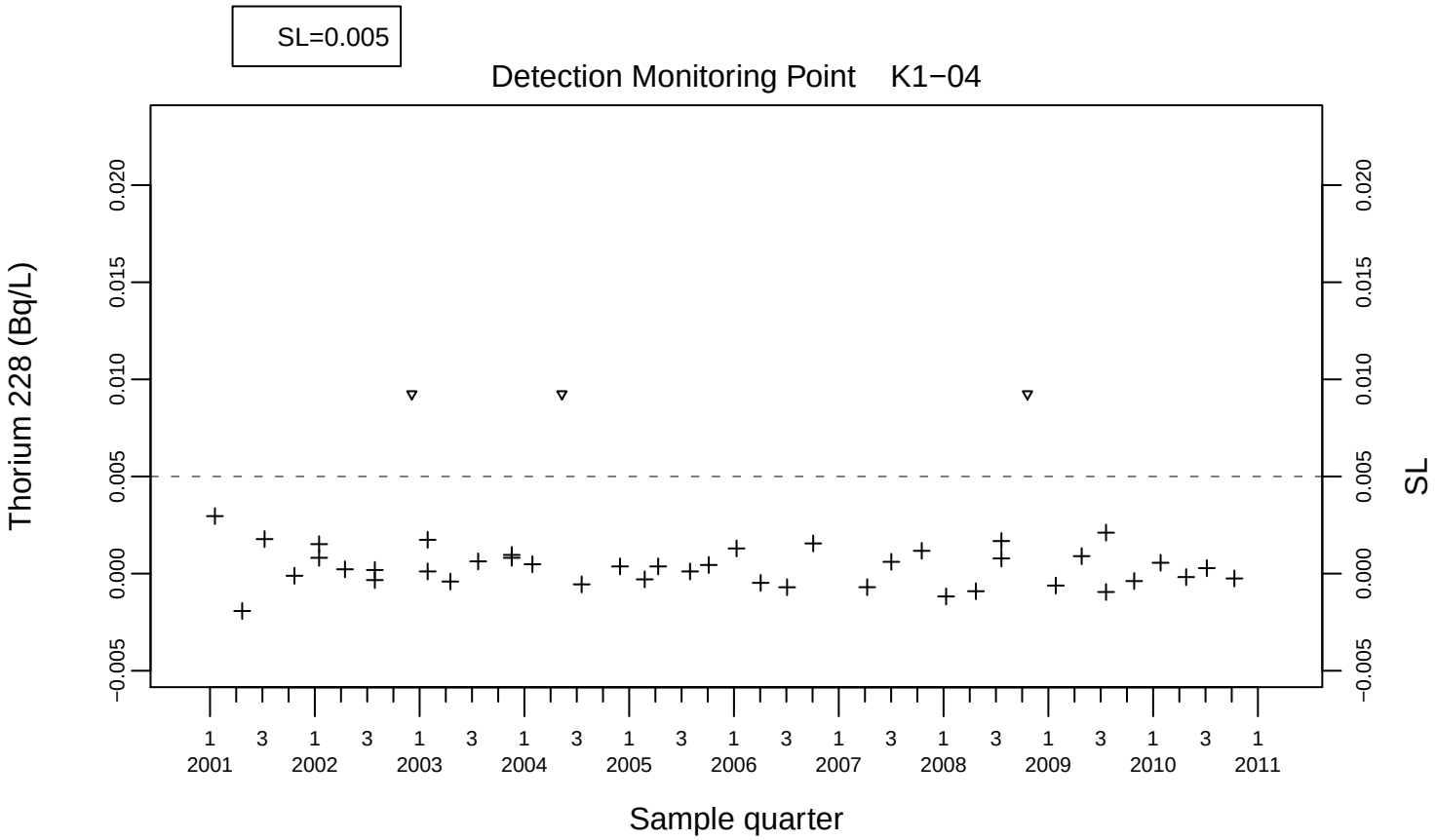

Pit 1 Area
Tritium (Bq/L)
SL=8.7
Crossgradient Monitoring Point K1−09
Above RL
Estimated
Tritium (Bq/L)
SL
Sample quarter

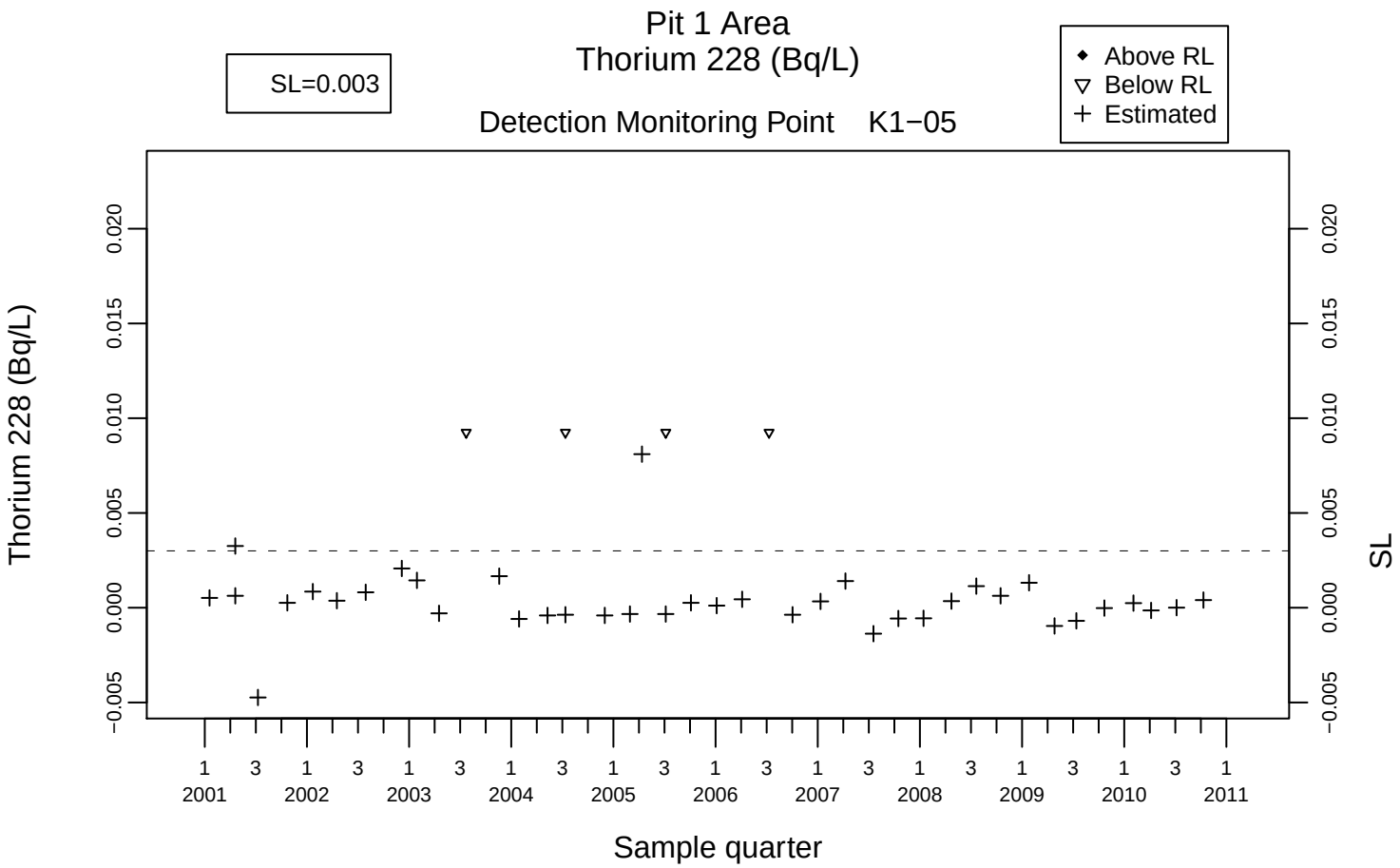

SL=132.8
Detection Monitoring Point W−PIT1−2326
Tritium (Bq/L)
SL
Sample quarter

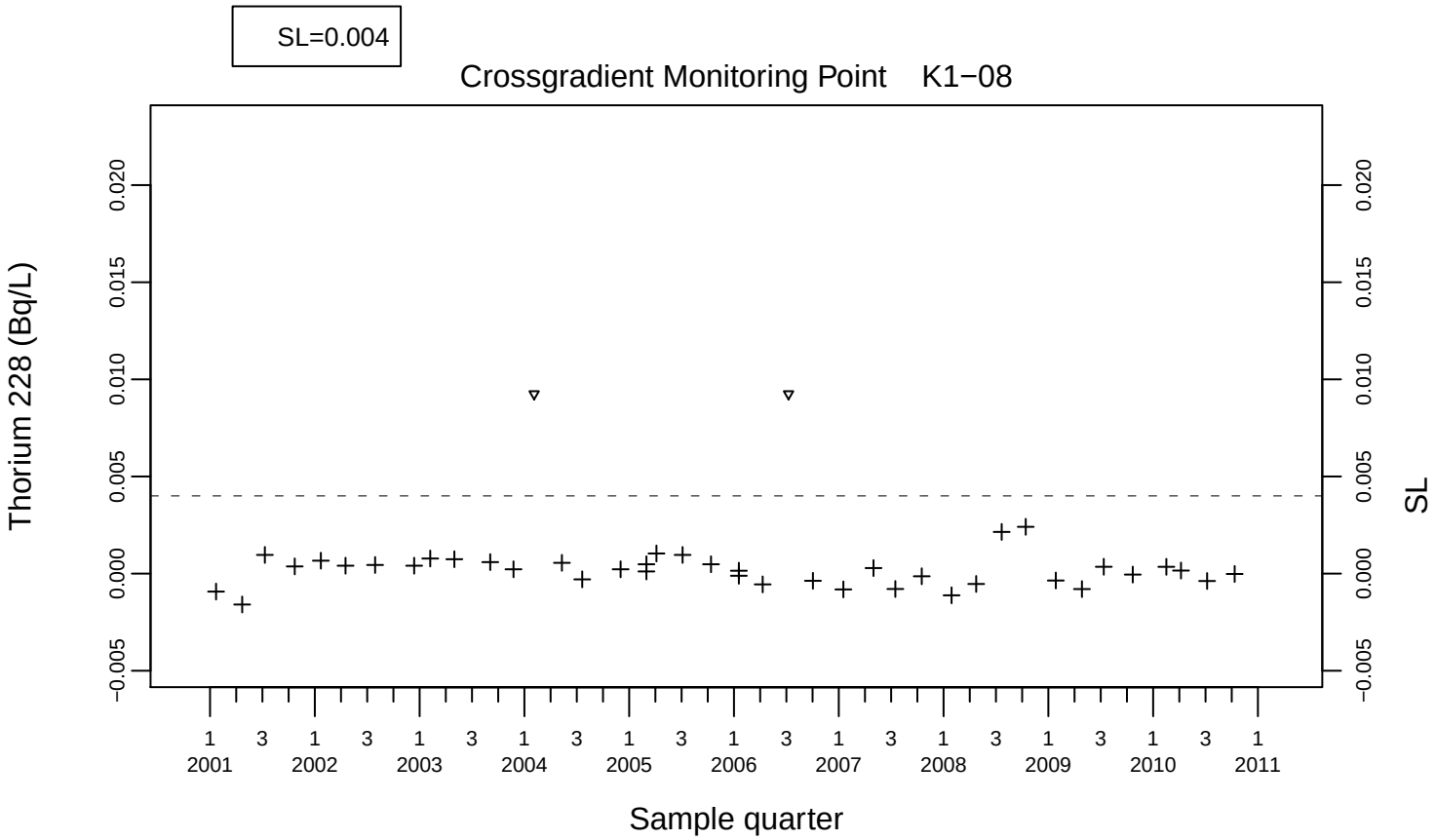

Pit 1 Area
Thorium 228 (Bq/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Estimated
Thorium 228 (Bq/L)
0.020
0.015
0.010
0.005
0.000
−0.005
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

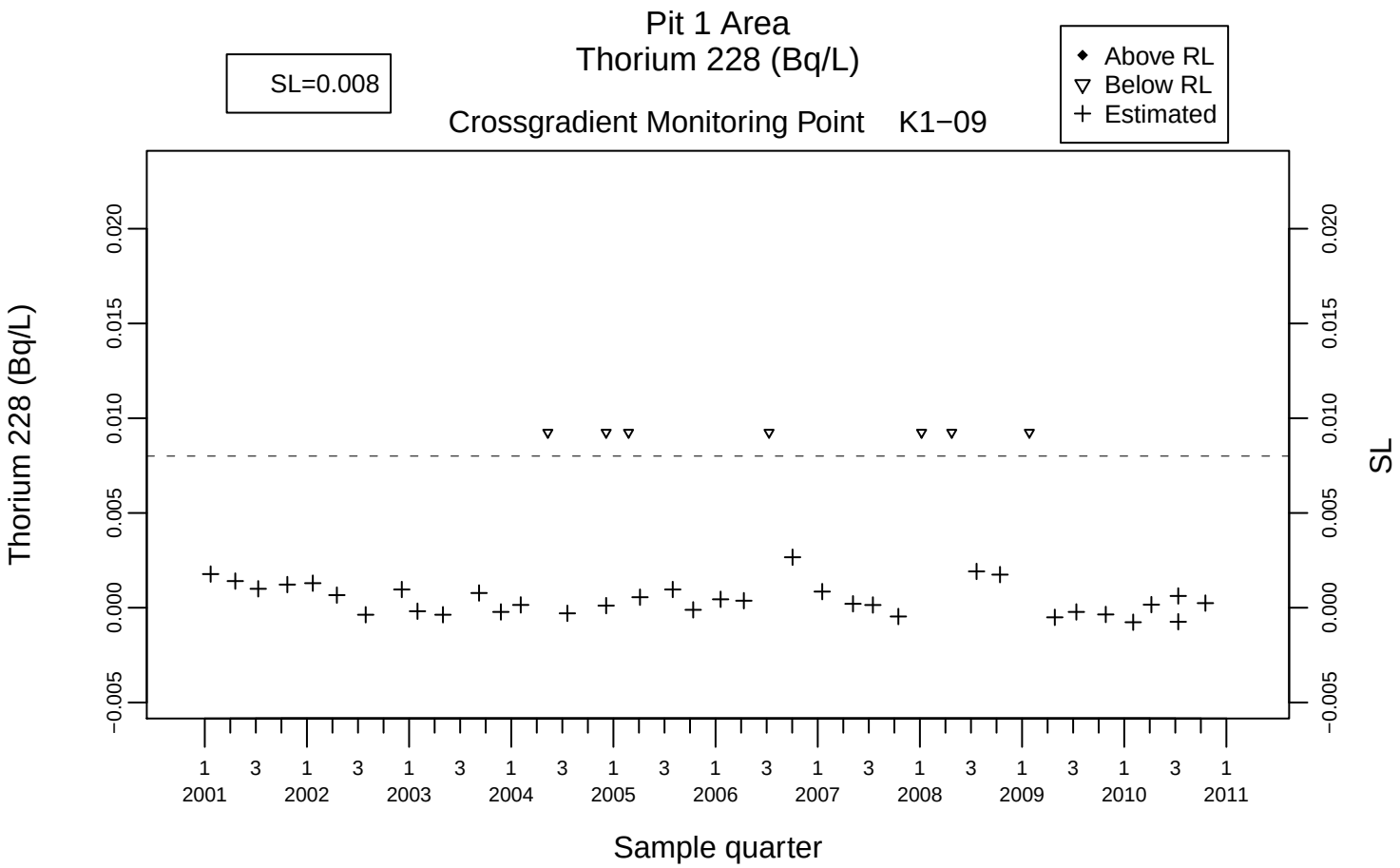

Background Monitoring Point K1−07
Thorium 228 (Bq/L)
0.020
0.015
0.010
0.005
0.000
−0.005
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

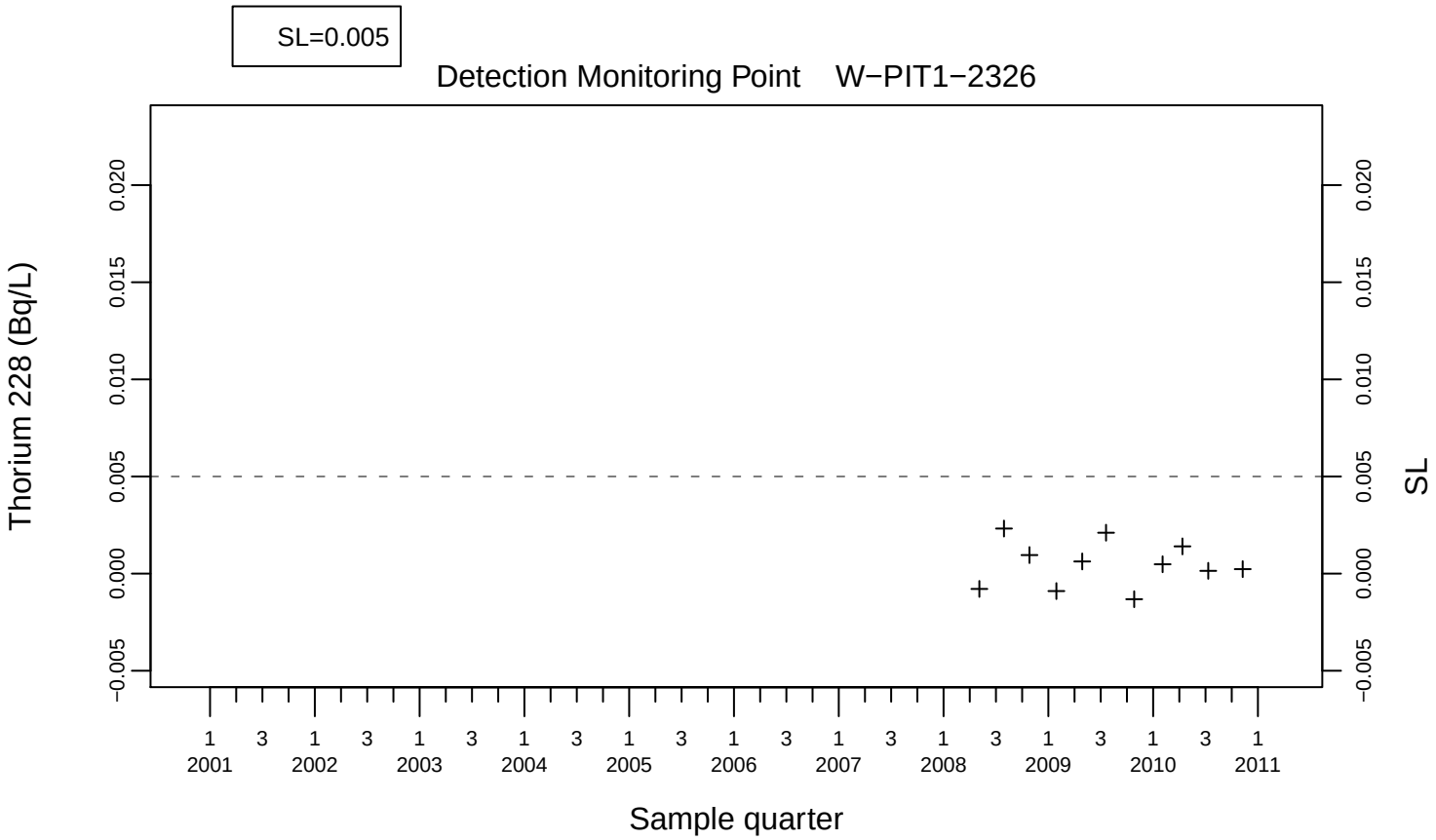

Pit 1 Area
Thorium 228 (Bq/L)
Detection Monitoring Point K1−02B
SL=0.003
Above RL
Below RL
Estimated
Thorium 228 (Bq/L)
SL
Sample quarter
−0.005
0.000
0.005
0.010
0.015
0.020
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

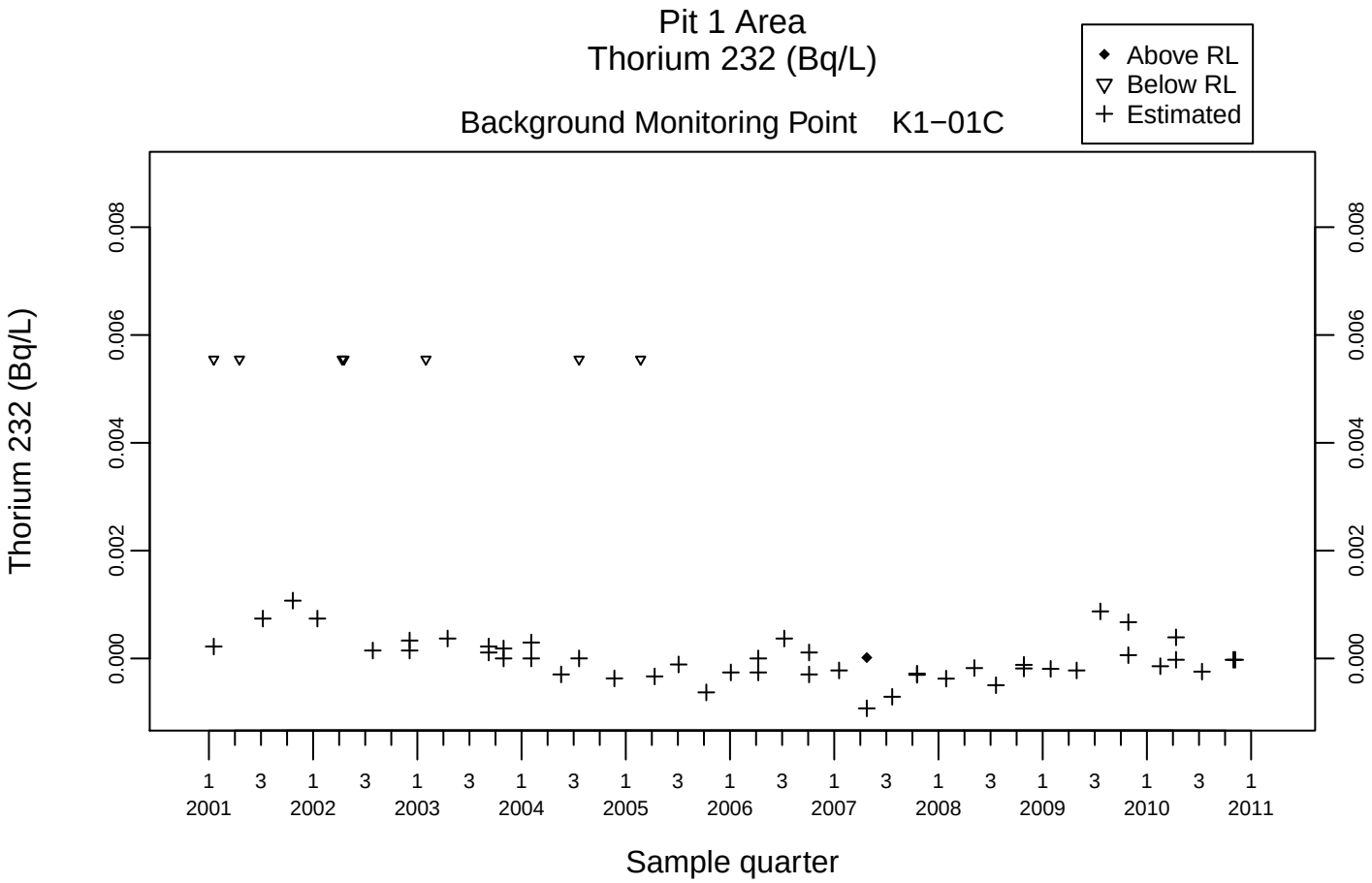

SL=0.005
Detection Monitoring Point K1−04
Thorium 228 (Bq/L)
SL
Sample quarter
−0.005
0.000
0.005
0.010
0.015
0.020
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

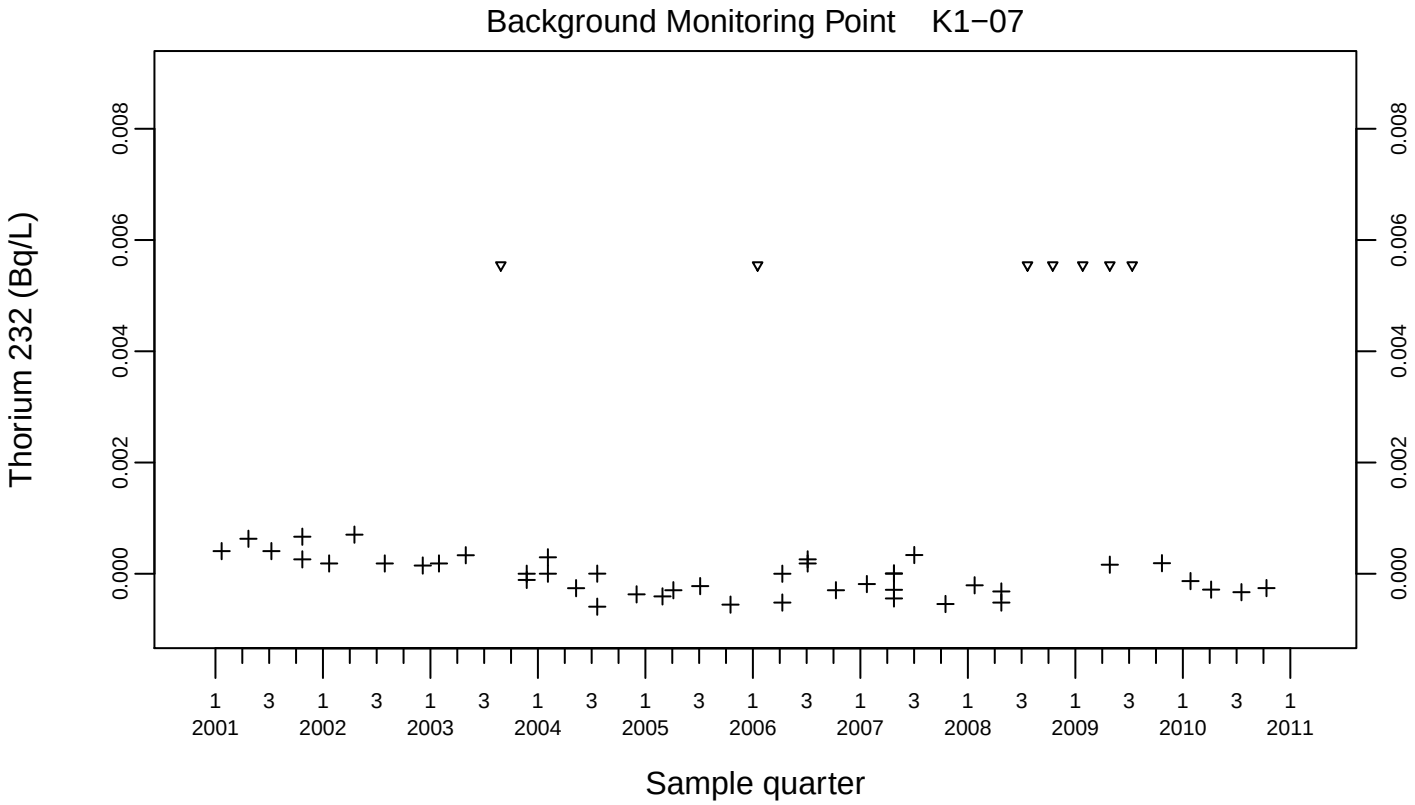

Pit 1 Area
Thorium 228 (Bq/L)
Detection Monitoring Point K1−05
SL=0.003
Above RL
Below RL
Estimated
Thorium 228 (Bq/L)
SL
Sample quarter
0.020
0.015
0.010
0.005
0.000
−0.005
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

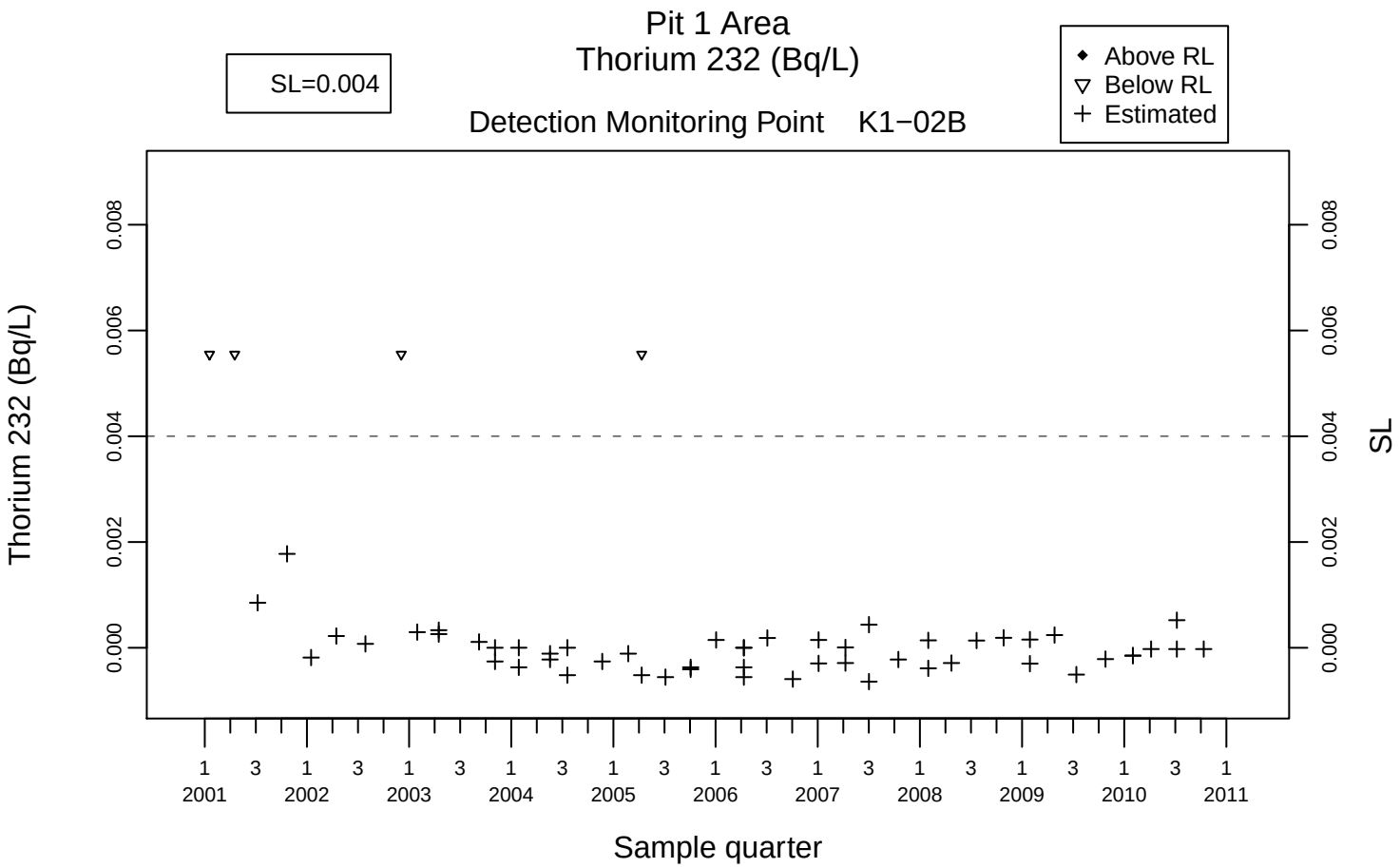

SL=0.004
Crossgradient Monitoring Point K1−08
Thorium 228 (Bq/L)
SL
Sample quarter
0.020
0.015
0.010
0.005
0.000
−0.005
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

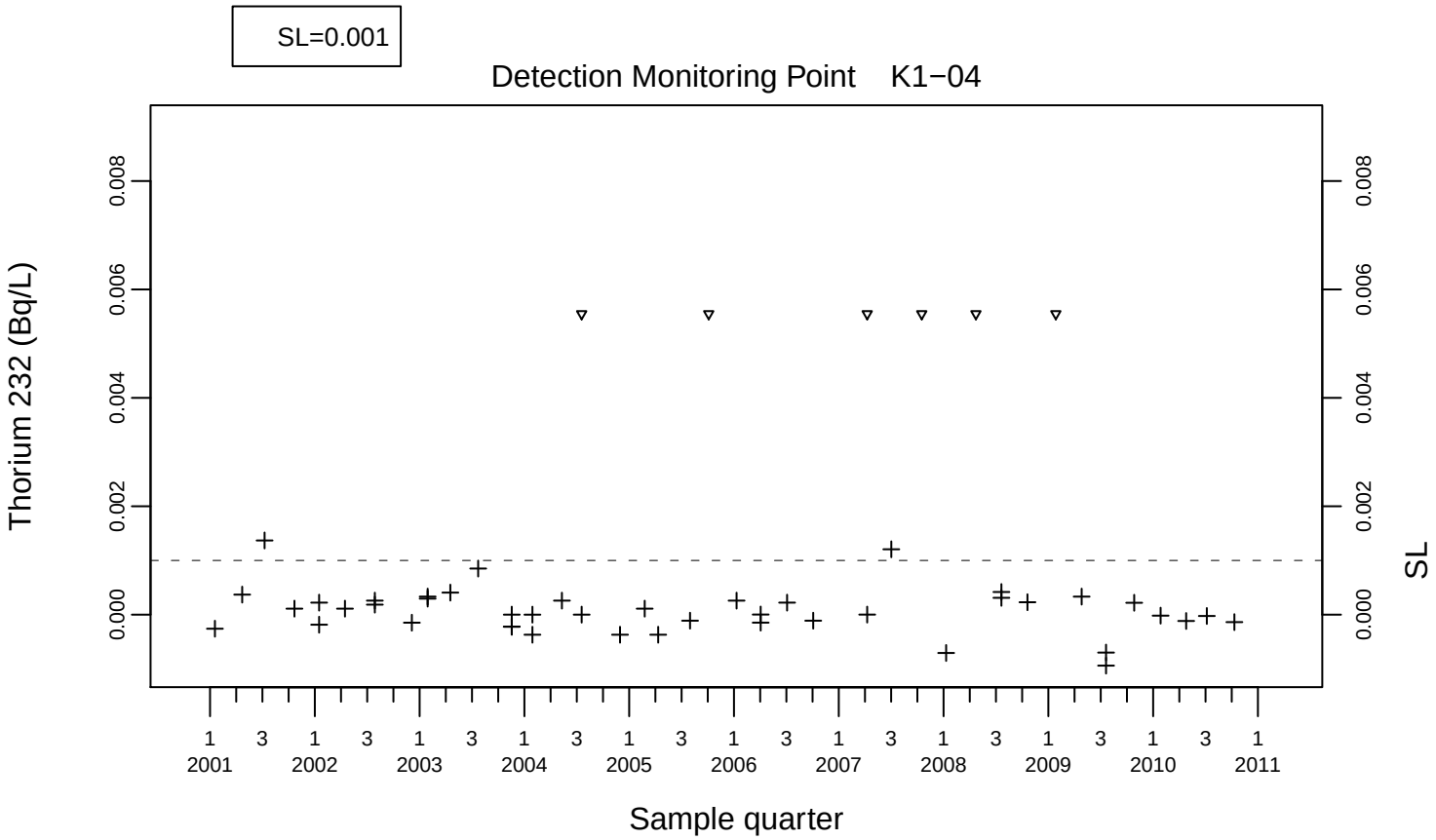

Pit 1 Area
Thorium 228 (Bq/L)
Crossgradient Monitoring Point K1−09
SL=0.008
Above RL
Below RL
Estimated
Thorium 228 (Bq/L)
SL
Sample quarter
0.020
0.015
0.010
0.005
0.000
−0.005
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

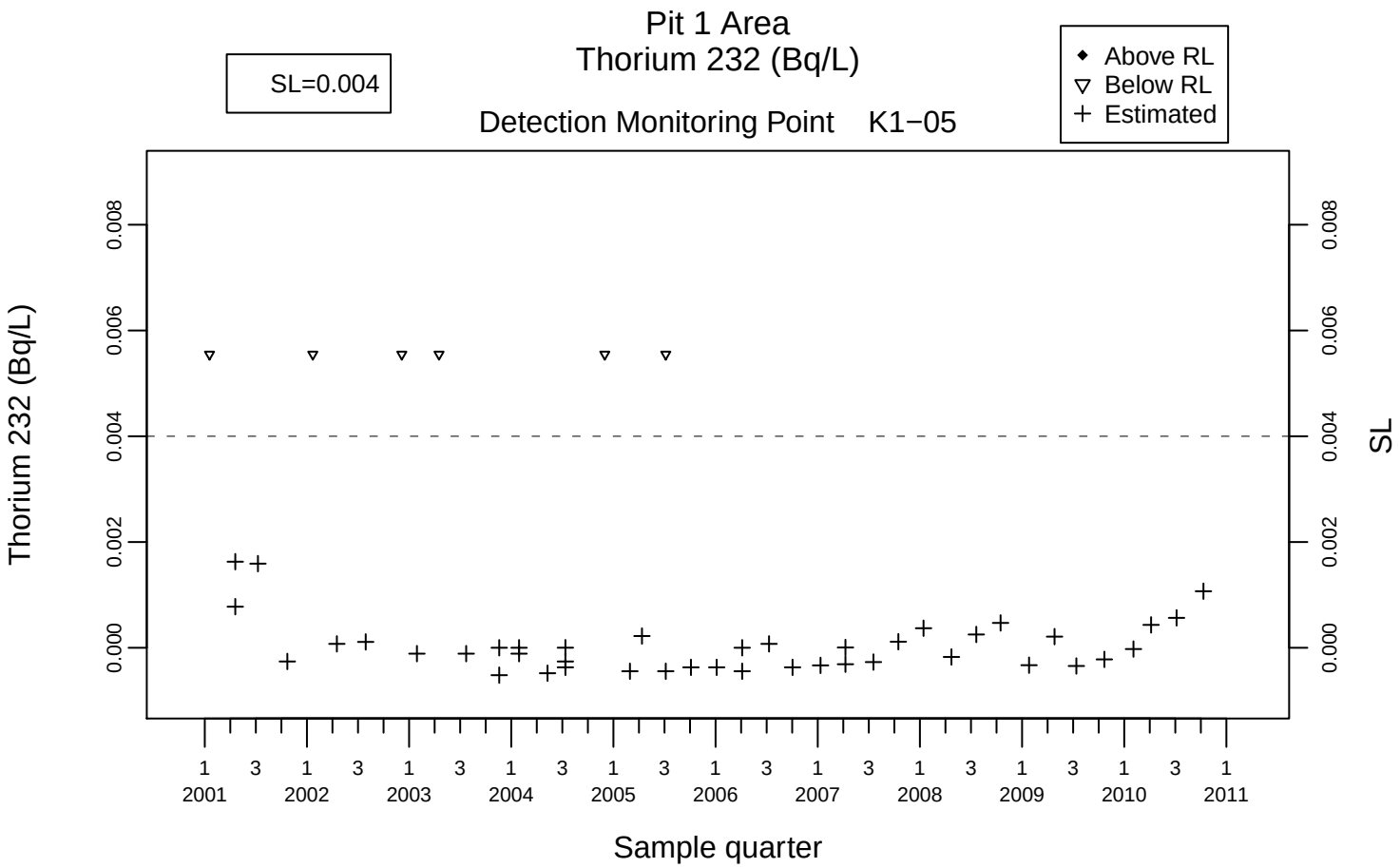

SL=0.005
Detection Monitoring Point W−PIT1−2326
Thorium 228 (Bq/L)
SL
Sample quarter
0.020
0.015
0.010
0.005
0.000
−0.005
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

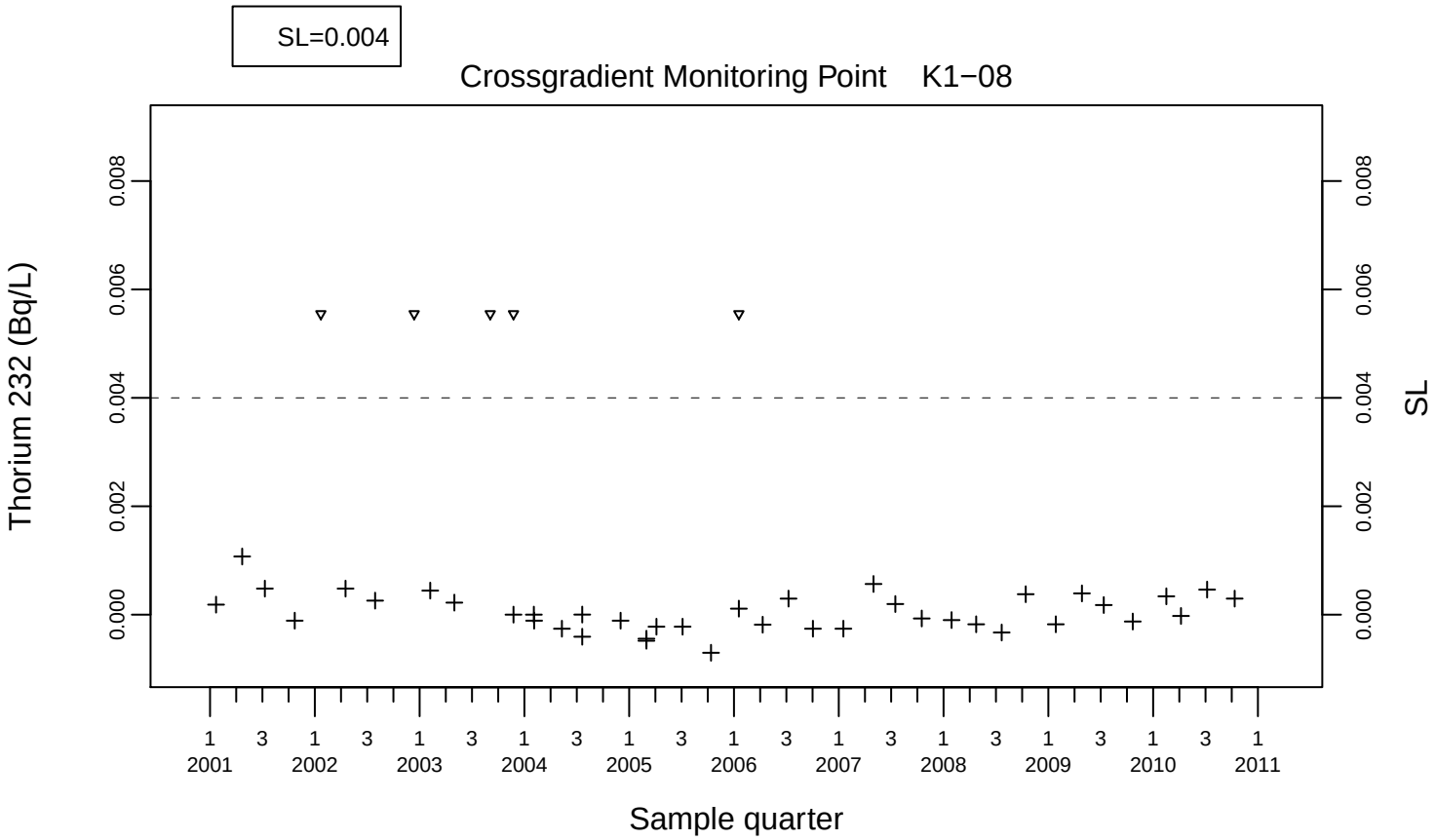

Pit 1 Area
Thorium 232 (Bq/L)
Above RL
Below RL
Estimated
Background Monitoring Point K1−01C
Thorium 232 (Bq/L)
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

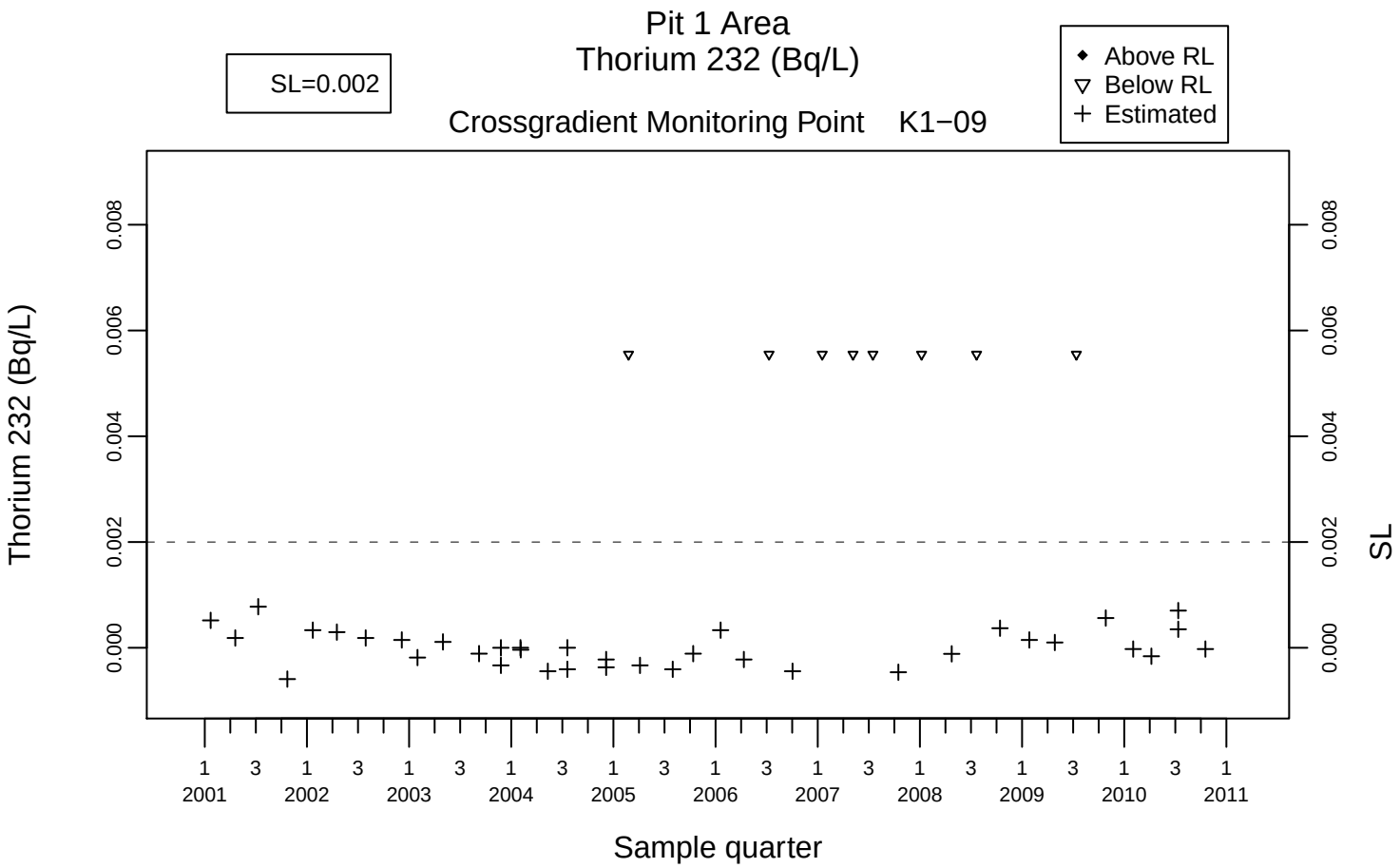

Background Monitoring Point K1−07
Thorium 232 (Bq/L)
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

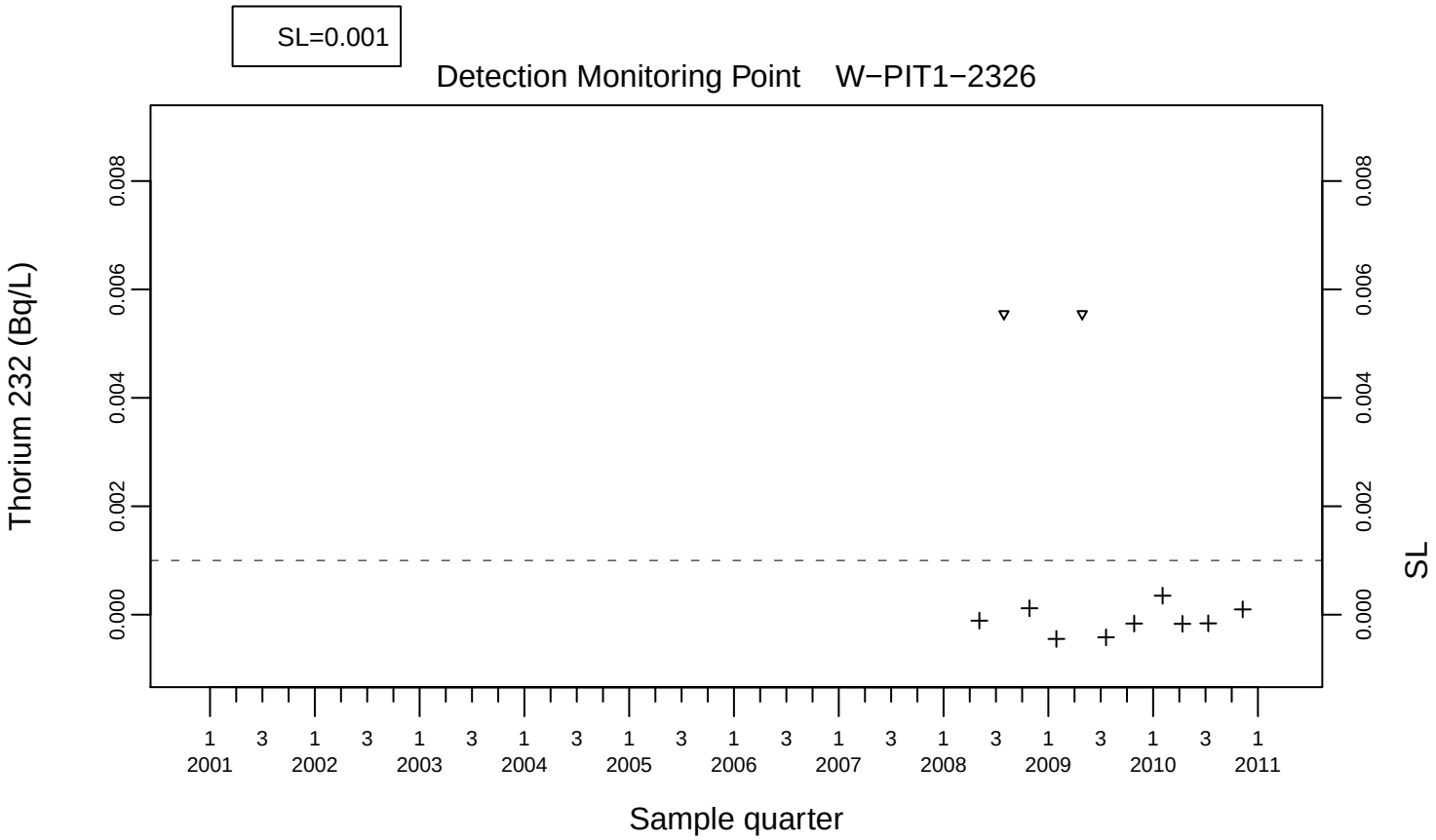

Pit 1 Area
Thorium 232 (Bq/L)
Detection Monitoring Point K1−02B
SL=0.004
Above RL
Below RL
Estimated
Thorium 232 (Bq/L)
SL
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

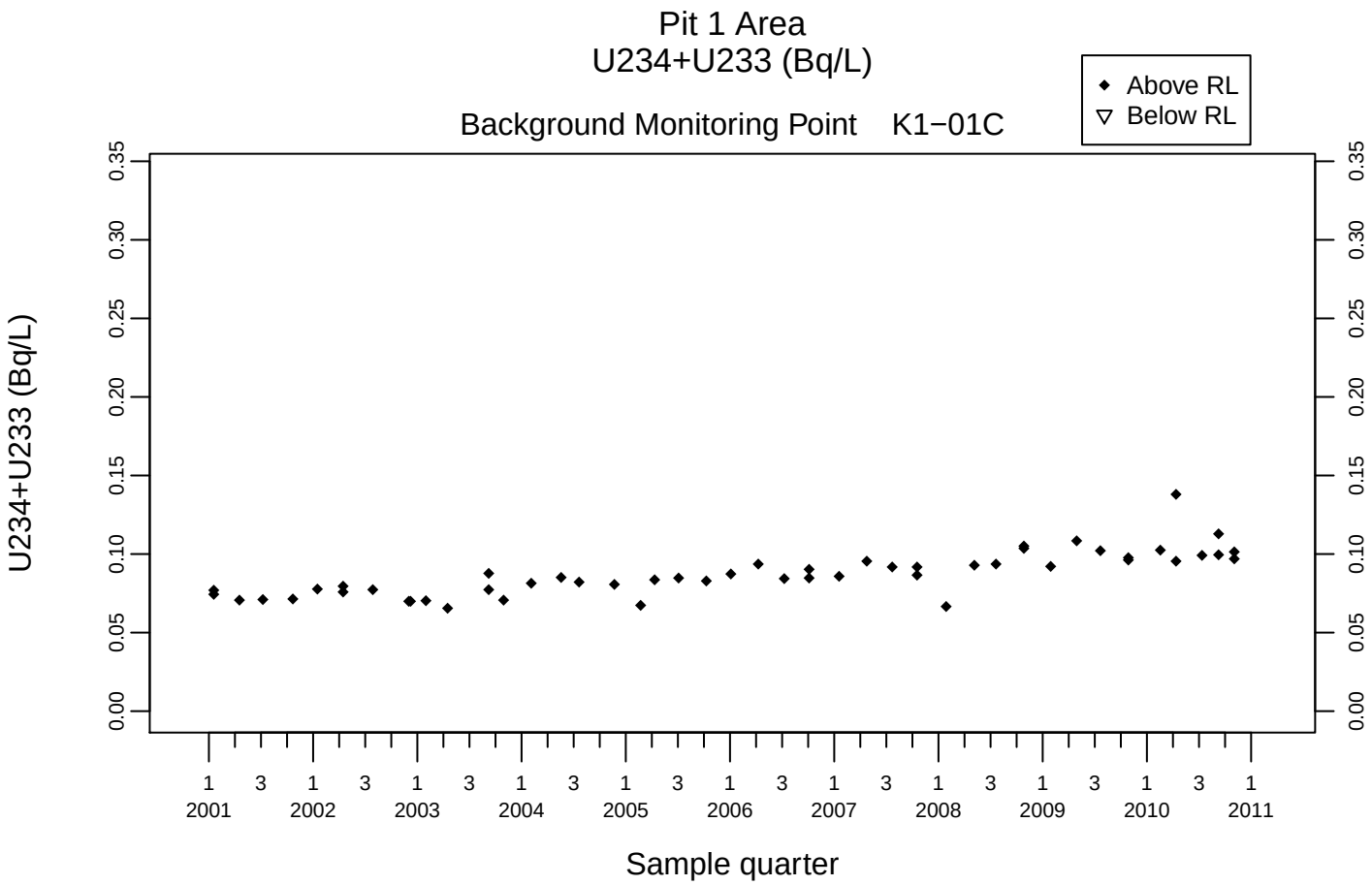

SL=0.001
Detection Monitoring Point K1−04
Thorium 232 (Bq/L)
SL
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

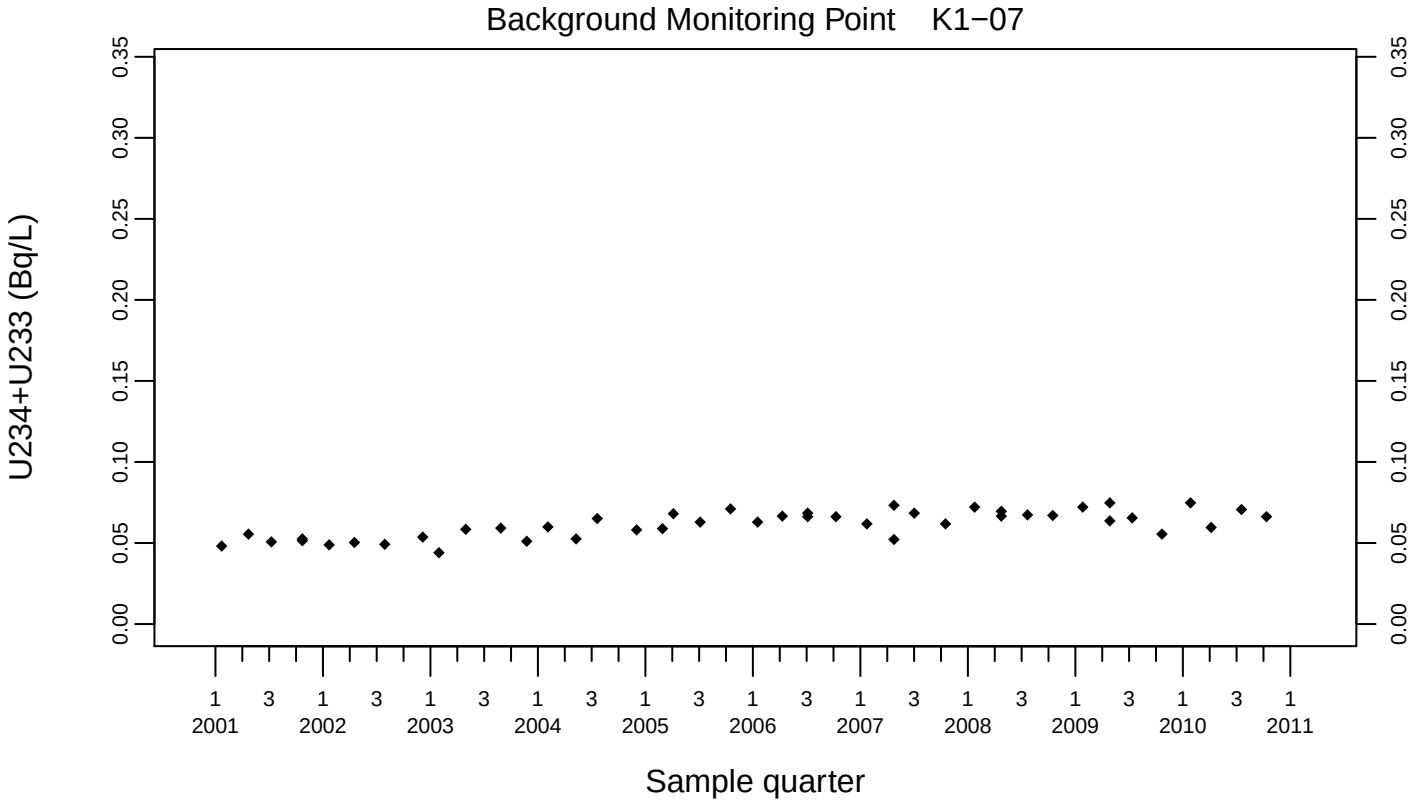

Pit 1 Area
Thorium 232 (Bq/L)
Detection Monitoring Point K1−05
SL=0.004
Above RL
Below RL
Estimated
Thorium 232 (Bq/L)
SL
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

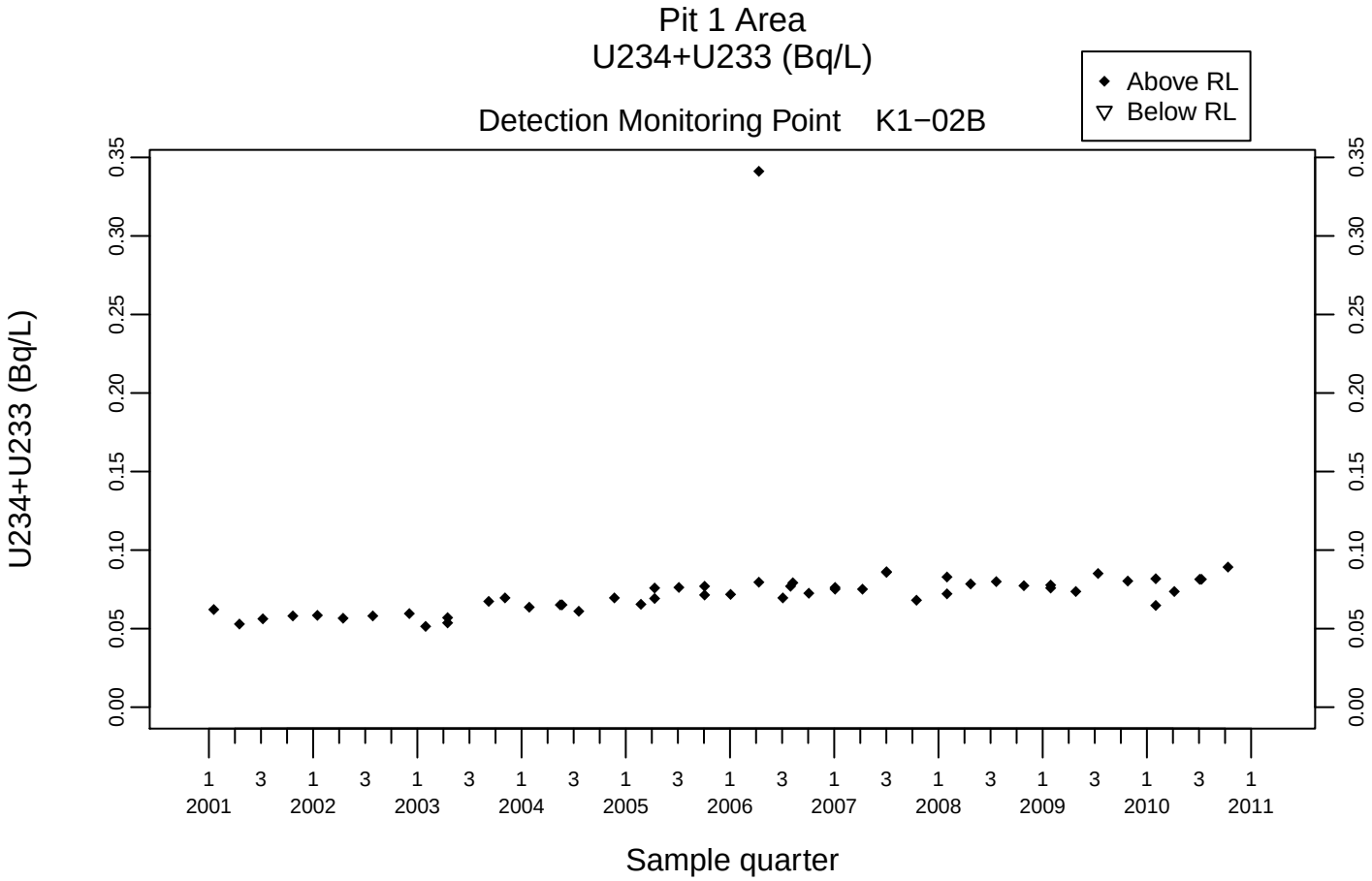

SL=0.004
Crossgradient Monitoring Point K1−08
Thorium 232 (Bq/L)
SL
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

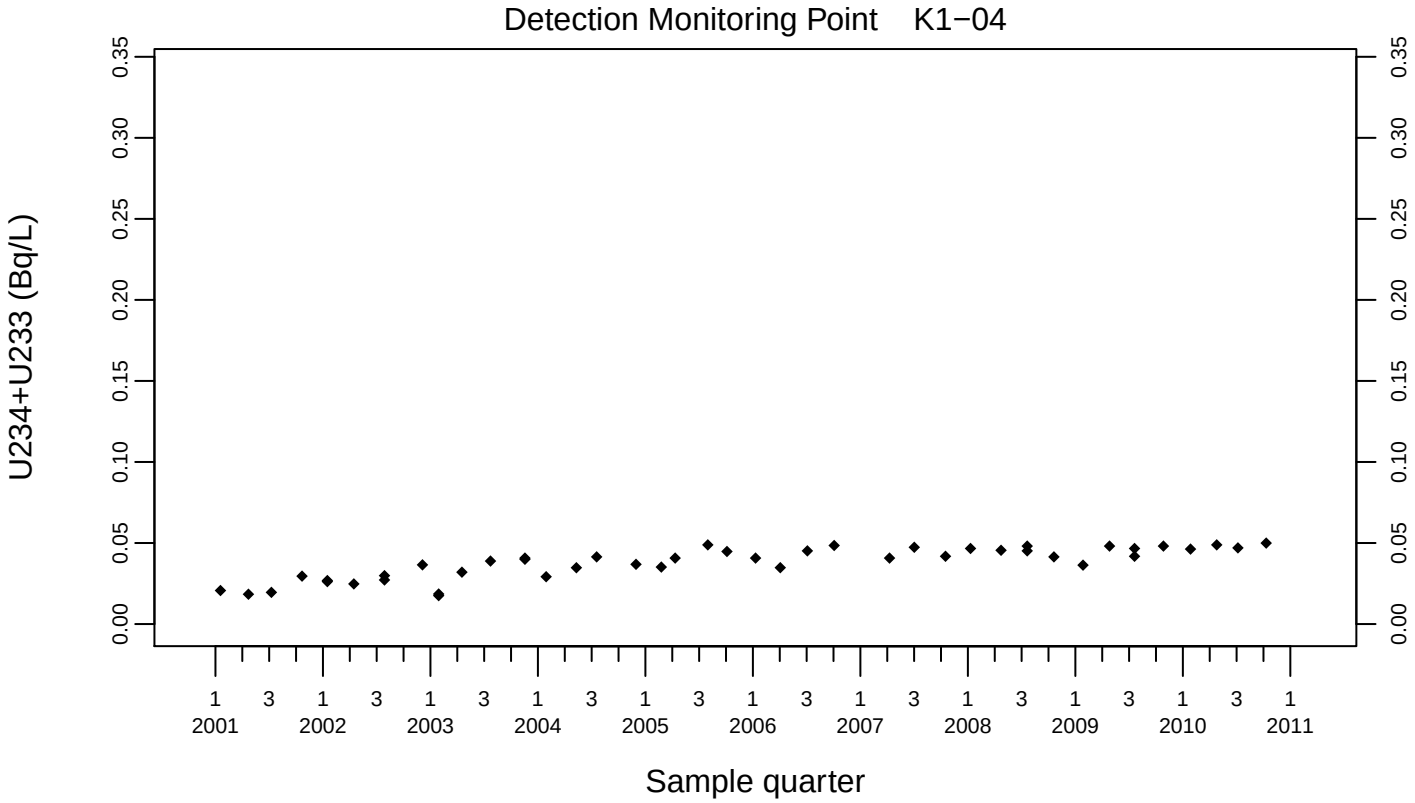

Pit 1 Area
Thorium 232 (Bq/L)
Crossgradient Monitoring Point K1−09
SL=0.002
Above RL
Below RL
Estimated
Thorium 232 (Bq/L)
SL
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

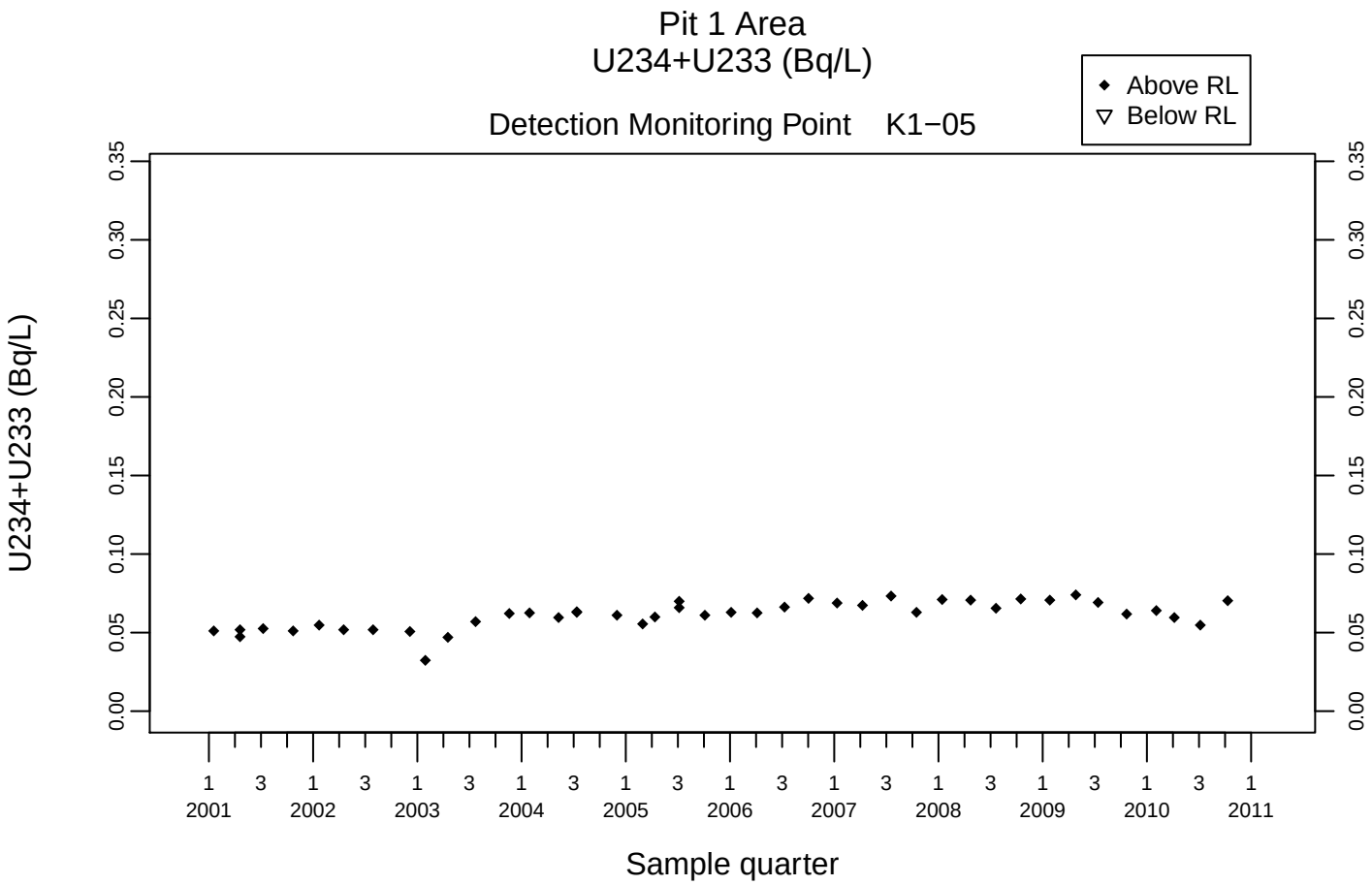

SL=0.001
Detection Monitoring Point W−PIT1−2326
Thorium 232 (Bq/L)
SL
0.000
0.002
0.004
0.006
0.008
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

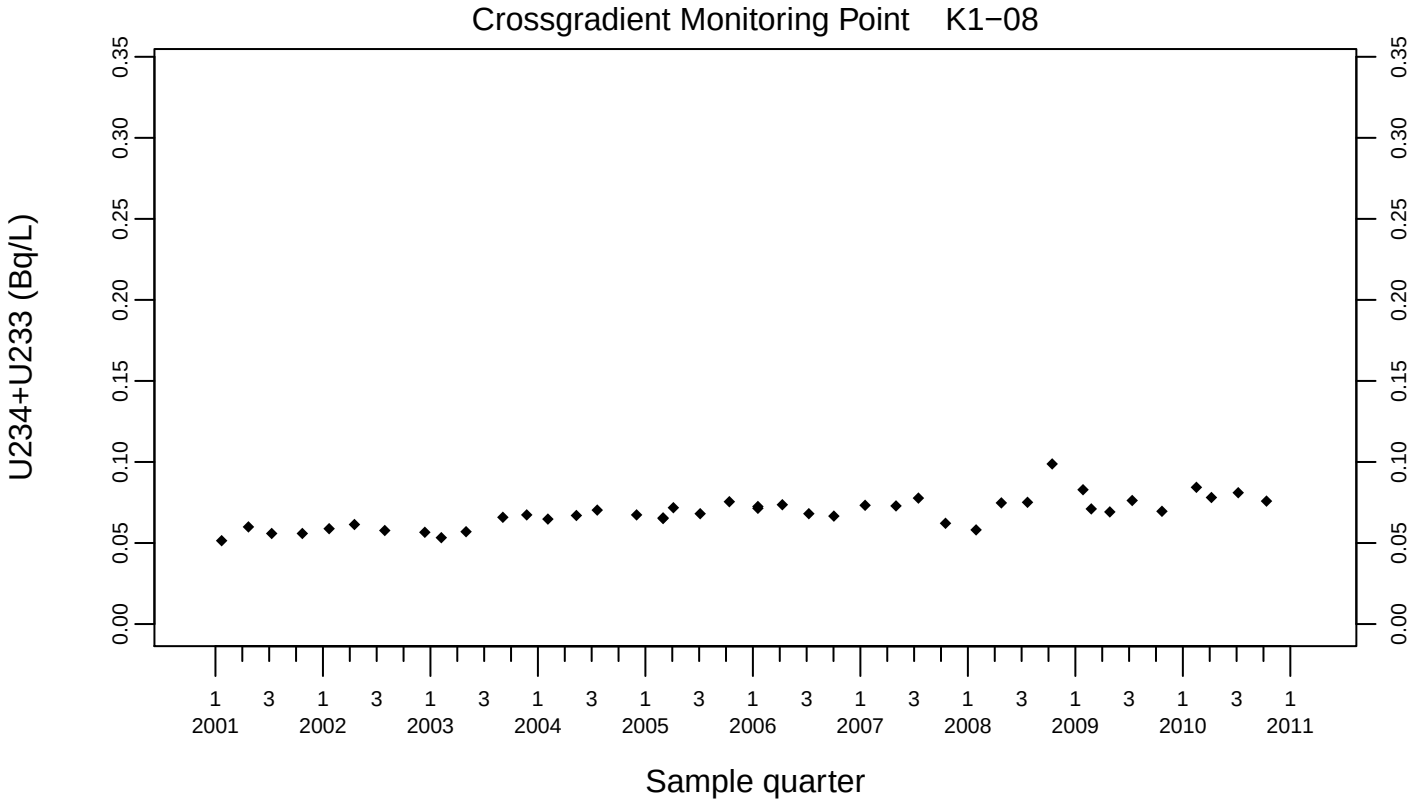

Pit 1 Area
U234+U233 (Bq/L)
Above RL
Below RL
Background Monitoring Point K1−01C
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

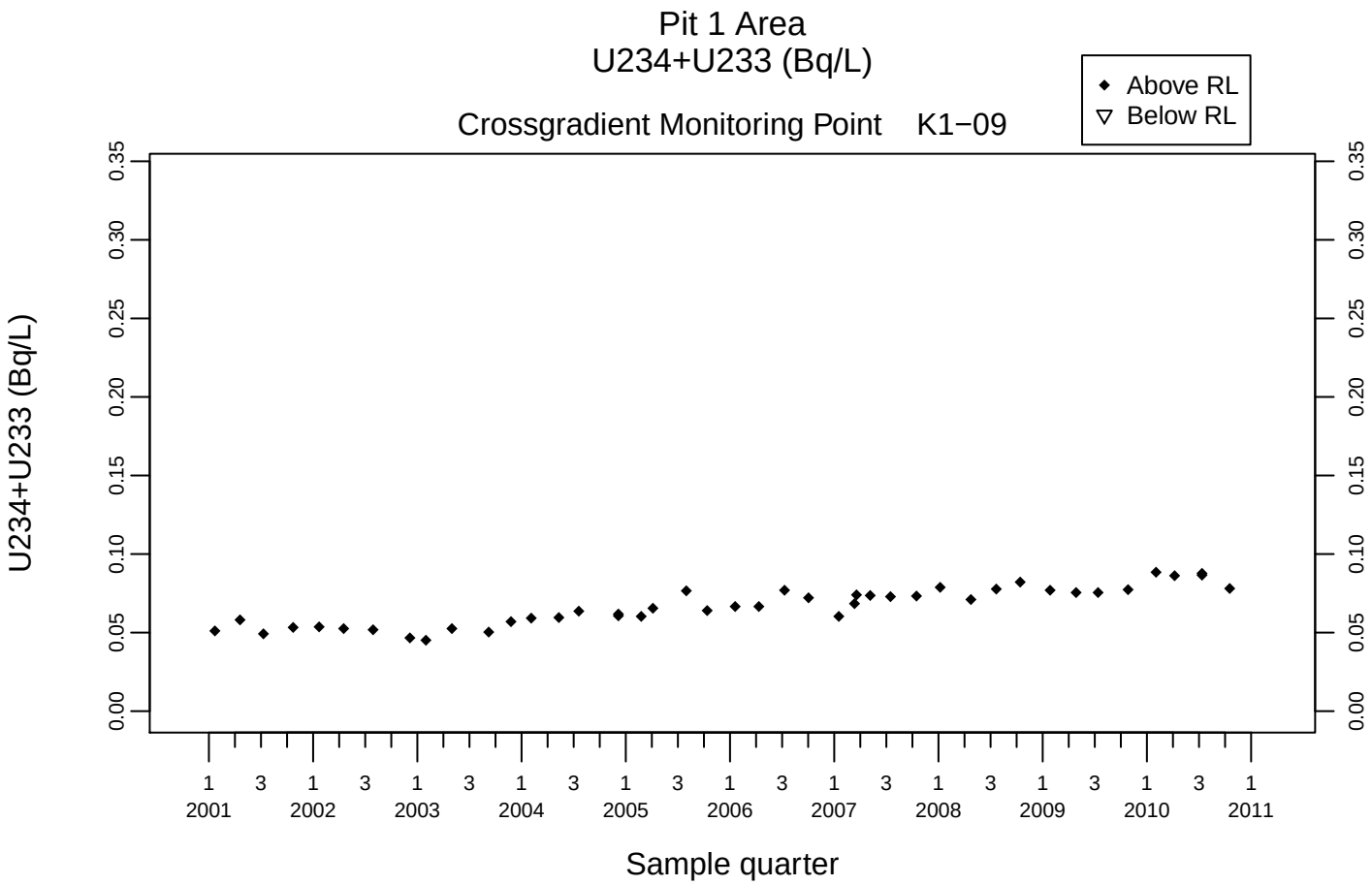

Background Monitoring Point K1−07
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

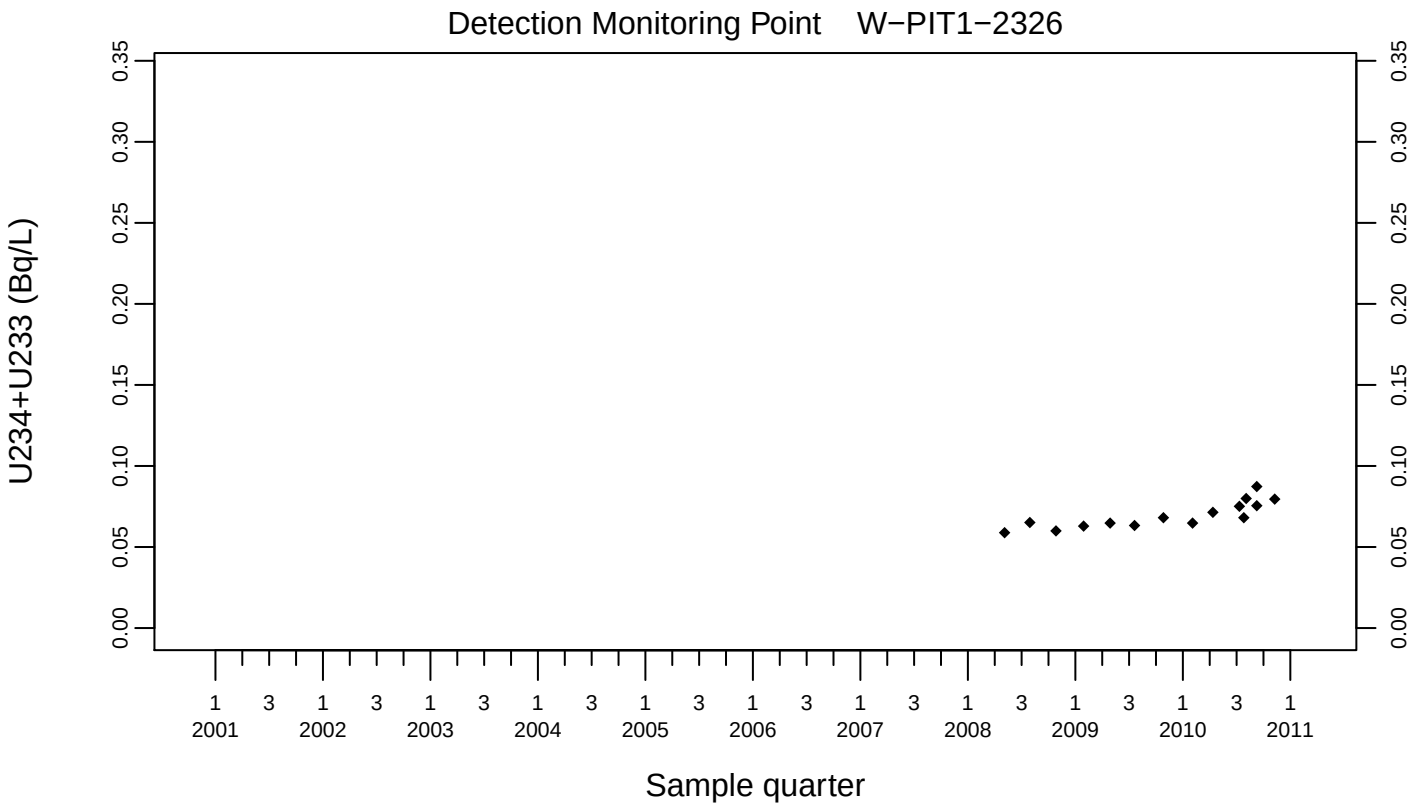

Pit 1 Area
U234+U233 (Bq/L)
Above RL
Below RL
Detection Monitoring Point K1−02B
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

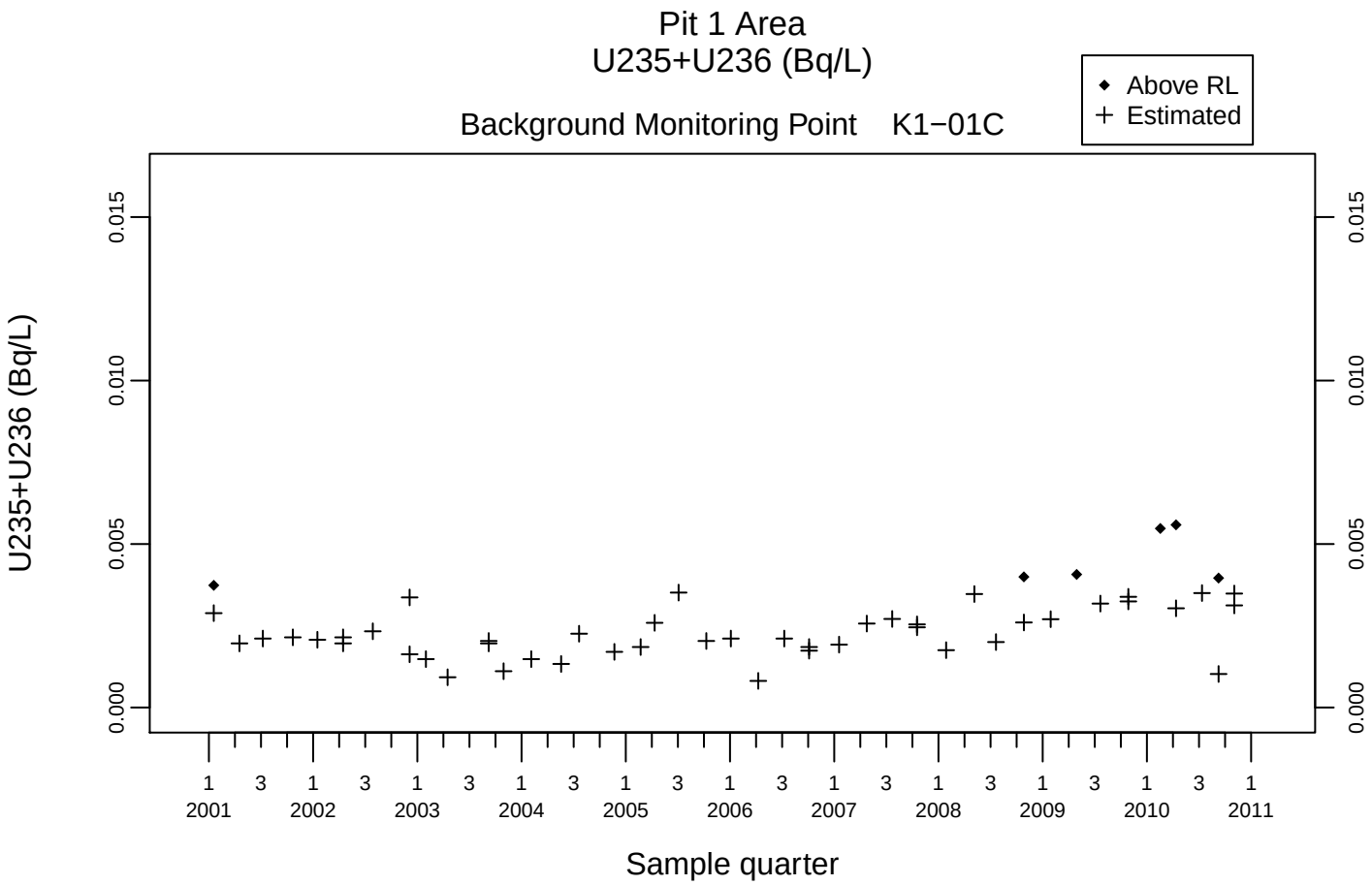

Detection Monitoring Point K1−04
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

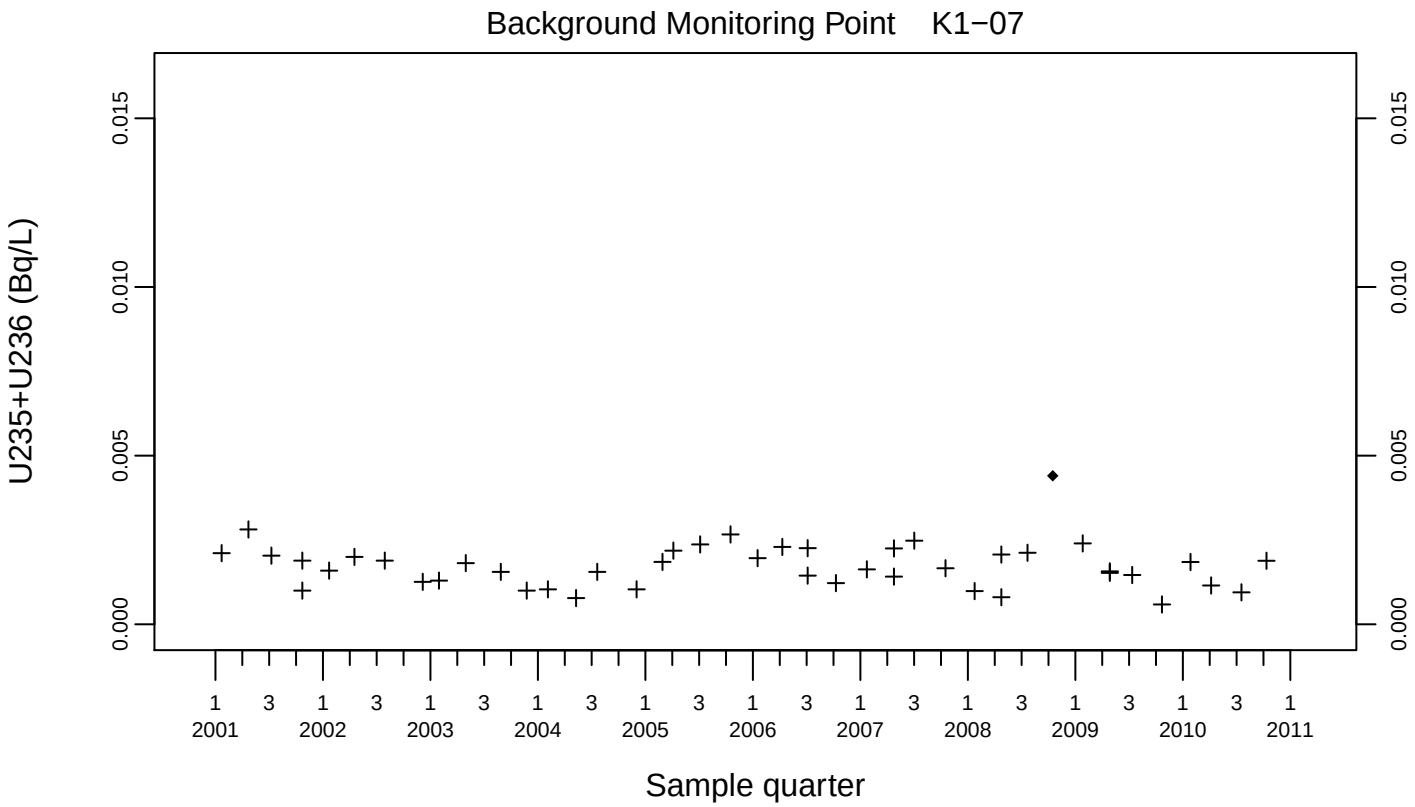

Pit 1 Area
U234+U233 (Bq/L)
Detection Monitoring Point K1−05
Above RL
Below RL
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

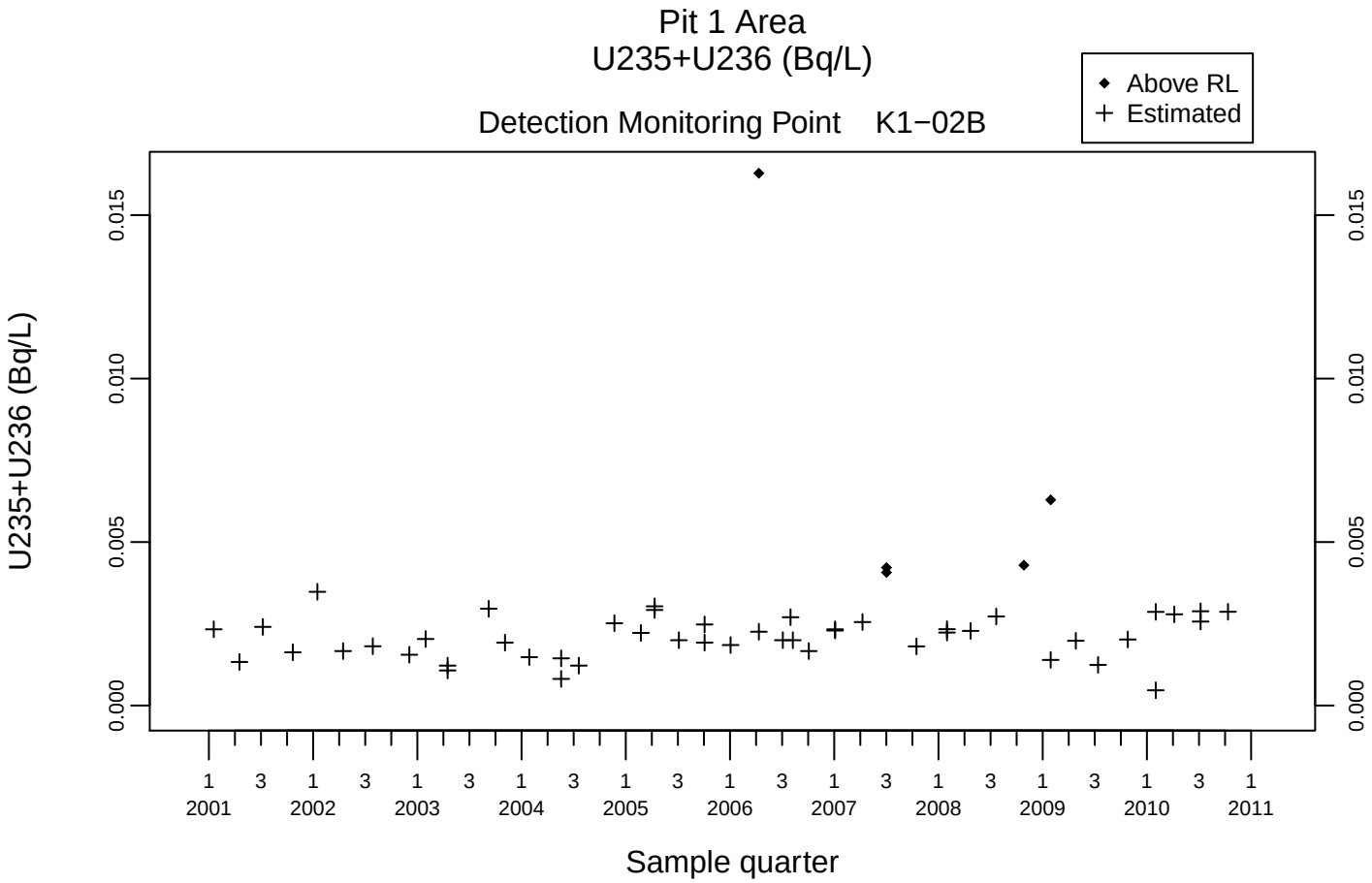

Crossgradient Monitoring Point K1−08
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

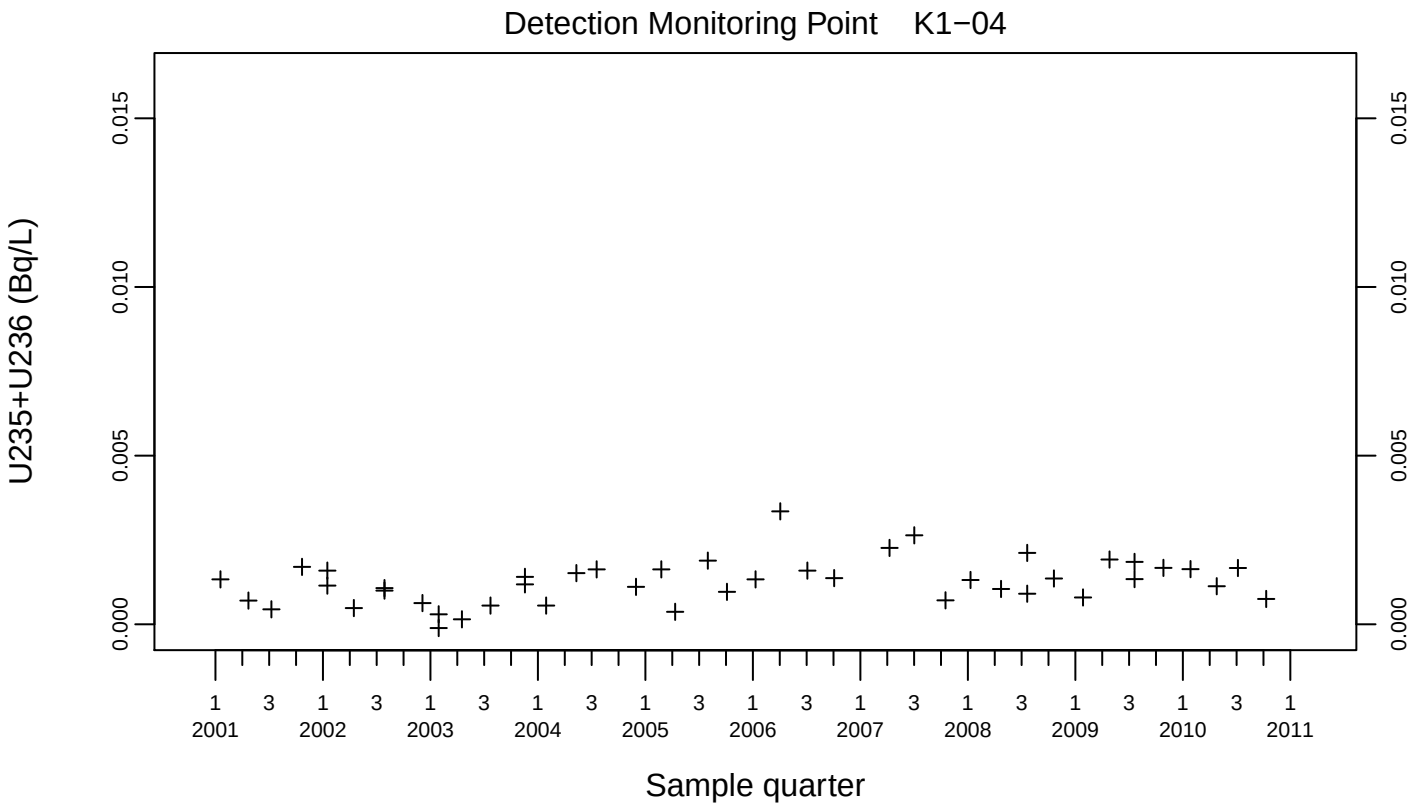

Pit 1 Area
U234+U233 (Bq/L)
Crossgradient Monitoring Point K1−09
Above RL
Below RL
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

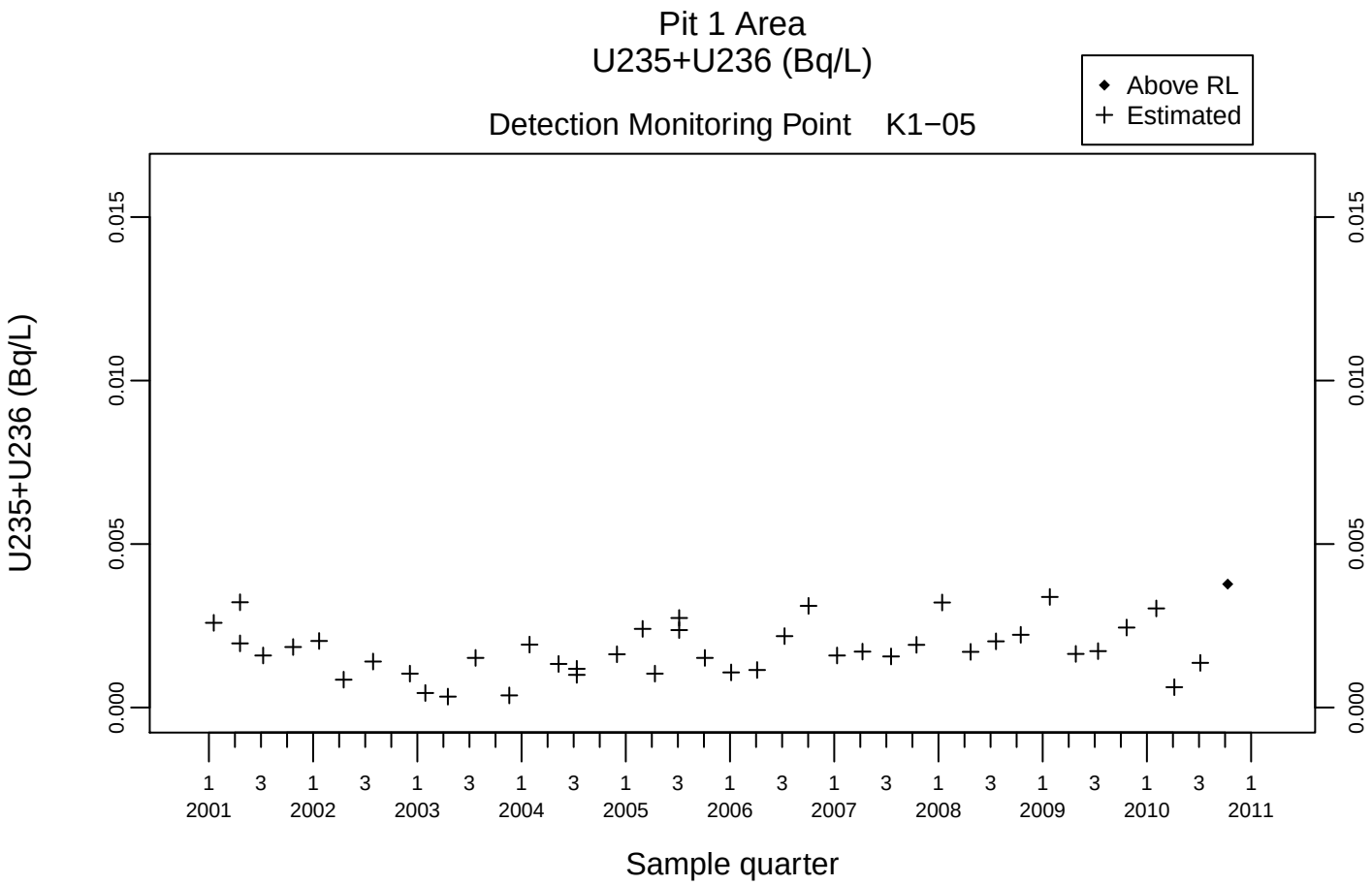

Detection Monitoring Point W−PIT1−2326
U234+U233 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
0.35
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

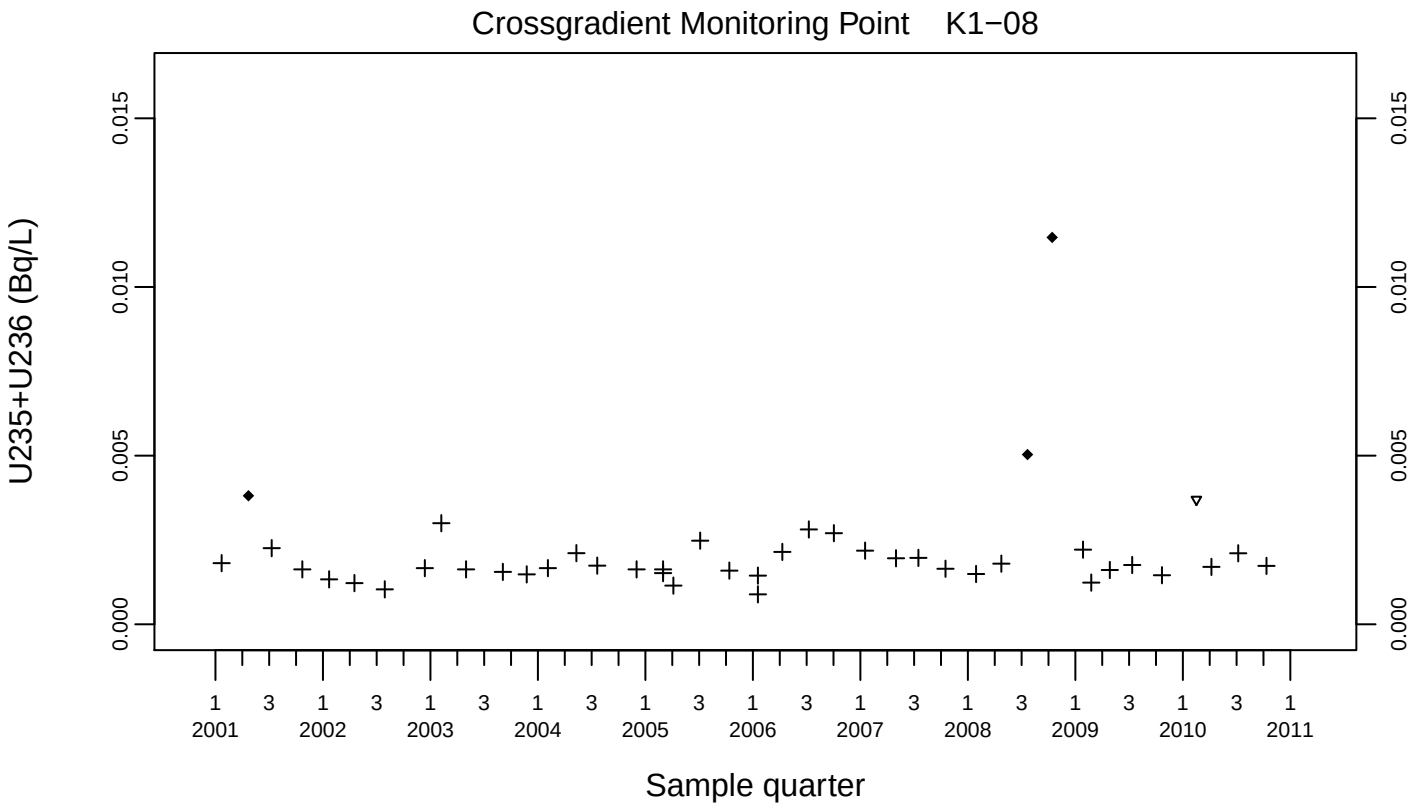

Pit 1 Area
U235+U236 (Bq/L)
Background Monitoring Point K1−01C
Above RL
Estimated
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

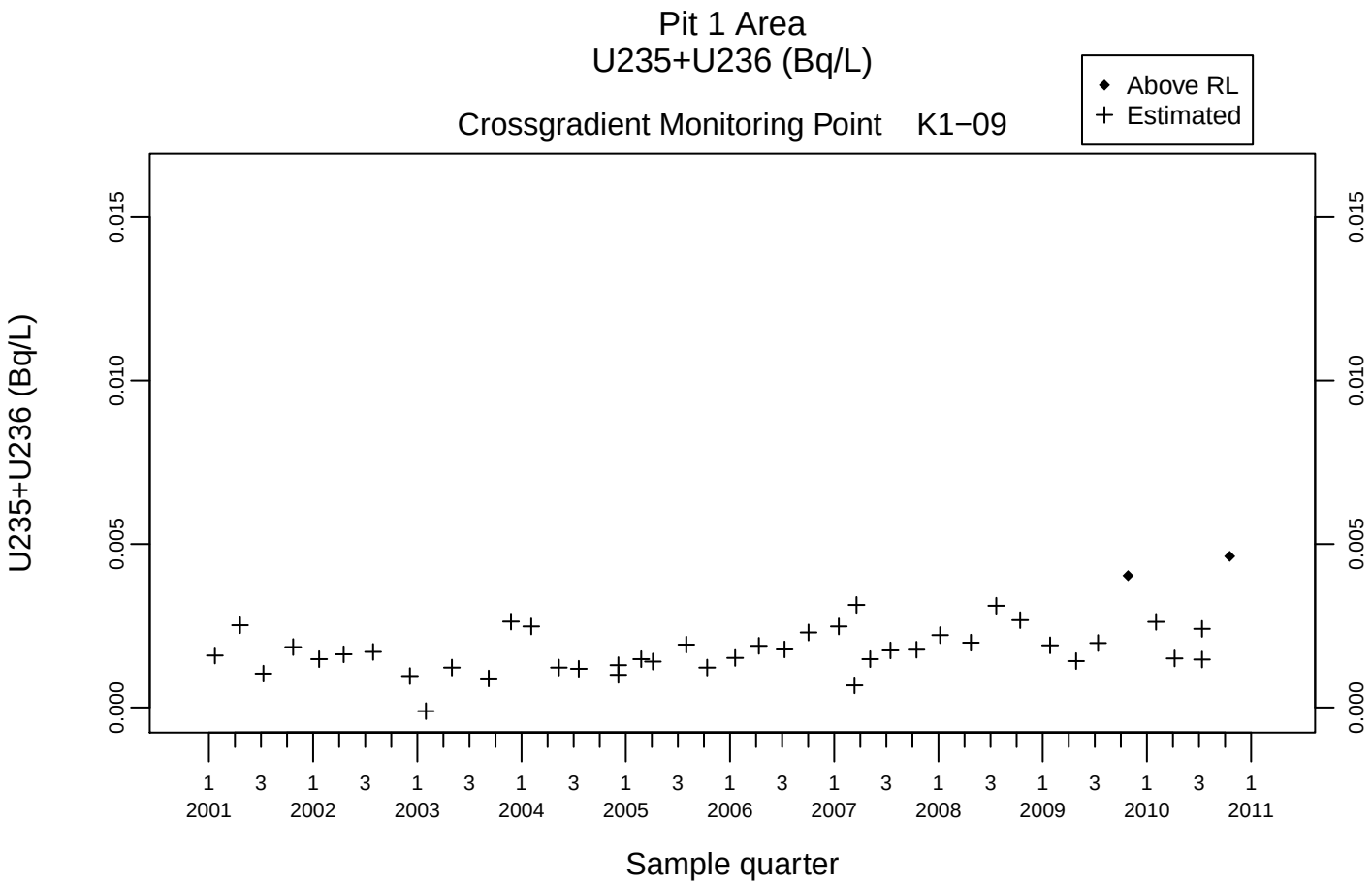

Background Monitoring Point K1−07
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

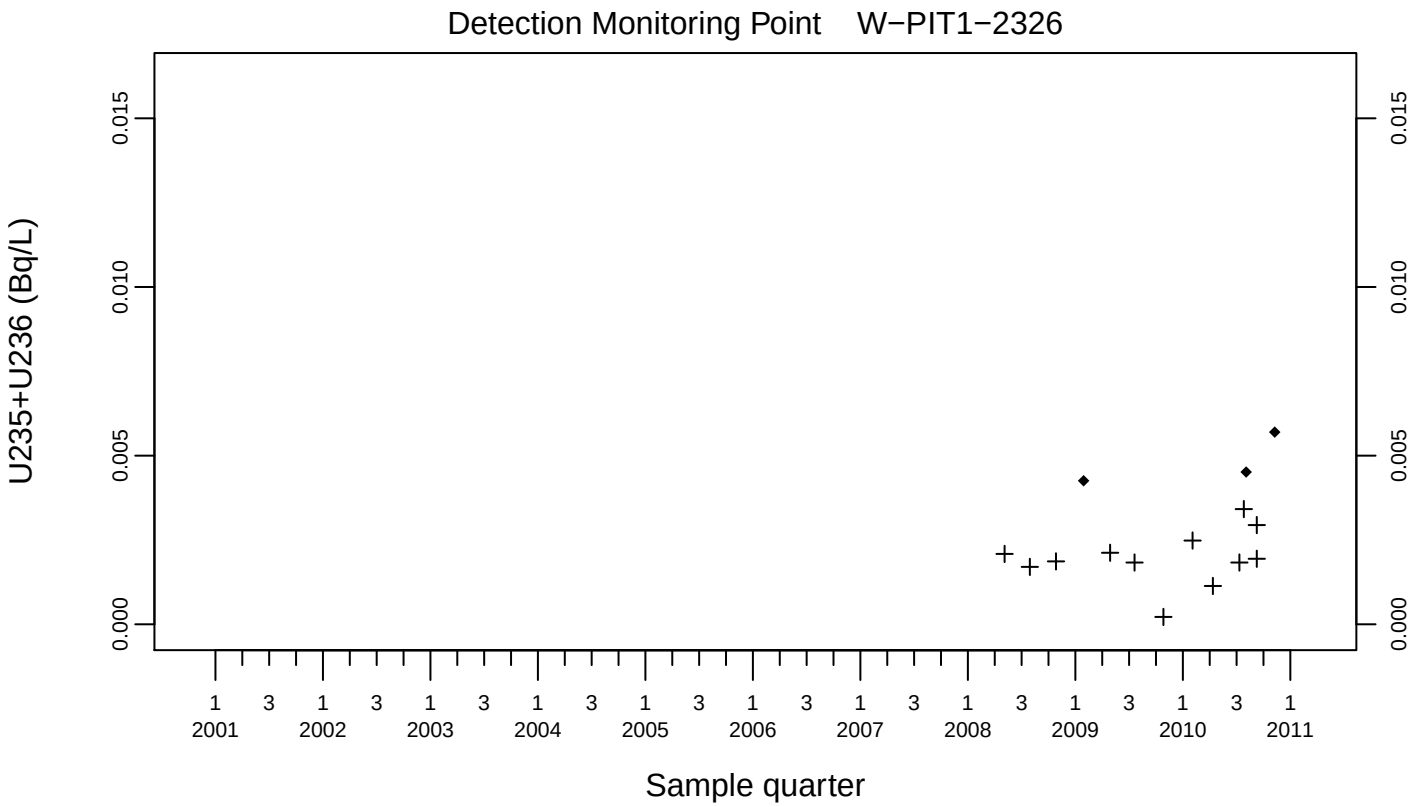

Pit 1 Area
U235+U236 (Bq/L)
Above RL
Estimated
Detection Monitoring Point K1−02B
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

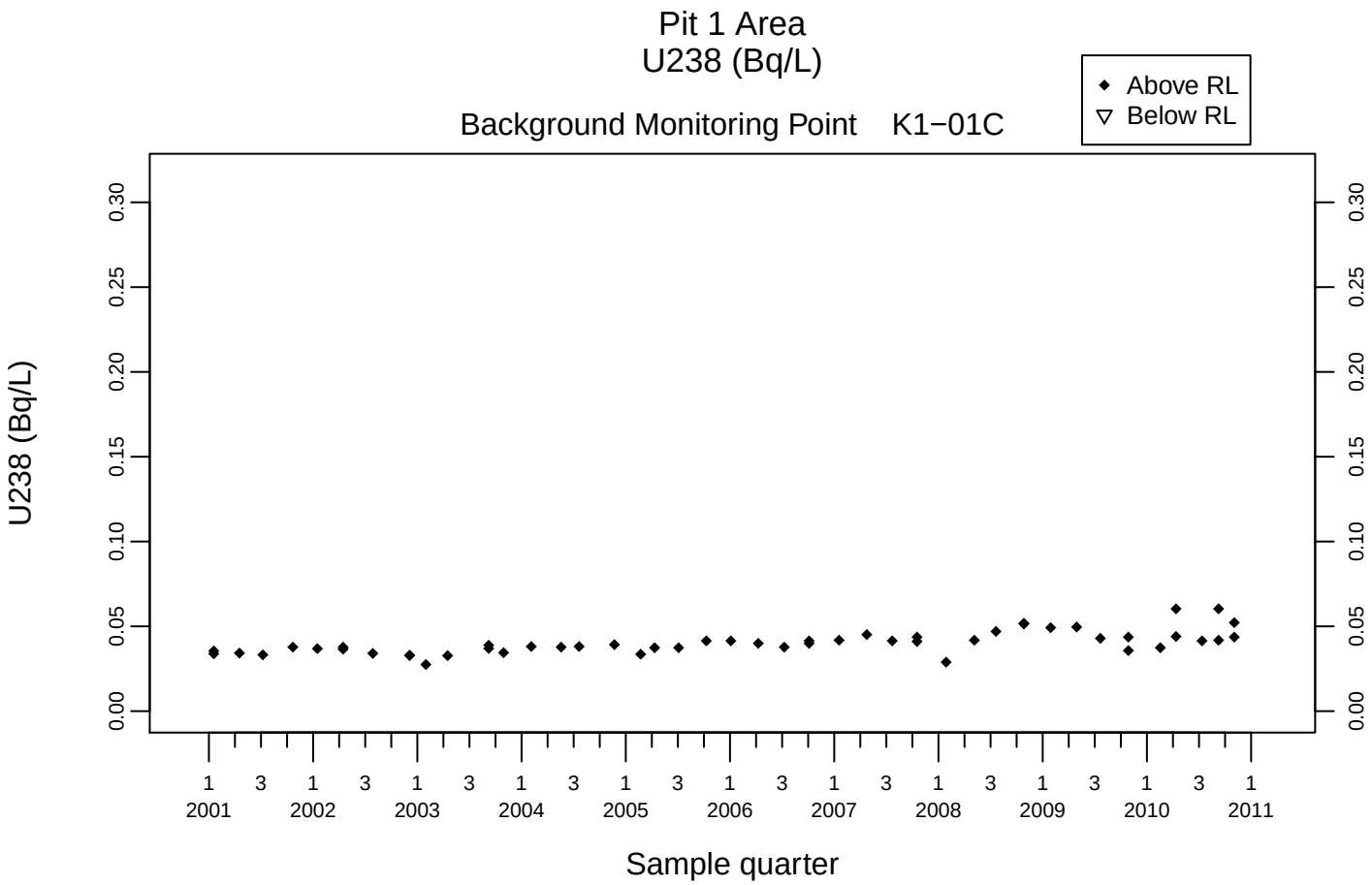

Detection Monitoring Point K1−04
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

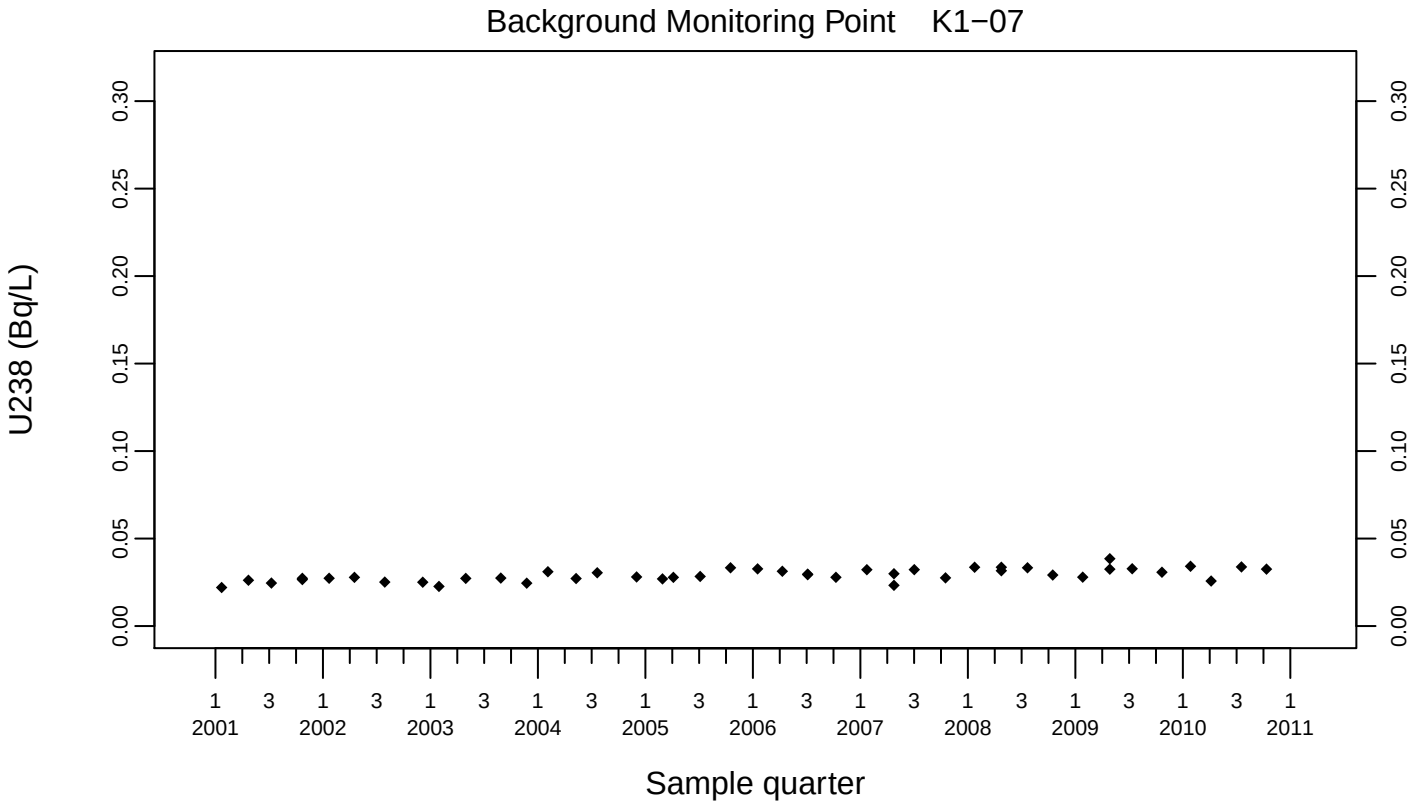

Pit 1 Area
U235+U236 (Bq/L)
Detection Monitoring Point K1−05
Above RL
Estimated
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

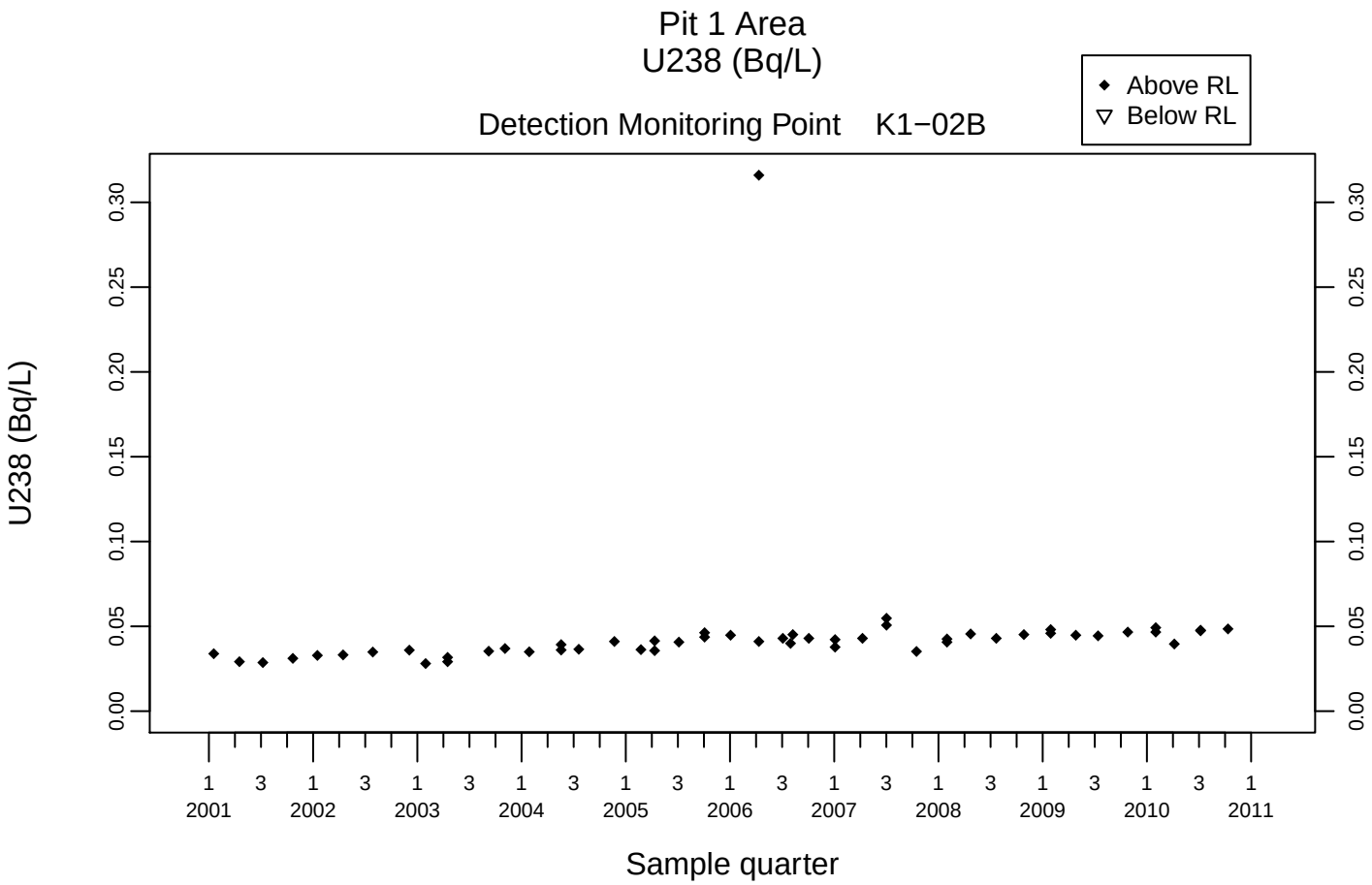

Crossgradient Monitoring Point K1−08
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

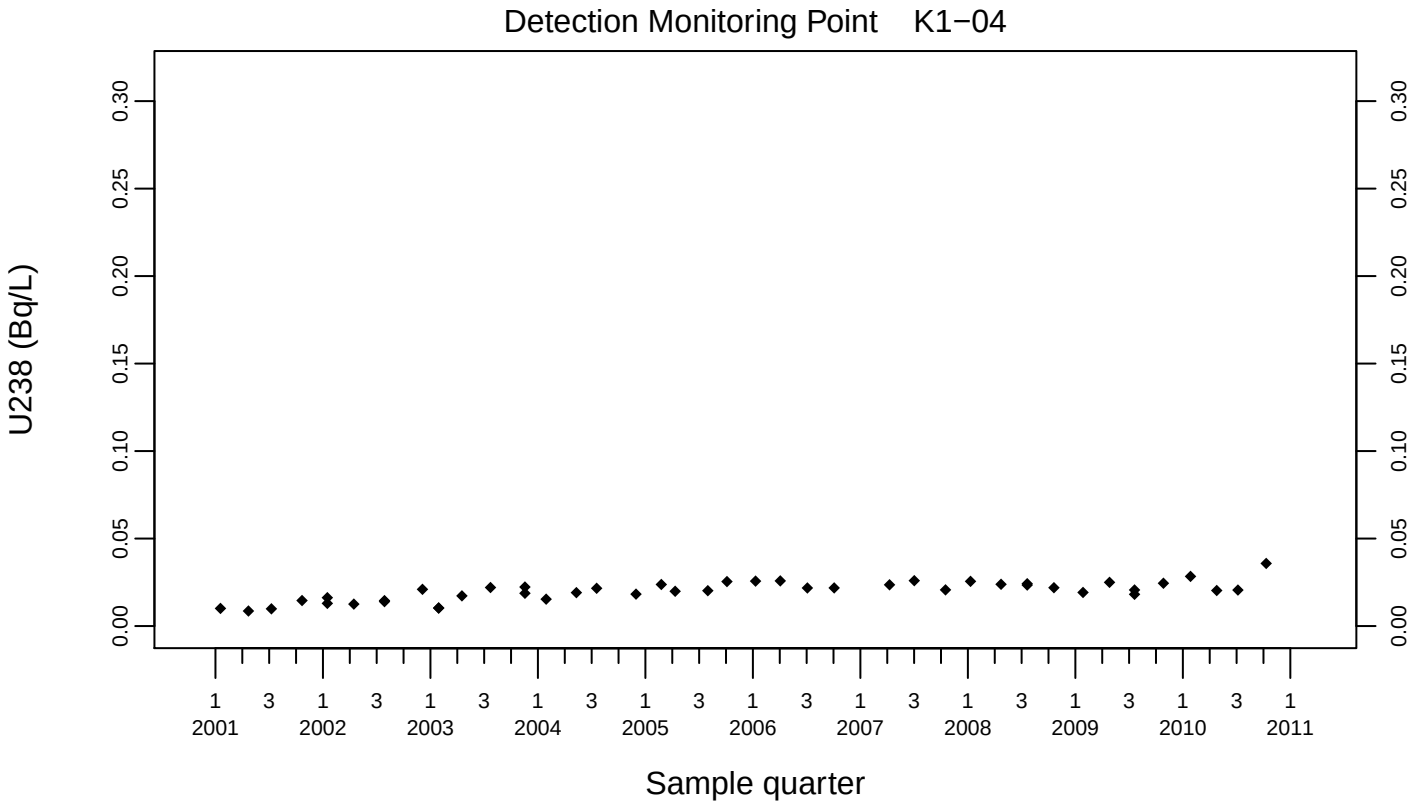

Pit 1 Area
U235+U236 (Bq/L)
Crossgradient Monitoring Point K1−09
Above RL
Estimated
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

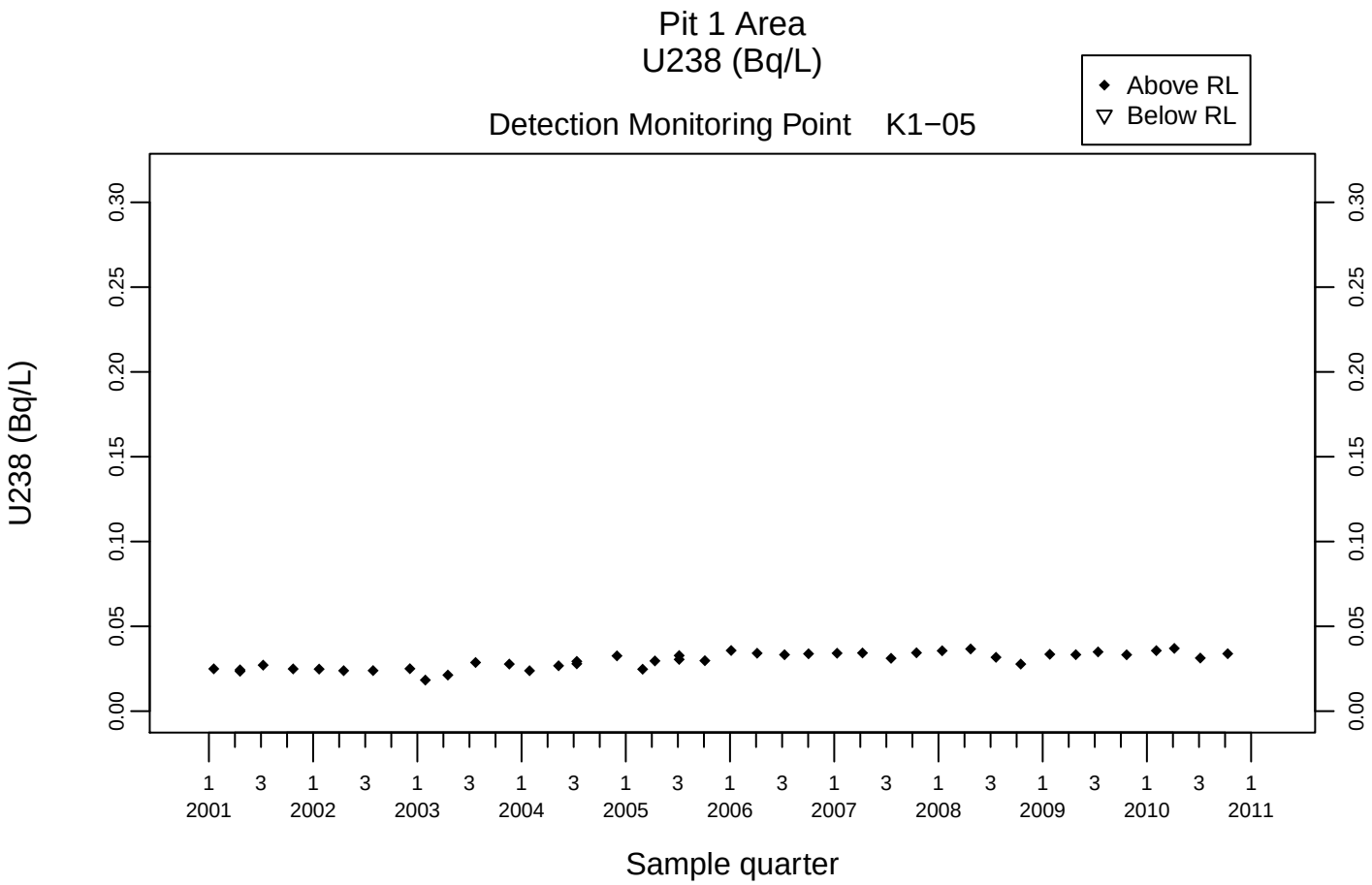

Detection Monitoring Point W−PIT1−2326
U235+U236 (Bq/L)
0.000
0.005
0.010
0.015
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

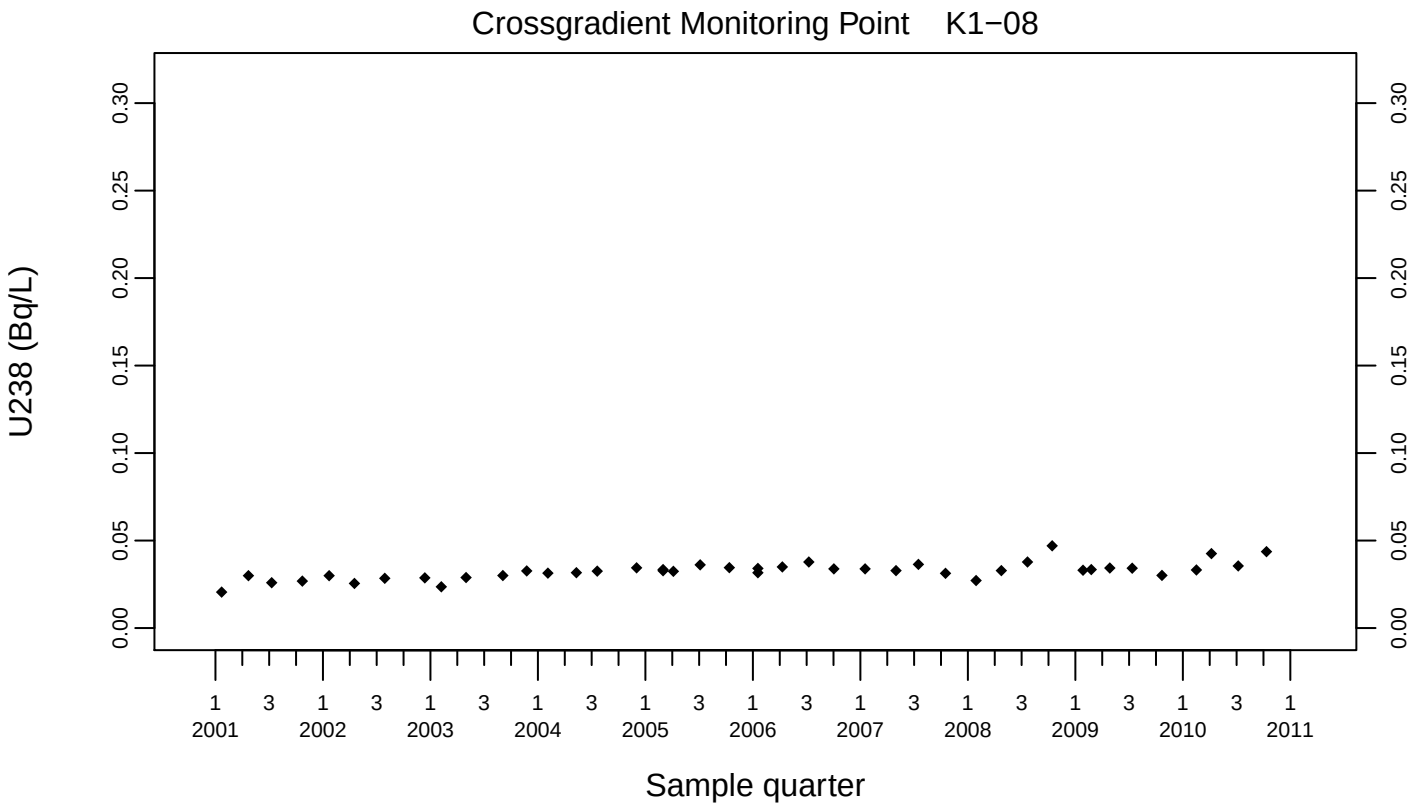

Pit 1 Area
U238 (Bq/L)
Above RL
Below RL
Background Monitoring Point K1−01C
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

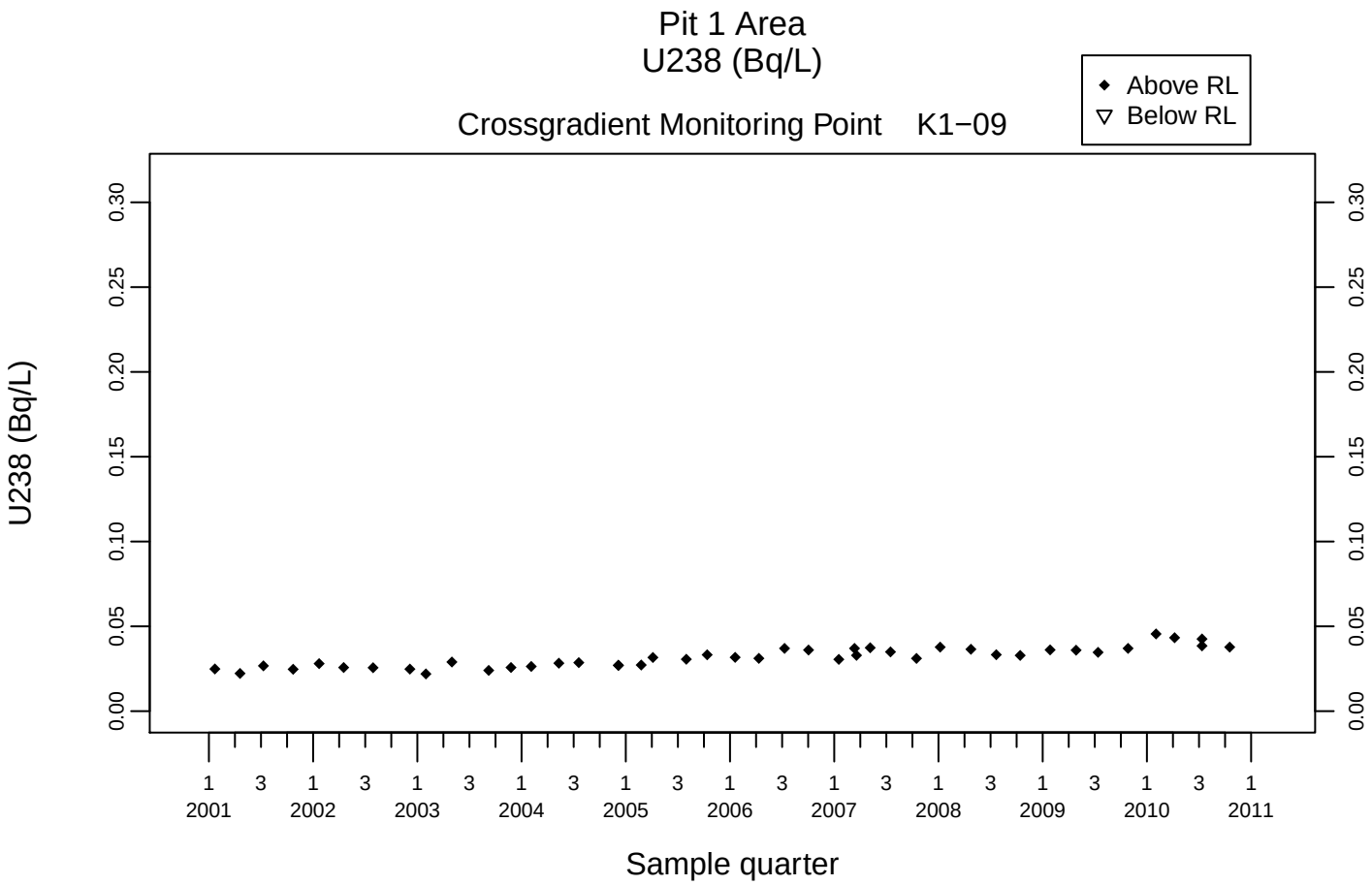

Background Monitoring Point K1−07
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

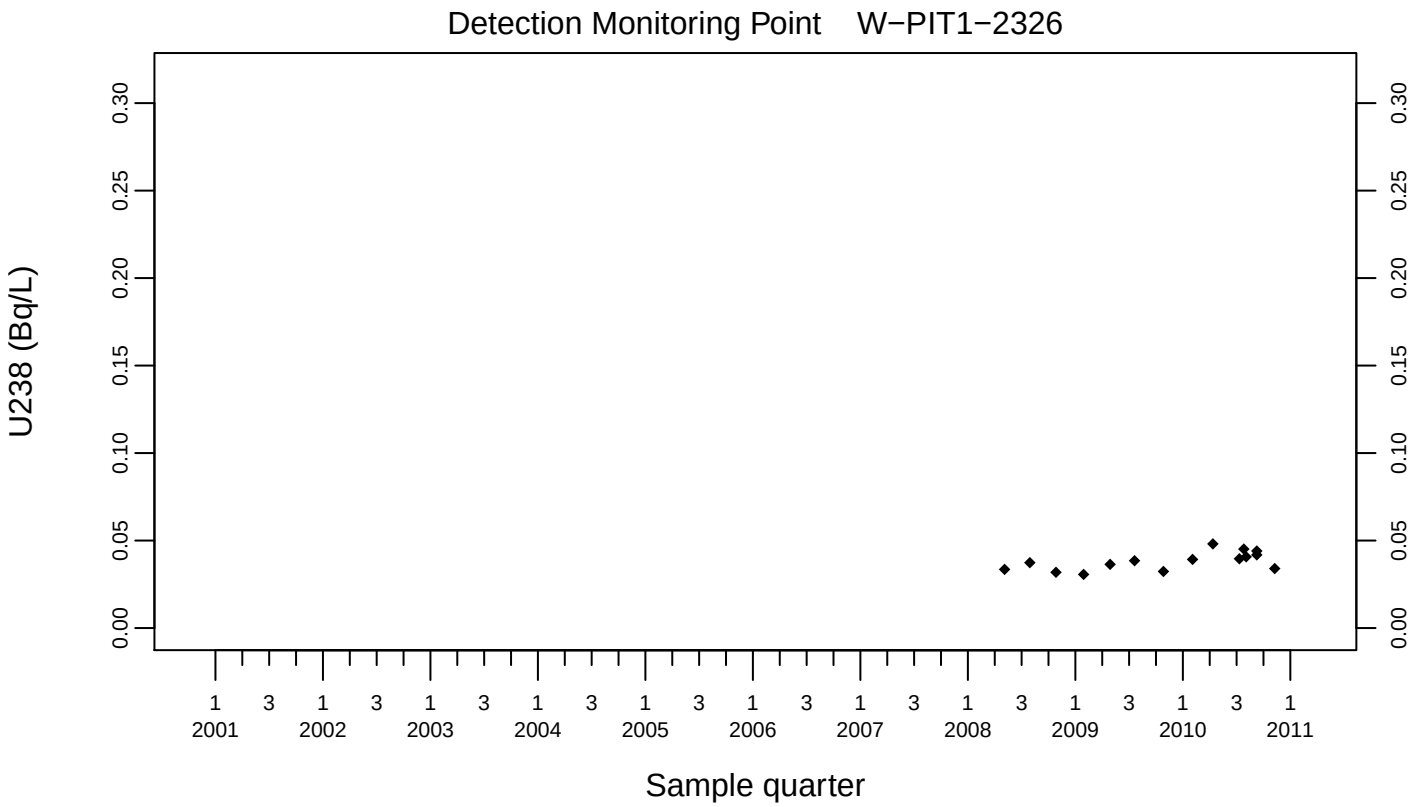

Pit 1 Area
U238 (Bq/L)
Above RL
Below RL
Detection Monitoring Point K1−02B
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

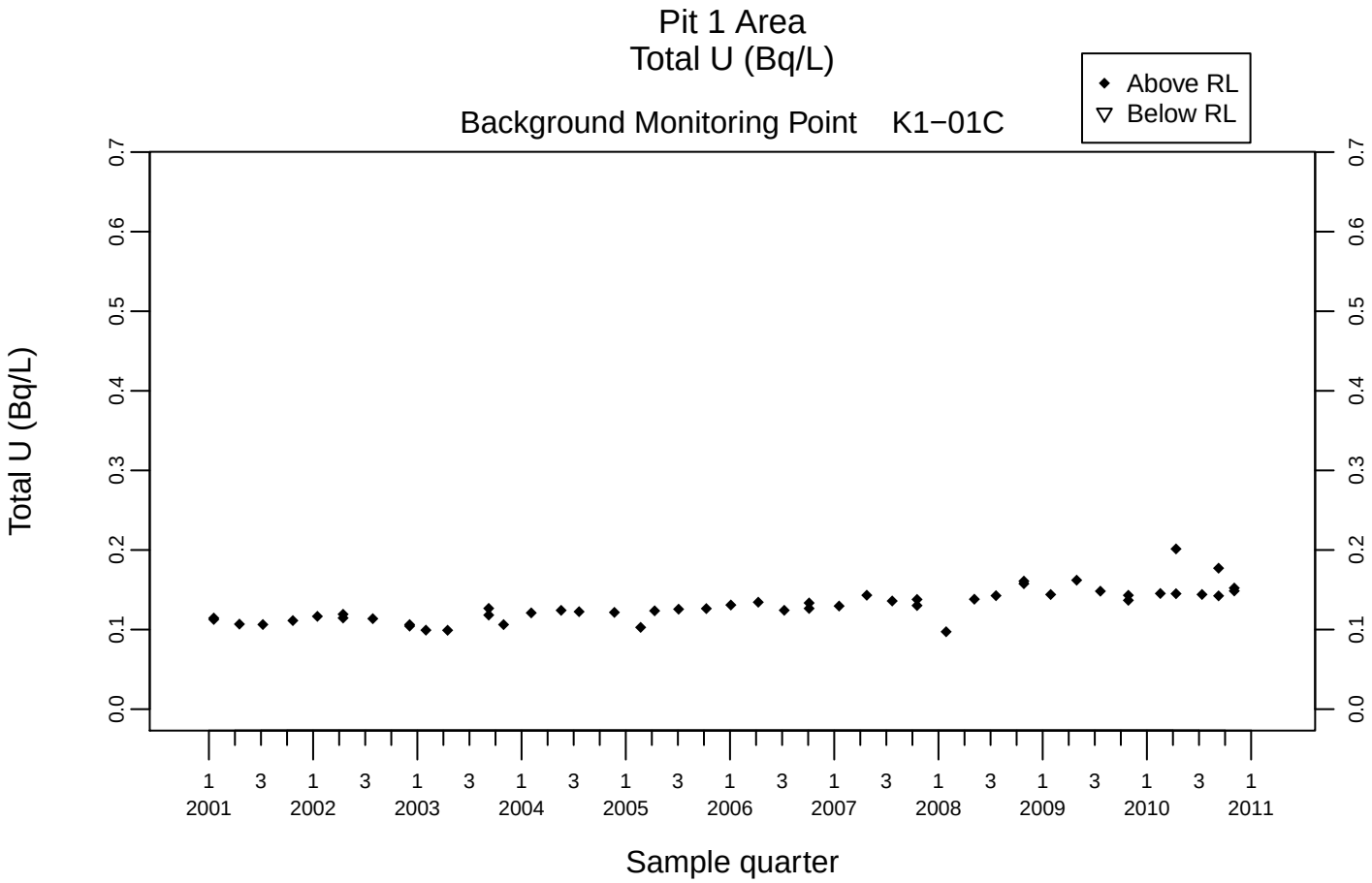

Detection Monitoring Point K1−04
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

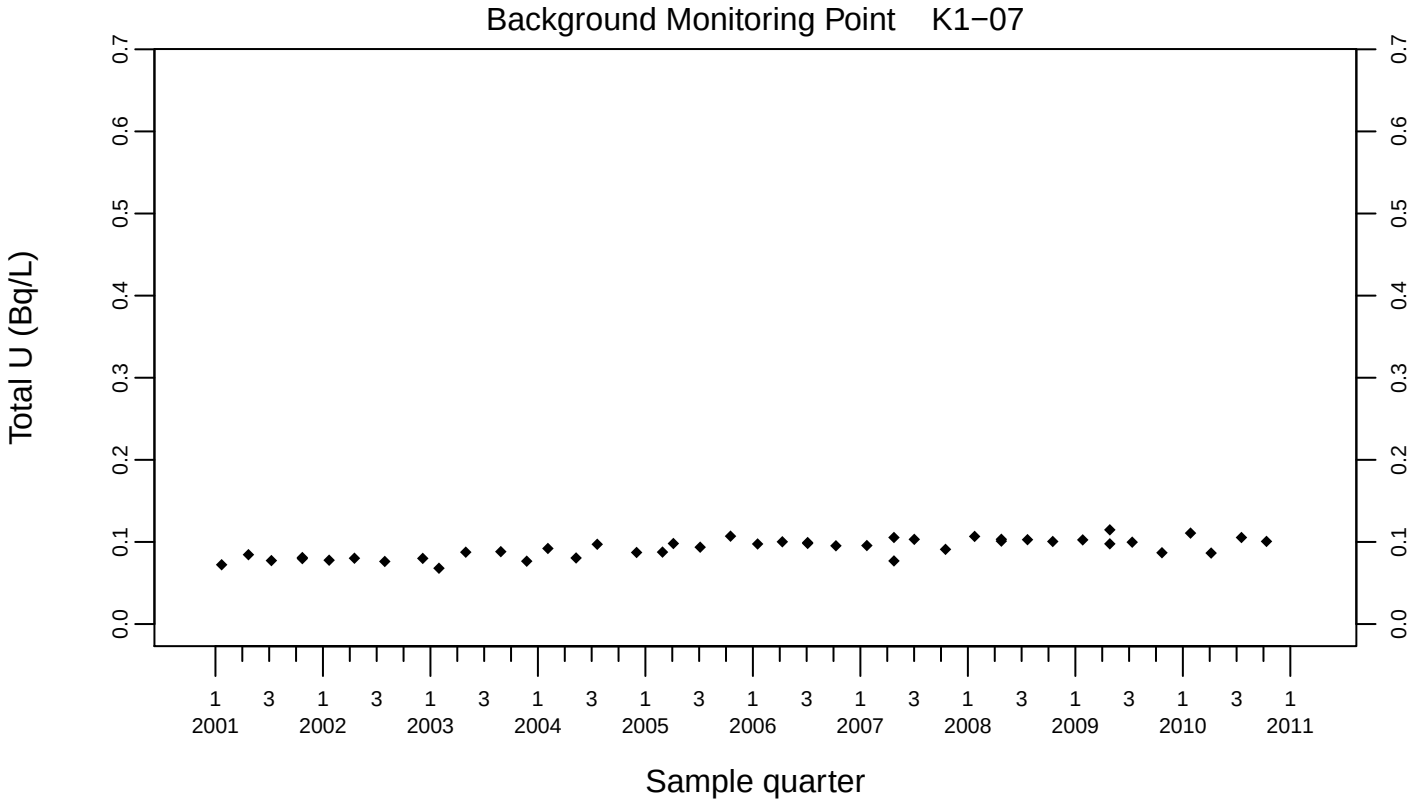

Pit 1 Area
U238 (Bq/L)
Detection Monitoring Point K1−05
Above RL
Below RL
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

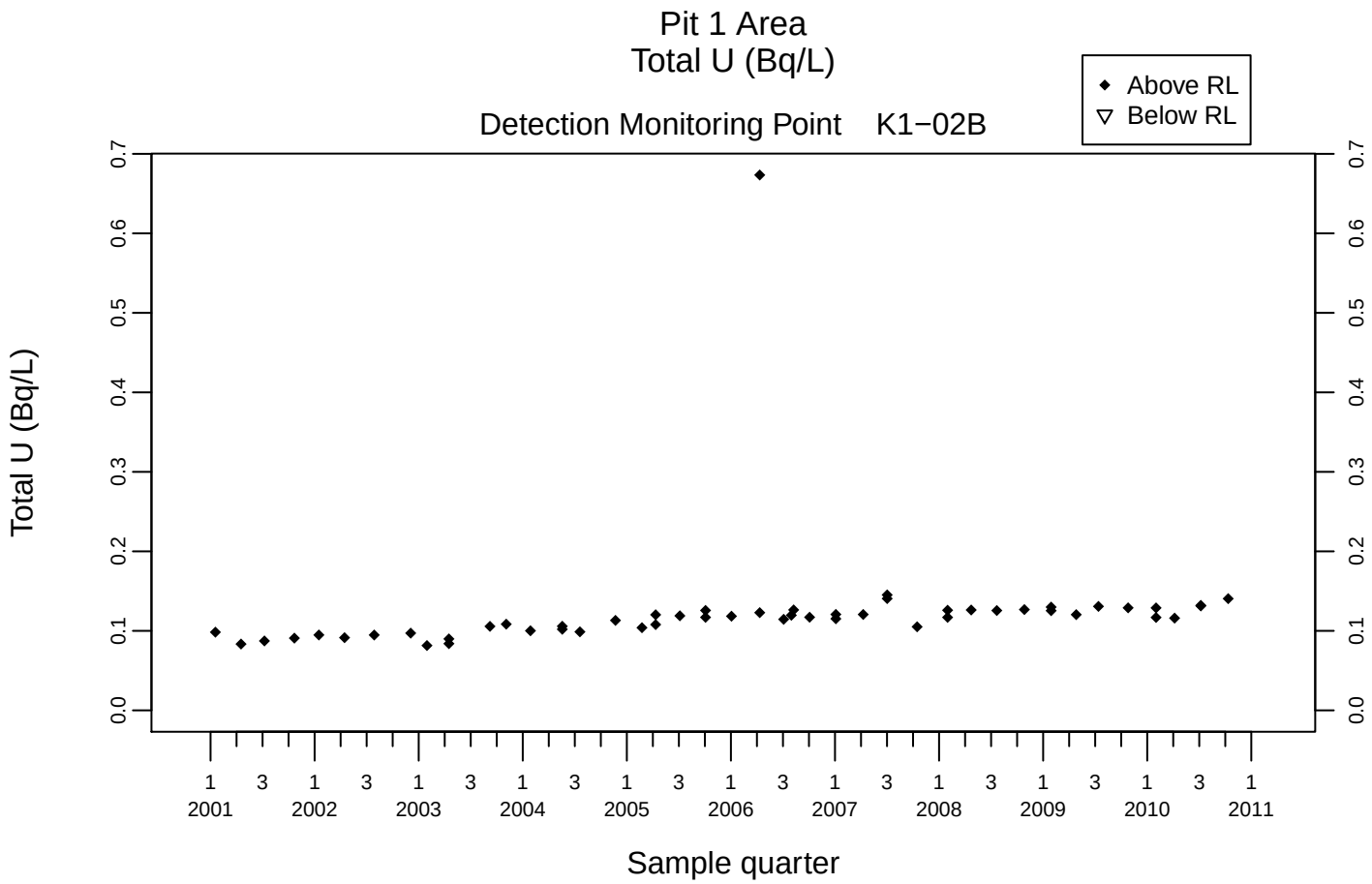

Crossgradient Monitoring Point K1−08
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

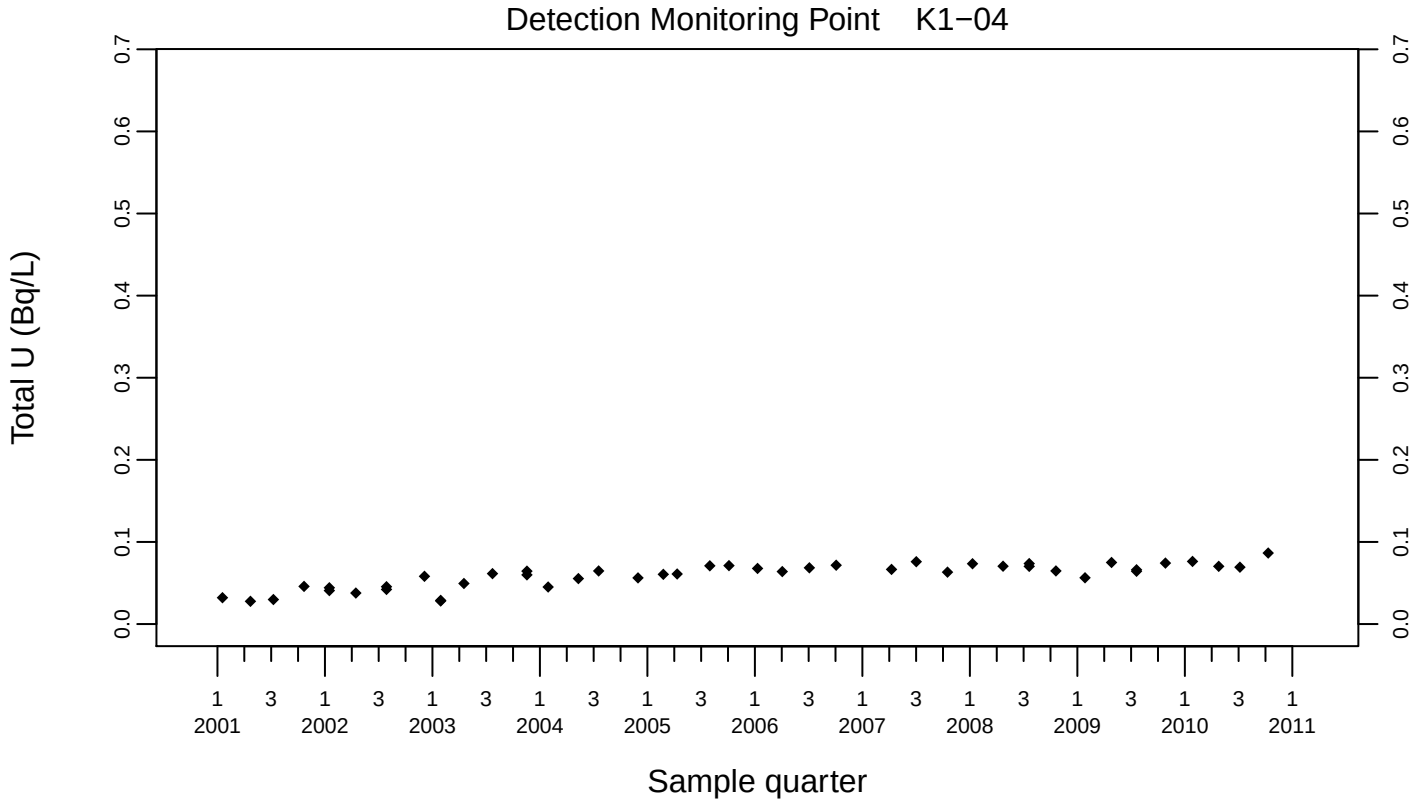

Pit 1 Area
U238 (Bq/L)
Crossgradient Monitoring Point K1−09
Above RL
Below RL
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

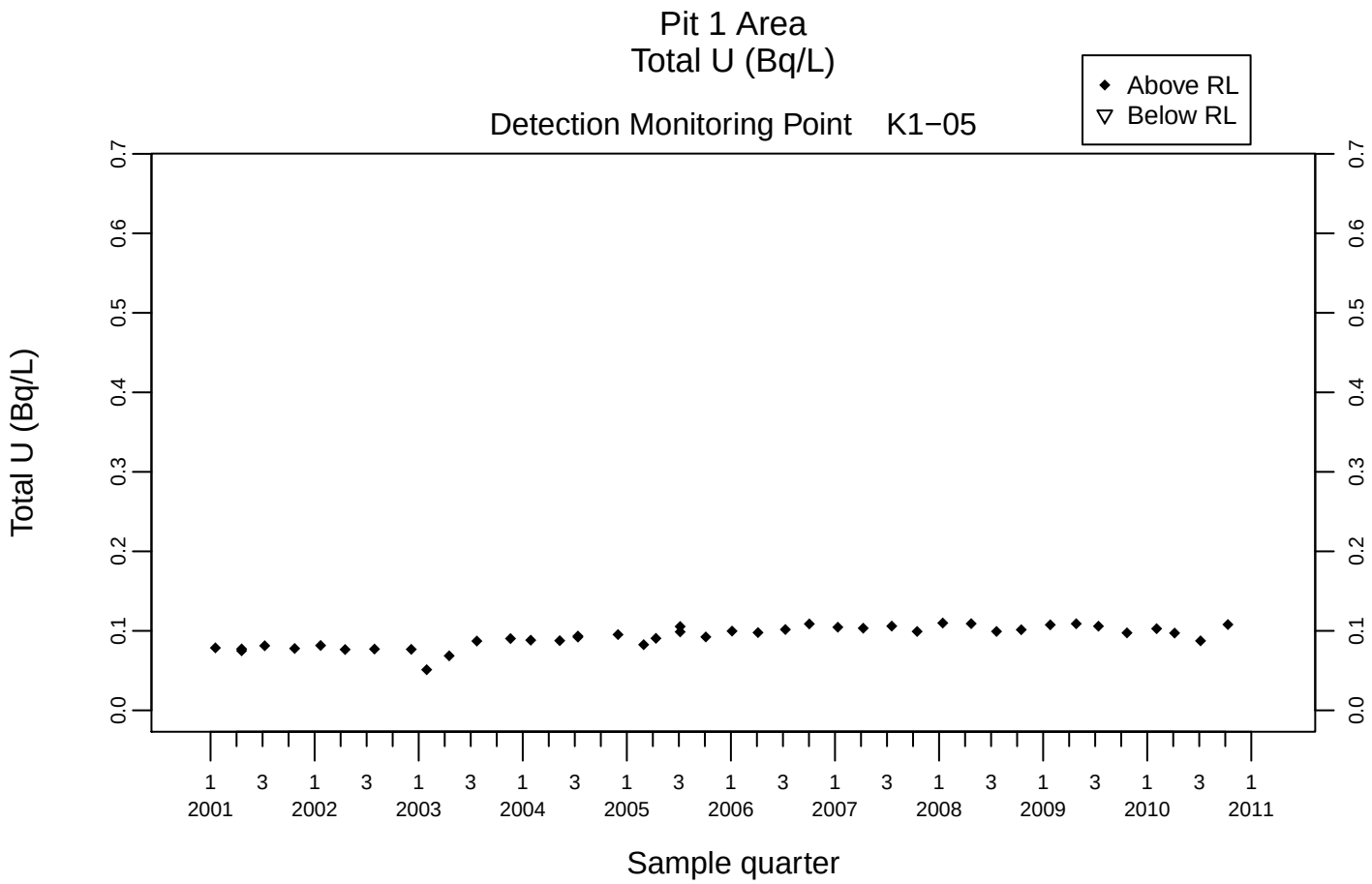

Detection Monitoring Point W−PIT1−2326
U238 (Bq/L)
0.00
0.05
0.10
0.15
0.20
0.25
0.30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

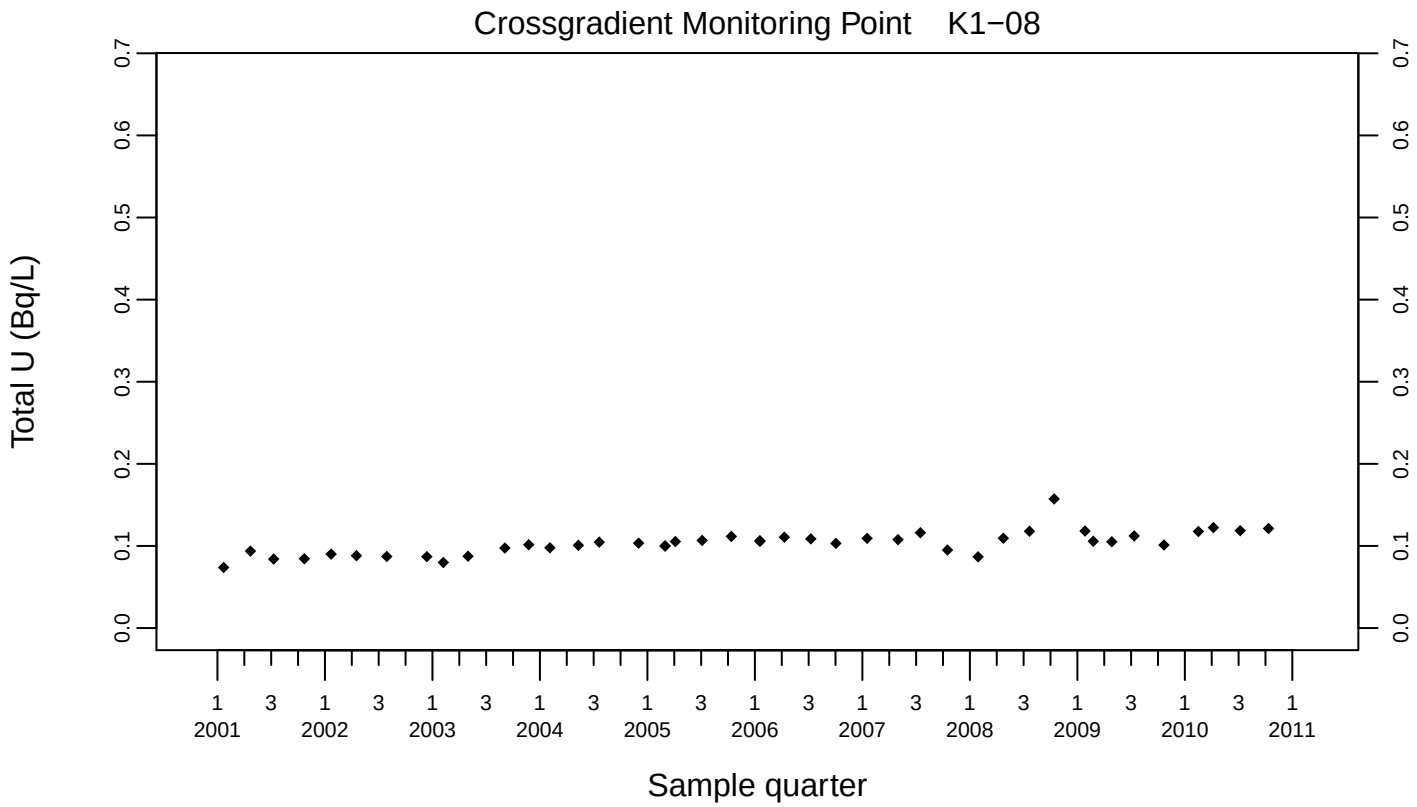

Pit 1 Area
Total U (Bq/L)
Background Monitoring Point K1−01C
Above RL
Below RL
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

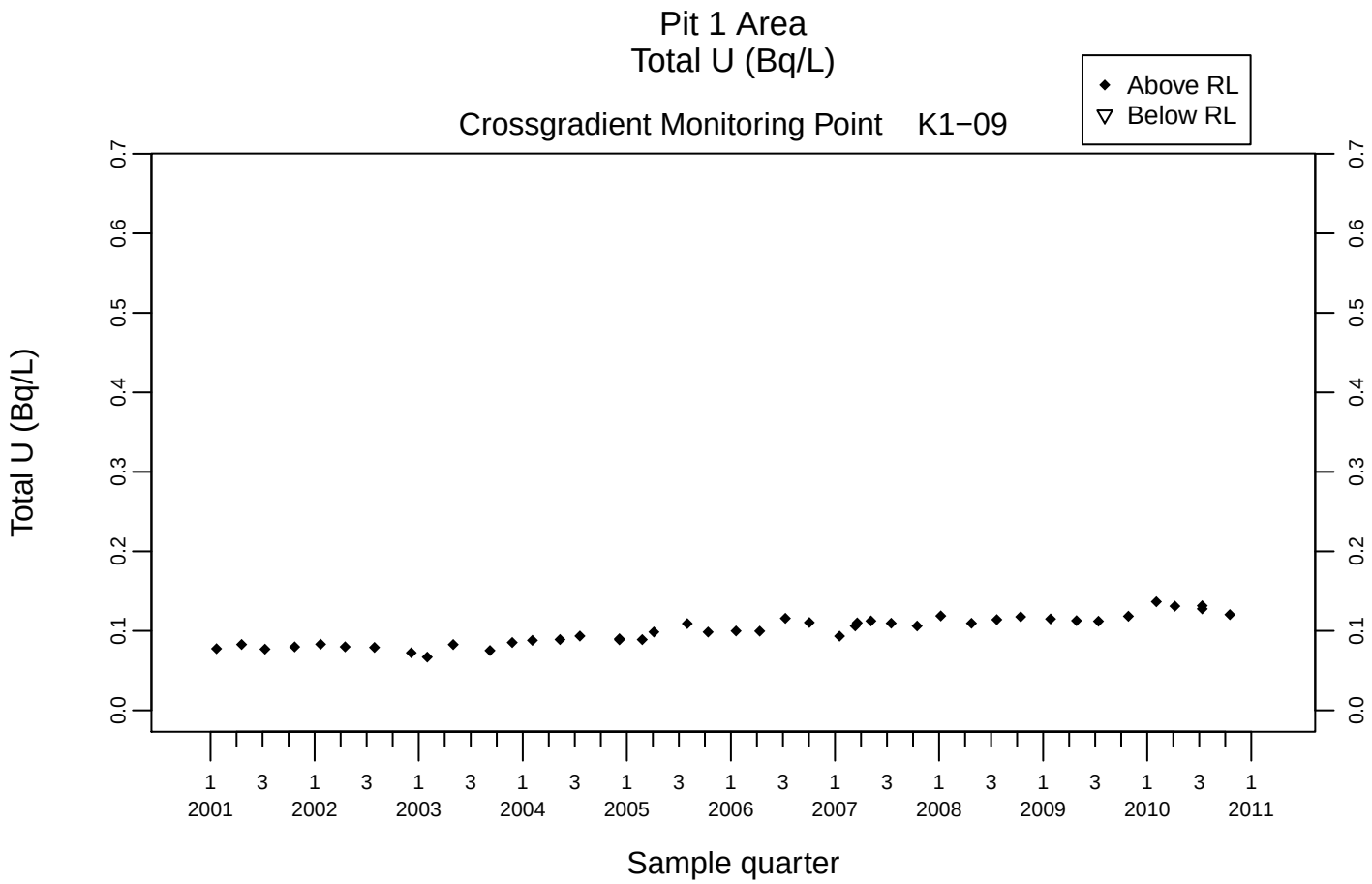

Background Monitoring Point K1−07
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

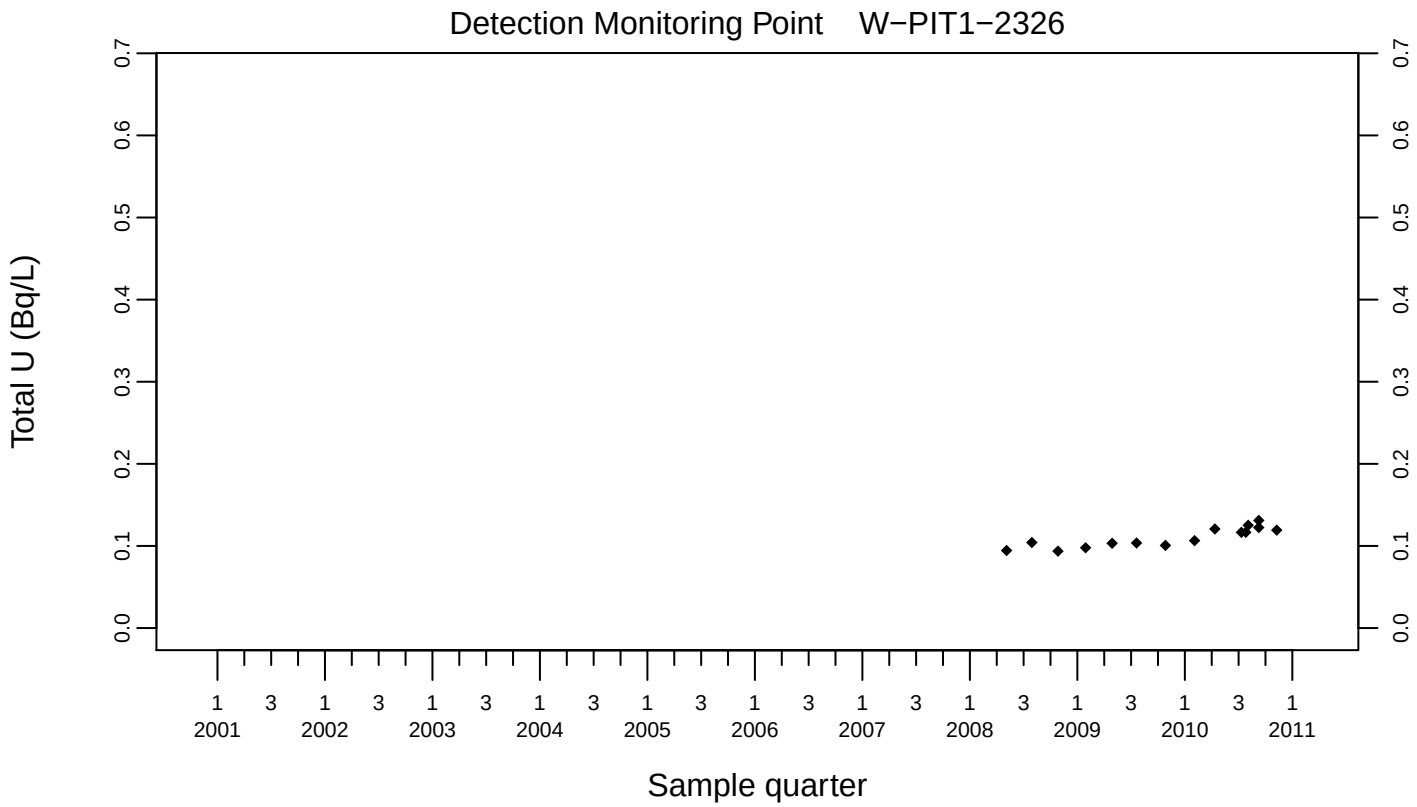

Pit 1 Area
Total U (Bq/L)
Detection Monitoring Point K1−02B
Above RL
Below RL
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

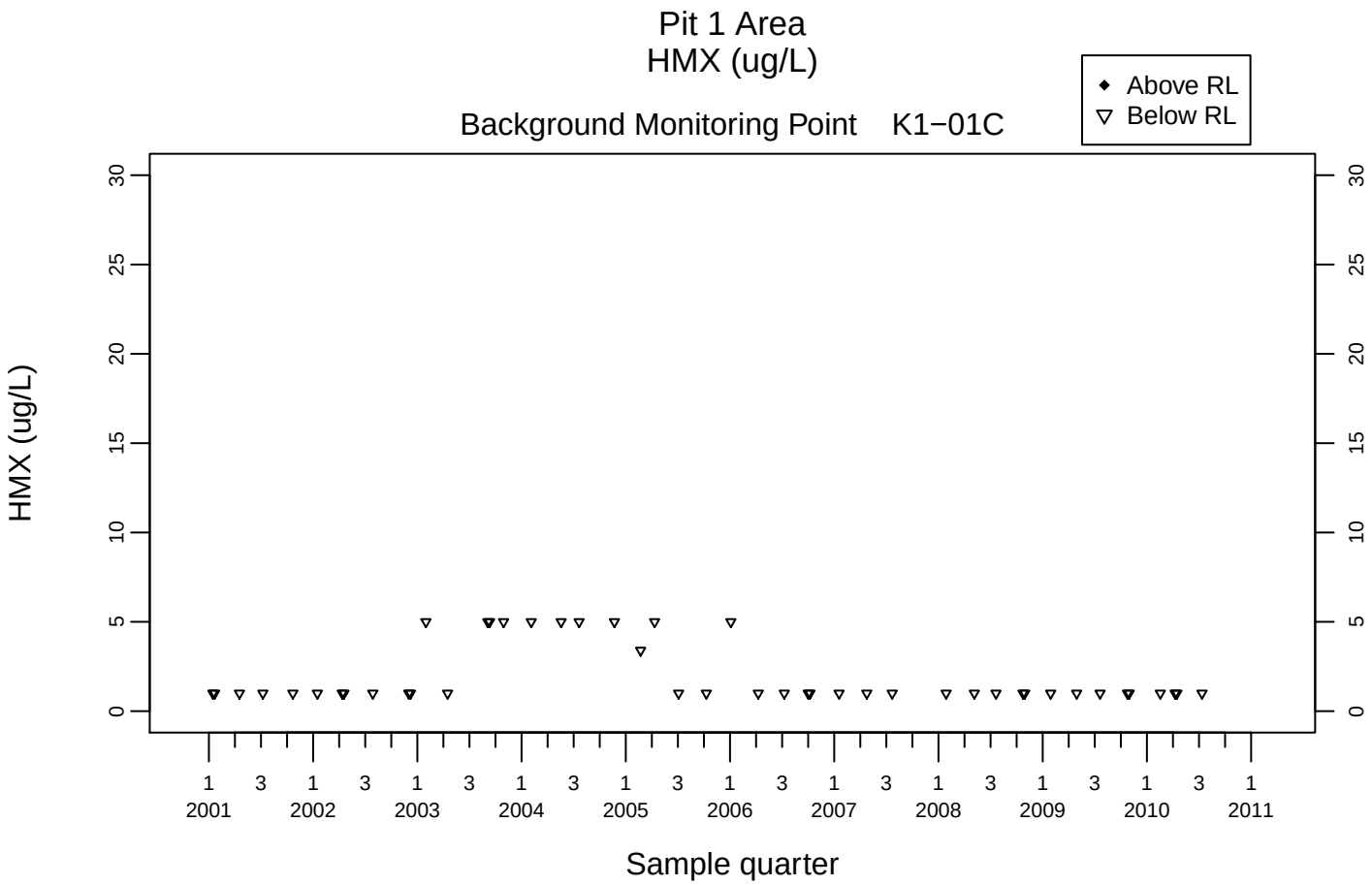

Detection Monitoring Point K1−04
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

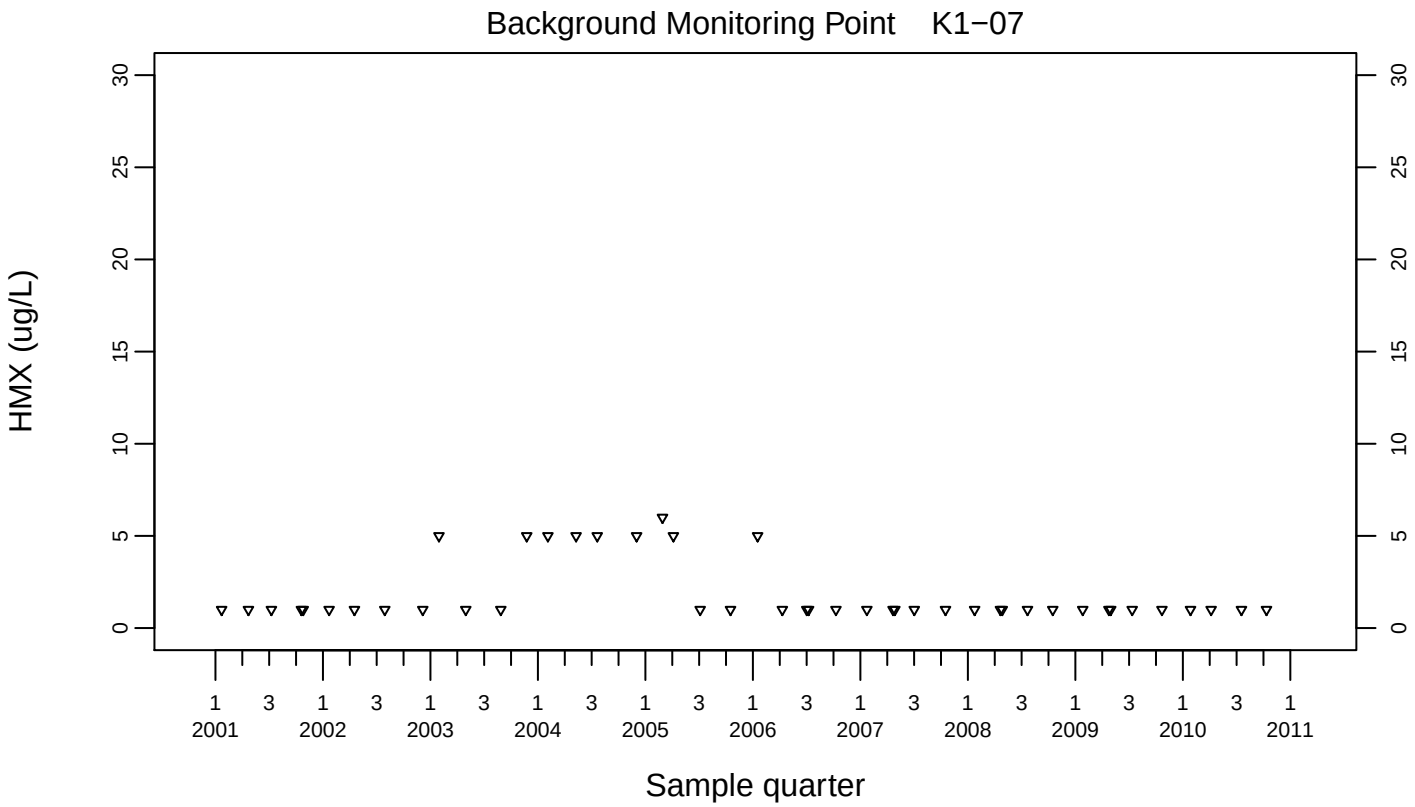

Pit 1 Area
Total U (Bq/L)
Detection Monitoring Point K1−05
Above RL
Below RL
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

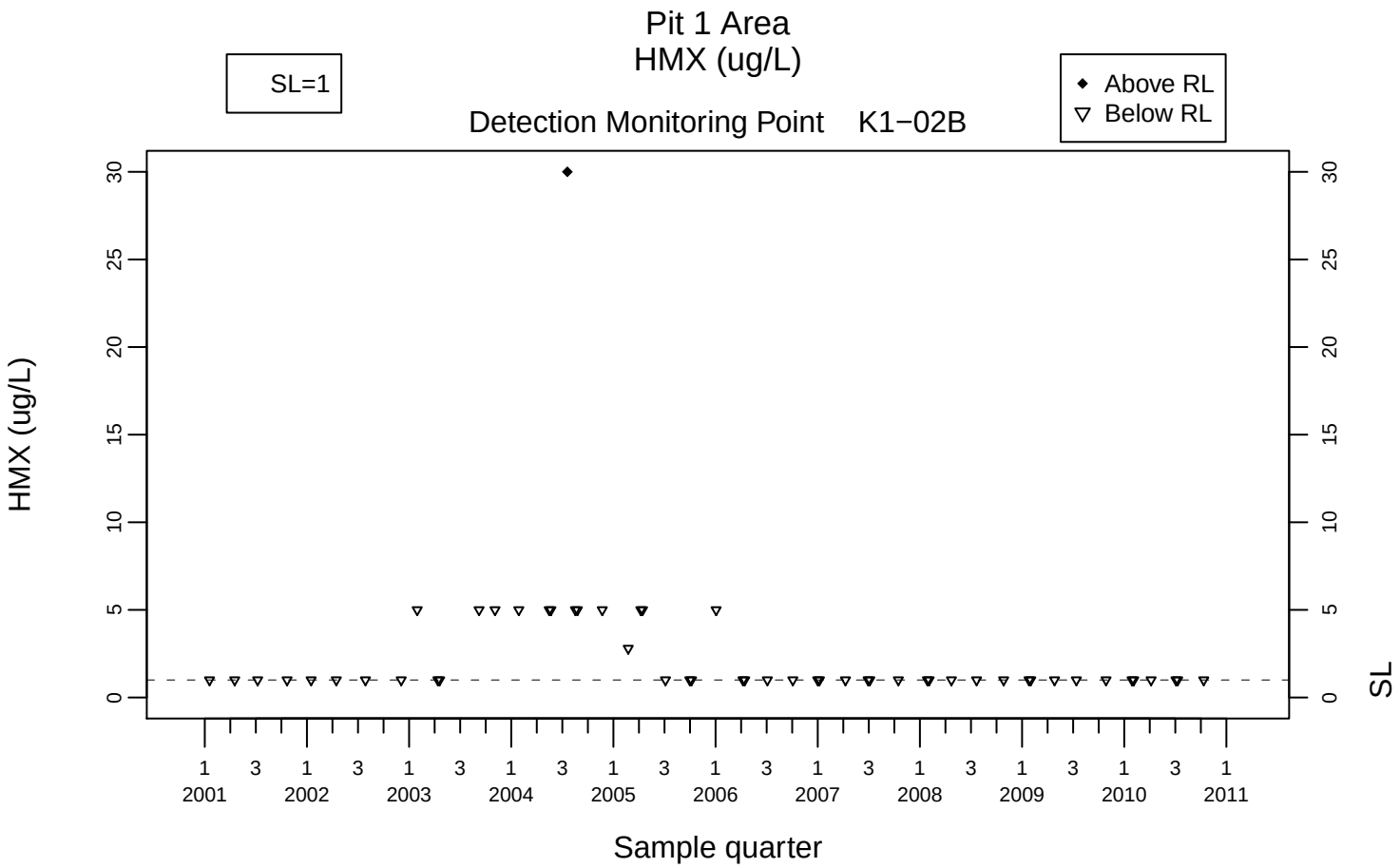

Crossgradient Monitoring Point K1−08
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

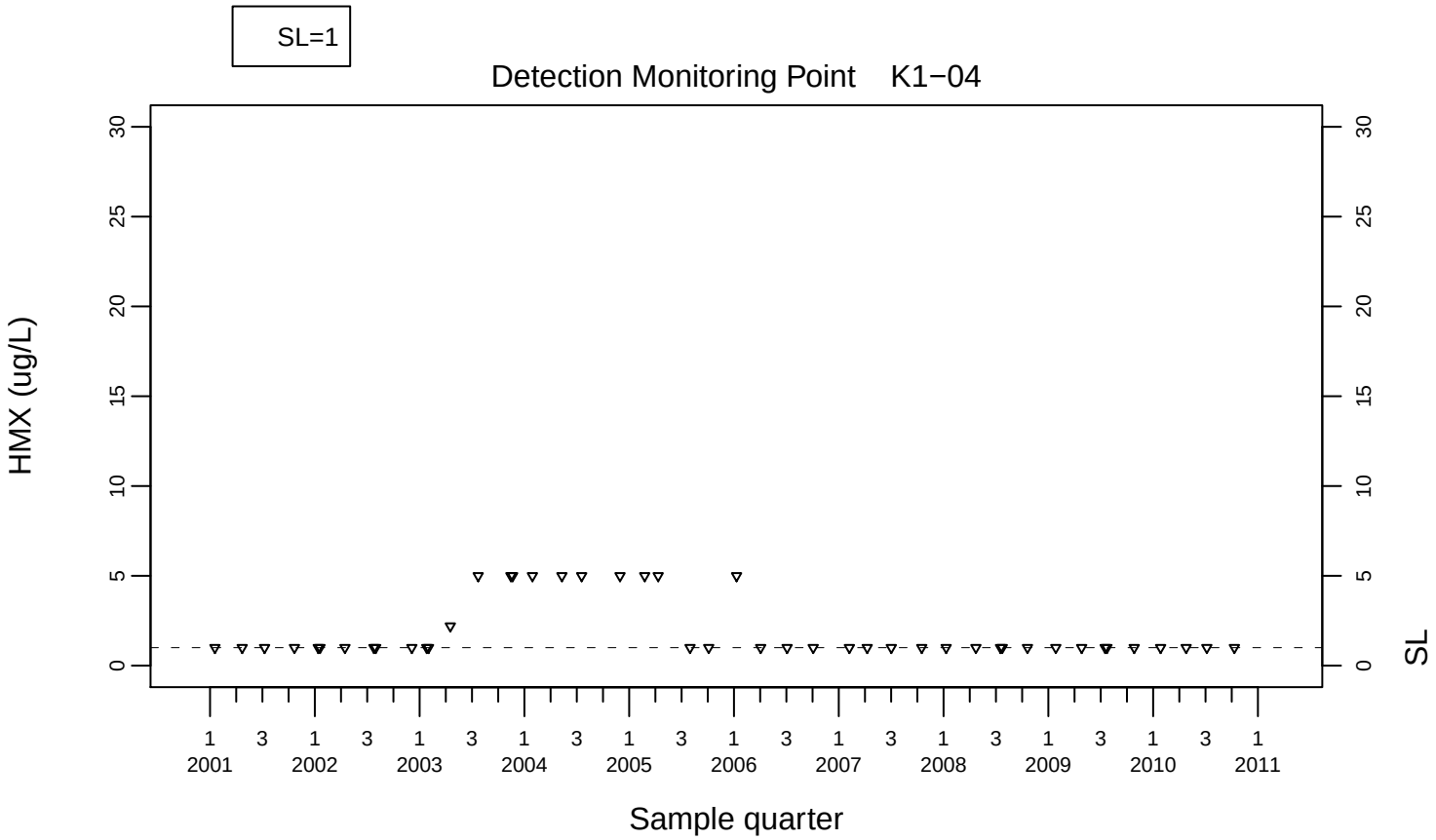

Pit 1 Area
Total U (Bq/L)
Crossgradient Monitoring Point K1−09
Above RL
Below RL
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

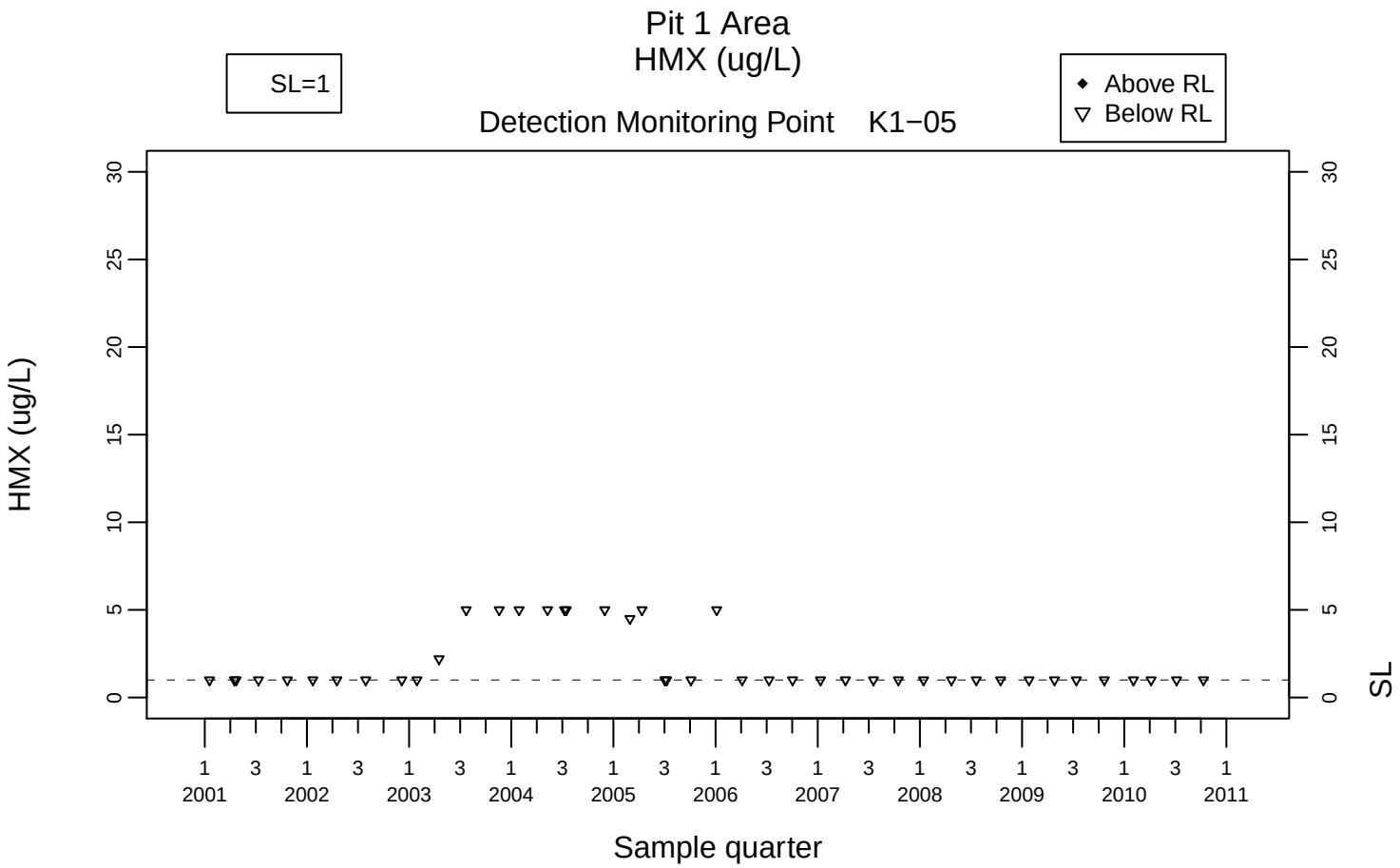

Detection Monitoring Point W−PIT1−2326
Total U (Bq/L)
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

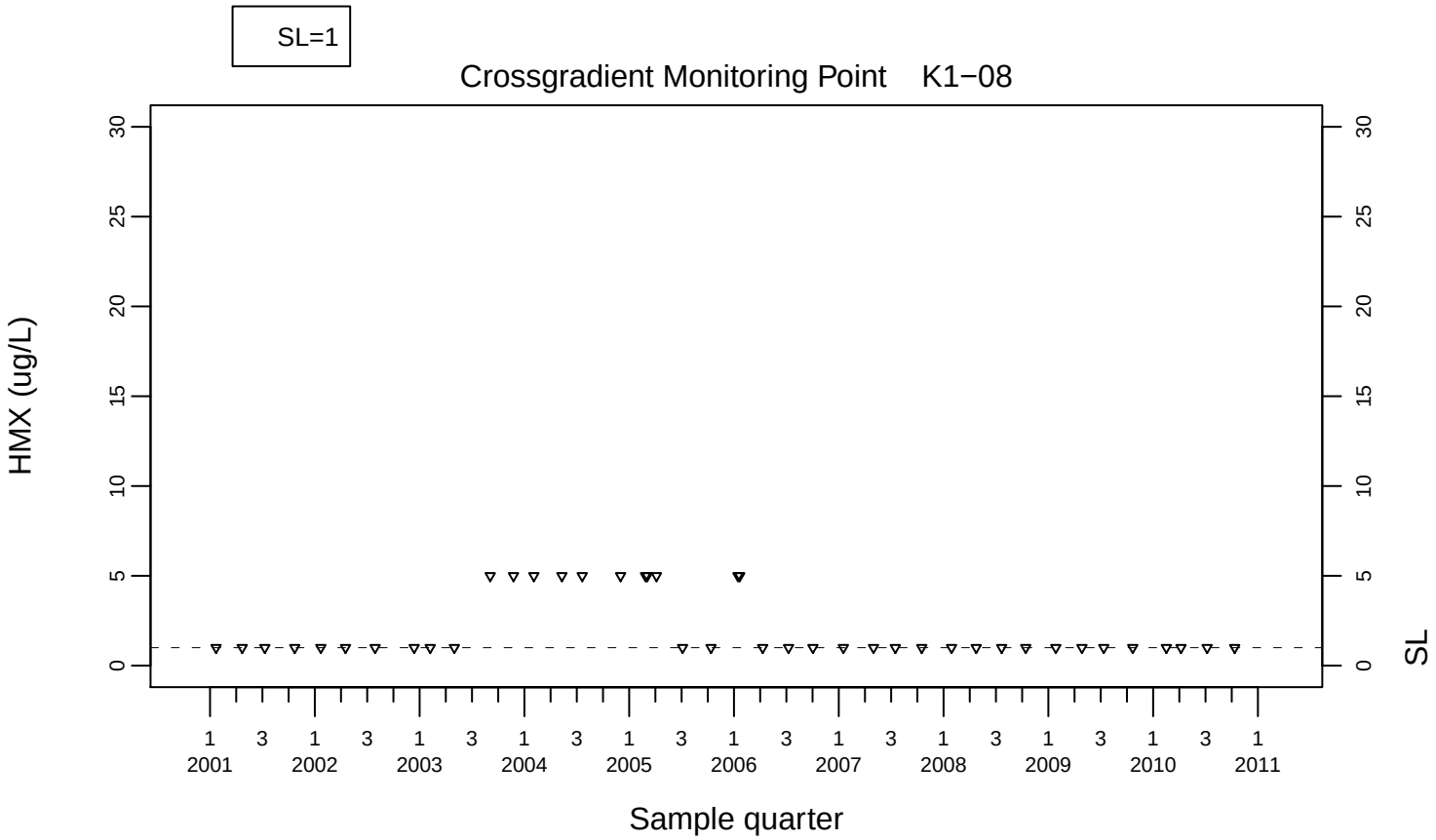

Pit 1 Area
HMX (ug/L)
Background Monitoring Point K1−01C
Above RL
Below RL
HMX (ug/L)
0
5
10
15
20
25
30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

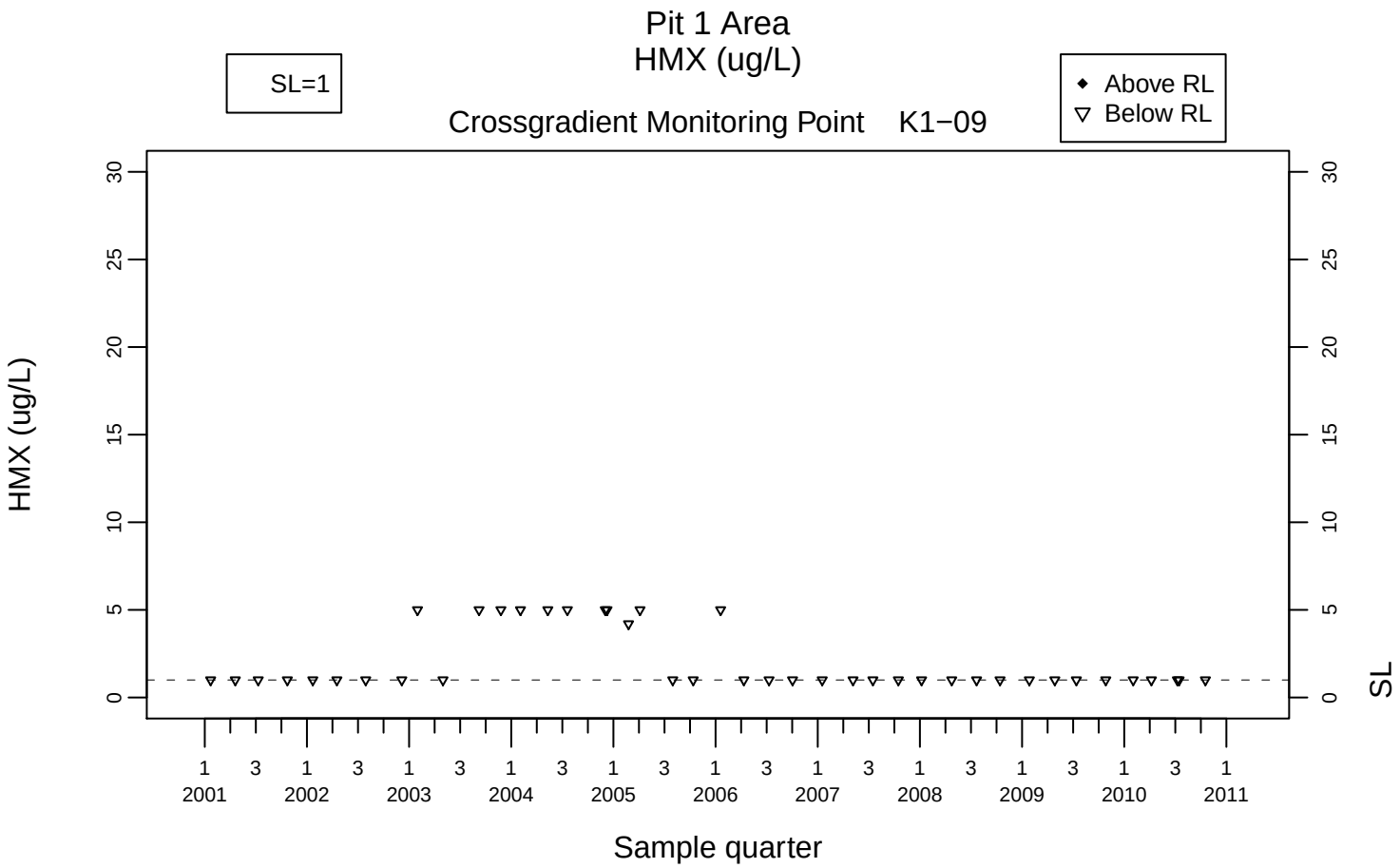

Background Monitoring Point K1−07
HMX (ug/L)
0
5
10
15
20
25
30
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

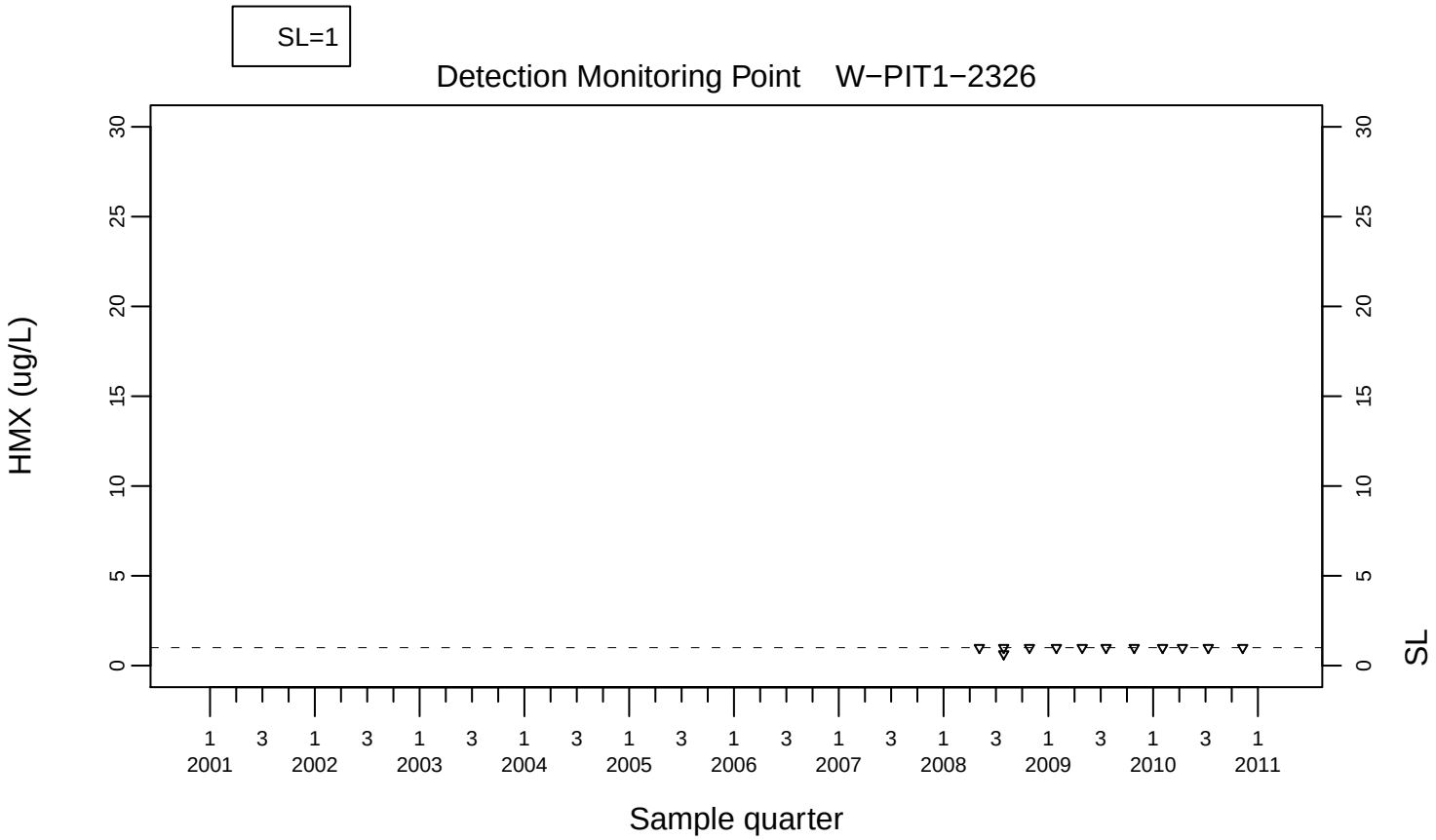

Pit 1 Area
HMX (ug/L)
SL=1
Above RL
Below RL
Detection Monitoring Point K1−02B
HMX (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

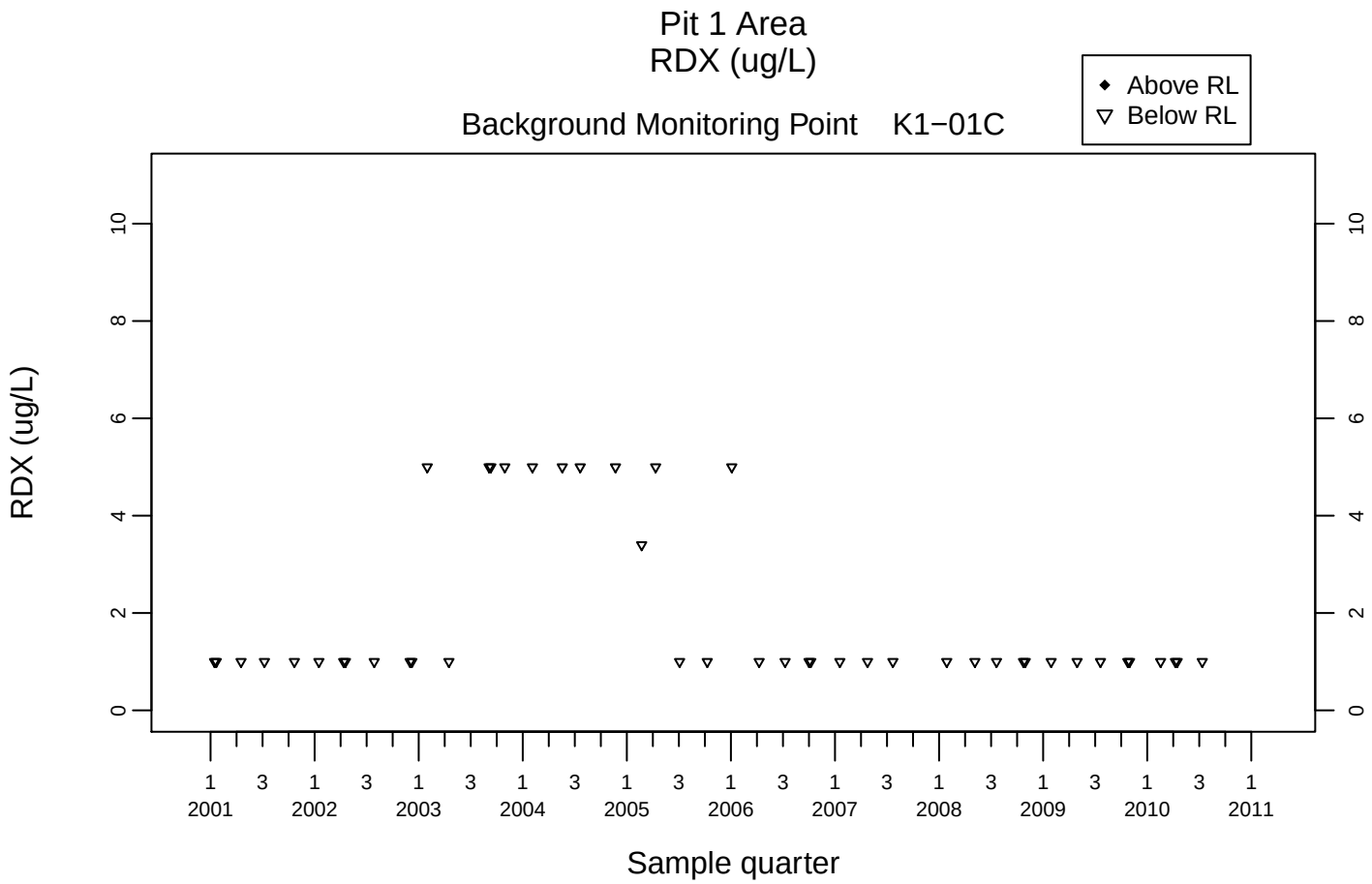

SL=1
Detection Monitoring Point K1−04
HMX (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

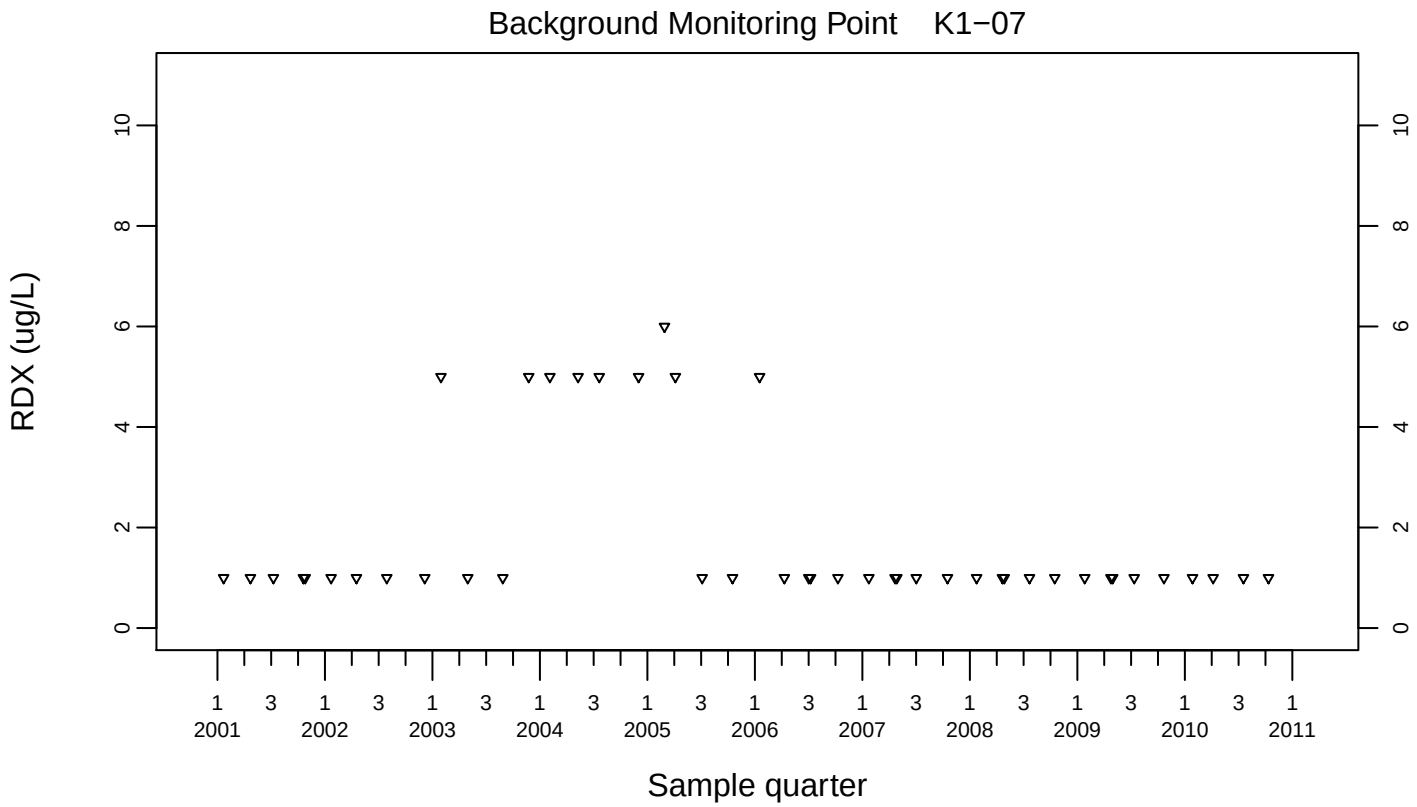

Pit 1 Area
HMX (ug/L)
SL=1
Above RL
Below RL
Detection Monitoring Point K1−05
HMX (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

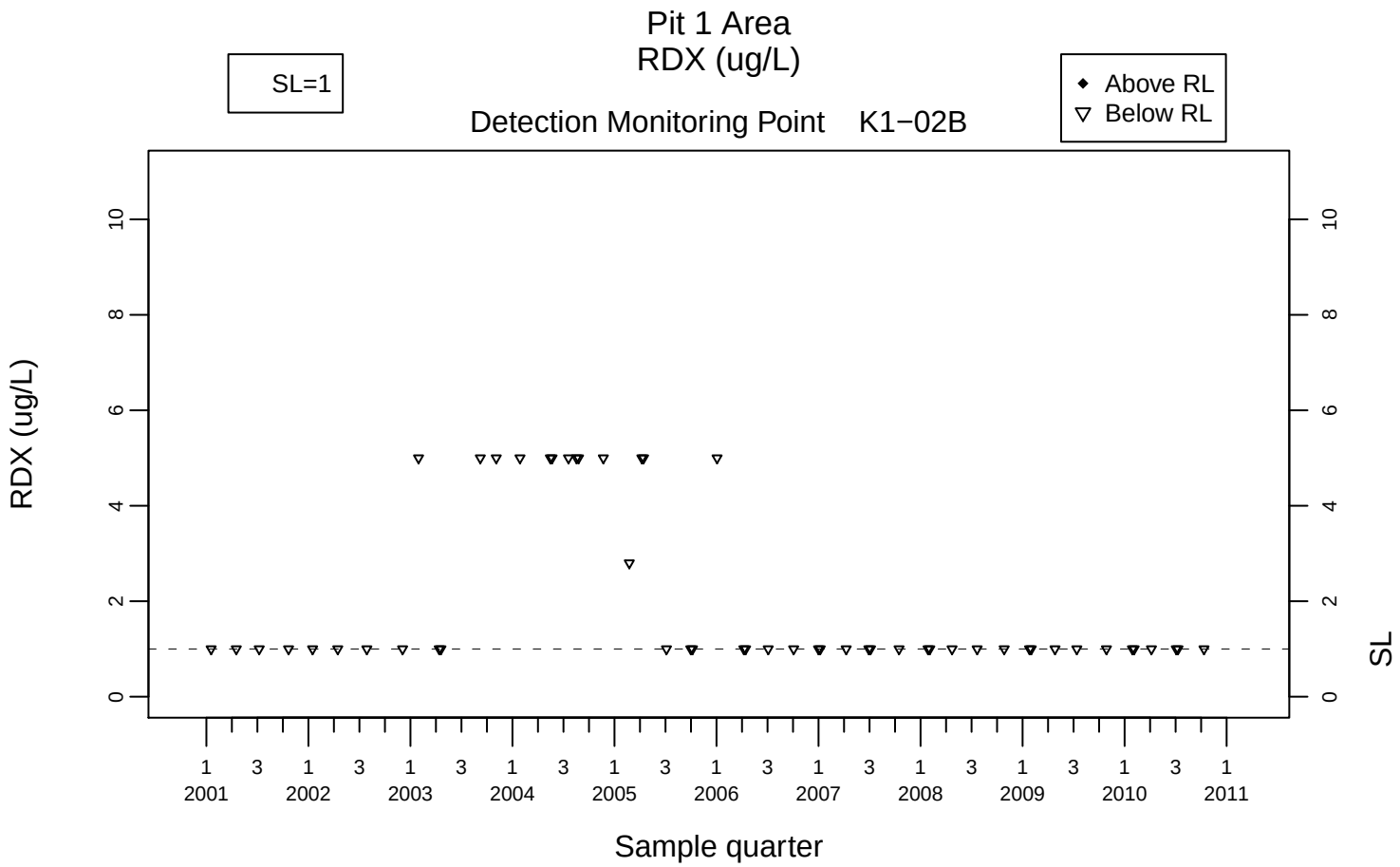

SL=1
Crossgradient Monitoring Point K1−08
HMX (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

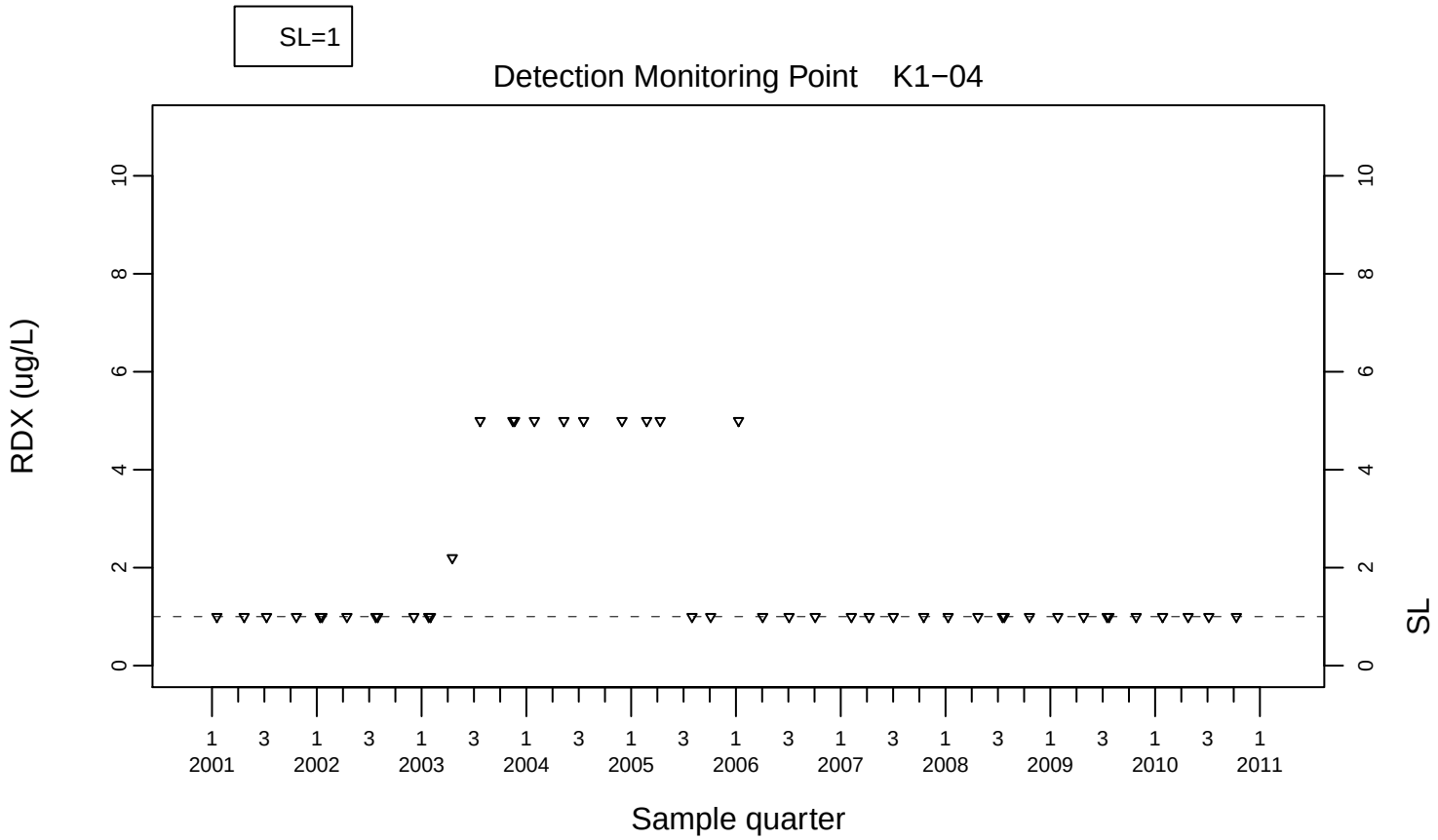

Pit 1 Area
HMX (ug/L)
SL=1
Above RL
Below RL
Crossgradient Monitoring Point K1−09
HMX (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

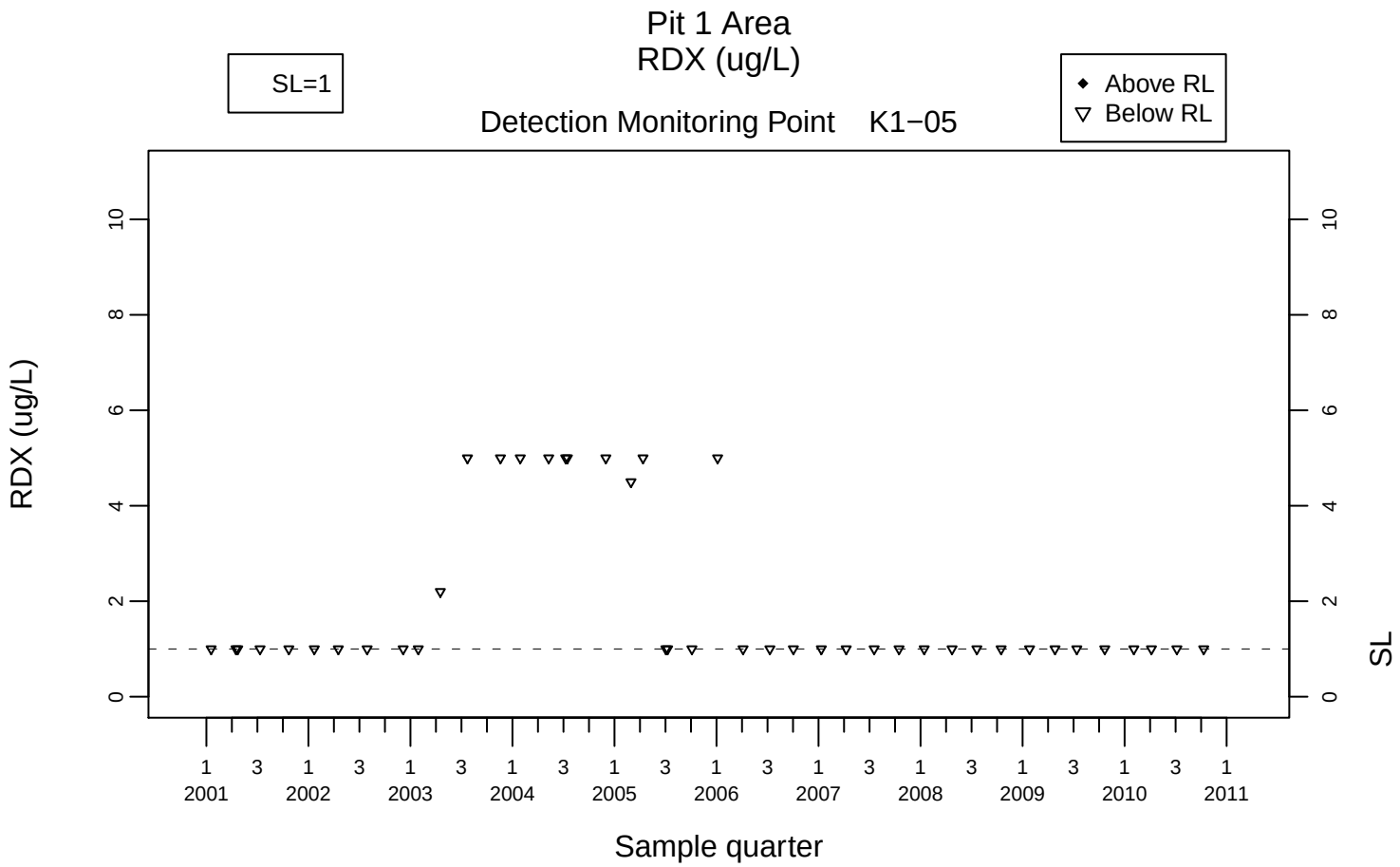

SL=1
Detection Monitoring Point W−PIT1−2326
HMX (ug/L)
SL
Sample quarter
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011

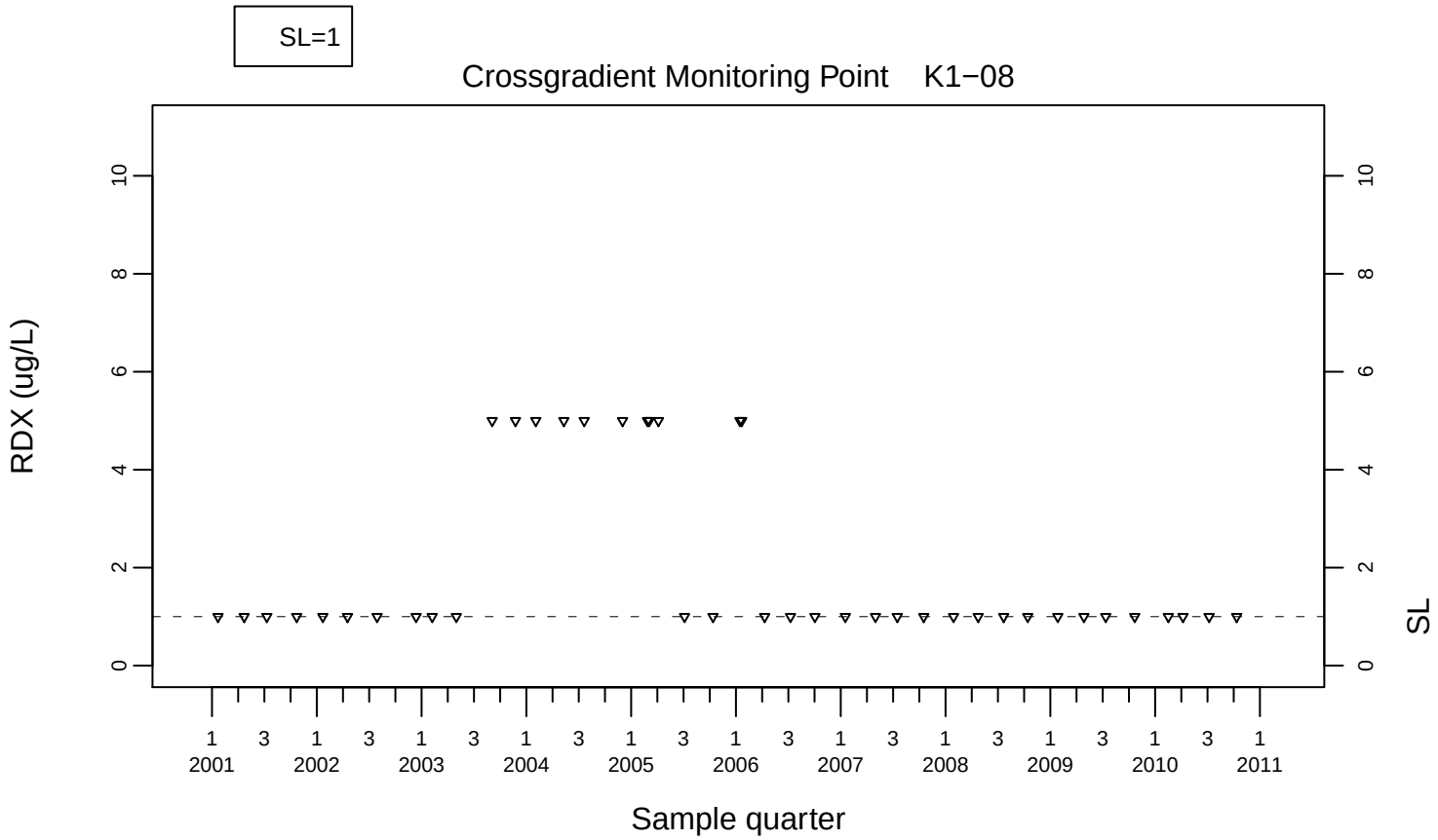

Pit 1 Area
RDX (ug/L)
Above RL
Below RL
Background Monitoring Point K1−01C
RDX (ug/L)
0
2
4
6
8
10
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

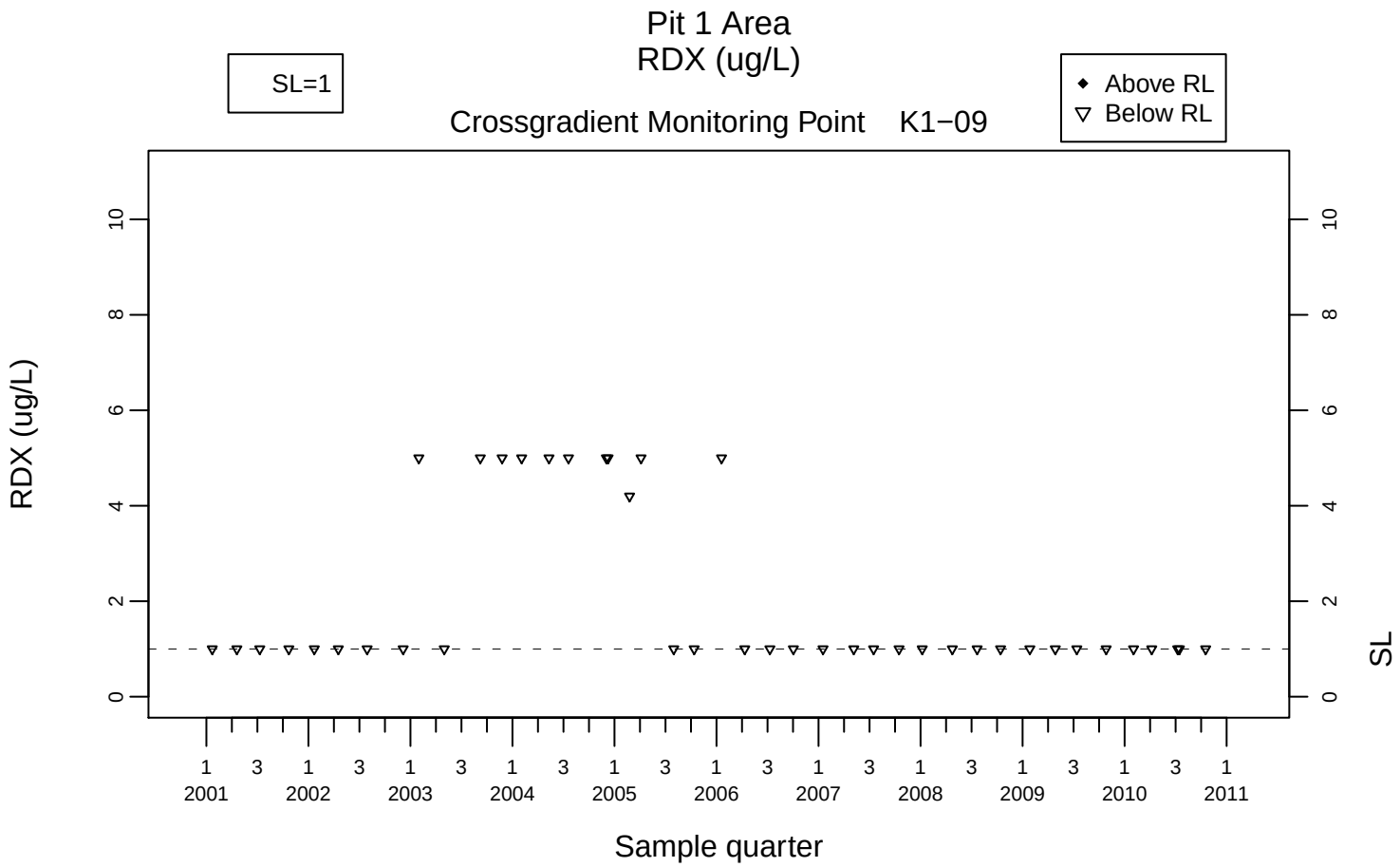

Background Monitoring Point K1−07
RDX (ug/L)
0
2
4
6
8
10
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011
Sample quarter

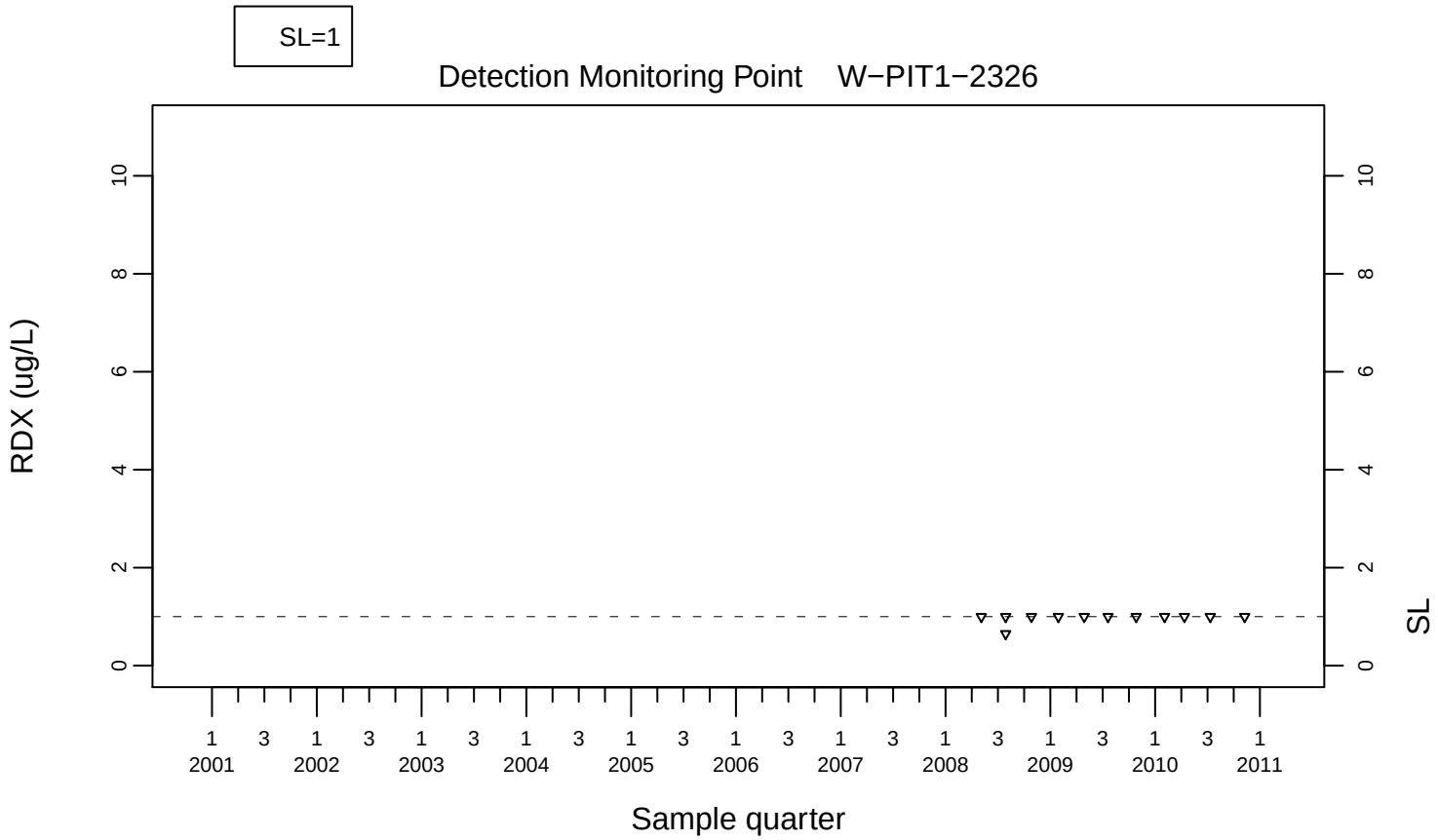

Pit 1 Area
RDX (ug/L)
SL=1
Above RL
Below RL
Detection Monitoring Point K1−02B
RDX (ug/L)
SL
Sample quarter
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


SL=1
Detection Monitoring Point K1−04
RDX (ug/L)
SL
Sample quarter
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


Pit 1 Area
RDX (ug/L)
SL=1
Above RL
Below RL
Detection Monitoring Point K1−05
RDX (ug/L)
SL
Sample quarter
0
2
4
6
8
10
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


SL=1
Crossgradient Monitoring Point K1−08
RDX (ug/L)
SL
Sample quarter
0
2
4
6
8
10
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


Pit 1 Area
RDX (ug/L)
SL=1
Above RL
Below RL
Crossgradient Monitoring Point K1−09
RDX (ug/L)
SL
Sample quarter
0
2
4
6
8
10
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011


SL=1
Detection Monitoring Point W−PIT1−2326
RDX (ug/L)
SL
Sample quarter
0
2
4
6
8
10
1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1 3 1
2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011

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