N3B Los Alamos

2022 Annual Sampling Implementation Plan

NPDES Permit No. NM0030759
March 2023

Los Alamos/Pueblo Watershed

Receiving Waters:
Bayo Canyon, DP Canyon,
Los Alamos Canyon, Pueblo Canyon, and Rendija Canyon

Volume 1

CONTENTS

1.0 R-SMA-1

Associated Sites	C-00-041
Receiving Water	Rendija Canyon
Drainage Area	262.54 acres
Landscape Characteristics	13% impervious, 87% pervious
Consent Order Site Status	AOC C-00-041: Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the August 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

1.1 2010 Administratively Continued Permit Summary

Following the May 2011 submittal of certification of baseline control installation to EPA, baseline stormwater samples were collected in July and August 2011. Analytical results from these samples initiated corrective action.

AOC C-00-041 received a COC under the Consent Order in July 2016. The Permittees submitted a certification of completion of corrective action for the Site per Permit part I.E.2(d) for the Site in March 2017 (LANL 2017, 602213). Stormwater monitoring has not occurred since 2011.

1.2 Site History

C-00-041 (12/21/2021)

AOC C-00-041 is the site of a former asphalt batch plant in a 600-ft-long portion of a side slope and drainage channel that flows into Rendija Canyon on USFS land. Aerial photographs confirm that the asphalt plant operated from the late 1940s to 1958. After the plant was removed, a portion of the land was transferred from the U.S. AEC to Los Alamos County in 1965, and another portion was transferred from the AEC to the USFS in 1969 to manage as public land. Currently, the site is undeveloped, and is located in a grassy open meadow bisected south to north by an ephemeral stream. A hiking trail, the Dot Grant Trail, is located to the east of AOC C-00-041, and another hiking trail, Perimeter Trail, and Guaje Pines Cemetery, are located to the west.

For the most recent Site activities, refer to “2021 Biennial Asphalt Monitoring and Removal Report for Area of Concern C-00-041, Guaje/Barrancas/Rendija Canyons Aggregate Area” (N3B 2021, 701812).

1.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 1.2-1.

Table 1.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
C-00-041	Asphalt batch plant	SVOCs (PAHs)

1.3 Consent Order Soil Data

Decision-level data for AOC C-00-041 consist of results from samples collected in 2007. Analytical results from those samples are presented in Figures 1.3-1 through 1.3-4. The 2007 IR, Revision 1, concluded that the nature and extent of contamination are defined.

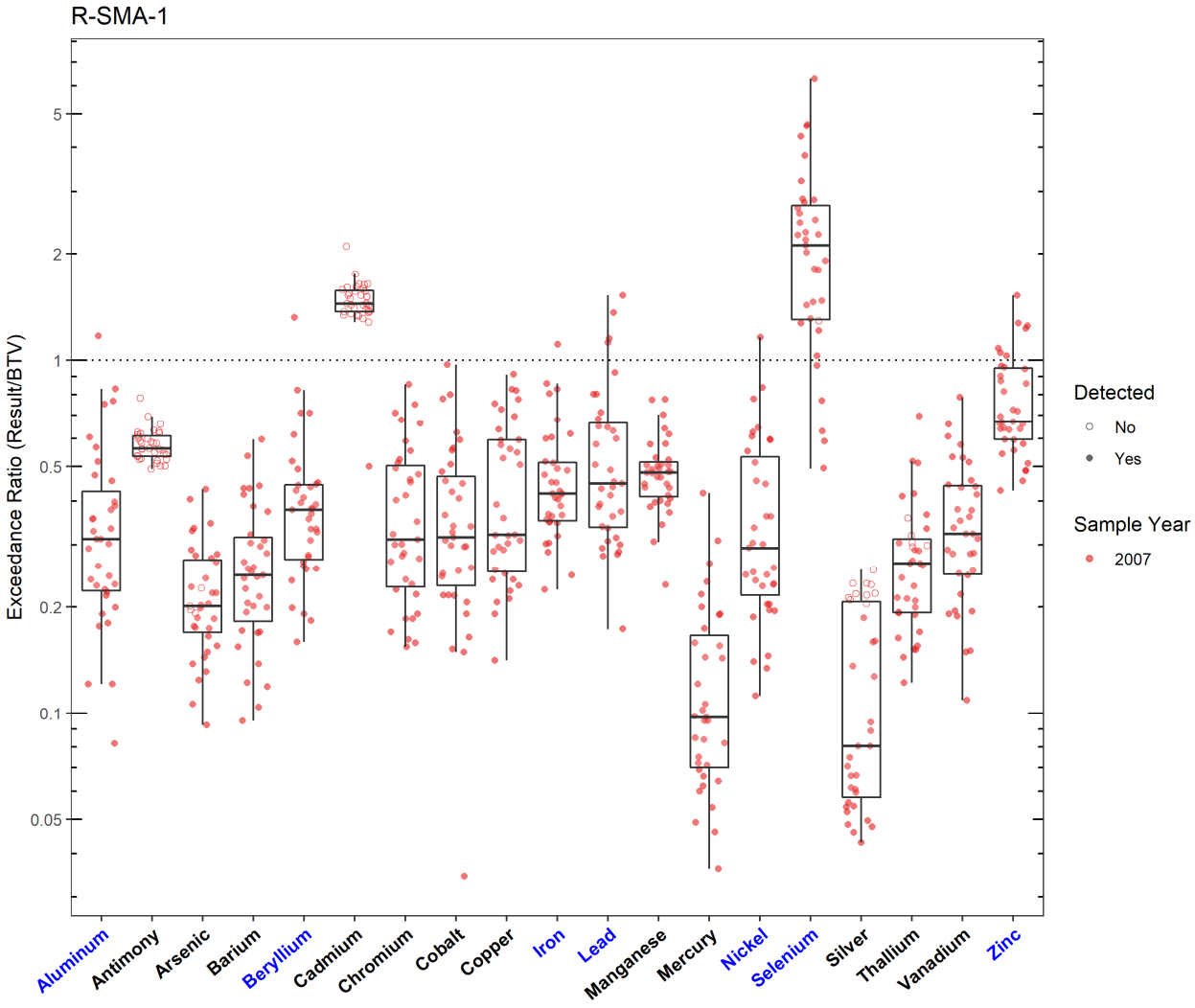

Figure 1.3-1 Inorganics Analytical Results from Soil Samples Associated with R-SMA-1

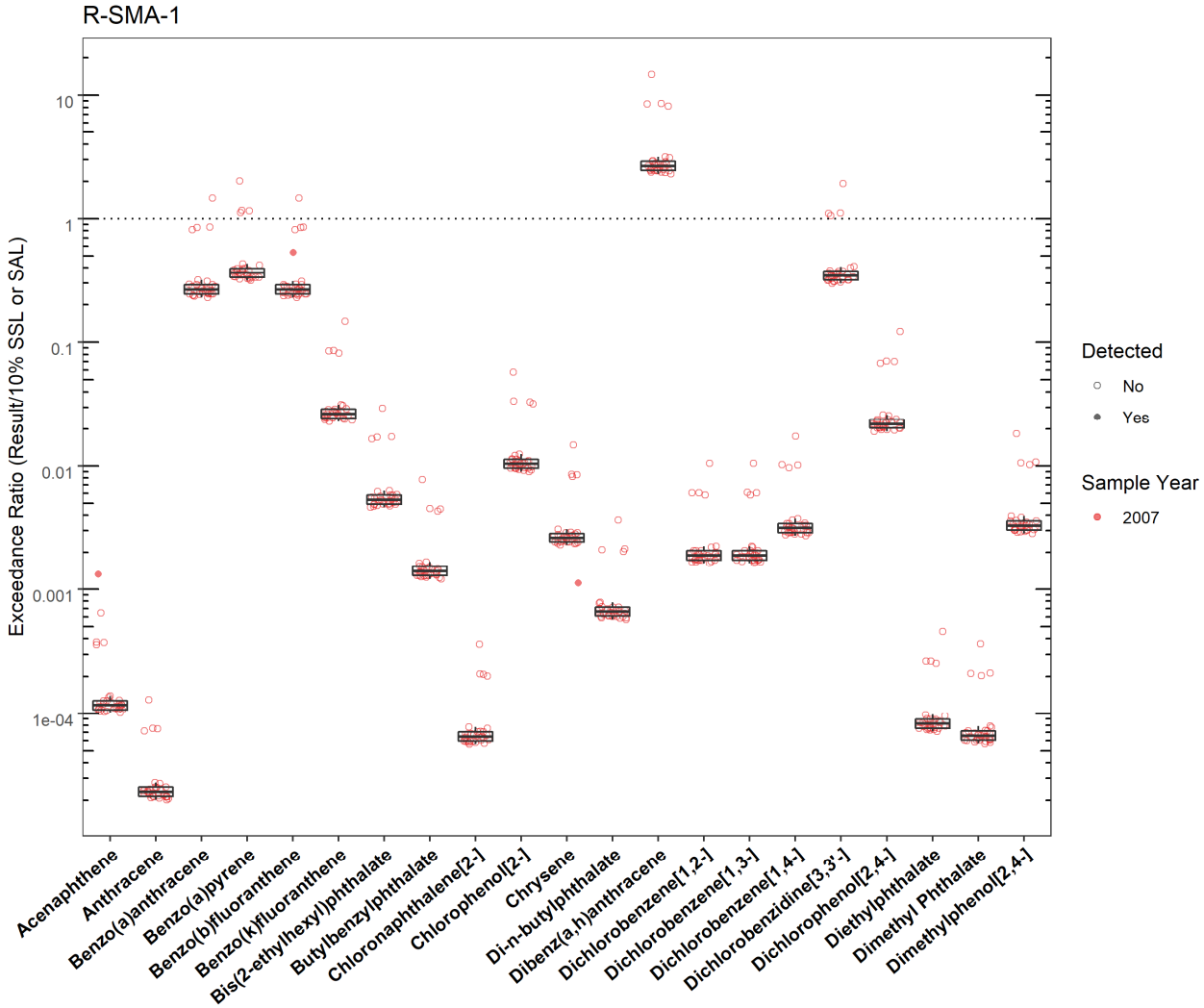

Figure 1.3-2 Organics Analytical Results from Soil Samples Associated with R-SMA-1 (Plot 1)

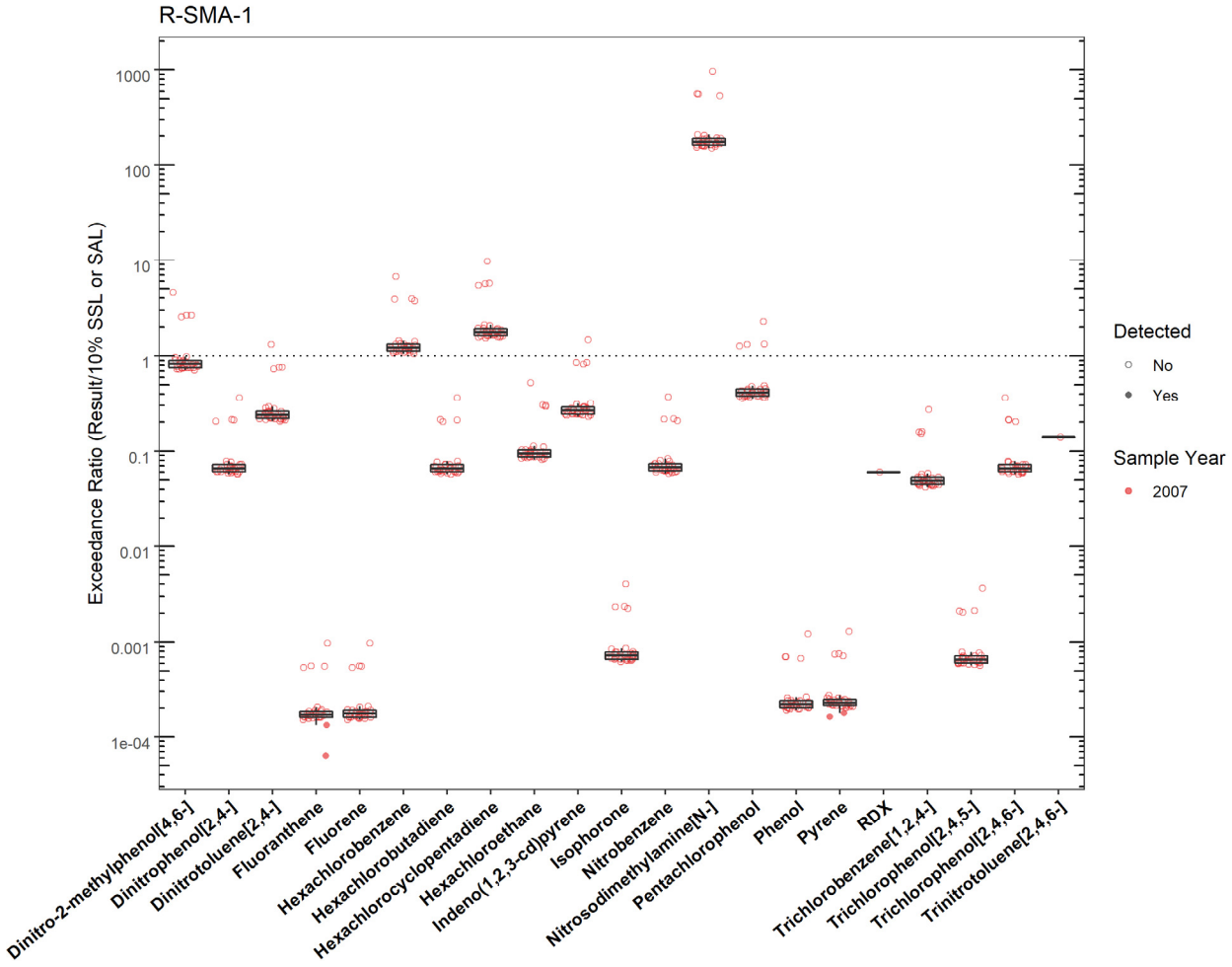

Figure 1.3-3 Organics Analytical Results from Soil Samples Associated with R-SMA-1 (Plot 2)

R-SMA-1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aluminum	R-SMA-1	Al	Y	BTV	29200	34100	2007-02-16
Beryllium	R-SMA-1	Be	Y	BTV	1.83	2.41	2007-02-16
Iron	R-SMA-1	Fe	Y	BTV	21500	23800	2007-02-16
Lead	R-SMA-1	Pb	Y	BTV	22.3	33.9	2007-02-15
Nickel	R-SMA-1	Ni	Y	BTV	15.4	17.9	2007-02-16
Selenium	R-SMA-1	Se	Y	BTV	1.52	9.54	2007-02-16
Zinc	R-SMA-1	Zn	Y	BTV	48.8	74.0	2007-02-16

Figure 1.3-4 Screening-Level Exceedances from Soil Samples Associated with R-SMA-1

1.4 Stormwater Evaluation

1.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective-action stormwater samples were collected in July and August 2011. Analytical results from those samples are presented in Figures 1.4-1 and 1.4-2.

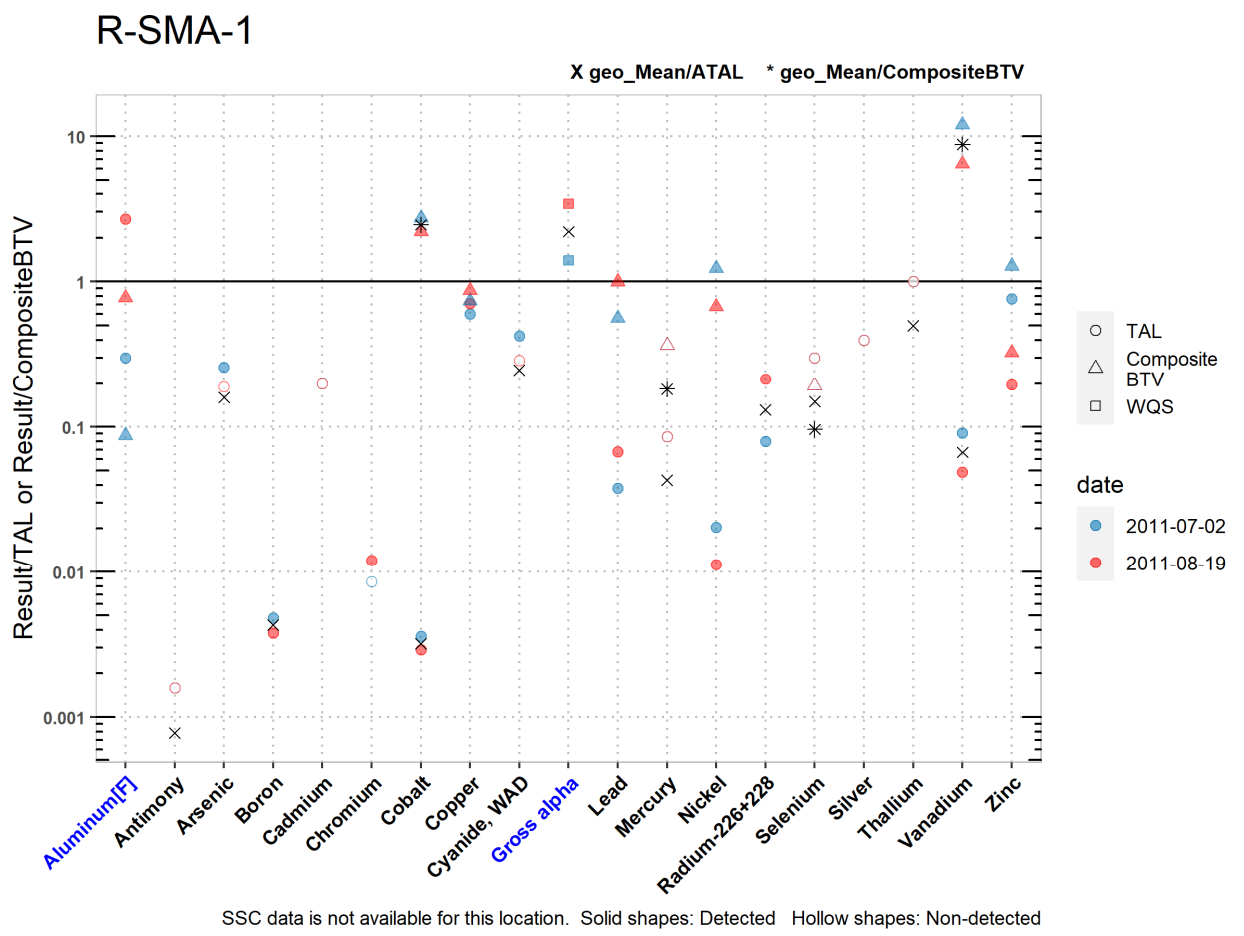

Figure 1.4-1 Analytical Results from Stormwater Samples, R-SMA-1 (Plot)

R-SMA-1

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	2580	NA	NA	NA	NA	NA	1.32	3.91	NA	56.2	1.30	0.180	3.10	5.04	7.78	NA	NA	0.756	35.5
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2011-07-02 result	226	*1.00*	2.30	24.2	*0.110*	*2.00*	3.60	2.90	2.21	21.1	0.730	*0.0660*	3.80	2.39	*1.50*	*0.200*	*0.450*	9.10	45.3
2011-07-02 dT	0.301	NA	0.26	0.0048	NA	NA	0.0036	0.604	0.425	1.4	0.0378	NA	0.0204	0.0797	NA	NA	NA	0.091	0.765
2011-07-02 dB	0.0876	NA	NA	NA	NA	NA	2.73	0.742	NA	NA	0.562	NA	1.23	NA	NA	NA	NA	12.0	1.28
2011-08-19 result	2010	*1.00*	*1.70*	19.1	*0.110*	2.80	2.90	3.40	*1.50*	51.1	1.30	*0.0660*	2.10	6.42	*1.50*	*0.200*	*0.450*	4.90	11.6
2011-08-19 dT	2.68	NA	NA	0.0038	NA	0.0120	0.0029	0.708	NA	3.4	0.0674	NA	0.0113	0.214	NA	NA	NA	0.049	0.196
2011-08-19 dB	0.779	NA	NA	NA	NA	NA	2.20	0.870	NA	NA	1.00	NA	0.677	NA	NA	NA	NA	6.48	0.327
geo_mean/ATAL	NA	0.00078	0.16	0.0043	NA	NA	0.0032	NA	0.248	2.2	NA	0.043	NA	0.131	0.15	NA	0.5	0.067	NA
geo_mean/B	NA	NA	NA	NA	NA	NA	2.45	NA	NA	NA	NA	0.183	NA	NA	0.0964	NA	NA	8.83	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV, geo_mean/B=geo_mean/composite_BTV

Figure 1.4-2 Analytical Results from Stormwater Samples, R-SMA-1 (Table)

1.4.2 Assessment Unit and Stream Impairments

R-SMA-1 drains to Rendija Canyon (Guaje Canyon to headwaters), which has not been assessed for impairments.

1.5 Site-Specific Demonstration

1.5.1 Soil Data Summary

The Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

Beryllium and iron exceeded the applicable screening value in soil data but are not Site-related POCs and will not be added to the SAP.

1.5.2 Stormwater Data Summary

Aluminum and gross alpha exceeded TALs in a previous stage of stormwater data but not BTVs Therefore, they will not be added to the SAP. The zinc result does not exceed the hardness-based TAL and will not be added to the SAP.

1.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

1.5.4 Sampling and Analysis Plan

Table 1.5-1 is the proposed SAP for R-SMA-1.

Table 1.5-1 Proposed SAP, R-SMA-1

Monitoring Constituent	Background for Monitoring
SVOCs	Site history (PAHs)
DOC	Permit requirement
SSC	Permit requirement

2.0 R-SMA-1.95

Associated Sites	00-015
Receiving Water	Rendija Canyon
Drainage Area	0.81 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC 00-015: In Progress Deferred per Consent Order
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the August 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Long-Term Stewardship per Permit Part I.C.3 and I.C.3.c criteria

2.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

Following the September 2014 submittal to EPA of certification of enhanced control installation (LANL 2014, 261903), corrective action monitoring was initiated. To date, stormwater flow has not been sufficient for sample collection at R-SMA-1.95. Corrective action monitoring is ongoing until at least one confirmation sample is collected.

2.2 Site History

00-015 (no date)

AOC 00-015 is the Los Alamos Sportsmen's Club, an active firing range located on GSA land leased from DOE in Rendija Canyon. The area covers approximately 30 acres. The firing range consists of several small-arms ranges and has operated since 1966. Lead is expected to be present in earthen berms and on the surface of the ranges. Shattered clay projectiles are present on the skeet and trap ranges.

Investigations under the Consent Order were not performed at AOC 00-015 as part of the Guaje/Barrancas/Rendija Canyons Aggregate Area investigation; the approved IWP (LANL 2005, 089657) proposed delaying full characterization of this active firing range until operations cease. At that time, the nature and extent of contamination at AOC 00-015 will be determined, and any necessary corrective actions will be identified and implemented.

2.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 2.2-1.

Table 2.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-015	Active firing site	Lead, copper

2.3 Consent Order Soil Data

No decision-level data exist for AOC 00-015.

2.4 Stormwater Evaluation

2.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current stage at the SMA.

2.4.2 Assessment Unit and Stream Impairments

R-SMA-1.95 drains to Rendija Canyon (Guaje Canyon to headwaters), which has not been assessed for impairments.

2.5 Site-Specific Demonstration

2.5.1 Soil Data Summary

No soil data available.

2.5.2 Stormwater Data Summary

Gross alpha was the only parameter to exceed the TAL in the previous stage of monitoring. Monitoring for gross alpha is only required if the SMA drains to an assessment unit that is impaired for gross alpha. The assessment unit to which R-SMA-1.95 drains is not impaired for gross alpha, and radionuclides are not a Site-related POC. Therefore, gross alpha will not be added to the SAP. Lead and copper, POCs from Site history, were measured below TALs.

2.5.3 2022 Permit Status

The SMA is eligible for long-term stewardship. Gross alpha was the sole TAL exceedance, and, pursuant to Part I.C.3.c of the permit, this SMA has been screened into long-term stewardship. The SWMU is also deferred under the Consent Order and is eligible for long-term stewardship pursuant to Part I.C.3.

3.0 R-SMA-2.3

Associated Sites	00-011(e)
Receiving Water	Rendija Canyon
Drainage Area	22.82 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 00-011(e): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Baseline Monitoring Extended[a]
2016–2018 SIP Actions	Based on the March 2018 meeting, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Site Deletion, unless a sample is collected between October 15 and the end of the 2022 Monitoring season.

[a] Baseline monitoring was reinitiated in 2020 (where one baseline sample had previously been collected with no TAL exceedances) in order to collect a second sample

3.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected at R-SMA-2.3 in June 2013. This sample had no TAL exceedances, and stormwater monitoring ceased until 2020. Monitoring resumed in 2020 to continue baseline confirmation monitoring to collect a second sample with all results below the applicable MTAL or ATAL so the Permittees could make a Site deletion request per Permit part I.I.2. Since that time, stormwater flow has not been sufficient for full-volume sample collection, and monitoring is ongoing at this SMA.

3.2 Site History

00-011(e) (no date)

SWMU 00-011(e) is a former ammunition impact area located on USFS land, in a tributary of Rendija Canyon known as Thirty-Seven-Millimeter Canyon. The Site was used from the mid- to late 1940s for training U.S. Army personnel operating tanks firing 20- and 37-mm rounds. The impact area extends north along the tributary to the top of a cliff face.

SWMU 00-011(e) is located within a very steep natural amphitheater with numerous loose rocks and boulders. Vegetation at the site consists of thick weeds and small shrubs. The site is fenced with barbed wire and posted with “Explosives No Trespassing” signs. During the 1993 Phase I RFI conducted at SWMU 00-011(e), the site was surveyed for UXO and OEW. Materials recovered in the ordnance sweep included 37-mm rounds and fragments. Because it was not known if these rounds were HE or armor-piercing, they were all placed in shallow pits and detonated with explosives.

For investigation activities, refer to “2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area” (N3B 2019, 700717).

3.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 3.2-1.

Table 3.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-011(e)	Former ammunition impact area	Copper, lead, iron, HE

3.3 Consent Order Soil Data

Decision-level data for SWMU 00-011(e) consist of results for samples collected in 2007. Analytical results from those samples are presented in Figures 3.3-1 through 3.3-3. The approved IR (LANL 2007, 099954) concluded that the lateral and vertical extent of all detected chemicals are defined.

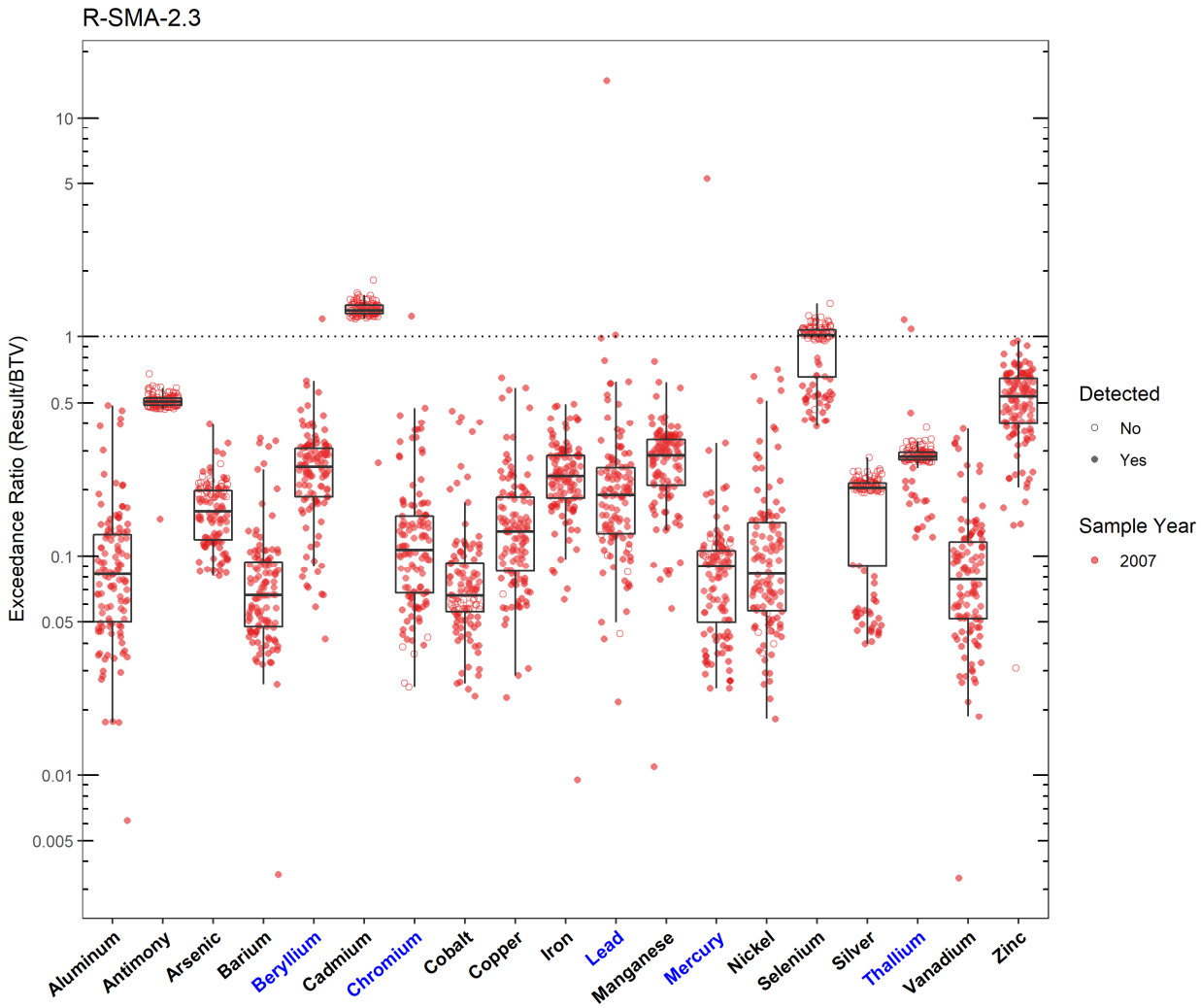

Figure 3.3-1 Inorganics Analytical Results from Soil Samples Associated with R-SMA-2.3

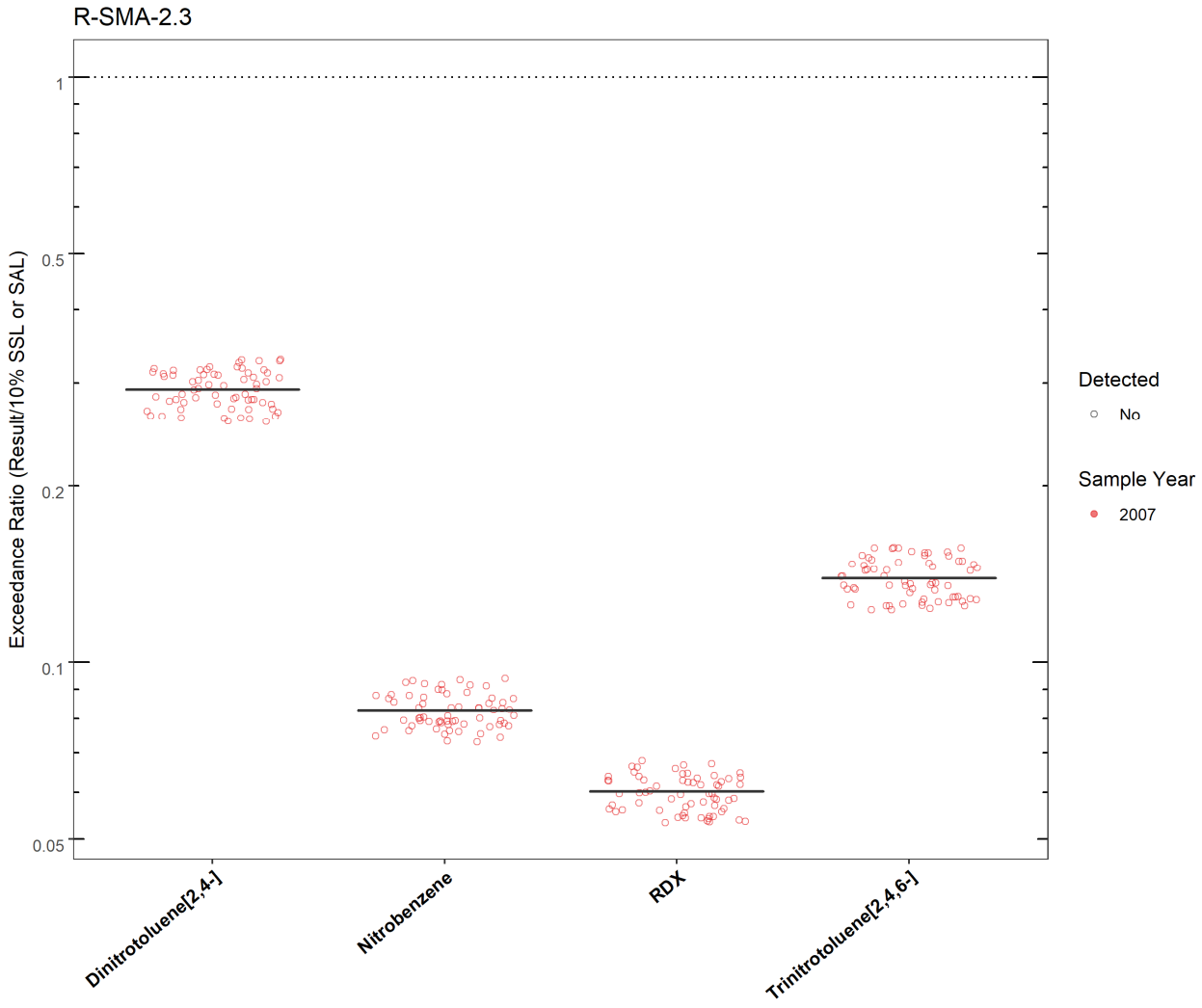

Figure 3.3-2 Organics Analytical Results from Soil Samples Associated with R-SMA-2.3

R-SMA-2.3

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Beryllium	R-SMA-2.3	Be	Y	BTV	1.83	2.20	2007-03-19
Chromium	R-SMA-2.3	Cr	Y	BTV	19.3	23.8	2007-03-27
Lead	R-SMA-2.3	Pb	Y	BTV	22.3	330	2007-03-05
Mercury	R-SMA-2.3	Hg	Y	BTV	0.100	0.525	2007-03-12
Thallium	R-SMA-2.3	Tl	Y	BTV	0.730	0.866	2007-03-27

Figure 3.3-3 Screening-Level Exceedances from Soil Samples Associated with R-SMA-2.3

3.4 Stormwater Evaluation

3.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Following the installation of baseline control measures, a baseline stormwater sample was collected in June 2013. Analytical results from that sample are presented in Figures 3.4-1 and 3.4-2.

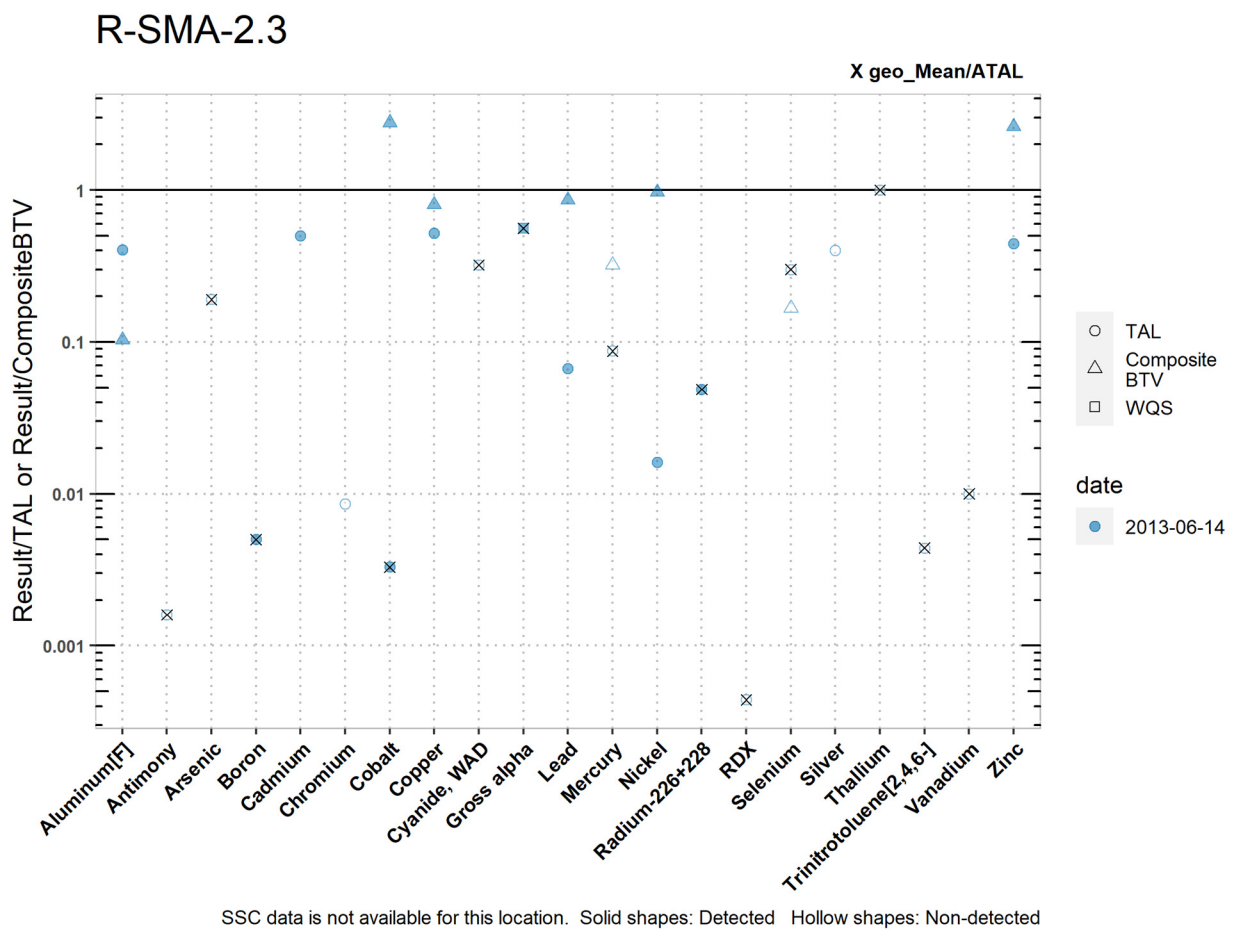

Figure 3.4-1 Analytical Results from Stormwater Sample, R-SMA-2.3 (Plot)

R-SMA-2.3

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	RDX	Selenium	Silver	Thallium	Trinitrotoluene [2,4,6-]	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	NA	5	0.5	0.5	NA	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	200	5	NA	0.47	20	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	2950	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2	1.50	0.208	3.10	4.21	NA	8.98	NA	NA	NA	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-06-14 result	303	*1.00*	*1.70*	25.1	0.353	*2.00*	3.28	2.50	*1.67*	8.37	1.29	*0.0670*	3.00	1.46	*0.0889*	*1.50*	*0.200*	*0.450*	*0.0889*	*1.00*	26.2
2013-06-14 dT	0.404	NA	NA	0.0050	0.5	NA	0.0033	0.521	NA	0.56	0.0668	NA	0.0161	0.0487	NA	NA	NA	NA	NA	NA	0.443
2013-06-14 dB	0.103	NA	NA	NA	NA	NA	2.78	0.801	NA	NA	0.860	NA	0.968	NA	NA	NA	NA	NA	NA	NA	2.62
geo_mean/ATAL	NA	0.0016	0.19	0.0050	NA	NA	0.0033	NA	0.321	0.56	NA	0.087	NA	0.0487	0.00044	0.30	NA	1	0.0044	0.010	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 3.4-2 Analytical Results from Stormwater Sample, R-SMA-2.3 (Table)

3.4.2 Assessment Unit and Stream Impairments

R-SMA-2.3 drains to Rendija Canyon (Guaje Canyon to headwaters), which has not been assessed for impairments.

3.5 Site-Specific Demonstration

3.5.1 Soil Data Summary

All Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP. Iron is a Site-related POC and did not exceed in soil data, therefore it will not be added to the SAP for monitoring.

Beryllium exceeded the applicable screening value in soil data but is not a Site-related POC and will not be added to the SAP.

3.5.2 Stormwater Data Summary

The 2013 stormwater sample had no TAL exceedances.

3.5.3 2022 Permit Status

The SMA and associated Sites are eligible for deletion because stormwater discharges associated with industrial activity no longer occur at the Site (Part I.C.4.e)

4.0 R-SMA-2.5

Associated Sites	00-011(a)
Receiving Water	Rendija Canyon
Drainage Area	29.33 acres
Landscape Characteristics	4% impervious, 96% pervious
Consent Order Site Status	SWMU 00-011(a): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the February 2016 signatures of the SIP evaluation map, it was agreed upon by all parties that current SMA sampler location is representative of runoff from the Site.
2022 Permit Status	Long-Term Stewardship per Permit Part I.C.3.a criterion

4.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2019. Analytical results from this sample initiated corrective action.

SWMU 00-011(e) received a COC under the Consent Order in May 2013. The Permittees submitted a certification of completion of corrective action for the Site, per Permit part I.E.2(d), in December 2019 (N3B 2019, 700724). Stormwater monitoring has not occurred since 2019.

4.2 Site History

00-011(a) (no date)

SWMU 00-011(a) is a 29-acre former mortar-impact area located on GSA land, about 0.4 mi east of the Sportsmen's Club small-arms firing range (AOC 00-015), in Rendija Canyon. The Site was a mortar-impact area in the mid-1940s for 60-mm and 82-mm rounds; operations ceased in the late 1940s.
SWMU 00-011(a) is located in a relatively flat open grassland with scattered shrubs and trees. The Site is bisected east to west by Rendija Road (unpaved). On the north side of the road, the Site has a gradual to steep slope to the ephemeral stream channel. The slope is covered by mulch consisting of downed trees that burned during the 2000 Cerro Grande fire.

Although the Site is fenced and posted with DOE "No Trespassing" signs, evidence indicates the Site is used for recreational activities such as dirt-biking and target practice. During the 1993 Phase I RFI conducted at SWMU 00-011(a), the Site was surveyed for UXO and OEW; two live mortar rounds were found and destroyed. Other materials recovered during the ordnance sweep included approximately 2400 pieces of ordnance fragments and three times as many pieces of scrap material. Geomorphic mapping was conducted including mapping of all drainage channels that drained the area enclosed within the boundaries of the Site, and the areas with high concentrations of ordnance fragments.
Two pits containing tires and UXO/MD were excavated and removed.

For most recent Site activities, refer to “2019 Triennial Ordnance Survey Report, Solid Waste Management Units 00-011(a, d, and e), Guaje/Barrancas/Rendija Canyons Aggregate Area” (N3B 2019, 700717).

4.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 4.2-1.

Table 4.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-011(a)	Former mortar impact area	Copper, lead, iron, HE

4.3 Consent Order Soil Data

Decision-level data for SWMU 00-011(a) consist of results for samples collected in 2007. Analytical results from those samples are presented in Figures 4.3-1 through 4.3-3. The approved IR (LANL 2007, 099954) concluded that the lateral and vertical extent of all detected chemicals are defined.

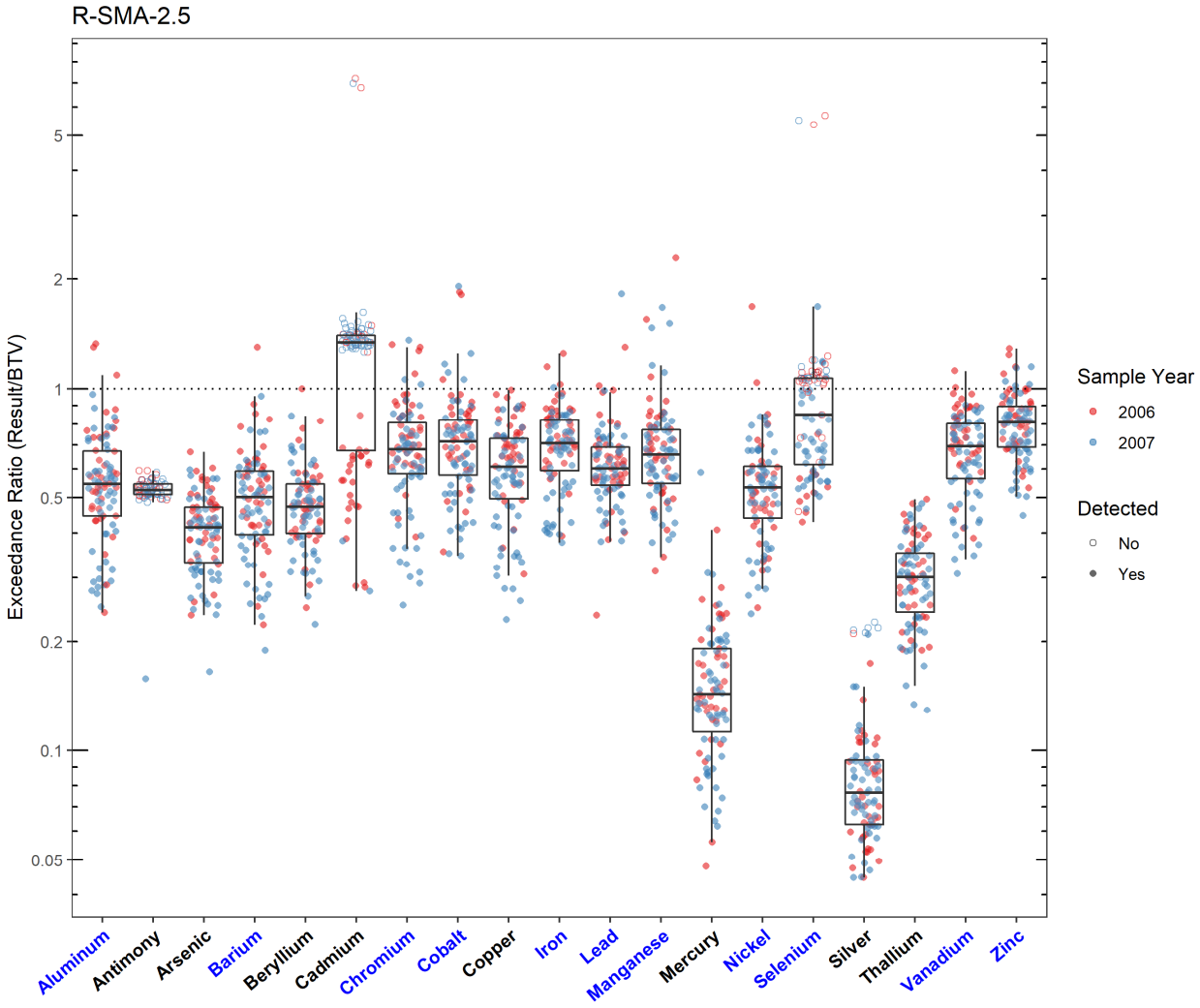

Figure 4.3-1 Inorganics Analytical Results from Soil Samples Associated with R-SMA-2.5

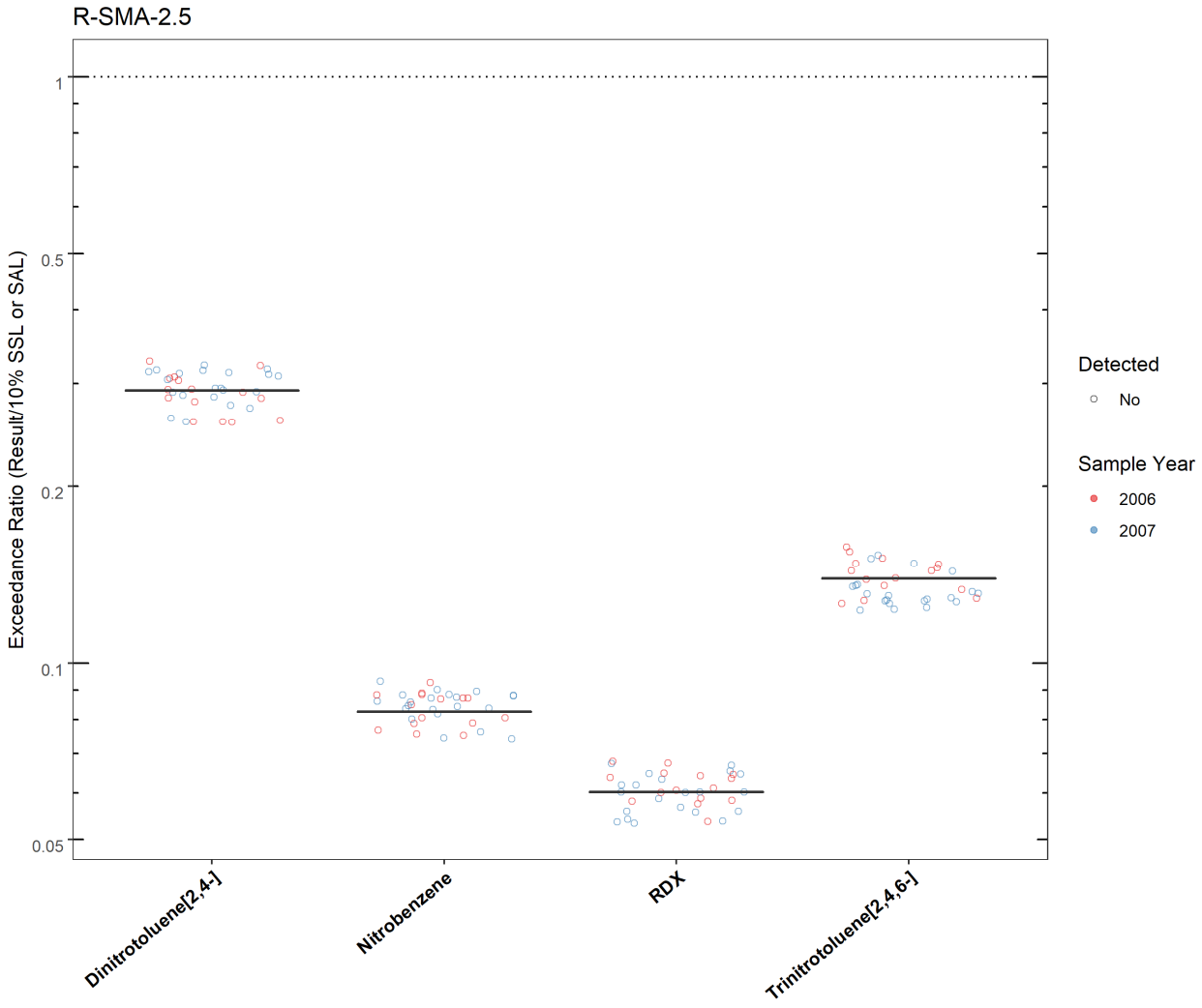

Figure 4.3-2 Organics Analytical Results from Soil Samples Associated with R-SMA-2.5

R-SMA-2.5

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aluminum	R-SMA-2.5	Al	Y	BTV	29200	38700	2006-12-14
Barium	R-SMA-2.5	Ba	Y	BTV	295	383	2006-12-04
Chromium	R-SMA-2.5	Cr	Y	BTV	19.3	26.3	2007-01-25
Cobalt	R-SMA-2.5	Co	Y	BTV	8.64	16.5	2007-01-08
Iron	R-SMA-2.5	Fe	Y	BTV	21500	26900	2006-12-04
Lead	R-SMA-2.5	Pb	Y	BTV	22.3	40.6	2007-01-30
Manganese	R-SMA-2.5	Mn	Y	BTV	671	1540	2006-12-07
Nickel	R-SMA-2.5	Ni	Y	BTV	15.4	25.8	2006-12-15
Selenium	R-SMA-2.5	Se	Y	BTV	1.52	2.55	2007-01-30
Vanadium	R-SMA-2.5	V	Y	BTV	39.6	44.5	2006-12-14
Zinc	R-SMA-2.5	Zn	Y	BTV	48.8	63.1	2006-12-14

Figure 4.3-3 Screening-Level Exceedances from Soil Samples Associated with R-SMA-2.5

4.4 Stormwater Evaluation

4.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Following the installation of baseline control measures, a baseline stormwater sample was collected in August 2019. Analytical results from that sample are presented in Figures 4.4-1 through 4.4-4.

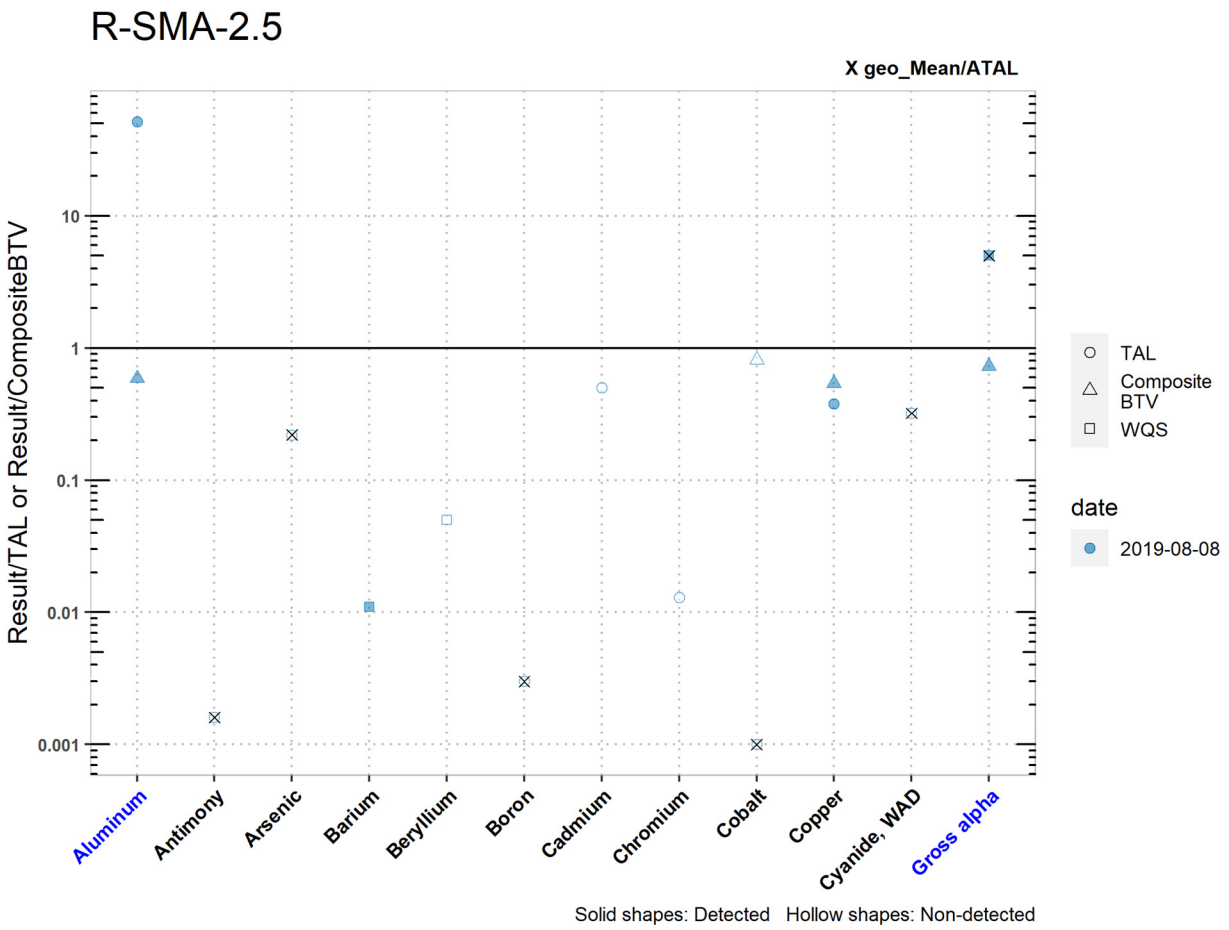

Figure 4.4-1 Analytical Results from Stormwater Sample, R-SMA-2.5 (Plot 1)

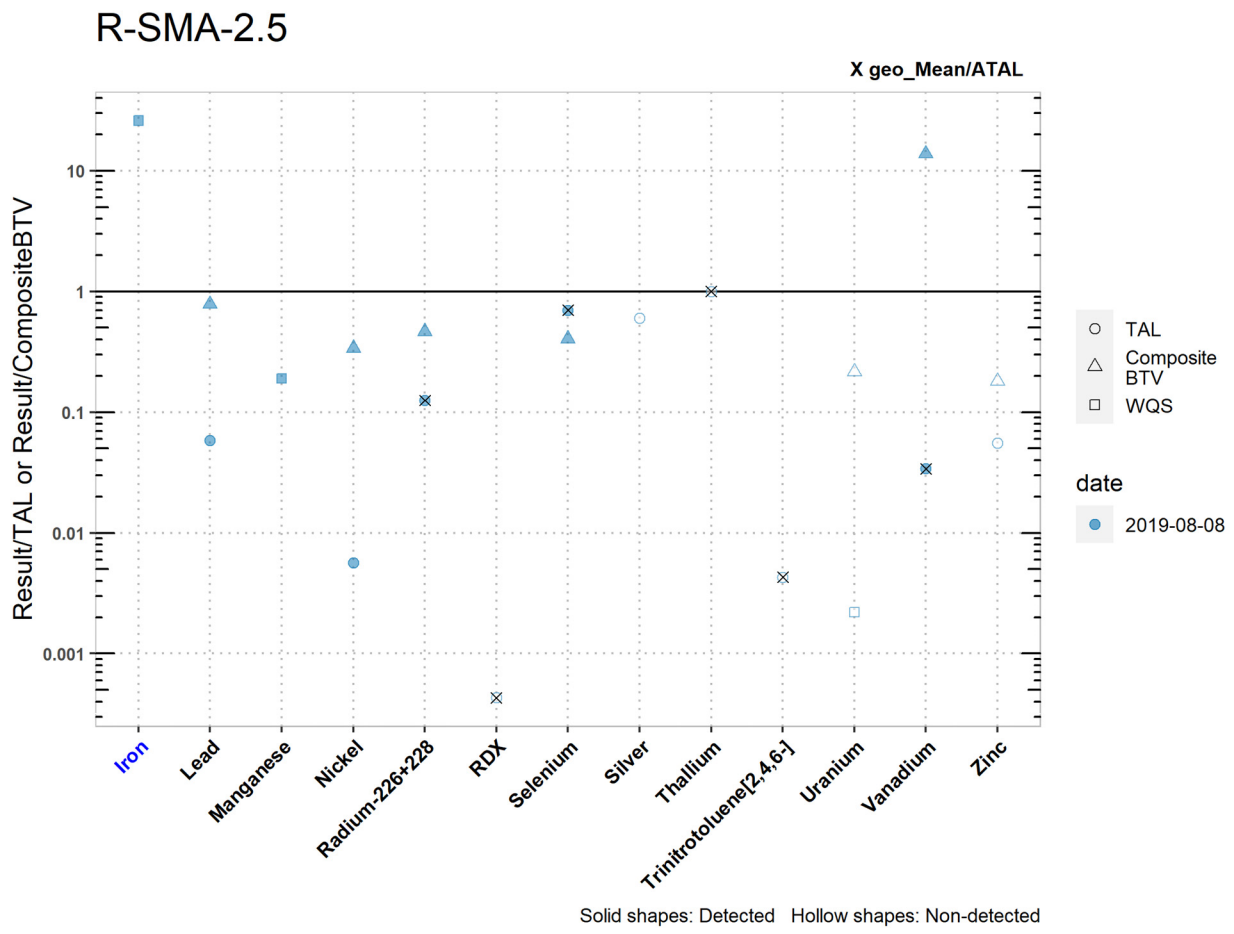

Figure 4.4-2 Analytical Results from Stormwater Sample, R-SMA-2.5 (Plot 2)

R-SMA-2.5

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	37200	NA	NA	NA	NA	NA	NA	NA	1.23	3.37	NA	56.9
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2019-08-08 result	39500	*1.00*	*2.00*	21.1	*0.200*	*15.0*	*0.300*	*3.00*	*1.00*	1.82	*1.67*	74.7
2019-08-08 dT	51.6	NA	NA	0.011	NA	NA	NA	NA	NA	0.379	NA	5.0
2019-08-08 dB	0.590	NA	NA	NA	NA	NA	NA	NA	NA	0.540	NA	0.729
geo_mean/ATAL	NA	0.0016	0.22	NA	NA	0.0030	NA	NA	0.0010	NA	0.321	5.0

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 4.4-3 Analytical Results from Stormwater Sample, R-SMA-2.5 (Table 1)

R-SMA-2.5

	Iron	Lead	Manganese	Nickel	Radium-226+228	RDX	Selenium	Silver	Thallium	Trinitrotoluene [2,4,6-]	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.5	NA	NA	5	0.5	0.5	NA	NA	50	20
ATAL	NA	NA	NA	NA	30	200	5	NA	0.47	20	NA	100	NA
MTAL	NA	19.3	NA	186	NA	NA	20	0.49	NA	NA	NA	NA	59.2
Composite_BTV	NA	1.44	NA	3.10	4.48	NA	8.59	NA	NA	NA	0.310	0.243	18.2
unit	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2019-08-08 result	26500	1.13	23.0	1.05	3.76	*0.0851*	3.49	*0.300*	*0.600*	*0.0851*	*0.0670*	3.35	*3.30*
2019-08-08 dT	26	0.0585	0.19	0.00565	0.125	NA	0.70	NA	NA	NA	NA	0.034	NA
2019-08-08 dB	NA	0.785	NA	0.339	0.466	NA	0.406	NA	NA	NA	NA	13.8	NA
geo_mean/ATAL	NA	NA	NA	NA	0.125	0.00043	0.70	NA	1	0.0043	NA	0.034	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g

Figure 4.4-4 Analytical Results from Stormwater Sample, R-SMA-2.5 (Table 2)

4.4.2 Assessment Unit and Stream Impairments

R-SMA-2.5 drains to Rendija Canyon (Guaje Canyon to headwaters), which has not been assessed for impairments.

4.5 Site-Specific Demonstration

4.5.1 Soil Data Summary

With the exception of aluminum and iron, the Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP. Aluminum exceeded the applicable screening value in soil data and exceeded TAL in stormwater, but was below BTV. Therefore, it will not be added to the SAP.

4.5.2 Stormwater Data Summary

Total aluminum and gross alpha exceeded TALs but not BTVs in stormwater.

Iron exceeded the water quality standard; however, there is no TAL in the Permit for iron. Only POCs with TALs are used in the SSD.

4.5.3 2022 Permit Status

The SMA is eligible for long-term stewardship. All Site-related POCs with TALs were below their respective composite BTVs (Part I.C.3.a).

5.0 B-SMA-0.5

Associated Sites	10-001(a), 10-001(b), 10-001(c), 10-001(d), 10-004(a), 10-004(b), 10-008, 10-009
Receiving Water	Bayo Canyon
Drainage Area	1052.68 acres
Landscape Characteristics	7% impervious, 93% pervious
Consent Order Site Status	SWMU 10-001(a): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-001(b): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-001(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-001(d): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-004(a): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-004(b): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-008: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 10-009: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the July 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

5.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

All Sites in this SMA received COCs under the Consent Order in January 2017. The Permittees submitted a certification of completion of corrective action for the Sites per Permit part I.E.2(d) in March 2017 (LANL 2017, 602250). Stormwater monitoring has not occurred since 2013.

5.2 Site History

For investigation activities at the Sites, refer to "Investigation Report for Bayo Canyon Aggregate Area, Revision 1" (LANL 2008, 102424).

10-001(a, b, c, d) (9/28/2021)

SWMU 10-001(a), known as former Firing Point 1, is one of four former firing sites [SWMUs 10-001(a-d)] (shot pads) that were located in the central-western portion of former TA-10 in Bayo Canyon. The firing site components included an x-unit chamber (former structure 10-22), an electronics chamber (former structure 10-23), a control chamber (former structure 10-13), a battery building (former structure 10-14), and an inspection building (former structure 10-8); the latter three were also associated with

Firing Point 2 [SWMU 10-001(b)]. Recently-discovered engineering drawing A5-C-42 shows the former x-unit chamber measured approximately 7 ft 8 in. wide × 7 ft 8 in. long, and engineering drawing A5-C-47 shows the former electronics chamber measured approximately 6 ft 8 in. wide × 8 ft 4 in. long.

SWMU 10-001(b), known as former Firing Point 2, is one of four former firing sites [SWMUs 10-001(a-d)] (shot pads) that were located in the central-western portion of former TA-10 in Bayo Canyon. The firing site components included an x-unit chamber (former structure 10-24), an electronics chamber (former structure 10-25), a control chamber (former structure 10-13), a battery building (former structure 10-14), and an inspection building (former structure 10-8); the latter three were also associated with Firing Point 1 [SWMU 10-001(a)].

SWMU 10-001(c), known as former Firing Point 3, is one of four former firing sites [SWMUs 10-001(a-d)] (shot pads) that were located in the central-western portion of former TA-10 in Bayo Canyon. The 1992 RFI Work Plan describes Firing Point 3 as a former asphalt shot pad associated with the decommissioned northwestern firing site at former TA-10, as shown on engineering drawings ENG-R 125 (pg. 1 of 1), ENG-C 1856, and A5-R36. Firing Point 3 consisted of an x-unit chamber (former structure 10-26), an electronics chamber (former structure 10-27), a control chamber (former structure 10-15), a battery building (former structure 10-16), and an inspection building (former structure 10-08); the latter three were also associated with Firing Point 4 [SWMU 10-001(d)].

SWMU 10-001(d), known as former Firing Point 4, is one of four former firing sites [SWMUs 10-001(a-d)] (shot pads) that were located in the central-western portion of former TA-10 in Bayo Canyon. The 1992 RFI Work Plan describes Firing Point 4 as a former asphalt shot pad associated with the decommissioned northwestern firing site at former TA-10, as shown on engineering drawings ENG-R 125 (pg. 1 of 1), ENG-C 1856, and A5-R36. Firing Point 4 consisted of an x-unit chamber (former structure 10-26), an electronics chamber (former structure 10-27), a control chamber (former structure 10-15), a battery building (former structure 10-16), and an inspection building (former structure 10-08); the latter three were also associated with Firing Point 3 [SWMU 10-001(c)].

Experiments for nuclear weapons research conducted at the four firing sites from 1943 to 1960 used 500–600 lb shots of HE. The experimental shots usually contained a short-lived radioactive source such as lanthanum-140 for diagnostic purposes. Over the operational life of the four firing sites, the active components of the shots included a total of approximately 2000 kg of natural uranium, 3380 kg of uranium-238, 39.6 ci of strontium-90, lead, and possibly beryllium. Other materials used in the shots included aluminum, steel, cable, and electronics components. The lanthanum-120 used in the shots has since decayed to below detection levels. Because residual radioactive material remained at and around the pad after a shot, the Site could not be used again for approximately one month, so shots were rotated among the four firing sites. The firing pads were washed with water and swept after each shot; residual material from the shot pads was moved to the SWMU 10-005 disposal pit located northwest of the four firing sites. Wash water flowed into the Bayo Canyon stream channel [AOC C-00-004], located directly north of the former firing sites.

All explosives testing at former TA-10 ceased in 1960. Because of the proximity and overlapping dispersion areas of each firing site and common use of the SWMU 10-005 disposal pit, source terms cannot be separated by SWMU or AOC. Former TA-10 underwent extensive D&D, including the razing of all structures, from 1961 to 1963. In 1963, the area surrounding the firing sites, to a radius of approximately 760 meters, was swept, and 90 truckloads of debris, including the asphalt shot pads and soil, were transported to MDAs C and G at TA-54 for disposal. All excavations were backfilled and the ground surface was subsequently regraded. All concrete structures associated with each firing site were demolished using dynamite, and were disposed of in the SWMU 10-007 landfill. Former TA-10 and Bayo Canyon were conveyed to Los Alamos County in 1967, but remain under DOE administrative

control, and are currently open to the public for recreational activities except where access is limited by a fence with posted "Caution —Do Not Enter" signs. A dirt road runs parallel to the former firing sites.

10-004(a) (9/28/2021)

SWMU 10-004(a) consists of a former septic system that served a former personnel building (building 10-21) from 1949 to 1961 in the northcentral portion of former TA-10 in Bayo Canyon. The septic system consisted of a 550-gal. reinforced-concrete septic tank (former structure 10-40), inlet and outlet drainlines, a disposal pit measuring 8 ft wide × 8 ft long × 12 ft deep located directly east of septic tank 10-40, and an outfall located in the Bayo Canyon drainage channel, approximately 200 ft directly north of former septic tank 10-40. The septic tank (former structure 10-40) received effluent via a 6-in.-diameter VCP inlet drainline from former building 10-21, and discharged to a 6-in.-diameter VCP outlet overflow drainline that discharged to an outfall north of the septic tank and into the Bayo Canyon drainage channel [AOC C-00-004], as shown in engineering drawing ENG-C 25683 (pg. 10 of 43). However, engineering drawing ENG-R 637 (pg. 2 of 3) indicates that, at one time, the septic tank discharged to the disposal pit.

Former TA-10 underwent extensive D&D, including the razing of all structures, from 1961 to 1963. During the D&D activities, the septic tank was excavated, removed, and disposed of at MDA G at TA-54; the excavation was backfilled with clean soil in 1963. There is no information available regarding the removal of the drainlines or soil/sediment at and downgradient of the outfall; however, a 2007 geophysical survey did not identify any subsurface anomalies, indicating that the inlet and outlet drainlines were likely removed during the 1961–1963 D&D activities.

Bayo Canyon was conveyed to Los Alamos County in 1967 but remains under U.S. DOE administrative control, and is currently open to the public for recreational activities except where access is limited by a fence with posted "Caution — Do Not Enter" signs.

10-004(b) (9/28/2021)

SWMU 10-004(b) is a former septic system that served the former radiochemistry laboratory (building 10-1) from 1944 to 1961 at former TA-10 in Bayo Canyon. The Task 15 CEARP Report for TA-10 describes SWMU 10-004(b) as an outfall from the SWMU 10-004(b) septic tank (former structure 10-38), that served former building 10-1 and discharged approximately 100 ft north-northeast into the Bayo Canyon drainage channel [AOC C-00-004]. The 1990 SWMU Report describes SWMU 10-004(b) as a decommissioned septic system that received sanitary, and likely laboratory, wastes from the radiochemistry laboratory housed in former building 10-1 in the southeastern portion of former TA-10. The septic system consisted of a 4-ft-wide × 10-ft-long × 4-ft-deep reinforced-concrete septic tank (former structure 10-38), inlet and outlet drainlines, and an overflow 4-in. VCP open joint drainline, identified as the SWMU 10-003(n) leach field located north of former building 10-1 in the Bayo Canyon drainage channel [AOC C-00-004] at former TA-10. The septic tank (former structure 10-38) received effluent via a 4-in.-diameter VCP inlet drainline, and discharged to a 4-in.-diameter VCP outlet overflow drainline that discharged to the SWMU 10-003(n) leach field located north of former building 10-1, as shown in engineering drawings ENG-C 1856 (Sheet U-1) and ENG-C 25683 (pg. 10 of 43). The SWMU 10-004(b) septic system was a component of the former liquid waste disposal complex, also known as the tank farm, which supported radiochemistry laboratory operations and handled sanitary waste from former building 10-1 in the southeastern portion of former TA-10. The exact dates of use for the septic system are unknown; however, it is estimated to have been used from 1944 to 1960.

Former TA-10 underwent extensive D&D, including the razing of all structures, from 1961 to 1963. In 1963, the liquid waste disposal complex, including the SWMU 10-004(b) septic system, was excavated to a depth of 20 ft bgs and disposed of at MDA G at TA-54. The excavation was partially backfilled with

uncontaminated building debris from the D&D of site structures, and the remainder of the excavation was backfilled with clean soil. There is no information available regarding the removal of the drainlines or the leach field; however, a 2007 geophysical survey did not identify the presence of subsurface anomalies, indicating that the inlet and outlet drainlines were likely removed during the 1961–1963 D&D activities. The area was released to Los Alamos County in 1967 but remains under the U.S. DOE administrative control, and is currently open to the public for recreational activities except where access is limited by a fence with posted "Caution — Do Not Enter" signs.

10-008 (1/31/2017)

SWMU 10-008 is a former satellite firing site located approximately 1,400 ft northwest of the former primary firing sites [SWMUs 10-001(a-d)] at TA-10. During a 1994 IA, shrapnel was found embedded in the northwestern sides of trees in this area (opposite the known primary firing sites). Because of the proximity and overlapping dispersion areas of each firing site and use of the disposal pit, source terms cannot be separated by SWMU or AOC.

This Site has been listed as an AOC in historical documentation. However, it is listed as a SWMU in the Consent Order and in Appendix K of the RCRA Permit.

10-009 (1/31/2017)

SWMU 10-009 is a former landfill discovered during routine surface shrapnel characterization activities in Bayo Canyon, when a small depression was noted that contained materials, including asbestos siding, heavy-gauge and coaxial wire and cable, glass laboratory equipment, and other debris. A geophysical survey conducted in the area showed additional anomalies; interviews conducted with former area workers confirmed that the area had been used for disposal. EPA was notified of a new SWMU in May 1995. The Site was fenced in 1995, pending further investigation and/or remediation. AOC C-10-001, which consists of two former radioactive (strontium-90) soil contamination areas, is located within the fenced area that encompasses SWMU 10-009.

This Site has been listed as an AOC in historical documentation. However, it is listed as a SWMU in the Consent Order and in Appendix K of the RCRA Permit.

5.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 5.2-1.

Table 5.2-1 POCs Known or Suspected to be Used Historically at the Sites

Site	Potential POC Source	Potential POCs
10-001(a)	Firing site	HE, natural uranium, uranium-238, strontium-90, lead, aluminum, and beryllium
10-001(b)	Firing site	HE, natural uranium, uranium-238, strontium-90, lead, aluminum, and beryllium
10-001(c)	Firing site	HE, natural uranium, uranium-238, strontium-90, lead, aluminum, and beryllium
10-001(d)	Firing site	HE, natural uranium, uranium-238, strontium-90, lead, aluminum, and beryllium
10-004(a)	Firing site	Metals, organic chemicals, strontium-90, barium, and cadmium
10-004(b)	Septic system	Metals, organic chemicals, strontium-90, barium, and cadmium
10-008	Firing point	Metals
10-009	Former Bayo Canyon landfill	Asbestos, metals, organic chemicals, radionuclides

5.3 Consent Order Soil Data

Decision-level data for SWMU 10-001(a), SWMU 10-001(b), SWMU 10-001(c), SWMU 10-001(d), SWMU 10-004(a), and SWMU 10-008 consist of results from samples collected in 1994 and 2007. Revision 1 of the 2008 IR (LANL 2008, 102424) concluded that the nature and extent of contamination have been defined.

Decision-level data for 10-004(b) consist of samples collected in 1994, 1996, 2007, and 2008, in conjunction with the investigation of SWMUs 10-002(a–b), 10-003(a–o), 10-004(b), and 10-007. Revision 1 of the 2008 IR (LANL 2008, 102424) concluded that the nature and extent of contamination are defined.

SMWU 10-009 and AOC C-10-001 were investigated together as one Site during the 2007 investigation. Decision-level data for SMWU 10-009 and AOC C-10-001 consist of results for samples collected in 2007. The approved IR concluded that the lateral and vertical extent of detected chemicals and radionuclides are defined at SMWU 10-009 and AOC C-10-001.

Analytical results from all decision-level soil samples for B-SMA-0.5 are presented in Figures 5.3-1 through 5.3-4.

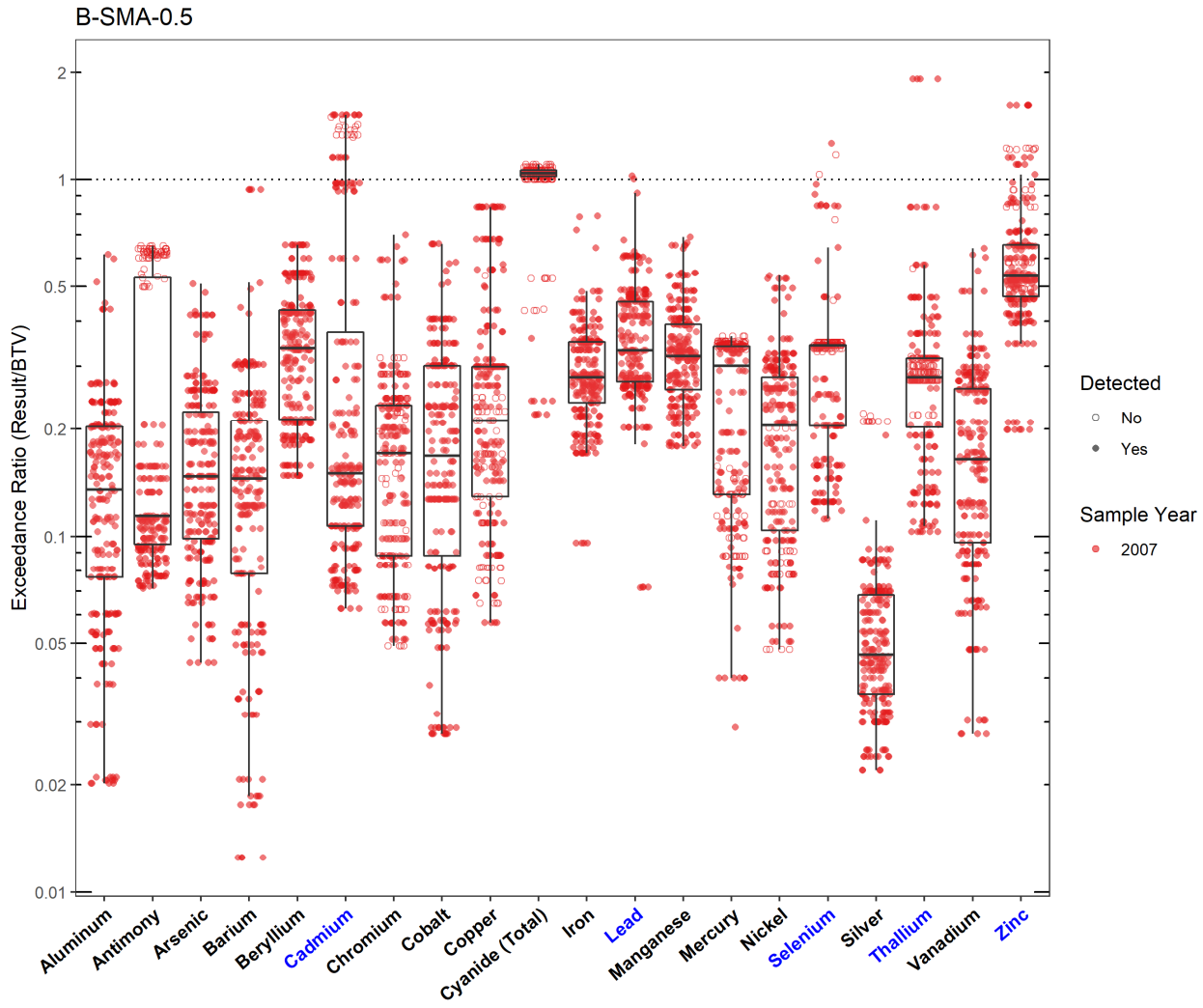

Figure 5.3-1 Inorganics Analytical Results from Soil Samples Associated with B-SMA-0.5

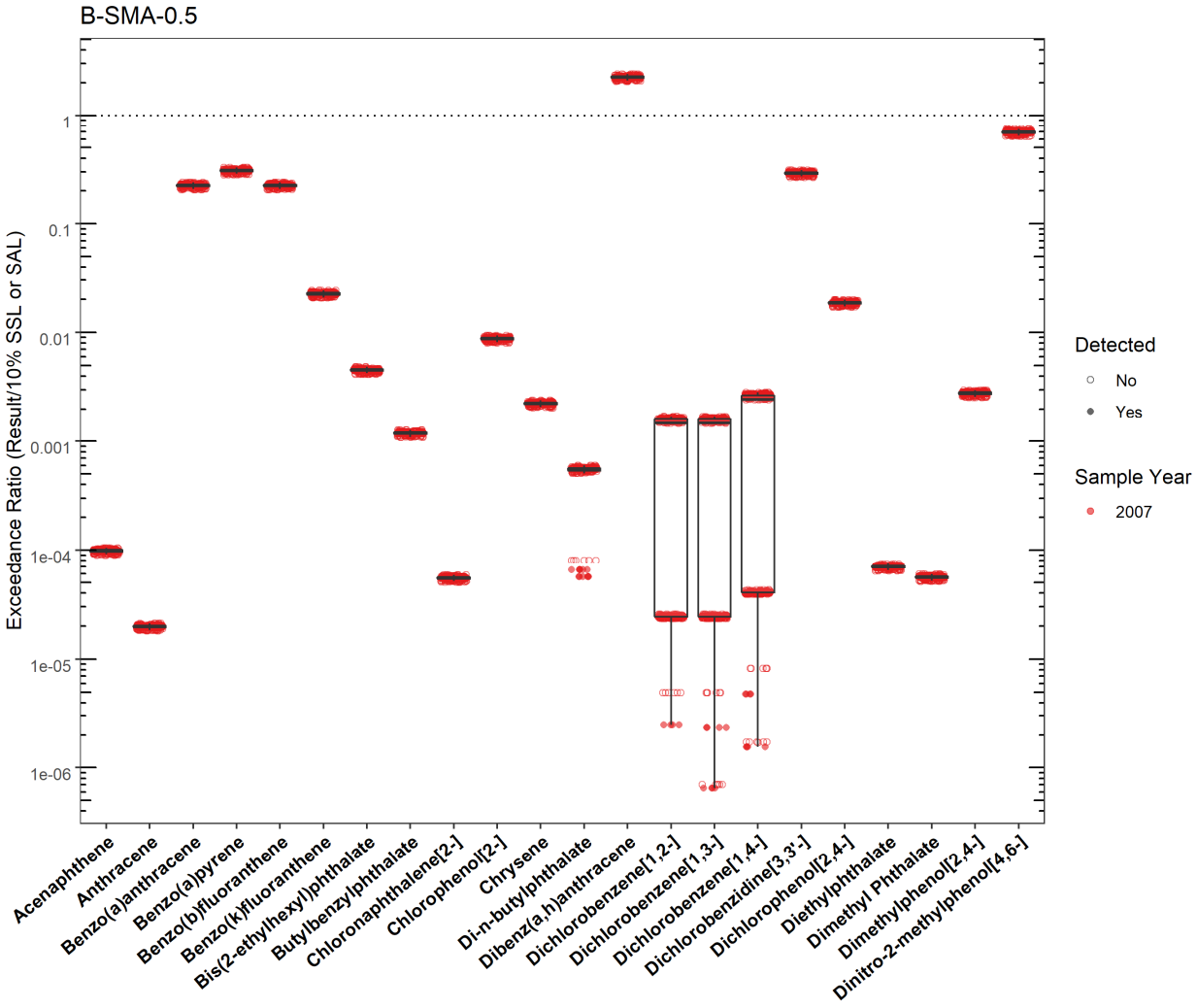

Figure 5.3-2 Organics Analytical Results from Soil Samples Associated with B-SMA-0.5 (Plot 1)

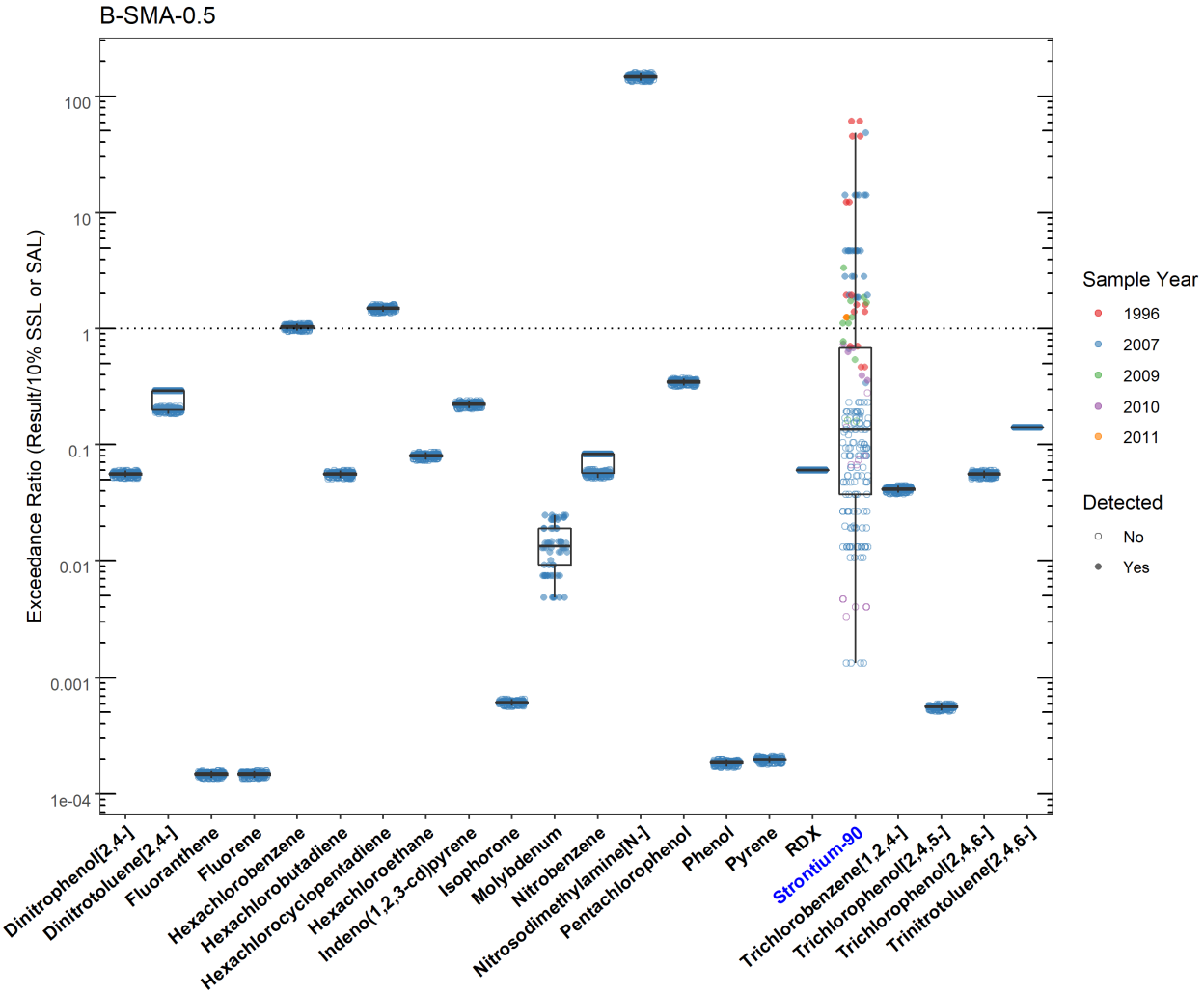

Figure 5.3-3 Organics Analytical Results from Soil Samples Associated with B-SMA-0.5 (Plot 2)

B-SMA-0.5

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Cadmium	B-SMA-0.5	Cd	Y	BTV	0.400	0.610	2007-09-10
Lead	B-SMA-0.5	Pb	Y	BTV	22.3	22.8	2007-02-02
Selenium	B-SMA-0.5	Se	Y	BTV	1.52	1.92	2007-02-01
Strontium-90	B-SMA-0.5	Sr-90	Y	SAL_0.1	1.50	92.0	1996-11-19
Thallium	B-SMA-0.5	Tl	Y	BTV	0.730	1.40	2007-08-13
Zinc	B-SMA-0.5	Zn	Y	BTV	48.8	79.3	2007-08-14

Figure 5.3-4 Screening-Level Exceedances from Soil Samples Associated with B-SMA-0.5

5.4 Stormwater Evaluation

5.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Following the installation of baseline control measures, a baseline stormwater sample was collected in September 2013. Analytical results from that sample are presented in Figures 5.4-1 and 5.4-2.

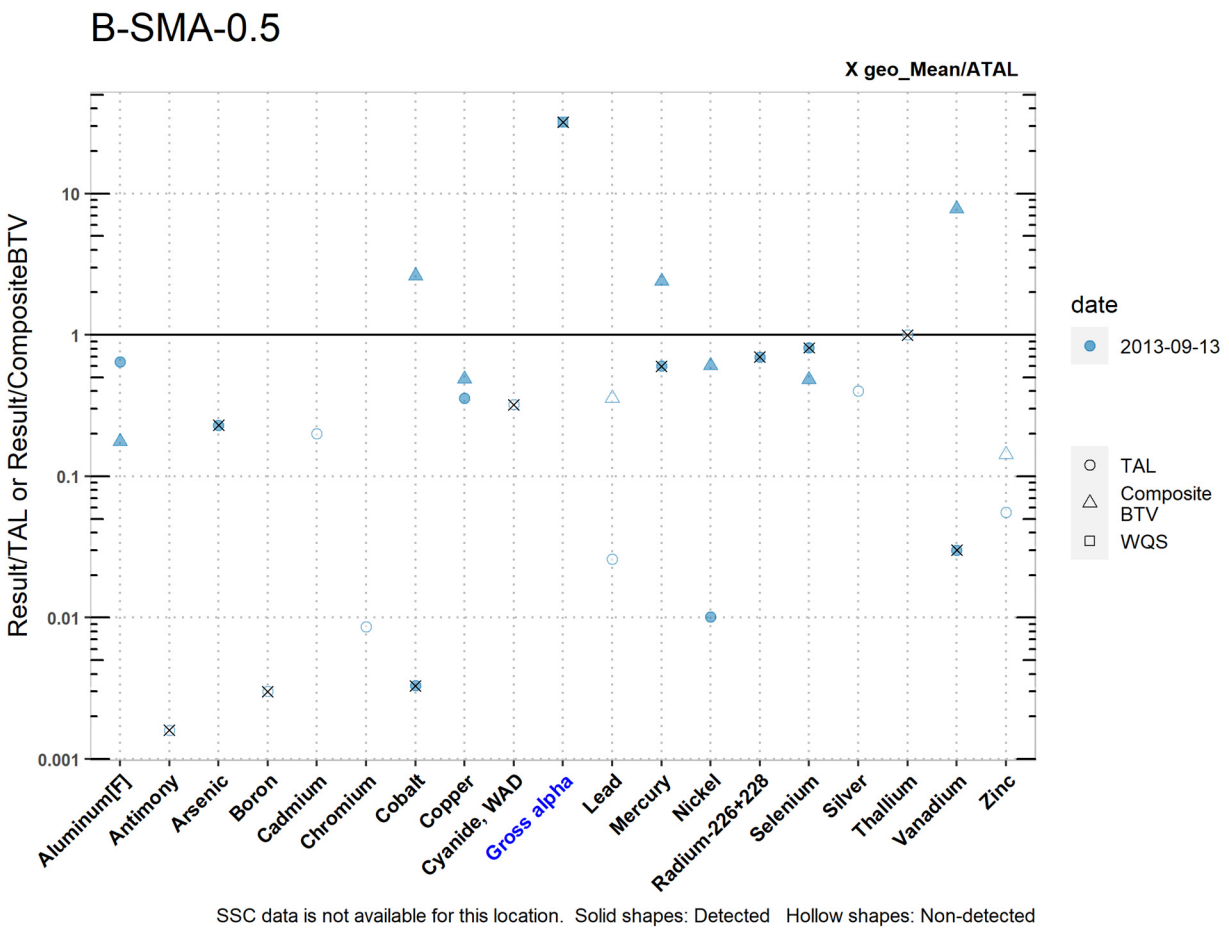

Figure 5.4-1 Analytical Results from Stormwater Sample, B-SMA-0.5 (Plot)

B-SMA-0.5

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	2760	NA	NA	NA	NA	NA	1.25	3.52	NA	56.7	1.40	0.194	3.10	4.63	8.36	NA	NA	0.387	23.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-09-13 result	485	*1.00*	2.08	*15.0*	*0.110*	*2.00*	3.28	1.71	*1.67*	486	*0.500*	0.464	1.88	20.9	4.03	*0.200*	*0.450*	3.02	*3.30*
2013-09-13 dT	0.647	NA	0.23	NA	NA	NA	0.0033	0.356	NA	32	NA	0.60	0.0101	0.697	0.81	NA	NA	0.030	NA
2013-09-13 dB	0.176	NA	NA	NA	NA	NA	2.62	0.486	NA	NA	NA	2.39	0.606	NA	0.482	NA	NA	7.80	NA
geo_mean/ATAL	NA	0.0016	0.23	0.0030	NA	NA	0.0033	NA	0.321	32	NA	0.60	NA	0.697	0.81	NA	1	0.030	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 5.4-2 Analytical Results from Stormwater Sample, B-SMA-0.5 (Table)

5.4.2 Assessment Unit and Stream Impairments

B-SMA-0.5 drains to Bayo Canyon (boundary of Pueblo de San Ildefonso to headwaters), which has not been assessed for impairments.

5.5 Site-Specific Demonstration

5.5.1 Soil Data Summary

Strontium-90 exceeded the applicable screening value in soil data and has not yet been measured in stormwater. It will be added to the SAP.

The metals that exceeded the applicable screening value in soil data were previously measured in stormwater and did not exceed TALs. Therefore, they will not be added to the SAP.

5.5.2 Stormwater Data Summary

Gross alpha exceeded the TAL, and radionuclides are a Site-related POC. Therefore, it will be added to the SAP.

5.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

5.5.4 Sampling and Analysis Plan

Table 5.5-1 is the proposed SAP for B-SMA-0.5.

Table 5.5-1 Proposed SAP, B-SMA-0.5

Monitoring Constituent	Background for Monitoring
Strontium-90	Site history and soil data
Gross alpha (1)	Site history and stormwater data
Tritium	Site history (radionuclides)
Total PCBs	Site history (organics)
SVOCs	Site history (organics)
Asbestos	Site history
DOC	Permit requirement
SSC	Permit requirement

6.0 B-SMA-1

Associated Sites	00-011(d)
Receiving Water	Bayo Canyon
Drainage Area	17.04 acres
Landscape Characteristics	8% impervious, 92% pervious
Consent Order Site Status	SWMU 00-011(d): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the July 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Long-Term Stewardship per Permit Part I.C.3.c criterion

6.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

SWMU 00-011(d) received a COC under the Consent Order in May 2013. The Permittees submitted a certification of completion of corrective action for the Site per Permit part I.E.2(d) in November 2013 (LANL 2013, 251268). Stormwater monitoring has not occurred since 2013.

6.2 Site History

00-011(d) (no date)

SWMU 00-011(d) is a former bazooka firing area, located on predominantly Los Alamos County land and a small section of private property, in a small north-trending tributary of Bayo Canyon. The Site, which operated between 1944 and 1948, is located northeast of the intersection of San Ildefonso Road and Diamond Drive. The 6-acre site is only partially fenced and is accessible to the public.

An investigation was conducted in 1992 to search for and remove UXO and OEW. OEW recovered from the site was found in the subsurface and was composed of about 0.5 yd^3 of tail-fin assemblies, motors, bullets, and other fragments from bazooka rockets. The 2007 Consent Order IR recommended the Site for corrective action complete without controls. The NMED approved the report with directions requiring biennial UXO surveys. NMED did not approve a request for COC without controls, but did approve a COC with controls for UXO. LANL requested that NMED rescind the COC with controls and reconsider the request for COC without controls, because the controls are not associated with requirements under the Consent Order.

For investigation activities, refer to “Investigation Report for Guaje/Barrancas/Rendija Canyons Aggregate Area at Technical Area 00, Revision 1” (LANL 2007, 099954).

6.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 6.2-1.

Table 6.2-1 POCs Known or Suspected to Be Used Historically At the Site

Site	Potential POC Source	Potential POCs
00-011(d)	Former bazooka firing area	Copper, lead, iron, HE

6.3 Consent Order Soil Data

Decision-level data for SWMU 00-011(d) consist of results collected from 2007. Analytical results from those samples are presented in Figures 6.3-1 through 6.3-3. The approved IR concluded that the lateral and vertical extent of all detected chemicals are defined at SWMU 00-011(d).

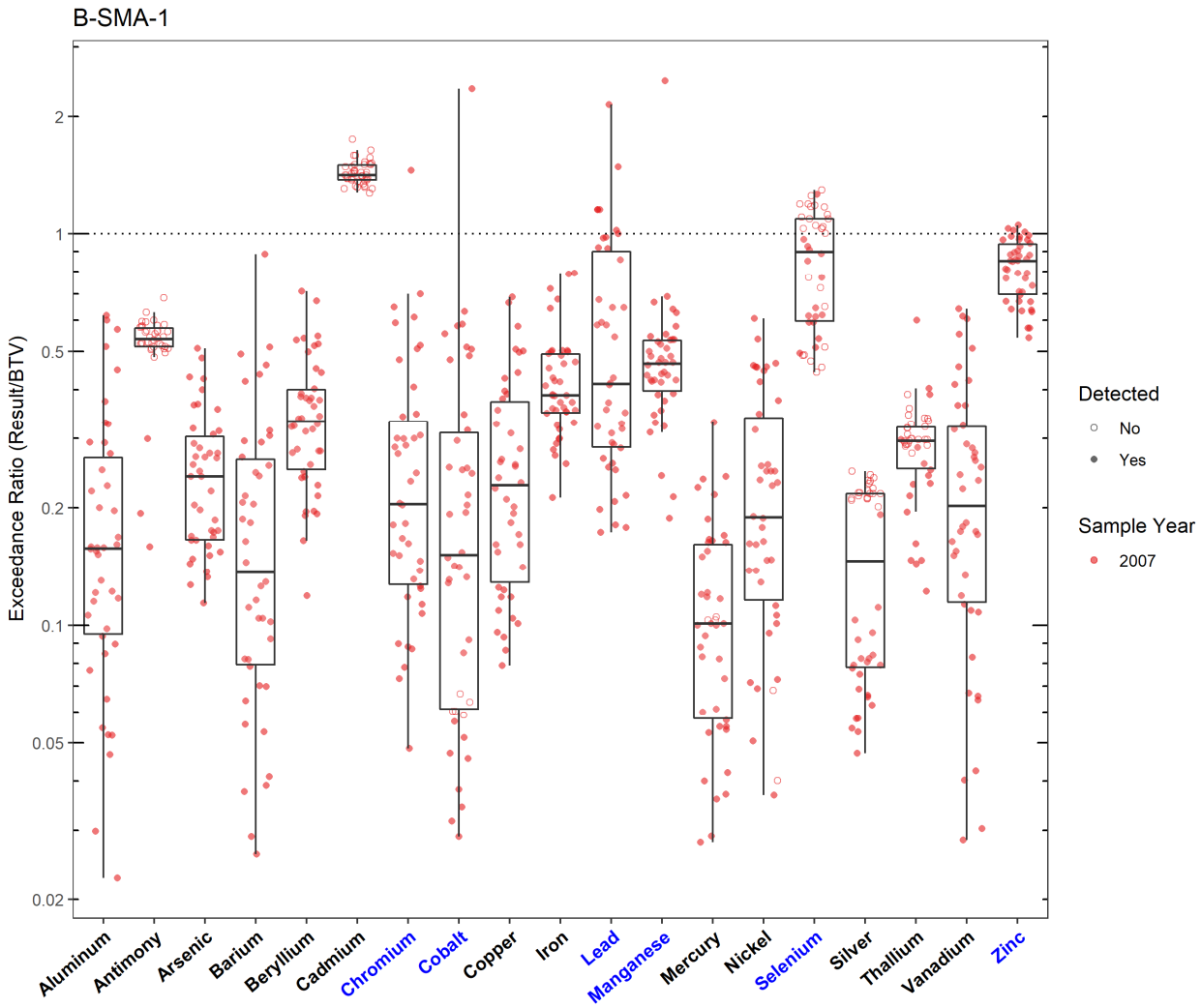

Figure 6.3-1 Inorganics Analytical Results from Soil Samples Associated with B-SMA-1

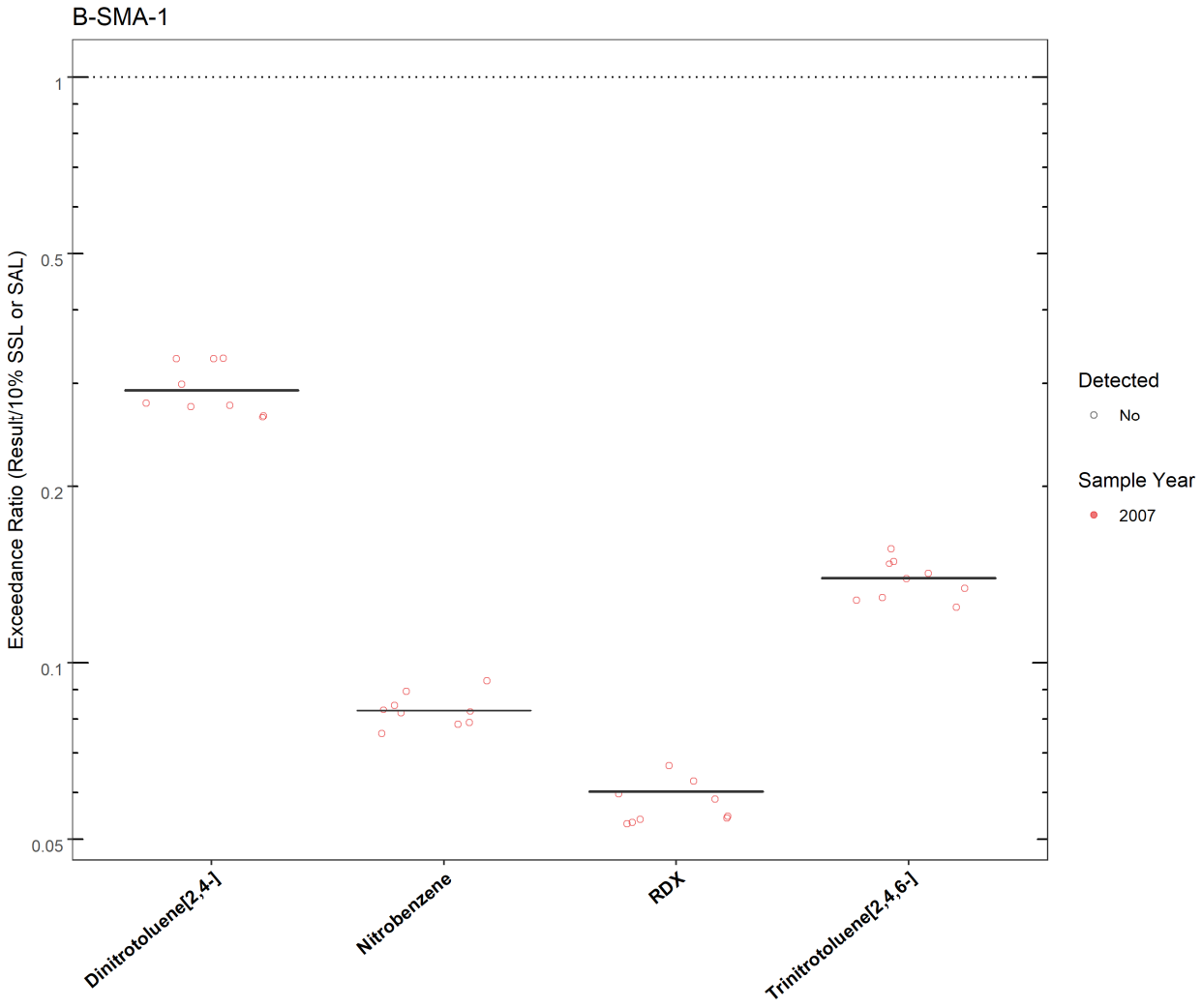

Figure 6.3-2 Organics Analytical Results from Soil Samples Associated with B-SMA-1

B-SMA-1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Chromium	B-SMA-1	Cr	Y	BTV	19.3	27.9	2007-02-06
Cobalt	B-SMA-1	Co	Y	BTV	8.64	20.3	2007-02-06
Lead	B-SMA-1	Pb	Y	BTV	22.3	47.7	2007-02-06
Manganese	B-SMA-1	Mn	Y	BTV	671	1650	2007-02-06
Selenium	B-SMA-1	Se	Y	BTV	1.52	1.92	2007-02-01
Zinc	B-SMA-1	Zn	Y	BTV	48.8	51.4	2007-02-07

Figure 6.3-3 Screening-Level Exceedances from Soil Samples Associated with B-SMA-1

6.4 Stormwater Evaluation

6.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Following the installation of baseline control measures, a baseline stormwater sample was collected in September 2013. Analytical results from this sample are presented in Figures 6.4-1 and 6.4-2.

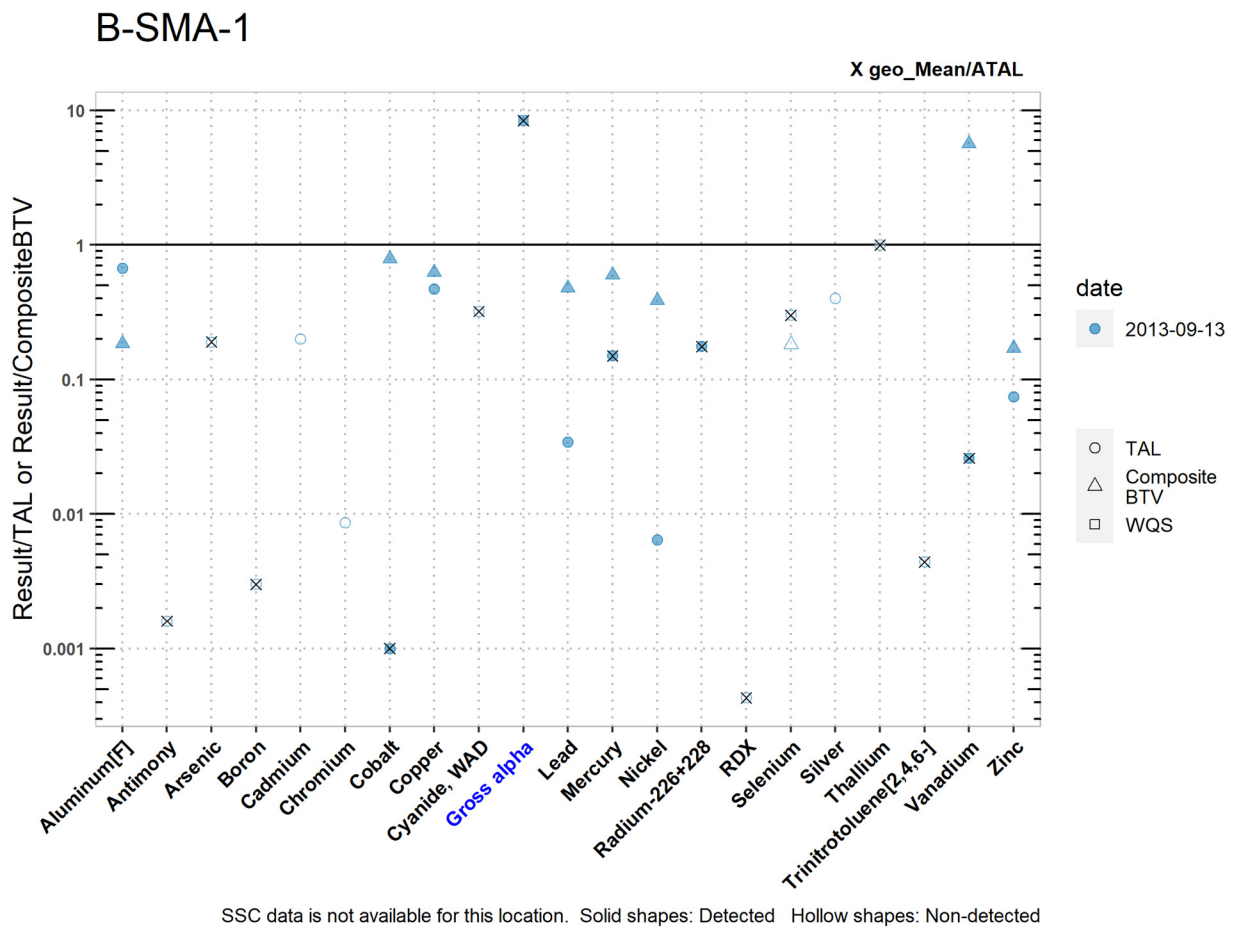

Figure 6.4-1 Analytical Results from Stormwater Sample, B-SMA-1 (Plot)

B-SMA-1

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	RDX	Selenium	Silver	Thallium	Trinitrotoluene [2,4,6-]	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	NA	5	0.5	0.5	NA	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	200	5	NA	0.47	20	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	2720	NA	NA	NA	NA	NA	1.27	3.61	NA	56.6	1.38	0.191	3.10	4.73	NA	8.23	NA	NA	NA	0.470	25.8
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-09-13 result	502	*1.00*	*1.70*	*15.0*	*0.110*	*2.00*	1.00	2.26	*1.67*	126	0.663	0.114	1.20	5.27	*0.0870*	*1.50*	*0.200*	*0.450*	*0.0870*	2.65	4.41
2013-09-13 dT	0.669	NA	NA	NA	NA	NA	0.0010	0.471	NA	8.4	0.0344	0.15	0.00645	0.176	NA	NA	NA	NA	NA	0.026	0.0745
2013-09-13 dB	0.185	NA	NA	NA	NA	NA	0.787	0.626	NA	NA	0.480	0.597	0.387	NA	NA	NA	NA	NA	NA	5.64	0.171
geo_mean/ATAL	NA	0.0016	0.19	0.0030	NA	NA	0.0010	NA	0.321	8.4	NA	0.15	NA	0.176	0.00043	0.30	NA	1	0.0044	0.026	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 6.4-2 Analytical Results from Stormwater Sample, B-SMA-1 (Table)

6.4.2 Assessment Unit and Stream Impairments

B-SMA-1 drains to Bayo Canyon (boundary of Pueblo de San Ildefonso to headwaters) which has not been assessed for impairments.

6.5 Site-Specific Demonstration

6.5.1 Soil Data Summary

Iron is a Site-related POC but did not exceed the applicable screening value in soil data. Therefore, it will not be added to the SAP.

The remaining metals that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs, therefore they will not be added to the SAP.

6.5.2 Stormwater Data Summary

Gross alpha exceeded the TAL, and there was no paired SSC result to confirm whether it was below BTV. Monitoring for gross alpha is only required if the SMA drains to an assessment unit that is impaired for gross alpha or if it is a Site-related constituent. The assessment unit to which B-SMA-1 drains is not impaired for gross alpha, and radionuclides are not a Site-related POC. Therefore, it will not be added to the SAP.

6.5.3 2022 Permit Status

The SMA is eligible for long-term stewardship. Gross alpha was the sole TAL exceedance, and, pursuant to Part I.C.3.c of the permit, this SMA has been screened into long term stewardship.

7.0 ACID-SMA-1.05

Associated Sites	SWMU 00-030(g)
Receiving Water	Acid Canyon - Tributary to Pueblo Canyon
Drainage Area	24.35 acres
Landscape Characteristics	27% impervious, 73% pervious
Consent Order Site Status	SWMU 00-030(g): In Progress
2010 Administratively Continued AC Permit Final Status	Extended Baseline Monitoring
2016–2018 SIP Actions	Based on the August 2017 field visits, the sampler was moved downgradient in the drainage near location 00-10237 (elevated detection of mercury) to include more of the potentially affected area.
2022 Permit Status	Active Monitoring

7.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to the EPA, a baseline stormwater sample was collected in August 2011. This sample had no TAL exceedances, and stormwater monitoring ceased until 2020. Monitoring resumed in 2020 to continue baseline confirmation monitoring to collect a second sample with all results below the applicable MTAL or ATAL so the Permittees could make a Site deletion request per Permit part I.I.2.

During development of the 2020 SAP, Permittees decided to implement the monitoring location move recommended during the 2017 SIP review. Because of the move, analytical results from the 2011 sample will no longer be used for confirmation-monitoring purposes. Since the relocation, stormwater flow has not been sufficient for full-volume sample collection and monitoring is ongoing.

7.2 Site History

00-030(g) (6/12/2017)

SWMU 00-030(g) was a sanitary septic system installed north of Canyon Road, west of the Canyon Road and Central Avenue Intersection, and directly east of the former Catholic Church (3200 Canyon Road) in former TA-00. The septic system consisted of a septic tank (referred to as Septic Tank #6), an inlet drainline, VCP outlet drainline, and an outfall that discharged to Acid Canyon.

The septic system was installed in the early 1940s and likely received sanitary waste from the original townsite and from early Laboratory operations at TA-01. Waste from TA-01 facilities may have included isotopic plutonium, polonium, uranium, and mercury. Septic Tank #6 consisted of reinforced concrete and measured 32 ft long × 22 ft wide × 6.5 ft deep. A center baffle separated the tank into east and west chambers. Effluent from the septic system discharged through an outfall to a drainage channel in Acid Canyon, a side canyon to Pueblo Canyon, in an area owned by Los Alamos County.

The septic system was decommissioned when the CWWTP (SWMU 00-019) came online in 1947. The septic tank and associated drainlines were removed in 1993; however, the inlet line was never discovered and may have been removed during the installation of a gas pipeline that crosses the Site. The former tank location is on private property that is currently used as an access driveway and parking lot for apartments. There were no known releases from this septic system other than the designed discharges of effluent to the outfall at the edge of the mesa.

For investigation activities refer to "RFI Report for SWMU 00-030(g)" (LANL 2001, 070273) and associated submittals to "Response to Request for Supplemental Information for the RFI Report for SWMU 00-030(g)" (LANL 2003, 079263).

7.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 7.2-1.

Table 7.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-030(g)	Septic System	Metals, mercury, organic chemicals, plutonium, uranium, polonium

7.3 Consent Order Soil Data

Decision-level data for SWMU 00-030(g) consist of results from samples collected in 1996, 1998, and 1999 (Figures 7.3-1 through 7.3-4). Analytical results from those samples are presented in Figures 7.3-1 through 7.3-4. The RFI report concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

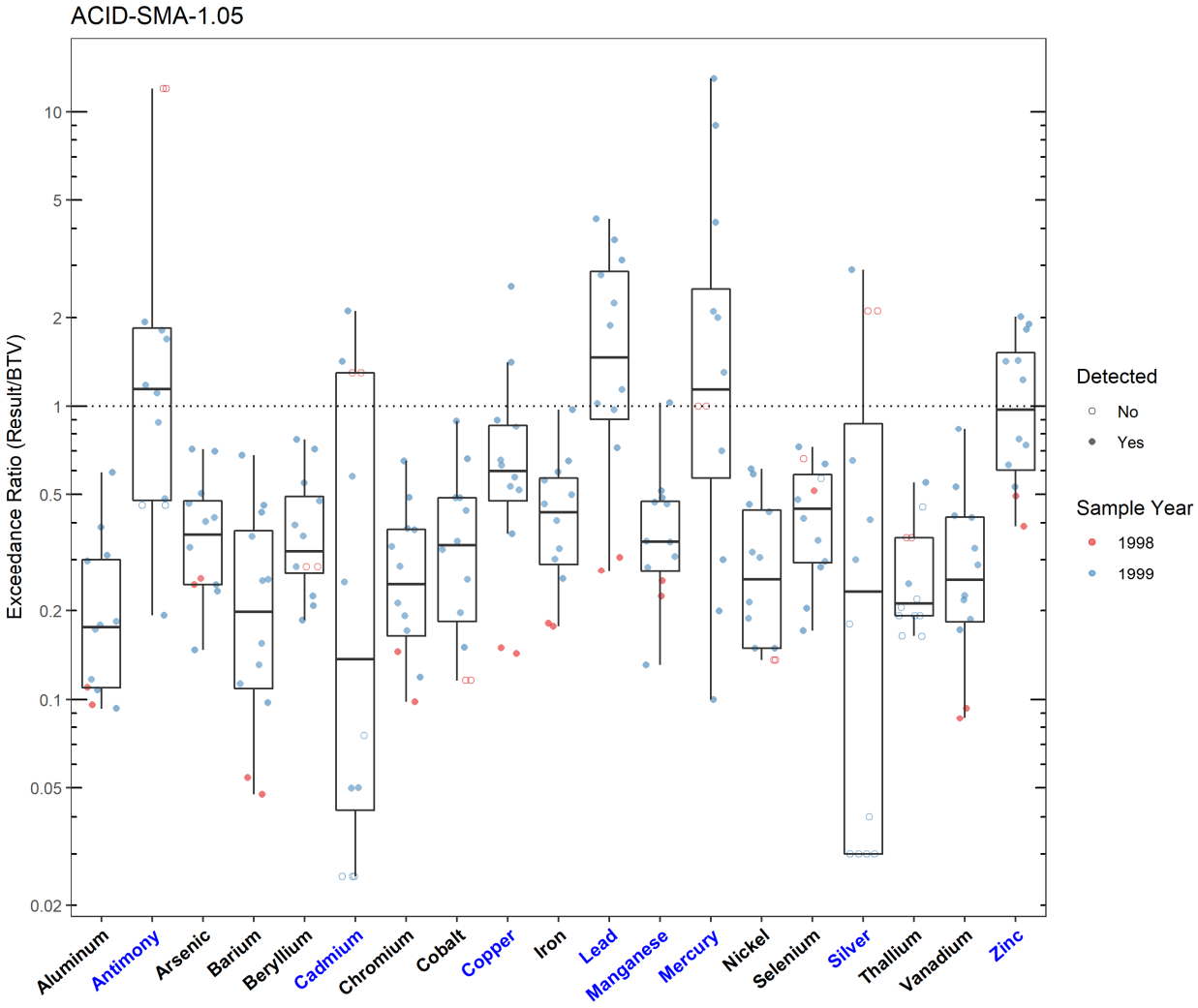

Figure 7.3-1 Inorganics Analytical Results from Soil Samples Associated with ACID-SMA-1.05

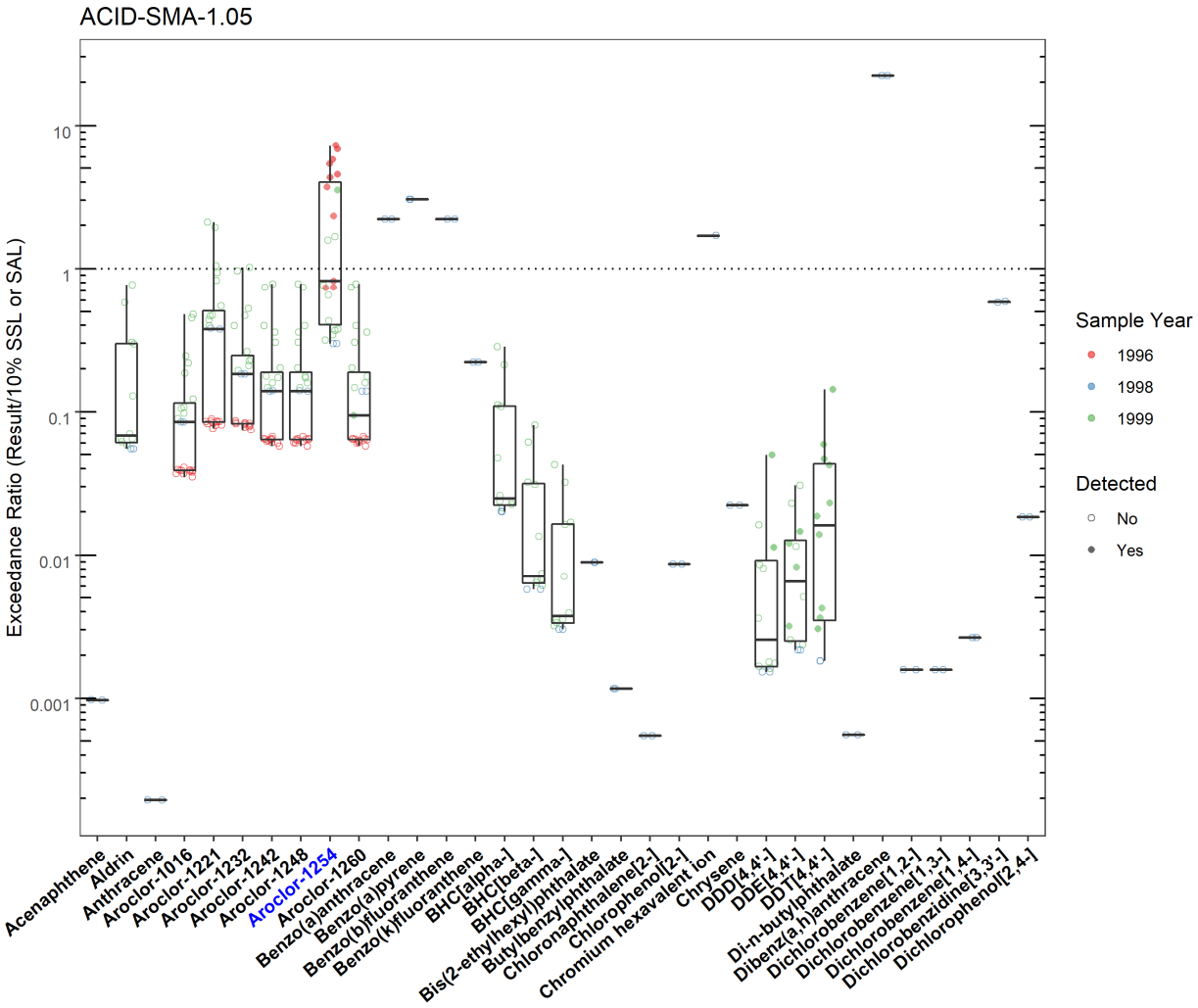

Figure 7.3-2 Organics Analytical Results from Soil Samples Associated with ACID-SMA-1.05 (Plot 1)

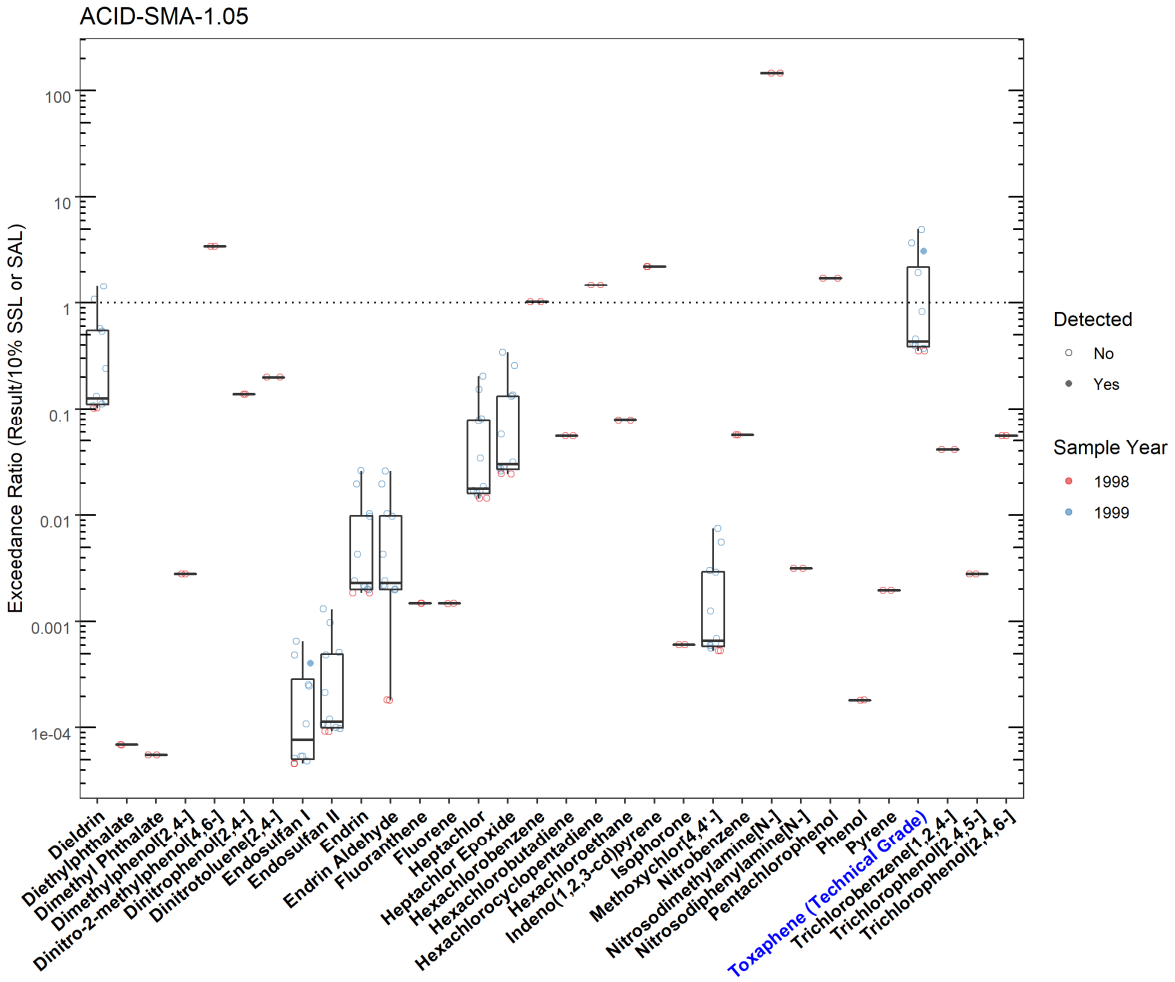

Figure 7.3-3 Organics Analytical Results from Soil Samples Associated with ACID-SMA-1.05 (Plot 2)

ACID-SMA-1.05

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	ACID-SMA-1.05	Sb	Y	BTV	0.830	1.60	1999-05-03
Aroclor-1254	ACID-SMA-1.05	11097-69-1	Y	SSL_0.1	0.114	0.828	1996-10-17
Cadmium	ACID-SMA-1.05	Cd	Y	BTV	0.400	0.840	1999-09-29
Copper	ACID-SMA-1.05	Cu	Y	BTV	14.7	37.5	1999-09-29
Lead	ACID-SMA-1.05	Pb	Y	BTV	22.3	96.4	1999-05-03
Manganese	ACID-SMA-1.05	Mn	Y	BTV	671	693	1999-09-29
Mercury	ACID-SMA-1.05	Hg	Y	BTV	0.100	1.30	1999-05-03
Silver	ACID-SMA-1.05	Ag	Y	BTV	1.00	2.90	1999-05-03
Toxaphene (Technical Grade)	ACID-SMA-1.05	8001-35-2	Y	SSL_0.1	0.484	1.50	1999-09-29
Zinc	ACID-SMA-1.05	Zn	Y	BTV	48.8	97.9	1999-09-29

Figure 7.3-4 Screening-Level Exceedances from Soil Samples Associated with ACID-SMA-1.05

7.4 Stormwater Evaluation

7.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current location at the SMA.

7.4.2 Assessment Unit and Stream Impairments

ACID-SMA-1.05 drains to Acid Canyon (Pueblo Canyon to headwaters) which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. These impairments may be Site-related, based on the Site history.

7.5 Site-Specific Demonstration

7.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: Aroclor-1254, antimony, cadmium, copper, lead, mercury, silver, and zinc.

Toxaphene exceeded the applicable screening value in soil data, but is not a Site-related POC and will not be added to the SAP.

7.5.2 Stormwater Data Summary

No confirmation-monitoring data.

7.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current monitoring location.

7.5.4 Sampling and Analysis Plan

Table 7.5-1 is the proposed SAP for ACID-SMA-1.05.

Table 7.5-1 Proposed SAP, ACID-SMA-1.05

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (plutonium, uranium, polonium)
Total PCBs	Impairment, Site history (organic chemicals), and soil data
Dissolved antimony, cadmium, copper, lead, manganese, silver, zinc	Impairment (copper), Site history (metals), and soil data
Total aluminum and mercury	Impairment (aluminum), Site history (metals), and soil data
SVOCs	Site history (organic chemicals)
DOC	Permit requirement
SSC	Permit requirement

8.0 ACID-SMA-2

Associated Sites	01-002(b)-00, 45-001, 45-002, 45-004
Receiving Water	Acid Canyon - Tributary to Pueblo Canyon
Drainage Area	52.44 acres
Landscape Characteristics	27% impervious, 73% pervious
Consent Order Site Status	SWMU 01-002(b)-00: Pending Receipt of Certificate of Completion SWMU 45-001: Pending Approval of Permit Modification Request. Certificate of Completion Received Without Controls SWMU 45-002: Pending Approval of Permit Modification Request. Certificate of Completion Received Without Controls SWMU 45-004: Pending Approval of Permit Modification Request. Certificate of Completion Received Without Controls
2010 Administratively Continued Permit Final Status	Alternative Compliance Requested/Corrective Action Complete
2016–2018 SIP Actions	Based on the 2016 field visits, the current sampler location does not include part of the impacted area where there are high detections of radionuclides in soil. Therefore, the sampler was moved down the drainage to better characterize runoff from the Site.
2022 Permit Status	Active Monitoring

8.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

Following the October 2016 certification to EPA of enhanced control installation as a corrective action (LANL 2016, 601865.1), a corrective action stormwater sample was collected in November 2016. During development of the 2017 SAP, a decision was made to implement the monitoring location move recommended during the 2016 SIP review. Because of the monitoring location move, analytical results from the 2016 sample could no longer be used for confirmation-monitoring purposes. After the move, two corrective action stormwater samples were collected in July 2017.

SWMUs 45-001, 45-002, and 45-004 received COCs under the Consent Order in February 2013. The Permittees submitted a certification of completion of corrective action per Permit part I.E.2(d) for the SWMUs in March 2013 (LANL 2013, 237754).

The Permittees submitted a request for alternative compliance per permit Part I.E.3 on April 22, 2019, for SWMU 01-002(b)-00 (N3B 2019, 700401). No response has been received from EPA, and stormwater monitoring has not occurred since 2017.

8.2 Site History

For investigation activities at the Sites, refer to “Phase II Investigation Report for Pueblo Canyon Aggregate Area” (LANL 2010, 110864).

01-002(b)-00 (6/12/2017)

SWMU 01-002(b)-00 consists of a former TA -01 industrial waste line outfall and drainage area in Acid Canyon. The outfall was located within the boundaries of TA-45, at the head of a small branch of Acid

Canyon known as the south fork of Acid Canyon. Untreated RLW generated in laboratories and research facilities in former TA-01 was discharged to this outfall from 1943 until 1951. Approximately 4.8 million gal./yr of untreated RLW were discharged to the SWMU 01-002(b)-00 outfall during this period. Average plutonium concentrations in the RLW ranged from 1000 to 10,000 pCi/L, resulting in a total estimated discharge of 1.9 g of plutonium. Discharges of untreated RLW ceased when the TA-45 RLW treatment plant began operation in 1951. However, releases of treated RLW continued until 1964.

In 1966, the SWMU 01-002(b)-00 outlet drainline, associated weir box, and contaminated tuff around the outfall and from the canyon cliff and drainage below the outfall were removed and disposed of at TA-54 as part of the D&D of the TA-45 RLW treatment plant. The TA-45 property was transferred to Los Alamos County in September 1967. In 1985, the last remnants of the industrial waste line between TA-01 and the SWMU 01-002(b)-00 outfall were removed and disposed of at TA-54. SWMU 01-002(b)-00 was part of SWMU 01-002, which was split into two units [SWMUs 01-002(a)-00 and 01-002(b)-00] in 2000.

45-001 (no date)

SWMU 45-001 consists of the former TA-45 liquid waste treatment plant and its two associated outfalls. The TA-45 liquid waste treatment plant (building 45-2) was the first such facility at LANL and was located near the current intersection of Canyon Road and Central Avenue in the Los Alamos townsite. The treatment plant began operation in 1951 and operated until 1961. The capacity of the plant was originally 90 gal./min but was expanded to 145 gal./min in 1957. The treatment plant included neutralization and storage tanks, flocculation tanks, sedimentation basins, vacuum filters, and granular media filters. Effluent from the plant discharged to Acid Canyon through outfalls located near the canyon rim. One outfall was used to discharge treated wastewater and the other was connected to floor drains in building 45-2.

Operation of the treatment plant ceased after the new RLW treatment facility was constructed at TA-50. D&D of SWMU 45-001 began in October 1966 and included demolition and removal of the treatment plant equipment, facilities, and waste lines, and excavation of contaminated soil. In September 1967, the TA-45 property was transferred to Los Alamos County.

45-002 (no date)

SWMU 45-002 consists of a former vehicle decontamination facility (former building 45-1), located adjacent to the TA-45 wastewater treatment plant, which was used to remove radioactive contamination from vehicles and large equipment, filters from the Sigma Building, trash dumpsters, and wing tanks from airplanes. SWMU 45-002 was located approximately 40 ft south of the TA-45 RLW treatment plant (SWMU 45-001). Vehicles and other equipment were decontaminated by steam cleaning. Decontamination wastewater was initially discharged to Acid Canyon, and later routed to the RLW treatment plant. The decontamination facility began operation in 1952 and was operated approximately once per month. The facility was decommissioned in 1966.

45-004 (no date)

SWMU 45-004 consists of a former sanitary sewer outfall. This outfall was associated with the sanitary sewer system that was constructed at TA-45 in 1947 to serve the Los Alamos townsite. This sewer system included a sanitary sewer lift station (structure 45-3) and sanitary sewer manholes (structures 45-5 and 45-6). The outfall was located north of the lift station, approximately 100 ft north of the TA-45 treatment plant (SWMU 45-001), and was used for emergency discharge of overflow. The outfall discharged into a drainage channel leading into Acid Canyon. The sanitary sewer system was transferred to Los Alamos County in 1967.

8.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 8.2-1.

Table 8.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-002(b)-00	Outfall associated with TA-01	Plutonium, uranium, americium, thorium, tritium, cesium-137, strontium-90, metals
45-001	Soil contamination from former RLW treatment plant	Plutonium, uranium, americium, thorium, tritium, cesium-137, strontium-90
45-002	Soil contamination from former decontamination facility	Radionuclides
45-004	Sanitary sewer outfall	Inorganic and organic chemicals

8.3 Consent Order Soil Data

Decision-level data for SWMU 01-002(b)-00 consist of results from samples collected in 1999, 2000 and 2001. Analytical results from those samples are presented in Figures 8.3-1 through 8.3-5). The 2002 IA completion report concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted (LANL 2002, 073660).

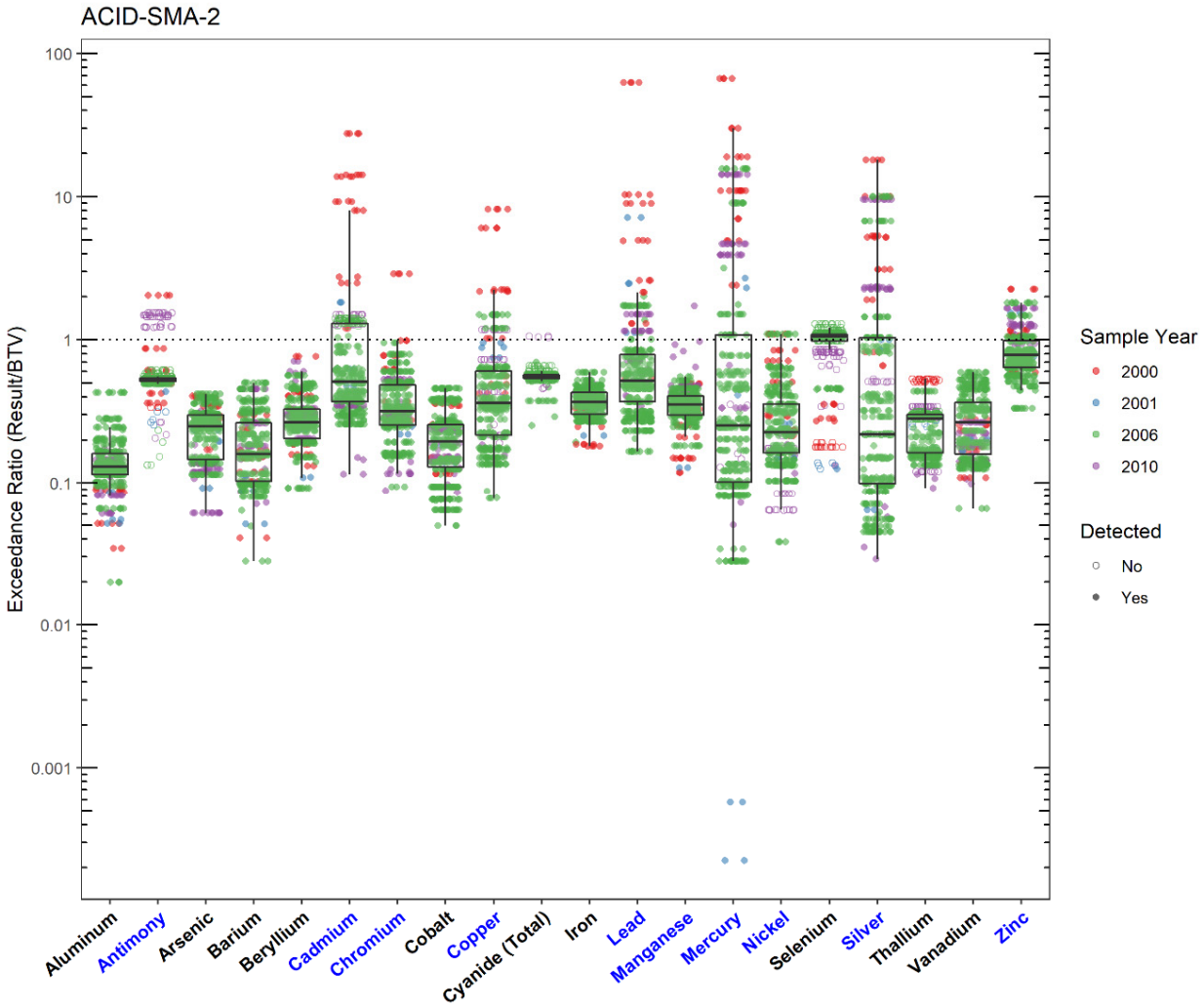

Figure 8.3-1 Inorganics Analytical Results from Soil Samples Associated with ACID-SMA-2

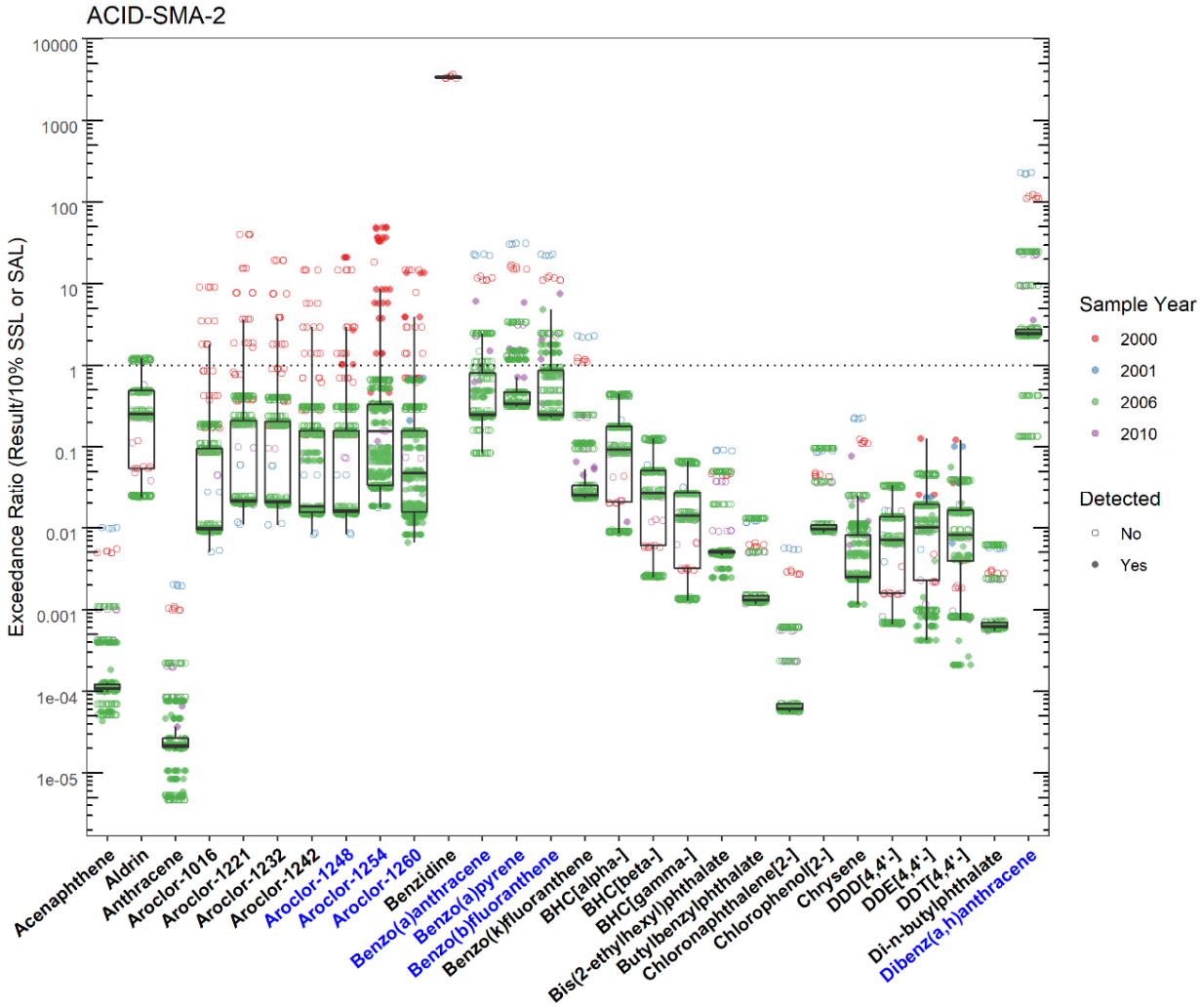

Figure 8.3-2 Organics and Radionuclides Analytical Results from Soil Samples Associated with ACID-SMA-2 (Plot 1)

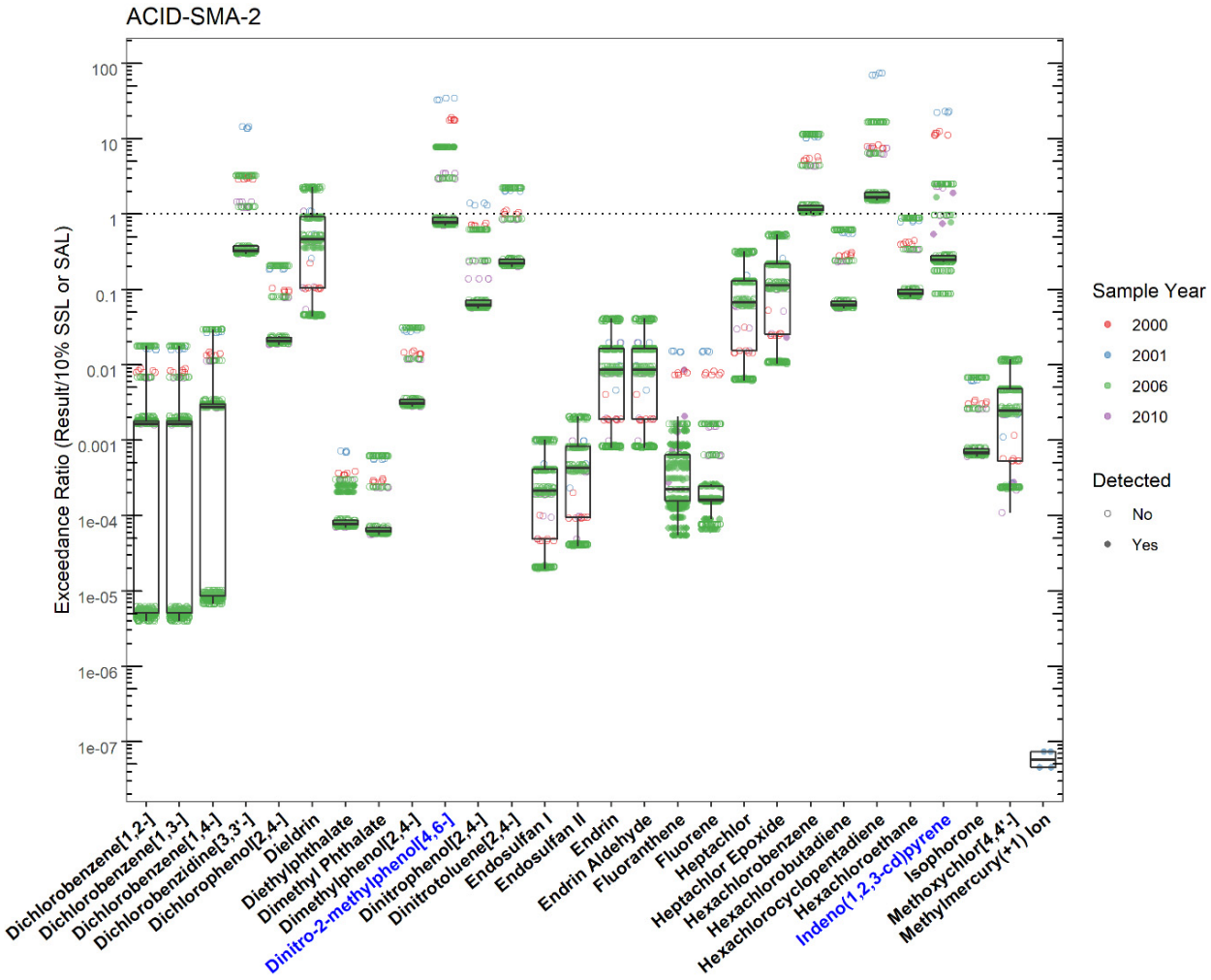

Figure 8.3-3 Organics and Radionuclides Analytical Results from Soil Samples Associated with ACID-SMA-2 (Plot 2)

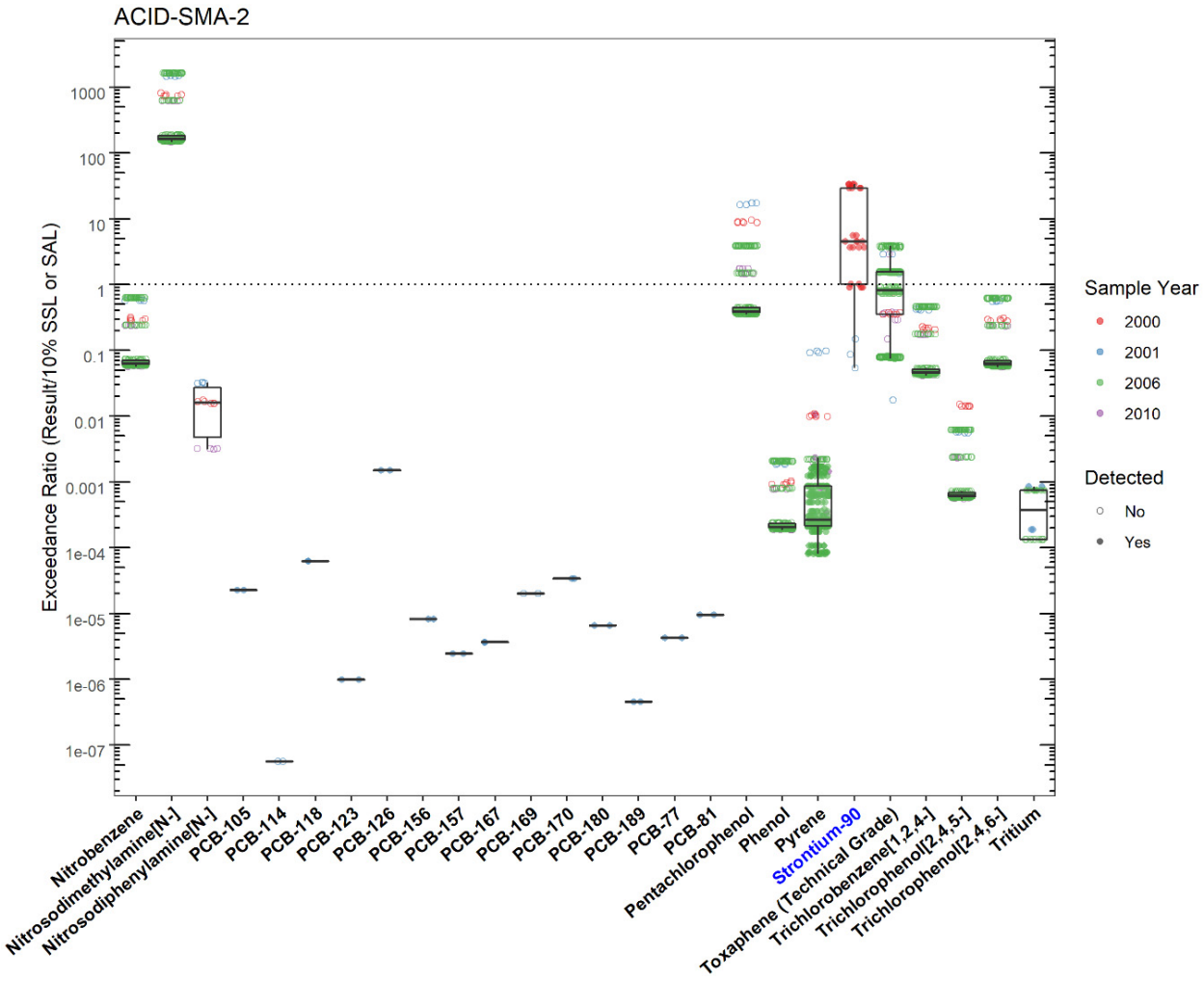

Figure 8.3-4 Organics and Radionuclides Analytical Results from Soil Samples Associated with ACID-SMA-2 (Plot 3)

ACID-SMA-2

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	ACID-SMA-2	Sb	Y	BTV	0.830	1.70	2000-08-31
Aroclor-1248	ACID-SMA-2	12672-29-6	Y	SSL_0.1	0.243	5.10	2000-09-11
Aroclor-1254	ACID-SMA-2	11097-69-1	Y	SSL_0.1	0.114	5.60	2000-08-31
Aroclor-1260	ACID-SMA-2	11096-82-5	Y	SSL_0.1	0.243	3.30	2000-09-11
Benzo(a)anthracene	ACID-SMA-2	56-55-3	Y	SSL_0.1	0.153	0.934	2010-03-01
Benzo(a)pyrene	ACID-SMA-2	50-32-8	Y	SSL_0.1	0.112	0.657	2010-03-01
Benzo(b)fluoranthene	ACID-SMA-2	205-99-2	Y	SSL_0.1	0.153	1.15	2010-03-01
Cadmium	ACID-SMA-2	Cd	Y	BTV	0.400	11.0	2000-08-31
Chromium	ACID-SMA-2	Cr	Y	BTV	19.3	56.0	2000-08-31
Copper	ACID-SMA-2	Cu	Y	BTV	14.7	120	2000-08-31
Dibenz(a,h)anthracene	ACID-SMA-2	53-70-3	Y	SSL_0.1	0.0153	0.0549	2010-03-01
Dinitro-2-methylpheno[4,6-]	ACID-SMA-2	534-52-1	Y	SSL_0.1	0.493	3.79	2006-07-25
Indeno(1,2,3-cd)pyrene	ACID-SMA-2	193-39-5	Y	SSL_0.1	0.153	0.291	2010-03-01
Lead	ACID-SMA-2	Pb	Y	BTV	22.3	1400	2000-08-31
Manganese	ACID-SMA-2	Mn	Y	BTV	671	1160	2010-03-01
Mercury	ACID-SMA-2	Hg	Y	BTV	0.100	6.70	2000-08-31
Nickel	ACID-SMA-2	Ni	Y	BTV	15.4	17.0	2000-08-31; 2006-08-17
Silver	ACID-SMA-2	Ag	Y	BTV	1.00	18.0	2000-08-31
Strontium-90	ACID-SMA-2	Sr-90	Y	SAL_0.1	1.50	50.2	2000-08-31
Zinc	ACID-SMA-2	Zn	Y	BTV	48.8	110	2000-08-31

Figure 8.3-5 Screening-Level Exceedances from Soil Samples Associated with ACID-SMA-2

8.4 Stormwater Evaluation

8.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in July 2017. Analytical results from these samples are presented in Figures 8.4-1 through 8.4-4.

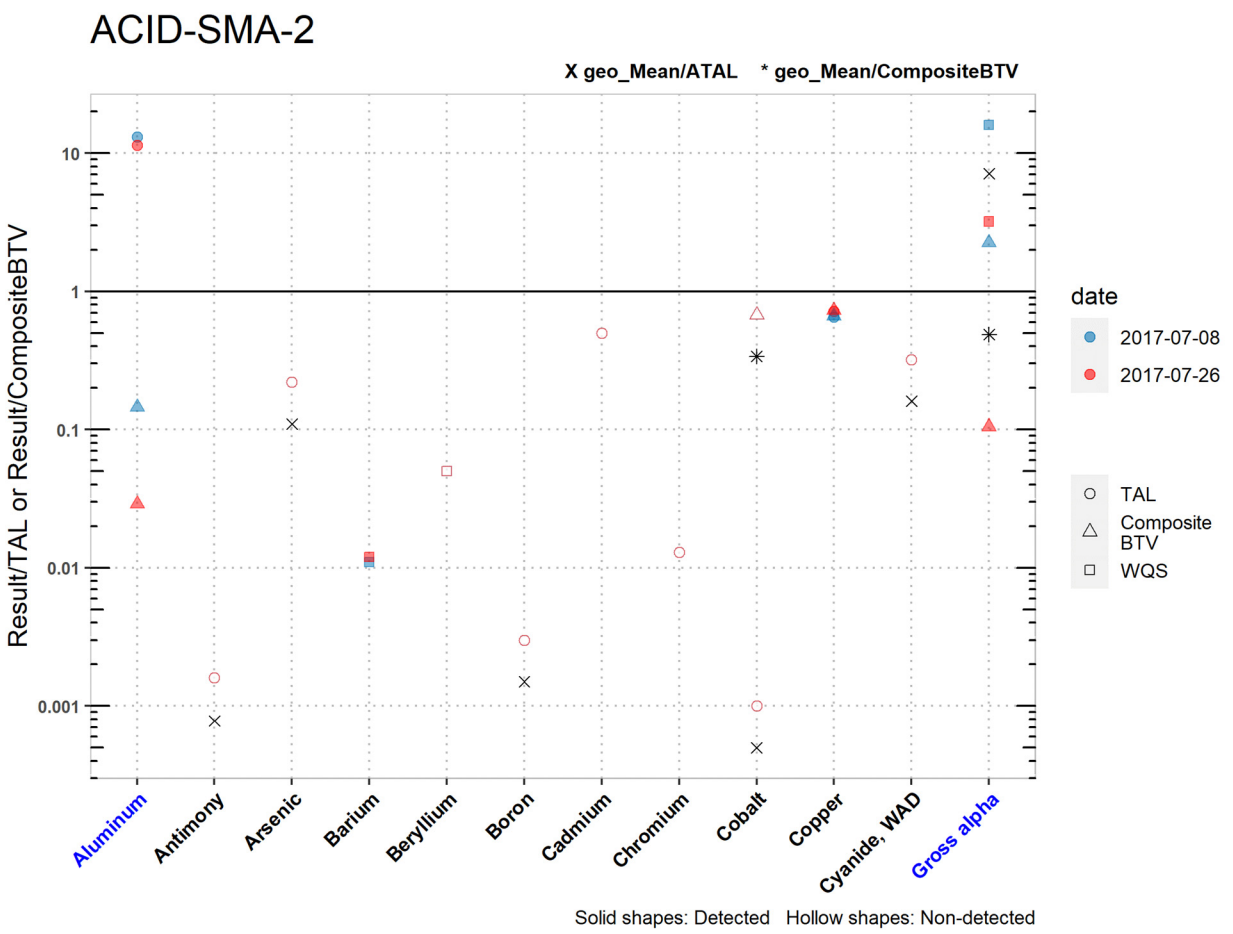

Figure 8.4-1 Analytical Results from Stormwater Samples, ACID-SMA-2 (Plot 1)

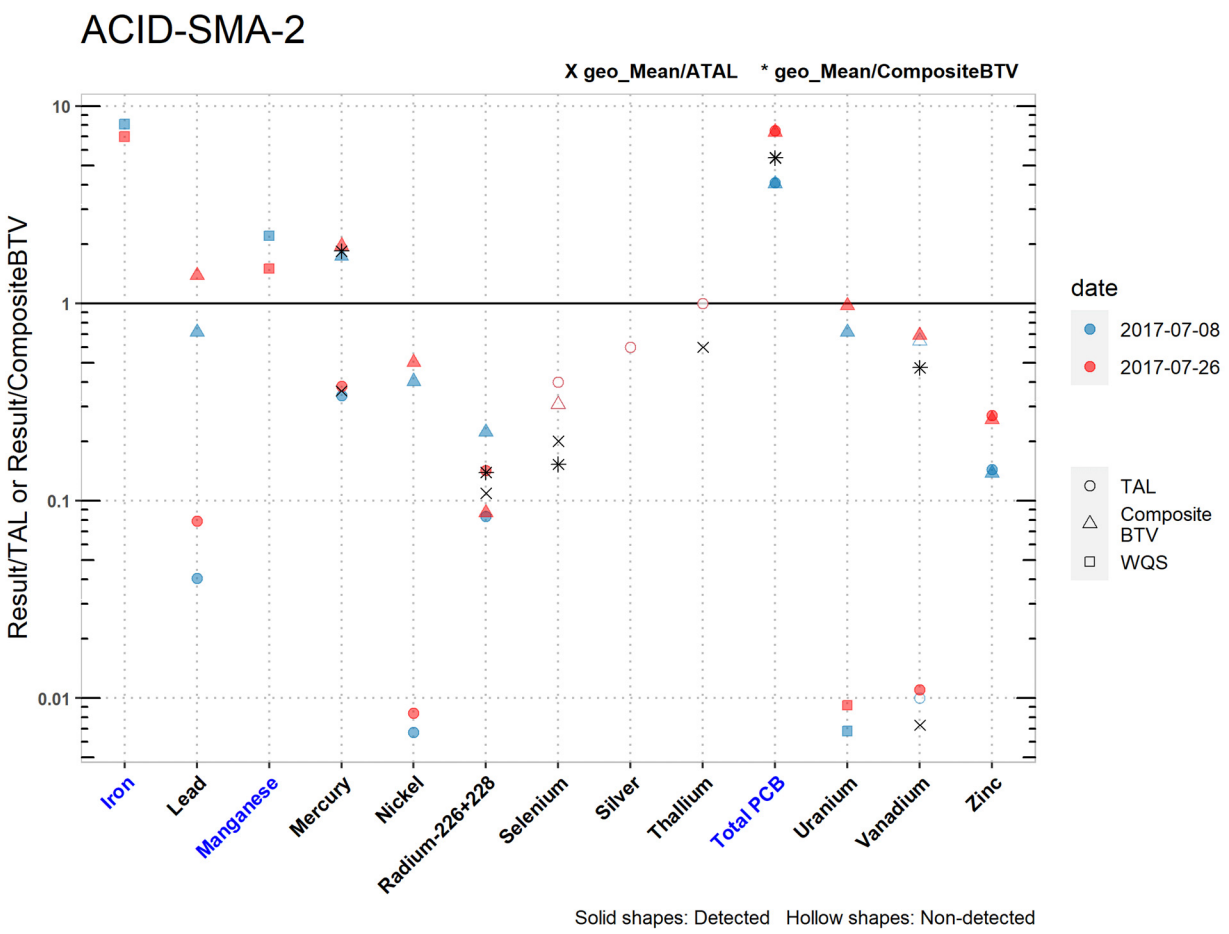

Figure 8.4-2 Analytical Results from Stormwater Samples, ACID-SMA-2 (Plot 2)

ACID-SMA-2

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	36400	NA	NA	NA	NA	NA	NA	NA	1.48	4.74	NA	55.1
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2017-07-08 result	10000	*1.00*	*2.00*	21.4	*0.200*	*15.0*	*0.300*	*3.00*	*1.00*	3.14	*1.67*	236
2017-07-08 dT	13.1	NA	NA	0.011	NA	NA	NA	NA	NA	0.654	NA	16
2017-07-08 dB	0.145	NA	NA	NA	NA	NA	NA	NA	NA	0.662	NA	2.25
2017-07-26 result	8750	*1.00*	*2.00*	23.3	*0.200*	*15.0*	*0.300*	*3.00*	*1.00*	3.45	*1.67*	47.9
2017-07-26 dT	11.4	NA	NA	0.012	NA	NA	NA	NA	NA	0.719	NA	3.2
2017-07-26 dB	0.0290	NA	NA	NA	NA	NA	NA	NA	NA	0.728	NA	0.105
geo_mean/ATAL	NA	0.00078	0.11	NA	NA	0.0015	NA	NA	0.00050	NA	0.161	7.1
geo_mean/B	NA	NA	NA	NA	NA	NA	NA	NA	0.338	NA	NA	0.486

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 8.4-3 Analytical Results from Stormwater Samples, ACID-SMA-2 (Table 1)

ACID-SMA-2

	Iron	Lead	Manganese	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.005	0.5	NA	5	0.5	0.5	0.2	NA	50	20
ATAL	NA	NA	NA	0.77	NA	30	5	NA	0.47	0.014	NA	100	NA
MTAL	NA	19.3	NA	NA	186	NA	20	0.49	NA	NA	NA	NA	59.2
Composite_BTV	NA	1.09	NA	0.151	3.10	5.91	6.52	NA	NA	0.0142	0.283	1.55	62.1
unit	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2017-07-08 result	8110	0.782	259	0.262	1.25	2.50	*2.00*	*0.300*	*0.600*	0.0573	0.203	*1.00*	8.55
2017-07-08 dT	8.1	0.0405	2.2	0.34	0.00672	0.0833	NA	NA	NA	4.1	0.0068	NA	0.144
2017-07-08 dB	NA	0.717	NA	1.74	0.403	0.223	NA	NA	NA	4.04	0.717	NA	0.138
2017-07-26 result	7040	1.52	177	0.296	1.56	4.26	*2.00*	*0.300*	*0.600*	0.105	0.276	1.07	16.0
2017-07-26 dT	7.0	0.0788	1.5	0.38	0.00839	0.142	NA	NA	NA	7.5	0.0092	0.011	0.270
2017-07-26 dB	NA	1.39	NA	1.96	0.503	0.0868	NA	NA	NA	7.39	0.975	0.690	0.258
geo_mean/ATAL	NA	NA	NA	0.36	NA	0.109	0.20	NA	0.6	5.5	NA	0.0073	NA
geo_mean/B	NA	NA	NA	1.84	NA	0.139	0.153	NA	NA	5.46	NA	0.472	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g

Figure 8.4-4 Analytical Results from Stormwater Samples, ACID-SMA-2 (Table 2)

8.4.2 Assessment Unit and Stream Impairments

ACID-SMA-2 drains to South Fork Acid Canyon (Acid Canyon to headwaters), which has impairments for adjusted gross alpha, PCBs, and dissolved copper. The impairments may be Site-related, based on the Site history.

8.5 Site-Specific Demonstration

8.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, dinitro-2-methylphenol[4,6-], indeno(1,2,3-cd)pyrene, and strontium-90.

Antimony, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc exceeded the applicable screening value in soil data, but were below TALs in stormwater data. Therefore, they will not be added to the SAP.

Manganese exceeded the applicable screening value in soil data and exceeded the WQS; however, there is no TAL in the Permit for manganese. Only POCs with TALs are used in the SSD.

8.5.2 Stormwater Data Summary

Total aluminum and gross alpha results exceeded the TAL but not the BTV, therefore they will not be added to the SAP. Total PCBs in stormwater data exceeded both TALs and BTVs.

Iron and manganese exceeded the WQS; however, there is no TAL in the Permit for iron or manganese. Only POCs with TALs are used in the SSD.

8.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

8.5.4 Sampling and Analysis Plan

Table 8.5-1 is the proposed SAP for ACID-SMA-2.

Table 8.5-1 Proposed SAP, ACID-SMA-2

Monitoring Constituent	Background for Monitoring
SVOCs	Site history and soil data
Strontium-90	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement

9.0 ACID-SMA-2.01

Associated Sites	SWMU 00-030(f)
Receiving Water	Acid Canyon - Tributary to Pueblo Canyon
Drainage Area	0.02 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC 00-030(f): In Progress
2010 Administratively Continued Permit Final Status	Extended Baseline Monitoring
2016–2018 SIP Actions	Based on the March 2018 SIP meeting, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

9.1 2010 Administratively Continued Permit Summary

Following the January 2011 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection, and monitoring is ongoing until one confirmation sample is collected from this SMA.

9.2 Site History

00-030(f) (6/12/2017)

AOC 00-030(f) is a former septic system consisting of two parallel septic tanks of unequal size (also referred to as structure #5 in 1947 historical reports), located on private property south of Canyon Road and north of Rose Street, near the United Church school building in former TA-00. A 1943 engineering drawing labels the septic tanks “Septic Tank No. 2.” The tanks connected with sewer inlet drainlines in the “Apartment Area,” and received sanitary waste from a school, a post exchange, and some of the original Los Alamos Ranch School buildings; the septic system did not receive waste from formerTA-01 operations. The outlet drainline ran to the north under Canyon Road and then to the northwest to an outfall in upper Acid Canyon. The septic system was decommissioned when the CWWTP [SWMU 00-019] became operational in 1947. The outfall was not located until 2009. Currently, the two septic tanks are still partially in place and are located beneath existing sidewalks and a retaining wall in a heavily developed area.

For investigation activities refer to “Phase II Investigation Report for Pueblo Canyon Aggregate Area” (LANL 2010, 110864).

9.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 9.2-1.

Table 9.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-030(f)	Septic System	Metals and organic chemicals

9.3 Consent Order Soil Data

Decision-level data for AOC 00-030(f) consist of results from samples collected in 2006 and 2010. Analytical results from those samples are presented in Figures 9.3-1 through 9.3-4. The 2010 Phase II IR (LANL 2010, 110864) concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

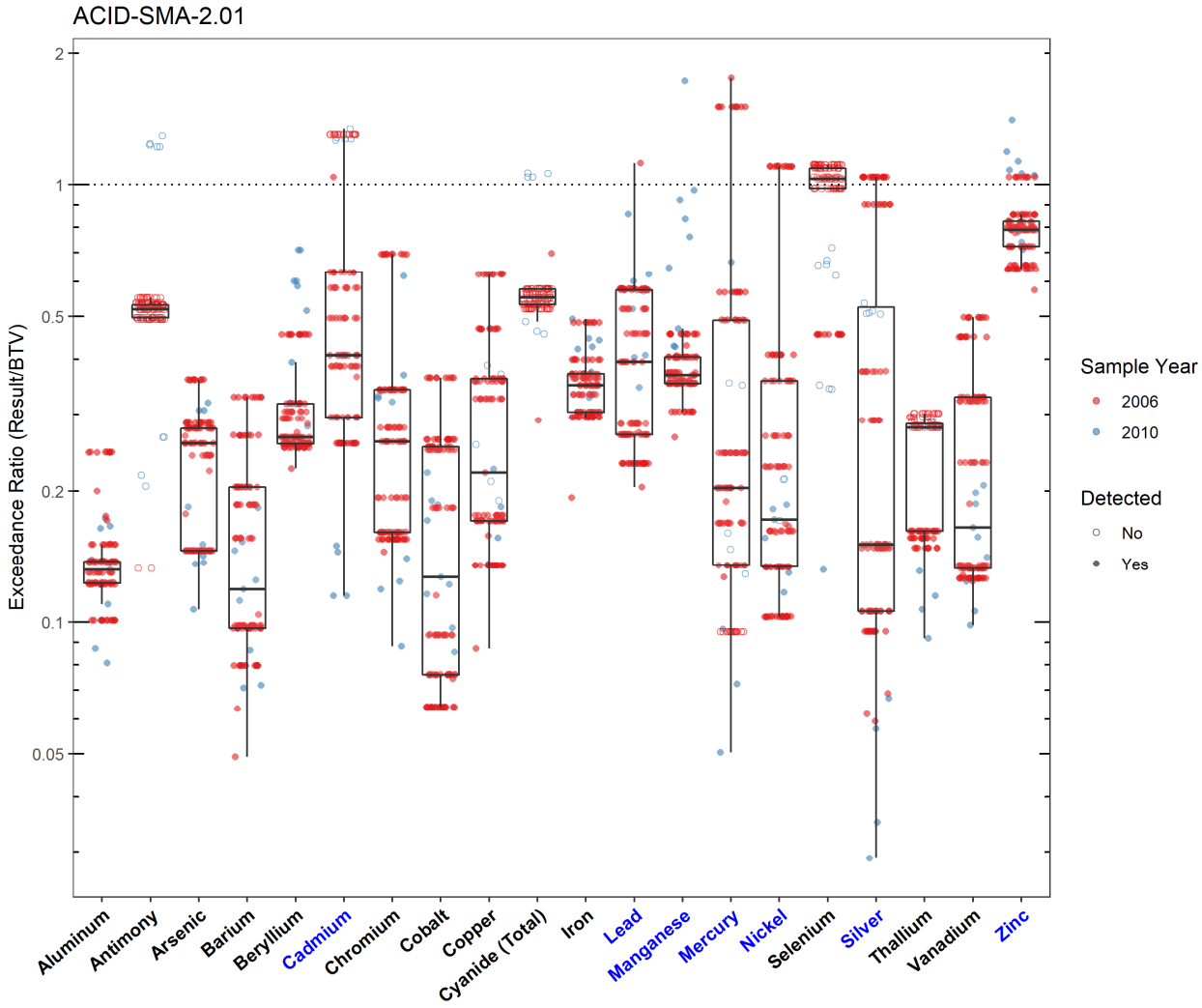

Figure 9.3-1 Inorganics Analytical Results from Soil Samples Associated with ACID-SMA-2.01

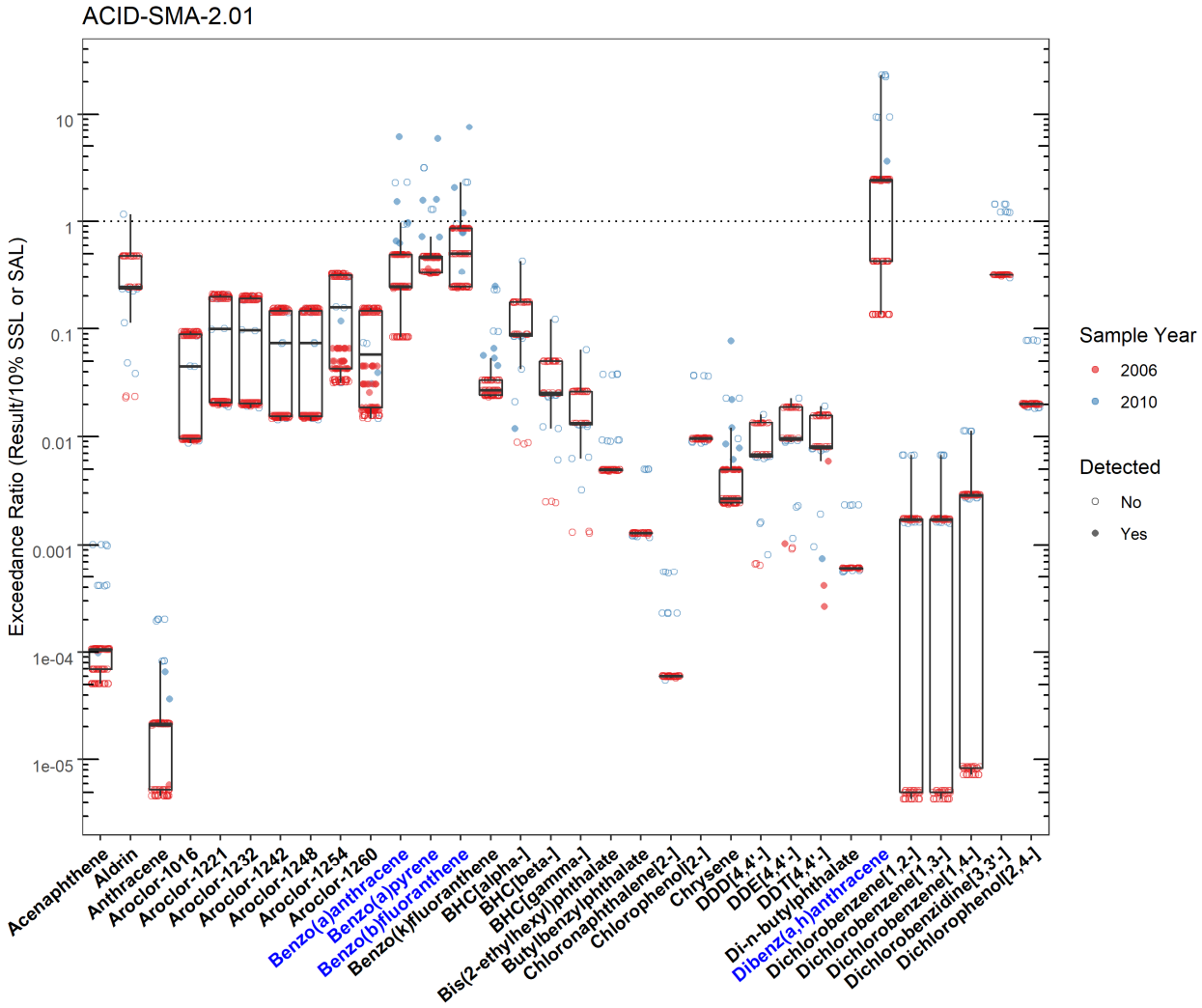

Figure 9.3-2 Organics Analytical Results from Soil Samples Associated with ACID-SMA-2.01 (Plot 1)

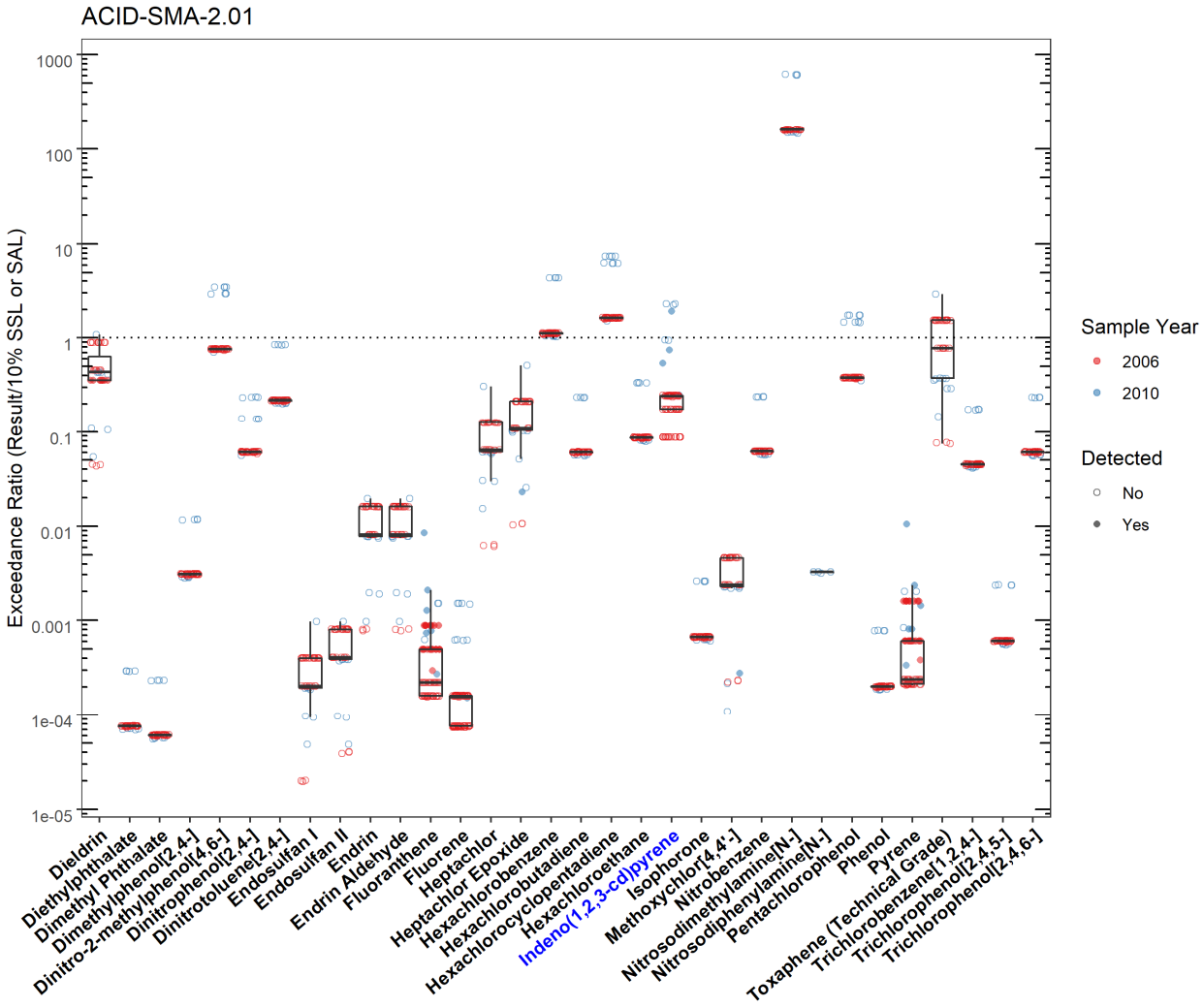

Figure 9.3-3 Organics Analytical Results from Soil Samples Associated with ACID-SMA-2.01 (Plot 2)

ACID-SMA-2.01

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	ACID-SMA-2.01	56-55-3	Y	SSL_0.1	0.153	0.934	2010-03-01
Benzo(a)pyrene	ACID-SMA-2.01	50-32-8	Y	SSL_0.1	0.112	0.657	2010-03-01
Benzo(b)fluoranthene	ACID-SMA-2.01	205-99-2	Y	SSL_0.1	0.153	1.15	2010-03-01
Cadmium	ACID-SMA-2.01	Cd	Y	BTV	0.400	0.415	2006-10-16
Dibenz(a,h)anthracene	ACID-SMA-2.01	53-70-3	Y	SSL_0.1	0.0153	0.0549	2010-03-01
Indeno(1,2,3-cd)pyrene	ACID-SMA-2.01	193-39-5	Y	SSL_0.1	0.153	0.291	2010-03-01
Lead	ACID-SMA-2.01	Pb	Y	BTV	22.3	25.0	2006-10-16
Manganese	ACID-SMA-2.01	Mn	Y	BTV	671	1160	2010-03-01
Mercury	ACID-SMA-2.01	Hg	Y	BTV	0.100	0.176	2006-10-16
Nickel	ACID-SMA-2.01	Ni	Y	BTV	15.4	17.0	2006-08-17
Silver	ACID-SMA-2.01	Ag	Y	BTV	1.00	1.04	2006-07-25
Zinc	ACID-SMA-2.01	Zn	Y	BTV	48.8	68.7	2010-06-28

Figure 9.3-4 Screening-Level Exceedances from Soil Samples Assoicated with ACID-SMA-2.01

9.4 Stormwater Evaluation

9.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

9.4.2 Assessment Unit and Stream Impairments

ACID-SMA-2.01 drains to South Fork Acid Canyon (Acid Canyon to headwaters) which has impairments for adjusted gross alpha, PCBs, and dissolved copper. The copper and PCBs impairments may be Site-related, based on the Site history.

9.5 Site-Specific Demonstration

9.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, cadmium, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, lead, manganese, mercury, nickel, silver, and zinc.

9.5.2 Stormwater Data Summary

No confirmation-monitoring data.

9.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

9.5.4 Sampling and Analysis Plan

Table 9.5-1 is the proposed SAP for ACID-SMA-2.01.

Table 9.5-1 Proposed SAP, ACID-SMA-2.01

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment and Site history (organics)
Dissolved cadmium, copper, manganese, nickel, silver, and zinc	Impairment (copper), Site history (metals), and soil data
Total mercury	Site history (metals) and soil data
SVOCs	Site history (organics)
DOC	Permit requirement
SSC	Permit requirement

10.0 ACID-SMA-2.1

Associated Sites	SWMU 01-002(b)-00
Receiving Water	Acid Canyon - Tributary to Pueblo Canyon
Drainage Area	263.08 acres
Landscape Characteristics	21% pervious, 79% impervious
Consent Order Site Status	SWMU 01-002(b)-00: Pending Receipt of Certificate of Completion
2010 Administratively Continued AC Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the field visit in December 2016, the current SMA sampling location and boundary was agreed upon by all parties to be the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

10.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2012. Analytical results from this sample initiated corrective action.

Following the October 2016 certification to EPA of enhanced control installation as a corrective action (LANL 2016, 601865.2), corrective action stormwater samples were collected in November 2016 and August 2017. Analytical results from these samples initiated corrective action.

The Permittees submitted a request for alternative compliance for the Site per Permit Part I.E.3 in April 2019 (N3B 2019, 700401). No response has been received from EPA, and stormwater monitoring has not occurred since 2017.

10.2 Site History

01-002(b)-00 (6/12/2017)

SWMU 01-002(b)-00 consists of a former TA-01 industrial waste line outfall and drainage area in Acid Canyon. The outfall was located within the boundaries of TA-45, at the head of a small branch of Acid Canyon known as the south fork of Acid Canyon. Untreated RLW generated in laboratories and research facilities in former TA-01 was discharged to this outfall from 1943 until 1951. During this time, approximately 4.8 million gal. of untreated RLW per yr were discharged to the SWMU 01-002(b)-00 outfall. Average plutonium concentrations in the RLW ranged from 1000 to 10,000 pCi/L, resulting in a total estimated discharge of 1.9 g of plutonium. Discharges of untreated RLW ceased when the TA-45 RLW treatment plant began operation in 1951. However, releases of treated RLW continued until 1964.

In 1966, the SWMU 01-002(b)-00 outlet drainline, associated weir box, and contaminated tuff around the outfall and from the canyon cliff and drainage below the outfall, were removed and disposed of at TA-54 as part of the decontamination and demolition of the TA-45 RLW treatment plant. The TA-45 property was transferred to Los Alamos County in September 1967. In 1985, the last remnants of the industrial waste line between TA-01 and the SWMU 01-002(b)-00 outfall were removed and disposed of at TA-54. SWMU 01-002(b)-00 was part of SWMU 01-002, which was split into two units, SWMUs 01-002(a)-00 and 01-002(b)-00, in 2000.

For investigation activities, refer to "Phase II Investigation Report for Pueblo Canyon Aggregate Area" (LANL 2010, 110864).

10.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 10.2-1.

Table 10.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-002(b)-00	Outfall associated with TA-01	Plutonium, uranium, americium, thorium, tritium, cesium-137, strontium-90, metals

10.3 Consent Order Soil Data

Decision-level data for SWMU 01-002(b)-00 consist of results from samples collected in 1999, 2000, and 2001. Analytical results from those samples are presented in Figures 10.3-1 through 10.3-5. The 2002 IA completion report concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

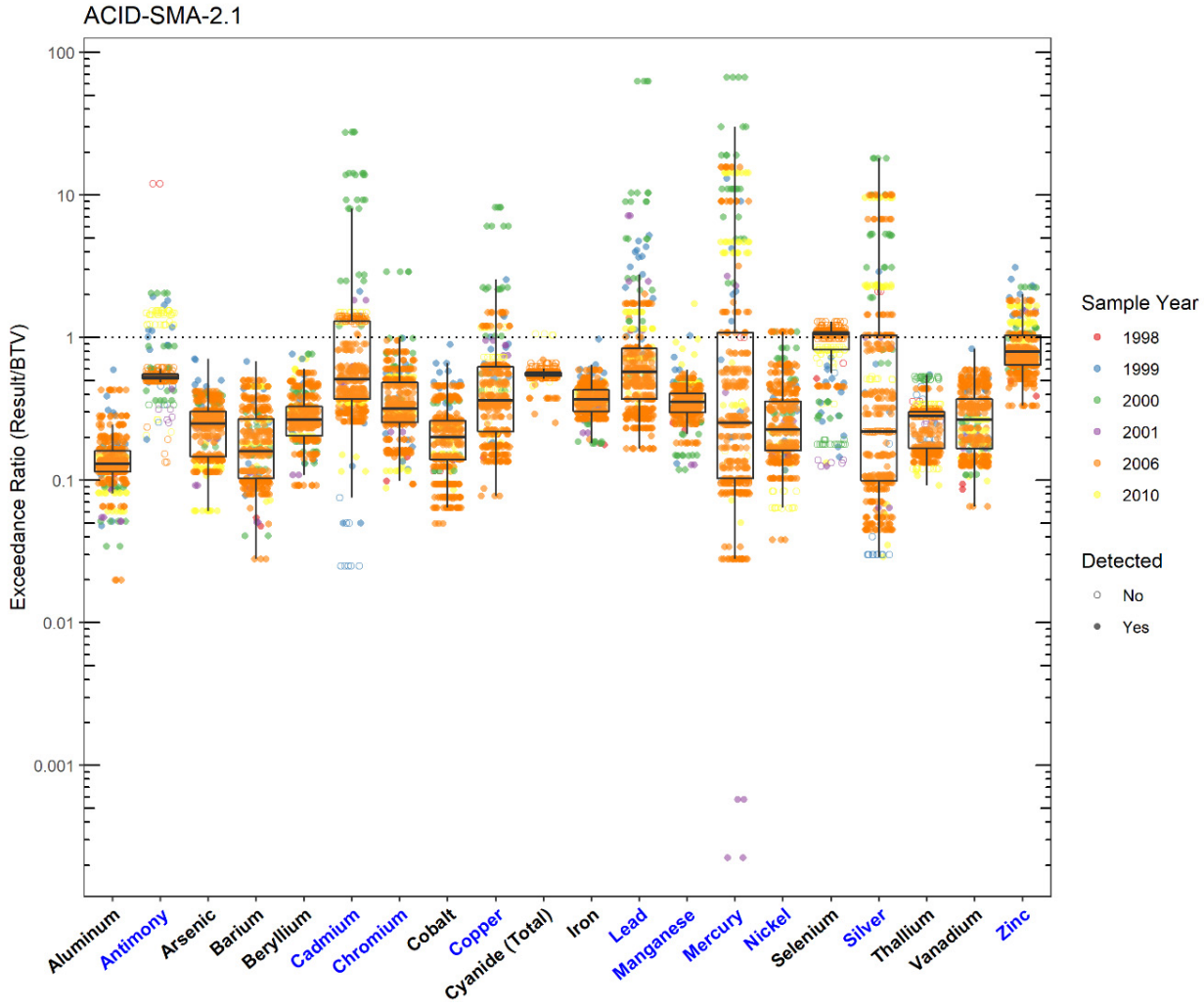

Figure 10.3-1 Inorganics Analytical Results from Soil Samples Associated with ACID-SMA-2.1

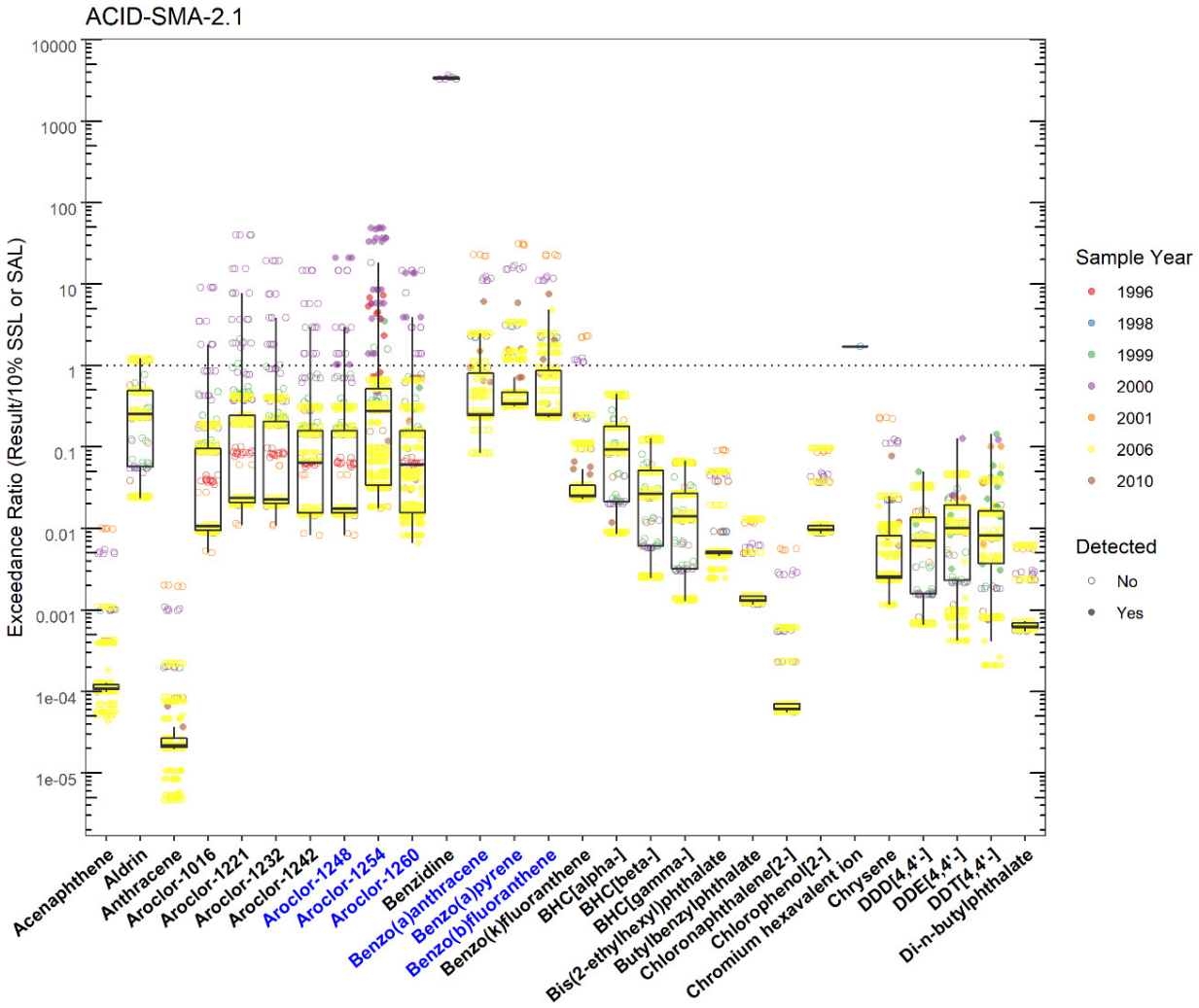

Figure 10.3-2 Organics Analytical Results from Soil Samples Assoicated with ACID-SMA-2.1 (Plot 1)

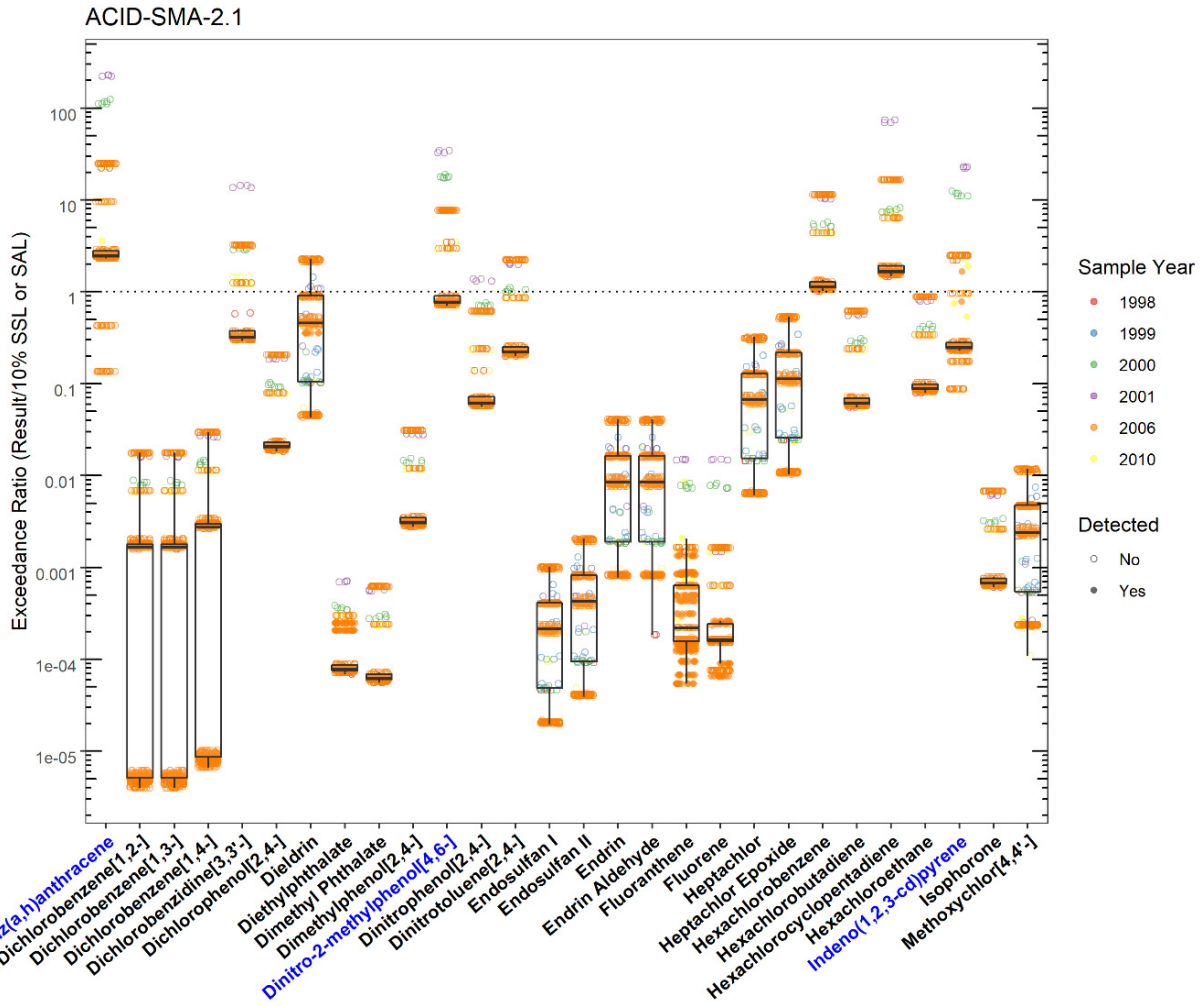

Figure 10.3-3 Organics Analytical Results from Soil Samples Associated with ACID-SMA-2.1 (Plot 2)

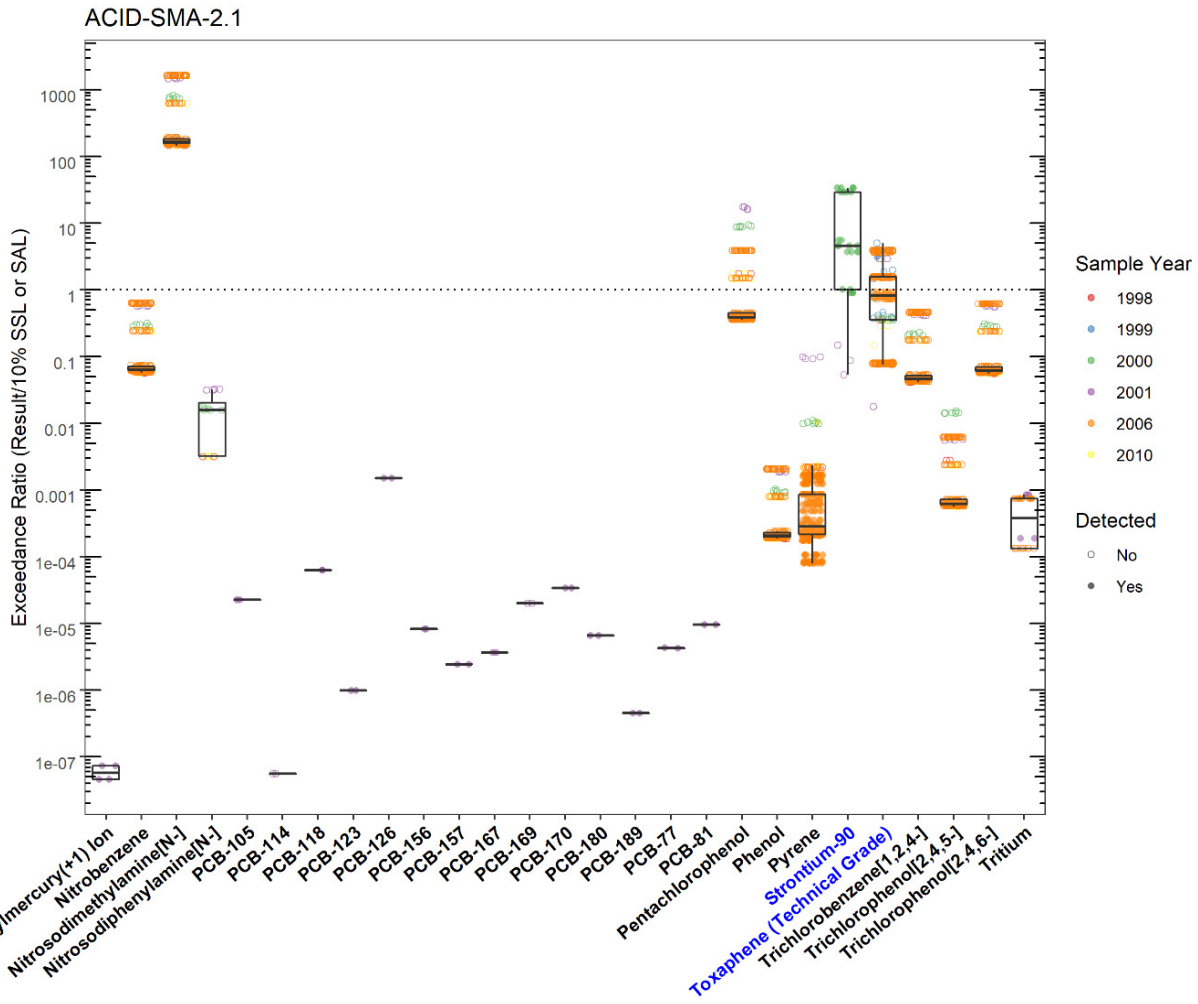

Figure 10.3-4 Organics Analytical Results from Soil Samples Associated with ACID-SMA-2.1 (Plot 3)

ACID-SMA-2.1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	ACID-SMA-2.1	Sb	Y	BTV	0.830	1.70	2000-08-31
Aroclor-1248	ACID-SMA-2.1	12672-29-6	Y	SSL_0.1	0.243	5.10	2000-09-11
Aroclor-1254	ACID-SMA-2.1	11097-69-1	Y	SSL_0.1	0.114	5.60	2000-08-31
Aroclor-1260	ACID-SMA-2.1	11096-82-5	Y	SSL_0.1	0.243	3.30	2000-09-11
Benzo(a)anthracene	ACID-SMA-2.1	56-55-3	Y	SSL_0.1	0.153	0.934	2010-03-01
Benzo(a)pyrene	ACID-SMA-2.1	50-32-8	Y	SSL_0.1	0.112	0.657	2010-03-01
Benzo(b)fluoranthene	ACID-SMA-2.1	205-99-2	Y	SSL_0.1	0.153	1.15	2010-03-01
Cadmium	ACID-SMA-2.1	Cd	Y	BTV	0.400	11.0	2000-08-31
Chromium	ACID-SMA-2.1	Cr	Y	BTV	19.3	56.0	2000-08-31
Copper	ACID-SMA-2.1	Cu	Y	BTV	14.7	120	2000-08-31
Dibenz(a,h)anthracene	ACID-SMA-2.1	53-70-3	Y	SSL_0.1	0.0153	0.0549	2010-03-01
Dinitro-2-methylphenol[4,6-]	ACID-SMA-2.1	534-52-1	Y	SSL_0.1	0.493	3.79	2006-07-25
Indeno(1,2,3-cd)pyrene	ACID-SMA-2.1	193-39-5	Y	SSL_0.1	0.153	0.291	2010-03-01
Lead	ACID-SMA-2.1	Pb	Y	BTV	22.3	1400	2000-08-31
Manganese	ACID-SMA-2.1	Mn	Y	BTV	671	1160	2010-03-01
Mercury	ACID-SMA-2.1	Hg	Y	BTV	0.100	6.70	2000-08-31
Nickel	ACID-SMA-2.1	Ni	Y	BTV	15.4	17.0	2000-08-31; 2006-08-17
Silver	ACID-SMA-2.1	Ag	Y	BTV	1.00	18.0	2000-08-31
Strontium-90	ACID-SMA-2.1	Sr-90	Y	SAL_0.1	1.50	50.2	2000-08-31
Toxaphene (Technical Grade)	ACID-SMA-2.1	8001-35-2	Y	SSL_0.1	0.484	1.50	1999-09-29
Zinc	ACID-SMA-2.1	Zn	Y	BTV	48.8	152	1999-05-04

Figure 10.3-5 Screening-Level Exceedances from Soil Samples Associted with ACID-SMA-2.1

10.4 Stormwater Evaluation

10.4.1 Summary of Stormwater Results Compared with TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in November 2016 and August 2017. Analytical results from those samples are presented in Figures 10.4-1 through 10.4-4.

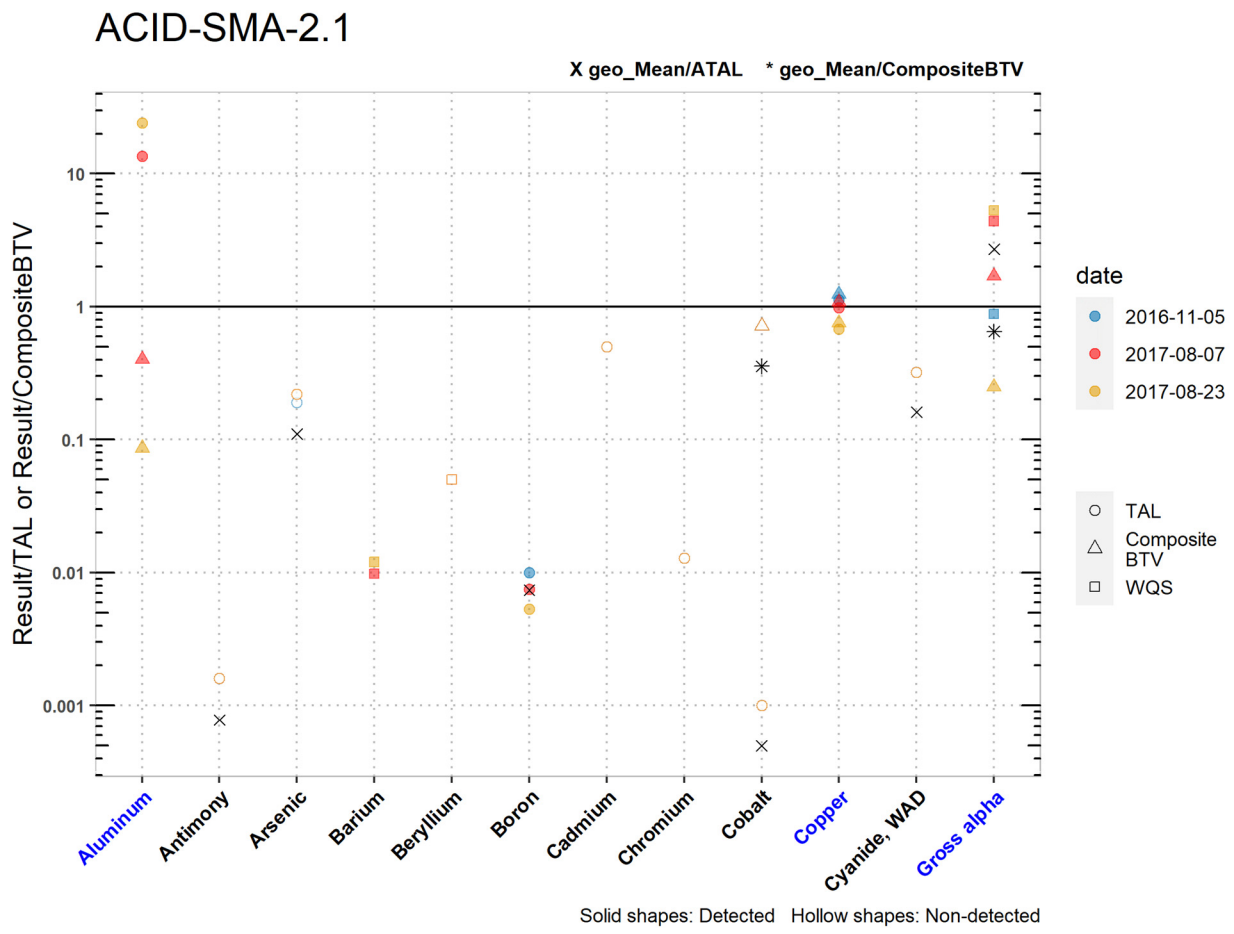

Figure 10.4-1 Analytical Results from Stormwater Samples, ACID-SMA-2.1 (Plot 1)

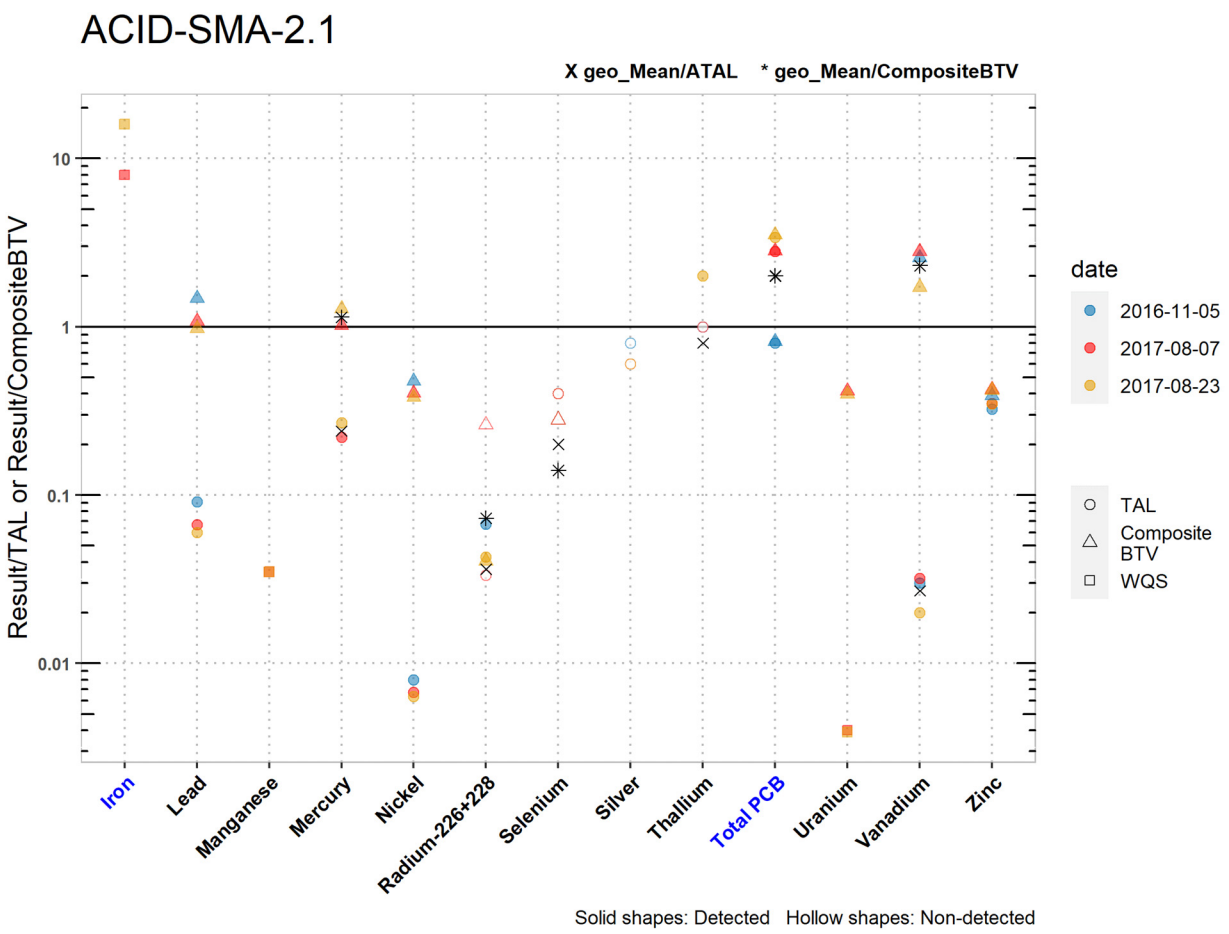

Figure 10.4-2 Analytical Results from Stormwater Samples, ACID-SMA-2.1 (Plot 2)

ACID-SMA-2.1

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	36700	NA	NA	NA	NA	NA	NA	NA	1.40	4.33	NA	55.6
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2016-11-05 result	NA	*1.00*	*1.70*	NA	NA	50.4	*0.300*	*3.00*	*1.00*	5.36	*1.67*	13.2
2016-11-05 dT	NA	NA	NA	NA	NA	0.010	NA	NA	NA	1.12	NA	0.88
2016-11-05 dB	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.24	NA	NA
2017-08-07 result	10300	*1.00*	*2.00*	19.7	*0.200*	37.4	*0.300*	*3.00*	*1.00*	4.69	*1.67*	66.1
2017-08-07 dT	13.5	NA	NA	0.0098	NA	0.0075	NA	NA	NA	0.977	NA	4.4
2017-08-07 dB	0.401	NA	NA	NA	NA	NA	NA	NA	NA	1.08	NA	1.70
2017-08-23 result	18400	*1.00*	*2.00*	23.3	*0.200*	26.4	*0.300*	*3.00*	*1.00*	3.27	*1.67*	80.2
2017-08-23 dT	24.1	NA	NA	0.012	NA	0.0053	NA	NA	NA	0.681	NA	5.3
2017-08-23 dB	0.0864	NA	NA	NA	NA	NA	NA	NA	NA	0.755	NA	0.249
geo_mean/ATAL	NA	0.00078	0.11	NA	NA	0.0074	NA	NA	0.00050	NA	0.161	2.7
geo_mean/B	NA	NA	NA	NA	NA	NA	NA	NA	0.357	NA	NA	0.650

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 10.4-3 Analytical Results from Stormwater Samples, ACID-SMA-2.1 (Table 1)

ACID-SMA-2.1

	Iron	Lead	Manganese	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.005	0.5	NA	5	0.5	0.5	0.2	NA	50	20
ATAL	NA	NA	NA	0.77	NA	30	5	NA	0.47	0.014	NA	100	NA
MTAL	NA	19.3	NA	NA	186	NA	20	0.49	NA	NA	NA	NA	59.2
Composite_BTV	NA	1.19	NA	0.165	3.10	5.48	7.14	NA	NA	0.0137	0.291	1.16	49.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2016-11-05 result	NA	1.76	NA	NA	1.48	2.01	*2.00*	*0.400*	*0.600*	0.0112	NA	2.99	19.1
2016-11-05 dT	NA	0.0912	NA	NA	0.00796	0.0670	NA	NA	NA	0.80	NA	0.030	0.323
2016-11-05 dB	NA	1.48	NA	NA	0.477	NA	NA	NA	NA	0.818	NA	2.58	0.390
2017-08-07 result	8040	1.29	4.25	0.168	1.25	*1.00*	*2.00*	*0.300*	*0.600*	0.0387	0.121	3.25	20.8
2017-08-07 dT	8.0	0.0668	0.035	0.22	0.00672	NA	NA	NA	NA	2.8	0.0040	0.032	0.351
2017-08-07 dB	NA	1.08	NA	1.02	0.403	NA	NA	NA	NA	2.82	0.416	2.80	0.424
2017-08-23 result	16300	1.16	4.18	0.211	1.18	1.29	*2.00*	*0.300*	0.708	0.0482	0.116	1.99	20.6
2017-08-23 dT	16	0.0601	0.035	0.27	0.00634	0.0430	NA	NA	2	3.4	0.0039	0.020	0.348
2017-08-23 dB	NA	0.975	NA	1.28	0.381	0.0406	NA	NA	NA	3.52	0.399	1.72	0.420
geo_mean/ATAL	NA	NA	NA	0.24	NA	0.0363	0.20	NA	0.8	2.0	NA	0.027	NA
geo_mean/B	NA	NA	NA	1.14	NA	0.0727	0.140	NA	NA	2.01	NA	2.31	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g

Figure 10.4-4 Analytical Results from Stormwater Samples, ACID-SMA-2.1 (Table 2)

10.4.2 Assessment Unit and Stream Impairments

ACID-SMA-2.1 drains to Acid Canyon (Pueblo Canyon to headwaters) which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The adjusted gross alpha and metals impairments may be Site-related, based on the Site history.

10.5 Site-Specific Demonstration

10.5.1 Soil Data Summary

Strontium-90 is the only Site-related POC that exceeded the applicable screening value in soil data and has not yet been measured in stormwater.

Toxaphene exceeded the applicable screening value in soil data but is not a Site-related POC and will not be added to the SAP.

Antimony, cadmium, chromium, lead, manganese, mercury, nickel, silver, and zinc exceeded the applicable screening value in soil data, but were previously monitored in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

Copper exceeded the applicable screening value in soil data and exceeded the TAL and BTV in stormwater data, Aroclor-1248, Aroclor-1254, and Aroclor-1260 exceeded the applicable screening value in soil data and total PCBs exceeded the TAL and BTV in stormwater data.

10.5.2 Stormwater Data Summary

Copper and total PCBs exceeded in stormwater; these exceedances will be included when the data is rescreened. Total aluminum and gross alpha exceeded the TALs, but not the BTVs, therefore they will not be added to the SAP.

Iron exceeded the water quality standard; however, there is no TAL in the Permit for iron. Only POCs with TALs are used in the SSD.

10.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

10.5.4 Sampling and Analysis Plan

Table 10.5-1 is the proposed SAP for ACID-SMA-2.1.

Table 10.5-1 Proposed SAP, ACID-SMA-2.1

Monitoring Constituent	Background for Monitoring
Strontium-90	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement

11.0 P-SMA-0.3

Associated Sites	00-018(b)
Receiving Water	Pueblo Canyon
Drainage Area	7.41 acres
Landscape Characteristics	12% impervious, 88% pervious
Consent Order Site Status	AOC 00-018(b): Pending Approval of Permit Modification Request. Certificate of Completion Received Without Controls
2010 Administratively Continued Permit Final Status	Corrective Action Complete
20162018 SIP Actions	Based on the August 2017 field visits, the sampler will be moved down the drainage past current Site controls located in the drainage channel to include more of the potentially affected area.
2022 Permit Status	Active Monitoring

11.1 2010 Administratively Complete Permit Summary

Following the December 2010 submittal to the EPA of certification of baseline control installation, a baseline stormwater sample was collected in July 2013. Analytical results from this sample initiated corrective action.

AOC 00-018(b) received a COC under the Consent Order in January 2011. The Permittees submitted a certification of completion of corrective action per Permit part I.E.2(d) for the Site in September 2013 (LANL 2013, 249474). Stormwater monitoring has not occurred since 2013.

11.2 Site History

00-018(b) (no date)

AOC 00-018(b) is the former Bayo Canyon WWTP that was located at the intersection of Pueblo and Bayo Canyons. It was owned and operated by Los Alamos County, began operating in 1963, and was upgraded in 1966. The plant treated the sanitary waste stream that previously was routed to the former central WWTP (SMWU 00-019) and sanitary waste from residences on Barranca Mesa. Most wastes treated at the plant were from businesses and from eastern Los Alamos residences, and Barranca Mesa residences. After the Pueblo Canyon WWTP [SWMU 00-018(a)] was decommissioned in 1992, the remaining northern and western Los Alamos residential sanitary waste streams were routed to the Bayo Canyon WWTP. This plant was the primary supplier of effluent for irrigation at the Los Alamos golf course and recreational ball fields from 1992 until it was decommissioned in 2007. Mercury was historically used to seal and lubricate the hubs of trickling filters at the former WWTP. The Bayo WWTP was demolished by Los Alamos County in 2009 and 2010. Residual mercury was found to be present in the trickling filter seals during demolition.

For investigation activities refer to “Demolition Documentation Report for the Bayo Canyon Wastewater Treatment Plant, Area of Concern 00-018(b)” (LANL 2010, 109193).

11.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 11.2-1.

Table 11.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-018(b)	Bayo Canyon WWTP	Beryllium, cadmium, lead, mercury, organic chemicals, uranium

11.3 Consent Order Soil Data

The approved IR (LANL 2008, 103243.34) concluded that the nature and extent have been defined for all chemicals detected at AOC 00-018(b). Analytical results from those samples are presented in Figures 11.3-1 through 11.3-4. All detected chemicals were below residential, industrial, recreational, and construction worker SSLs.

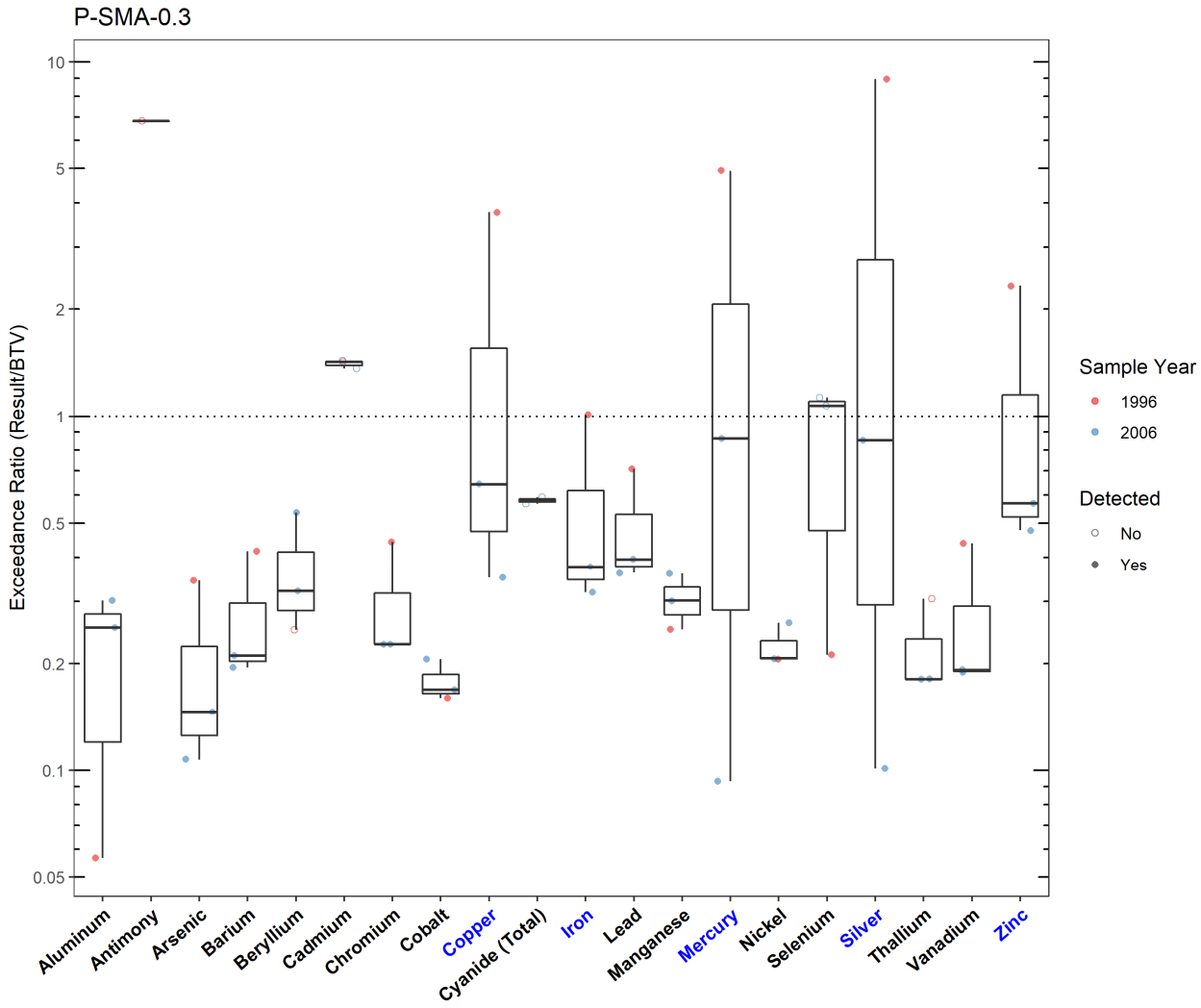

Figure 11.3-1 Inorganics Analytical Results from Soil Samples Assicoated with P-SMA-0.3

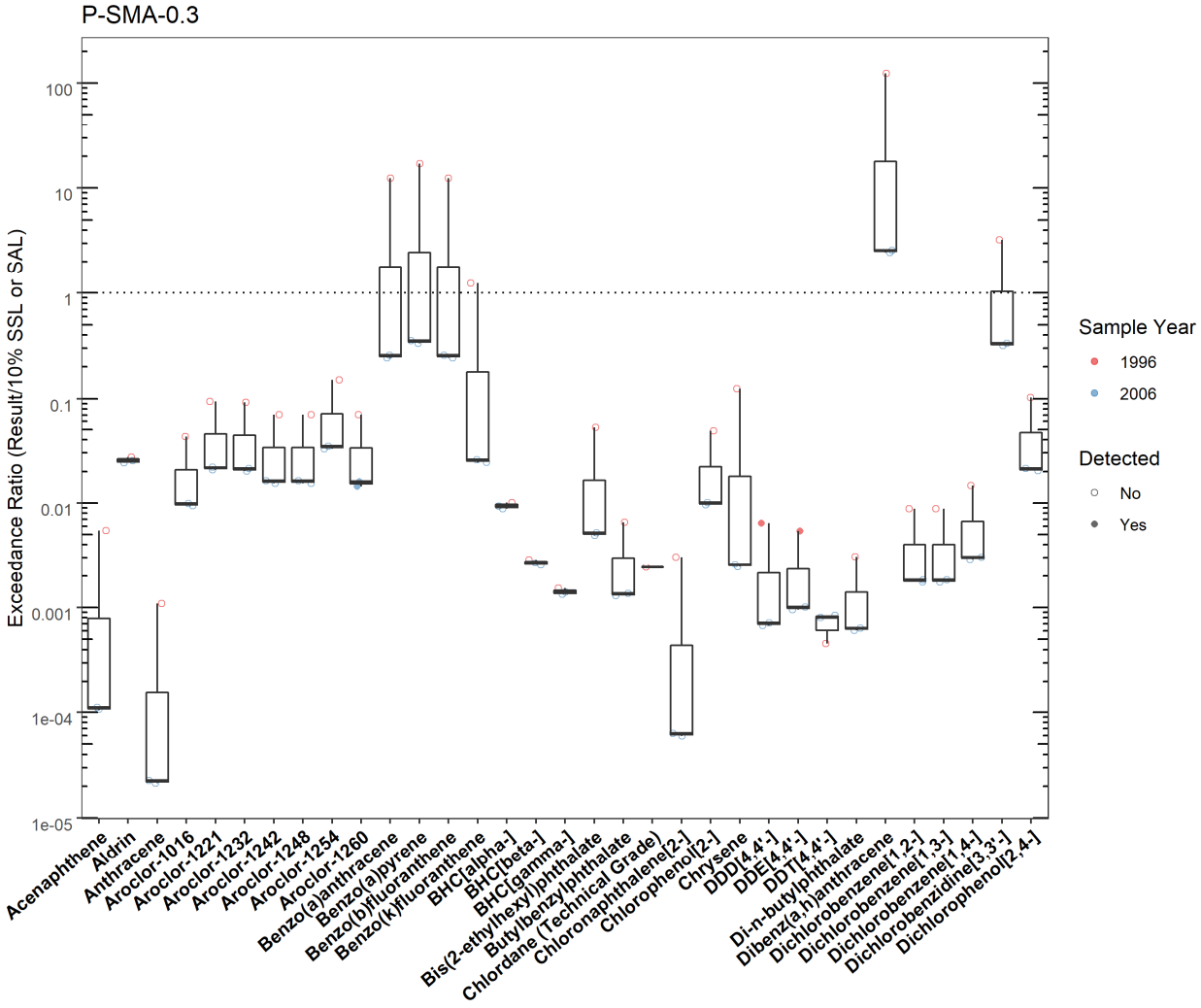

Figure 11.3-2 Organics Analytical Results from Soil Samples Associated with P-SMA-0.3 (Plot 1)

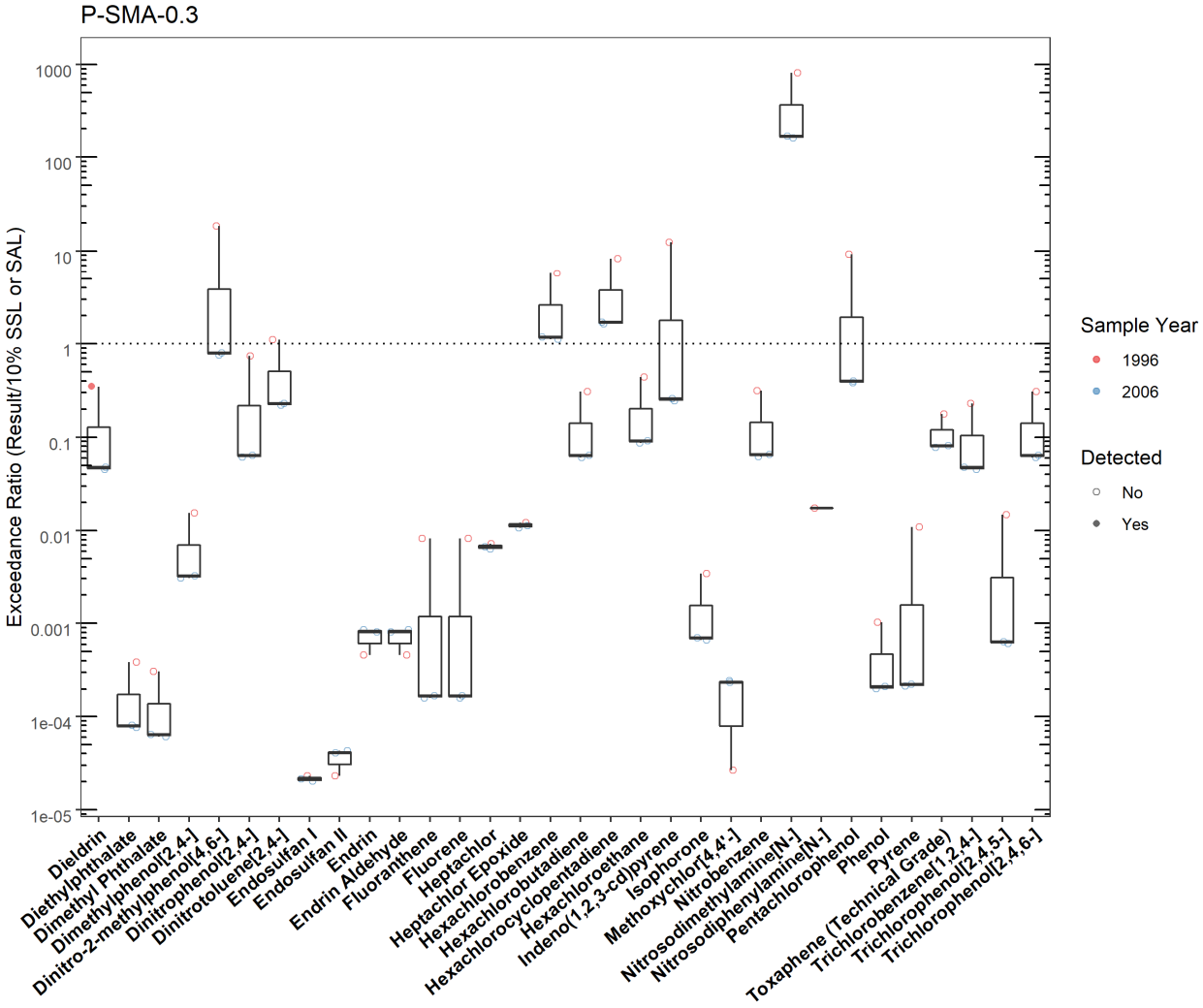

Figure 11.3-3 Organics Analytical Results from Soil Samples Associated with P-SMA-0.3 (Plot 2)

P-SMA-0.3

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Copper	P-SMA-0.3	Cu	Y	BTV	14.7	55.3	1996-11-04
Iron	P-SMA-0.3	Fe	Y	BTV	21500	21700	1996-11-04
Mercury	P-SMA-0.3	Hg	Y	BTV	0.100	0.492	1996-11-04
Silver	P-SMA-0.3	Ag	Y	BTV	1.00	8.96	1996-11-04
Zinc	P-SMA-0.3	Zn	Y	BTV	48.8	113	1996-11-04

Figure 11.3-4 Screening-Level Exceedances from Soil Samples Associated with P-SMA-0.3

11.4 Stormwater Evaluation

11.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the current monitoring location at the SMA.

11.4.2 Assessment Unit and Stream Impairments

P-SMA-0.3 drains to Pueblo Canyon (Los Alamos Canyon to Los Alamos WWTP), which has impairments for adjusted gross alpha, total aluminum, PCBs, and total selenium. The adjusted gross alpha and PCB impairments may be Site-related, based on Site history.

11.5 Site-Specific Demonstration

11.5.1 Soil Data Summary

The Site-related POCs mercury and uranium exceeded the applicable screening value in soil data and have not yet been measured in stormwater at the current monitoring location. SVOCs and beryllium are in the Site history but did not exceed the applicable screening value in soil data, therefore they will not be added to the SAP. The remaining metals that exceeded the applicable screening value in soil data are not Site-related POCs and will not be added to the SAP.

11.5.2 Stormwater Data Summary

No confirmation-monitoring data.

11.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected from the current monitoring location.

11.5.4 Sampling and Analysis Plan

Table 11.5-1 is the proposed SAP for P-SMA-0.3.

Table 11.5-1 Proposed SAP, P-SMA-0.3

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Total PCBs	Impairment and Site history
Total mercury	Site history and soil data
Dissolved uranium	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement

12.0 P-SMA-1

Associated Sites	73-001(a), 73-004(d)
Receiving Water	Pueblo Canyon
Drainage Area	25.85 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 73-001(a): Pending Receipt of Certificate of Completion. SWMU 73-004(d): Pending Receipt of Certificate of Completion.
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	The August 2017 field visits determined that the sampler does not currently include the channel area. Therefore, the sampler was moved to former NMED-OB sampling location, "Pueblo Below Landfill East," to include more of the potentially affected area.
2022 Permit Status	Active Monitoring

12.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater monitoring was initiated. In 2015, the monitoring location was relocated to a more representative location after a boundary change for the Site and baseline monitoring was reinitiated. While developing the 2018 sampling SAP, a decision was made to implement the monitoring location move that had been recommended during the 2017 SIP review, and baseline monitoring was reinitiated. To date, stormwater flow has not been sufficient for full-volume sample collection. Monitoring is ongoing until one confirmation sample is collected from this SMA.

12.2 Site History

73-001(a) (6/12/2017)

SWMU 73-001(a) is an inactive municipal landfill within TA-73. The main landfill covers a surface area of approximately 12 acres. This inactive landfill is located on Los Alamos County property at the Los Alamos County Airport. The mesa top has served as an airport facility since the late 1940s. Los Alamos County plans to maintain and operate this airport indefinitely.

The Airport Landfill received municipal waste from the Laboratory and Los Alamos townsite from 1943 until 1973. The landfill was located on the mesa top primarily because it was a secure and convenient location with easy access, and was in close proximity to the Los Alamos townsite with room to expand the landfill. Solid waste was collected twice weekly from the Laboratory and the townsite, and was burned on the edge of the hanging valley located adjacent to the airport runway. This intentional burning ceased in 1965, when Los Alamos County assumed operation of the landfill. Heavy equipment was used to push the burned residues and ash into whichever permanent disposal area within the landfill was being used at the time. Debris associated with this landfill spilled into at least four drainages leading from the mesa top area down toward the bottom of Pueblo Canyon. Debris found in these drainages along the side slopes of the south side of Pueblo Canyon was composed of tires, car bodies, pieces of concrete and asphalt, empty drums, galvanized steel trash cans, and other miscellaneous debris items.

As more capacity was required, trenches were excavated into the tuff. A hot-mix asphalt batch plant operated in the vicinity of the landfill from the mid-1940s until 1954. Ash and burn residues from an

incinerator [SWMU 73-002] were also deposited in the landfill. LAC operated the landfill from 1965 until it closed in 1973. Between 1984 and 1986, the western portion of the landfill was excavated and moved to the debris disposal pit [SWMU 73-001(d)] to allow for the construction of airplane hangars and tie-down areas at the airport. Clean fill was used to backfill the excavated area.

The mesa top area inclusive of the landfill was transferred by the DOE to LAC in 2002. In 2006 and 2007, a MatCon asphalt cap was constructed over the landfill along with five concrete hangar pads. The MatCon cap was replaced with a new evapotranspiration cover system in 2015 and 2016. Los Alamos County operates the county municipal airport located between Los Alamos and Pueblo Canyons. However, maintenance of the landfill remains the responsibility of the DOE, including the maintenance of the landfill cover, stormwater control system, fencing, retaining wall, erosion and sediment control measures, site access, and routine monitoring and reporting of every aspect of the landfill for the foreseeable future.

SWMU 73-004(d) (6/13/2017)

SWMU 73-004(d) consists of a former septic system, installed in 1943, which was located approximately 20 ft northeast of the current Los Alamos County airport terminal building at TA-73. The septic system, which served the former landfill office, consisted of a septic tank, inlet and outlet drainlines, and a leach field. A 4 in.-diameter VCP connected the toilet in the building to the septic tank. The building and septic tank were removed as part of the decommissioning activities implemented in 1973. The former septic system was located within the boundary of the SWMU 73-001(a) landfill, and is no longer identifiable as a discrete unit within the landfill.

For investigation activities for the Sites, refer to "2020–2021 Annual Long-Term Monitoring Status Report (July 2020 through June 2021) for the Los Alamos County Airport Landfill Cover System Replacement, Solid Waste Management Units 73-001(a, d) in Technical Area 73" (N3B 2021, 701559).

12.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 12.2-1.

Table 12.2-1 POCs Known or Suspected to be Used Historically at the Sites

Site	Potential POC Source	Potential POCs
73-001(a)	Landfill	Metals, organic chemicals, PCBs, uranium, pesticides
73-004(d)	Soil Contamination from former Septic Tank	Metals, organic chemicals

12.3 Consent Order Soil Data

Decision-level data for SWMU 73-001(a), which includes SWMU 73-004(d), consist of results from samples collected in 2003. Analytical results from those samples are presented in Figures 12.3-1 through 12.3-4. The 2004 IM report concluded that the nature and extent of contamination in the drainages north of the landfill have been defined and no further sampling for extent is warranted.

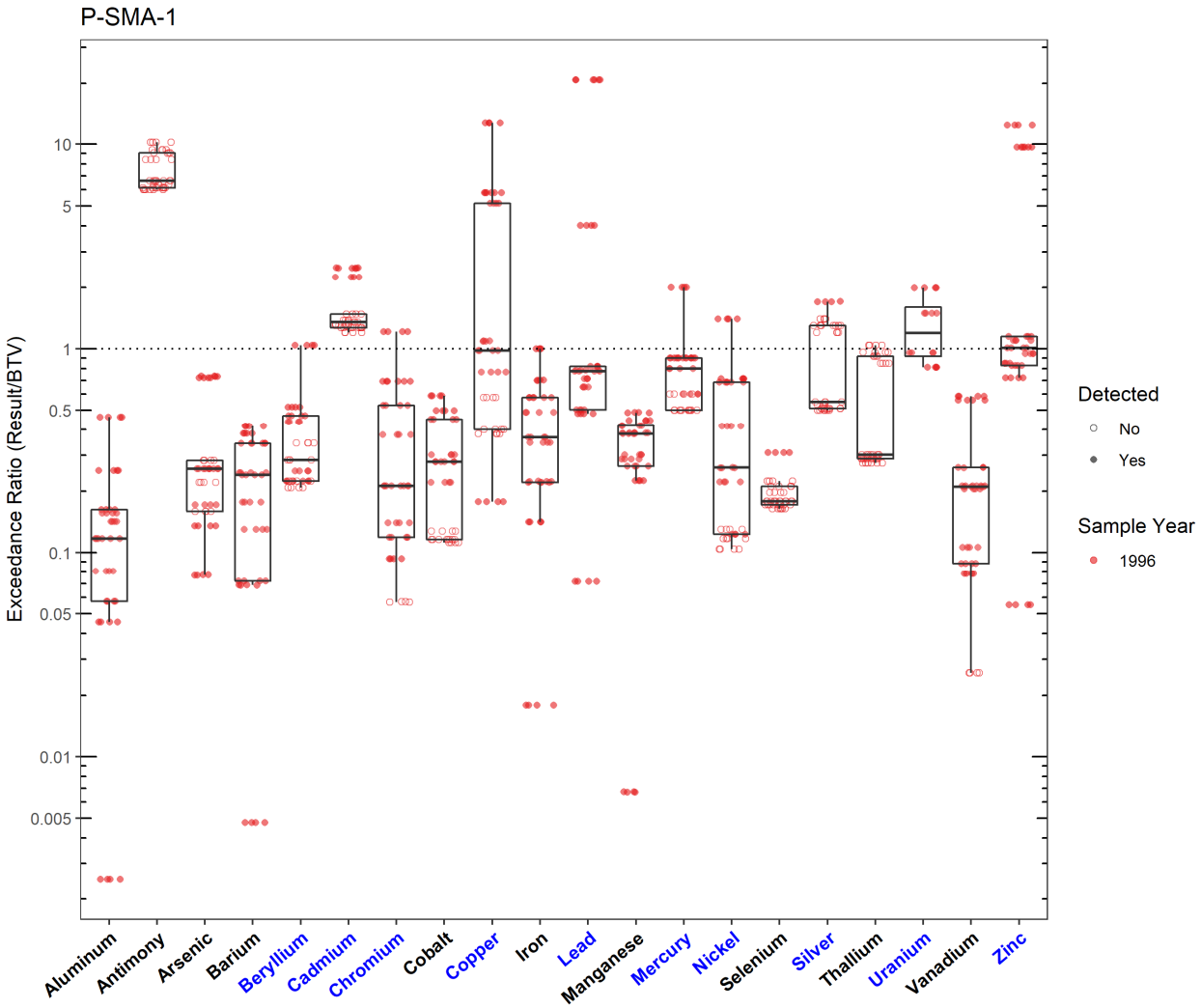

Figure 12.3-1 Inorganics Analytical Results from Soil Samples Associated with P-SMA-1

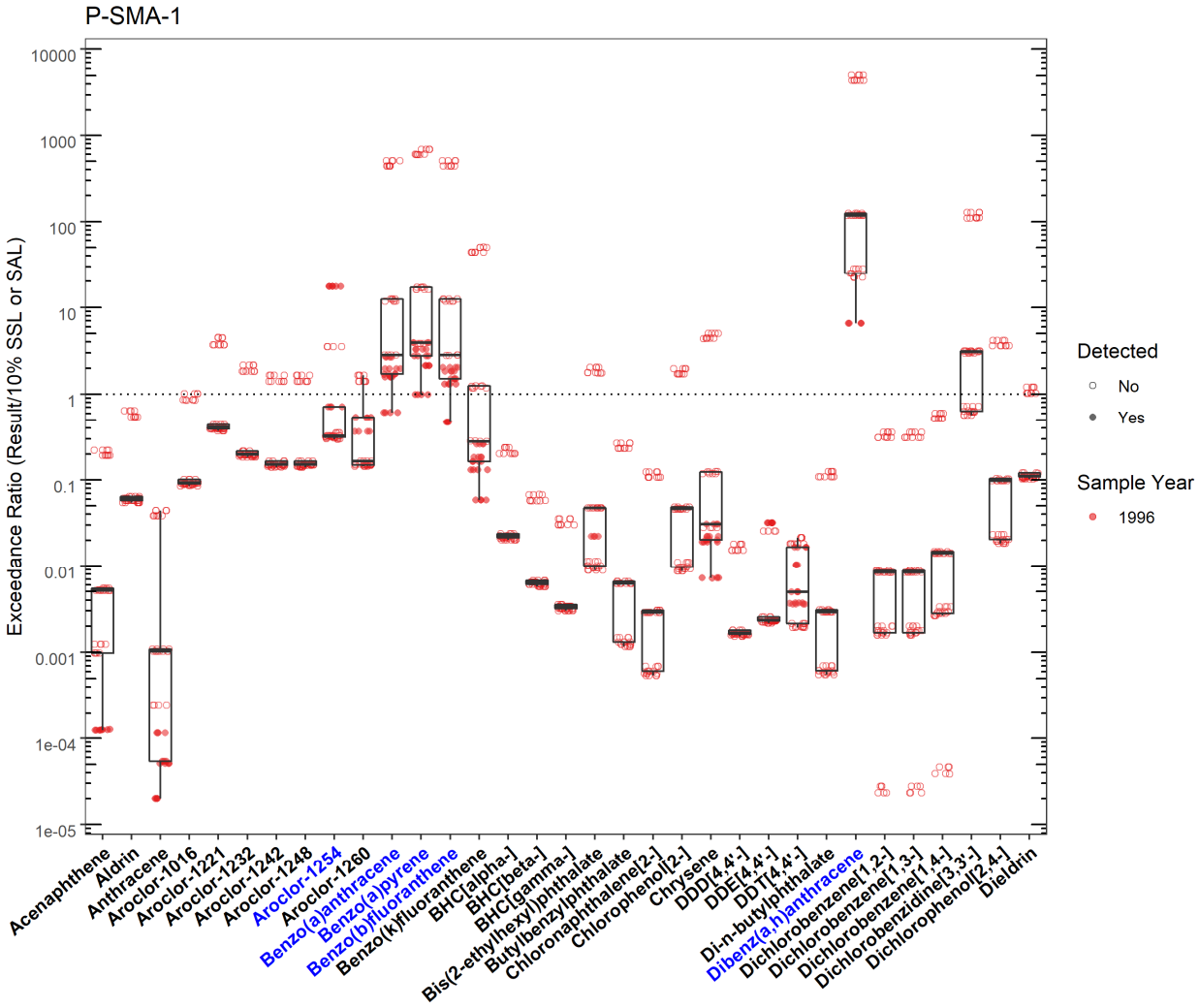

Figure 12.3-2 Organics Analytical Results from Soil Samples Associated with P-SMA-1 (Plot 1)

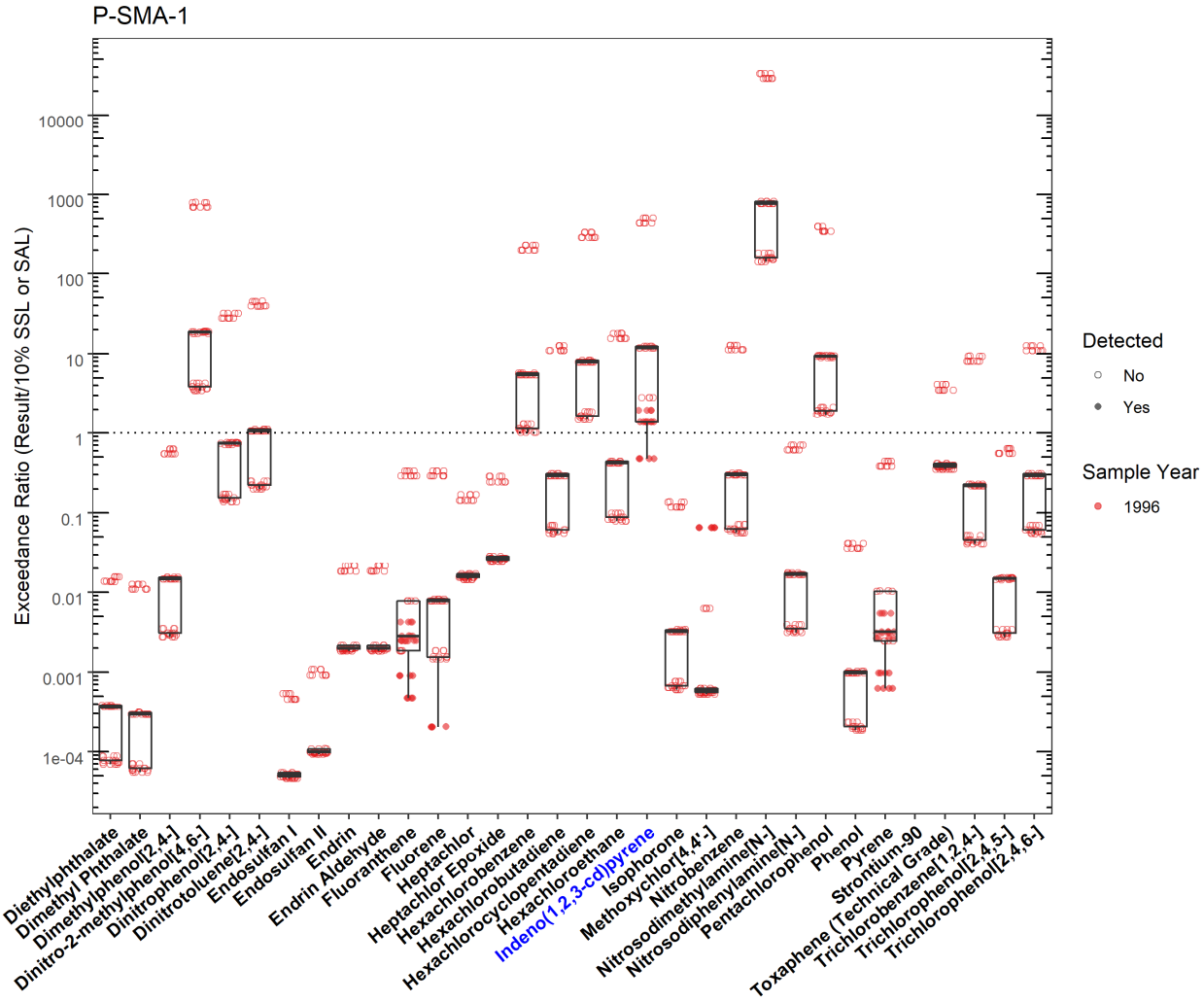

Figure 12.3-3 Organics Analytical Results from Soil Samples Associated with P-SMA-1 (Plot 2)

P-SMA-1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	P-SMA-1	11097-69-1	Y	SSL_0.1	0.114	2.00	1996-04-03
Benzo(a)anthracene	P-SMA-1	56-55-3	Y	SSL_0.1	0.153	0.410	1996-04-03
Benzo(a)pyrene	P-SMA-1	50-32-8	Y	SSL_0.1	0.112	0.440	1996-04-03
Benzo(b)fluoranthene	P-SMA-1	205-99-2	Y	SSL_0.1	0.153	0.310	1996-03-28
Beryllium	P-SMA-1	Be	Y	BTV	1.83	1.90	1996-03-28
Cadmium	P-SMA-1	Cd	Y	BTV	0.400	1.00	1996-04-03
Chromium	P-SMA-1	Cr	Y	BTV	19.3	23.3	1996-04-03
Copper	P-SMA-1	Cu	Y	BTV	14.7	188	1996-04-03
Dibenz(a,h)anthracene	P-SMA-1	53-70-3	Y	SSL_0.1	0.0153	0.100	1996-03-28
Indeno(1,2,3-cd)pyrene	P-SMA-1	193-39-5	Y	SSL_0.1	0.153	0.300	1996-04-03
Lead	P-SMA-1	Pb	Y	BTV	22.3	463	1996-04-03
Mercury	P-SMA-1	Hg	Y	BTV	0.100	0.200	1996-04-03
Nickel	P-SMA-1	Ni	Y	BTV	15.4	21.5	1996-04-03
Silver	P-SMA-1	Ag	Y	BTV	1.00	1.70	1996-04-03
Uranium	P-SMA-1	U	Y	BTV	1.82	3.62	1996-03-28
Zinc	P-SMA-1	Zn	Y	BTV	48.8	608	1996-04-03

Figure 12.3-4 Screening-Level Exceedances from Soil Samples Associated with P-SMA-1

12.4 Stormwater Evaluation

12.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

12.4.2 Assessment Unit and Stream Impairments

P-SMA-1 drains to Pueblo Canyon (Los Alamos WWTP to Acid Canyon) which has impairments for adjusted gross alpha and PCBs. The impairments may be Site-related, based on Site history.

12.5 Site-Specific Demonstration

12.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: Aroclor-1254, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, beryllium, cadmium, chromium, copper, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, lead, mercury, nickel, silver, uranium and zinc.

12.5.2 Stormwater Data Summary

No confirmation-monitoring data.

12.5.3 2022 Permit Status

The SMA is in active monitoring. A confirmation-monitoring sample has not been collected.

12.5.4 Sampling and Analysis Plan

Table 12.5-1 is the proposed SAP for P-SMA-1.

Table 12.5-1 Proposed SAP, P-SMA-1

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment, Site history, and soil data
Gross alpha	Impairment and Site history
Dissolved beryllium, cadmium, chromium, copper, lead, nickel, silver, uranium, and zinc	Site history and soil data
Total mercury	Site history and soil data
SVOCs	Site history and soil data
Pesticides	Site history
DOC	Permit requirement
SSC	Permit requirement

13.0 P-SMA-2

Associated Sites	73-002, 73-006
Receiving Water	Pueblo Canyon
Drainage Area	2.64-acre
Landscape Characteristics	2% impervious, 98% pervious
Consent Order Site Status	SWMU 73-002: Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls SWMU 73-006: Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	The August 2017 field visits determined that the current sampler is located upslope from the highest detection of dioxin/furans in soil (73-25599). In addition, the western drainage area, where there are high detections of metals in soil (73-27297 copper, 73-25605 silver), is not currently monitored. Therefore, the current sampler will be moved approximately 20 ft. downgradient of soil sampling location 73-25599 to include more of the potentially affected area.
2022 Permit Status	Active Monitoring

13.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2014. Analytical results from this sample initiated corrective action.

SWMUs 73-002 and 73-006 received COCs under the Consent Order in August 2007. The Permittees submitted a certification of completion of corrective action per Permit part I.E.2(d) for the Sites in April 2015 (LANL 2015, 600370) and resubmitted in February 2022 (N3B 2022, 701897). Stormwater monitoring has not occurred since 2014.

13.2 Site History

73-002 (no date)

SWMU 73-002 consists of a former inactive incinerator that was located in building 73-2, and a former associated ash pile located at TA-73, west of the Los Alamos Airport terminal and on the south rim of Pueblo Canyon. A 6-ft-diameter stack was located on the north side of the building. The incinerator was originally used to destroy classified documents from LANL; however, this practice was discontinued after a short period because combustion was incomplete. The incinerator was then used to burn municipal trash.

Ash and debris were deposited over the edge of the mesa, which resulted in an ash pile that was approximately 150 ft wide × 160 ft long and up to 8 ft deep. Incinerator operations ceased in 1973, and the incinerator equipment and stack were removed. The ash pile and the associated incinerator debris were removed between 2005 and 2007. Building 73-2 remains in place.

73-006 (no date)

SWMU 73-006 consists of two former cast-iron drainlines that discharged to Pueblo Canyon from the former incinerator building (structure 73-2), located west of the airport terminal building at TA-73. The

west drainline originated from two floor drains within the west side of the building, and the east drainline originated from drains located on the east side of the building. The drainlines discharged directly onto the ash pile (SWMU 73-002). The floor drains were plugged in 1973 when incinerator operations ceased. The west drainline was removed during the 1997 RFI; the east drainline could not be located.

For investigation activities at the Sites, refer to "Investigation Report for Consolidated Unit 73-002-99 and Corrective Action of Solid Waste Management Unit 73-002 at Technical Area 73" (LANL 2007, 098194).

13.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 13.2-1.

Table 13.2-1 POCs Known or Suspected to be Used Historically at the Sites

Site	Potential POC Source	Potential POCs
73-002	Incinerator surface disposal	Metals, tetrachlorodibenzodioxin[2,3,7,8-], PAHs, PCBs, radionuclides, pesticides
73-006	Airport building outfalls	Inorganic and organic chemicals, tetrachlorodibenzodioxin[2,3,7,8-]

13.3 Consent Order Soil Data

Decision-level data consist of the results from samples collected from SWMU 73-002 and SWMU 73-006. Analytical results from those samples are presented in Figures 13.3-1 through 13.3-4. The approved IR (LANL 2007, 098194) concluded that the nature and extent have been defined for all chemicals detected at SWMU 73-002 and SWMU 73-006.

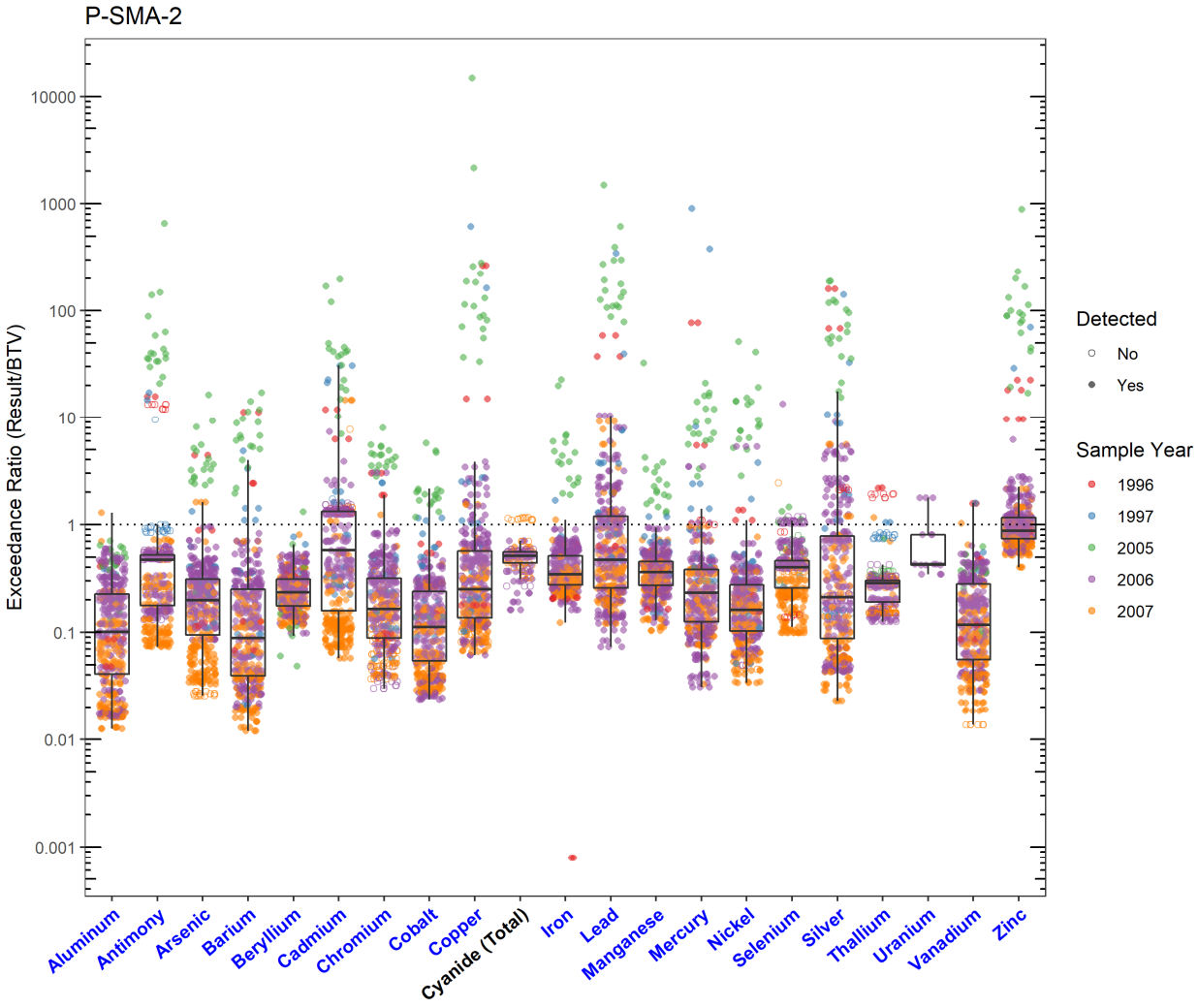

Figure 13.3-1 Inorganics Analytical Results from Soil Samples Associated with P-SMA-2

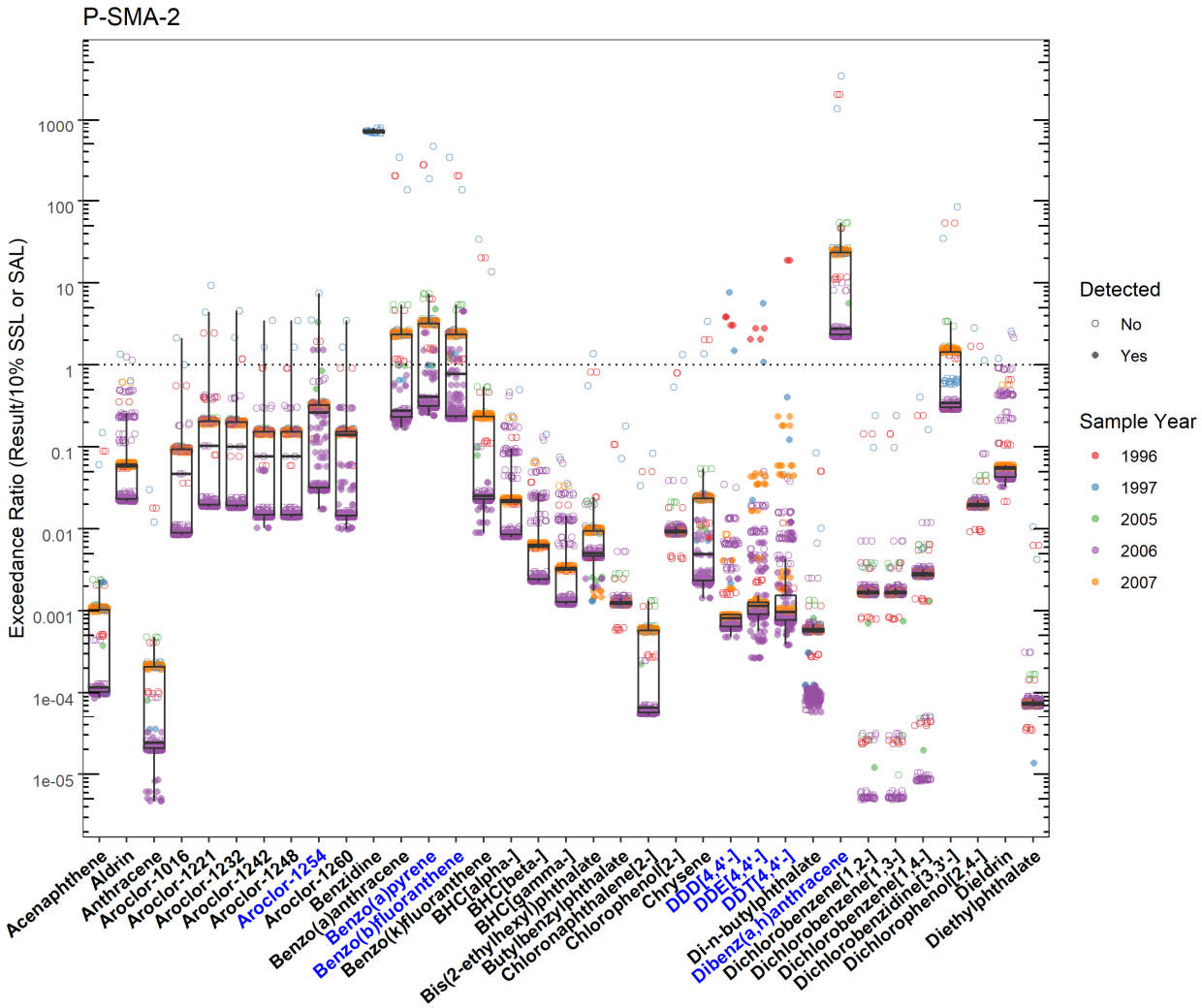

Figure 13.3-2 Organics Analytical Results from Soil Samples Associated with P-SMA-2 (Plot 1)

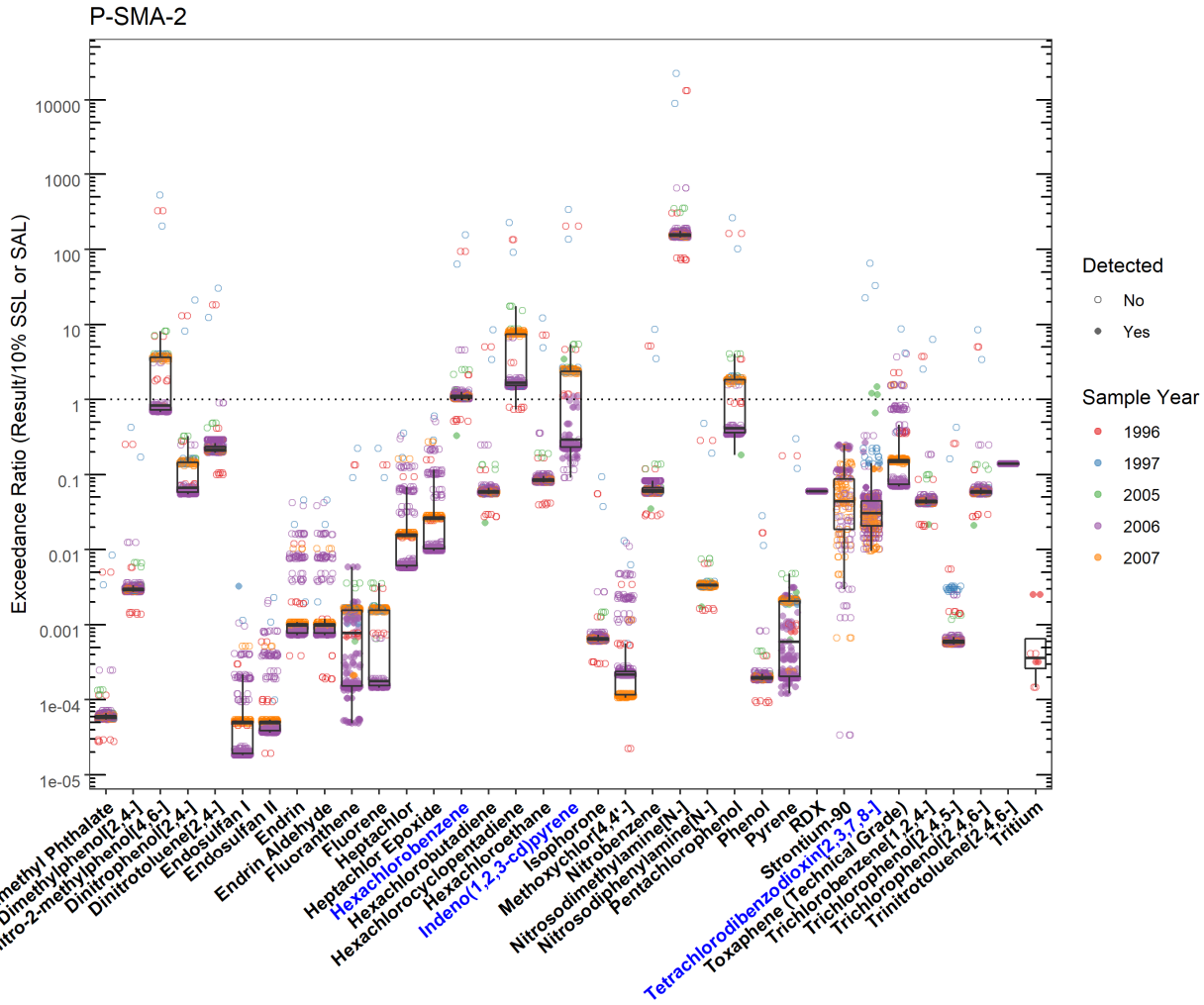

Figure 13.3-3 Organics Analytical Results from Soil Samples Associated with P-SMA-2 (Plot 2)

P-SMA-2

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aluminum	P-SMA-2	Al	Y	BTV	29200	37700	2007-01-04
Antimony	P-SMA-2	Sb	Y	BTV	0.830	543	2005-04-19
Aroclor-1254	P-SMA-2	11097-69-1	Y	SSL_0.1	0.114	0.380	2005-04-20
Arsenic	P-SMA-2	As	Y	BTV	8.17	133	2005-04-19
Barium	P-SMA-2	Ba	Y	BTV	295	5030	2005-04-19
Benzo(a)pyrene	P-SMA-2	50-32-8	Y	SSL_0.1	0.112	0.540	2005-04-19
Benzo(b)fluoranthene	P-SMA-2	205-99-2	Y	SSL_0.1	0.153	0.693	2006-03-24
Beryllium	P-SMA-2	Be	Y	BTV	1.83	2.40	2005-04-19
Cadmium	P-SMA-2	Cd	Y	BTV	0.400	78.5	2005-04-19
Chromium	P-SMA-2	Cr	Y	BTV	19.3	154	2005-04-19
Cobalt	P-SMA-2	Co	Y	BTV	8.64	49.7	2005-04-19
Copper	P-SMA-2	Cu	Y	BTV	14.7	219000	2005-04-19
DDD[4,4'-]	P-SMA-2	72-54-8	Y	SSL_0.1	2.22	17.0	1997-07-22
DDE[4,4'-]	P-SMA-2	72-55-9	Y	SSL_0.1	1.57	8.80	1997-07-22
DDT[4,4'-]	P-SMA-2	50-29-3	Y	SSL_0.1	1.87	35.4	1996-07-01
Dibenz(a,h)anthracene	P-SMA-2	53-70-3	Y	SSL_0.1	0.0153	0.0860	2005-04-19
Hexachlorobenzene	P-SMA-2	118-74-1	Y	SSL_0.1	0.333	0.450	2005-04-19
Indeno(1,2,3-cd)pyrene	P-SMA-2	193-39-5	Y	SSL_0.1	0.153	0.530	2005-04-19
Iron	P-SMA-2	Fe	Y	BTV	21500	486000	2005-04-19
Lead	P-SMA-2	Pb	Y	BTV	22.3	33000	2005-04-19
Manganese	P-SMA-2	Mn	Y	BTV	671	21800	2005-04-19
Mercury	P-SMA-2	Hg	Y	BTV	0.100	90.0	1997-07-23
Nickel	P-SMA-2	Ni	Y	BTV	15.4	792	2005-04-20
Selenium	P-SMA-2	Se	Y	BTV	1.52	20.4	2006-03-17
Silver	P-SMA-2	Ag	Y	BTV	1.00	190	2005-04-19
Tetrachlorodibenzodioxin[2,3,7,8-]	P-SMA-2	1746-01-6	Y	SSL_0.1	0.00000490	0.00000720	2005-04-19
Thallium	P-SMA-2	Tl	Y	BTV	0.730	1.60	1996-06-13
Uranium	P-SMA-2	U	Y	BTV	1.82	3.22	2006-11-17
Vanadium	P-SMA-2	V	Y	BTV	39.6	62.4	1997-07-22
Zinc	P-SMA-2	Zn	Y	BTV	48.8	43000	2005-04-19

Figure 13.3-4 Screening-Level Exceedances from Soil Samples Associated with P-SMA-2

13.4 Stormwater Evaluation

13.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected from the current location at the SMA.

13.4.2 Assessment Unit and Stream Impairments

P-SMA-2 drains to Pueblo Canyon (Los Alamos WWTP to Acid Canyon) which has impairments for adjusted gross alpha and PCBs. The impairments may be Site-related, based on Site history.

13.5 Site-Specific Demonstration

13.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater at the current monitoring location: aluminum, antimony, Aroclor-1254, arsenic, barium, benzo(a)pyrene, benzo(b)fluoranthene, beryllium, cadmium, chromium, cobalt, copper, DDD[4,4'-]; DDE[4,4'-], DDT[4,4'-], dibenz(a,h)anthracene, hexachlorobenzine, indeno(1,2,3-cd)pyrene, iron, lead, manganese, mercury, nickel, selenium, silver, tetrachlorodibenzodioxin [2,3,7,8-], thallium, uranium, vanadium, and zinc.

13.5.2 Stormwater Data Summary

No confirmation-monitoring data.

13.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current location.

13.5.4 Sampling and Analysis Plan

Table 13.5-1 is the proposed SAP for P-SMA-2.

Table 13.5-1 Proposed SAP, P-SMA-2

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Total PCBs	Impairment, Site history, and soil data
Tetrachlorodibenzodioxin [2,3,7,8-]	Site history and soil data
Dissolved antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, manganese, nickel, silver, thallium, uranium, vanadium, and zinc.	Site history (metals) and soil data
Total aluminum, mercury, iron and selenium	Site history (metals) and soil data
Radium-226 and radium-228	Site history (radionuclides)
Tritium	Site history (radionuclides)
SVOCs	Site history (organic chemicals) and soil data
Pesticides	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement

14.0 P-SMA-2.15

Associated Sites	31-001
Receiving Water	Pueblo Canyon
Drainage Area	11.24 acres
Landscape Characteristics	11% impervious, 89% impervious
Consent Order Site Status	SWMU 31-001: In Progress
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the August 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

14.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection at P-SMA-2.15. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

14.2 Site History

31-001 (6/12/2017)

SWMU 31-001 is a former septic system located at TA-31 in what is now the eastern residential area of Los Alamos, immediately west of the Los Alamos County Airport. This system consisted of a septic tank (structure ULR-7 or 0-7), two sanitary sewer manholes (structures ULR-41 and -42), associated inlet and outlet drainline, and an outfall. TA-31 served as the receiving area for all truck shipments to the Laboratory from 1945 to 1954. In 1949, six hutments that made up warehouse 31-2 were removed to make room for a more permanent warehouse, building 31-7. The SWMU 31-001 septic system was installed at the same time to serve building 31-7.

The septic tank (structure 0-7) was constructed of reinforced concrete. It measured 4 ft × 3 ft and was several feet deep. The inlet line ran to the north from building 31-7 to the septic tank. The septic tank was located aboveground on a small bench above the rim of Pueblo Canyon, and discharged through a 4-in.-diameter outlet drainline to an outfall in Pueblo Canyon. The septic system operated until 1954, when TA-31 was abandoned and the buildings were removed. The septic system remained in place until its removal in 1988. The inlet and outlet drainlines were not encountered when the septic tank was removed in 1988.

Data from samples collected from the tank contents showed no detectable concentrations of hazardous constituents; the tank was disposed of at the Los Alamos County landfill.

For investigation activities refer to “Phase II Investigation Report for Pueblo Canyon Aggregate Area” (LANL 2010, 110864).

14.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 14.2-1.

Table 14.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
31-001	Soil contamination from former septic tank	Inorganic and organic chemicals

14.3 Consent Order Soil Data

Decision-level data for SWMU 31-001 consist of results from samples collected in 2006 and 2010. Analytical results from those samples are presented in Figures 14.3-1 through 14.3-4. The 2010 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

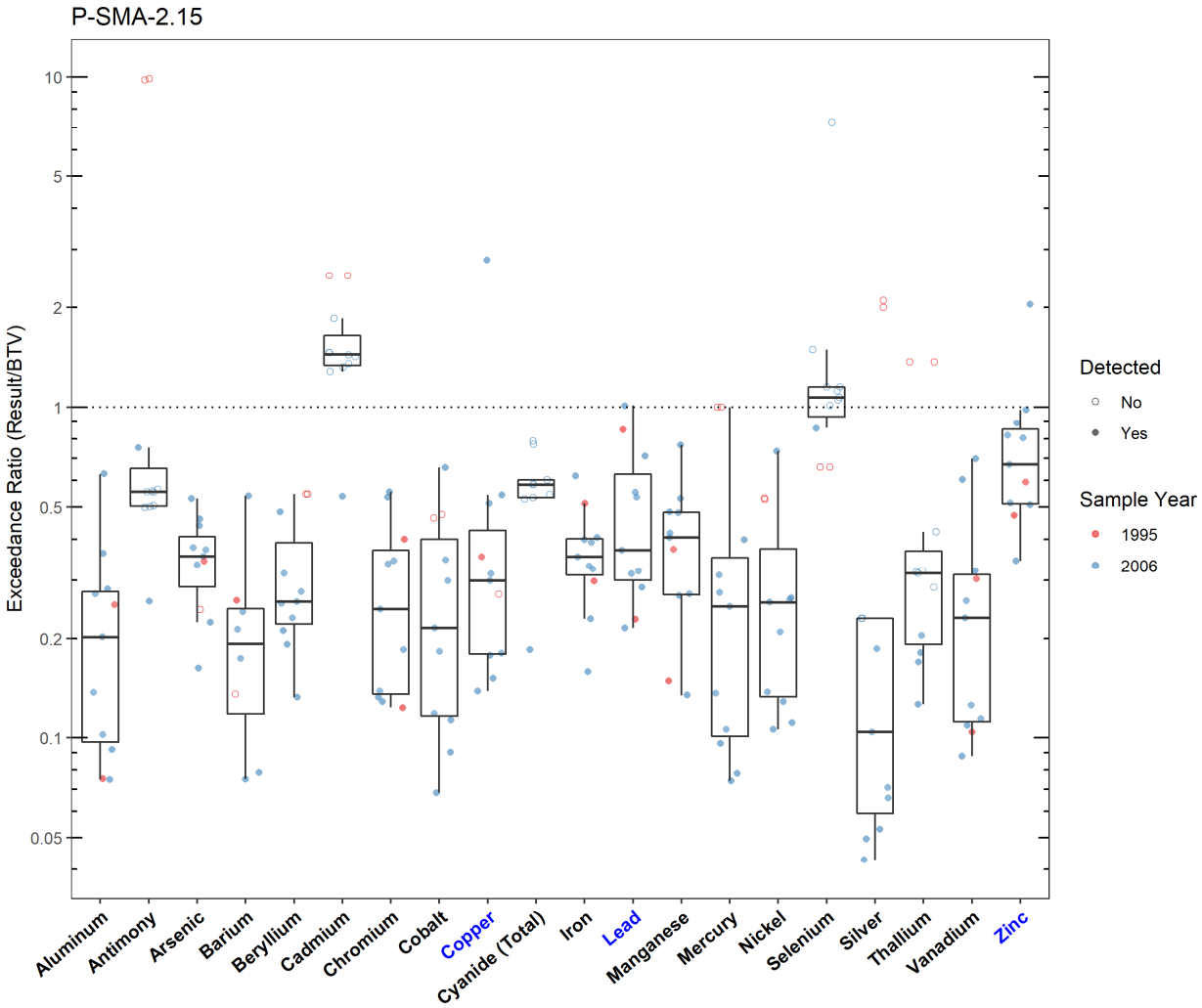

Figure 14.3-1 Inorganics Analytical Results from Soil Samples Associated with P-SMA-2.15

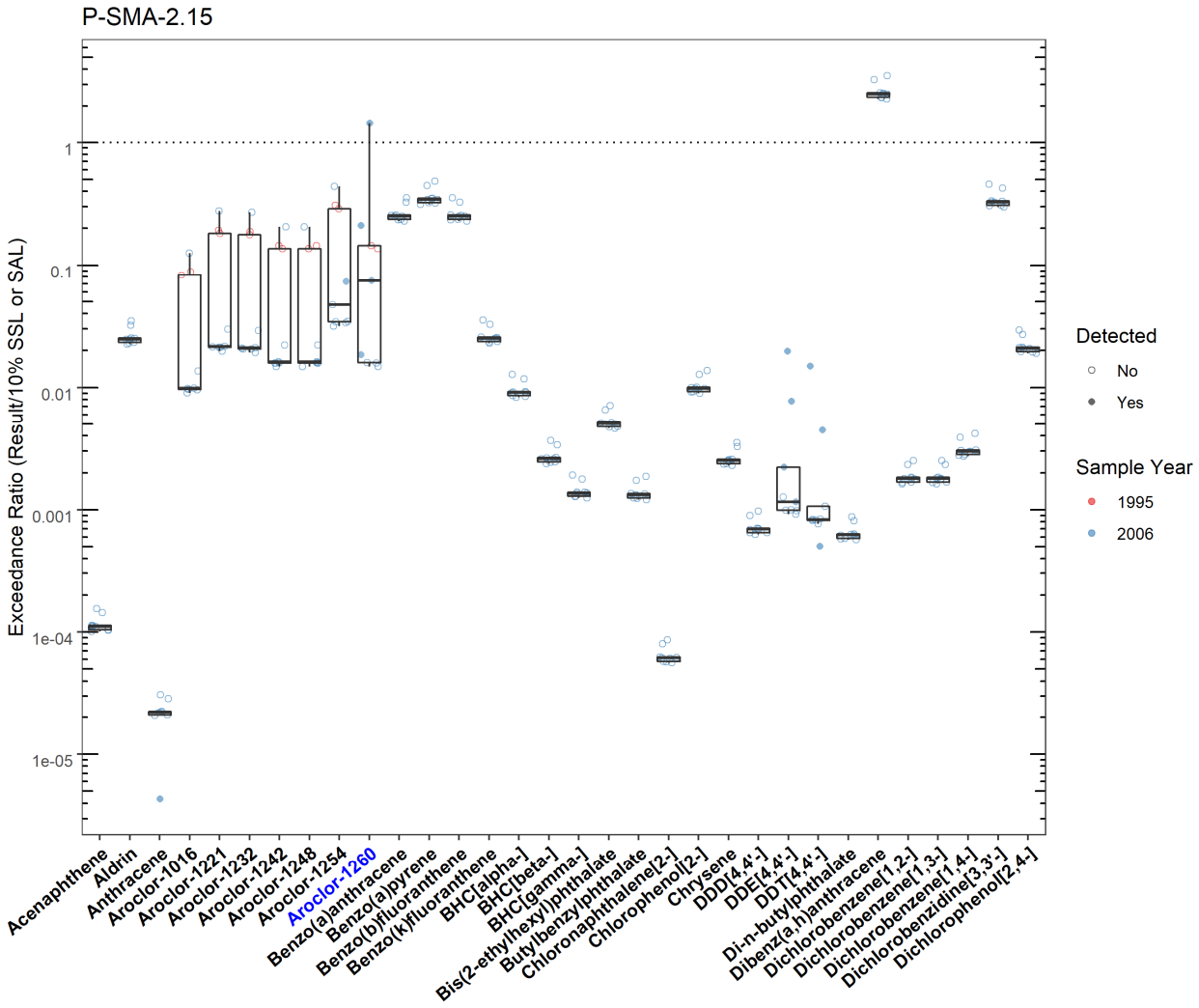

Figure 14.3-2 Organics Analytical Results from Soil Samples Associated with P-SMA-2.15 (Plot 1)

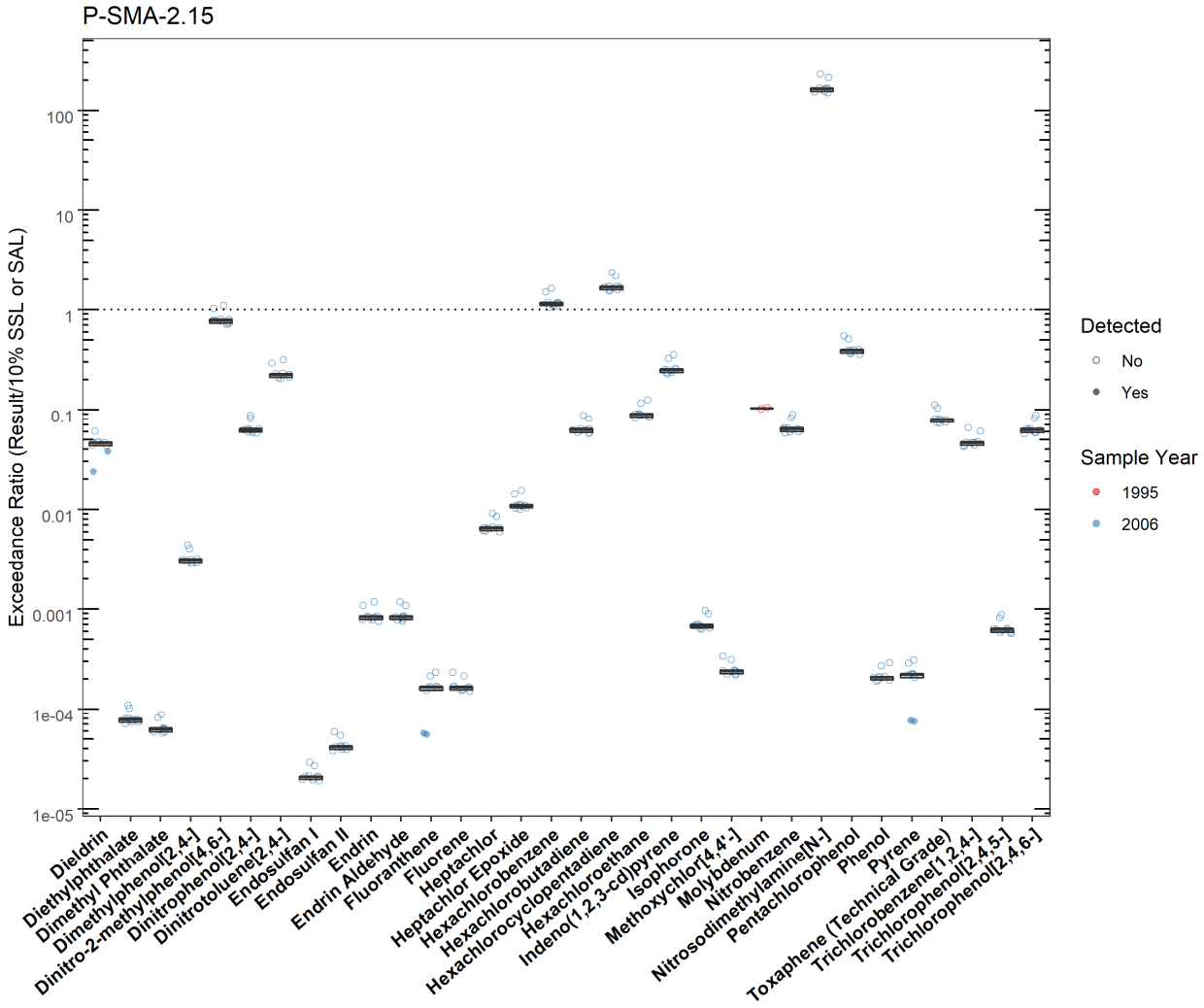

Figure 14.3-3 Organics Analytical Results from Soil Samples Associated with P-SMA-2.15 (Plot 2)

P-SMA-2.15

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1260	P-SMA-2.15	11096-82-5	Y	SSL_0.1	0.243	0.355	2006-09-11
Copper	P-SMA-2.15	Cu	Y	BTV	14.7	41.0	2006-09-11
Lead	P-SMA-2.15	Pb	Y	BTV	22.3	22.6	2006-09-11
Zinc	P-SMA-2.15	Zn	Y	BTV	48.8	99.5	2006-09-11

Figure 14.3-4 Screening-Level Exceedances from Soil Samples Associated with P-SMA-2.15

14.4 Stormwater Evaluation

14.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

14.4.2 Assessment Unit and Stream Impairments

P-SMA-2.15 drains to Pueblo Canyon (Los Alamos WWTP to Acid Canyon), which has impairments for adjusted gross alpha and PCBs. The PCB impairment may be Site-related, based on Site history.

14.5 Site-Specific Demonstration

14.5.1 Soil Data Summary

The Site-related POCs Aroclor-1260, copper, lead, and zinc exceeded the applicable screening value in soil data and have not yet been measured in stormwater.

14.5.2 Stormwater Data Summary

No confirmation-monitoring data.

14.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

14.5.4 Sampling and Analysis Plan

Table 14.5-1 is the proposed SAP for P-SMA-2.15.

Table 14.5-1 Proposed SAP, P-SMA-2.15

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment, Site history, and soil data
SVOCs	Site history (organic chemicals)
Dissolved copper, lead, and zinc	Site history (inorganic chemicals) and soil data
DOC	Permit requirement
SSC	Permit requirement

15.0 P-SMA-2.2

Associated Sites	00-019
Receiving Water	Pueblo Canyon
Drainage Area	3.7 acres
Landscape Characteristics	14% impervious, 86% pervious
Consent Order Site Status	SWMU 00-019: Pending LANL Administrative Action
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the August 2017 field visits, the sampler was moved down the drainage past soil location 00-10256 (elevated detections of metals and PCBs) to include more of the potentially affected area.
2022 Permit Status	Active Monitoring

15.1 2010 Administratively Continued Permit Summary

Following the May 2011 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. In 2013, the monitoring location was relocated to a more representative location after a boundary change for SWMU 00-019 was implemented. Baseline monitoring was re-initiated at this location with stormwater not being sufficient for full-volume sample collection. While developing the 2018 SAP, a decision was made to implement the monitoring location move that had been recommended during the 2017 SIP review. Baseline monitoring was re-initiated at the new location in 2018, and a baseline sample was collected in July 2019. Analytical results from this sample initiated corrective action.

Following a 2019 SIP review revision and the December 2020 certification to EPA of enhance control installation as a corrective action (N3B 2020, 701161), corrective action stormwater sampling was initiated at a new monitoring location more representative of the Site after the control installations. Since that time, stormwater flow has not been sufficient for full-volume sample collection; monitoring is ongoing at this location until at least one confirmation-monitoring sample is collected from this SMA.

15.2 Site History

00-019 (6/12/2017)

SWMU 00-019 is the former CWWTP, which was first installed to replace a series of septic tanks serving original Laboratory facilities and some residential areas of the Los Alamos townsite in former TA-00. The Site is located in the eastern portion of the Los Alamos townsite at the current location of the Sombrillo assisted-living facility, at the northern edge of Townsite Mesa above Graduation Canyon, a hanging tributary canyon of Pueblo Canyon. The CWWTP used conventional wastewater treatment processes, including primary settling, activated sludge digestion, sludge drying beds, trickling filtration, final clarification, and chlorination. CWWTP components included a primary settling tank, sludge digestion tank, final settling tank, trickling filter, chlorine contact tank, clarifier, pump house, two sludge drying beds, two outfall areas, manholes, and associated underground piping.

The CWWTP was constructed and began operating in 1947. The plant was used to treat sanitary sewage from laboratory buildings and residential areas, including wastewater from sanitary drains at former TA-01 buildings, residences, and local businesses. The treated waste was discharged to the eastern outfall into Graduation Canyon. The Laboratory operated the CWWTP from 1947 to 1961. Beginning in 1948, the treated effluent was diverted via a pipeline along Canyon Road to the Los Alamos Golf Course.

Beginning In 1951, most of the effluent from the CWWTP was used as makeup water for the cooling towers at TA-03, and was no longer discharged via the outfalls.

The pump house, which connected the primary settling tank to the sludge digestion tank, was built of cinder block and concrete, measured 22 ft × 28 ft wide × 15 ft high, and extended 30 ft bgs. Numerous other process lines, overflow lines, and drainlines, ranging from 4 to 16 in. in diameter, connected the various former tanks.

The two CWWTP outfall discharge pipes employed gravity flow from the inlet manhole (western outfall) and the final chlorine contact tank (eastern outfall). The outfalls discharged at the north edge of the mesa into Graduation Canyon.

The western outfall drainline consisted of an 8-in. diameter VCP with a concrete discharge apron. The western outfall accommodated overflow from the inlet manhole, and may have discharged untreated sewage in the event of over-capacity flow events at the CWWTP.

The eastern outfall was located 170 ft east of the western outfall; a 12-in.-diameter VCP channeled effluent to an exposed section of corrugated metal pipe that discharged treated effluent. The eastern outfall initially discharged treated effluent from the final settling tank. Once the CWWTP was renovated to provide supplemental irrigation water for the Los Alamos golf course, the eastern outfall received overflow from the chlorine contact tank. A second 6-in.-diameter VCP also discharged to the eastern outfall; this drainline was connected to floor drains in the pump house. The eastern outfall may have discharged untreated and/or partially treated wastewater and/or sludge from the pump house in the event of leaks or pipe breaks in the pump house.

No records are available regarding wastewater volumes discharged to the CWWTP outfalls.

The CWWTP ceased operating, and was initially decommissioned, in 1961. In 1967, the site was transferred intact, but out of service, to Los Alamos County. Although Los Alamos County never operated the plant as a wastewater treatment plant, the site was used for various activities, and over time Los Alamos County removed portions of the former treatment plant structures. Los Alamos County used the mesa-top portion of the site for various maintenance-related activities, primarily to house the LAC roads and grounds headquarters and a storage area. As a result, the mesa top was heavily reworked by the County over more than 30 yr of ownership. Only the former pump house, outfalls, and an unknown portion of the underground drainlines were known to remain in the late 1990s. Construction of a senior-citizen assisted-living facility was completed in 2004 over the Site.

For investigation activities, refer to “Voluntary Corrective Action Completion Report for Potential Release Site 00-019 (former Central Waste Water Treatment Plant)” (LANL 2001, 240519).

15.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 15.2-1.

Table 15.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-019	Central WWTP	Inorganic and organic chemicals, radionuclides

15.3 Consent Order Soil Data

Decision-level data for SWMU 00-019 consist of results from samples collected in 1996, 1997, 1999, 2000, and 2001. Analytical results from those samples are presented in Figures 15.3-1 through 15.3-4.

The 2001 VCA report concluded that the nature and extent of contamination have been defined, and no further sampling for extent is warranted.

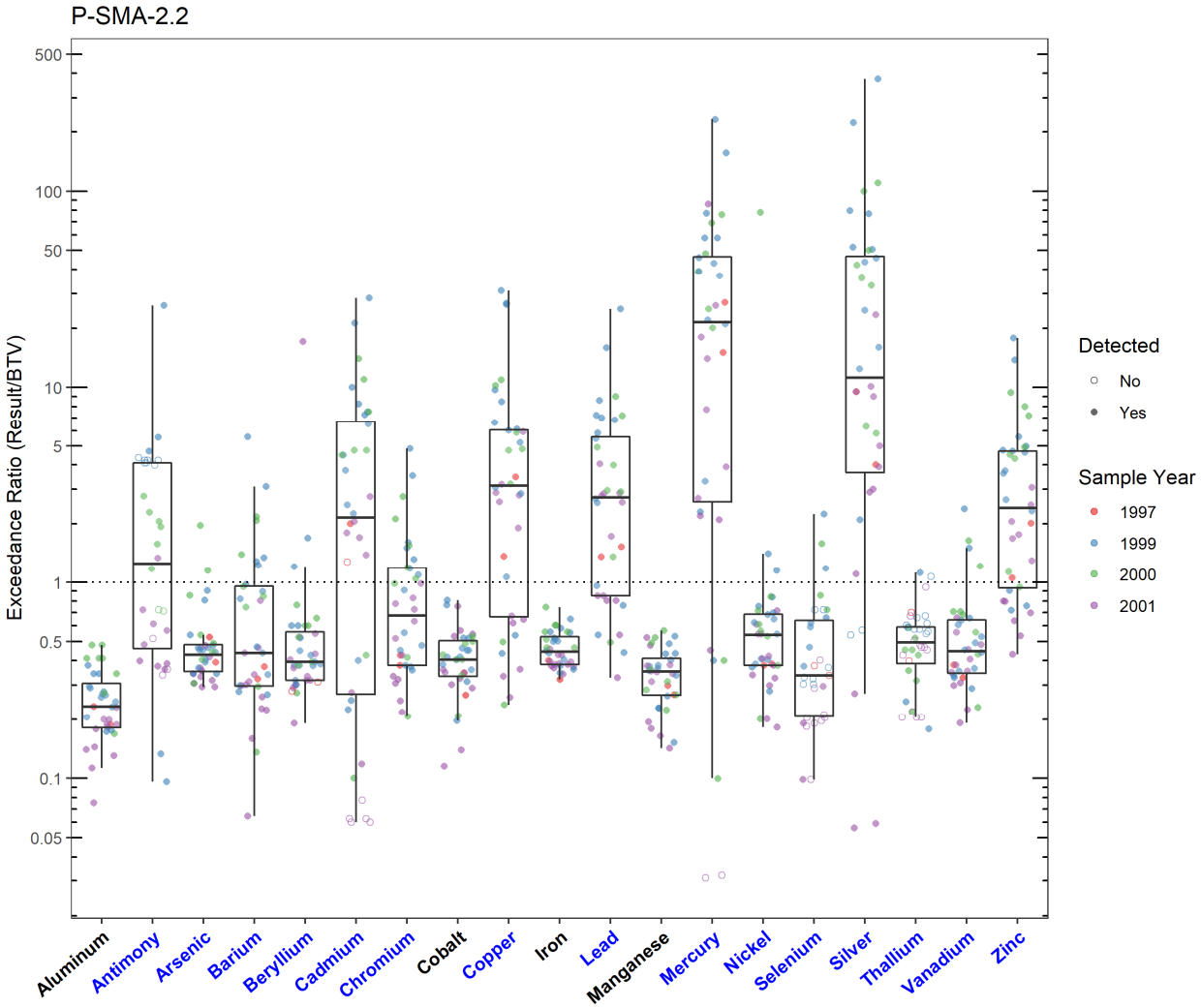

Figure 15.3-1 Inorganics Analytical Results from Soil Samples Associated with P-SMA-2.2

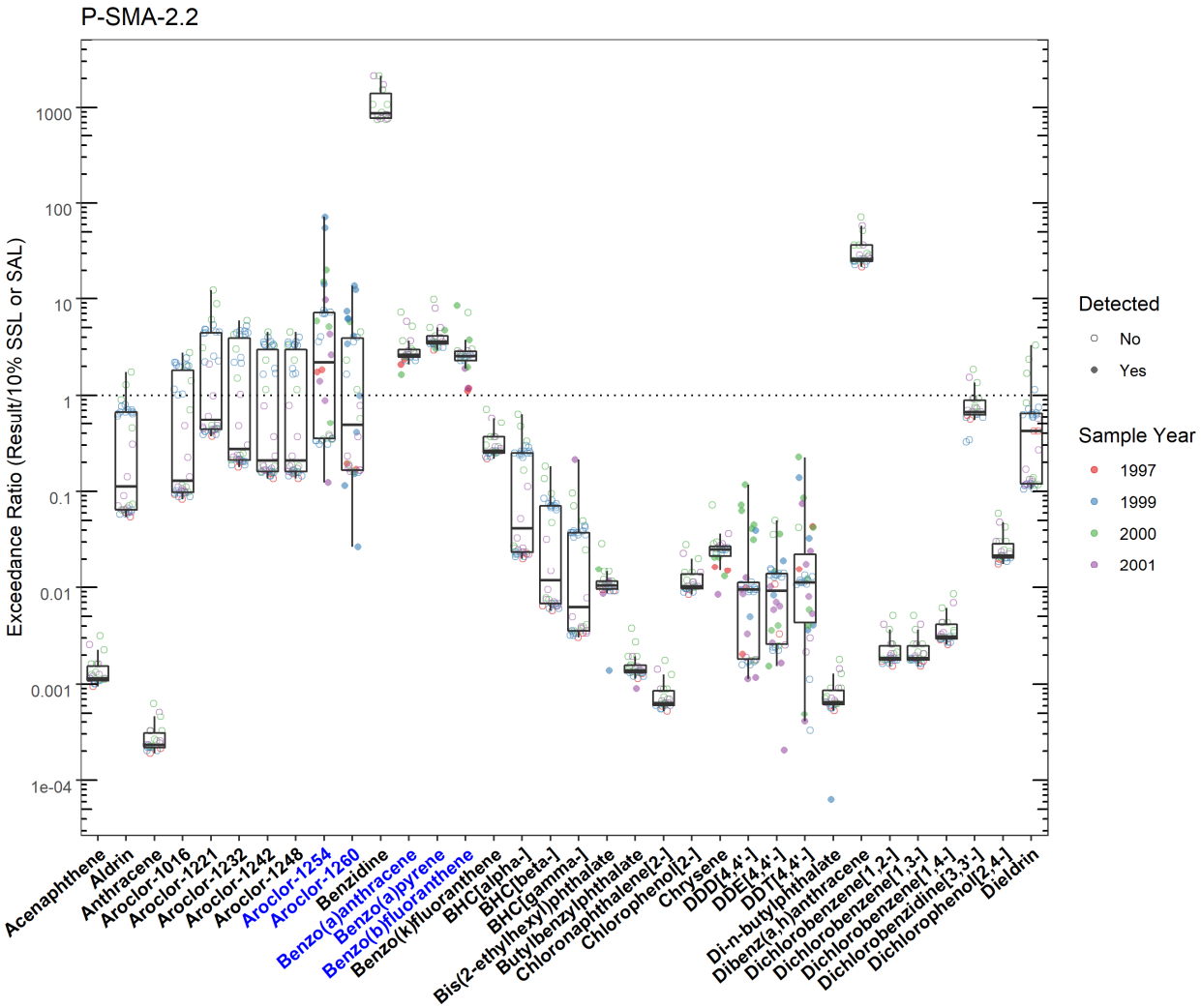

Figure 15.3-2 Organics Analytical Results from Soil Samples Associated with P-SMA-2.2 (Plot 1)

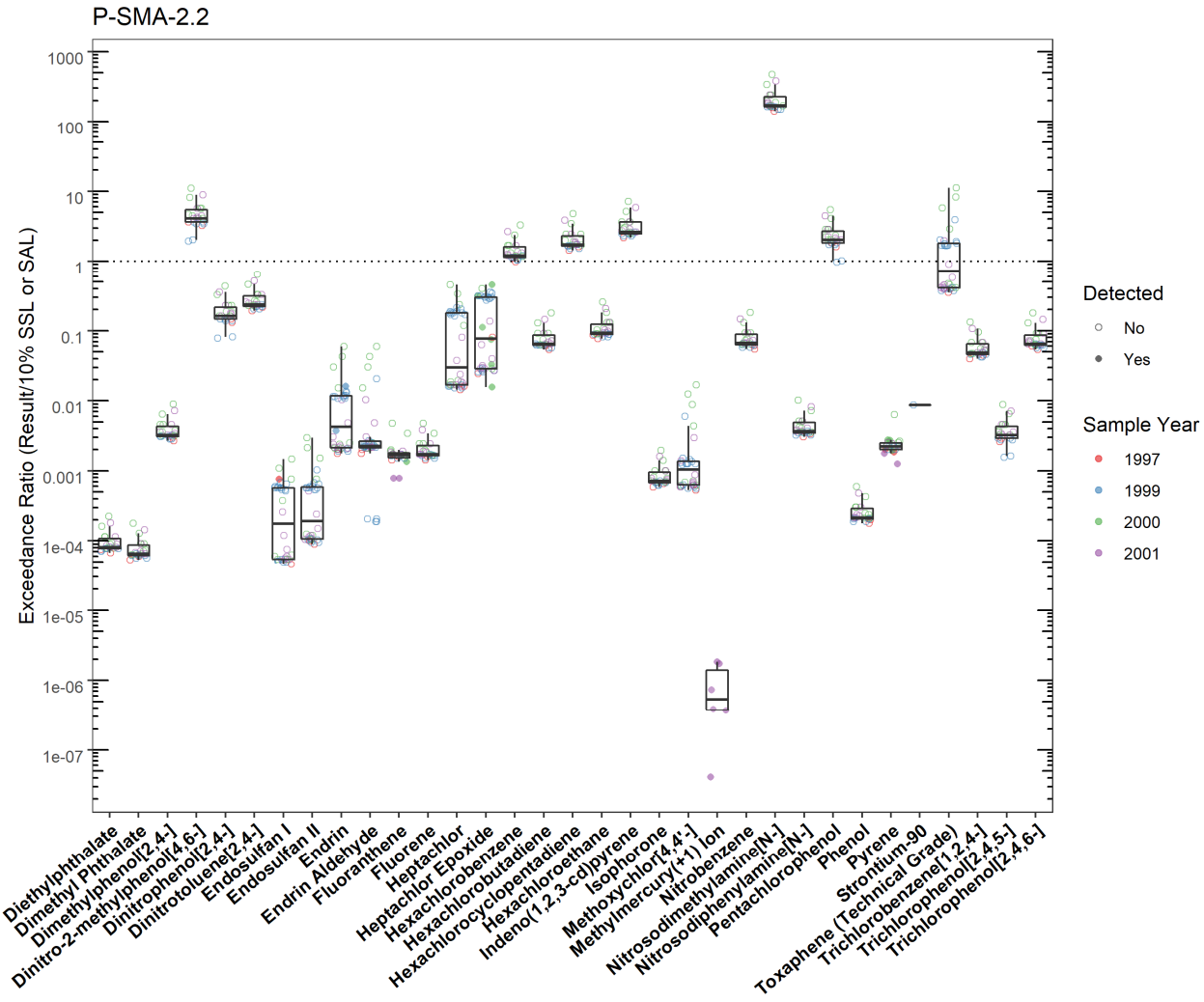

Figure 15.3-3 Organics Analytical Results from Soil Samples Associated with P-SMA-2.2 (Plot 2)

P-SMA-2.2

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	P-SMA-2.2	Sb	Y	BTV	0.830	21.7	1999-06-16
Aroclor-1254	P-SMA-2.2	11097-69-1	Y	SSL_0.1	0.114	8.20	1999-06-16
Aroclor-1260	P-SMA-2.2	11096-82-5	Y	SSL_0.1	0.243	3.30	1999-06-16
Arsenic	P-SMA-2.2	As	Y	BTV	8.17	16.0	2000-01-26
Barium	P-SMA-2.2	Ba	Y	BTV	295	1640	1999-06-16
Benzo(a)anthracene	P-SMA-2.2	56-55-3	Y	SSL_0.1	0.153	0.360	1997-03-19
Benzo(a)pyrene	P-SMA-2.2	50-32-8	Y	SSL_0.1	0.112	0.530	2000-01-25
Benzo(b)fluoranthene	P-SMA-2.2	205-99-2	Y	SSL_0.1	0.153	1.30	2000-01-25
Beryllium	P-SMA-2.2	Be	Y	BTV	1.83	31.3	2001-03-29
Cadmium	P-SMA-2.2	Cd	Y	BTV	0.400	11.4	1999-06-16
Chromium	P-SMA-2.2	Cr	Y	BTV	19.3	93.5	1999-06-16
Copper	P-SMA-2.2	Cu	Y	BTV	14.7	457	1999-06-16
Lead	P-SMA-2.2	Pb	Y	BTV	22.3	557	1999-06-16
Mercury	P-SMA-2.2	Hg	Y	BTV	0.100	23.4	1999-06-16
Nickel	P-SMA-2.2	Ni	Y	BTV	15.4	1200	2000-01-26
Selenium	P-SMA-2.2	Se	Y	BTV	1.52	3.40	1999-06-16
Silver	P-SMA-2.2	Ag	Y	BTV	1.00	375	1999-06-16
Thallium	P-SMA-2.2	Tl	Y	BTV	0.730	0.820	1999-07-07
Vanadium	P-SMA-2.2	V	Y	BTV	39.6	94.6	1999-06-16
Zinc	P-SMA-2.2	Zn	Y	BTV	48.8	871	1999-06-16

Figure 15.3-4 Screening-Level Exceedances from Soil Samples Associated with P-SMA-2.2

15.4 Stormwater Evaluation

15.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for SSD. No confirmation-monitoring stormwater samples have been collected in the current location at the SMA.

15.4.2 Assessment Unit and Stream Impairments

P-SMA-2.2 drains to Graduation Canyon (Pueblo Canyon to headwaters) which has impairments for dissolved copper and PCBs. The impairments may be Site-related, based on Site history.

15.5 Site-Specific Demonstration

15.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater at the current monitoring location: antimony, Aroclor-1254, Aroclor-1260, arsenic, barium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.

15.5.2 Stormwater Data Summary

No confirmation-monitoring data.

15.5.3 2022 Permit Status

The SMA is in active monitoring; no corrective action samples have been collected at the current location.

15.5.4 Sampling and Analysis Plan

Table 15.5-1 is the proposed SAP for P-SMA-2.2.

Table 15.5-1 Proposed SAP, P-SMA-2.2

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment, sampler move, Site history, and soil data
Dissolved antimony, arsenic, barium, beryllium, cadmium, chromium, copper, lead, nickel, silver, thallium, vanadium, and zinc	Impairment (copper), Site history (inorganic chemicals), sampler move, and soil data
Gross alpha	Site history and stormwater data
Tritium	Site history (radionuclides)
SVOCs	Site history, sampler move, and soil data
Total mercury and selenium	Site history (inorganic chemicals), sampler move, and soil data
DOC	Permit requirement
SSC	Permit requirement

16.0 P-SMA-3.05

Associated Sites	00-018(a)
Receiving Water	Pueblo Canyon
Drainage Area	0.4 acres
Landscape Characteristics	9% impervious, 91% pervious
Consent Order Site Status	SWMU 00-018(a): Pending Approval of Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	The August 2017 field visit determined that a berm should be added to the east of the sampling location 00-25529 (highest detection of silver) to capture any runoff from this area.
2022 Permit Status	Active Monitoring

16.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action. Stormwater monitoring has not occurred since 2013.

SWMU 00-018(a) received a COC under the Consent Order in January 2015. The Permittees submitted a certification of completion of corrective action per Permit part I.E.2(d) for the Site in April 2015 (LANL 2015, 600370).

16.2 Site History

00-018(a) (no date)

SWMU 00-018(a) consists of the decommissioned Pueblo Canyon WWTP, located at the end of Olive Street in Pueblo Canyon on Los Alamos County property. The plant, which was built between 1946 and 1948, began operating in 1951 and received waste from HRL at TA-43 until 1983, and from Los Alamos business and residential customers until 1991. From 1983 to 1991, the plant received only sanitary waste from Los Alamos businesses and residences. The plant was the primary supplier of irrigation water for the Los Alamos golf course and recreational ball fields.

From 1953 to 1983, this WWTP received laboratory waste (less than 10 L/month) from the HRL at TA-43, the only known laboratory contributor to the waste stream at the plant. The HRL generated chemical and radioactive wastes, but LANL policy required that radioactive wastes not be discharged to the drains. In the early 1960s, Los Alamos County assumed control of the WWTP and decommissioned it in 1992.

For investigation activities refer to “Phase II Investigation Report for Pueblo Canyon Aggregate Area” (LANL 2010, 110864).

16.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 16.2-1.

Table 16.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-018(a)	Pueblo Canyon WWTP	Beryllium, cadmium, lead, mercury, organic chemicals, uranium

16.3 Consent Order Soil Data

Decision-level data for SWMU 00-018(a) consist of results from samples collected in 1996, 2006, and 2010. Analytical results from those samples are presented in Figures 16.3-1 through 16.3-4. The lateral and vertical extent for all detected chemicals and radionuclides at SWMU 00-018(a) have been defined, including the extent of contaminant migration downslope towards Pueblo Canyon.

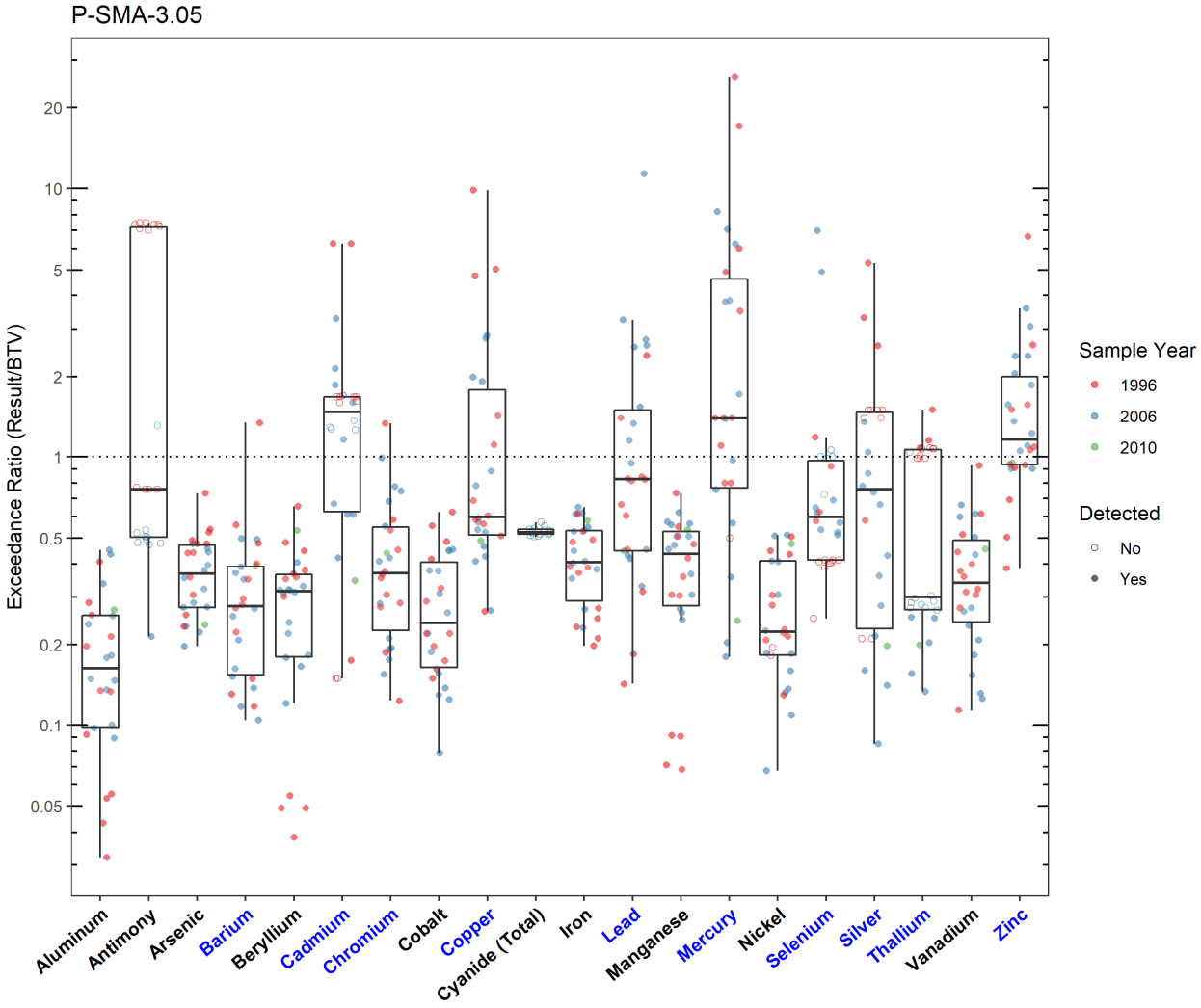

Figure 16.3-1 Inorganics Analytical Results from Soil Samples Associated with P-SMA-3.05

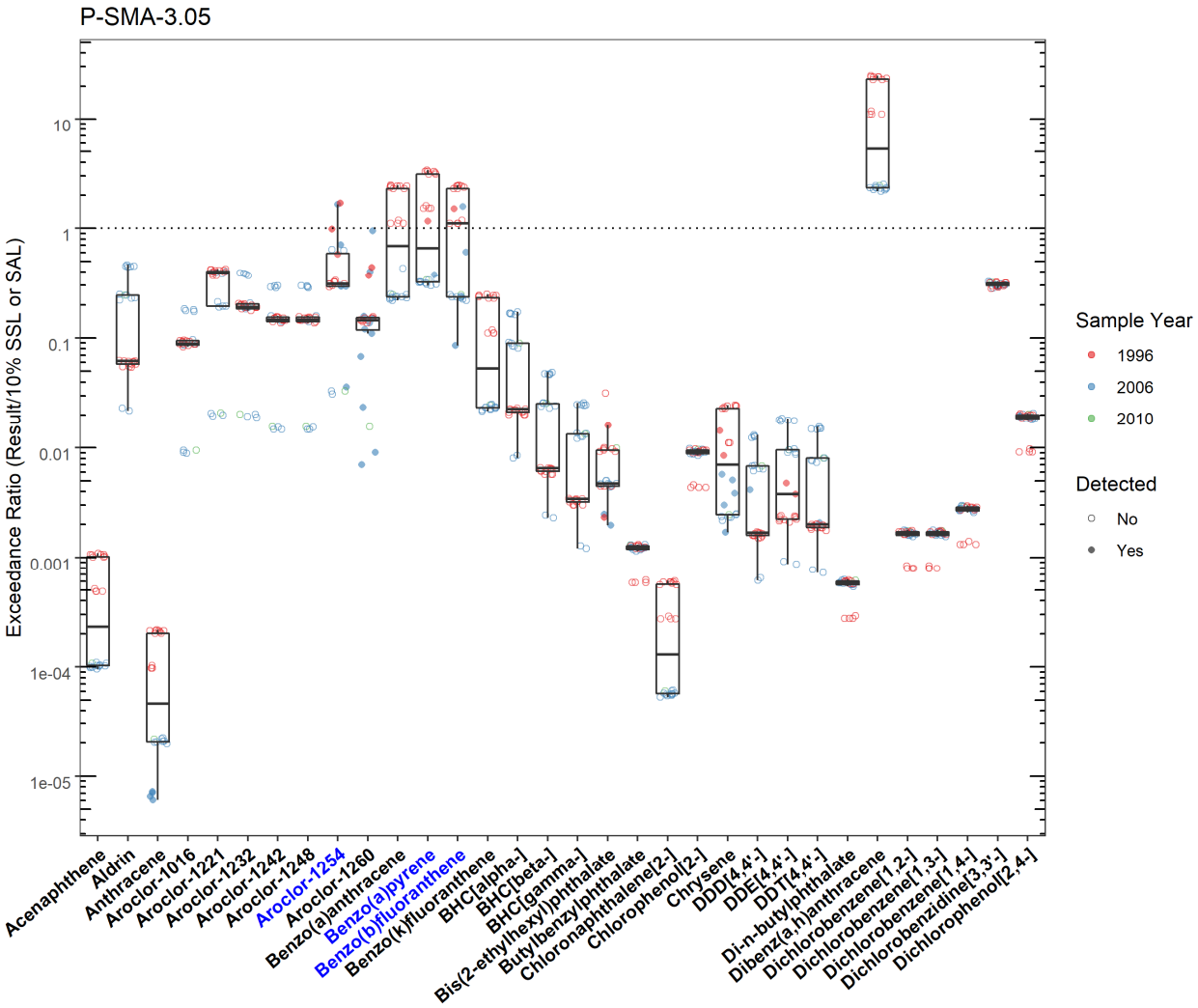

Figure 16.3-2 Organics Analytical Results from Soil Samples Associated with P-SMA-3.05 (Plot 1)

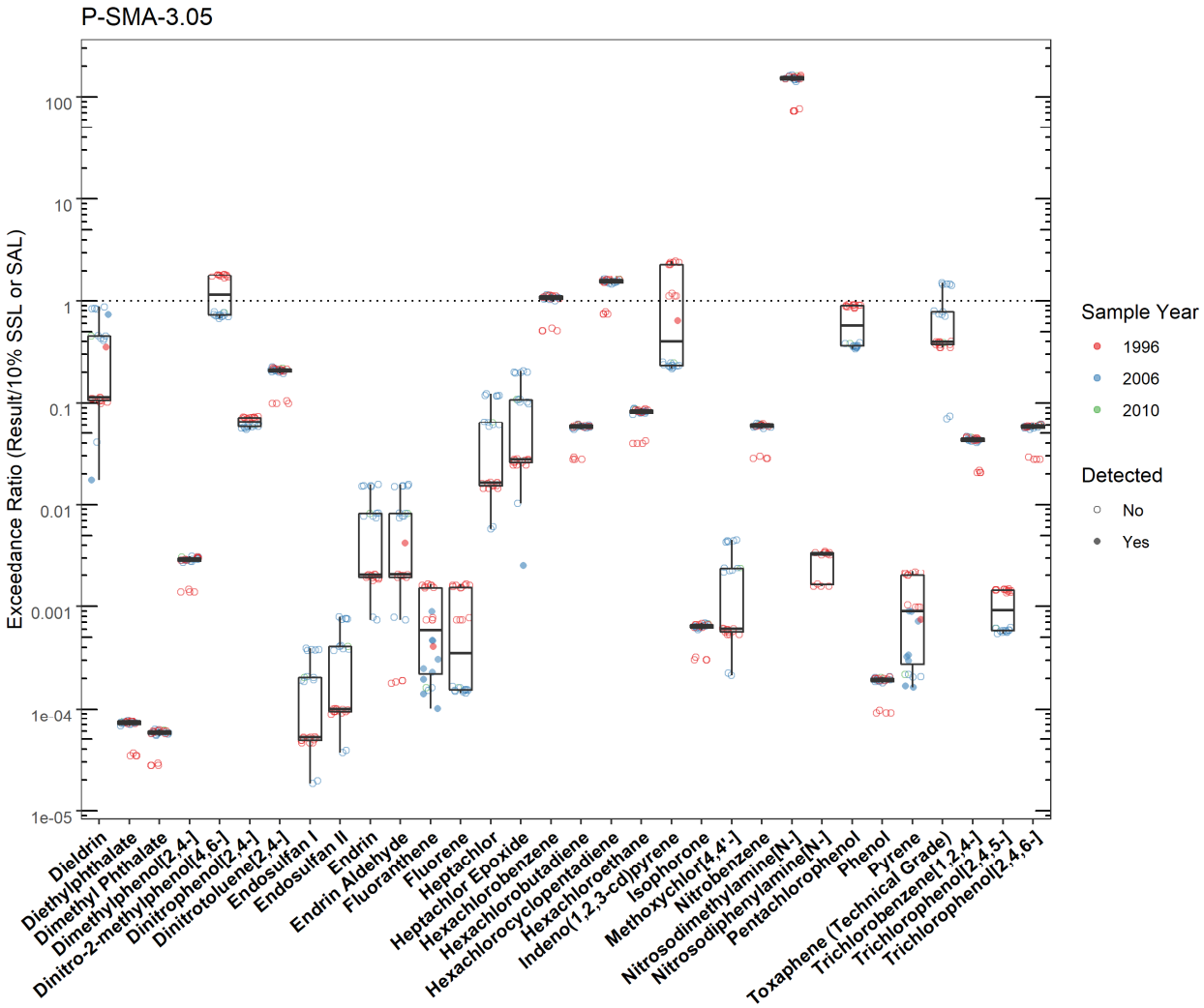

Figure 16.3-3 Organics Analytical Results from Soil Samples Associated with P-SMA-3.05 (Plot 2)

P-SMA-3.05

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	P-SMA-3.05	11097-69-1	Y	SSL_0.1	0.114	0.194	1996-09-17
Barium	P-SMA-3.05	Ba	Y	BTV	295	394	1996-09-17
Benzo(a)pyrene	P-SMA-3.05	50-32-8	Y	SSL_0.1	0.112	0.130	1996-09-17
Benzo(b)fluoranthene	P-SMA-3.05	205-99-2	Y	SSL_0.1	0.153	0.240	2006-07-27
Cadmium	P-SMA-3.05	Cd	Y	BTV	0.400	2.50	1996-09-11; 1996-09-17
Chromium	P-SMA-3.05	Cr	Y	BTV	19.3	25.6	1996-09-17
Copper	P-SMA-3.05	Cu	Y	BTV	14.7	145	1996-09-17
Lead	P-SMA-3.05	Pb	Y	BTV	22.3	251	2006-07-27
Mercury	P-SMA-3.05	Hg	Y	BTV	0.100	2.60	1996-09-17
Selenium	P-SMA-3.05	Se	Y	BTV	1.52	10.6	2006-08-02
Silver	P-SMA-3.05	Ag	Y	BTV	1.00	5.30	1996-09-17
Thallium	P-SMA-3.05	Tl	Y	BTV	0.730	1.10	1996-09-17
Zinc	P-SMA-3.05	Zn	Y	BTV	48.8	324	1996-09-17

Figure 16.3-4 Screening-Level Exceedances from Soil Samples Associated with P-SMA-3.05

16.4 Stormwater Evaluation

16.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in September 2013. Analytical results of this sampling are presented in Figures 16.4-1 and 16.4-2.

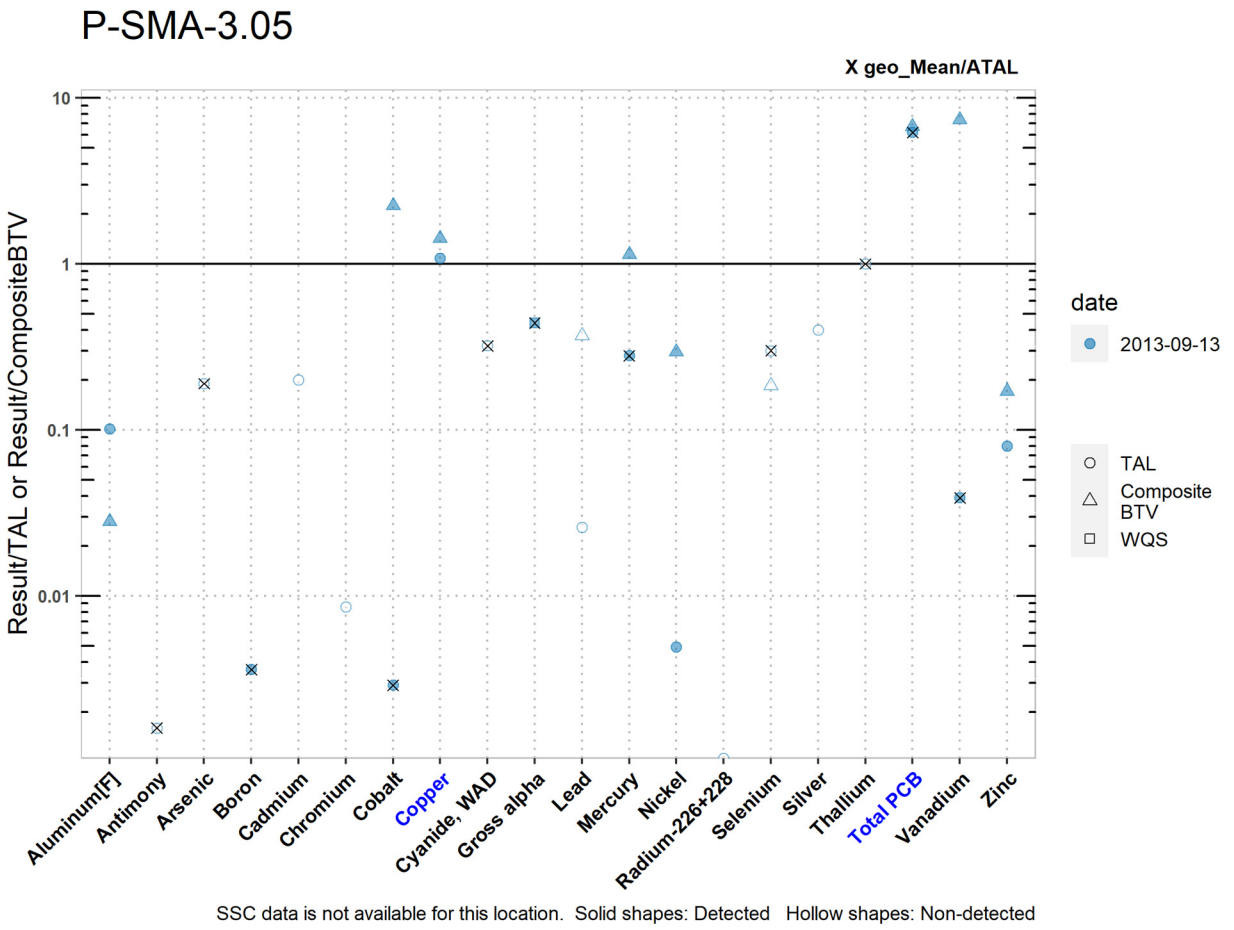

Figure 16.4-1 Analytical Results from Stormwater Sample, P-SMA-3.05 (Plot)

P-SMA-3.05

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	0.2	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	0.014	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	2690	NA	NA	NA	NA	NA	1.28	3.67	NA	56.5	1.36	0.189	3.10	4.79	8.14	NA	NA	0.0129	0.526	27.7
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-09-13 result	75.6	*1.00*	*1.70*	18.1	*0.110*	*2.00*	2.87	5.20	*1.67*	6.64	*0.500*	0.216	0.914	*NA*	*1.50*	*0.200*	*0.450*	0.0868	3.87	4.73
2013-09-13 dT	0.101	NA	NA	0.0036	NA	NA	0.0029	1.08	NA	0.44	NA	0.28	0.00491	NA	NA	NA	NA	6.2	0.039	0.0799
2013-09-13 dB	0.0281	NA	NA	NA	NA	NA	2.24	1.42	NA	NA	NA	1.14	0.295	NA	NA	NA	NA	6.73	7.36	0.171
geo_mean/ATAL	NA	0.0016	0.19	0.0036	NA	NA	0.0029	NA	0.321	0.44	NA	0.28	NA	NA	0.30	NA	1	6.2	0.039	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 16.4-2 Analytical Results from Stormwater Sample, P-SMA-3.05 (Table)

16.4.2 Assessment Unit and Stream Impairments

P-SMA-3.05 drains to Pueblo Canyon (Acid Canyon to headwaters), which has impairments for adjusted gross alpha, total aluminum, dissolved copper, and PCBs. The adjusted gross alpha and PCB impairments may be Site-related, based on Site history.

16.5 Site-Specific Demonstration

16.5.1 Soil Data Summary

The Site-related POCs benzo(a)pyrene and benzo(b)fluoranthene exceeded the applicable screening value in soil data and have not yet been measured in stormwater.

Barium exceeded the applicable screening value in soil data but is not a Site-related POC and will not be added to the SAP. With the exception of copper, the remaining metals that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

Copper and Aroclor-1254 exceeded the applicable screening value in soil data and will continue to be monitored in stormwater data.

16.5.2 Stormwater Data Summary

No confirmation-monitoring data for the current monitoring stage have been collected. Based on past exceedances in stormwater data, copper and total PCBs will be added to the SAP.

16.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

16.5.4 Sampling and Analysis Plan

Table 16.5-1 is the proposed SAP for P-SMA-3.05.

Table 16.5-1 Proposed SAP, P-SMA-3.05

Monitoring Constituent	Background for Monitoring
Total PCBs (1)	Impairment, Site history, soil data, and stormwater data
SVOCs	Site history and soil data
Dissolved copper (1) and uranium	Stormwater data and Site history
DOC	Permit requirement
SSC	Permit requirement

17.0 LA-SMA-0.85

Associated Sites	03-055(c)
Receiving Water	Los Alamos Canyon
Drainage Area	4.34 acres
Landscape Characteristics	45% impervious, 55% pervious
Consent Order Site Status	SWMU 03-055(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the February 2018 field visit, all parties agreed that the current sampler location and boundary are the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

17.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to the EPA, baseline stormwater samples were collected in July and August 2011. Analytical results from these samples initiated corrective action.

Following the October 2012 submittal of certification of enhanced control installation as a corrective action (LANL 2012, 228782) to EPA, the sampler was relocated to a more representative location and corrective action monitoring was initiated. Stormwater samples were collected in November 2012 and May 2013. Analytical results from these samples initiated corrective action.

SWMU 03-055(c) received a COC under the Consent Order in September 2019. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in December 2019 (N3B 2019, 700724). Stormwater monitoring has not occurred since 2013.

17.2 Site History

03-055(c) (9/28/2021)

SWMU 03-055(c) is an outfall and associated storm drain located north of the fire station (building 03-41) in the northeast corner of TA-03. Stormwater is channeled toward Los Alamos Canyon through a galvanized CMP to the SWMU 03-055(c) outfall. From the early 1960s until 1991, floor drains in the fire station (building 03-41) were tied into the SWMU 03-055(c) storm drain. In 1992, the fire station floor drains were rerouted to the TA-03 sanitary sewer system. Currently, the storm drain collects and channels only stormwater runoff from parking lots located in the northern portion of TA-03 to the SWMU 03-055(c) outfall. The Site is currently an undeveloped wooded area north of fire station 03-41 on DOE property.

For investigation activities, refer to “Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1” (N3B 2021, 701261).

17.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 17.2-1.

Table 17.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
03-055(c)	Outfall	Inorganic and organic chemicals

17.3 Consent Order Soil Data

Decision-level data for SWMU 03-055(c) consist of results from samples collected in 2007 and 2011. Analytical results from those samples are presented in Figures 17.3-1 through 17.3-4. Revision 1 of "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261) concluded that the nature and extent of contamination have been defined, and no further sampling for extent is warranted.

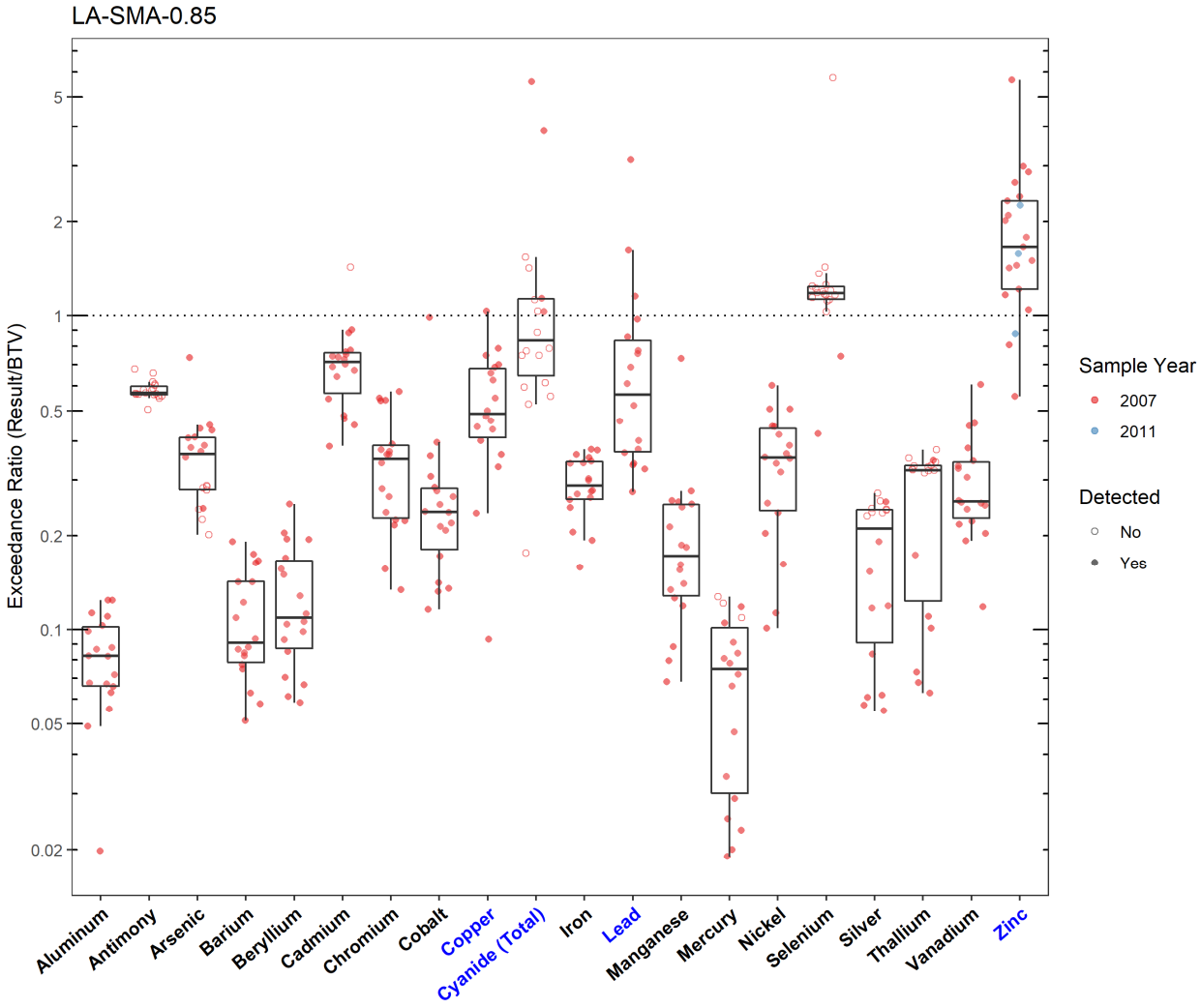

Figure 17.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-0.85

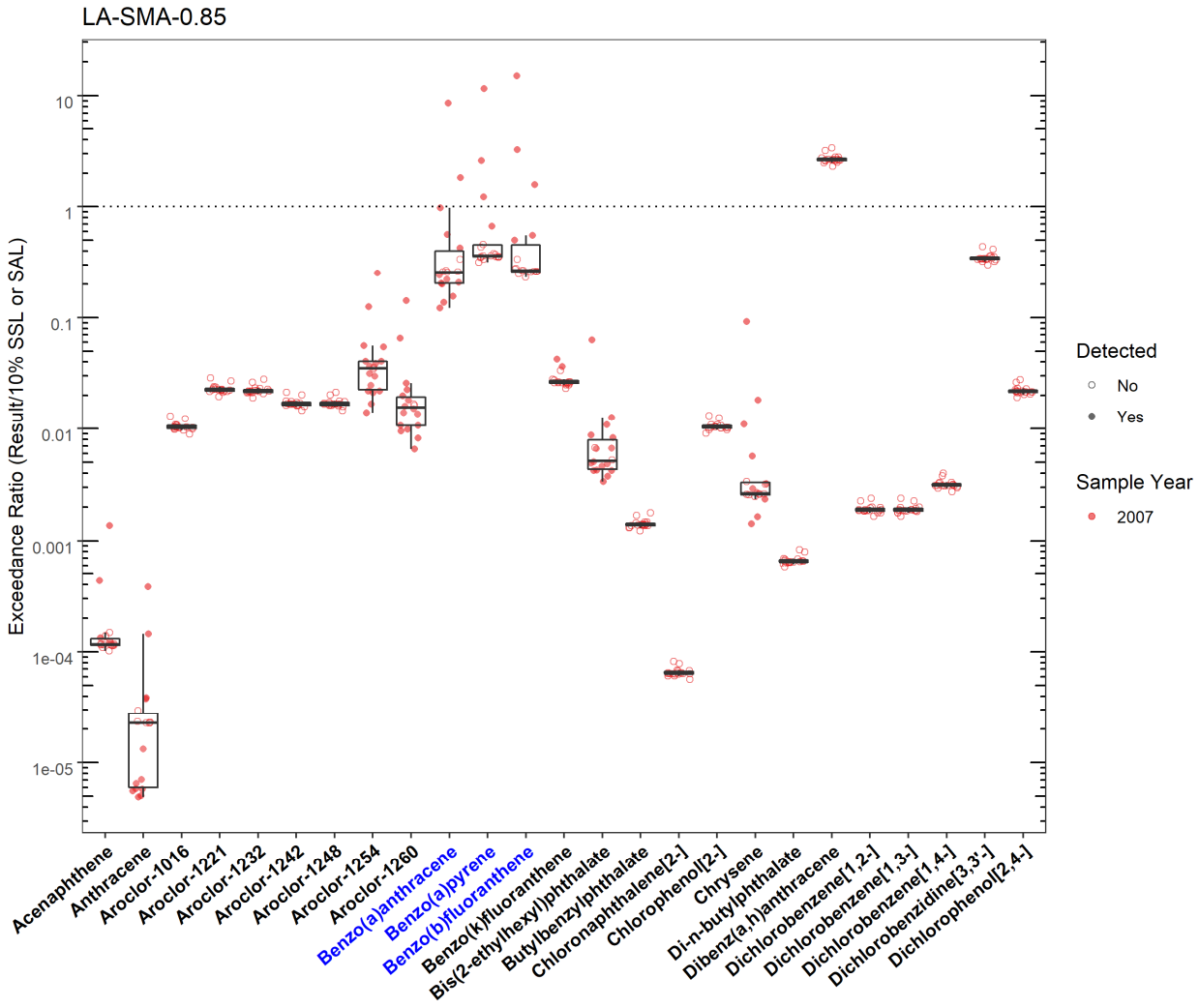

Figure 17.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-0.85 (Plot 1)

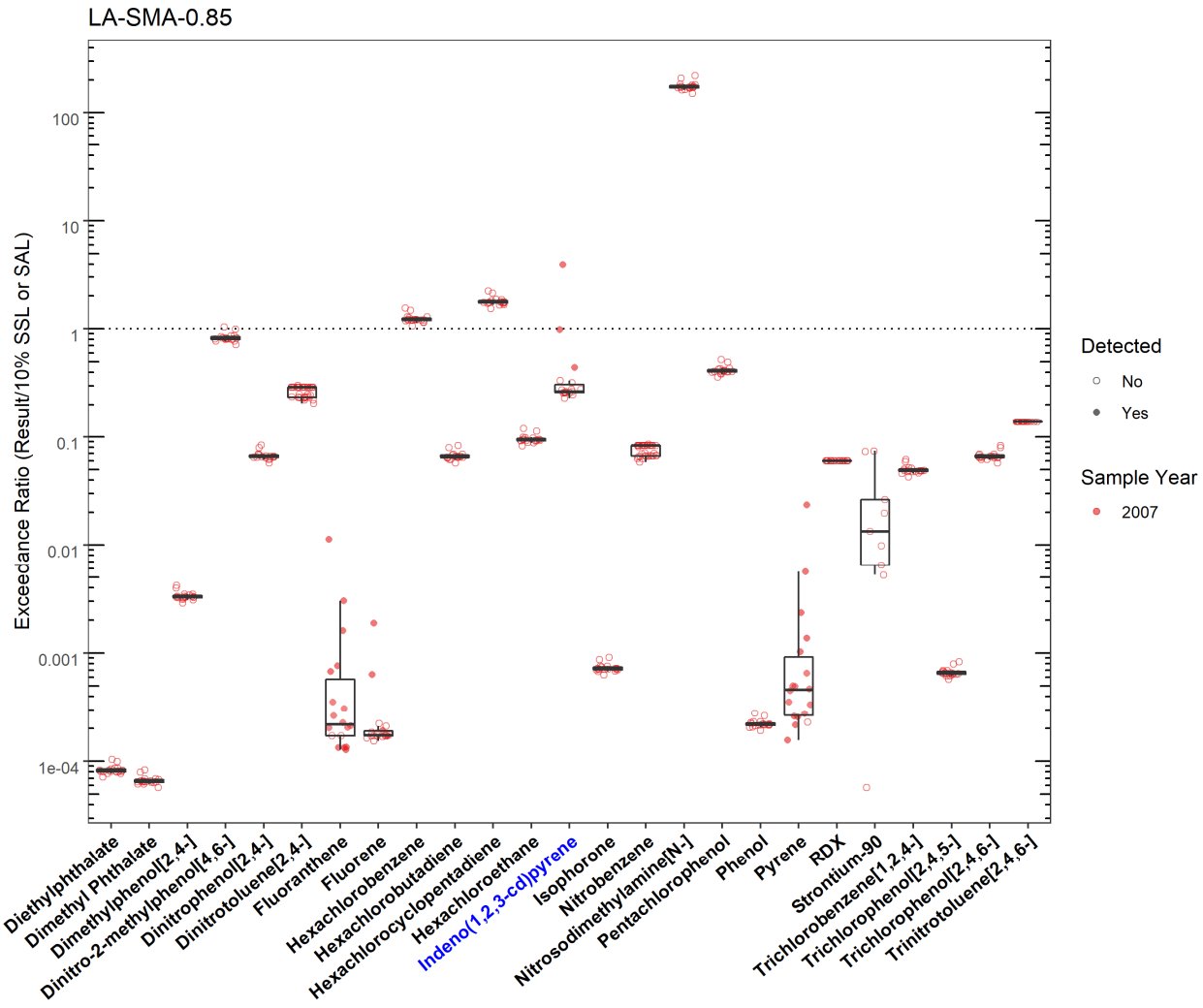

Figure 17.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-0.85 (Plot 2)

LA-SMA-0.85

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-0.85	56-55-3	Y	SSL_0.1	0.153	1.31	2007-12-05
Benzo(a)pyrene	LA-SMA-0.85	50-32-8	Y	SSL_0.1	0.112	1.30	2007-12-05
Benzo(b)fluoranthene	LA-SMA-0.85	205-99-2	Y	SSL_0.1	0.153	2.29	2007-12-05
Copper	LA-SMA-0.85	Cu	Y	BTV	14.7	15.1	2007-12-05
Cyanide (Total)	LA-SMA-0.85	CN(TOTAL)	Y	BTV	0.500	2.79	2007-12-05
Indeno(1,2,3-cd)pyrene	LA-SMA-0.85	193-39-5	Y	SSL_0.1	0.153	0.606	2007-12-05
Lead	LA-SMA-0.85	Pb	Y	BTV	22.3	70.0	2007-12-05
Zinc	LA-SMA-0.85	Zn	Y	BTV	48.8	276	2007-12-05

Figure 17.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-0.85

17.4 Stormwater Evaluation

17.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in November 2012 and May 2013. Analytical results from those samples presented in Figures 17.4-1 and 17.4-2.

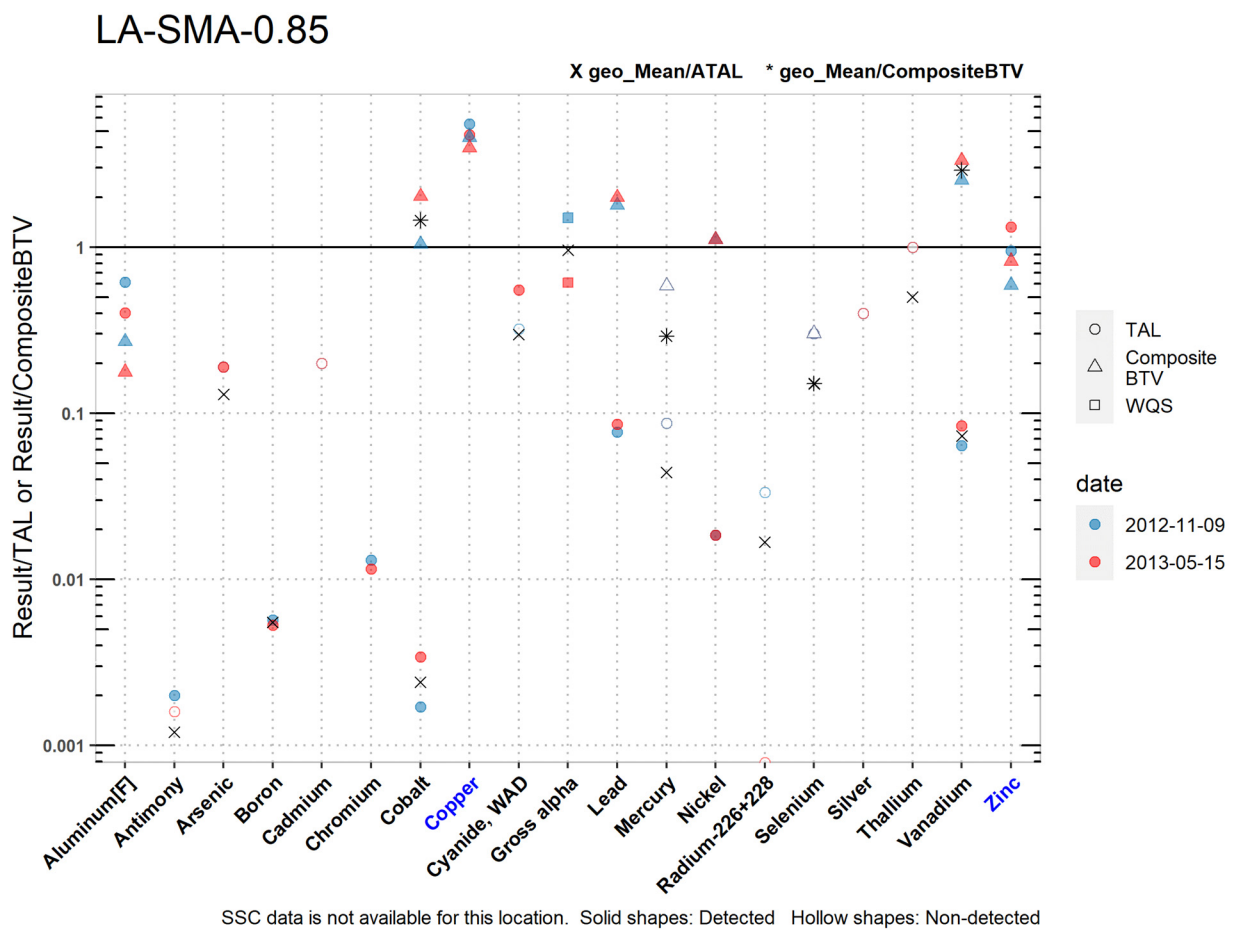

Figure 17.4-1 Analytical Results from Stormwater Samples, LA-SMA-0.85 (Plot)

LA-SMA-0.85

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	1710	NA	NA	NA	NA	NA	1.66	5.76	NA	53.8	0.829	0.115	3.10	6.98	4.97	NA	NA	2.52	94.9
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2012-11-09 result	462	1.28	*1.70*	28.4	*0.110*	3.04	1.73	26.4	*1.67*	22.9	1.48	*0.0670*	3.44	*1.00*	*1.50*	*0.200*	*0.450*	6.40	56.1
2012-11-09 dT	0.616	0.0020	NA	0.0057	NA	0.0130	0.0017	5.50	NA	1.5	0.0767	NA	0.0185	NA	NA	NA	NA	0.064	0.948
2012-11-09 dB	0.270	NA	NA	NA	NA	NA	1.04	4.58	NA	NA	1.79	NA	1.11	NA	NA	NA	NA	2.54	0.591
2013-05-15 result	302	*1.00*	1.71	26.4	*0.110*	2.67	3.35	22.8	2.86	9.10	1.65	*0.0670*	3.44	*NA*	*1.50*	*0.200*	*0.450*	8.37	78.2
2013-05-15 dT	0.403	NA	0.19	0.0053	NA	0.0115	0.0034	4.75	0.550	0.61	0.0855	NA	0.0185	NA	NA	NA	NA	0.084	1.32
2013-05-15 dB	0.177	NA	NA	NA	NA	NA	2.02	3.96	NA	NA	1.99	NA	1.11	NA	NA	NA	NA	3.32	0.824
geo_mean/ATAL	NA	0.0012	0.13	0.0055	NA	NA	0.0024	NA	0.297	0.96	NA	0.044	NA	0.0167	0.15	NA	0.5	0.073	NA
geo_mean/B	NA	NA	NA	NA	NA	NA	1.45	NA	NA	NA	NA	0.291	NA	NA	0.151	NA	NA	2.90	NA

Italic font indicates nondetect results

dT=detected_result/TAL, dB=detected_result/composite_BTV, geo_mean/B=geo_mean/composite_BTV

Figure 17.4-2 Analytical Results from Stormwater Samples, LA-SMA-0.85 (Table)

17.4.2 Assessment Unit and Stream Impairments

LA-SMA-0.85 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history with the exception of gross alpha.

17.5 Site-Specific Demonstration

17.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)Fluoranthene, and indeno(1,2,3-cd)pyrene.

Copper exceeded the applicable screening value in soil data and in stormwater, and will be added to the SAP. Lead and zinc exceeded the applicable screening value in soil data and were previously measured in stormwater data and did not exceed TAL and/or BTV, therefore they will not be added to the SAP.

17.5.2 Stormwater Data Summary

Copper exceeded the TAL and BTV, while zinc exceed the TAL but not the BTV. Copper will be added to the SAP.

17.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

17.5.4 Sampling and Analysis Plan

Table 17.5-1 is the proposed SAP for LA-SMA-0.85.

Table 17.5 Proposed SAP, LA-SMA-0.85

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment and Site history (organic chemicals)
Dissolved copper	Site history, soil data, and stormwater data
SVOCs	Site history (organic chemicals) and soil data
DOC	Permit requirement
SSC	Permit requirement

18.0 LA-SMA-0.9

Associated Sites	00-017, C-00-044
Receiving Water	Los Alamos Canyon
Drainage Area	0.06 acres
Landscape Characteristics	20% impervious, 80% pervious
Consent Order Site Status	SWMU 00-017: In Progress AOC C-00-044: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the October 2017 field visit, the sampler could be moved to a better location to increase the chance of collecting a sample. Therefore, the sampler was moved.
2022 Permit Status	Active Monitoring

18.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. While developing the 2018 SAP, a decision was made to implement the monitoring location move that had been recommended during the 2017 SIP review. To date, stormwater flow has not been sufficient for full-volume sample collection, and monitoring is ongoing until one confirmation sample is collected from this SMA.

18.2 Site History

00-017 (9/28/2021)

SWMU 00-017 consists of inactive industrial waste lines within the Los Alamos townsite that are not incorporated into other SWMUs and AOCs. The portion of SWMU 00-017 within Upper Los Alamos Canyon Aggregate Area includes former industrial waste line 167, former manhole ULR 33, and former industrial waste lines 170 and 171. Former waste line 167 and former manhole ULR-33 were removed before 1985, except for the concrete anchors and sections of drainline encased in the anchors. Lines 170 and 171 are the only sections of industrial waste line known to remain in Los Alamos townsite. The site of former waste line 167 and former manhole ULR-33 under the Omega Bridge in Los Alamos Canyon remains undeveloped. Nine concrete anchors and 3-ft-long sections of drainpipe encased in each of the anchors remain at the Site. Other portions of SWMU 00-017 are within Pueblo Canyon Aggregate Area.

The SWMU 00-017 waste lines received industrial waste from SWMUs 03-038(a) and 03-038(b), a former pump house with two concrete underground tanks and a former 28,500-gal. steel waste-holding tank, respectively. The estimated operation period for the majority of these waste lines was from the 1950s to the 1970s. Phased decommissioning and removal of the waste lines began in 1964, and various removal projects were completed through 1986.

Currently, the former location of line 167 on the canyon wall beneath the Omega Bridge is undeveloped. The location of line 170 is covered with asphalt parking lots and narrow landscaped areas in the parking lot medians. The location of line 171 is entirely covered by the parking lot and the Los Alamos Medical Center (LAMC). Both remaining waste-line sections are 15 to 20 ft bgs.

C-00-044 (9/28/2021)

AOC C-00-044 consists of surface contamination resulting from the historical use of lead-based paint on the Omega Bridge. The bridge was constructed in 1951 and is located in both TA-00 and TA-03. This AOC was identified in 1999 during RFI activities conducted at SWMU 00-017. Elevated lead concentrations were detected in surface samples collected from locations in Los Alamos Canyon under the north and south ends of the Omega Bridge during the investigation of SWMU 00-017. The lead could not reasonably be attributed to SWMU 00-017, an inactive underground industrial waste line. Further research, and interviews with Los Alamos County and Laboratory maintenance staff, established that lead paint chips had been deposited beneath the bridge on the north and south slopes of Los Alamos Canyon as a result of periodic bridge maintenance activities, including scraping and chipping old lead-based paint before new paint was applied. The use of lead-based paint has been discontinued.

For investigation activities for the Sites, refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

18.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 18-2-1.

Table 18.2-1 POCs Known or Suspected to be Used Historically at the Sites

Site	Potential POC Source	Potential POCs
00-017	Industrial waste lines (components of RLW)	Radionuclides
C-00-044	Surface contamination (lead paint on Omega Bridge)	Lead

18.3 Consent Order Soil Data

Decision-level data at SWMU 00-017 consist of results from samples collected in 1998–1999, 2009, and 2012. "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261) concluded that the lateral and vertical extent of contamination are defined, and no further sampling for extent is warranted within the areas of SWMU 00-017 that have been sampled.

Decision-level data for AOC C-00-044 consist of results from samples collected in 2011 and 2013. "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261) concluded that the lateral and vertical extent of inorganic and organic contamination have been defined, or no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-0.9 are presented in Figures 18.3-1 through 18.3-4.

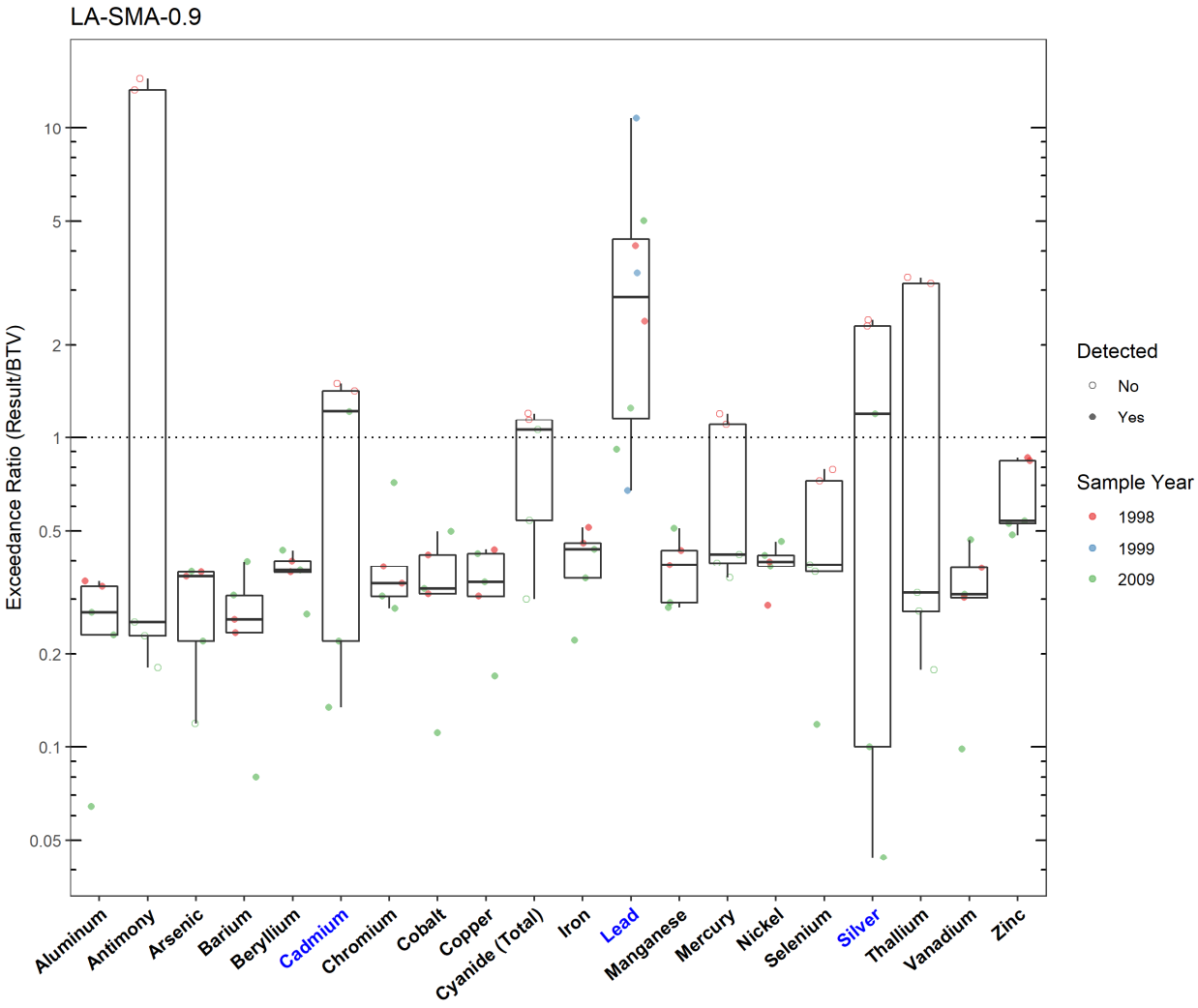

Figure 18.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-0.9

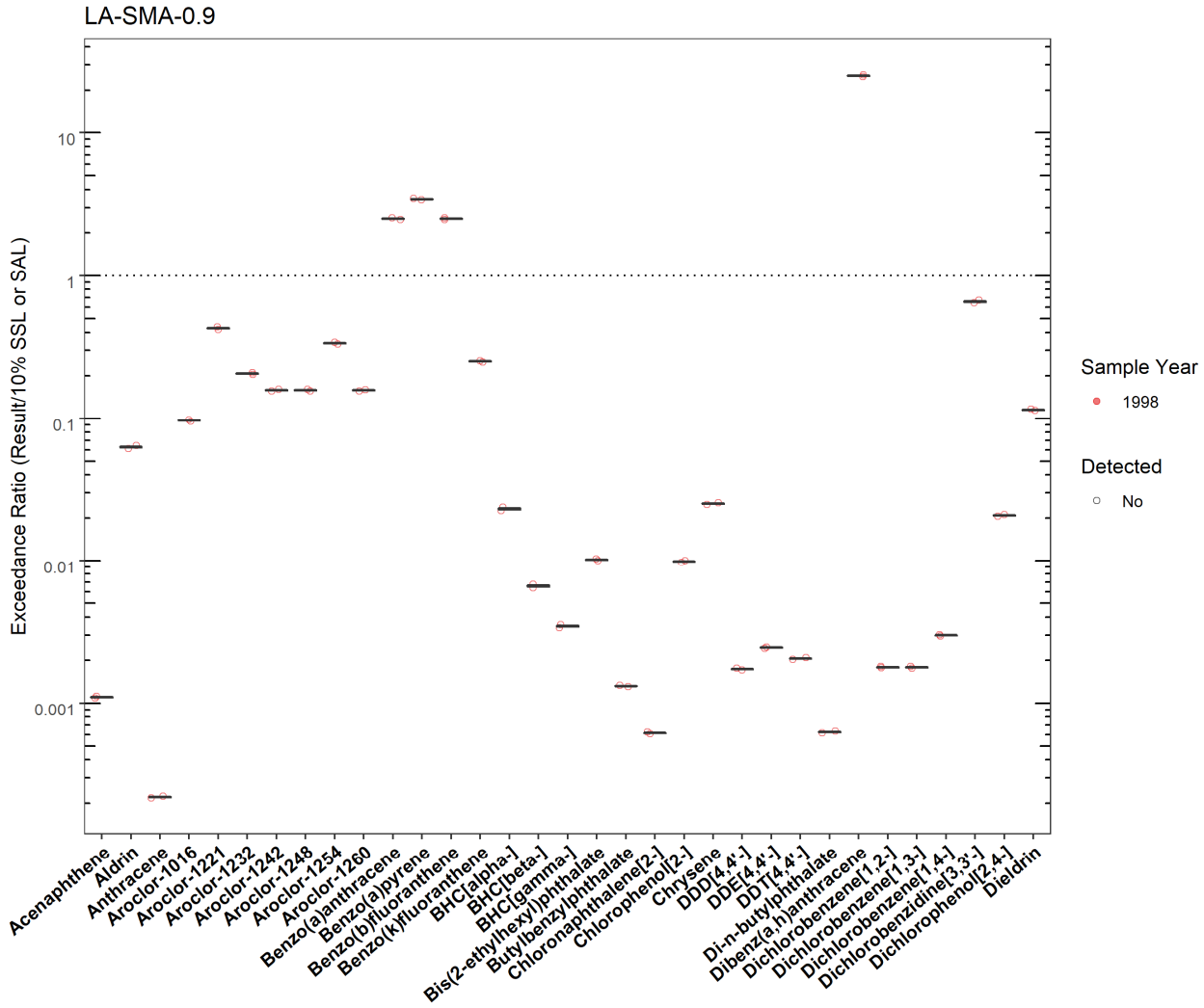

Figure 18.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-0.9 (Plot 1)

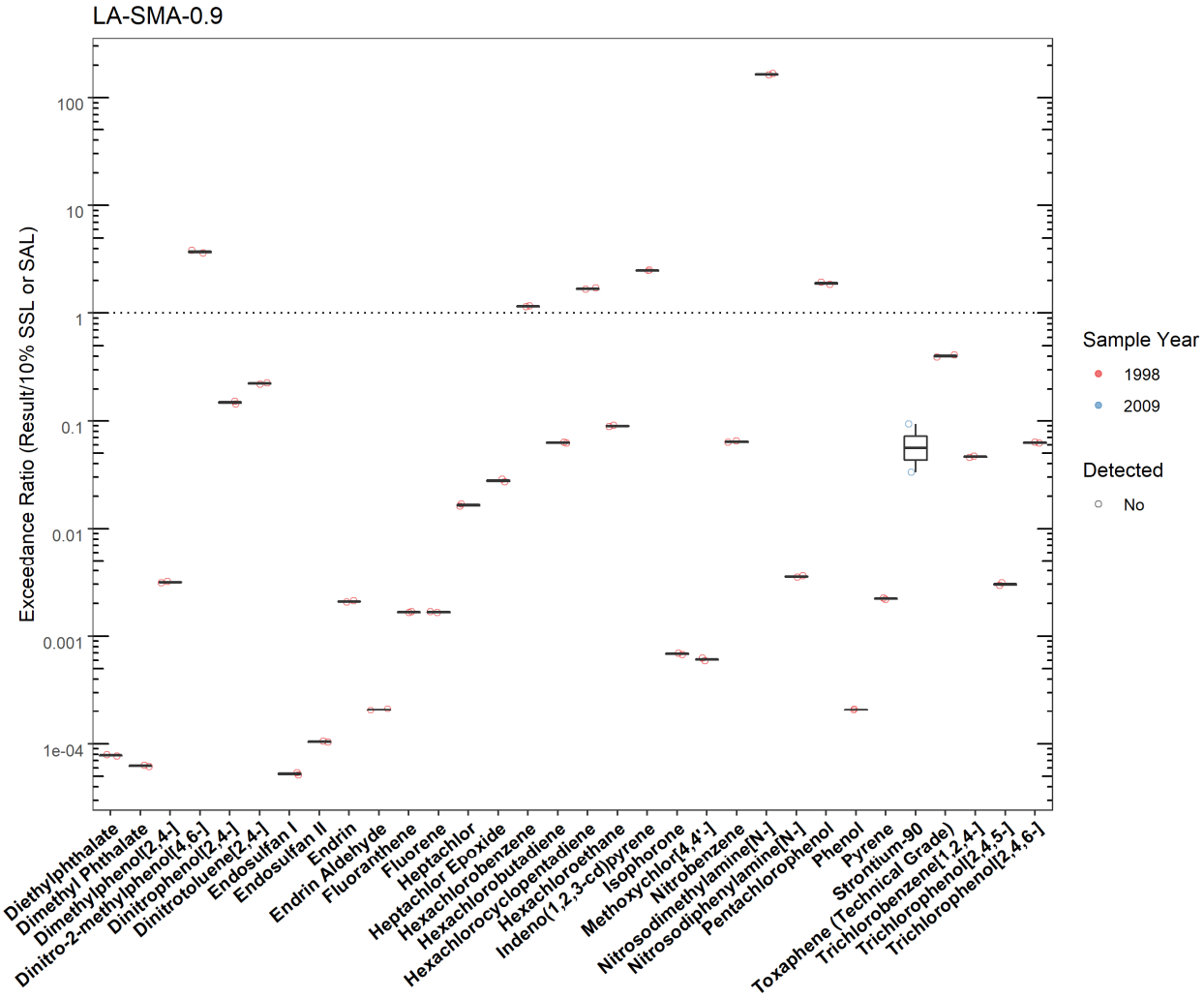

Figure 18.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-0.9 (Plot 2)

LA-SMA-0.9

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Cadmium	LA-SMA-0.9	Cd	Y	BTV	0.400	0.490	2009-01-21
Lead	LA-SMA-0.9	Pb	Y	BTV	22.3	240	1999-01-20
Silver	LA-SMA-0.9	Ag	Y	BTV	1.00	1.20	2009-01-21

Figure 18.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-0.9

18.4 Stormwater Evaluation

18.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring samples have been collected at this SMA.

18.4.2 Assessment Unit and Stream Impairments

LA-SMA-0.9 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

18.5 Site-Specific Demonstration

18.5.1 Soil Data Summary

Lead is the only Site-related POC that exceeded the applicable screening value in soil data and has not yet been measured in stormwater. Cadmium and silver exceeded the applicable screening value in soil data but are not Site-related POCs and will not be added to the SAP.

18.5.2 Stormwater Data Summary

No confirmation-monitoring data.

18.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at this location.

18.5.4 Sampling and Analysis Plan

Table 18.5-1 is the proposed SAP for LA-SMA-0.9.

Table 18.5-1 Proposed SAP, LA-SMA-0.9

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
Radium-226 and radium-228	Site history (radionuclides)
Tritium	Site history (radionuclides)
Dissolved lead	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement

19.0 LA-SMA-1

Associated Sites	00-017, C-00-044
Receiving Water	Los Alamos Canyon
Drainage Area	0.93 acres
Landscape Characteristics	38% impervious, 62% pervious
Consent Order Site Status	SWMU 00-017: In Progress AOC C-00-044: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete/Alternative Compliance Requested
2016–2018 SIP Actions	Based on the October 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Corrective Action

19.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

Following the December 2012 submittal of certification of enhanced control installation as a corrective action to EPA (LANL 2012, 232349), the sampler was relocated to a more representative location and corrective action monitoring was initiated. Stormwater samples were collected in September 2013 and July 2014. Analytical results from these samples initiated corrective action.

The Permittees submitted a request for alternative compliance to EPA per permit Part I.E.3 in May 2015 for AOC C-00-044 (LANL 2015, 600418). No response has been received from EPA and stormwater monitoring has not occurred for this Site since 2014.

Following the September 2015 submittal to EPA of certification of a no exposure condition (LANL 2015, 600932), corrective action monitoring was initiated for SWMU 00-017 and an investigation sample was collected in July 2017. The Permittees submitted a completion of corrective action per Permit part I.E.1(b) for the Site in November 2017 (LANL 2017, 602741). Stormwater monitoring has not occurred for this Site since 2017.

19.2 Site History

00-017 (9/28/2021)

SWMU 00-017 consists of inactive industrial waste lines within the Los Alamos townsite that are not incorporated into other SWMUs and AOCs. The portion of SWMU 00-017 within Upper Los Alamos Canyon Aggregate Area includes former industrial waste line 167, former manhole ULR-33, and former industrial waste lines 170 and 171. Former waste line 167 and former manhole ULR-33 were removed before 1985, except for the concrete anchors and sections of drainline encased in the anchors. Lines 170 and 171 are the only sections of industrial waste line known to remain in Los Alamos townsite. The site of former waste line 167 and former manhole ULR-33 under the Omega Bridge in Los Alamos Canyon remains undeveloped. Nine concrete anchors and 3-ft-long sections of drainpipe encased in each of the anchors remain at the Site. Other portions of SWMU 00-017 are within Pueblo Canyon Aggregate Area.

The SWMU 00-017 waste lines received industrial waste from SWMUs 03-038(a) and 03-038(b), a former pump house with two concrete underground tanks and a former 28,500-gal. steel waste-holding tank, respectively. The estimated operation period for the majority of these waste lines was from the 1950s to the 1970s. Phased decommissioning and removal of the waste lines began in 1964, and various removal projects were completed through 1986.

Currently, the former location of line 167 on the canyon wall beneath the Omega Bridge is undeveloped. The location of line 170 is covered with asphalt parking lots and narrow landscaped areas in the parking lot medians. The location of line 171 is entirely covered by the parking lot and the Los Alamos Medical Center (LAMC). Both remaining waste-line sections are 15 to 20 ft bgs.

C-00-044 (9/28/2021)

AOC C-00-044 consists of surface contamination resulting from the historical use of lead-based paint on the Omega Bridge. The bridge was constructed in 1951 and is located in both TA-00 and TA-03. This AOC was identified in 1999 during RFI activities conducted at SWMU 00-017. Elevated lead concentrations were detected in surface samples collected from locations in Los Alamos Canyon under the north and south ends of the Omega Bridge during the investigation of SWMU 00-017. The lead could not reasonably be attributed to SWMU 00-017, an inactive underground industrial waste line. Further research, and interviews with Los Alamos County and Laboratory maintenance staff, established that lead paint chips had been deposited beneath the bridge on the north and south slopes of Los Alamos Canyon as a result of periodic bridge maintenance activities, including scraping and chipping old lead-based paint before new paint was applied. The use of lead-based paint has been discontinued.

For investigation activities for the Sites, refer to “Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1” (N3B 2021, 701261).

19.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 19.2-1.

Table 19.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
00-017	Industrial waste lines (components of RLW)	Radionuclides
C-00-044	Surface Contamination (lead paint on Omega Bridge)	Lead

19.3 Consent Order Soil Data

Decision-level data at SWMU 00-017 consist of results from samples collected in 1998–1999, 2009, and 2012. Revision 1 of the 2021 Phase II IR concluded that the lateral and vertical extent of contamination are defined, and no further sampling for extent is warranted within the areas of SWMU 00-017 that have been sampled.

Decision-level data for AOC C-00-044 consist of results from samples collected in 2011 and 2013. Revision 1 of the 2021 Phase II IR concluded that the lateral and vertical extent of inorganic and organic contamination have been defined, and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-1 are presented in Figures 19.3-1 through 19.3-4.

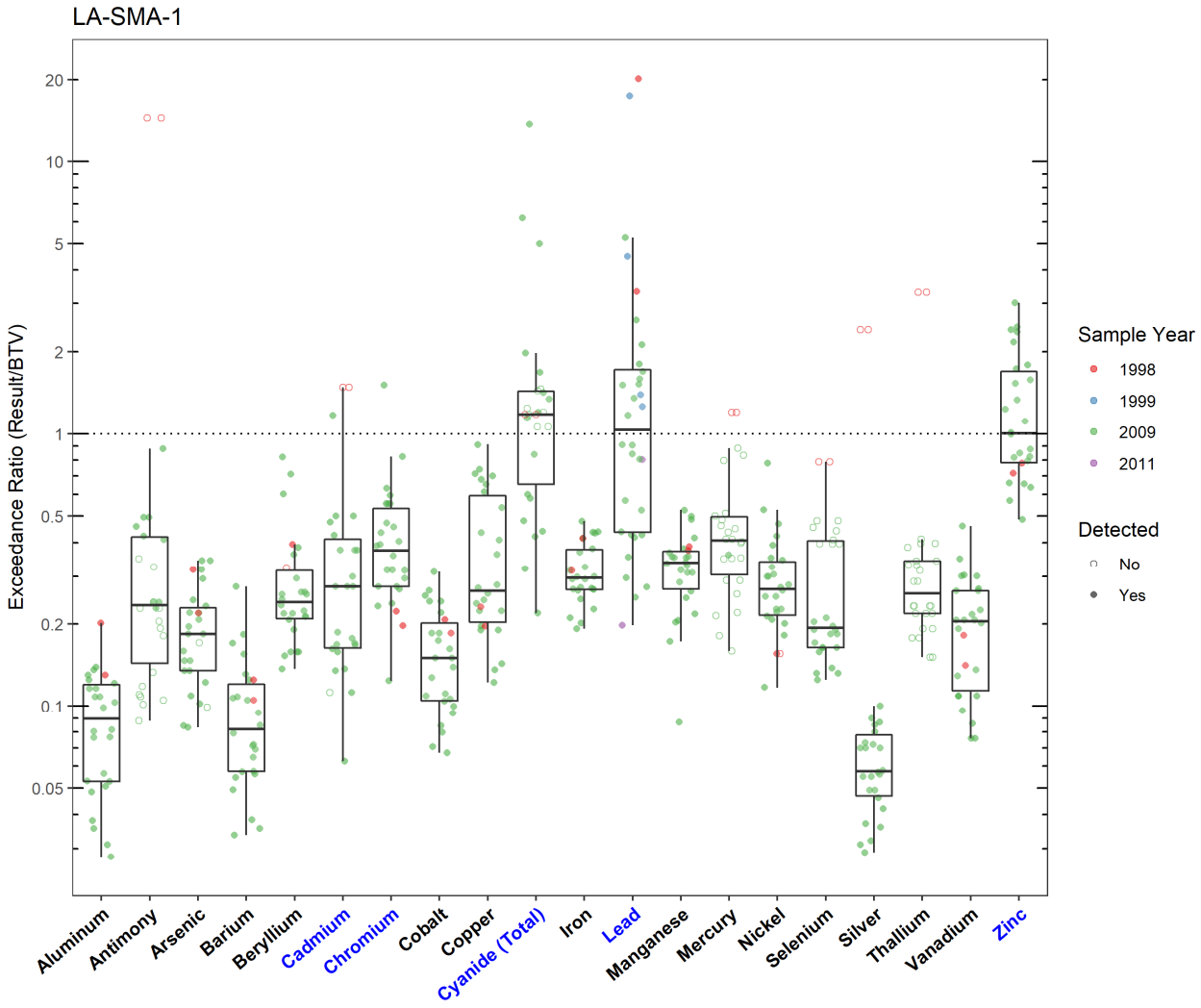

Figure 19.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-1

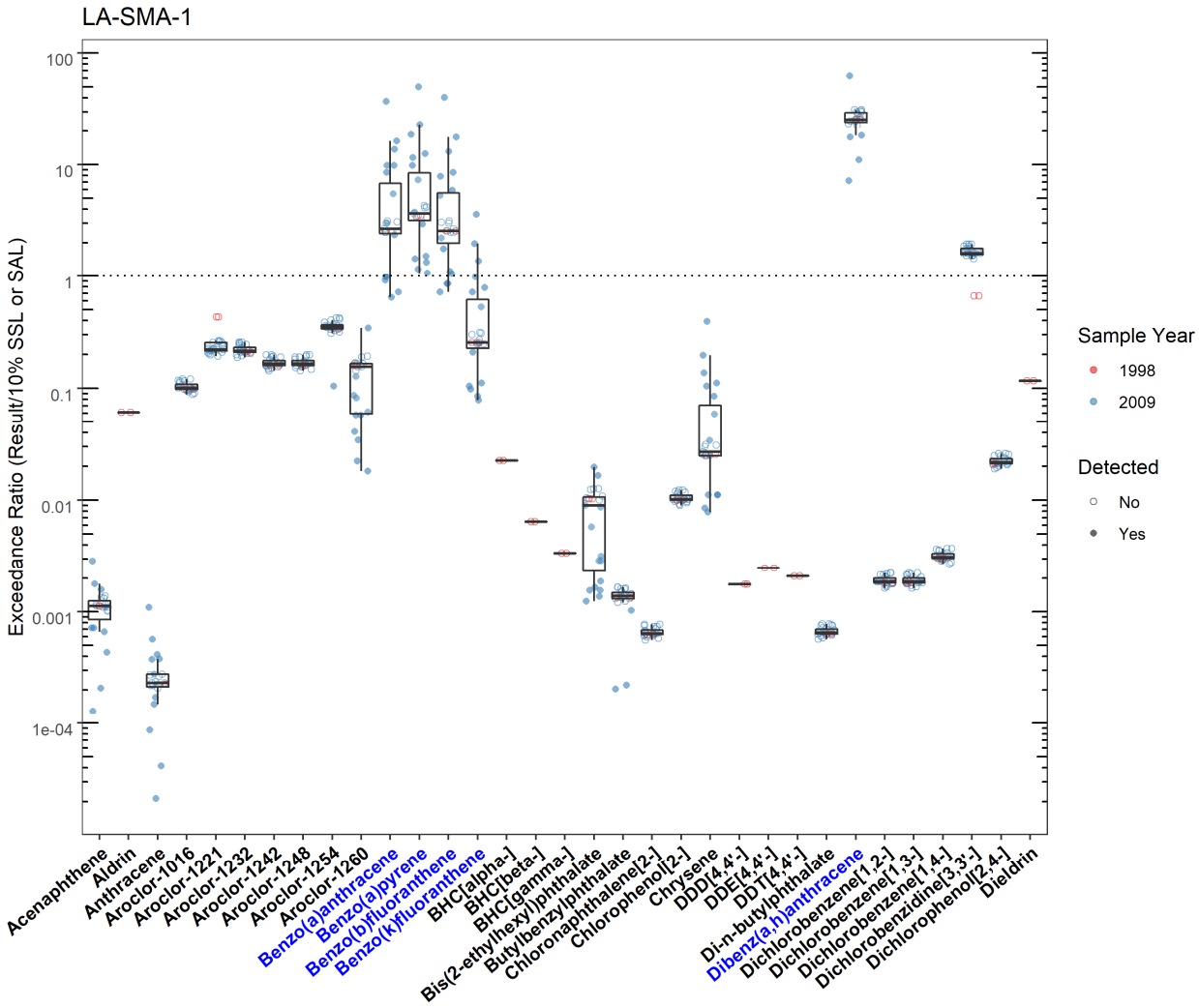

Figure 19.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-1 (Plot 1)

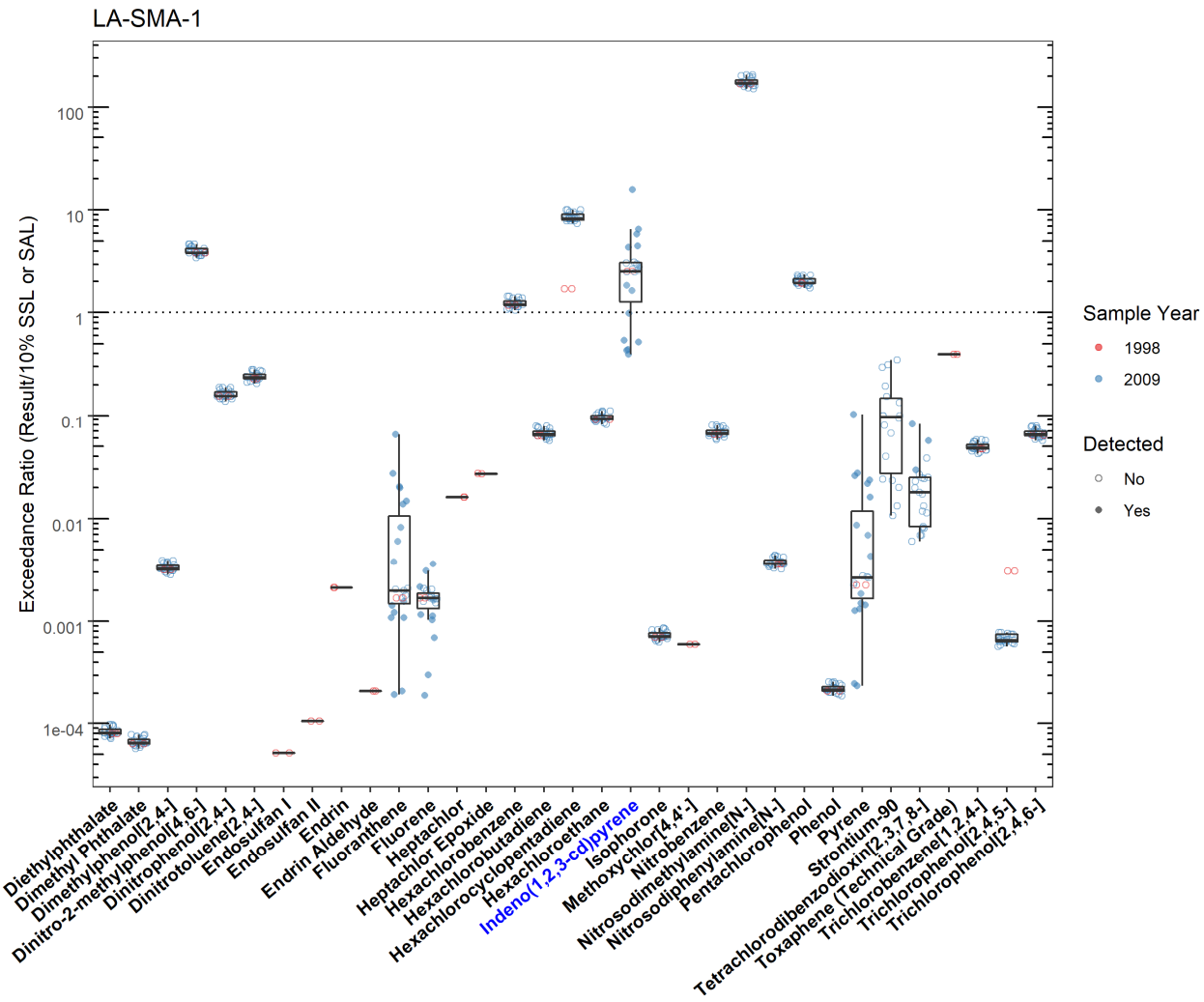

Figure 19.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-1 (Plot 2)

LA-SMA-1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-1	56-55-3	Y	SSL_0.1	0.153	5.70	2009-01-16
Benzo(a)pyrene	LA-SMA-1	50-32-8	Y	SSL_0.1	0.112	5.60	2009-01-16
Benzo(b)fluoranthene	LA-SMA-1	205-99-2	Y	SSL_0.1	0.153	6.20	2009-01-16
Benzo(k)fluoranthene	LA-SMA-1	207-08-9	Y	SSL_0.1	1.53	5.50	2009-01-16
Cadmium	LA-SMA-1	Cd	Y	BTV	0.400	0.470	2009-01-19
Chromium	LA-SMA-1	Cr	Y	BTV	19.3	29.1	2009-01-19
Cyanide (Total)	LA-SMA-1	CN(TOTAL)	Y	BTV	0.500	6.90	2009-01-16
Dibenz(a,h)anthracene	LA-SMA-1	53-70-3	Y	SSL_0.1	0.0153	0.960	2009-01-16
Indeno(1,2,3-cd)pyrene	LA-SMA-1	193-39-5	Y	SSL_0.1	0.153	2.40	2009-01-16
Lead	LA-SMA-1	Pb	Y	BTV	22.3	450	1998-11-11
Zinc	LA-SMA-1	Zn	Y	BTV	48.8	147	2009-01-16

Figure 19.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-1

19.4 Stormwater Evaluation

19.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in July 2017. Analytical results from that sample are presented in Figures 19.4-1 through 19.4-4.

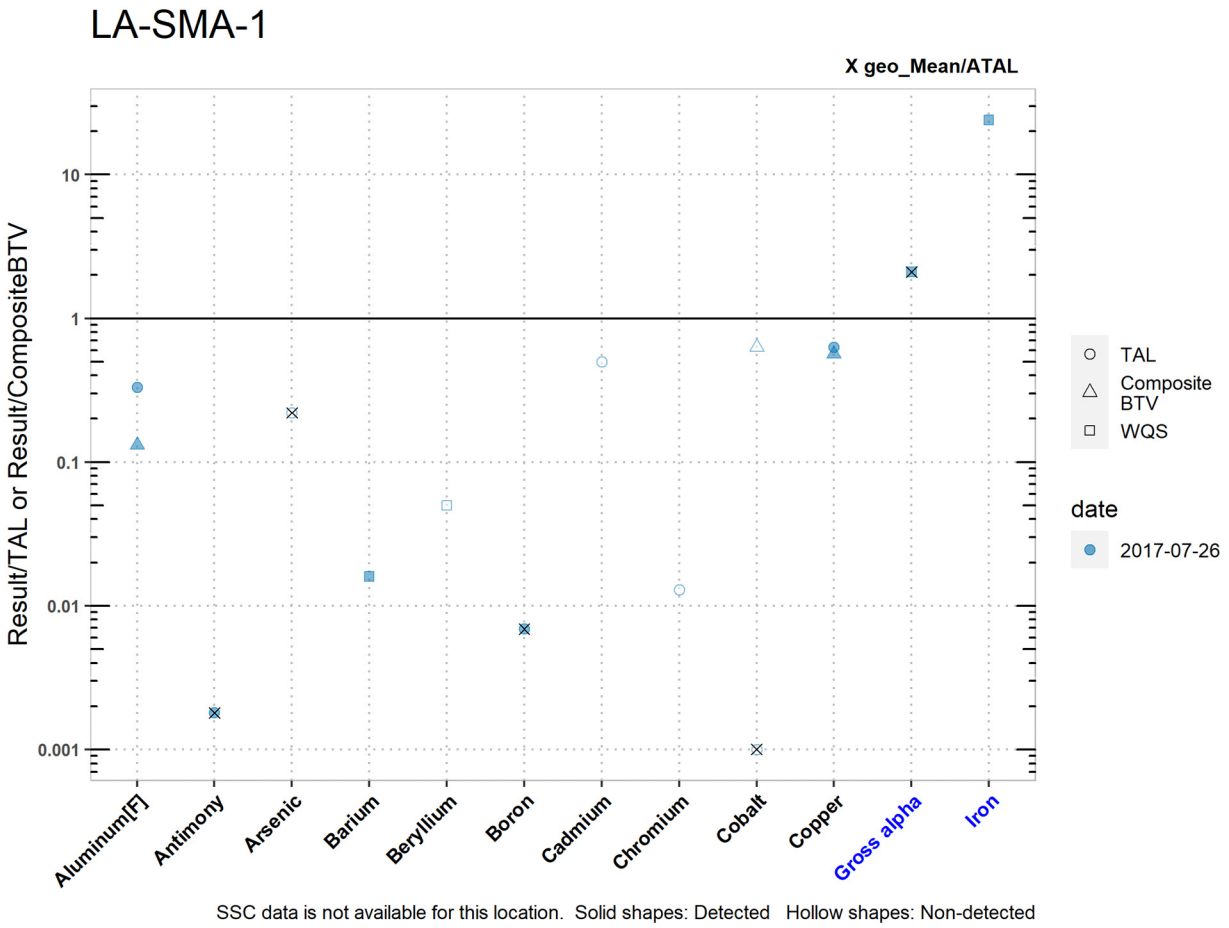

Figure 19.4-1 Analytical Results from Stormwater Sample, LA-SMA-1 (Plot 1)

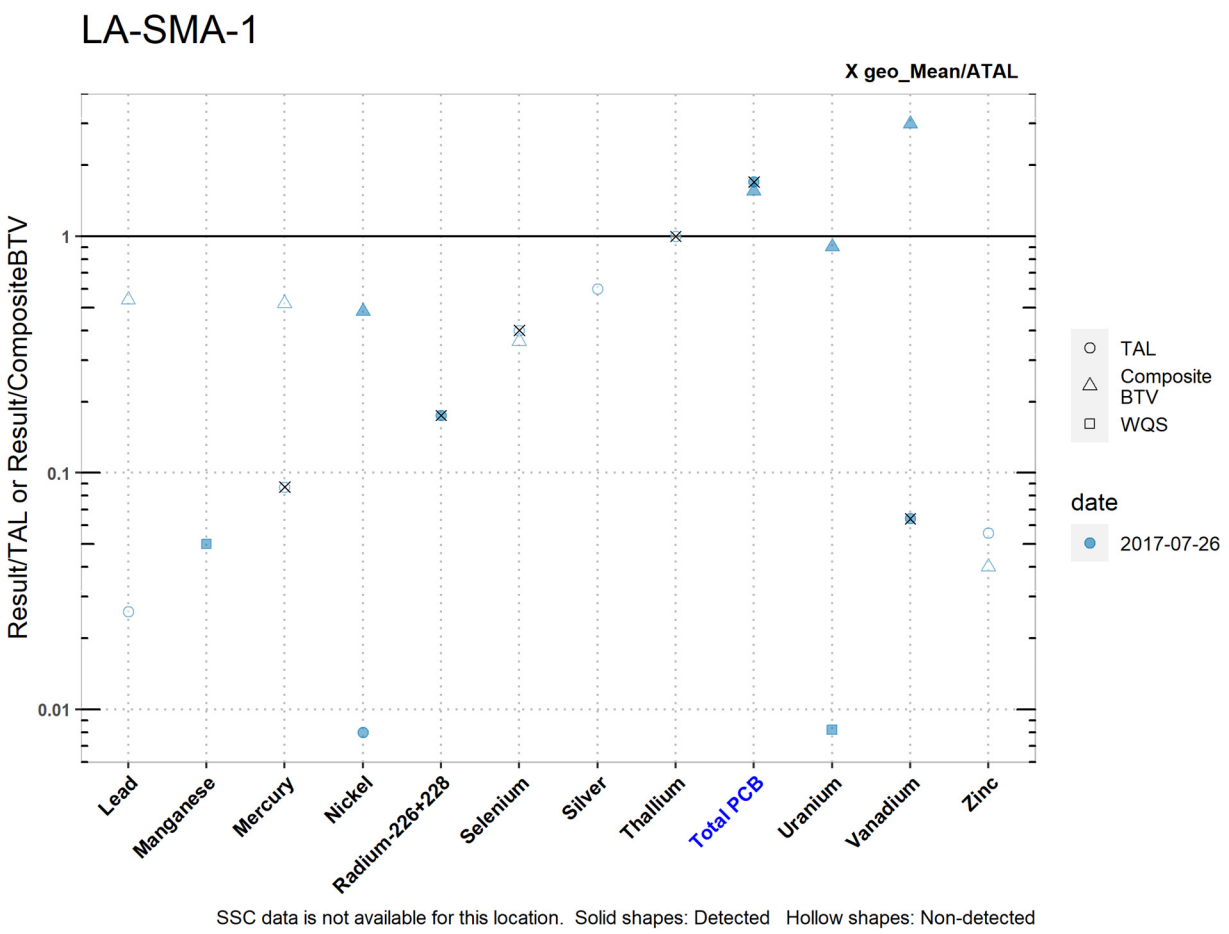

Figure 19.4-2 Analytical Results from Stormwater Sample, LA-SMA-1 (Plot 2)

LA-SMA-1

	Aluminum [F]	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Gross alpha	Iron
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	NA	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	15	NA
MTAL	750	NA	340	NA	NA	NA	0.65	233	NA	4.8	NA	NA
Composite_BTV	1890	NA	NA	NA	NA	NA	NA	NA	1.59	5.38	54.3	NA
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L
2017-07-26 result	248	1.14	*2.00*	31.9	*0.200*	34.4	*0.300*	*3.00*	*1.00*	3.03	31.1	23700
2017-07-26 dT	0.331	0.0018	NA	0.016	NA	0.0069	NA	NA	NA	0.631	2.1	24
2017-07-26 dB	0.131	NA	NA	NA	NA	NA	NA	NA	NA	0.563	NA	NA
geo_mean/ATAL	NA	0.0018	0.22	NA	NA	0.0069	NA	NA	0.0010	NA	2.1	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 19.4-3 Screening Results from Stormwater Sample, LA-SMA-1 (Table 1)

LA-SMA-1

	Lead	Manganese	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Uranium	Vanadium	Zinc
MQL	0.5	NA	0.005	0.5	NA	5	0.5	0.5	0.2	NA	50	20
ATAL	NA	NA	0.77	NA	30	5	NA	0.47	0.014	NA	100	NA
MTAL	19.3	NA	NA	186	NA	20	0.49	NA	NA	NA	NA	59.2
Composite_BTV	0.927	NA	0.129	3.10	6.57	5.55	NA	NA	0.0150	0.271	2.15	82.6
unit	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2017-07-26 result	*0.500*	5.97	*0.0670*	1.49	5.26	*2.00*	*0.300*	*0.600*	0.0232	0.245	6.41	*3.30*
2017-07-26 dT	NA	0.050	NA	0.00801	0.175	NA	NA	NA	1.7	0.0082	0.064	NA
2017-07-26 dB	NA	NA	NA	0.481	NA	NA	NA	NA	1.55	0.904	2.98	NA
geo_mean/ATAL	NA	NA	0.087	NA	0.175	0.40	NA	1	1.7	NA	0.064	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 19.4-4 Screening Results from Stormwater Sample, LA-SMA-1 (Table 2)

19.4.2 Assessment Unit and Stream Impairments

LA-SMA-1 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

19.5 Site-Specific Demonstration

19.5.1 Soil Data Summary

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd) exceeded the applicable screening value in soil data, but are not Site-related POCs and will not be added to the SAP.

All Site-related POCs which exceeded the applicable screening value in soil data have been previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

19.5.2 Stormwater Data Summary

Gross alpha and total aluminum results exceeded TALs in 2017 stormwater data; there was no paired SSC value to confirm whether the results were below BTVs. PCBs also exceeded their TAL and BTV.

Iron exceeded the WQS; however, there is no TAL in the Permit for iron. Only POCs with TALs are used in the SSD.

19.5.3 2022 Permit Status

Due to the exceedance of a composite BTV and/or TAL, corrective action will be initiated at this SMA (Part I.C.2)

20.0 LA-SMA-1.1

Associated Sites	43-001(b2)
Receiving Water	Los Alamos Canyon
Drainage Area	1.34 acres
Landscape Characteristics	36% impervious, 64% pervious
Consent Order Site Status	AOC 43-001(b2): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the February 2018 field visit, the current sampler location does not adequately monitor the affected area. Therefore, the sampler will be moved downgradient in the drainage.
2022 Permit Status	Active Monitoring

20.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater samples were collected in July and August 2011. Analytical results from these samples initiated corrective action. Stormwater monitoring has not occurred since 2012.

AOC 43-001(b2) received a COC under the Consent Order in September 2010. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in November 2012 LANL (2012/2013, 232273) and resubmitted in August 2013 (LANL 2013, 250035).

20.2 Site History

43-001(b2) (3/28/2022)

AOC 43-001(b2) is a storm drain outfall and associated outlet drainline that served the HRL (building 43-1) at TA-43. The outfall received effluent from 6 floor drains in the subbasement of building 43-1, blowdown from an evaporative cooler, and stormwater from 13 roof drains on the west side of HRL. The effluent was discharged west of HRL through a 130-ft-long, 12 in.-diameter CMP to Los Alamos Canyon. The outfall was permitted in the mid-to-late 1970s under the LANL NPDES permit as EPA 03A040.

Discharges from the evaporative cooler ceased and the floor drains were plugged in 1998; outfall EPA 03A040 was removed from the NPDES Permit on January 11, 1999. The outfall may have historically discharged radioactively-contaminated wastewater and/or once-through and treated cooling water. No historical quantitative information is available regarding potential residual contamination as a result of the discharges from this outfall. The outfall is located on the undeveloped slope west of HRL and still receives stormwater discharges from the building roof drains.

For investigation activities, refer to “Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1” (LANL 2010, 108528).

20.2.1 Known or Potential Use of PPOCs

POCs known to be managed or potentially used at the Site are listed in Table 20.2-1.

Table 20.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
43-001(b2)	Outfall	Radionuclides

20.3 Consent Order Soil Data

Decision-level data for AOC 43-001(b2) consist of results from samples collected in 2009. Analytical results from those samples are presented in Figures 20.3-1 through 20.3-4. Revision 1 of the 2010 IR concluded that the nature and extent of contamination have been defined.

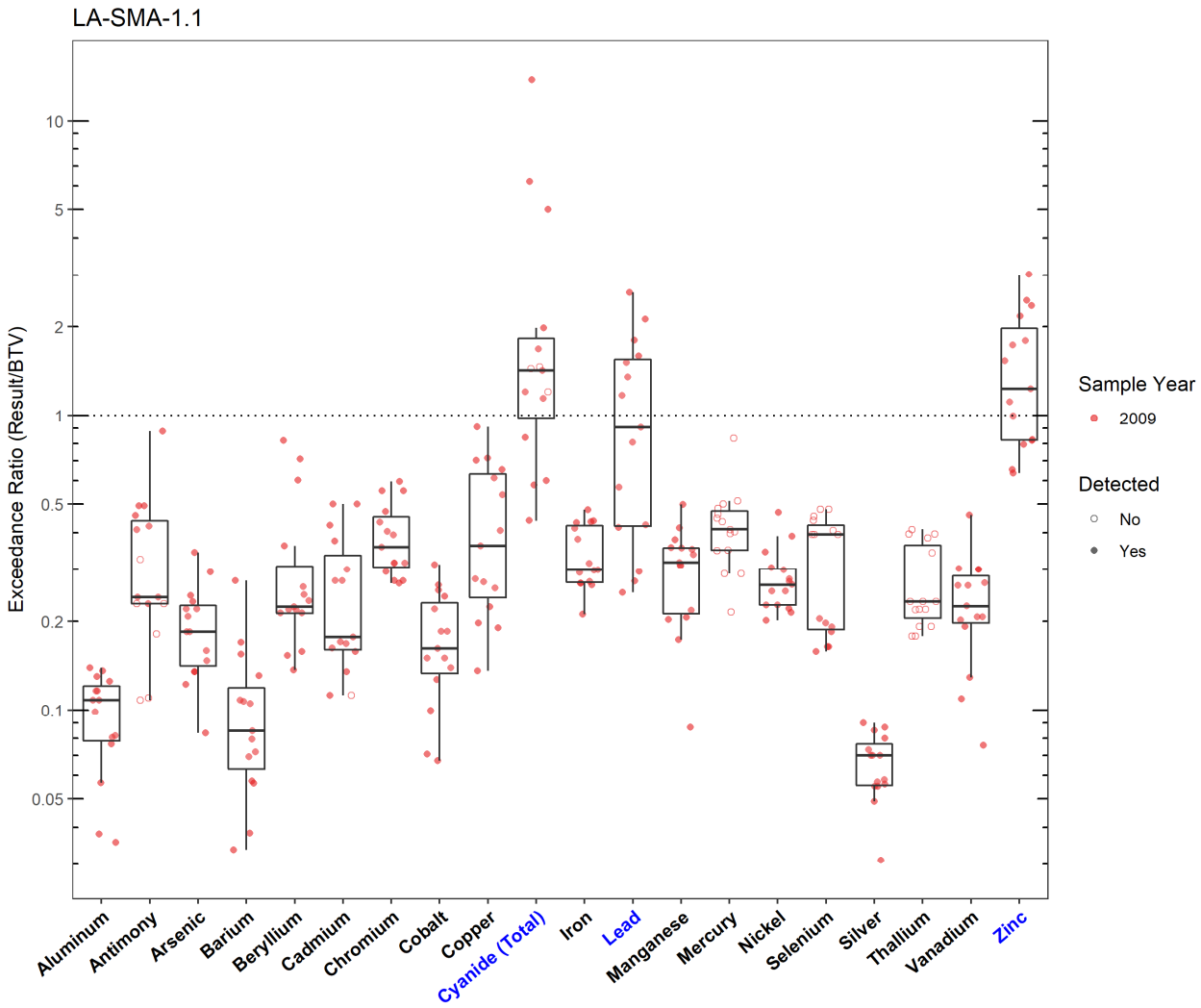

Figure 20.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-1.1

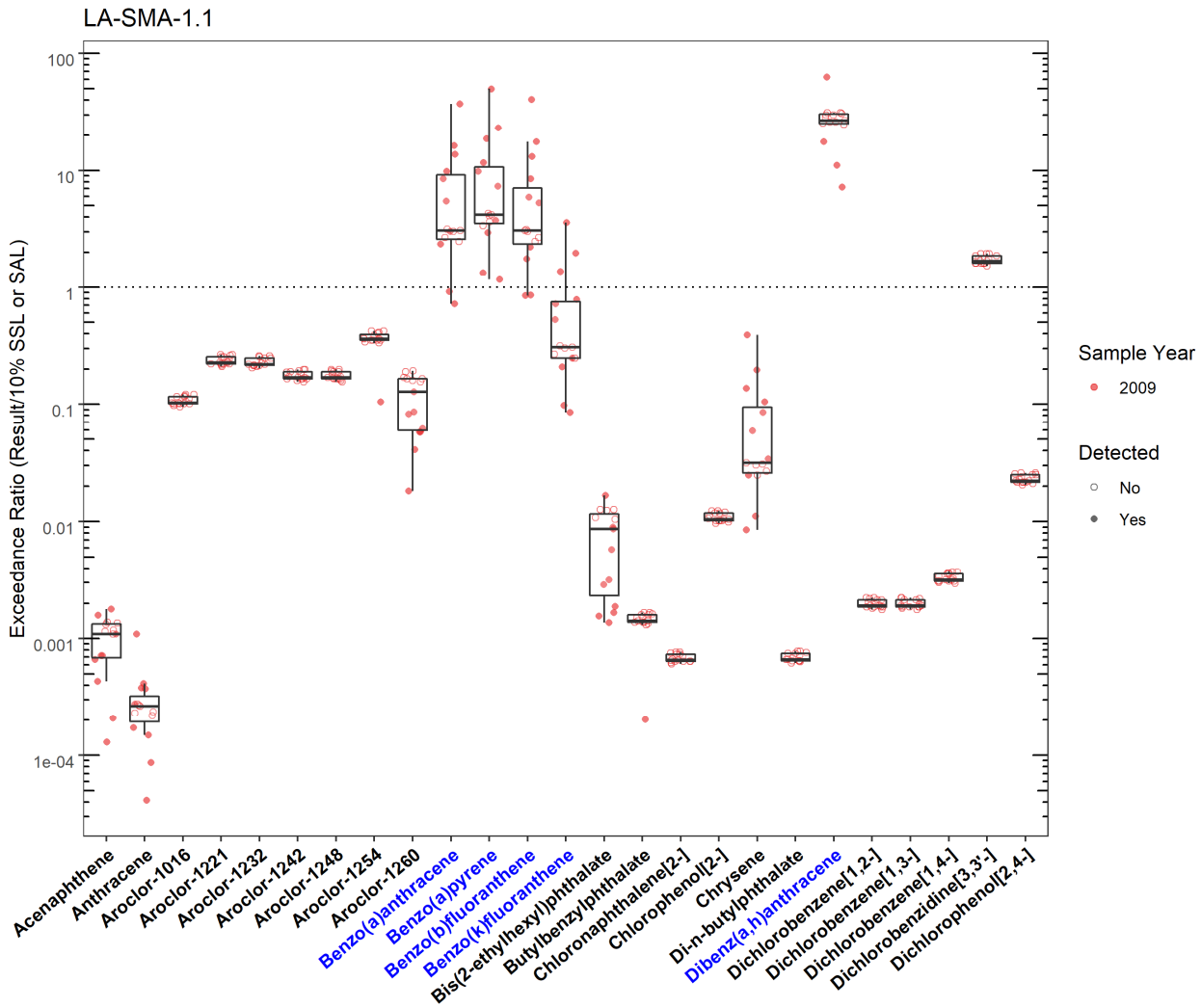

Figure 20.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-1.1 (Plot 1)

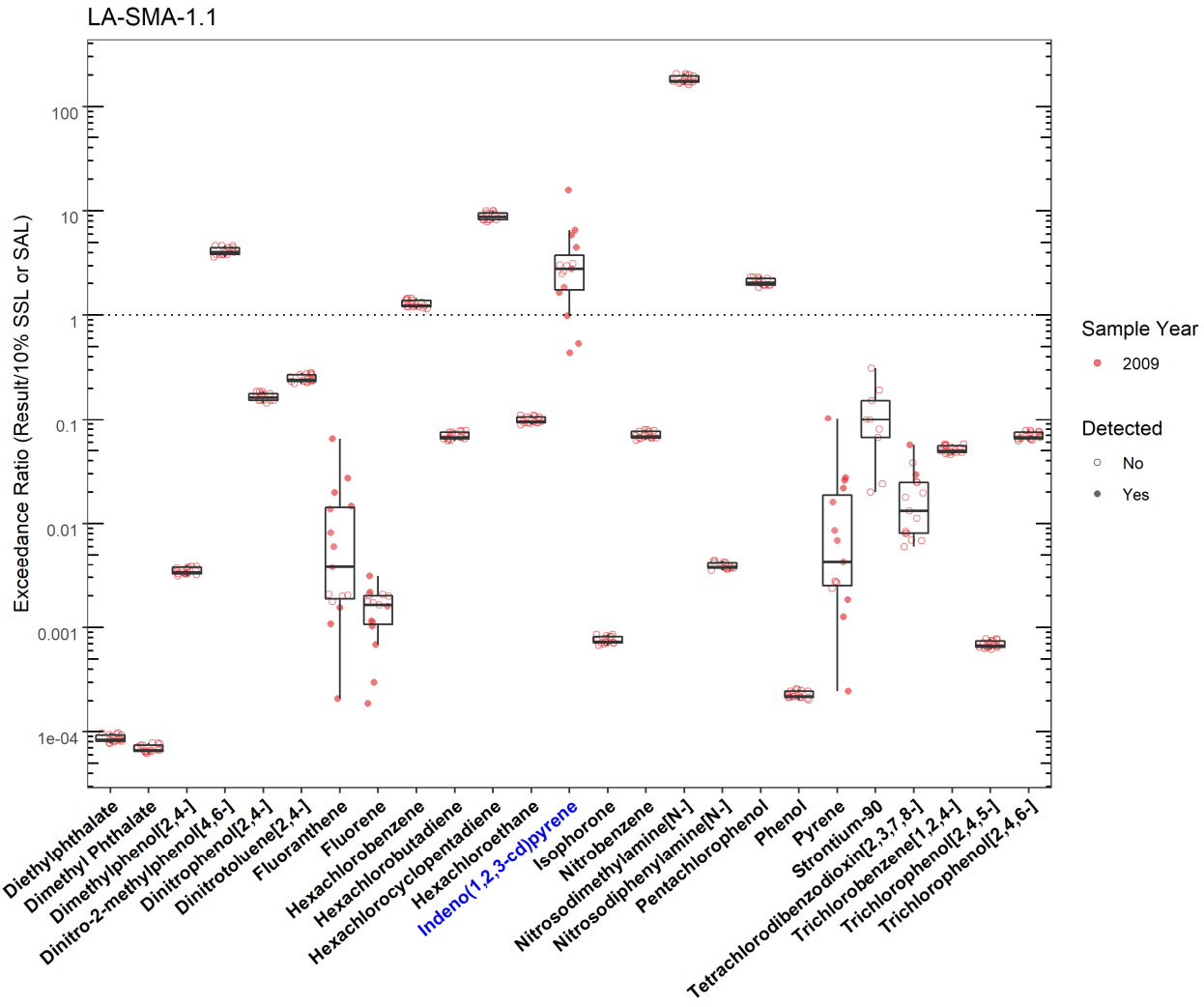

Figure 20.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-1.1 (Plot 2)

LA-SMA-1.1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-1.1	56-55-3	Y	SSL_0.1	0.153	5.70	2009-01-16
Benzo(a)pyrene	LA-SMA-1.1	50-32-8	Y	SSL_0.1	0.112	5.60	2009-01-16
Benzo(b)fluoranthene	LA-SMA-1.1	205-99-2	Y	SSL_0.1	0.153	6.20	2009-01-16
Benzo(k)fluoranthene	LA-SMA-1.1	207-08-9	Y	SSL_0.1	1.53	5.50	2009-01-16
Cyanide (Total)	LA-SMA-1.1	CN(TOTAL)	Y	BTV	0.500	6.90	2009-01-16
Dibenz(a,h)anthracene	LA-SMA-1.1	53-70-3	Y	SSL_0.1	0.0153	0.960	2009-01-16
Indeno(1,2,3-cd)pyrene	LA-SMA-1.1	193-39-5	Y	SSL_0.1	0.153	2.40	2009-01-16
Lead	LA-SMA-1.1	Pb	Y	BTV	22.3	58.1	2009-01-16
Zinc	LA-SMA-1.1	Zn	Y	BTV	48.8	147	2009-01-16

Figure 20.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-1.1

20.4 Stormwater Evaluation

20.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the current monitoring location at the SMA.

20.4.2 Assessment Unit and Stream Impairments

LA-SMA-1.1 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

20.5 Site-Specific Demonstration

20.5.1 Soil Data Summary

No Site-related POCs exceeded BVs or 10% of the SSL in soil data. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, lead, and zinc exceeded the applicable screening value in soil data, but are not Site-related POCs and will not be added to the SAP.

20.5.2 Stormwater Data Summary

No confirmation-monitoring data.

20.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current monitoring location.

20.5.4 Sampling and Analysis Plan

Table 20.5-1 is the proposed SAP for LA-SMA-1.1.

Table 20.5-1 Proposed SAP, LA-SMA-1.1

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
Radium-226 and radium-228	Site history (radionuclides)
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

21.0 LA-SMA-1.25

Associated Sites	C-43-001
Receiving Water	Los Alamos Canyon
Drainage Area	1.41 acres
Landscape Characteristics	50% impervious, 50% pervious
Consent Order Site Status	AOC C-43-001: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the February 2018 field visit, it was determined that the current sampler location does not adequately monitor the affected area. Therefore, the sampler will be moved down the drainage.
2022 Permit Status	Active Monitoring

21.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater samples were collected in July and August 2011. Analytical results from these samples initiated corrective action.

Following the September 2012 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2012, 227785), the sampler was relocated to be in a more representative location and corrective action monitoring was initiated. Stormwater samples were collected in September and October 2012. Analytical results from these samples initiated corrective action.

The Permittees submitted a request for alternative compliance for the Site to EPA per permit Part I.E.3 in May 2015 (LANL 2015, 600417). No response has been received from EPA, and stormwater monitoring has not occurred since 2012.

21.2 Site History

C-43-001 (9/28/2021)

AOC C-43-001 is a storm drain system and outfall that discharges to Los Alamos Canyon in TA-43. The storm drain system collects stormwater runoff from the HRL (building 43-1) loading dock and also functions as the overflow for a sanitary lift station (structure 43-10). The overflow line is an 8-in.-diameter VCP that extends from structure 43-10 130 ft south to a manhole. A 12-in.-diameter CMP, which receives stormwater from two storm drains and any effluent from the overflow, flows southwest for 160 ft and discharges into Los Alamos Canyon south of the HRL. The sanitary waste lines for the HRL [SWMU 43-001(a1) and AOC 43-001(a2)] may have become clogged on occasion, causing an overflow at the lift station. Any sanitary waste carried through the sewer lines could have discharged to the storm drain system. Although no documentation was found to confirm any routine releases to the storm drains, the outfall may have received radioactive, nonsanitary cooling water. Currently, the outfall is located on the undeveloped north slope of Los Alamos Canyon on DOE property.

For investigation activities, refer to “Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1” (N3B 2021, 701261).

21.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 21.2-1.

Table 21.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
C-43-001	Outfall	Metals, radionuclides, tritium

21.3 Consent Order Soil Data

Decision-level data for AOC C-43-001 consist of results from samples collected in 2009, 2011, 2013, and 2015. Analytical results from those samples are presented in Figures 21.3-1 through 21.3-4. Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination have been defined, and no further sampling for extent is warranted.

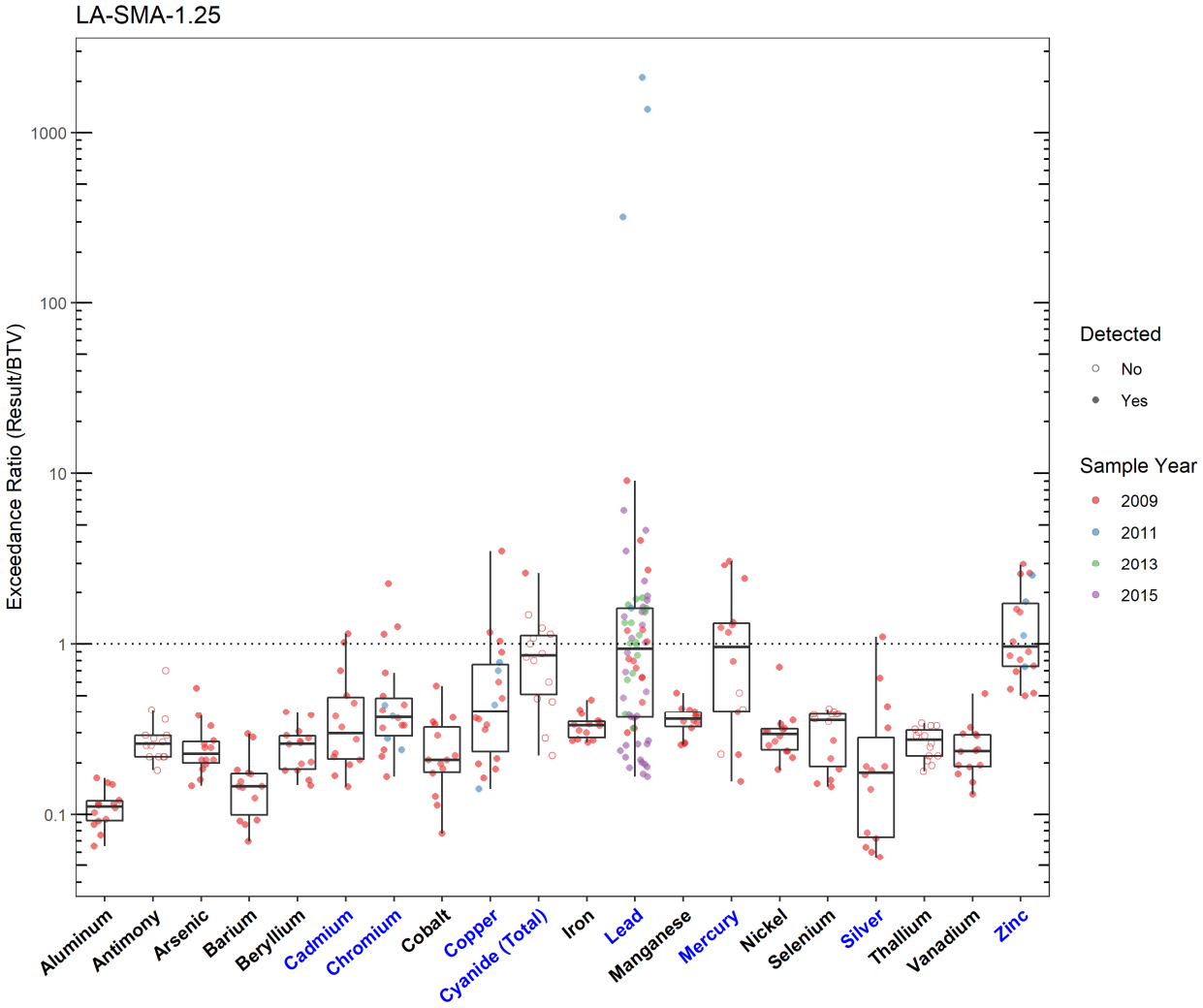

Figure 21.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-1.25

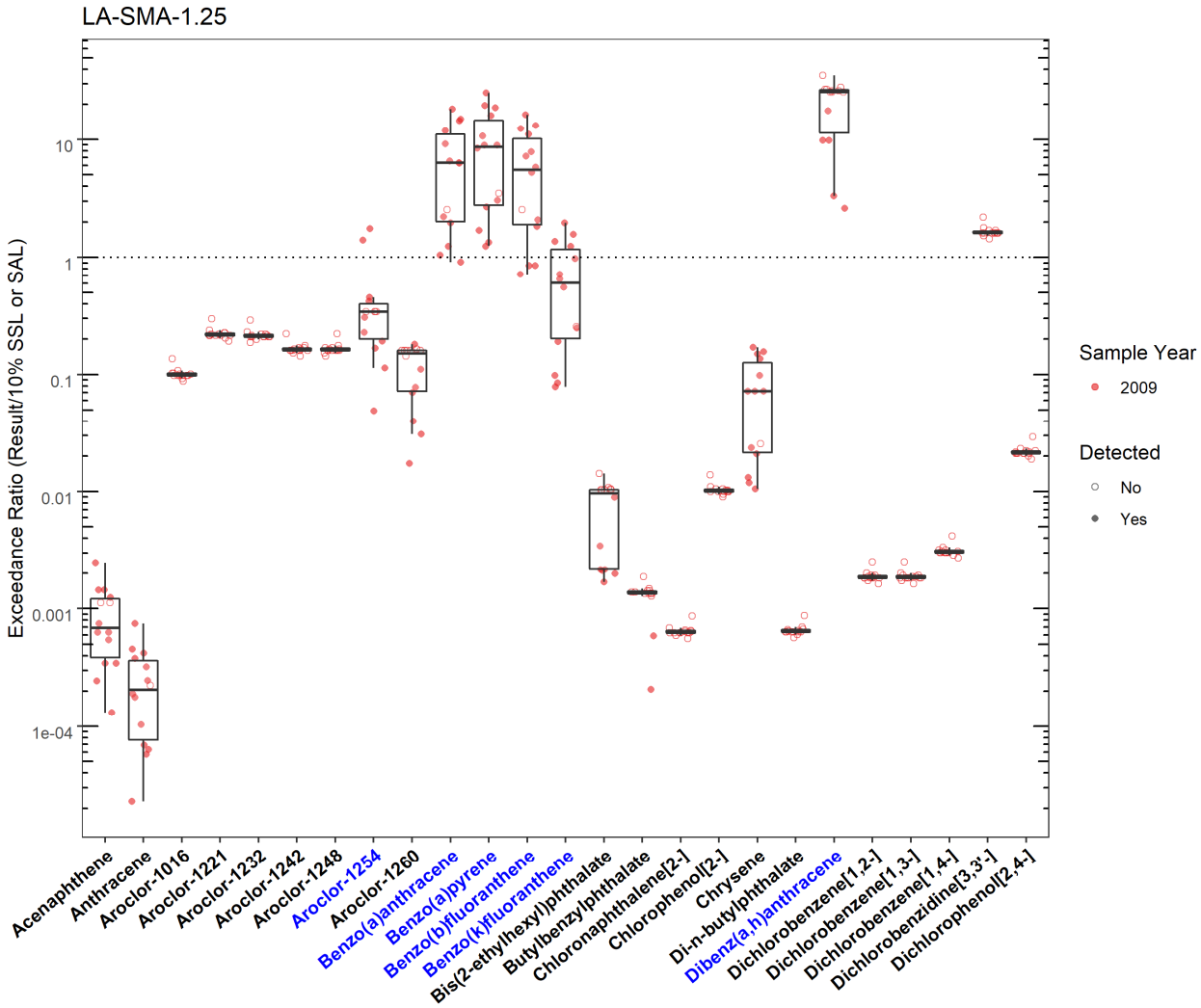

Figure 21.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-1.25 (Plot 1)

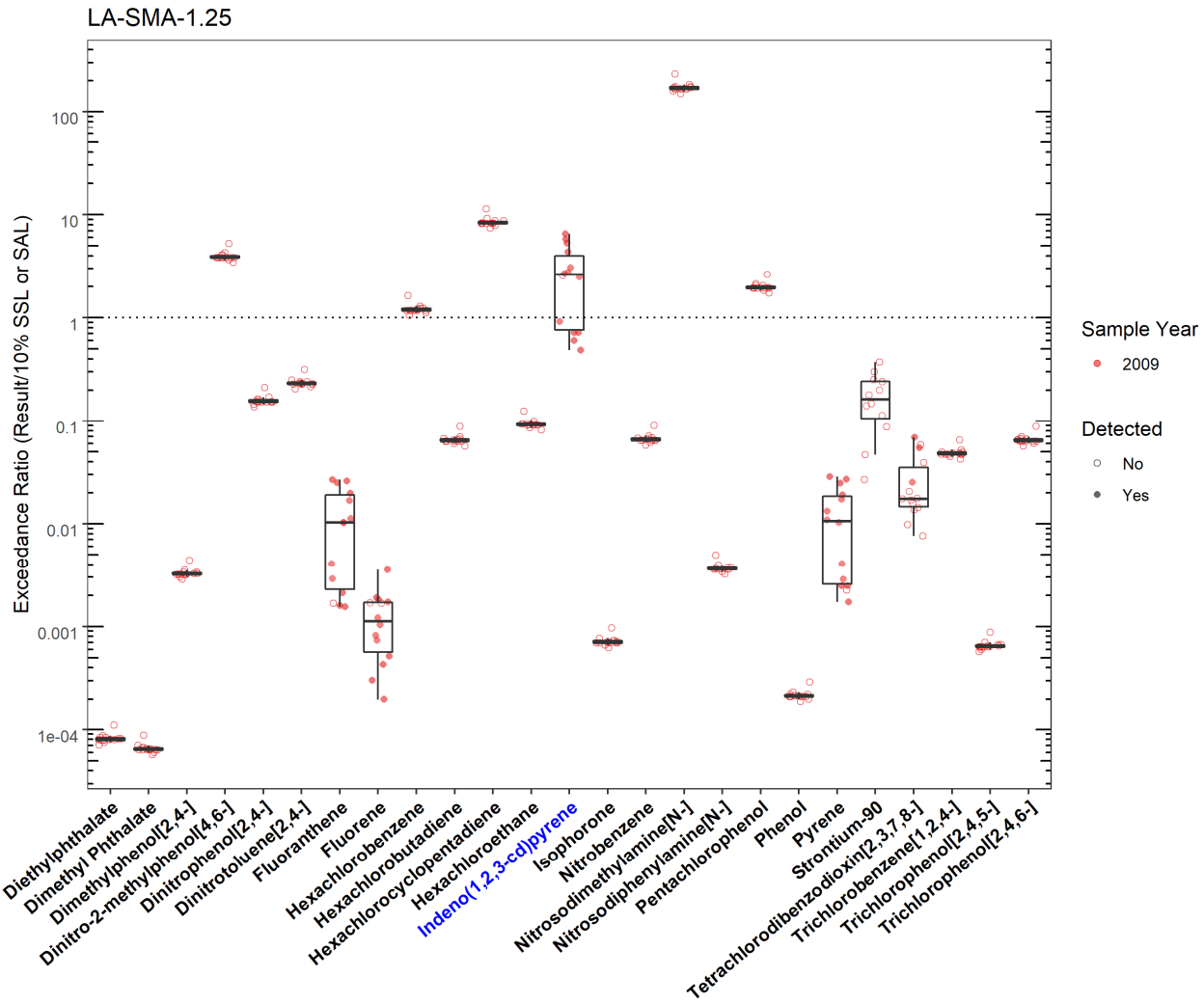

Figure 21.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-1.25 (Plot 2)

LA-SMA-1.25

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-1.25	11097-69-1	Y	SSL_0.1	0.114	0.200	2009-03-19
Benzo(a)anthracene	LA-SMA-1.25	56-55-3	Y	SSL_0.1	0.153	2.80	2009-01-16
Benzo(a)pyrene	LA-SMA-1.25	50-32-8	Y	SSL_0.1	0.112	2.80	2009-01-16
Benzo(b)fluoranthene	LA-SMA-1.25	205-99-2	Y	SSL_0.1	0.153	2.50	2009-01-16
Benzo(k)fluoranthene	LA-SMA-1.25	207-08-9	Y	SSL_0.1	1.53	3.00	2009-01-16
Cadmium	LA-SMA-1.25	Cd	Y	BTV	0.400	0.460	2009-03-19
Chromium	LA-SMA-1.25	Cr	Y	BTV	19.3	43.5	2009-03-19
Copper	LA-SMA-1.25	Cu	Y	BTV	14.7	52.0	2009-01-16
Cyanide (Total)	LA-SMA-1.25	CN(TOTAL)	Y	BTV	0.500	1.30	2009-01-16
Dibenz(a,h)anthracene	LA-SMA-1.25	53-70-3	Y	SSL_0.1	0.0153	0.270	2009-03-19
Indeno(1,2,3-cd)pyrene	LA-SMA-1.25	193-39-5	Y	SSL_0.1	0.153	1.00	2009-01-16
Lead	LA-SMA-1.25	Pb	Y	BTV	22.3	47200	2011-10-20
Mercury	LA-SMA-1.25	Hg	Y	BTV	0.100	0.308	2009-01-16
Silver	LA-SMA-1.25	Ag	Y	BTV	1.00	1.10	2009-03-19
Zinc	LA-SMA-1.25	Zn	Y	BTV	48.8	144	2009-01-16

Figure 21.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-1.25

21.4 Stormwater Evaluation

21.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current monitoring location at the SMA.

21.4.2 Assessment Unit and Stream Impairments

LA-SMA-1.25 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha and metals impairments may be Site-related, based on Site history.

21.5 Site-Specific Demonstration

21.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater at the current monitoring location: cadmium, chromium, copper, lead, mercury, silver and zinc.

The SVOCs, Aroclor-1254, and cyanide that exceeded the applicable screening value in soil data are not Site-related POCs and will not be added to the SAP.

21.5.2 Stormwater Data Summary

No confirmation-monitoring data.

21.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current location.

21.5.4 Sampling and Analysis Plan

Table 21.5-1 is the proposed SAP for LA-SMA-1.25.

Table 21.5-1 Proposed SAP, LA-SMA-1.25

Monitoring Constituent	Background for Monitoring
Total mercury and selenium	Impairment, Site history (metals), and soil data
Gross alpha	Impairment and Site history (radionuclides)
Tritium	Site history (radionuclides)
Radium-226 and radium-228	Site history (radionuclides)
Dissolved cadmium, chromium, copper, lead, silver and zinc	Site history (metals) and soil data
DOC	Permit requirement
SSC	Permit requirement

22.0 LA-SMA-2.1

Associated Sites	01-001(f)
Receiving Water	Los Alamos Canyon
Drainage Area	14.25 acres
Landscape Characteristics	36% impervious, 64% pervious
Consent Order Site Status	SWMU 01-001(f): In Progress
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the February 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

22.1 2010 Administratively Continued Permit Summary

Following the May 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

Following the September 2014 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2014, 261903), corrective action monitoring was initiated. The sampler was relocated in 2017 to a more representative location after a change in condition at the SMA and monitoring was reinitiated. Since that time, stormwater flow has not been sufficient for full-volume corrective-action sample collection, and monitoring is ongoing.

22.2 Site History

01-001(f) (9/28/2021)

SWMU 01-001(f) is the former location of septic tank 140 (former structure 01-140), its associated inlet and outlet drainlines, and a former outfall in former TA-01. Septic tank 140 measured approximately 5 ft × 10 ft × 6 ft deep, and was constructed of reinforced concrete in 1945. The tank was located west of former K-1 Building (building 01-98) and served HT Building (01-29) [SWMU 01-007(p)] and FP Building (01-20). The septic system outfall discharged into Los Alamos Canyon to an area later designated as Hillside 140, which is situated in TA-43 downslope from former TA-01. HT Building was used to heat-treat and machine natural and enriched uranium. FP Building was a foundry for nonradioactive and nonferrous metals and was not radiologically contaminated. The heat-treatment and machining operations likely resulted in discharges of radioactive waste to the tank and outfall, and the machining operations were likely the source of the PCBs found in the SWMU 01-001(f) outfall and drainage below.

In 1946, low levels of plutonium and polonium were detected in the drain to the waste line from HT Building. Buildings 01-98 and 01-29 were decommissioned and removed in 1965 as part of the relocation of all TA-01 activities to new Laboratory TAs south of the Los Alamos townsite. HT Building was found to be radioactively-contaminated during its D&D and was disposed of at an unspecified MDA. Use of the SWMU 01-001(f) septic system ceased in 1965 and the tank was removed in 1976.

During the 1975–1976 Ahlquist Radiological Survey conducted at SWMU 01-001(f), septic tank 140 was found to be filled with sludge with high levels of uranium activity. Both inlet and outlet lines were

contaminated. The septic tank, all inlet and outlet drainlines, and approximately 351 yd^3 of contaminated soil were removed in 1976. Although the mesa-top portion of SWMU 01-001(f) was determined to be decontaminated, steep terrain prevented the removal of all known contamination on the hillside south and west of the outlet excavation.

Currently, the mesa-top area of SWMU 01-001(f) is developed; former drainline locations are under pavement and buildings in the Ridge Park Village residential development. The location of former septic tank 140 is partially covered by a building. The outfall location and the hillside drainage into which it discharged are located on undeveloped land owned by the DOE.

Two surface water retention basins were constructed at the bottom of the drainage in 2010. Installation of controls to divert run-on away from the SWMU 01-001(f) outfall, and stabilize the hillside drainage portion of the site, was completed in 2015. Stormwater runoff from the area above the drainage is currently being collected via a drop inlet and piping system, and discharged directly into the stream channel below the drainage.

For investigation activities, refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

22.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 22.2-1.

Table 22.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-001(f)	Septic Tank 140	Metals, organic chemicals, radionuclides

22.3 Consent Order Soil Data

Decision-level data for SWMU 01-001(f) consist of results from samples collected between 2008 and 2013. These data include those samples from 2008–2013 that were not excavated during cleanup activities. Analytical results from those samples are presented in Figures 22.3-1 through 22.3-4. Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination have been defined, and no further sampling for extent is warranted.

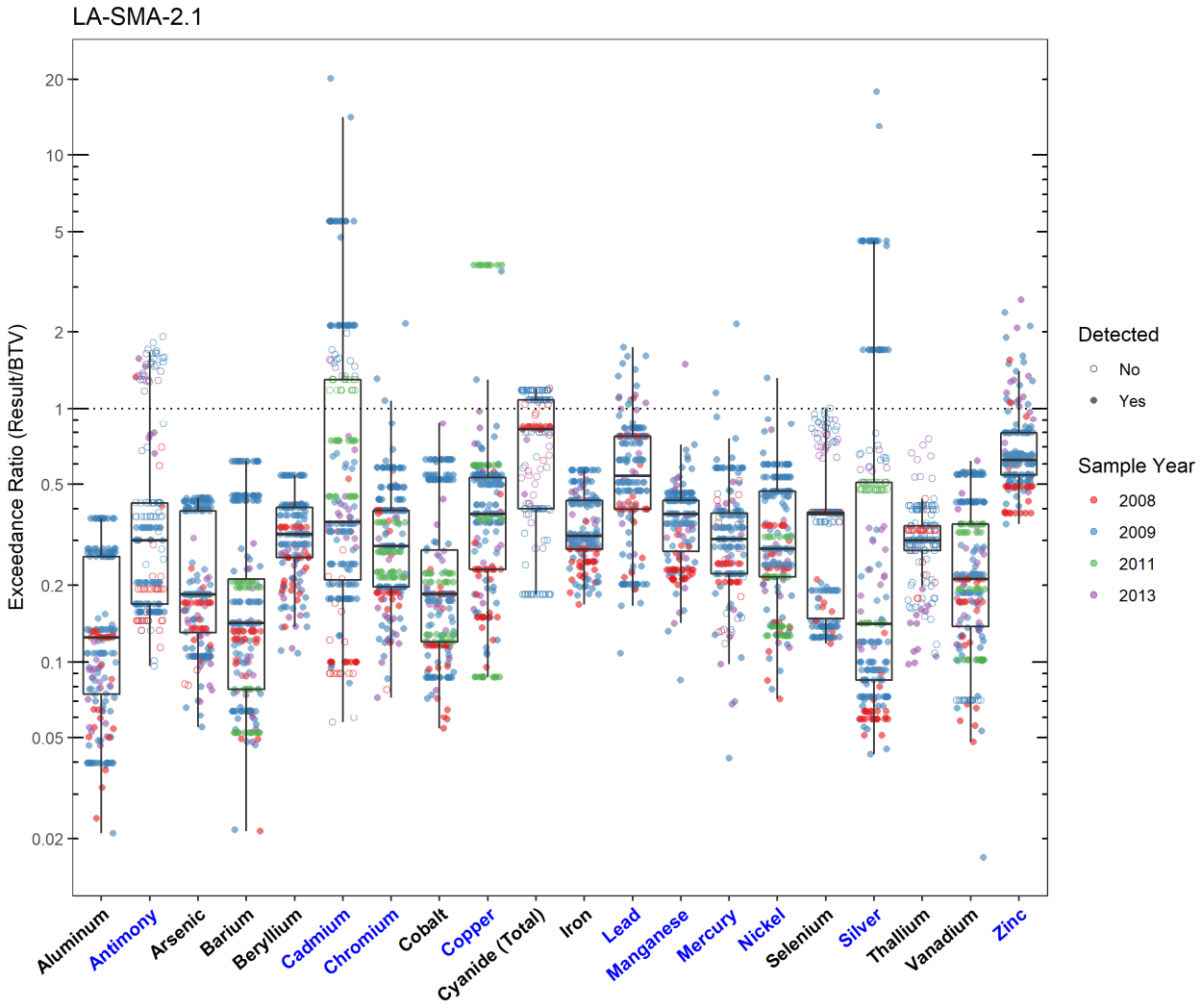

Figure 22.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-2.1

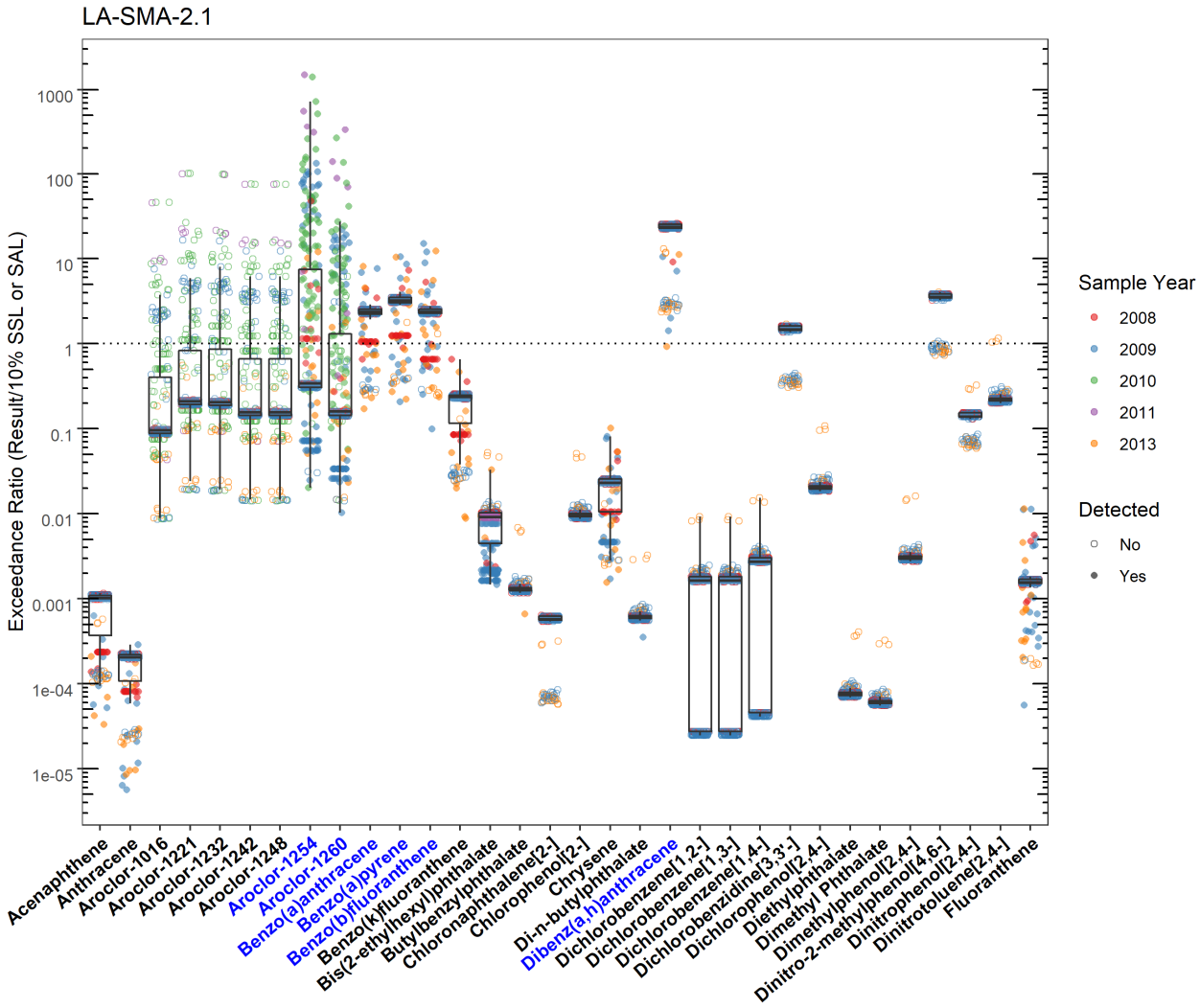

Figure 22.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-2.1 (Plot 1)

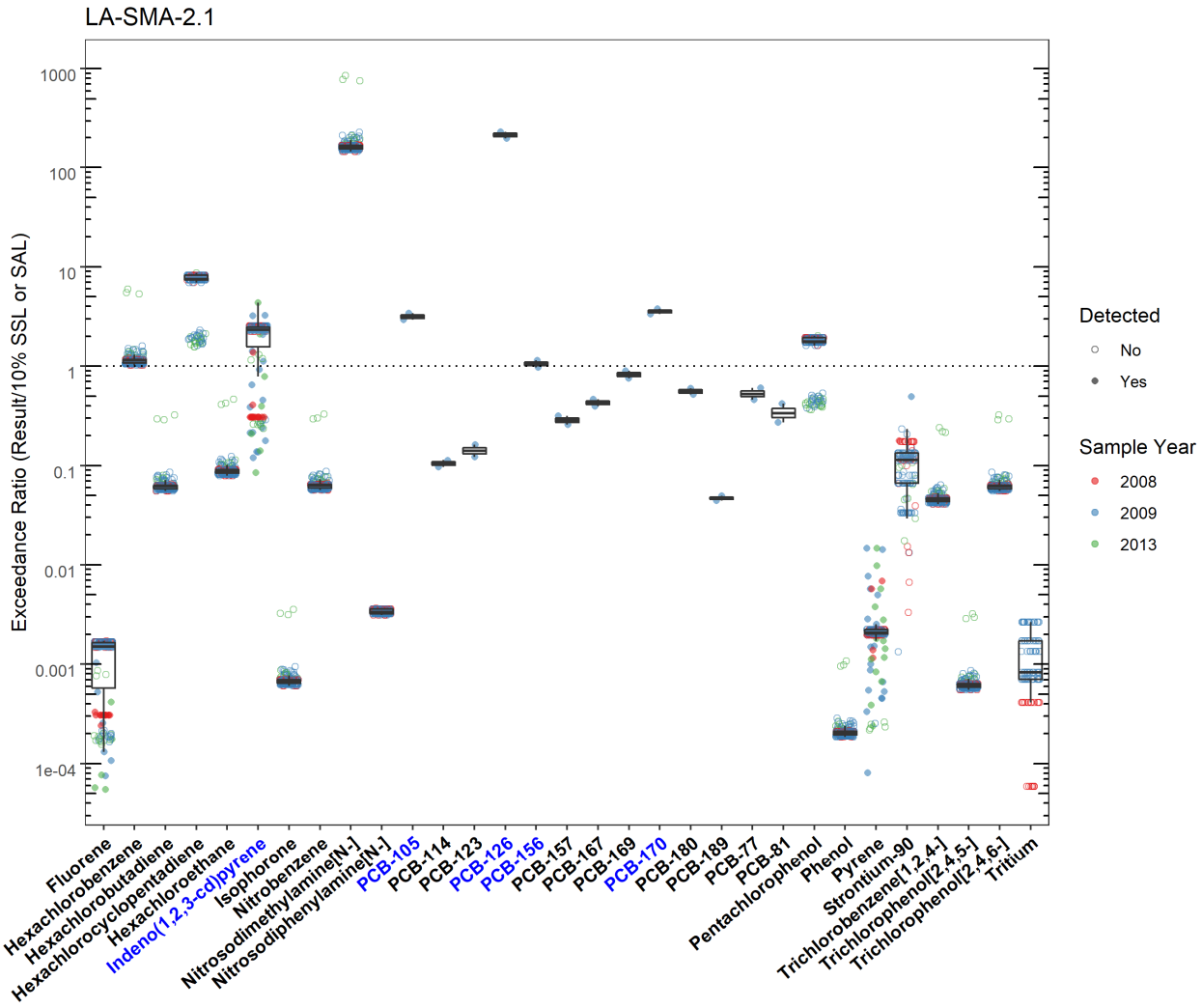

Figure 22.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-2.1 (Plot 2)

LA-SMA-2.1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-2.1	Sb	Y	BTV	0.830	1.30	2013-08-07
Aroclor-1254	LA-SMA-2.1	11097-69-1	Y	SSL_0.1	0.114	170	2011-09-07
Aroclor-1260	LA-SMA-2.1	11096-82-5	Y	SSL_0.1	0.243	80.0	2011-09-07
Benzo(a)anthracene	LA-SMA-2.1	56-55-3	Y	SSL_0.1	0.153	1.24	2013-08-09
Benzo(a)pyrene	LA-SMA-2.1	50-32-8	Y	SSL_0.1	0.112	1.18	2009-07-31
Benzo(b)fluoranthene	LA-SMA-2.1	205-99-2	Y	SSL_0.1	0.153	2.31	2009-07-31
Cadmium	LA-SMA-2.1	Cd	Y	BTV	0.400	8.10	2009-01-21
Chromium	LA-SMA-2.1	Cr	Y	BTV	19.3	41.7	2009-01-05
Copper	LA-SMA-2.1	Cu	Y	BTV	14.7	54.3	2011-11-17
Dibenz(a,h)anthracene	LA-SMA-2.1	53-70-3	Y	SSL_0.1	0.0153	0.171	2013-08-09
Indeno(1,2,3-cd)pyrene	LA-SMA-2.1	193-39-5	Y	SSL_0.1	0.153	0.662	2013-08-09
Lead	LA-SMA-2.1	Pb	Y	BTV	22.3	38.8	2009-07-31
Manganese	LA-SMA-2.1	Mn	Y	BTV	671	1000	2013-08-07
Mercury	LA-SMA-2.1	Hg	Y	BTV	0.100	0.215	2009-01-06
Nickel	LA-SMA-2.1	Ni	Y	BTV	15.4	20.4	2009-01-05
PCB-105	LA-SMA-2.1	32598-14-4	Y	SSL_0.1	0.125	0.426	2009-11-16
PCB-126	LA-SMA-2.1	57465-28-8	Y	SSL_0.1	0.0000375	0.00857	2009-11-16
PCB-156	LA-SMA-2.1	38380-08-4	Y	SSL_0.1	0.125	0.142	2009-11-16
PCB-170	LA-SMA-2.1	35065-30-6	Y	SSL_0.1	0.0375	0.142	2009-11-16
Silver	LA-SMA-2.1	Ag	Y	BTV	1.00	17.9	2009-01-21
Zinc	LA-SMA-2.1	Zn	Y	BTV	48.8	131	2013-08-07

Figure 22.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-2.1

22.4 Stormwater Evaluation

22.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the current location at the SMA.

22.4.2 Assessment Unit and Stream Impairments

LA-SMA-2.1 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha, metals, and PCB impairments may be Site-related, based on Site history.

22.5 Site-Specific Demonstration

22.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater data: Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, PCB-105, PCB-126, PCB-170, and PCB-156.

22.5.2 Stormwater Data Summary

No confirmation-monitoring data.

22.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current location.

22.5.4 Sampling and Analysis Plan

Table 22.5-1 is the proposed SAP for LA-SMA-2.1.

Table 22.5-1 Proposed SAP, LA-SMA-2.1

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history (radionuclides), and stormwater data
Total PCBs	Impairment, Site history (organics), stormwater data, and soil data
Total mercury and selenium	Impairment, Site history (metals)
SVOCs	Site history (organics) and soil data
Dissolved copper	Site history (metals) and stormwater data
DOC	Permit requirement
SSC	Permit requirement

23.0 LA-SMA-2.3

Associated Sites	01-001(b)
Receiving Water	Los Alamos Canyon
Drainage Area	0.16 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 01-001(b): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the February 2018 field visit, the current sampler location does not adequately monitor runoff from this Site. Therefore, the sampler will be moved west to the area where the Site discharged.
2022 Permit Status	Active Monitoring

23.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

SWMU 01-001(b) received a COC under the Consent Order in September 2010. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in November 2012 (LANL 2012/2013, 232273) and resubmitted in August 2013 (LANL 2013, 250035). Stormwater monitoring has not occurred since 2012.

23.2 Site History

SWMU 01-001(b) is the location of a former septic tank (structure 01-135) southwest of Oppenheimer Drive in the Los Alamos townsite at former TA-01. The septic system served former FP and M-1 Buildings through a single sanitary waste line connection, and discharged to Los Alamos Canyon.
Septic tank 01-135 measured 7 ft × 3.5 ft × 5 ft deep. It was installed in 1950 and removed in 1975 during the 1974–1976 radiological survey and D&D of TA-01; the inlet and outlet drainlines were left in place.

FP Building was constructed in November 1945 and was a foundry for nonradioactive and nonferrous metals. The building was determined to be free of radioactive contamination before D&D. M-1 Building was completed in June 1950 and originally was used to machine lithium and later to machine uranium-238. The building superstructure was determined to be free of contamination in 1964, but the floor drains were suspected to be radioactively contaminated from the uranium-238 machining conducted in M-1 Building. Currently, the locations of the inactive drainlines are under pavement and the buildings of Ridge Park Village.

For investigation activities, refer to “Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory” (LANL 2010, 108536).

23.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 23.2-1.

Table 23.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-001(b)	Septic Tank 135	Uranium-238, metals, inorganic and organic chemicals

23.3 Consent Order Soil Data

Decision-level data for SWMU 01-001(b) consist of results from samples collected in 2008. Analytical results from those samples are presented in Figures 23.3-1 through 23.3-4. Revision 1 of the 2010 IR concluded that the nature and extent of contamination are defined.

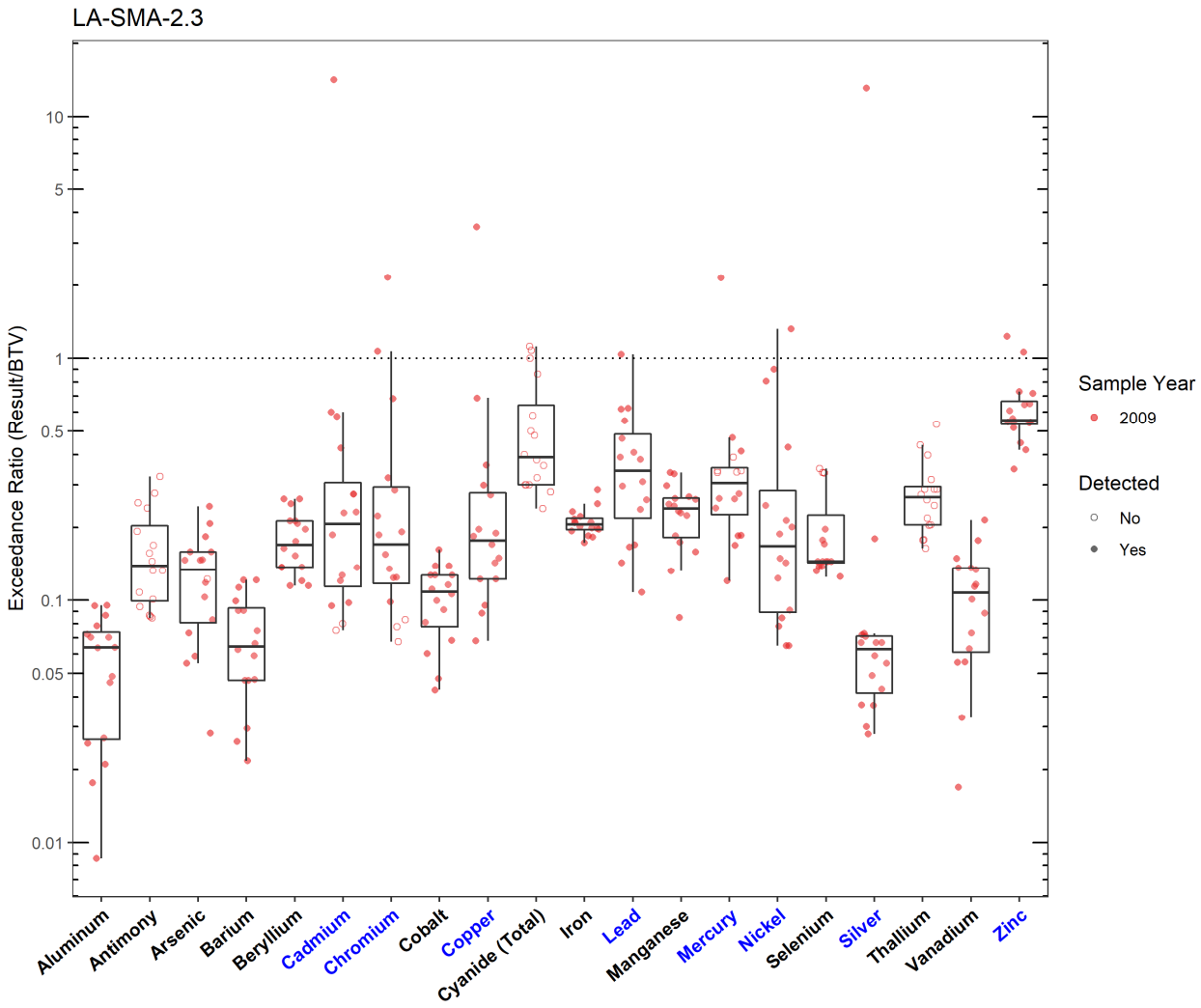

Figure 23.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-2.3

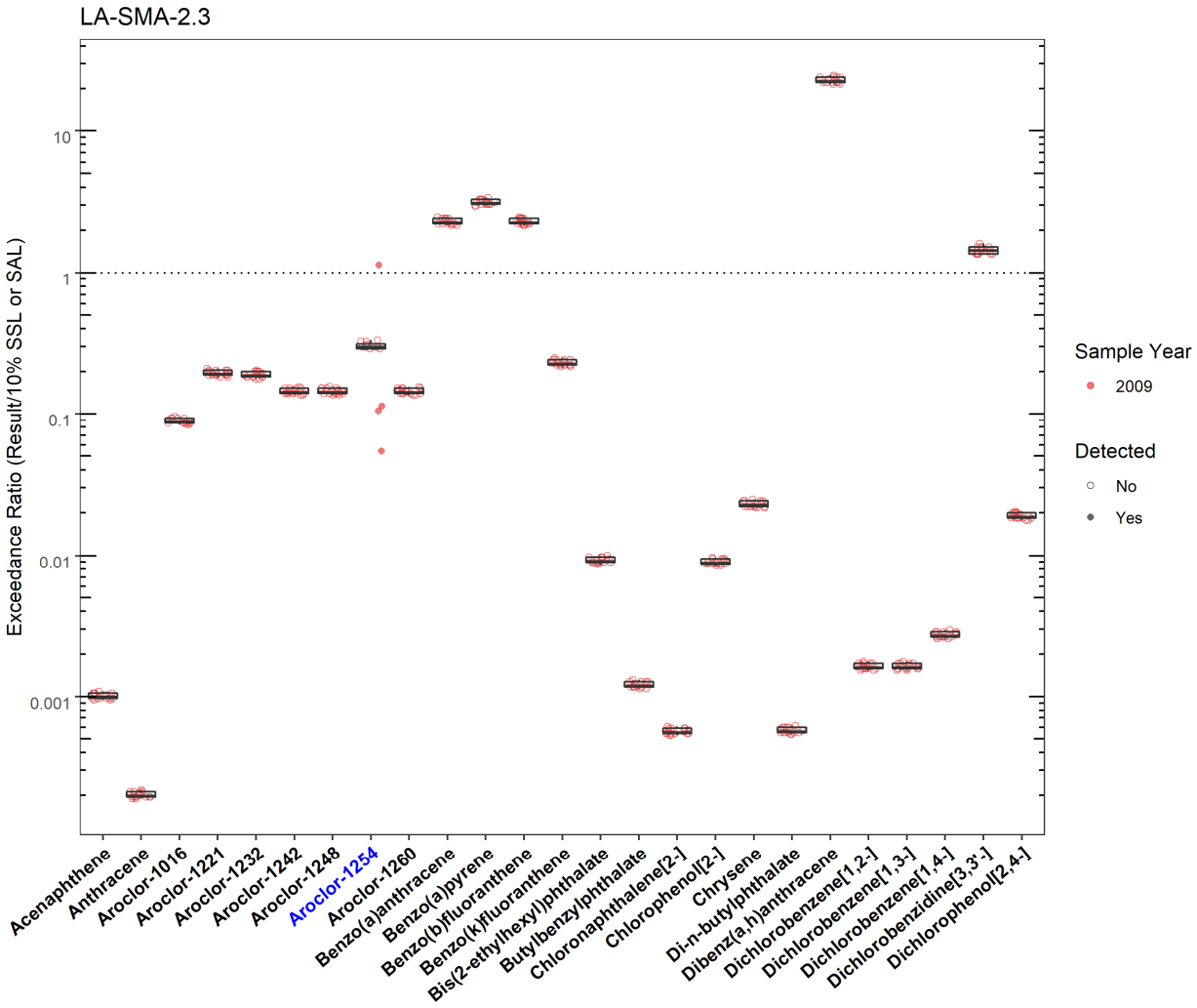

Figure 23.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-2.3 (Plot 1)

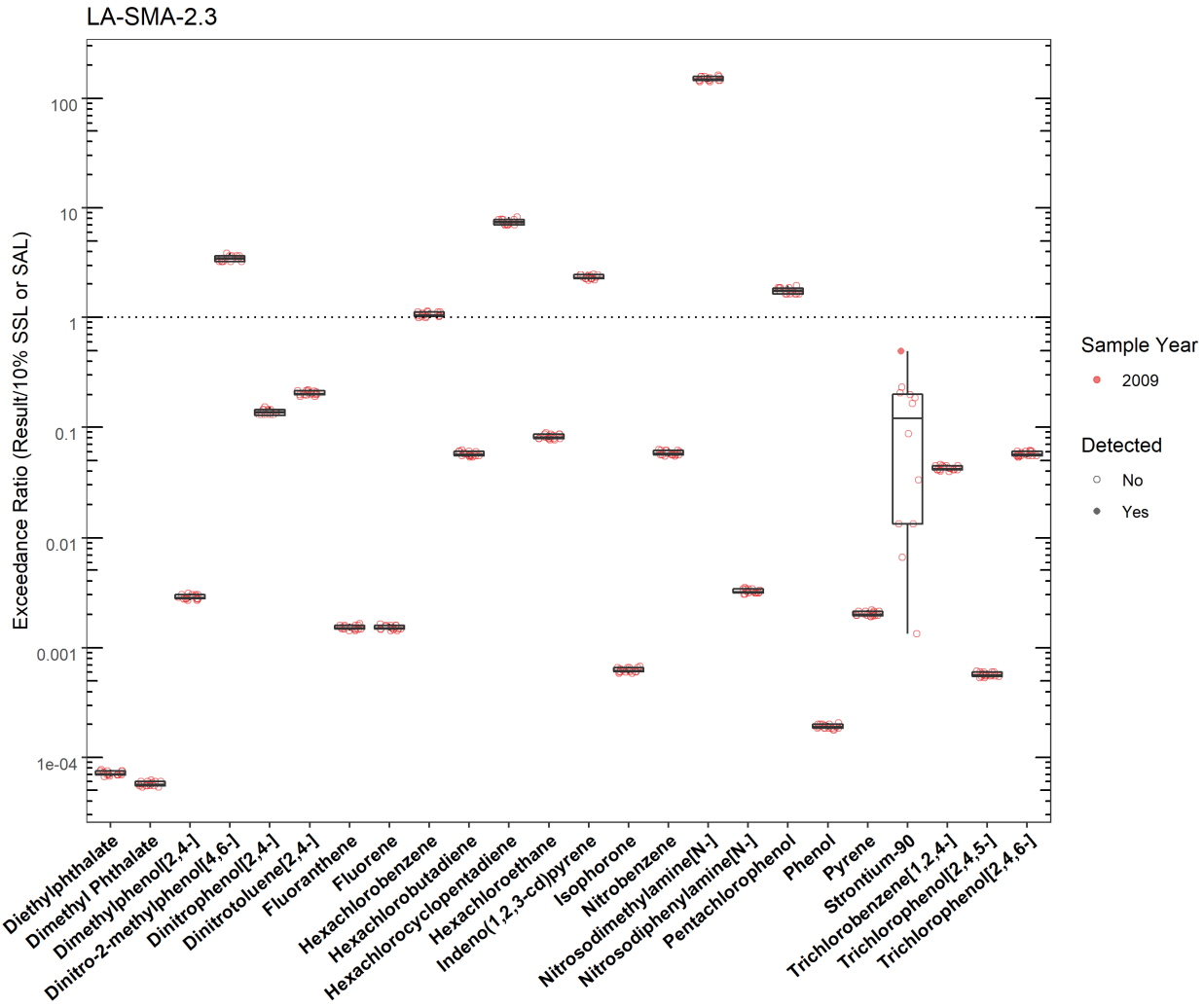

Figure 23.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-2.3 (Plot 2)

LA-SMA-2.3

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-2.3	11097-69-1	Y	SSL_0.1	0.114	0.130	2009-01-06
Cadmium	LA-SMA-2.3	Cd	Y	BTV	0.400	5.70	2009-01-20
Chromium	LA-SMA-2.3	Cr	Y	BTV	19.3	41.7	2009-01-05
Copper	LA-SMA-2.3	Cu	Y	BTV	14.7	51.3	2009-01-20
Lead	LA-SMA-2.3	Pb	Y	BTV	22.3	23.1	2009-01-06
Mercury	LA-SMA-2.3	Hg	Y	BTV	0.100	0.215	2009-01-06
Nickel	LA-SMA-2.3	Ni	Y	BTV	15.4	20.4	2009-01-05
Silver	LA-SMA-2.3	Ag	Y	BTV	1.00	13.1	2009-01-20
Zinc	LA-SMA-2.3	Zn	Y	BTV	48.8	59.8	2009-01-20

Figure 23.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-2.3

23.4 Stormwater Evaluation

23.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring data have been collected at the current location for the SMA.

23.4.2 Assessment Unit and Stream Impairments

LA-SMA-2.3 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The impairments may be Site-related, based on Site history.

23.5 Site-Specific Demonstration

23.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater at the current monitoring location: Aroclor-1254, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc.

23.5.2 Stormwater Data Summary

No confirmation-monitoring data.

23.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current location.

23.5.4 Sampling and Analysis Plan

Table 23.5-1 is the proposed SAP for LA-SMA-2.3.

Table 23.5-1 Proposed SAP, LA-SMA-2.3

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history (uranium-238), and stormwater data
Total PCBs	Impairment, Site history (organics), and soil data
Total mercury and selenium	Impairment, Site history (metals), and soil data
Cyanide	Impairment and Site history (inorganics)
Dissolved cadmium, chromium, copper, lead, nickel, silver, and zinc	Site history (metals) and soil data
SVOCs	Site history (organics)
DOC	Permit requirement
SSC	Permit requirement

24.0 LA-SMA-3.1

Associated Sites	01-001(e), 01-003(a)
Receiving Water	Los Alamos Canyon
Drainage Area	13.82 acres
Landscape Characteristics	39% impervious, 61% pervious
Consent Order Site Status	SWMU 01-001(e): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls SWMU 01-003(a): In Progress
2010 AC Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the February 2018 field visit, the current sampler location does not adequately monitor the affected area. Therefore, the sampler was moved downgradient in the drainage.
2022 Permit Status	Active Monitoring

24.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA baseline monitoring was initiated. While developing the 2018 SAP, a decision was made to implement the monitoring location move recommended during the 2018 SIP review. Monitoring was reinitiated and a baseline stormwater sample was collected in October 2018. Analytical results from this sample initiated corrective action.

The Permittees submitted a request for alternative compliance for the Sites to EPA per permit Part I.E.3 in April 2019 (N3B 2022, 701992). No response has been received from EPA, and stormwater monitoring has not occurred since 2018.

24.2 Site History

01-001(e) (3/28/2022)

SWMU 01-001(e) is the location of a former septic system that consisted of former septic tank 01-139, associated inlet and outlet drainlines, and a former outfall at former TA-01. The outfall discharged southeast of I Building and the D-5 Sigma vault, at the head of Bailey Bridge Canyon [SWMU 01-003(a)]. Septic tank 139 was constructed in 1944 of reinforced concrete and measured 3 ft × 6 ft × 5 ft deep and served the D-5 Sigma vault, I Building, and Delta Building. D-5 Sigma vault was used to store plutonium-239 and uranium-235. I Building was used to store and machine beryllium between 1947 and 1958. Delta Building was used as a meeting place and a laboratory where fission-product tracers were used. The septic system was reportedly decommissioned and abandoned in place in 1965. However, the septic tank was not found during the 1974–1976 radiological survey of TA-01, nor was it found when the area was developed for residential use. Currently, the SWMU location is on private property under Oppenheimer Drive, various residential buildings, and adjacent yards, driveways, and sidewalks.

For investigation activities, refer to “Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory” (LANL 2010, 108536).

01-003(a) (9/28/2021)

SWMU 01-003(a) is the inactive Bailey Bridge landfill located at the head of Bailey Bridge Canyon at former TA-01. Demolition debris from former TA-01 structures was placed on the hillsides in the

drainage at the head of Bailey Bridge Canyon between 1959 and 1978. The area measured approximately 200 ft × 100 ft × 100 ft deep.

A September 1964 Zia Company memorandum regarding disposal of former TA-01 debris from demolition activities specified that concrete walls and flooring from the former Sigma Building (structure 01-56) with radioactivity levels below 2500 cpm of surface alpha contamination were to be broken up and disposed of in Bailey Bridge Canyon; the disposed concrete was covered with 4 ft of earthen fill. Demolition debris with less than 2500 cpm surface alpha contamination from several other buildings (the D-5 vault [01-11], HT [01-29], warehouse 19 [01-103], and the sheet metal shop [structure 01-104]) located in the western portion of former TA-01 was also disposed of in Bailey Bridge Canyon and covered with soil. Additional fill was placed over the landfill and the area regraded before the area was developed for residential housing.

The debris and fill placed at the head of Bailey Bridge Canyon extended the canyon edge to the south by approximately 100 ft. The mesa-top portion of SWMU 01-003(a) is currently under pavement and one building of the Los Arboles townhouses. The area downslope of the landfill is undeveloped DOE land.

For investigation activities, refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

24.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 24.2-1.

Table 24.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-001(e)	Septic Tank 139	Beryllium, fission tracers, uranium and plutonium
01-003(a)	Landfill	Metals, organic chemicals, radionuclides

24.3 Consent Order Soil Data

Decision-level data for SWMU 01-001(e) consist of results from samples collected in 2008. Revision 1 of the 2010 IR concluded that the nature and extent of contamination are defined.

Decision-level data for SWMU 01-003(a) consist of results from samples collected in 2008, 2012, 2013, and 2016. Revision 1 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-3.1 are presented in Figures 24.3-1 through 24.3-3.

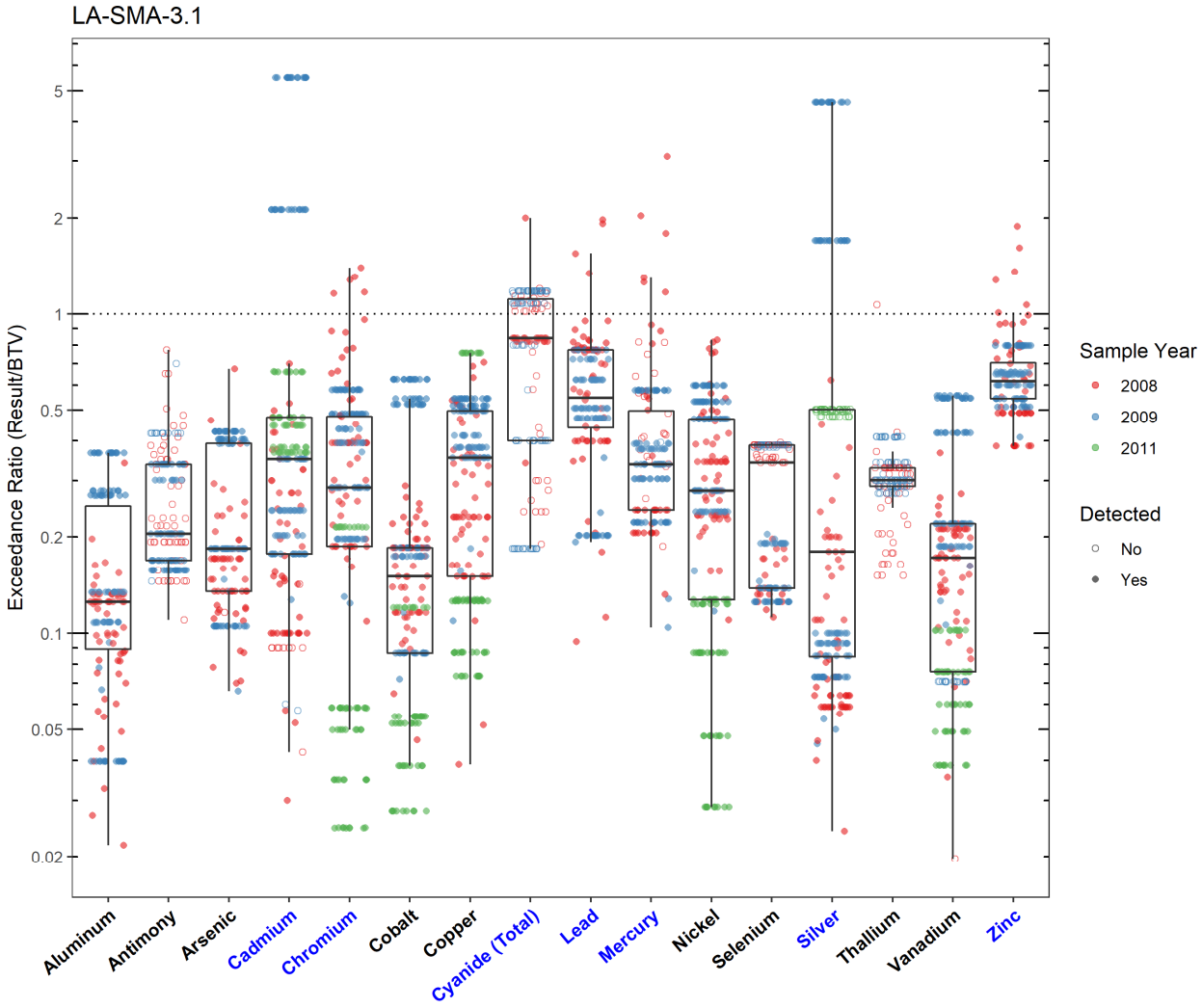

Figure 24.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-3.1

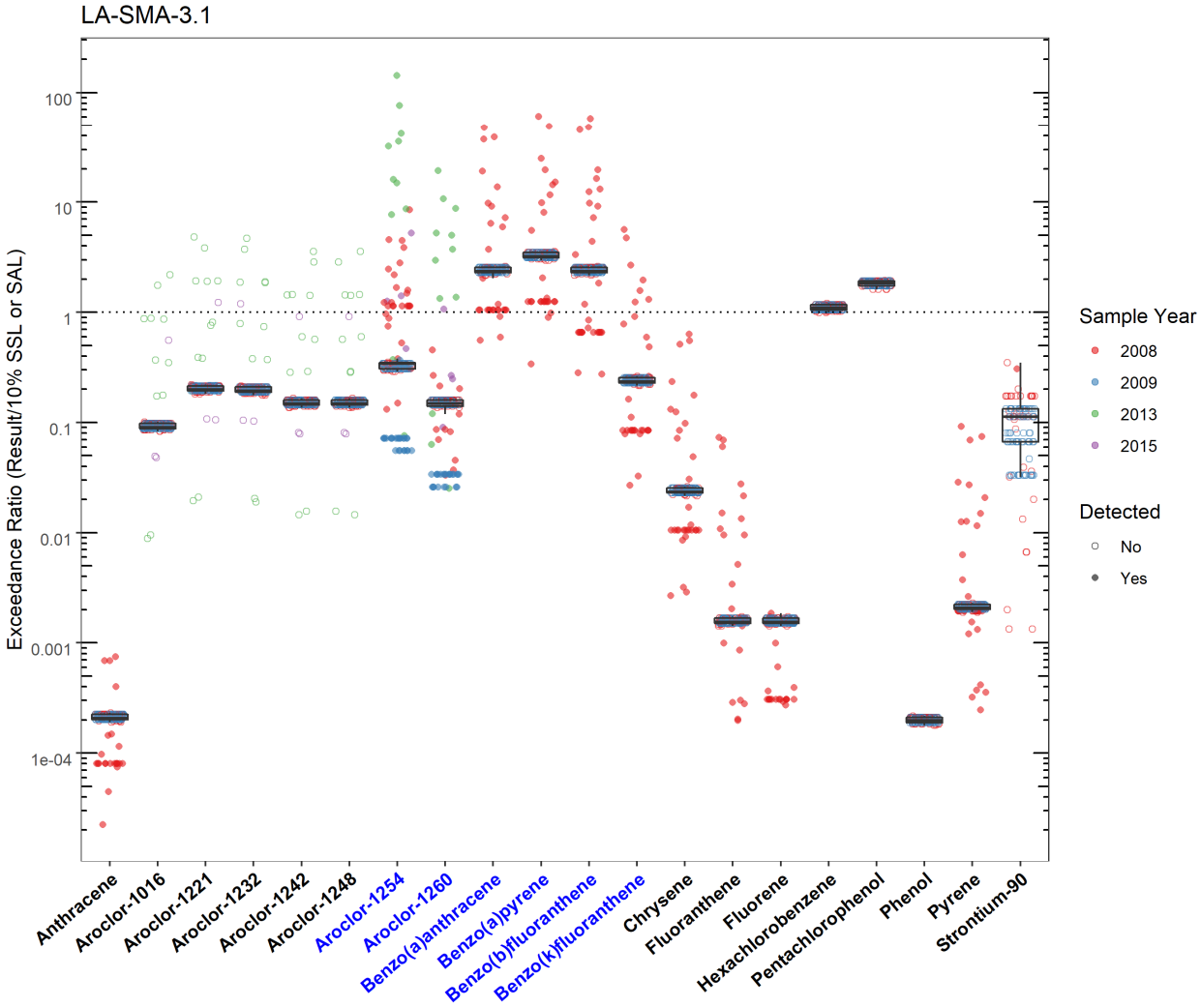

Figure 24.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-3.1

LA-SMA-3.1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-3.1	11097-69-1	Y	SSL_0.1	0.114	16.3	2013-08-26
Aroclor-1260	LA-SMA-3.1	11096-82-5	Y	SSL_0.1	0.243	4.66	2013-08-26
Benzo(a)anthracene	LA-SMA-3.1	56-55-3	Y	SSL_0.1	0.153	7.30	2008-11-11
Benzo(a)pyrene	LA-SMA-3.1	50-32-8	Y	SSL_0.1	0.112	6.80	2008-11-11
Benzo(b)fluoranthene	LA-SMA-3.1	205-99-2	Y	SSL_0.1	0.153	8.90	2008-11-11
Benzo(k)fluoranthene	LA-SMA-3.1	207-08-9	Y	SSL_0.1	1.53	8.60	2008-11-11
Cadmium	LA-SMA-3.1	Cd	Y	BTV	0.400	2.20	2009-01-21
Chromium	LA-SMA-3.1	Cr	Y	BTV	19.3	27.1	2008-11-12
Cyanide (Total)	LA-SMA-3.1	CN(TOTAL)	Y	BTV	0.500	1.00	2008-11-12
Lead	LA-SMA-3.1	Pb	Y	BTV	22.3	44.0	2008-11-12
Mercury	LA-SMA-3.1	Hg	Y	BTV	0.100	0.310	2008-11-13
Silver	LA-SMA-3.1	Ag	Y	BTV	1.00	4.60	2009-01-21
Zinc	LA-SMA-3.1	Zn	Y	BTV	48.8	91.9	2008-11-11

Figure 24.3-3 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-3.1

24.4 Stormwater Evaluation

24.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in October 2018. Analytical results from that sample are presented in Figures 24.4-1 through 24.4-4.

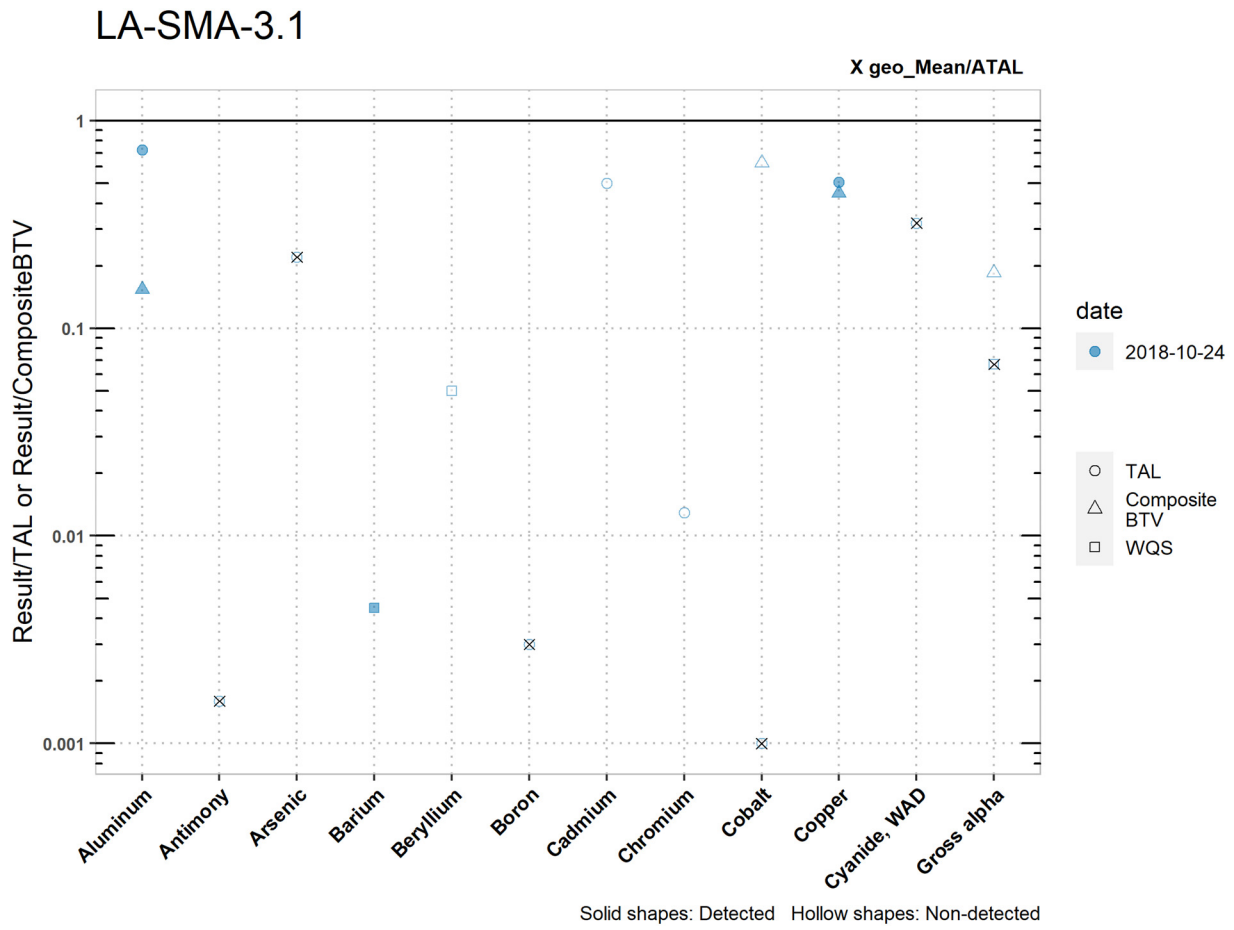

Figure 24.4-1 Analytical Results from Stormwater Sample, LA-SMA-3.1 (Plot 1)

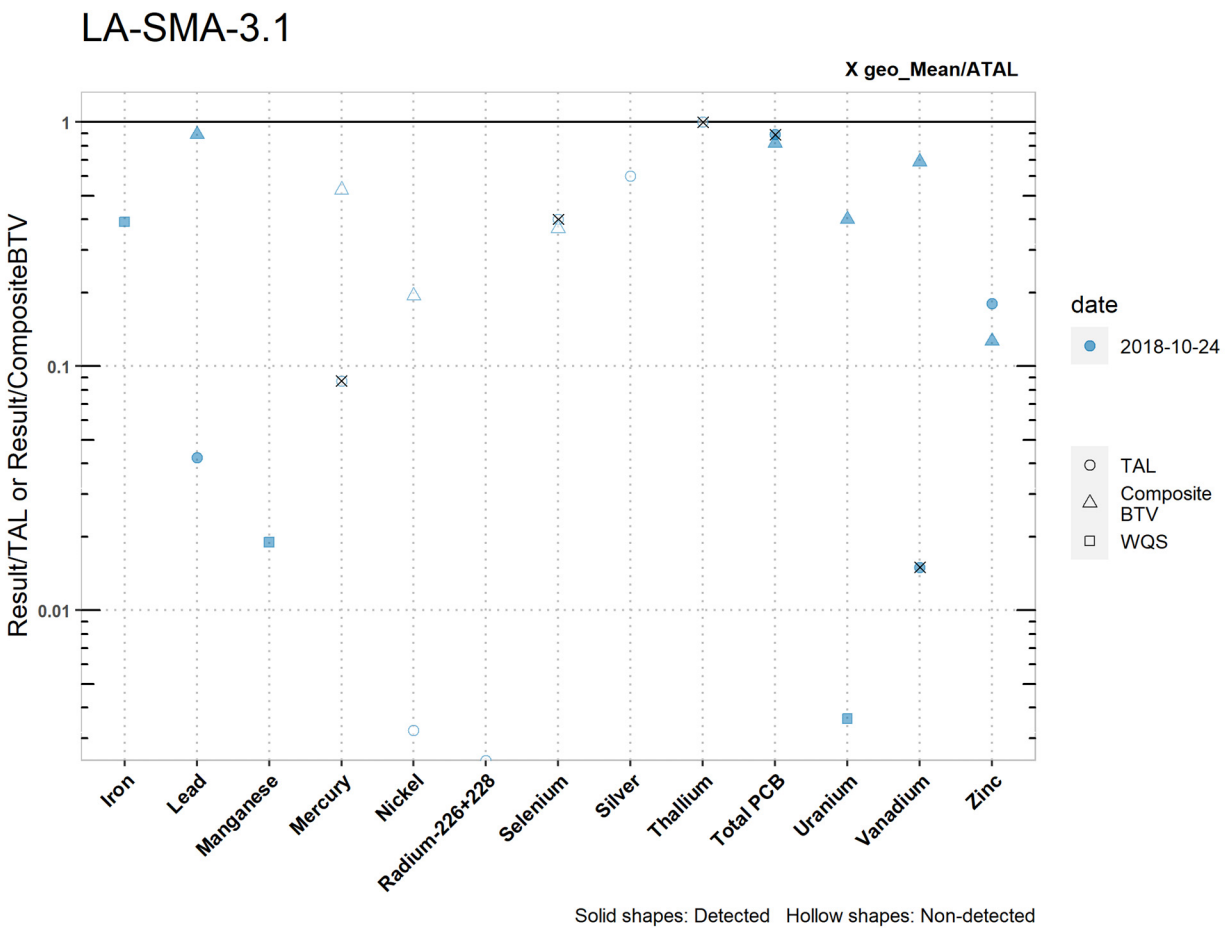

Figure 24.4-2 Analytical Results from Stormwater Sample, LA-SMA-3.1 (Plot 2)

LA-SMA-3.1

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	36000	NA	NA	NA	NA	NA	NA	NA	1.60	5.43	NA	54.2
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2018-10-24 result	555	*1.00*	*2.00*	9.08	*0.200*	*15.0*	*0.300*	*3.00*	*1.00*	2.43	*1.67*	*1.00*
2018-10-24 dT	0.725	NA	NA	0.0045	NA	NA	NA	NA	NA	0.506	NA	NA
2018-10-24 dB	0.154	NA	NA	NA	NA	NA	NA	NA	NA	0.448	NA	NA
geo_mean/ATAL	NA	0.0016	0.22	NA	NA	0.0030	NA	NA	0.0010	NA	0.321	0.067

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 24.4-3 Analytical Results from Stormwater Sample, LA-SMA-3.1 (Table 1)

LA-SMA-3.1

	Iron	Lead	Manganese	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.005	0.5	NA	5	0.5	0.5	0.2	NA	50	20
ATAL	NA	NA	NA	0.77	NA	30	5	NA	0.47	0.014	NA	100	NA
MTAL	NA	19.3	NA	NA	186	NA	20	0.49	NA	NA	NA	NA	59.2
Composite_BTV	NA	0.914	NA	0.127	3.10	6.63	5.47	NA	NA	0.0151	0.270	2.21	84.3
unit	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2018-10-24 result	387	0.814	2.32	*0.0670*	*0.600*	*NA*	*2.00*	*0.300*	*0.600*	0.0124	0.108	1.52	10.7
2018-10-24 dT	0.39	0.0422	0.019	NA	NA	NA	NA	NA	NA	0.89	0.0036	0.015	0.181
2018-10-24 dB	NA	0.891	NA	NA	NA	NA	NA	NA	NA	0.821	0.400	0.688	0.127
geo_mean/ATAL	NA	NA	NA	0.087	NA	NA	0.40	NA	1	0.89	NA	0.015	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g

Figure 24.4-4 Analytical Results from Stormwater Sample, LA-SMA-3.1 (Table 2)

24.4.2 Assessment Unit and Stream Impairments

LA-SMA-3.1 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha, metals, and PCB impairments may be Site-related, based on Site history.

24.5 Site-Specific Demonstration

24.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, dibenz(a,h)anthracene, and indeno(1,2,3-cd)pyrene.

PCBs, as Aroclor-1254 and Aroclor-1260, exceeded the applicable screening value in soil data but were measured in stormwater and did not exceed TAL. Cyanide, cadmium, chromium, lead, mercury, and zinc also exceeded the applicable screening value in soil data but were below TAL in stormwater data.

24.5.2 Stormwater Data Summary

There were no stormwater data exceedances.

24.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

24.5.4 Sampling and Analysis Plan

Table 24.5-1 is the proposed SAP for LA-SMA-3.1.

Table 24.5-1 Proposed SAP, LA-SMA-3.1

Monitoring Constituent	Background for Monitoring
Total PCBs (1)	Impairment, soil data, and Site history (organics)
Total mercury (1) and selenium (1)	Impairment and Site history
SVOCs	Soil data and Site history (organics)
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

25.0 LA-SMA-3.9

Associated Sites	01-001(g), 01-006(a)
Receiving Water	Los Alamos Canyon
Drainage Area	0.30 acres
Landscape Characteristics	30% impervious, 70% pervious
Consent Order Site Status	SWMU 01-001(g): In Progress SWMU 01-006(a): In Progress
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the February 2018 field visit, the SIP team agreed that 2017 consent order soil sampling data from Upper Los Alamos Canyon would be considered prior to deciding if a sampler move was warranted. After review of the 2018 Consent Order Upper Los Alamos Canyon IR, the SIP team determined that the current SMA sampler does not adequately monitor the affected area and the current location is not representative. Therefore the sampler was moved downgradient in the drainage.
2022 Permit Status	Active Monitoring

25.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater monitoring was initiated. While developing the 2019 SAP, a decision was made to implement the monitoring location move recommended during the 2018 SIP review. To date, stormwater flow has not been sufficient for full-volume sample collection at LA-SMA-3.9. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

25.2 Site History

01-001(g) (9/28/2021)

SWMU 01-001(g) consists of a former sanitary septic system that included septic tank 141 (former structure 01-141), inlet and outlet drainlines and an outfall at former TA-01. Former septic tank 141 was a cylindrical steel tank, measuring approximately 4 ft in diameter and 4 ft deep, that was installed in 1943. The septic tank was located south of former X Building (former building 01-79), near the edge of Los Alamos Canyon, and received sanitary waste from former X Building through a single sanitary waste line. Former X Building housed a cyclotron (accelerator) in which radioactive targets were tested. Waste water from the septic tank flowed through an outlet line and discharged to an outfall on the rim of Los Alamos Canyon.

X Building was decommissioned and removed in 1954 as part of the relocation of all TA-01 activities to new Laboratory TAs south of the Los Alamos townsite. Use of the SWMU 01-001(g) septic system ceased in 1965 and septic tank 141 was removed during the Ahlquist Radiological Survey in 1975. The tank, its contents, and surrounding soil had no evidence of radiological contamination and were disposed of at an unnamed MDA. Currently, the location of the former inlet drainline is under one of the Los Arboles condominium buildings, and the outfall location is on undeveloped land owned by the DOE.

01-006(a) (9/28/2021)

SWMU 01-006(a) consists of a former drainline and outfall that served cooling tower 80 (former structure 01-80) at former TA-01. The drainline and outfall were located on the east side of former

cooling tower 01-80 and south of X Building (former structure 01-79), near the north rim of Los Alamos Canyon. Cooling tower 01-80 was installed in 1944 and removed in 1954; the outlet drainline was left in place. Biocides containing chromium may have been added to the cooling tower, as was standard practice at the time.

Currently, the location of the former drainline is under one of the Los Arboles condominium buildings. Although no record can be found on the removal of the drainline, it was likely removed during the construction of the residential building.

For investigation activities for these Sites, refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

25.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 25.2-1.

Table 25.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-001(g)	Septic Tank 141	Metals, organic chemicals, radionuclides
01-006(a)	Drainlines and outfall	Metals

25.3 Consent Order Soil Data

Decision-level data for SWMU 01-001(g) consist of results from samples collected between 2008 and 2016. Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination in the accessible area of the Site have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 01-006(a) consist of results from samples collected in 2008 and 2012. Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected from LA-SMA-3.9 are presented in Figures 20.3-1 through 20.3-4.

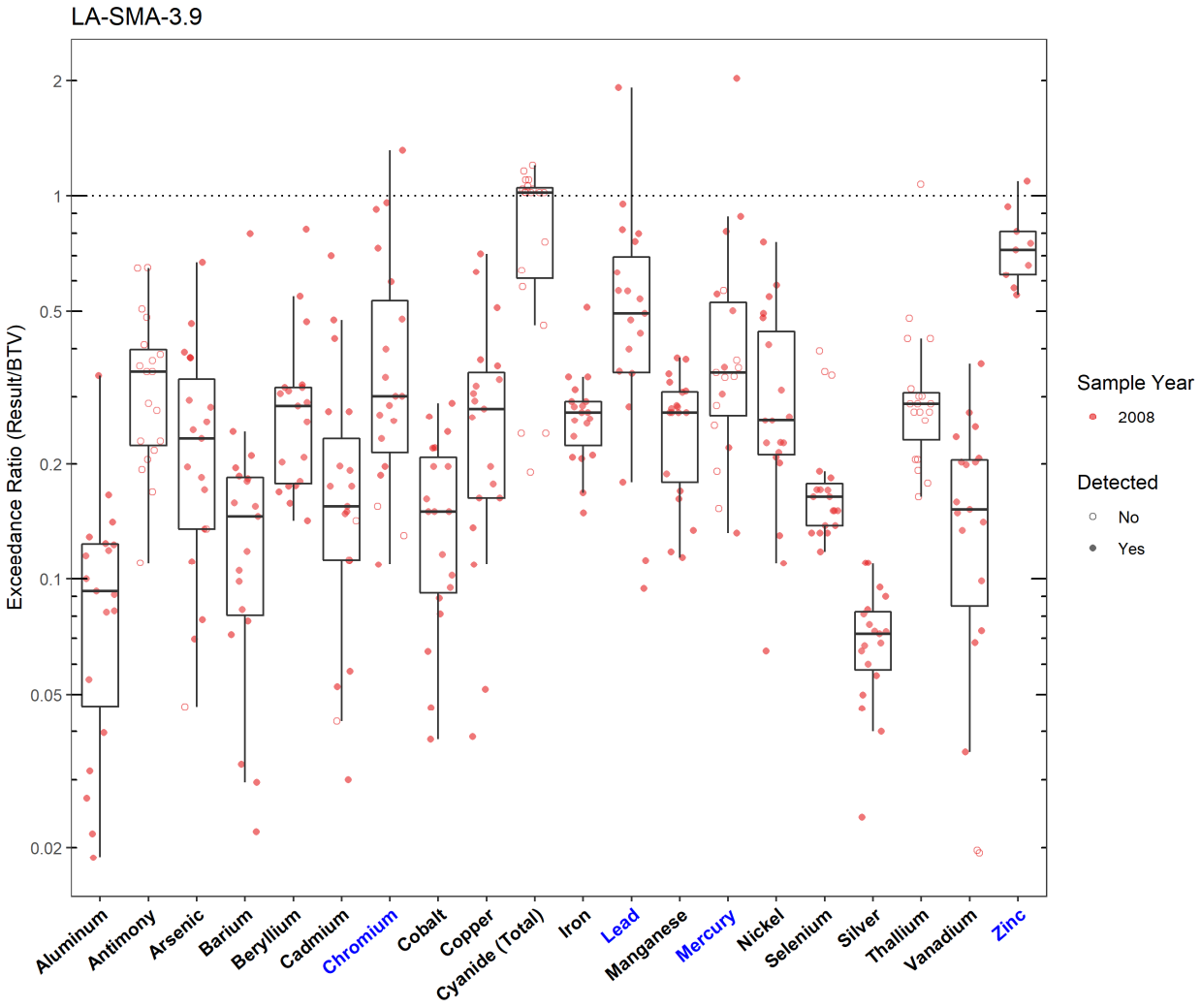

Figure 25.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-3.9

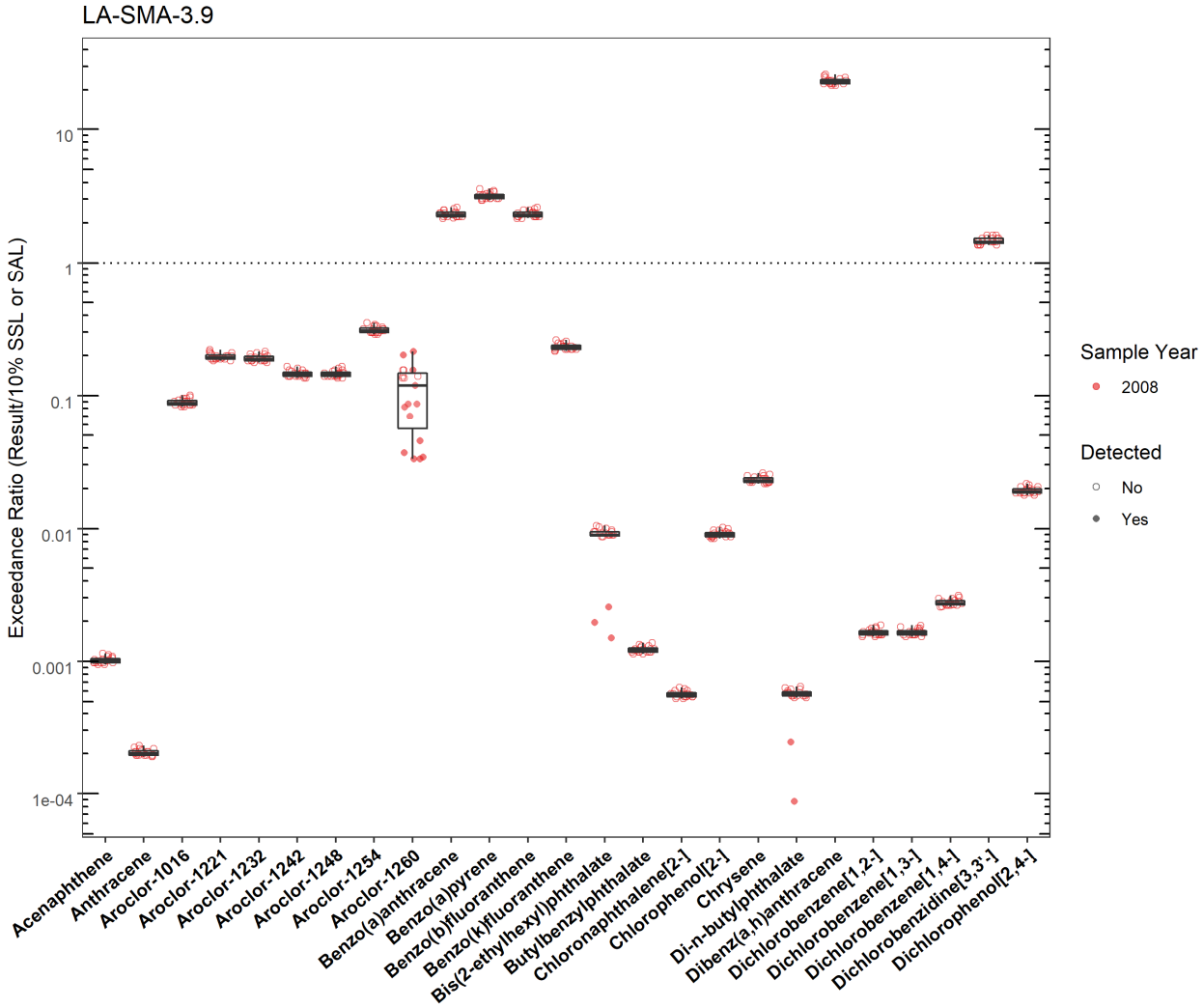

Figure 25.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-3.9 (Plot 1)

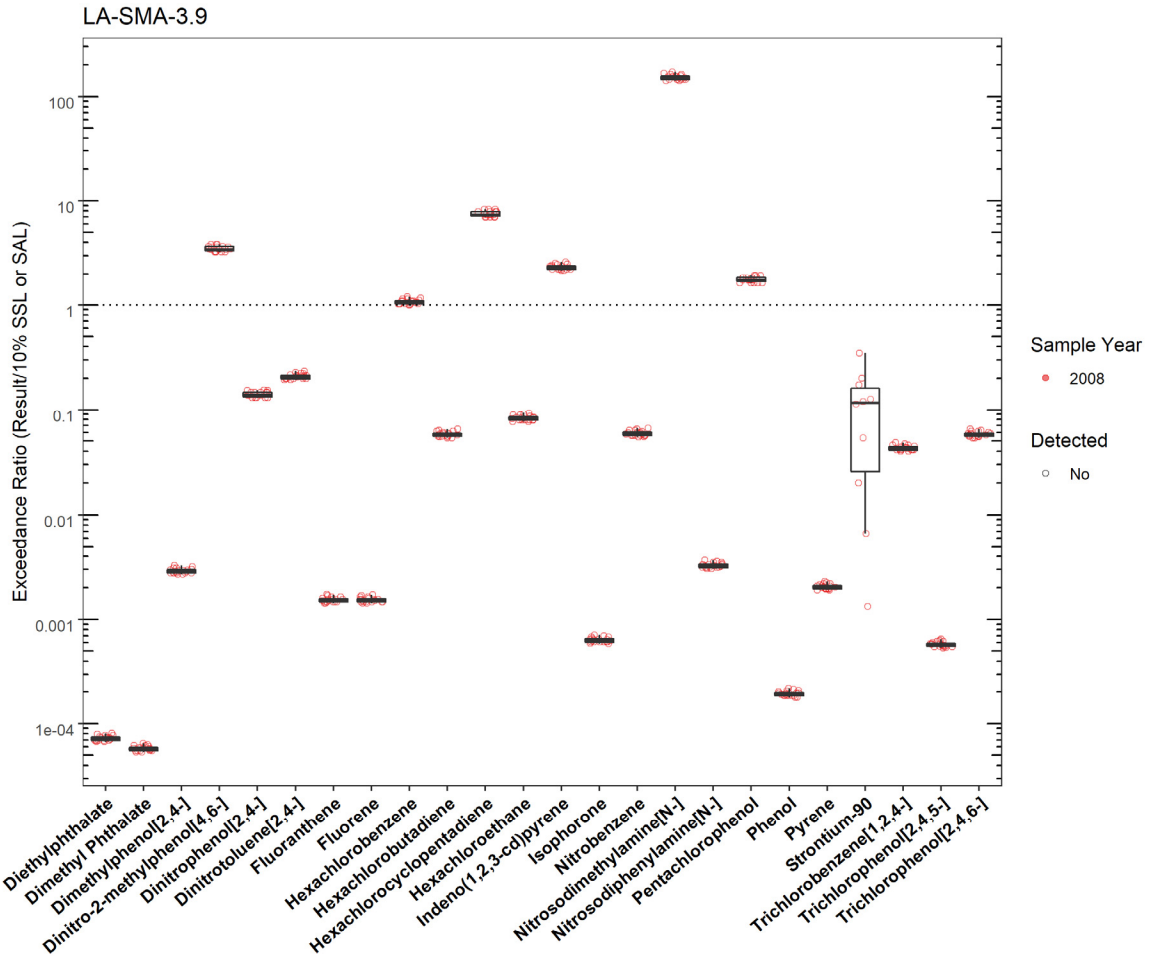

Figure 25.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-3.9 (Plot 2)

LA-SMA-3.9

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Chromium	LA-SMA-3.9	Cr	Y	BTV	19.3	25.3	2008-12-12
Lead	LA-SMA-3.9	Pb	Y	BTV	22.3	42.8	2008-12-10
Mercury	LA-SMA-3.9	Hg	Y	BTV	0.100	0.203	2008-12-17
Zinc	LA-SMA-3.9	Zn	Y	BTV	48.8	53.2	2008-12-11

Figure 25.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-3.9

25.4 Stormwater Evaluation

25.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring samples have been collected at the SMA.

25.4.2 Assessment Unit and Stream Impairments

LA-SMA-3.9 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha, metals, and PCB impairments may be Site-related, based on Site history.

25.5 Site-Specific Demonstration

25.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: chromium, lead, mercury, and zinc.

25.5.2 Stormwater Data Summary

No confirmation-monitoring data.

25.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

25.5.4 Sampling and Analysis Plan

Table 25.5-1 is the proposed SAP for LA-SMA-3.9.

Table 25.5-1 Proposed SAP, LA-SMA-3.9

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
Total mercury and selenium	Impairment, Site history (metals), and soil data
Total PCBs	Impairment and Site history (organics)
Dissolved chromium, lead, and zinc	Site history (metals) and soil data
SVOCS	Site history (organics)
Radium-226 and radium-228	Site history (radionuclides)
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

26.0 LA-SMA-4.1

Associated Sites	01-003(b1), 01-003(b2), 01-006(b)
Receiving Water	Los Alamos Canyon
Drainage Area	4.5 acres
Landscape Characteristics	15% impervious, 85% pervious
Consent Order Site Status	AOC 01-003(b1): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls AOC 01-003(b2): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 01-006(b): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the February 2018 field visit, all parties agreed that the current SMA sampling location and SMA boundary was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

26.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater samples were collected in August and September 2011. Analytical results from these samples initiated corrective action.

The Permittees submitted a request for alternative compliance for the Sites to EPA per permit Part I.E.3 in May 2015 (LANL 2015, 600417). No response has been received from EPA, and stormwater monitoring has not occurred since 2011.

26.2 Site History

01-003(b1) (5/22/2017)

AOC 01-003(b1) is the approximately 20 ft x 20 ft northeast portion of a suspected surface disposal site [former AOC 01-003(b)], reported to be located below the north rim of Los Alamos Canyon approximately 450 ft east of Bailey Bridge Canyon. AOC 01-003(b1) is the portion of the reported surface disposal area located within the southwest corner of the former Los Alamos Inn property. Evidence of the reported disposal area was not observed during several site visits conducted between the late 1980s and late 1990s. Several pieces of metal piping were found, a few objects were found scattered over more than an acre on the hillside, and the portable beta/gamma instruments used to screen each object registered only background radiation. Currently, the location of the area now designated as AOC 01-003(b1) is undeveloped.

AOC 01-003(b1) was originally part of AOC 01-003(b), which was split into AOCs 01-003(b1) and 01-003(b2) in a request for modification of the LANL Hazardous Waste Facility Permit approved by NMED on November 9, 2016. LANL proposed to split former AOC 01-003(b) into two newly designated AOCs because the components of the AOC are located on property owned by different entities.

For investigation activities, refer to “Investigation Report for the Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area, Revision 1” (LANL 2017, 602404.2).

01-003(b2) (9/28/2021)

AOC 01-003(b2) is the primary portion of a suspected surface disposal site [former AOC 01-003(b)], reported to be located below the north rim of Los Alamos Canyon, approximately 450 ft east of Bailey Bridge Canyon. AOC 01-003(b2) includes all of former AOC 01-003(b) located on DOE property, except the northeast area, now designated as AOC 01-003(b1), which is located within the southwest corner of the former Los Alamos Inn property. Evidence of the reported disposal area was not observed during several site visits conducted between the late 1980s and late 1990s. Several pieces of metal piping were found, a few objects were found scattered over more than an acre on the hillside, and the portable beta/gamma instruments used to screen each object registered only background radiation. Currently, the location of the area now designated as AOC 01-003(b2) is undeveloped.

AOC 01-003(b2) was originally part of former AOC 01-003(b), which was split into AOCs 01-003(b1) and 01-003(b2) in a request for modification of the LANL Hazardous Waste Facility Permit approved by the NMED on November 9, 2016. The Laboratory proposed to split former AOC 01-003(b) into two newly designated sites because the components of the AOC are located on property owned by different entities.

For investigation activities refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

01-006(b) (9/3/2019)

SWMU 01-006(b) consists of a former drainline and outfall (01-6) that served former Building D, which housed plutonium and uranium processing operations at former TA-01. The drainline exited the southwest side of Building D, and extended southwest and then south before discharging into Los Alamos Canyon. The types and quantities of effluent discharged to this drainline and outfall are not known. Building D was removed in 1954. During the Ahlquist radiological survey, contaminated soil was excavated in the areas of former Buildings D and D-2 in 1975–1976. Approximately 9,400 yd^3 of soil and tuff exhibiting elevated levels of radioactivity was removed from areas in and around former Buildings D and D-2, along with all drainlines including the SWMU 01-006(b) drainline. The excavated areas were backfilled with clean fill. Currently, this area is undeveloped. The former drainline and outfall of SWMU 01-006(b) are entirely within the boundary of SWMU 01-007(a).

For investigation activities, refer to "Investigation Report for the Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area, Revision 1" (LANL 2017, 602404.2).

26.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 26.2-1.

Table 26.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-003(b1) and 01-003(b2)	Surface disposal site	Metals, organic chemicals
01-006(b)	Drainlines and outfall	Radionuclides (plutonium), inorganic and organic chemicals

26.3 Consent Order Soil Data

Decision-level data for AOC 01-003(b1) consist of results from samples collected in 2016. The 2017 IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for AOC 01-003(b2) consist of results from samples collected in 2009, 2012, 2013, and 2016. Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 01-006(b) consist of results from samples collected in 2009, 2012, 2013, and 2016. The 2017 IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-4.1 are presented in Figures 26.3-1 through 26.3-4.

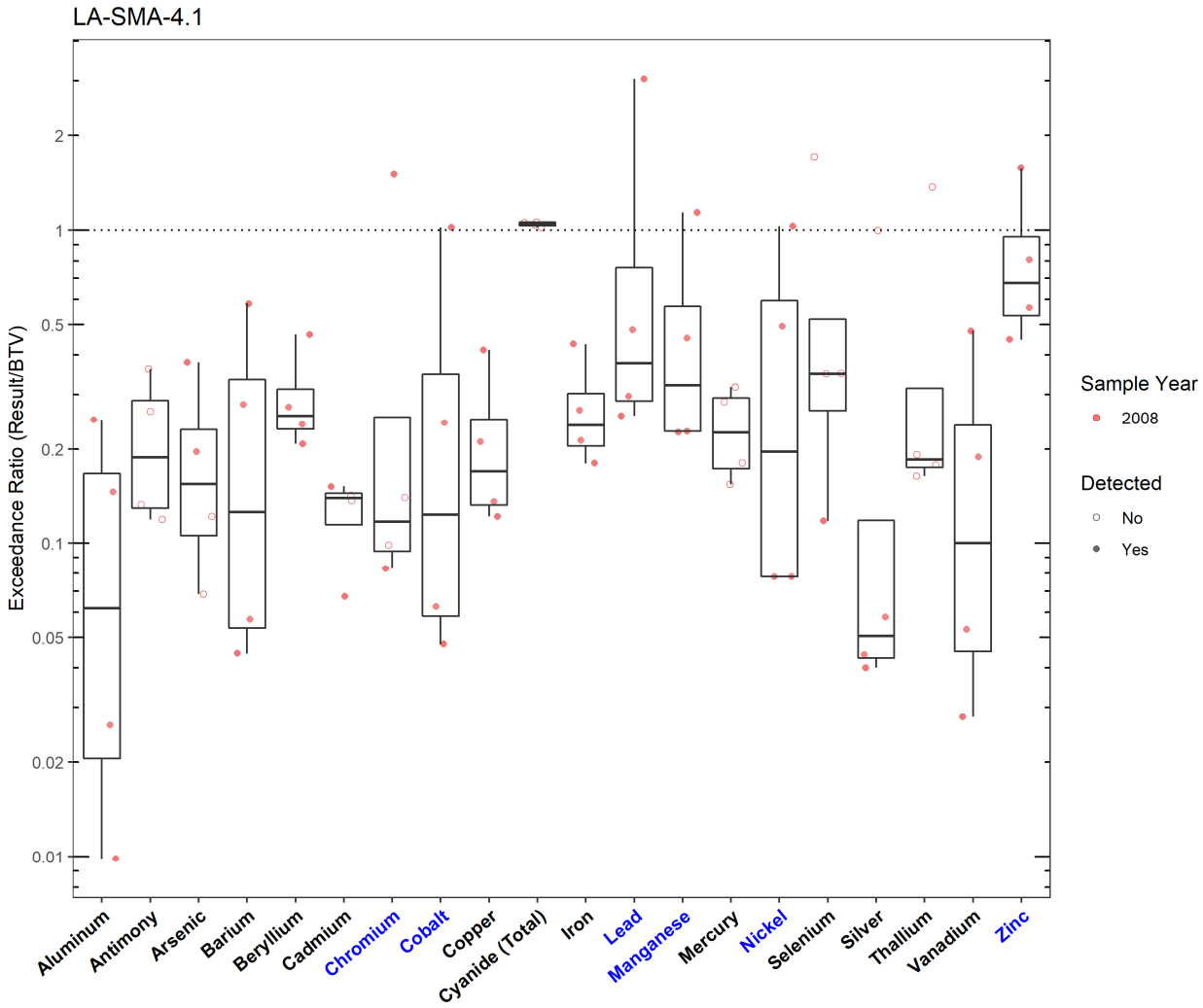

Figure 26.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-4.1

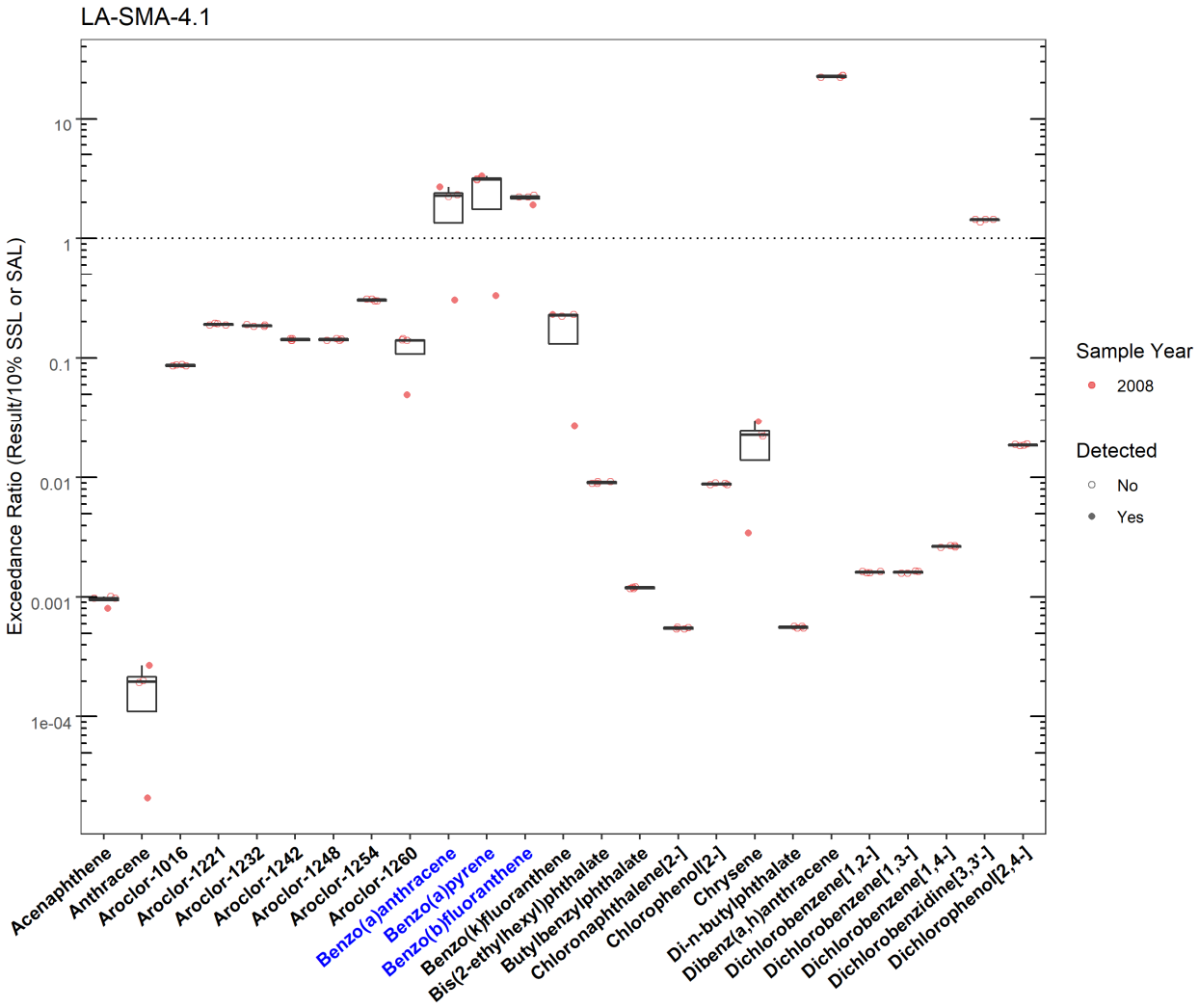

Figure 26.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-4.1 (Plot 1)

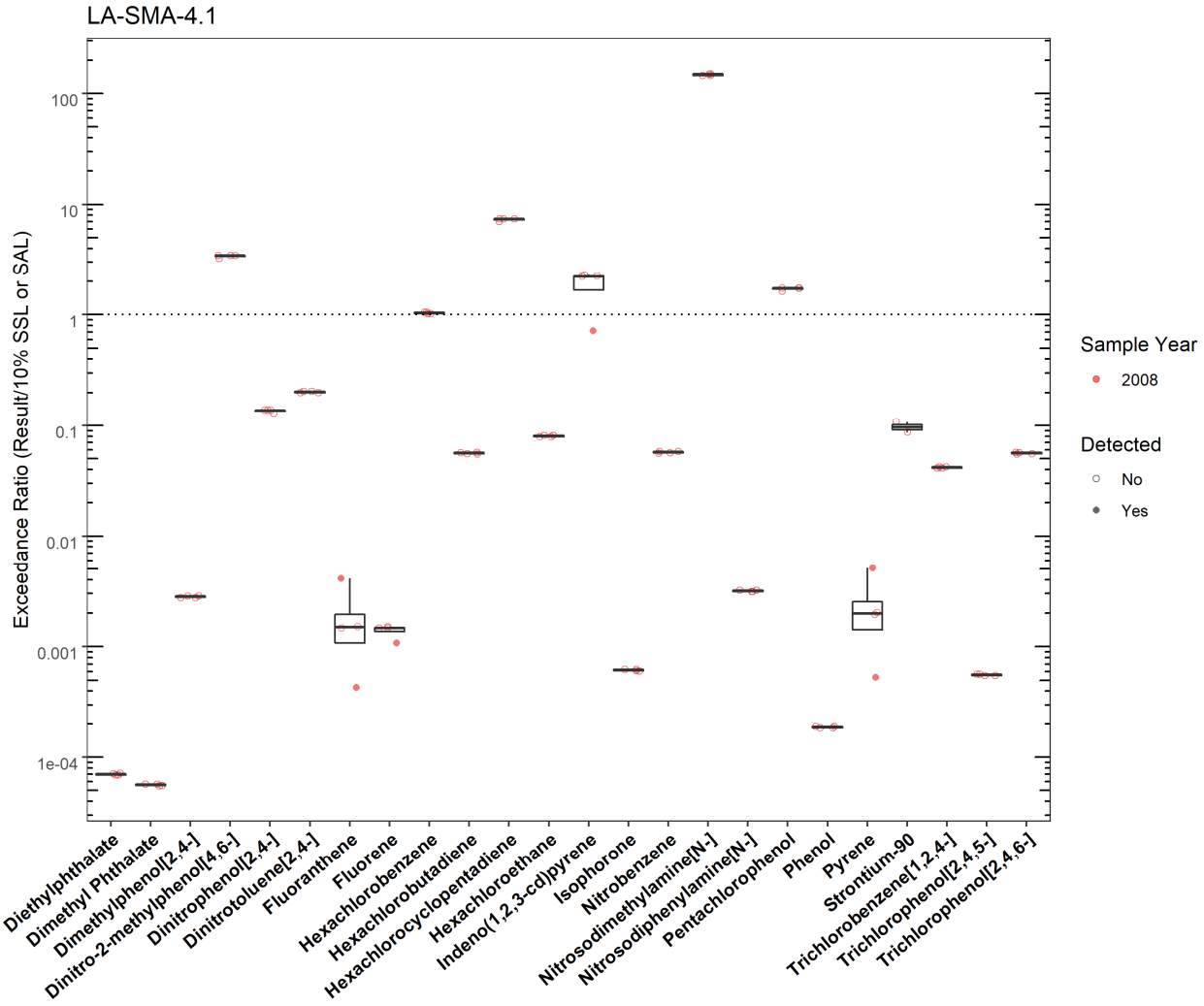

Figure 26.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-4.1 (Plot 2)

LA-SMA-4.1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-4.1	56-55-3	Y	SSL_0.1	0.153	0.410	2008-11-20
Benzo(a)pyrene	LA-SMA-4.1	50-32-8	Y	SSL_0.1	0.112	0.370	2008-11-20
Benzo(b)fluoranthene	LA-SMA-4.1	205-99-2	Y	SSL_0.1	0.153	0.290	2008-11-20
Chromium	LA-SMA-4.1	Cr	Y	BTV	19.3	29.2	2008-11-20
Cobalt	LA-SMA-4.1	Co	Y	BTV	8.64	8.80	2008-11-20
Lead	LA-SMA-4.1	Pb	Y	BTV	22.3	67.9	2008-11-20
Manganese	LA-SMA-4.1	Mn	Y	BTV	671	764	2008-11-20
Nickel	LA-SMA-4.1	Ni	Y	BTV	15.4	15.8	2008-11-20
Zinc	LA-SMA-4.1	Zn	Y	BTV	48.8	76.7	2008-11-20

Figure 26.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-4.1

26.4 Stormwater Evaluation

26.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in August and September 2011. Analytical results from those samples are presented in Figures 26.4-1 and 26.4-2.

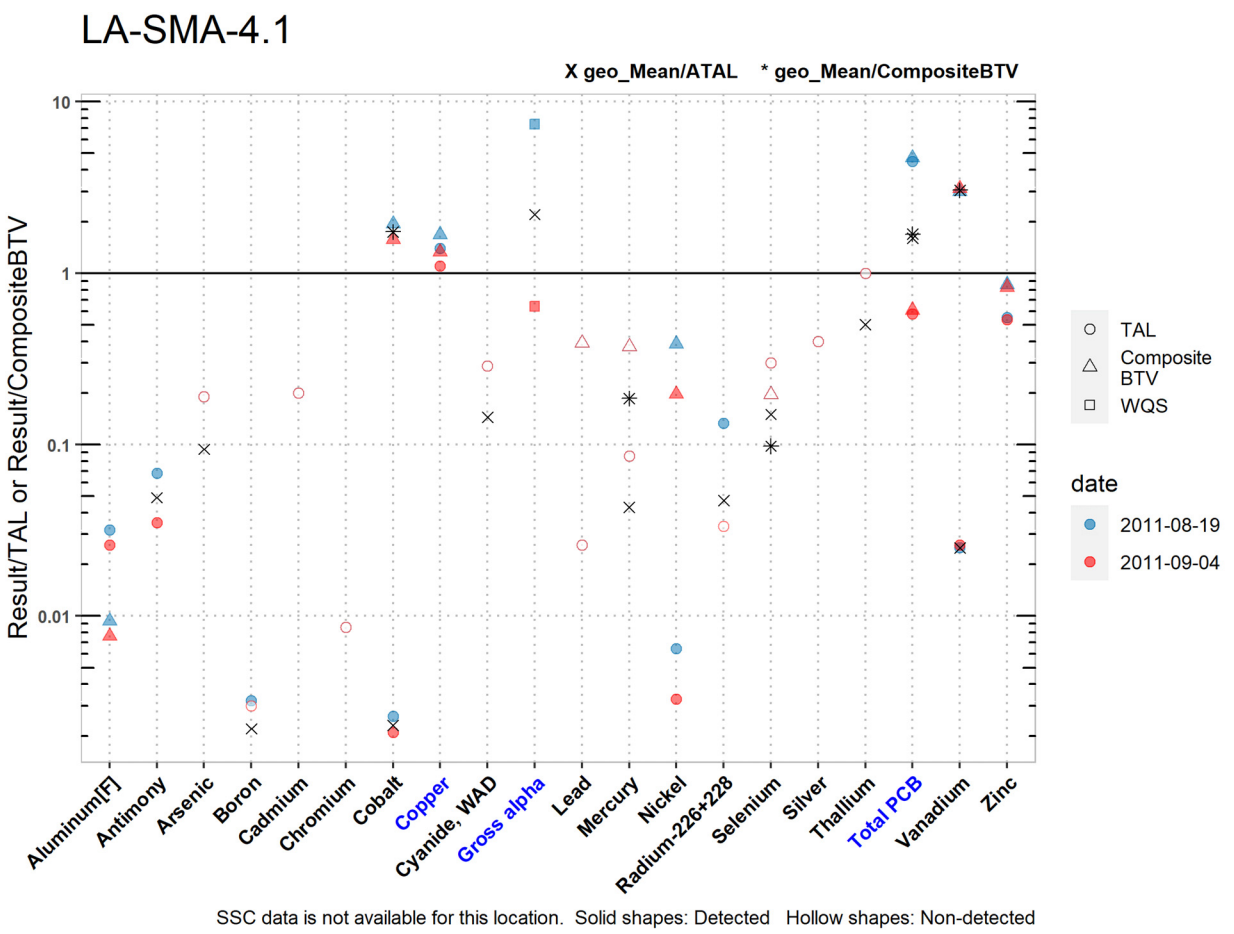

Figure 26.4-1 Analytical Results from Stormwater Samples, LA-SMA-4.1 (Plot)

LA-SMA-4.1

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	0.2	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	0.014	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	2540	NA	NA	NA	NA	NA	1.34	3.99	NA	56.1	1.28	0.177	3.10	5.13	7.65	NA	NA	0.0133	0.835	38.1
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2011-08-19 result	23.8	43.7	*1.70*	16.2	*0.110*	*2.00*	2.60	6.70	*1.50*	111	*0.500*	*0.0660*	1.20	4.00	*1.50*	*0.200*	*0.450*	0.0625	2.50	32.7
2011-08-19 dT	0.0317	0.068	NA	0.0032	NA	NA	0.0026	1.40	NA	7.4	NA	NA	0.00645	0.133	NA	NA	NA	4.5	0.025	0.552
2011-08-19 dB	0.00937	NA	NA	NA	NA	NA	1.94	1.68	NA	NA	NA	NA	0.387	NA	NA	NA	NA	4.70	2.99	0.858
2011-09-04 result	19.4	22.1	*1.70*	*15.0*	*0.110*	*2.00*	2.10	5.30	*1.50*	9.63	*0.500*	*0.0660*	0.610	*1.00*	*1.50*	*0.200*	*0.450*	0.00810	2.60	31.6
2011-09-04 dT	0.0259	0.035	NA	NA	NA	NA	0.0021	1.10	NA	0.64	NA	NA	0.00328	NA	NA	NA	NA	0.58	0.026	0.534
2011-09-04 dB	0.00764	NA	NA	NA	NA	NA	1.57	1.33	NA	NA	NA	NA	0.197	NA	NA	NA	NA	0.609	3.11	0.829
geo_mean/ATAL	NA	0.049	0.094	0.0022	NA	NA	0.0023	NA	0.144	2.2	NA	0.043	NA	0.0471	0.15	NA	0.5	1.6	0.025	NA
geo_mean/B	NA	NA	NA	NA	NA	NA	1.74	NA	NA	NA	NA	0.186	NA	NA	0.0980	NA	NA	1.69	3.05	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV, geo_mean/B=geo_mean/composite_BTV

Figure 26.4-2 Analytical Results from Stormwater Samples, LA-SMA-4.1 (Table)

26.4.2 Assessment Unit and Stream Impairments

LA-SMA-4.1 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The impairments may be Site-related, based on Site history.

26.5 Site-Specific Demonstration

26.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, and benzo(b)fluoranthene.

The metals, excluding copper, that exceeded the applicable screening value in soil data had previously been monitored in stormwater data and did not exceed the TAL. Copper exceed the TAL and the applicable screening value in soil data and will be added to the SAP.

26.5.2 Stormwater Data Summary

Copper and PCBs were above TALs and BTVs; that exceedance will be screened when the remaining data are collected. Gross alpha exceeded TAL and there was no paired SSC result to confirm whether it was below BTVs. Therefore, it will be added to the SAP.

26.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

26.5.4 Sampling and Analysis Plan

Table 26.5-1 is the proposed SAP for LA-SMA-4.1.

Table 26.5-1 Proposed SAP, LA-SMA-4.1

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, and stormwater data
SVOCs	Site history (organics), soil data
DOC	Permit requirement
SSC	Permit requirement

27.0 LA-SMA-4.2

Associated Sites	01-001(c), 01-006(c), 01-006(d)
Receiving Water	Los Alamos Canyon
Drainage Area	0.27 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 01-001(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls SWMU 01-006(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 01-006(d): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the February 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

27.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection at LA-SMA-4.2. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

27.2 Site History

01-001(c) (3/8/2022)

SWMU 01-001(c) is the location of a former septic system that consisted of a septic tank (former structure 01-137), associated inlet and outlet drainlines, and an outfall at former TA-01. The cylindrical metal septic tank measured 3 ft diameter by 6 ft long by 5 ft deep. It was installed in 1945 and removed in 1975.

The septic system served former D-2 Building, which originally operated as a laundry for radioactively-contaminated clothing and recyclable equipment. The building was converted to an electronics shop after laundry operations were relocated to TA-21 in 1945. Septic tank 01-137 was identified as a potential source of plutonium contamination in the runoff area below the septic tank outfall pipe. The outfall discharged over the canyon rim and onto the canyon hillside now designated as Hillside 137 within Upper Los Alamos Canyon. Septic tank 01-137 and the inlet and outlet drainlines were removed in 1975 and disposed of at MDA G at TA-54. High levels of radiological activity were detected in the sidewalls of the septic tank excavation. Soil was removed from the excavation until gross-alpha activity levels were below 25 pCi/g. Clean soil was used to backfill the excavation.

For investigation activities, refer to “Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory” (LANL 2010, 108536).

01-006(c) (9/3/2019)

SWMU 01-006(c) consists of two former drainlines and outfalls that served former Building D-2 at former TA-01. Former Building D-2 served as the facility for laundering radioactively contaminated clothing and recyclable equipment for the entire TA from 1943 to 1945. Two drainlines and outfalls were shown on an engineering drawing at the southeast end of former Building D-2 and would have discharged directly onto Hillside 137 in Los Alamos Canyon.

Building D-2 was removed in 1953. During the Ahlquist radiological survey, contaminated soil was excavated in the areas of former Buildings D and D-2 in 1975–1976. Approximately 9,400 yd^3 of soil and tuff exhibiting elevated levels of radioactivity was removed from areas in and around former Buildings D and D-2, along with all drainlines. The two drainlines and outfalls shown on the engineering drawing at the southeast end of former Building D-2 were not located when trenching was conducted in the Building D-2 area. However, two drainlines and outfalls at the southwest end of the building were encountered during trenching and were removed. These drainlines would have discharged directly onto Hillside 137 in Los Alamos Canyon. The excavated areas were backfilled with clean fill. Currently, the site is covered with fill material and is undeveloped. SWMU 01-006(c) lies entirely within SWMU 01-007(b).

For investigation activities, refer to "Investigation Report for the Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area, Revision 1" (LANL 2017, 602404.2).

01-006(d) (3/28/2022)

SWMU 01-006(d) is a former outlet drainline and outfall that served former D-3 Building and discharged to Los Alamos Canyon hillside at the former TA-01. The outfall is located on Hillside 137, in the same area as the outfall from an outlet drainline from former Building D-2 [SWMU 01-006(c)]. Activities conducted at Building D-3 included counting radioactive filter papers from Building H-1. During the D&D of Buildings D and D-2, all drainlines were removed along with soil exhibiting areas of elevated radioactivity. Because the main portion of the outlet drainline from Building D-3 was located in close proximity to Building D-2, this drainline was likely removed during the excavation of contaminated soils beneath and around Buildings D and D-2. Clean soil was used to backfill the excavations. Currently, the location of SWMU 01-006(d) is undeveloped and privately owned.

For investigation activities refer to "Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory" (LANL 2010, 108536).

27.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 27.2-1.

Table 27.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-001(c)	Septic Tank 137	Metals, organics, radionuclides (plutonium, tritium)
01-006(c)	Drainlines and outfall	Metals, organics, radionuclides
01-006(d)	Drainlines and outfall	Radionuclides

27.3 Consent Order Soil Data

Decision-level data for SWMU 01-001(c) consist of results from samples collected in 2008. Revision 1 of the 2010 IR concluded that the nature and extent of contamination are defined.

Decision-level data for SWMU 01-006(c) consist of results from samples collected in 2008 and 2012. The 2017 IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 01-006(d) consist of results from samples collected in 2008. Revision 1 of the 2010 IR concluded that the nature and extent of contamination have been defined.

Analytical results from all decision-level soil samples collected for LA-SMA-4.2 are presented in Figures 27.3-1 through 27.3-4.

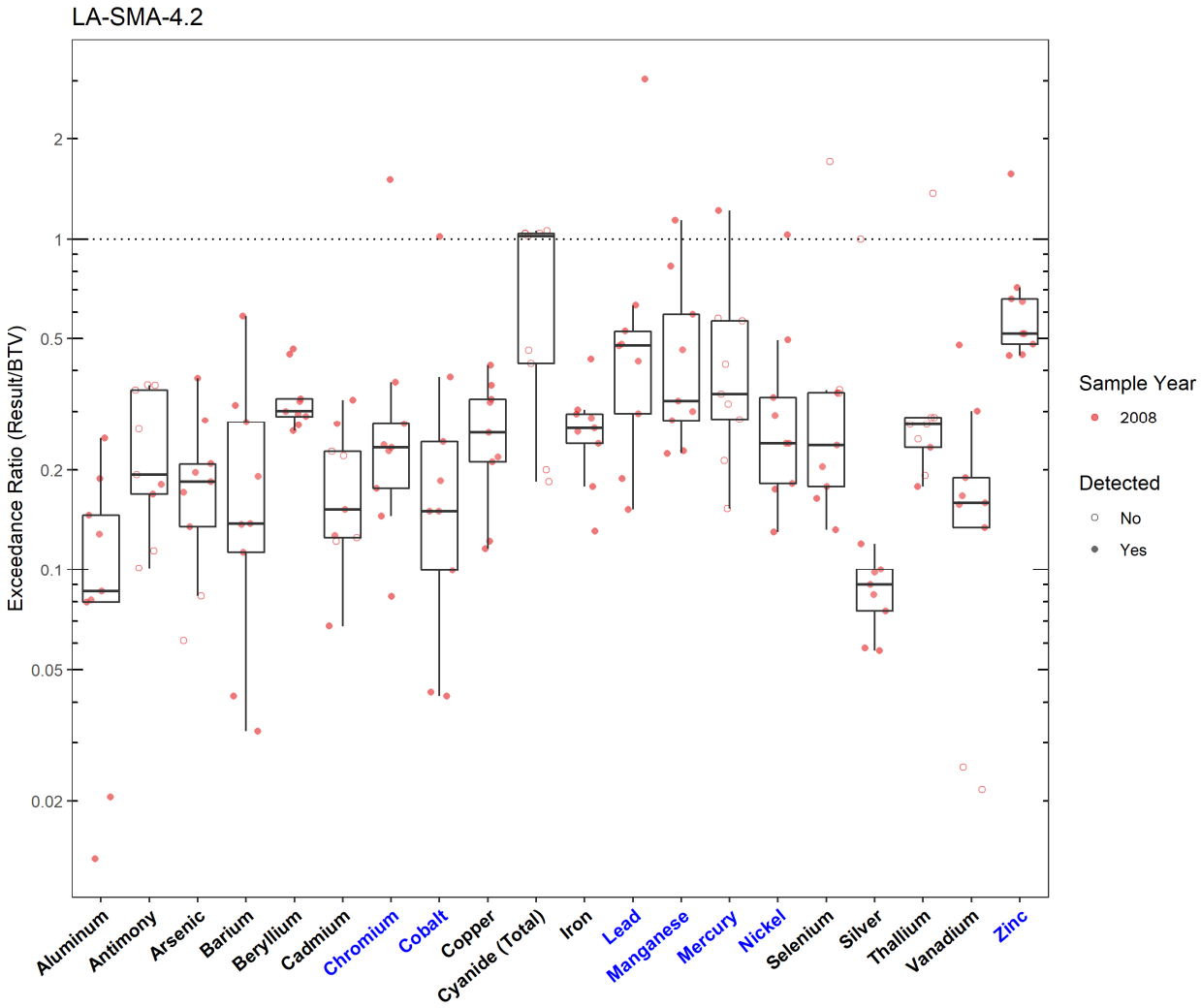

Figure 27.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-4.2

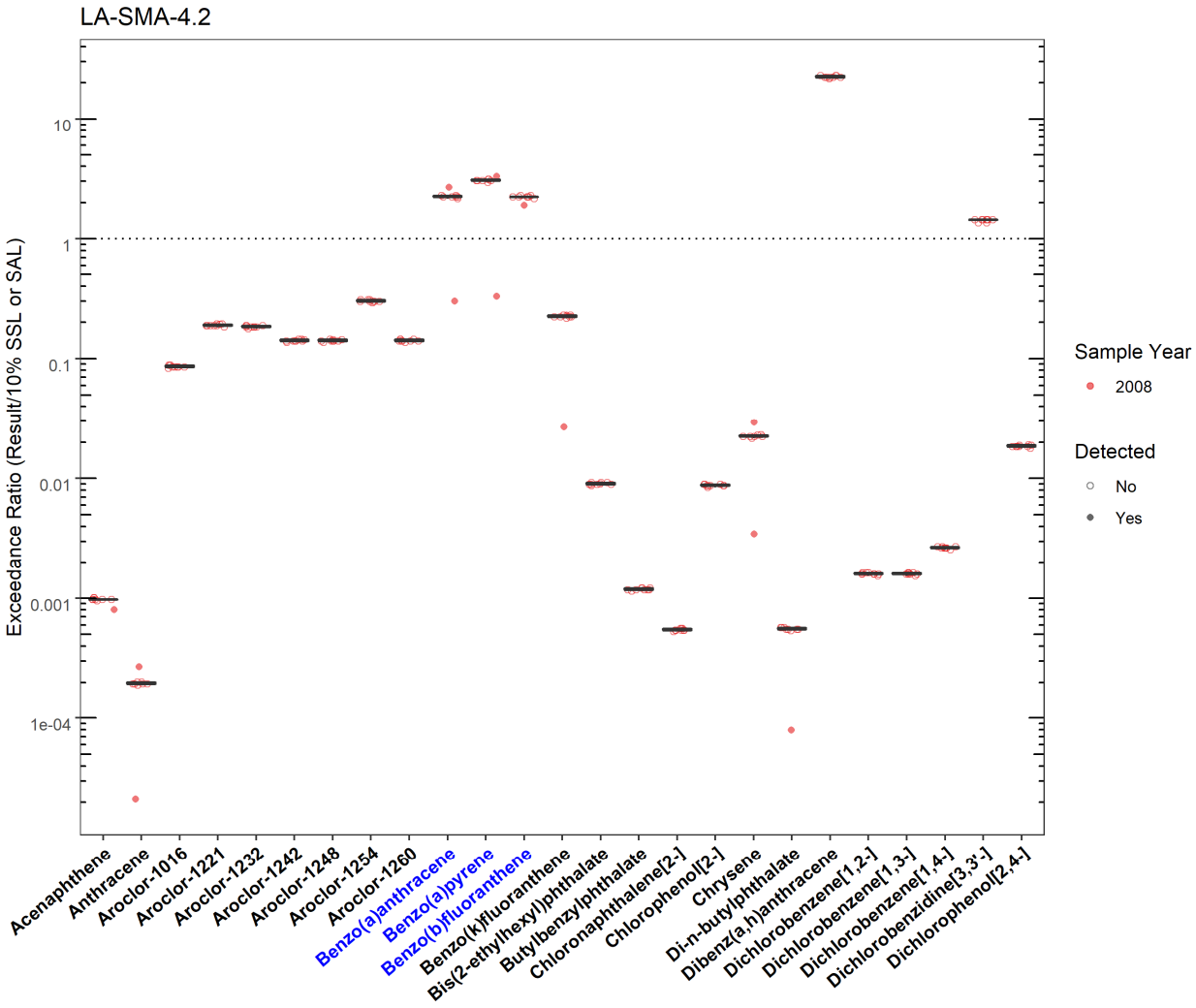

Figure 27.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-4.2 (Plot 1)

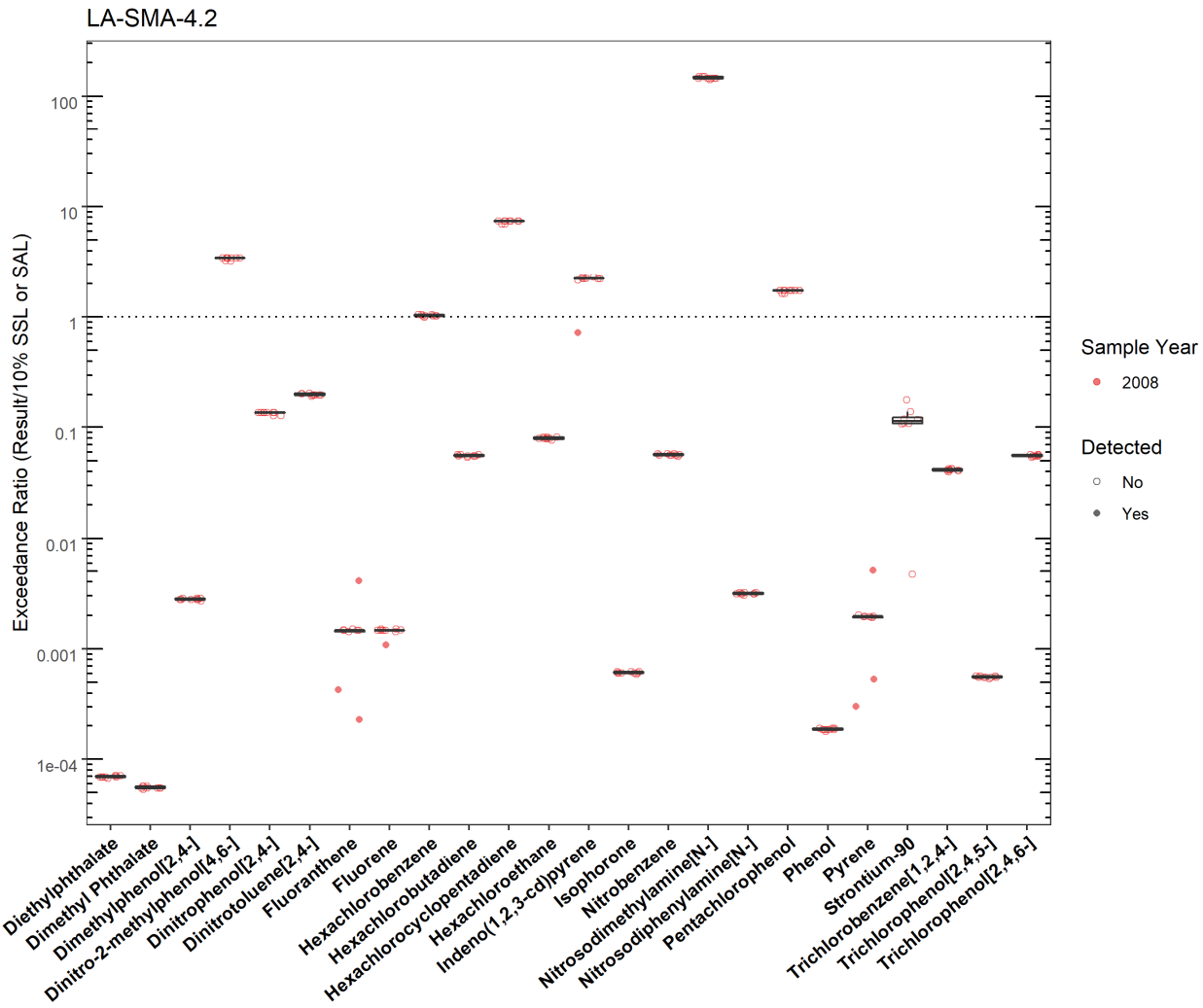

Figure 27.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-4.2 (Plot 2)

LA-SMA-4.2

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-4.2	56-55-3	Y	SSL_0.1	0.153	0.410	2008-11-20
Benzo(a)pyrene	LA-SMA-4.2	50-32-8	Y	SSL_0.1	0.112	0.370	2008-11-20
Benzo(b)fluoranthene	LA-SMA-4.2	205-99-2	Y	SSL_0.1	0.153	0.290	2008-11-20
Chromium	LA-SMA-4.2	Cr	Y	BTV	19.3	29.2	2008-11-20
Cobalt	LA-SMA-4.2	Co	Y	BTV	8.64	8.80	2008-11-20
Lead	LA-SMA-4.2	Pb	Y	BTV	22.3	67.9	2008-11-20
Manganese	LA-SMA-4.2	Mn	Y	BTV	671	764	2008-11-20
Mercury	LA-SMA-4.2	Hg	Y	BTV	0.100	0.122	2008-11-20
Nickel	LA-SMA-4.2	Ni	Y	BTV	15.4	15.8	2008-11-20
Zinc	LA-SMA-4.2	Zn	Y	BTV	48.8	76.7	2008-11-20

Figure 27.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-4.2

27.4 Stormwater Evaluation

27.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring samples have been collected at the SMA.

27.4.2 Assessment Unit and Stream Impairments

LA-SMA-4.2 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha, metals, and PCB impairments may be Site-related, based on Site history.

27.5 Site-Specific Demonstration

27.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, cobalt, chromium, lead, manganese, mercury, nickel, and zinc.

27.5.2 Stormwater Data Summary

No confirmation-monitoring data.

27.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

27.5.4 Sampling and Analysis Plan

Table 27.5-1 is the proposed SAP for LA-SMA-4.2.

Table 27.5-1 Proposed SAP, LA-SMA-4.2

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Total mercury and selenium	Impairment, Site history (metals), and soil data
Total PCBs	Impairment and Site history
Dissolved cobalt, chromium, manganese, nickel, lead, and zinc	Site history (metals) and soil data
Radium-226 and radium-228	Site history (radionuclides)
SVOCs	Site history (organics) and soil data
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

28.0 LA-SMA-5.01

Associated Sites	01-001(d1), 01-001(d2), 01-001(d3), 01-006(h1), 01-006(h2), 01-006(h3)
Receiving Water	Los Alamos Canyon
Drainage Area	0.65 acres
Landscape Characteristics	11% impervious, 89% pervious
Consent Order Site Status	SWMU 01-001(d1): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 01-001(d2): In Progress SWMU 01-001(d3): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls SWMU 01-006(h1): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 01-006(h2): In Progress SWMU 01-006(h3): In Progress
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the February 2018 field visit, the SIP team agreed that 2017 consent order soil sampling data from Upper Los Alamos Canyon would be considered prior to deciding if a sampler move was warranted. After review of the 2018 Consent Order Upper Los Alamos Canyon IR, the SIP team determined that the current SMA sampler does not adequately monitor the affected area. Therefore, the sampler was moved slightly downgradient in the drainage.
2022 Permit Status	Active Monitoring

28.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection at LA-SMA-5.01. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

28.2 Site History

01-001(d1) (9/3/2019)

SWMU 01-001(d1) is the inactive sanitary waste line that connected former Buildings K, V, and Y to former septic tank 138 [SWMU 01-001(d2)] at former TA-01. Former septic tank 138 was installed in 1943 and located southeast of former Building Y. Building K was a chemical stock room that contained a still for repurifying mercury. Records indicate that mercury spills from the still occurred periodically. Building V housed the original Laboratory uranium and beryllium machine shop. Dry-grinding of boron was also conducted in Building V. Building Y housed a cryogenic and physics laboratory that handled tritium, uranium-238, and polonium-210.

In addition, a cooling tower (former structure 01-82) was associated with Building Y and was removed in June 1956. Because no drainline or outfall was directly associated with the former cooling tower, blowdown could have been discharged to septic tank 138 through an existing drainline [e.g., SWMU 01-001(d1)] associated with Building Y.

The SWMU 01-001(d1) sanitary waste line is currently located on private property and commercially-developed land with an asphalt parking lot. A portion of the waste line was located under commercial buildings, but is now accessible following removal of the buildings.

The SWMU 01-001(d2) septic tank and surrounding soil were removed during the Ahlquist radiological survey conducted at former TA-01 between 1974 and 1976. No radiological contamination was found in the septic tank, broken pipe shards from the inlet line, or in the outlet line; therefore, the section of the SWMU 01-001(d1) inlet line located beneath an office building was left in place. The septic tank outfall [new SWMU 01-001(d3)] was located east of former Building Y and discharged over the rim of Los Alamos Canyon. This outfall area is known as Hillside 138.

SWMU 01-001(d1) was originally part of former SWMU 01-001(d), which was split into SWMUs 01-001(d1), 01-001(d2), and 01-001(d3) in a request for modification of the LANL HWFP approved by the NMED on November 9, 2016. LANL proposed to split SWMU 01-001(d) into three newly designated SWMUs because the components of the SWMU are located on property owned by different entities.

For investigation activities refer to "Investigation Report for the Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area, Revision 1" (LANL 2017, 602404.2).

01-001(d2) (9/28/2021)

SWMU 01-001(d2) consists of soil contamination associated with former septic tank 138 that was connected to former Buildings K, V, and Y by a sanitary waste line [SWMU 01-001(d1)] and the portion of the former outlet drainline located on private property directly north of DOE Property at TA-01. The septic tank was a cylindrical metal tank measuring 4 ft diameter × 4 ft high, installed in 1943, and located southeast of former Building Y. Building K was a chemical stock room that contained a still for re-purifying mercury. Records indicate that mercury spills from the still occurred periodically. Building V housed the original uranium and beryllium machine shop. Dry-grinding of boron was also conducted in Building V. Building Y housed a cryogenics and physics laboratory that handled tritium, uranium-238, and polonium-210.

In addition, a cooling tower (former structure 01-82) was associated with Building Y and was removed in June 1956. Because no drainline or outfall was directly associated with the former cooling tower, blowdown could have been discharged to septic tank 138 through an existing drainline [e.g., new SWMU 01-001(d1)] associated with Building Y.

The former septic tank outfall was located east of former Building Y and discharged over the rim of Los Alamos Canyon. This outfall area and former location of the outlet drainline located on DOE property is known as Hillside 138 [new SWMU 01-001(d3)].

The SWMU 01-001(d2) septic tank and surrounding soil (approximately 1 ft around the entire tank) were removed in 1975 during the Ahlquist radiological survey conducted at TA-01. No radiological contamination was found in the septic tank, in the broken pipe shards from the inlet line, or in the outlet line; therefore, the section of the inlet line located beneath an office building was left in place. That portion of the waste line that was located under commercial buildings is now accessible following removal of the buildings.

SWMU 01-001(d2)] was originally part of former SWMU 01-001(d), which was split into SWMUs 01-001(d1), 01-001(d2), and 01-001(d3) in a request for modification of the LANL HWFP approved by the NMED on November 9, 2016. The Laboratory proposed to split SWMU 01-001(d) into three newly-designated SWMUs because the components of the SWMU are located on property owned by different entities. SWMU 01-001(d2) is beneath a structure on private property and is therefore currently inaccessible.

No investigation activities have been conducted at SWMU 01-001(d2).

01-001(d3) (9/28/2021)

SWMU 01-001(d3) consists of a portion of the former outlet line from former septic tank 138 [new SWMU 01-001(d2)] and the outfall through which wastewater from the tank discharged onto the canyon rim and north slope of Los Alamos Canyon. This outfall area, known as Hillside 138, is located on DOE-owned property in TA-41. The septic tank was a cylindrical metal tank measuring 4 ft diameter × 4 ft high, installed in 1943, located southeast of former Building Y, and was connected to former Buildings K, V, and Y by a sanitary waste line [SWMU 01-001(d1)]. Building K was a chemical stock room that housed a mercury still. Building V housed the original uranium and beryllium machine shop. Dry-grinding of boron was also conducted in Building V. Building Y housed a physics laboratory that handled tritium, uranium-238, and polonium-210.

In addition, a cooling tower (former structure 01-82) was associated with Building Y and was removed in June 1956. Because no drainline or outfall was directly associated with the former cooling tower, blowdown could have been discharged to septic tank 138 through an existing drainline [e.g., SWMU 01-001(d1)] associated with Building Y. The corrective action for SWMU 01-001(d1) was completed in the investigation of the former Los Alamos Inn property.

The SWMU 01-001(d2) septic tank and surrounding soil were removed in 1975 during the Ahlquist radiological survey conducted at TA-01. No radiological contamination was found in the septic tank, broken pipe shards from the inlet line, or in the outlet line; therefore, the section of the SWMU 01-001(d1) inlet line located beneath an office building was left in place. That portion of the waste line located under commercial buildings is now accessible following removal of the buildings. The septic tank outfall [new SWMU 01-001(d3)] was located east of former Building Y and discharged over the rim of Los Alamos Canyon. This outfall area is known as Hillside 138. Samples collected from Hillside 138 indicated elevated levels of plutonium-239 and cesium-137; however, the hillside was not decontaminated during the survey because it was inaccessible. The area was fenced to prevent public access from the mesa top.

SWMU 01-001(d3) was originally part of former SWMU 01-001(d), which was split into SWMUs 01-001(d1), 01-001(d2), and 01-001(d3) in a request for modification of the Los Alamos National Laboratory (LANL) Hazardous Waste Facility Permit approved by the New Mexico Environment Department (NMED) on November 9, 2016. The Laboratory proposed to split SWMU 01-001(d) into three newly designated SWMUs because the components of the SWMU are located on property owned by different entities.

For investigation activities refer to “Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1” (N3B 2021, 701261).

01-006(h1) (5/18/2020)

SWMU 01-006(h1) is the middle section of the former stormwater drainage system and outfall that served the northwest side of former Building R and the east side of former Building Y at former TA-01. SWMU 01-006(h1) is the portion of the stormwater drainage system within the former LA Inn property boundary. Former Building R (former building 01-50) housed model, glass, carpentry, and plumbing shops. Former Building Y (former building 01-81) housed a physics laboratory that handled tritium, uranium-238, and polonium-210. The outfall for this stormwater drainage system was located 25 ft south of former Building Y on the north rim of Los Alamos Canyon. During the 1972–1974 Ahlquist radiological survey, no radioactivity was detected in and adjacent to components of the stormwater

drainage areas near former Buildings R and Y; the drainlines were removed. Currently, the location of SWMU 01-006(h1) is on privately owned and commercially developed land.

SWMU 01-006(h1) was originally part of former SWMU 01-006(h), which was split into SWMUs 01-006(h1), 01-006(h2), and 01-006(h3) in a request for modification of the LANL HWFP approved by the NMED on November 9, 2016. LANL proposed to split SWMU 01-006(h) into three newly designated SWMUs because the components of former SWMU 01-006(h) are located on property owned by different entities.

For investigation activities refer to "Investigation Report for the Former Los Alamos Inn Property Sites within the Upper Los Alamos Canyon Aggregate Area, Revision 1" (LANL 2017, 602404.2).

01-006(h2) (9/28/2021)

SWMU 01-006(h2) is the southernmost section of the former stormwater drainage system, including the outfall at former TA-01, which discharged to Los Alamos Canyon. Former SWMU 01-006(h) is the former stormwater drainage system that served the northwest side of former Building R (01-50) and the east side of former Building Y (01-81). Former Building R housed model, glass, carpentry, and plumbing shops, and former Building Y housed a physics laboratory that handled tritium, uranium-238, and polonium-210. The drainage system discharged to an outfall [SWMU 01-006(h2)] located 25 ft south of former Building Y on the north rim of Los Alamos Canyon, immediately west of Hillside 138 [new SWMUs 01-001(d2) and 01-001(d3)]. During the 1972–1974 Ahlquist radiological survey, no radioactivity was detected in or adjacent to components of the stormwater drainage areas near former Buildings R and Y; the drainlines were removed.

Currently, the location of the southernmost section of the former stormwater drainage system, including the outfall [SWMU 01-006(h2)], is on privately-owned and commercially-developed land. SWMU 01-006(h2) is currently located beneath a building.

SWMU 01-006(h2) was originally part of former SWMU 01-006(h), which was split into SWMUs 01-006(h1), 01-006(h2), and 01-006(h3) in a request for modification of the LANL HWFP approved by the NMED on November 9, 2016. The Laboratory proposed to split SWMU 01-006(h) into three newly-designated SWMUs because the components of the SWMU are located on property owned by different entities.

For investigation activities, refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

01-006(h3) (9/28/2021)

SWMU 01-006(h3) is the northernmost section of the former stormwater drainage system at former TA-01. Former SWMU 01-006(h) is the stormwater drainage system that served the northwest side of former Building R (01-50) and the east side of former Building Y (01-81). Former Building R housed model, glass, carpentry, and plumbing shops, and former Building Y housed a physics laboratory that handled tritium, uranium-238, and polonium-210. The drainage system discharged to an outfall located 25 ft south of former Building Y on the north rim of Los Alamos Canyon [new SWMU 01- 006(h2)], immediately west of Hillside 138 [new SWMUs 01-001(d2) and 01-001(d3)]. During the 1972–1974 Ahlquist radiological survey, no radioactivity was detected in or adjacent to components of the stormwater drainage areas near former Buildings R and Y.

Currently, the location of the northernmost section of the former stormwater drainage system is on privately-owned and commercially-developed land. SWMU 01-006(h3) is currently located beneath a building.

SWMU 01-006(h3) was originally part of former SWMU 01-006(h), which was split into SWMUs 01-006(h1), 01-006(h2), and 01-006(h3) in a request for modification of the LANL HWFP approved by the NMED on November 9, 2016. The Laboratory proposed to split SWMU 01-006(h) into three newly designated SWMUs because the components of the SWMU are located on property owned by different entities.

For investigation activities refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

28.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 28.2-1.

Table 28.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-001(d1), 01-001(d2), 01-001(d3)	Septic Tank 138	Metals, organics, mercury, plutonium, uranium, beryllium, boron, tritium, polonium
01-006(h1), 01-006(h2), 01-006(h3)	Drainlines and outfall	No known POCs

28.3 Consent Order Soil Data

Decision-level data for SWMU 01-001(d1) consist of results from samples collected in 2008 and 2016. The 2017 IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data are not available for SWMU 01-001(d2).

Decision-level data for SWMU 01-001(d3) consist of results from samples collected in 2008–2009, 2011–2012, 2013, and 2017. Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 01-006(h1) consist of results from samples collected in 2016. The 2017 IR, Revision 1, concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data are not available for the drainage system portion of SWMU 01-006(h2).

Decision-level data for the outfall portion of SWMU 01-006(h2) consist of results from samples collected in 2008–2009, 2011–2012, 2013, and 2017 in conjunction with the investigation of SWMU 01-001(d3). Revision 1 of the 2021 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted for the outfall portion of the Site.

Decision-level data are not available for SWMU 01-006(h3).

Analytical results from all decision-level soil samples collected for LA-SMA-5.01 are presented in Figures 20.3-1 through 20.3-4.

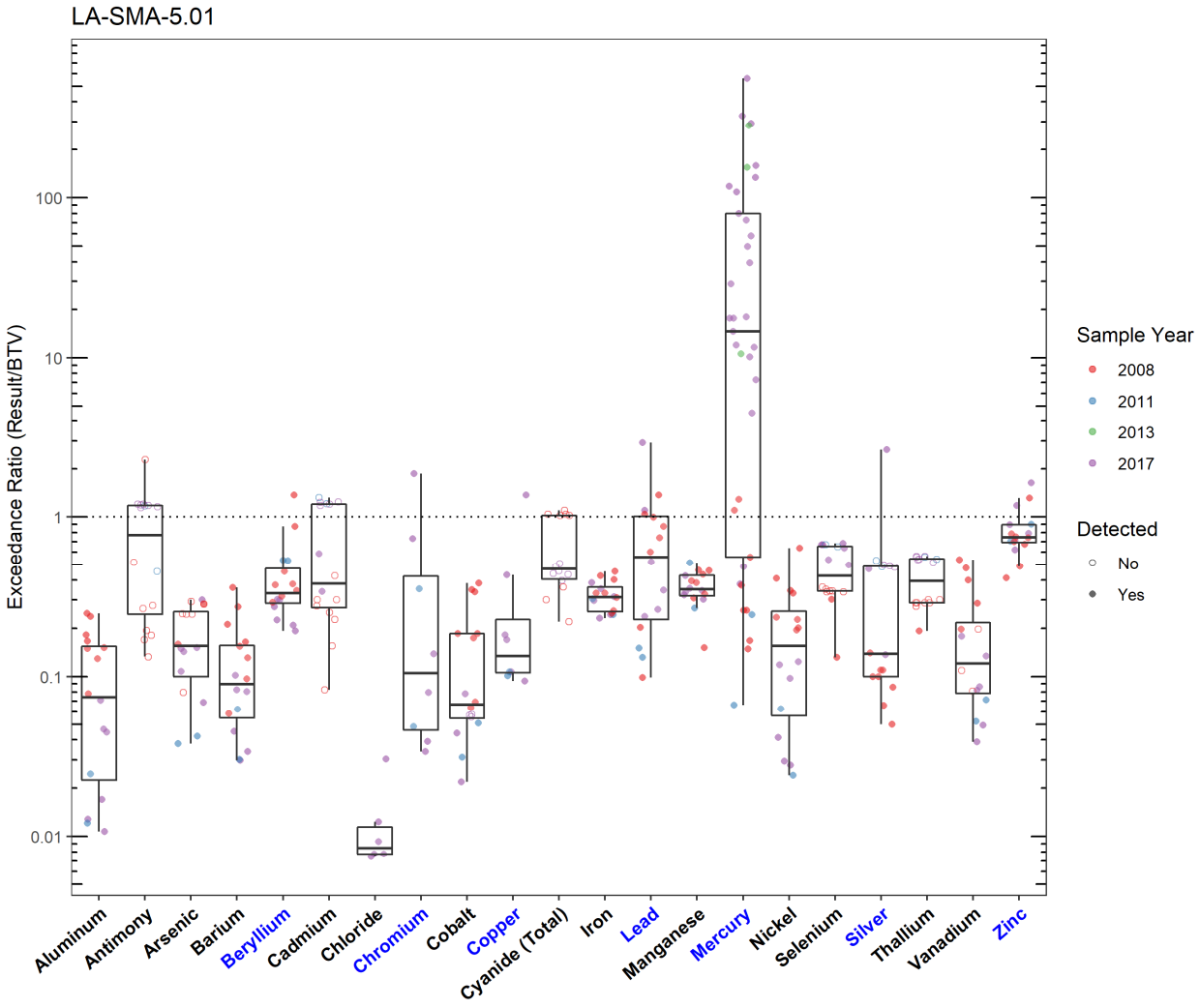

Figure 28.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.01

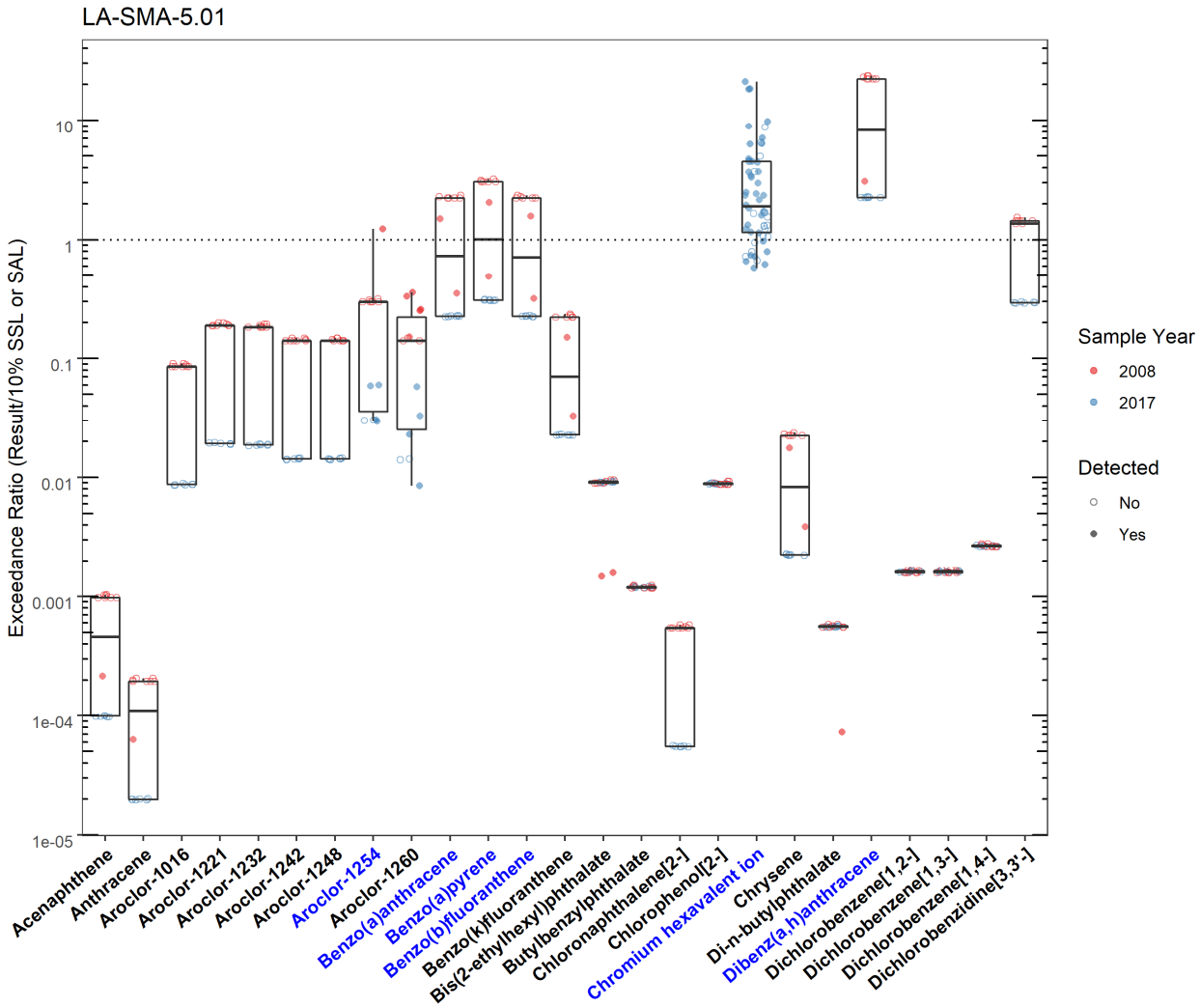

Figure 28.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.01 (Plot 1)

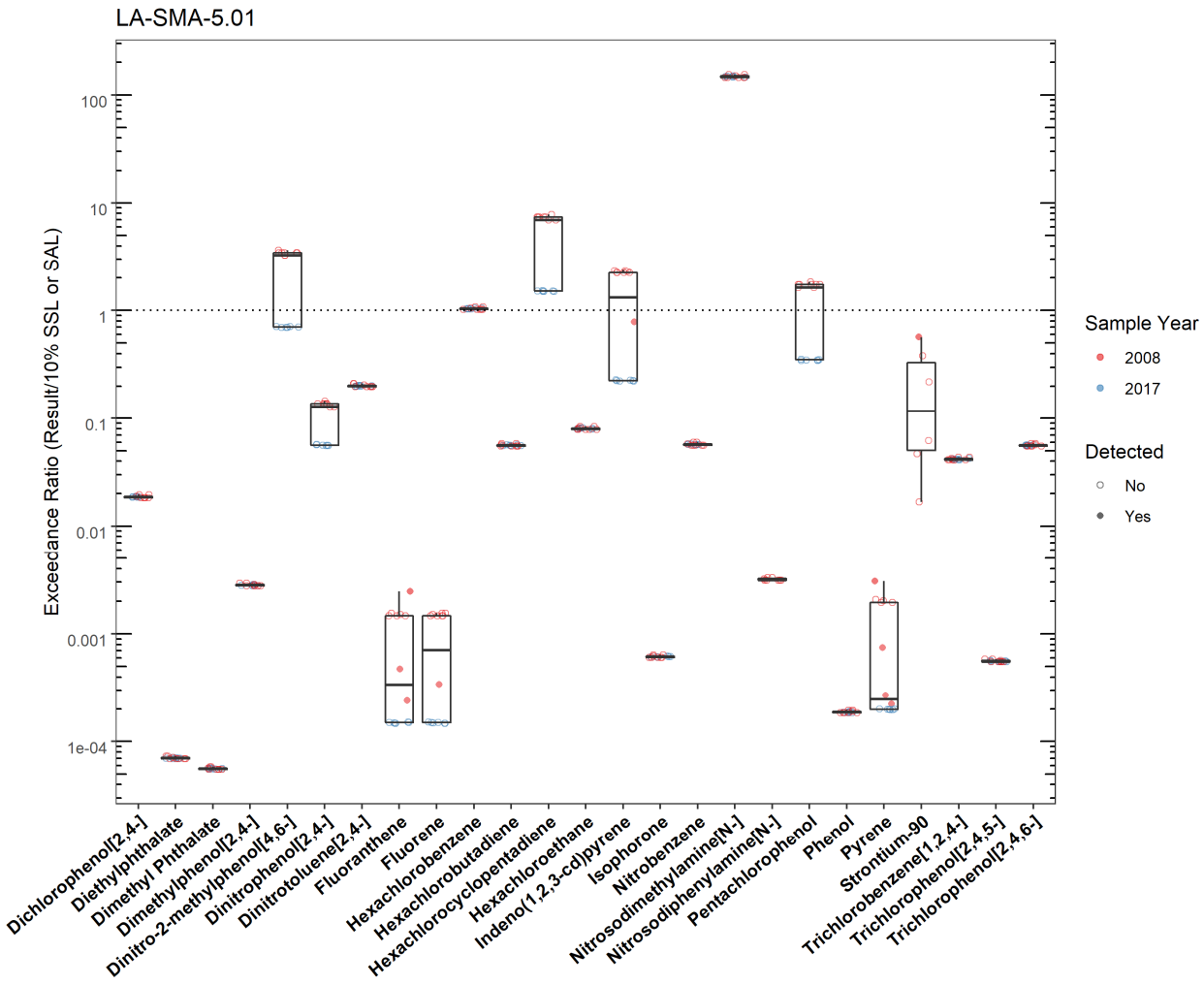

Figure 28.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.01 (Plot 2)

LA-SMA-5.01

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-5.01	11097-69-1	Y	SSL_0.1	0.114	0.140	2008-10-08
Benzo(a)anthracene	LA-SMA-5.01	56-55-3	Y	SSL_0.1	0.153	0.230	2008-10-07
Benzo(a)pyrene	LA-SMA-5.01	50-32-8	Y	SSL_0.1	0.112	0.230	2008-10-07
Benzo(b)fluoranthene	LA-SMA-5.01	205-99-2	Y	SSL_0.1	0.153	0.240	2008-10-07
Beryllium	LA-SMA-5.01	Be	Y	BTV	1.83	2.50	2008-10-08
Chromium	LA-SMA-5.01	Cr	Y	BTV	19.3	36.1	2017-05-08
Chromium hexavalent ion	LA-SMA-5.01	Cr(VI)	Y	SSL_0.1	0.305	6.45	2017-06-16
Copper	LA-SMA-5.01	Cu	Y	BTV	14.7	20.1	2017-05-08
Dibenz(a,h)anthracene	LA-SMA-5.01	53-70-3	Y	SSL_0.1	0.0153	0.0470	2008-10-07
Lead	LA-SMA-5.01	Pb	Y	BTV	22.3	65.3	2017-05-08
Mercury	LA-SMA-5.01	Hg	Y	BTV	0.100	56.2	2017-06-12
Silver	LA-SMA-5.01	Ag	Y	BTV	1.00	2.64	2017-05-08
Zinc	LA-SMA-5.01	Zn	Y	BTV	48.8	80.1	2017-05-08

Figure 28.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.01

28.4 Stormwater Evaluation

28.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring samples have been collected at the SMA.

28.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.01 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha, metals, and PCB impairments may be Site-related, based on Site history.

28.5 Site-Specific Demonstration

28.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: Aroclor-1254, benzo(a)anthracene, benzo(a)pyrene, benzo(b)Fluoranthene, beryllium, chromium, chromium (hexavalent ion), copper, dibenz(a,h)anthracene, lead, mercury, silver, and zinc.

28.5.2 Stormwater Data Summary

No confirmation-monitoring data.

28.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

28.5.4 Sampling and Analysis Plan

Table 28.5-1 is the proposed SAP for LA-SMA-5.01.

Table 28.5-1 Proposed SAP, LA-SMA-5.01

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Total mercury and selenium	Impairment, Site history (metals), and soil data
Total PCBs	Impairment, Site history (organics), and soil data
Dissolved beryllium, silver, chromium, copper, lead, zinc	Site history (metals) and soil data
SVOCs	Site history (organics) and soil data
Tritium	Site history
DOC	Permit requirement
SSC	Permit requirement

29.0 LA-SMA-5.02

Associated Sites	01-003(e)
Receiving Water	Los Alamos Canyon
Drainage Area	0.16 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 01-003(e): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the February 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

29.1 2010 Administratively Continued Permit Summary

Following the May 2011 submittal of certification of baseline control installation to EPA, two baseline stormwater samples were collected in August 2011. Analytical results from these samples initiated corrective action.

AOC 43-001(b2) received a COC under the Consent Order in September 2010. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in November 2012 (LANL 2012/2013, 232273) and resubmitted in August 2013 (LANL 2013, 250035). Stormwater monitoring has not occurred since 2012.

29.2 Site History

01-003(e) (03/28/2022)

SWMU 01-003(e) was a surface disposal area located on the mesa top and on the north hillside of Los Alamos Canyon, southeast of the former Los Alamos Inn at former TA-01. Demolition debris from former TA-01 was placed at this site in the 1950s. Surface debris on the hillside of SWMU 01-003(e) consisted primarily of concrete construction debris, but also included utility boxes, piping, and other miscellaneous debris.

Review of historical aerial photographs from the 1950s and 1960s indicates that when the buildings in the eastern portion of former TA-01 underwent D&D in the 1950s, debris from the 1940s-era buildings was placed at the head of the canyon, and some of the debris was pushed down the hillside. Review of historical aerial photographs from the mid-1970s shows that additional fill was placed over the mesa-top portion of this SWMU by a private land owner to extend the canyon rim farther south during construction of the Los Alamos Inn. At this time, adjacent professional buildings and associated parking lots were also constructed. Currently, a major portion of this site is under the fill material, and the mesa-top portion of the Site is paved with asphalt and does not contain any of the previously discarded materials; the professional buildings remain in place.

For investigation activities refer to “Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory,” (LANL 2010, 108536).

29.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 29.2-1.

Table 29.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-003(e)	Surface disposal site	Metals, SVOCs

29.3 Consent Order Soil Data

Decision-level data for SWMU 01-003(e) consist of results from samples collected in 2008. Analytical results from those samples are presented in Figures 29.3-1 through 29.3-4. Revision 1 of the 2010 IR concluded that the nature and extent of contamination are defined.

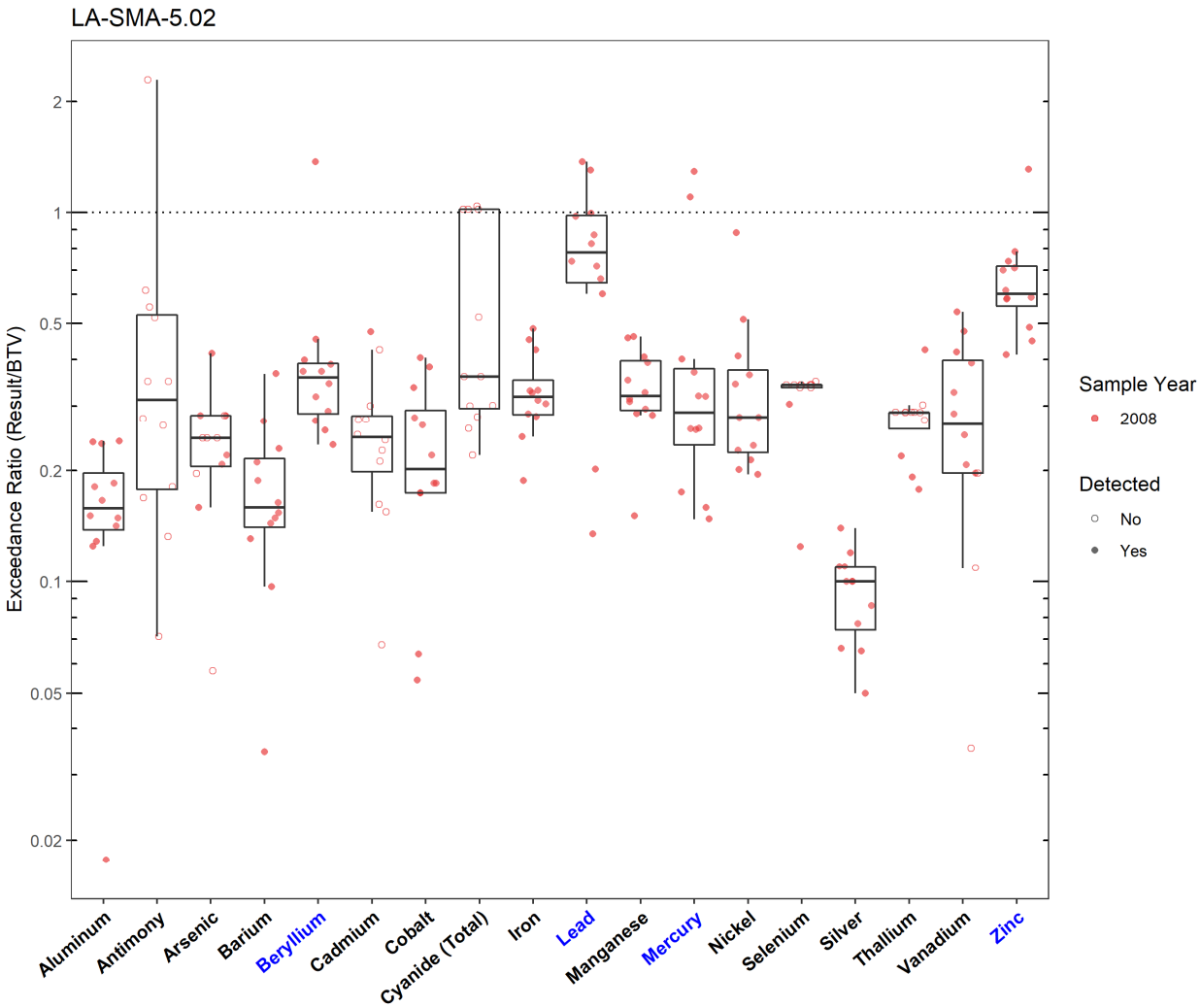

Figure 29.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.02

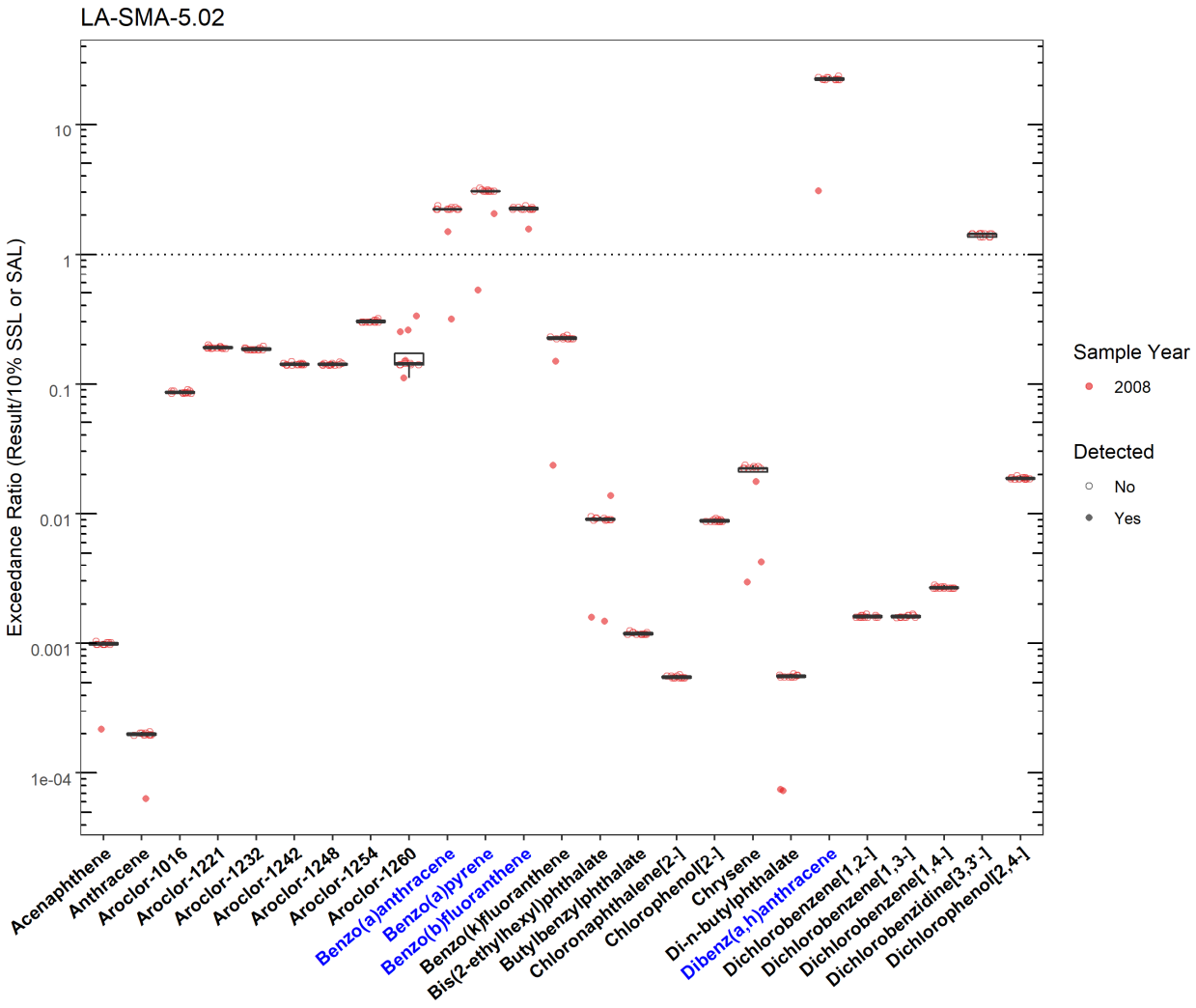

Figure 29.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.02 (Plot 1)

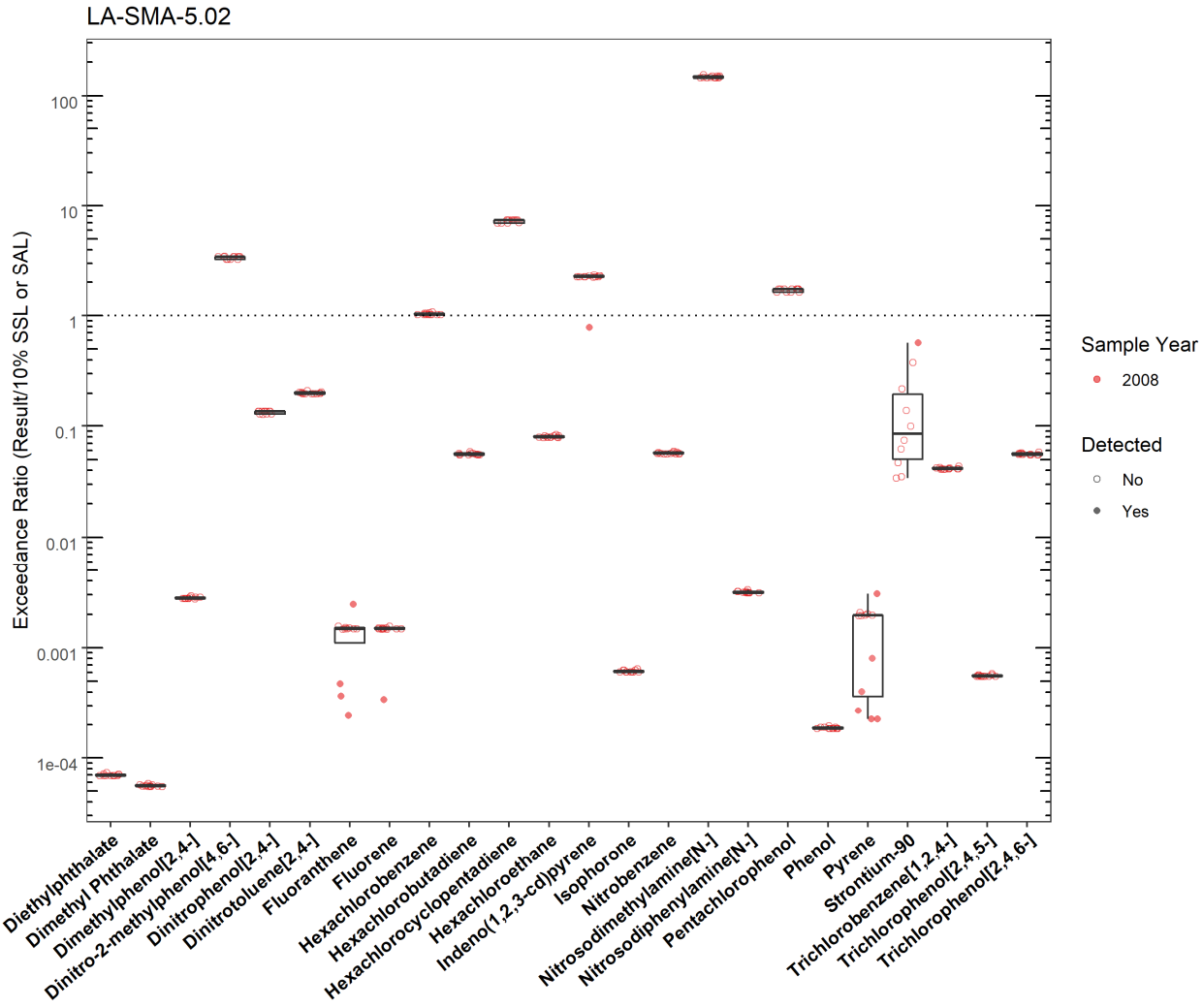

Figure 29.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.02 (Plot 2)

LA-SMA-5.02

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-5.02	56-55-3	Y	SSL_0.1	0.153	0.230	2008-10-07
Benzo(a)pyrene	LA-SMA-5.02	50-32-8	Y	SSL_0.1	0.112	0.230	2008-10-07
Benzo(b)fluoranthene	LA-SMA-5.02	205-99-2	Y	SSL_0.1	0.153	0.240	2008-10-07
Beryllium	LA-SMA-5.02	Be	Y	BTV	1.83	2.50	2008-10-08
Dibenz(a,h)anthracene	LA-SMA-5.02	53-70-3	Y	SSL_0.1	0.0153	0.0470	2008-10-07
Lead	LA-SMA-5.02	Pb	Y	BTV	22.3	30.6	2008-10-08
Mercury	LA-SMA-5.02	Hg	Y	BTV	0.100	0.129	2008-10-08
Zinc	LA-SMA-5.02	Zn	Y	BTV	48.8	63.8	2008-10-08

Figure 29.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.02

29.4 Stormwater Evaluation

29.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in August 2011. Analytical results from those samples are presented in Figures 29.4-1 and 29.4-2.

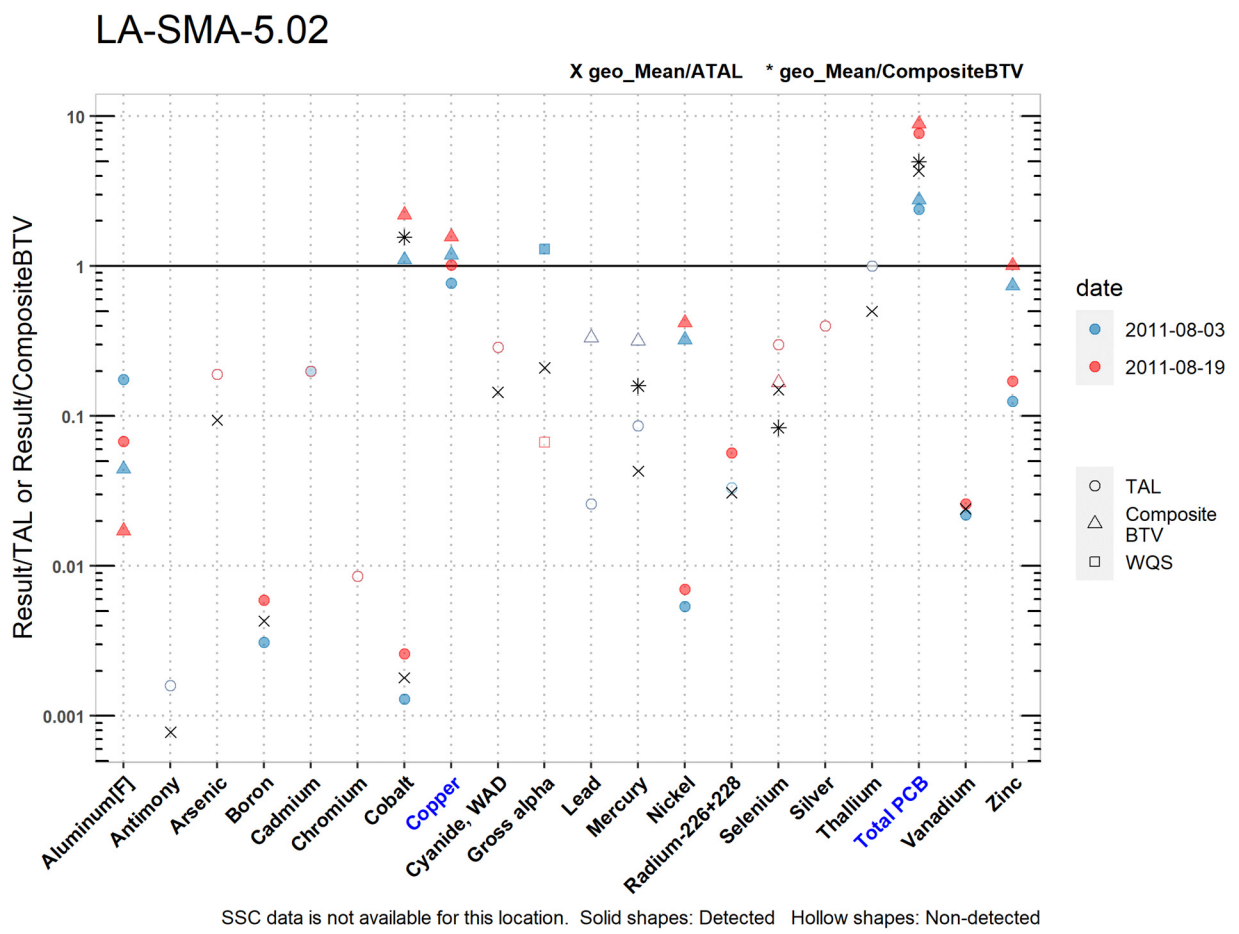

Figure 29.4-1 Analytical Results from Stormwater Samples, LA-SMA-5.02 (Plot)

LA-SMA-5.02

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Total PCB	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	0.2	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	0.014	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	2950	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2	1.50	0.208	3.10	4.21	8.98	NA	NA	0.0122	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2011-08-03 result	131	*1.00*	*1.70*	15.3	0.130	*2.00*	1.30	3.70	*1.50*	19.7	*0.500*	*0.0660*	1.00	*1.00*	*1.50*	*0.200*	*0.450*	0.0337	2.20	7.40
2011-08-03 dT	0.175	NA	NA	0.0031	0.2	NA	0.0013	0.771	NA	1.3	NA	NA	0.00538	NA	NA	NA	NA	2.4	0.022	0.125
2011-08-03 dB	0.0444	NA	NA	NA	NA	NA	1.10	1.19	NA	NA	NA	NA	0.323	NA	NA	NA	NA	2.76	NA	0.740
2011-08-19 result	50.8	*1.00*	*1.70*	29.6	*0.110*	*2.00*	2.60	4.90	*1.50*	*1.00*	*0.500*	*0.0660*	1.30	1.71	*1.50*	*0.200*	*0.450*	0.108	2.60	10.1
2011-08-19 dT	0.0677	NA	NA	0.0059	NA	NA	0.0026	1.02	NA	NA	NA	NA	0.00699	0.0570	NA	NA	NA	7.7	0.026	0.171
2011-08-19 dB	0.0172	NA	NA	NA	NA	NA	2.20	1.57	NA	NA	NA	NA	0.419	NA	NA	NA	NA	8.85	NA	1.01
geo_mean/ATAL	NA	0.00078	0.094	0.0043	NA	NA	0.0018	NA	0.144	0.21	NA	0.043	NA	0.0308	0.15	NA	0.5	4.3	0.024	NA
geo_mean/B	NA	NA	NA	NA	NA	NA	1.56	NA	NA	NA	NA	0.159	NA	NA	0.0835	NA	NA	4.95	NA	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV, geo_mean/B=geo_mean/composite_BTV

Figure 29.4-2 Analytical Results from Stormwater Samples, LA-SMA-5.02 (Table)

29.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.02 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The metals impairments may be Site-related, based on Site history.

29.5 Site-Specific Demonstration

29.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, beryllium, and dibenz(a,h)anthracene.

Lead, mercury, and zinc exceeded the applicable screening value in soil data but did not exceed TALs in stormwater. Therefore, they will not be added to the SAP.

29.5.2 Stormwater Data Summary

Copper and PCBs exceeded TALs and BTVs in stormwater data.

29.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

29.5.4 Sampling and Analysis Plan

Table 29.5-1 is the proposed SAP for LA-SMA-5.02.

Table 29.5-1 Proposed SAP, LA-SMA-5.02

Monitoring Constituent	Background for Monitoring
SVOCs	Soil data and Site history (SVOCs)
Dissolved beryllium	Stormwater data, Site history, and soil data
DOC	Permit requirement
SSC	Permit requirement

30.0 LA-SMA-5.2

Associated Sites	01-003(d)
Receiving Water	Los Alamos Canyon
Drainage Area	0.46 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 01-003(d): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the 2018 field visit, the SIP team agreed that 2017 Consent Order soil sampling data from Upper Los Alamos Canyon would be considered prior to deciding if a sampler move was warranted. After review of the 2018 Consent Order Upper Los Canyon IR, the SIP team determined that the current SMA sampler may not encompass stormwater from areas where industrial materials were known or potentially managed at this Site. A new location was not recommended, therefore, the sampler will not be moved.
2022 Permit Status	Active Monitoring

30.1 2010 Administratively Continued Permit Summary

Following the May 2011 submittal of certification of baseline control installation to EPA, baseline stormwater monitoring was initiated. In 2013, the sampler location was relocated to a more representative location for the Site after changes in drainage pattern of Los Alamos Canyon slopes were observed. A baseline stormwater sample was collected in July 2019. Analytical results from this sample initiated corrective action.

Following the July 2021 submittal to EPA of certification of enhanced control installation (N3B 2021, 701533), corrective action monitoring was initiated. Since that time stormwater flow has not been sufficient for full-volume corrective action sample collection and monitoring is ongoing.

30.2 Site History

01-003(d) (9/28/2021)

SWMU 01-003(d), also known as the Can Dump Site, is located on the undeveloped hillside of Los Alamos Canyon south of the current CenturyLink communications building and Trinity Drive. It was used for the surface disposal of empty solvent and paint cans during Zia Company operations at former TA-01. The Zia Company operated several warehouses on the mesa top between Trinity Drive and Los Alamos Canyon from the early 1940s to the late 1950s, in support of TA-01 operations. The Zia Company warehouses formerly located in this area were used as paint, carpentry, furniture repair, and sign shops, and were likely the source of the waste at the former Can Dump Site. No radioactive materials were handled in these warehouses because they were outside the TA-01 security fence. Currently, the area is located on undeveloped DOE land.

For investigation activities, refer to “Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1” (N3B 2021, 701261).

30.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 30.2-1.

Table 30.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
01-003(d)	Surface disposal site	Metals, lead

30.3 Consent Order Soil Data

Decision-level data for SWMU 01-003(d) consist of results from samples collected in 2008, 2012, 2013, and 2017. Analytical results from those samples are presented in Figures 30.3-1 through 30.3-4. Revision 1 of the 2021 Phase II IR concluded the nature and extent of contamination have been defined and no further sampling for extent is warranted.

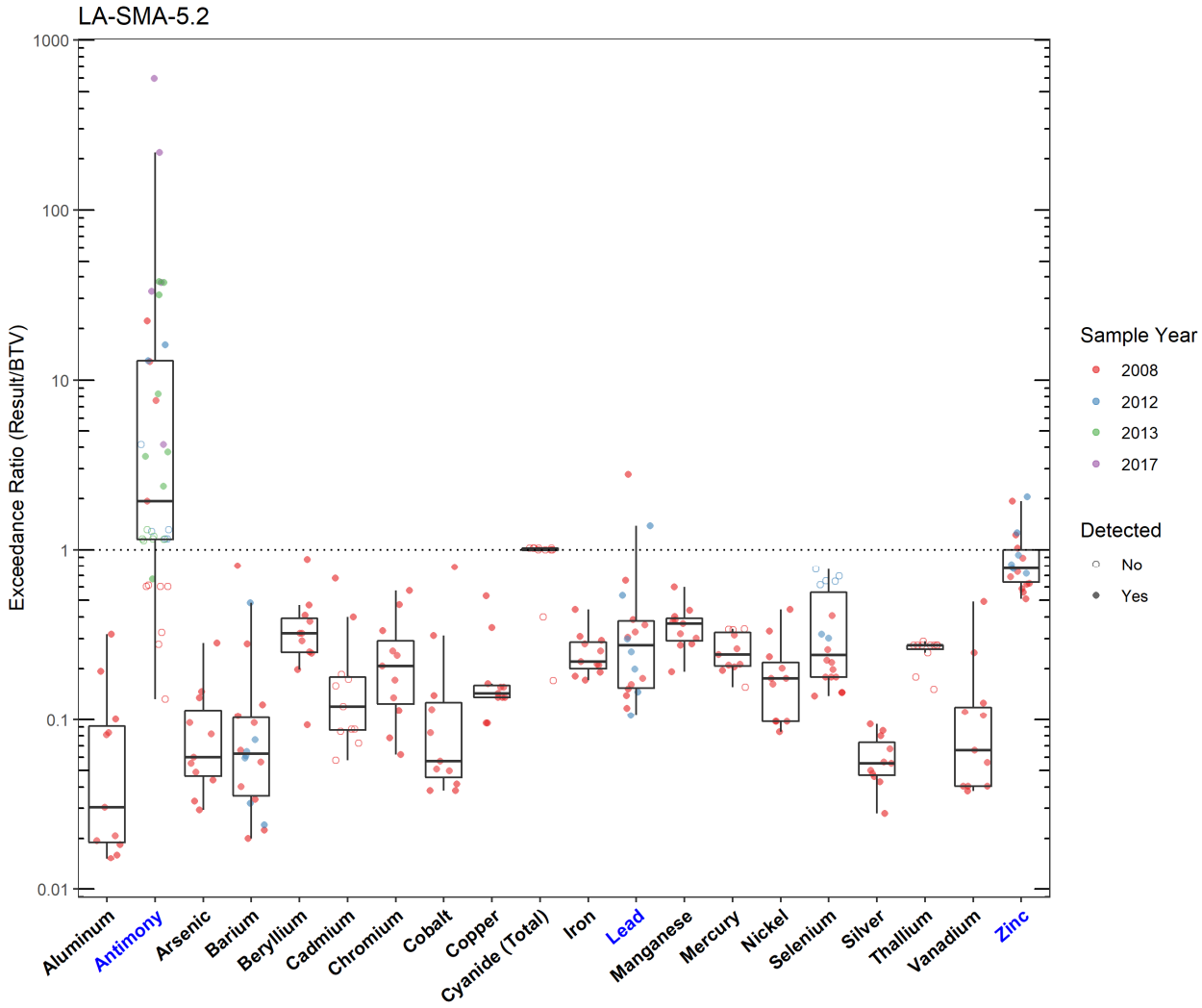

Figure 30.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.2

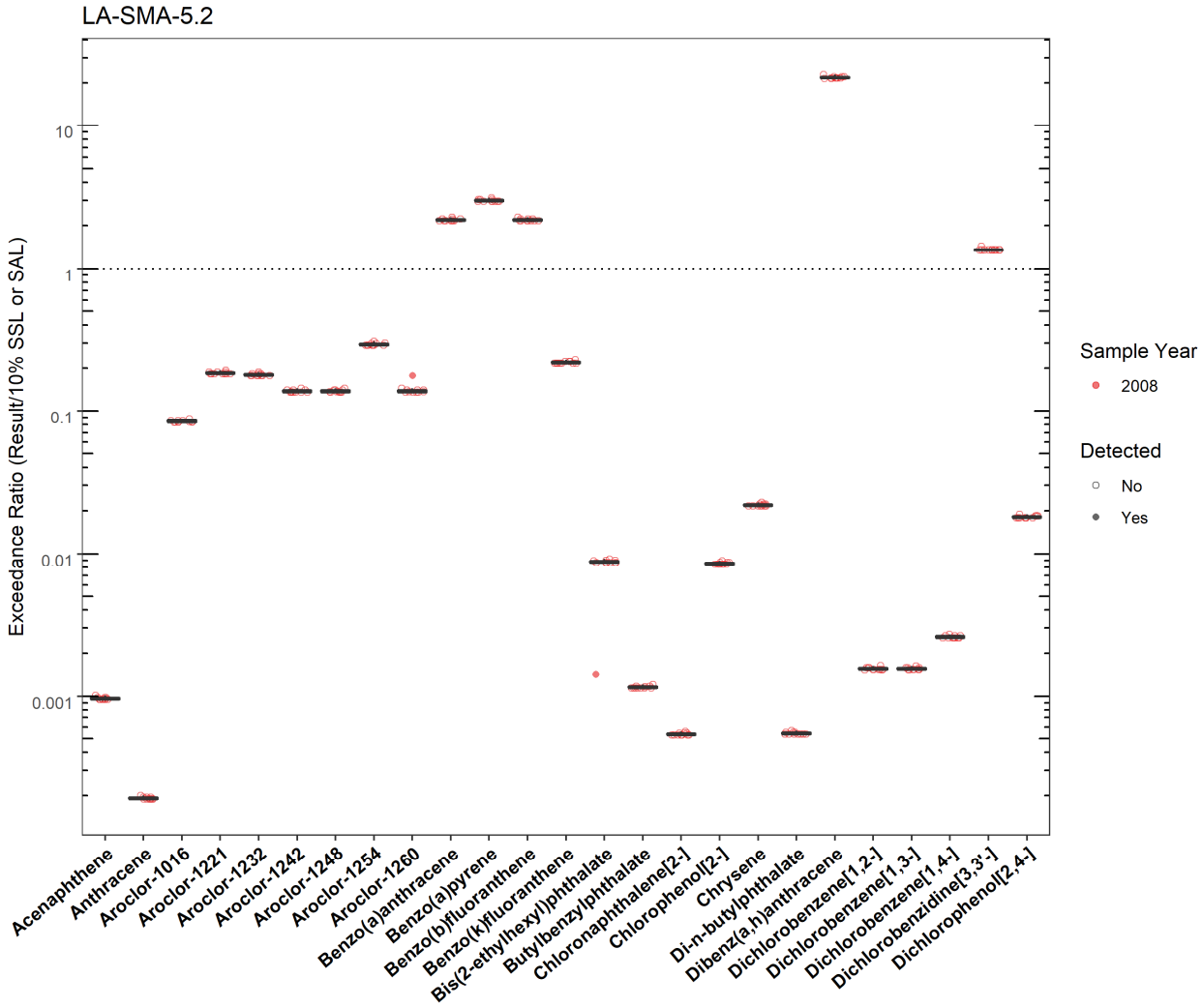

Figure 30.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.2 (Plot 1)

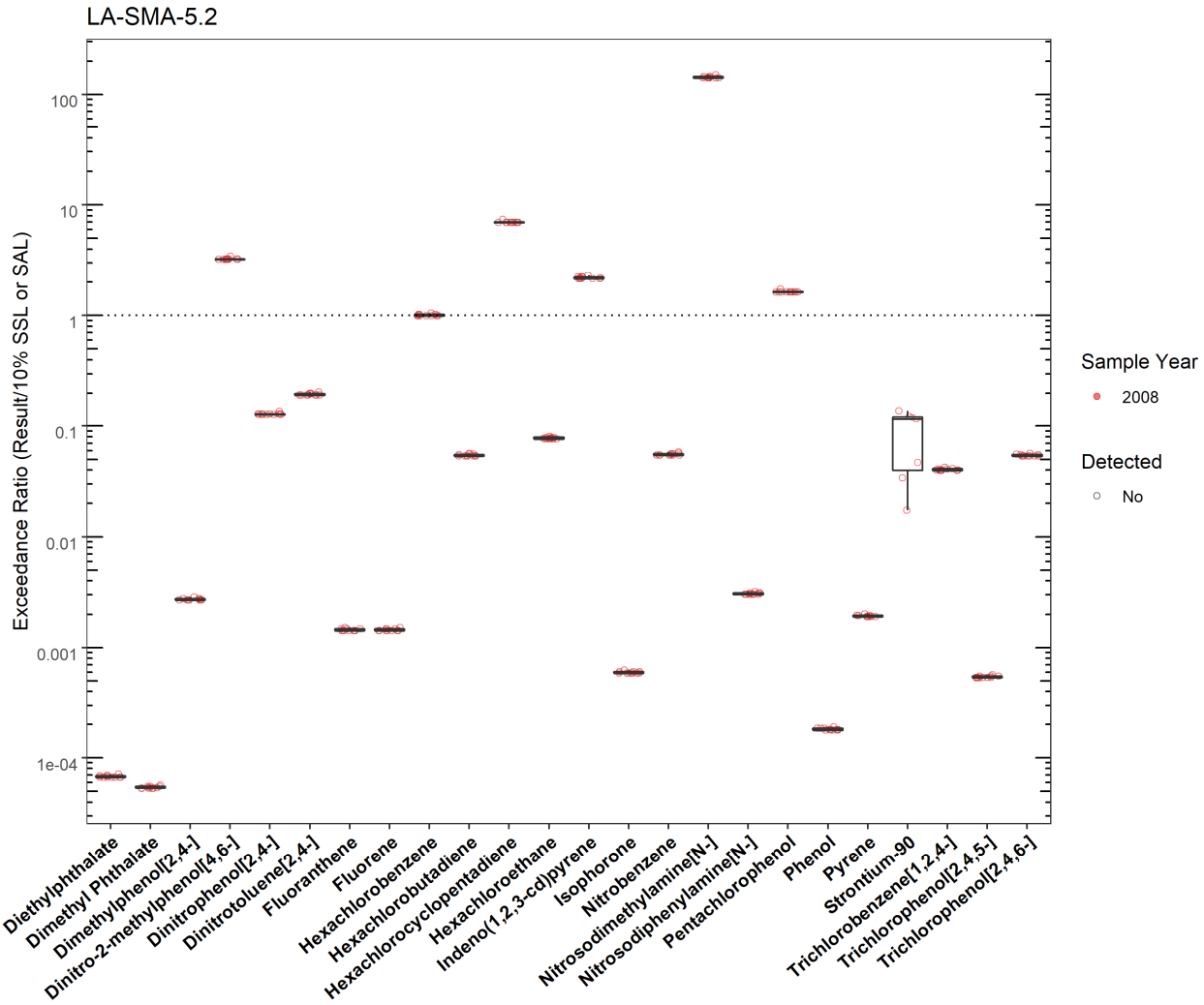

Figure 30.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.2 (Plot 2)

LA-SMA-5.2

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-5.2	Sb	Y	BTV	0.830	497	2017-03-31
Lead	LA-SMA-5.2	Pb	Y	BTV	22.3	62.1	2008-10-06
Zinc	LA-SMA-5.2	Zn	Y	BTV	48.8	100	2012-01-09

Figure 30.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.2

30.4 Stormwater Evaluation

30.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No samples have been collected in the current stage at the SMA.

30.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.2 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The metals impairments may be Site-related, based on Site history.

30.5 Site-Specific Demonstration

30.5.1 Soil Data Summary

Antimony, lead, and zinc exceeded the applicable screening value in soil data. These metals were previously monitored in stormwater data and did not exceed the TAL, so they will not be added to the SAP.

30.5.2 Stormwater Data Summary

No data for the current monitoring stage have been collected.

Aluminum, gross alpha, and radium-226 and radium-228 exceeded TAL in the previous monitoring stage, but not composite BTV; therefore, they will not be added to the SAP. Arsenic, selenium, and zinc exceeded TAL and composite BTV and will be added to the SAP.

30.5.3 2022 Permit Status

The SMA is in active monitoring. A confirmation-monitoring sample has not been collected for this stage at this location.

30.5.4 Sampling and Analysis Plan

Table 30.5-1 is the proposed SAP for LA-SMA-5.2.

Table 30.5-1 Proposed SAP, LA-SMA-5.2

Monitoring Constituent	Background for Monitoring
Total selenium	Impairment, stormwater data, and Site history (metals)
Dissolved arsenic and zinc	Stormwater data and Site history (metals)
DOC	Permit requirement
SSC	Permit requirement

31.0 LA-SMA-5.31

Associated Sites	41-002(c)
Receiving Water	Los Alamos Canyon
Drainage Area	0.04 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 41-002(c): In Progress Deferred per Consent Order
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site
2022 Permit Status	Long-term Stewardship per Permit Part I.C.3 criterion

31.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

Following the August 2012 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2012, 225367), corrective action monitoring was initiated. Since that time, stormwater flow has not been sufficient for full-volume corrective action sample collection and monitoring is ongoing.

31.2 Site History

41-002(c) (5/24/2017)

SWMU 41-002(c) consists of an inactive sludge drying bed (41-9), a component of a small sanitary sewage treatment plant at TA-41 [along with SWMU 41-002(a)], an Imhoff tank and 10 ft × 8 ft × 10 ft chlorinator (structure 41-7), and SWMU 41-002(b), a chlorine contact tank (structure 41-8). These SWMUs are all components of the former treatment plant and are interconnected by a network of drainlines, and are completely inactive. The treatment plant was built in 1951 and received sanitary waste from TA-41 until 1987, and received sanitary waste from TA-02 from the early 1970s until 1987. Between 1987 and 1992, sanitary wastes were pumped to the TA-03 Sanitary WWTP for treatment. Beginning in 1992, all sanitary wastes were pumped to the TA-46 SWSC plant.

When operational, the TA-41 sanitary sewage treatment plant discharged treated effluent to Los Alamos Canyon via LANL NPDES-permitted outfall SSS06S (removed from the LANL NPDES permit effective December 14, 1990). After it was shut down, the TA-41 treatment plant was retained as a standby unit in the event of failure of the lift pump. Currently, the sewage treatment plant is located on DOE property behind locked gates. The SWMU 41-002(c) was abandoned in place.

TA-41 has been continuously used from the early 1940s for testing, monitoring, assembling, and storing nuclear weapon components, weapons subsystems and boosting systems development, and for long-term studies on weapons subsystems. Isotopic analyses were conducted on uranium and plutonium samples. Operations at TA-41 required the use of radioactive materials, toxic gases, metals, and organic chemicals.

For investigation activities, refer to "Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory," (LANL 2010, 108536).

31.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 31.2-1.

Table 31.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
41-002(c)	Sludge drying bed	Inorganic and organic chemicals, metals, radionuclides

31.3 Consent Order Soil Data

Decision-level data for SWMU 41-002(c) consist of results from samples collected in 1995. Analytical results from those samples are presented in Figures 31.3-1 through 31.3-4. The 2006 IWP concluded that the nature and extent of contamination are not defined. No sampling activities were proposed in the approved IWP for SWMU 41-002(c). Site characterization and investigation are deferred until the future D&D of the sewage treatment plant.

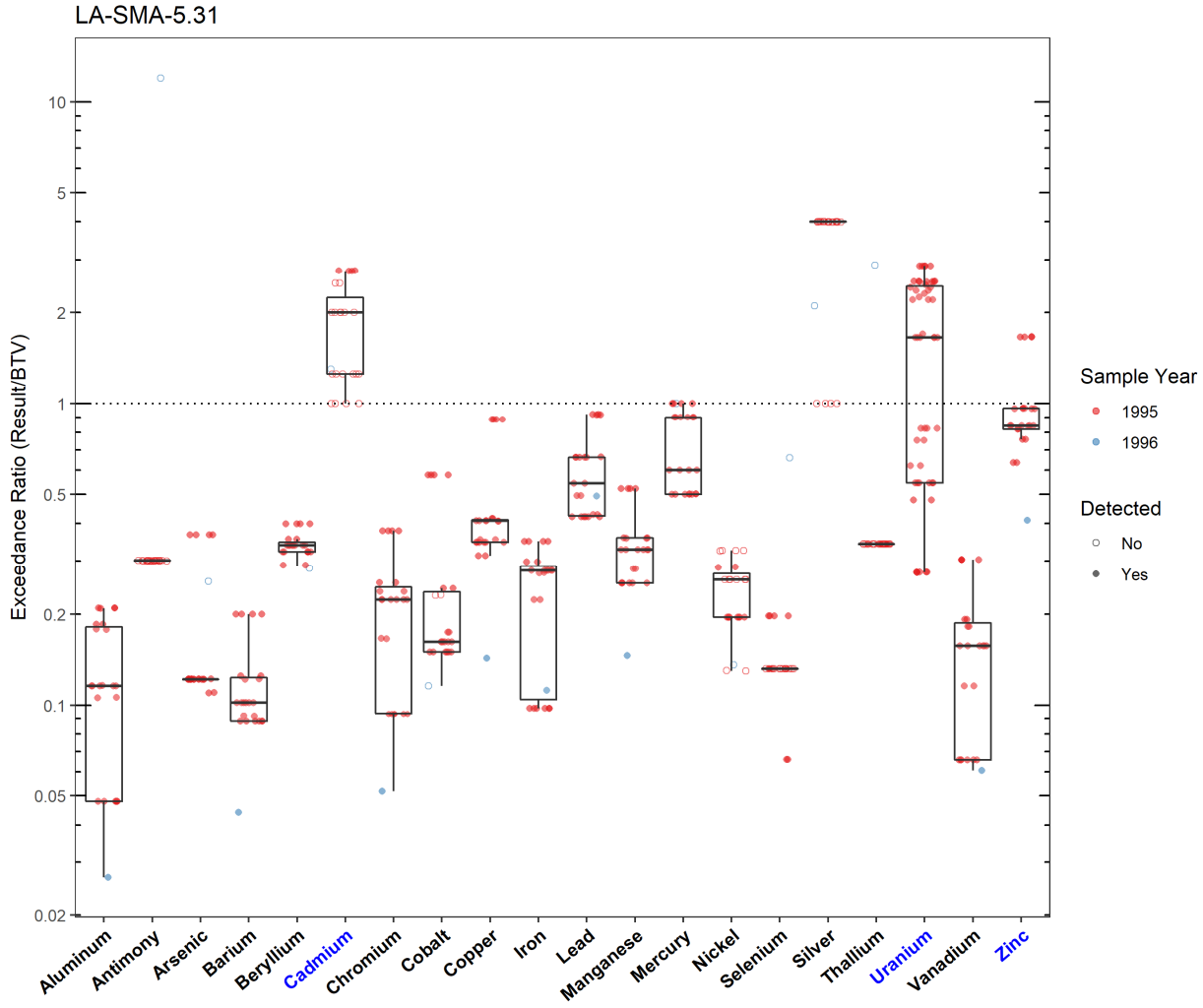

Figure 31.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.31

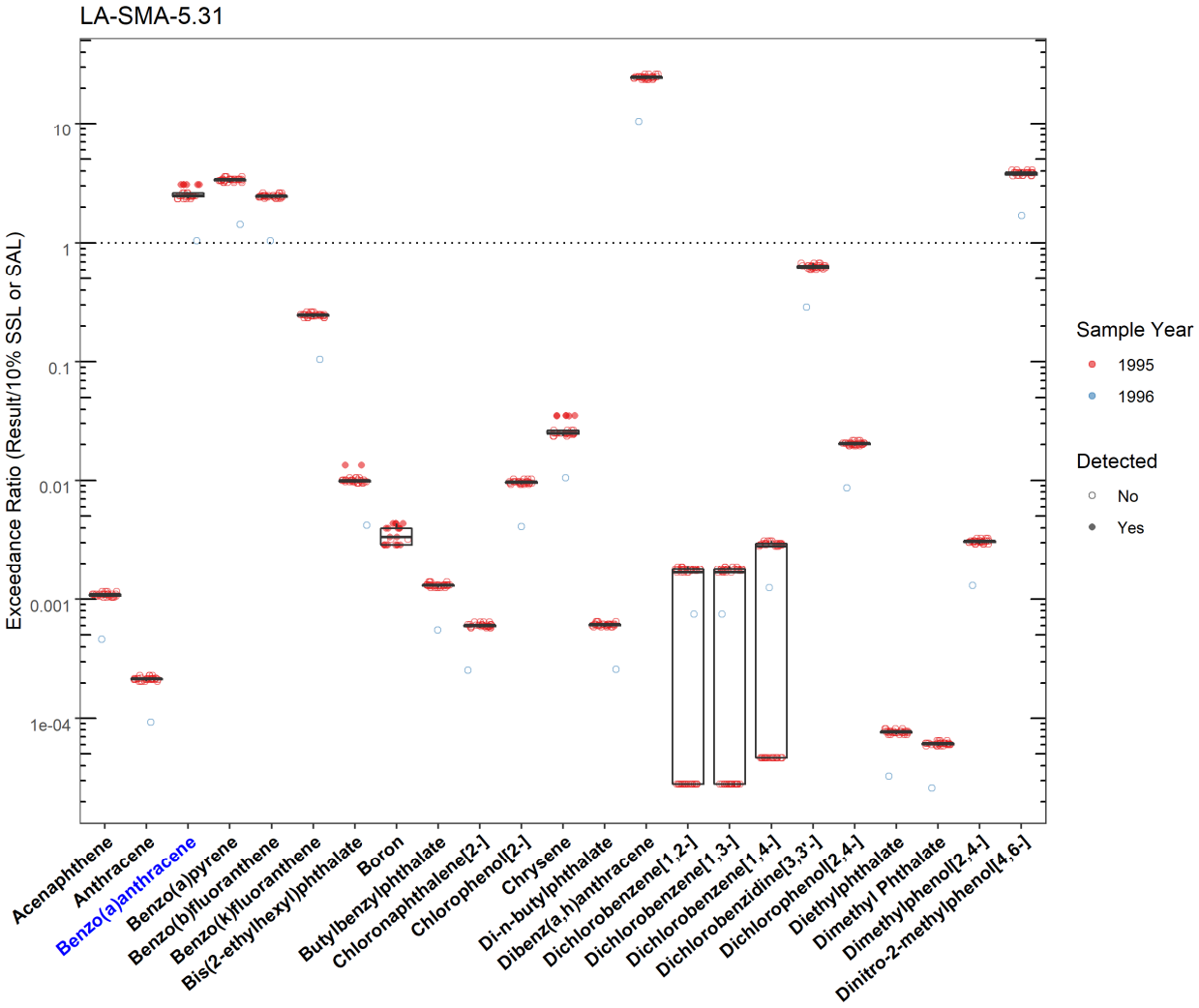

Figure 31.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.31 (Plot 1)

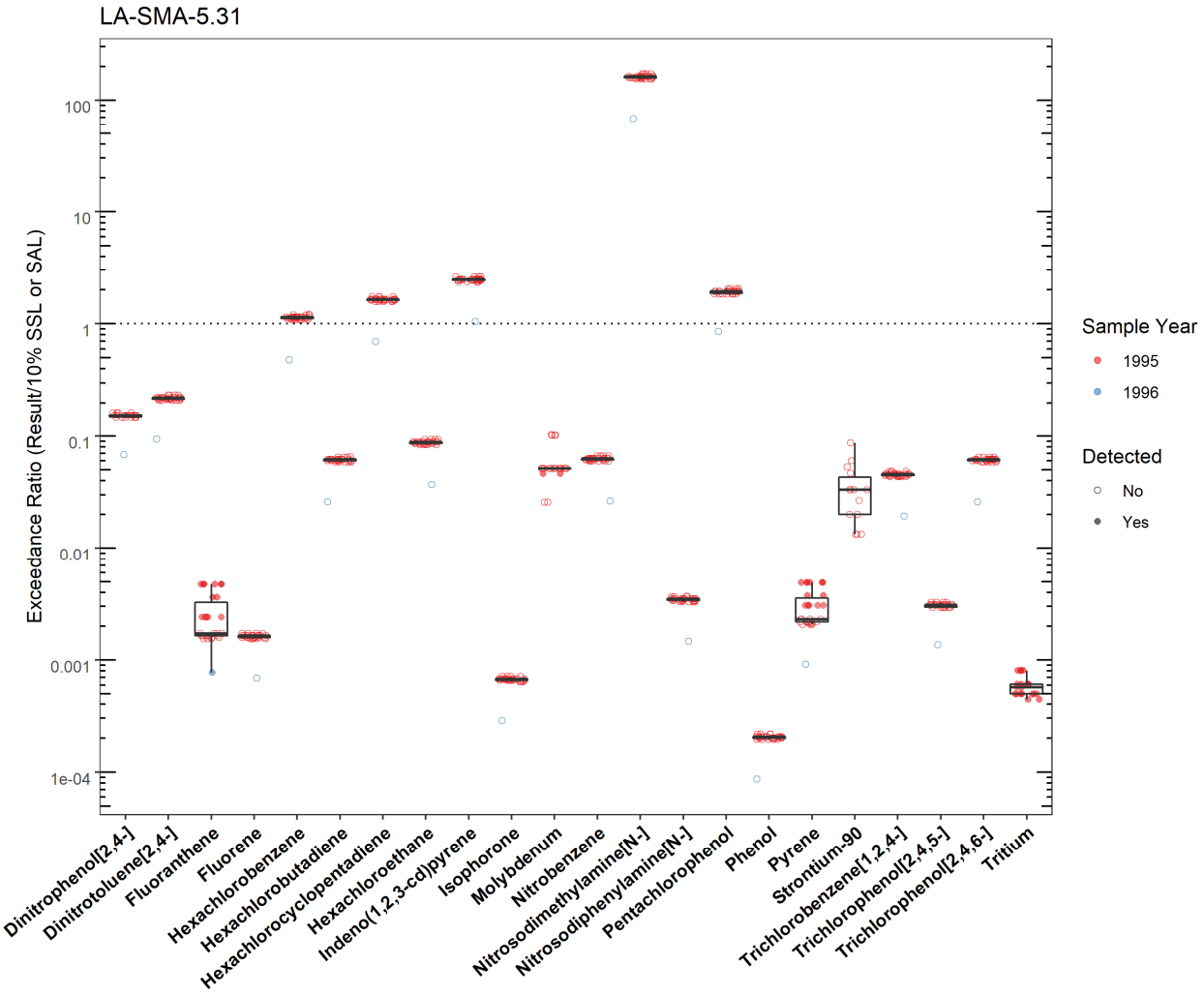

Figure 31.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.31 (Plot 2)

LA-SMA-5.31

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-5.31	56-55-3	Y	SSL_0.1	0.153	0.470	1995-03-08
Cadmium	LA-SMA-5.31	Cd	Y	BTV	0.400	1.10	1995-03-07
Uranium	LA-SMA-5.31	U	Y	BTV	1.82	5.20	1995-02-27; 1995-03-07
Zinc	LA-SMA-5.31	Zn	Y	BTV	48.8	81.0	1995-03-07

Figure 31.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.31

31.4 Stormwater Evaluation

31.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current stage at the SMA.

31.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.31 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history.

31.5 Site-Specific Demonstration

31.5.1 Soil Data Summary

Benzo(a)anthracene and uranium are the only Site-related POCs that exceeded the applicable screening value in soil data; they have not yet been measured in stormwater.

31.5.2 Stormwater Data Summary

No confirmation-monitoring data.

31.5.3 2022 Permit Status

All Sites within the SMA are deferred under the Consent Order. Therefore, the SMA is eligible for long-term stewardship pursuant to Part 1.C.3.

32.0 LA-SMA-5.33

Associated Sites	32-004
Receiving Water	Los Alamos Canyon
Drainage Area	0.01 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC 32-004: Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the October 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

32.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

AOC 32-004 received a COC under the Consent Order in December 2012. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in March 2013 (LANL 2013, 237753). Stormwater monitoring has not occurred since 2012.

32.2 Site History

32-004 (3/28/2022)

AOC 32-004 consists of a former drainline and outfall that served former building 32-3 in former TA-32, and discharged to Upper Los Alamos Canyon. Building 32-3 was an office building that housed a vault room where a radioactive source was stored. The drainline at AOC 32-004 led directly to an outfall at the edge of the mesa without passing through a septic tank. Building 32-3 was removed when TA-32 was decommissioned in 1954.

During the 1996 Phase II RFI and VCA conducted at AOC 32-004, the 37.5-ft section of the drainline located on Los Alamos County property was removed. Because the drainline was found not to be contaminated, the portion of the drainline located on DOE property was left in place and grouted at both ends.

For investigation activities, refer to “Supplemental Remedy Completion Report for Upper Los Alamos Canyon Aggregate Area, Former Technical Area 32” (LANL 2012, 226638).

32.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 32.2-1.

Table 32.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
32-004	Drainline and outfall	Radionuclides

32.3 Consent Order Soil Data

Decision-level data for AOC 32-004 consist of results from samples collected in 1996, 2008, and 2010. Analytical results from those samples are presented in Figures 32.3-1 through 32.3-4. Revision 1 of the 2011 remedy completion report concluded the nature and extent of contamination are defined.

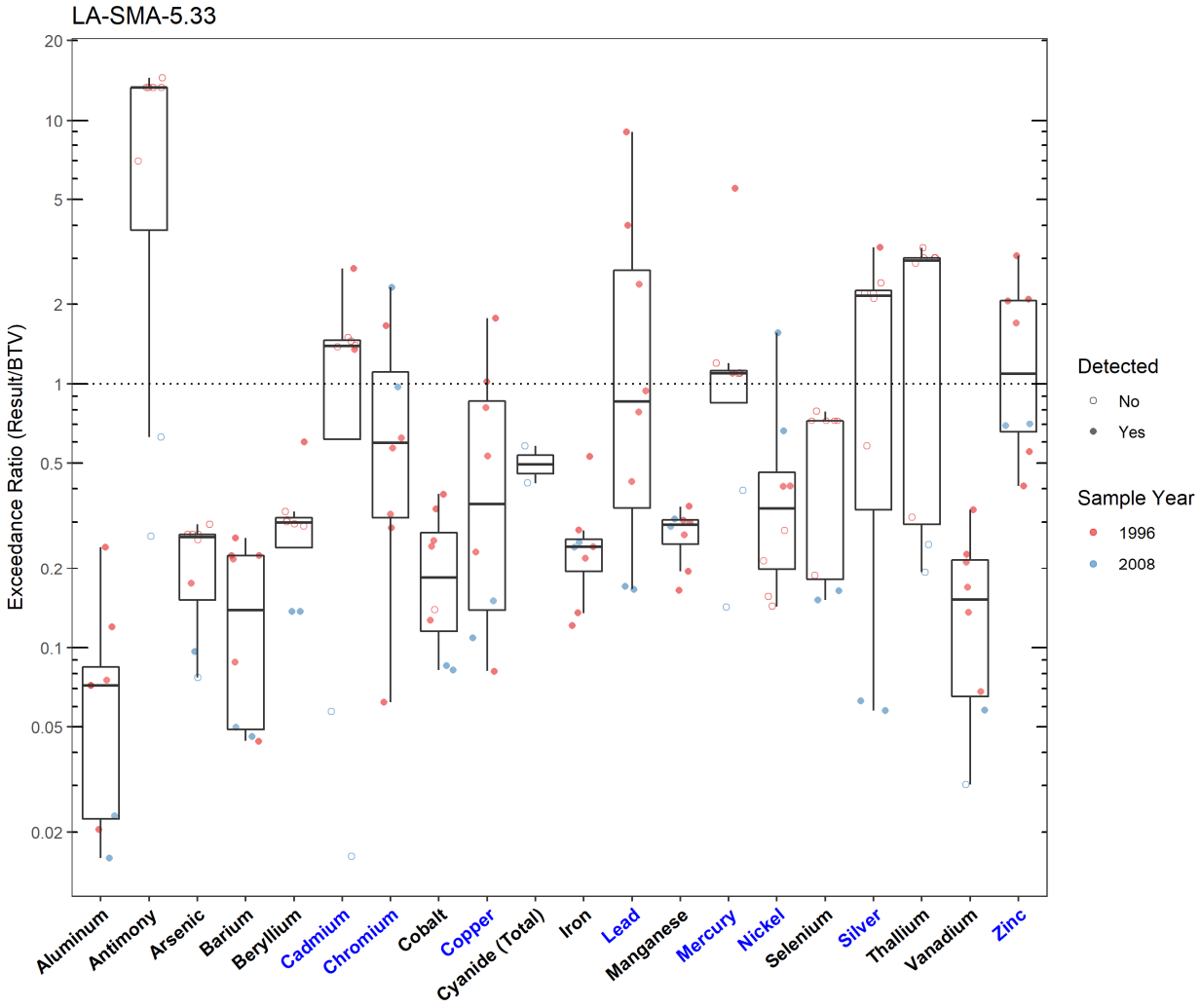

Figure 32.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.33

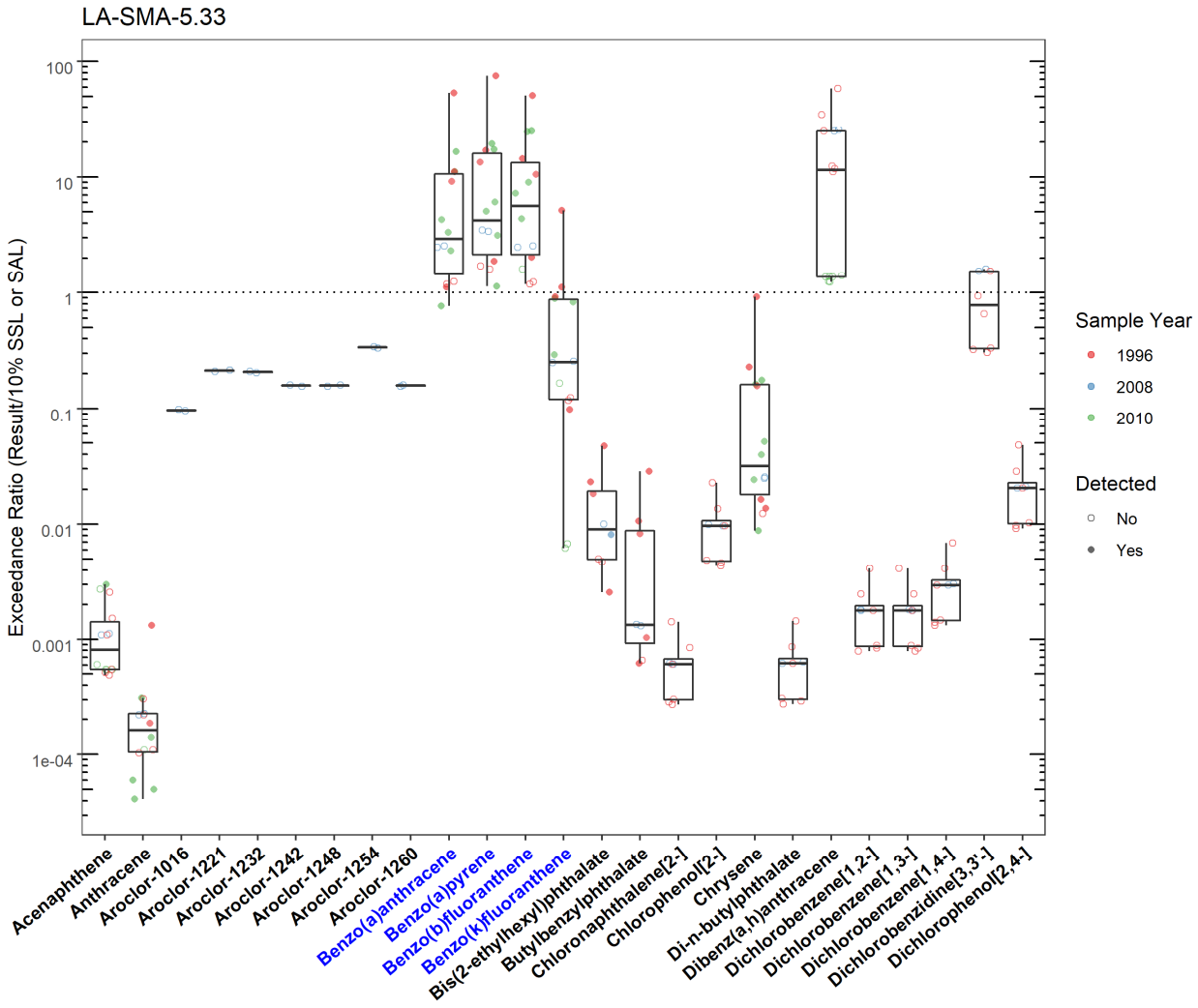

Figure 32.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.33 (Plot 1)

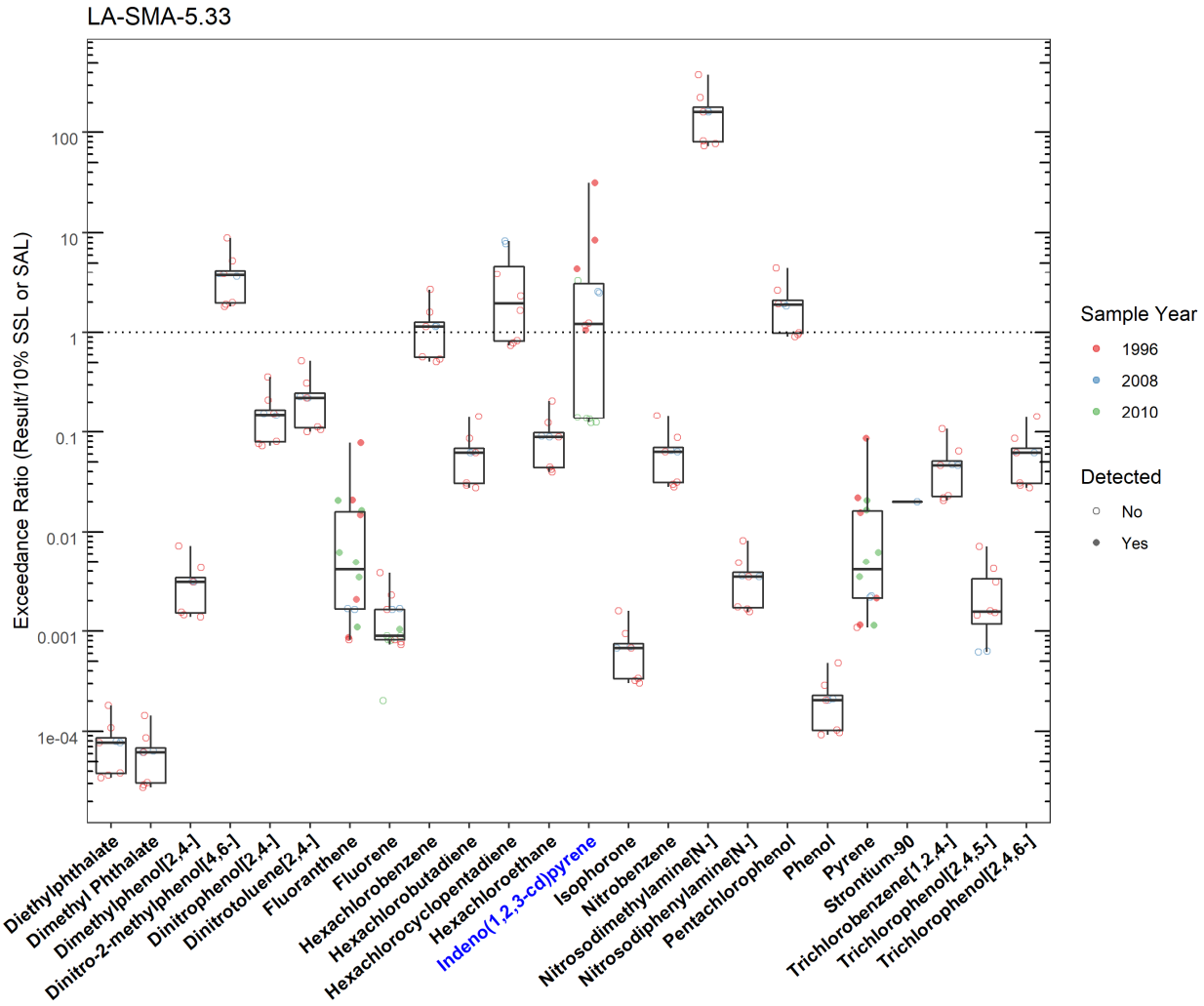

Figure 32.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.33 (Plot 2)

LA-SMA-5.33

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-5.33	56-55-3	Y	SSL_0.1	0.153	8.20	1996-04-01
Benzo(a)pyrene	LA-SMA-5.33	50-32-8	Y	SSL_0.1	0.112	8.40	1996-04-01
Benzo(b)fluoranthene	LA-SMA-5.33	205-99-2	Y	SSL_0.1	0.153	7.80	1996-04-01
Benzo(k)fluoranthene	LA-SMA-5.33	207-08-9	Y	SSL_0.1	1.53	7.90	1996-04-01
Cadmium	LA-SMA-5.33	Cd	Y	BTV	0.400	1.10	1996-04-01
Chromium	LA-SMA-5.33	Cr	Y	BTV	19.3	44.6	2008-09-24
Copper	LA-SMA-5.33	Cu	Y	BTV	14.7	26.0	1996-04-01
Indeno(1,2,3-cd)pyrene	LA-SMA-5.33	193-39-5	Y	SSL_0.1	0.153	4.80	1996-04-01
Lead	LA-SMA-5.33	Pb	Y	BTV	22.3	200	1996-04-01
Mercury	LA-SMA-5.33	Hg	Y	BTV	0.100	0.550	1996-04-19
Nickel	LA-SMA-5.33	Ni	Y	BTV	15.4	24.1	2008-09-24
Silver	LA-SMA-5.33	Ag	Y	BTV	1.00	3.30	1996-04-01
Zinc	LA-SMA-5.33	Zn	Y	BTV	48.8	150	1996-04-01

Figure 32.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.33

32.4 Stormwater Evaluation

32.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No samples have been collected in the current stage at the SMA.

32.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.33 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

32.5 Site-Specific Demonstration

32.5.1 Soil Data Summary

No Site-related POCs exceeded the applicable screening value in soil data.

32.5.2 Stormwater Data Summary

No data for the current monitoring stage have been collected. Gross alpha exceeded in the previous monitoring stage.

32.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

32.5.4 Sampling and Analysis Plan

Table 32.5-1 is the proposed SAP for LA-SMA-5.33.

Table 32.5-1 Proposed SAP, LA-SMA-5.33

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, and stormwater data
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

33.0 LA-SMA-5.35

Associated Sites	C-41-004
Receiving Water	Los Alamos Canyon
Drainage Area	0.01 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC C-41-004: In Progress Deferred per Consent Order
2010 AC Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Long-term Stewardship per Permit Part I.C.3 criterion

33.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater samples were collected in August and September 2011. Analytical results from these samples initiated corrective action.

Following the December 2012 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2012, 232349), corrective action monitoring was initiated and stormwater samples were collected in June and July 2014. Analytical results from these samples initiated corrective action.

The Permittees submitted a request for alternative compliance for the Site to EPA per permit Part I.E.3 in May 2015 044 (LANL 2015, 600418). No response has been received from EPA, and stormwater monitoring has not occurred since 2014.

33.2 Site History

C-41-004 (5/24/2017)

AOC C-41-004 is the active storm drain system around laboratory building 41-4 at TA-41. The system consists of seven catchment basins and/or manholes (structures 41-22 through 41-28) and connecting drainlines that collect stormwater from paved areas around building 41-4 and discharge the stormwater through an outfall to the Los Alamos Canyon drainage channel. There are no indications of contaminant releases to the system; however, no monitoring of the storm drains or outfalls has been conducted. Deposition from historical stack emissions between building 41-4 and 41-30 (an office building) may have resulted in surface tritium contamination of the storm drain system. Building 41-4 is currently in use, and the catchment basins/manholes and connecting drainlines are located within and under the asphalt pavement around the building.

TA-41 has been continuously used from the early 1940s for testing, monitoring, assembling, and storing nuclear weapon components, development of weapons subsystems and boosting systems, and for long-term studies on weapons subsystems. Isotopic analyses were conducted on uranium and plutonium samples. Operations at TA-41 required the use of radioactive materials, toxic gases, metals, and organic chemicals.

For investigation activities, refer to “Response to the Notice of Disapproval for the Investigation Report for Upper Los Alamos Canyon Aggregate Area, Los Alamos National Laboratory” (LANL 2010, 108536).

33.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 33.2-1.

Table 33.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
C-41-004	Storm drains	Tritium, uranium, plutonium, beryllium, lead, mercury

33.3 Consent Order Soil Data

Decision-level data for AOC C-41-004 consist of results from one sample collected at one location in 1995. Analytical results from this sample are presented in Figures 33.3-1 through 33.3-3. The 2006 IWP (LANL 2006, 091916) concluded that the nature and extent of contamination are not defined.

No sampling activities were proposed in the approved IWP for AOC C-41-004. Site characterization and investigation are deferred until the future D&D of building 41-4 and the remainder of structures in TA-41, when structures are removed to facilitate access to the Site with a drill rig.

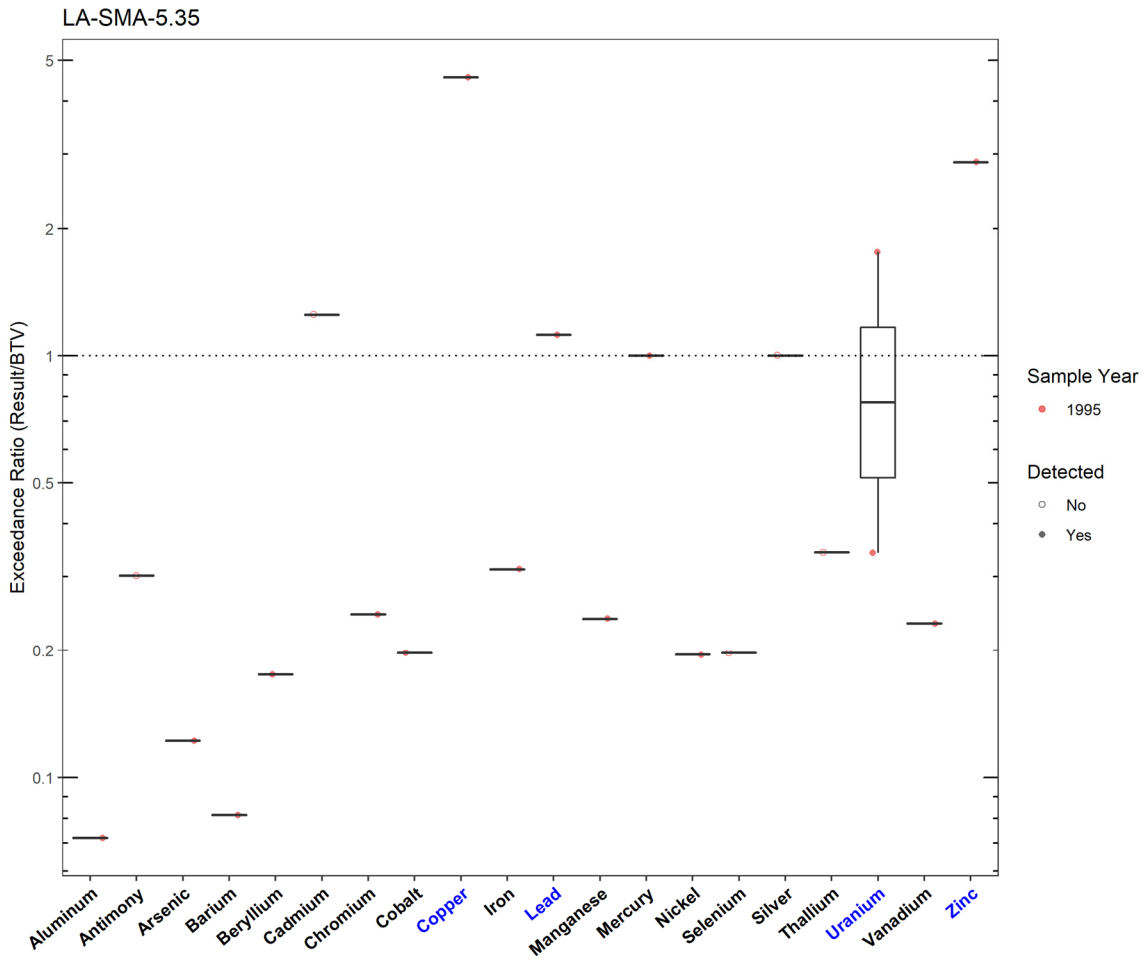

Figure 33.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.35 (Plot 1)

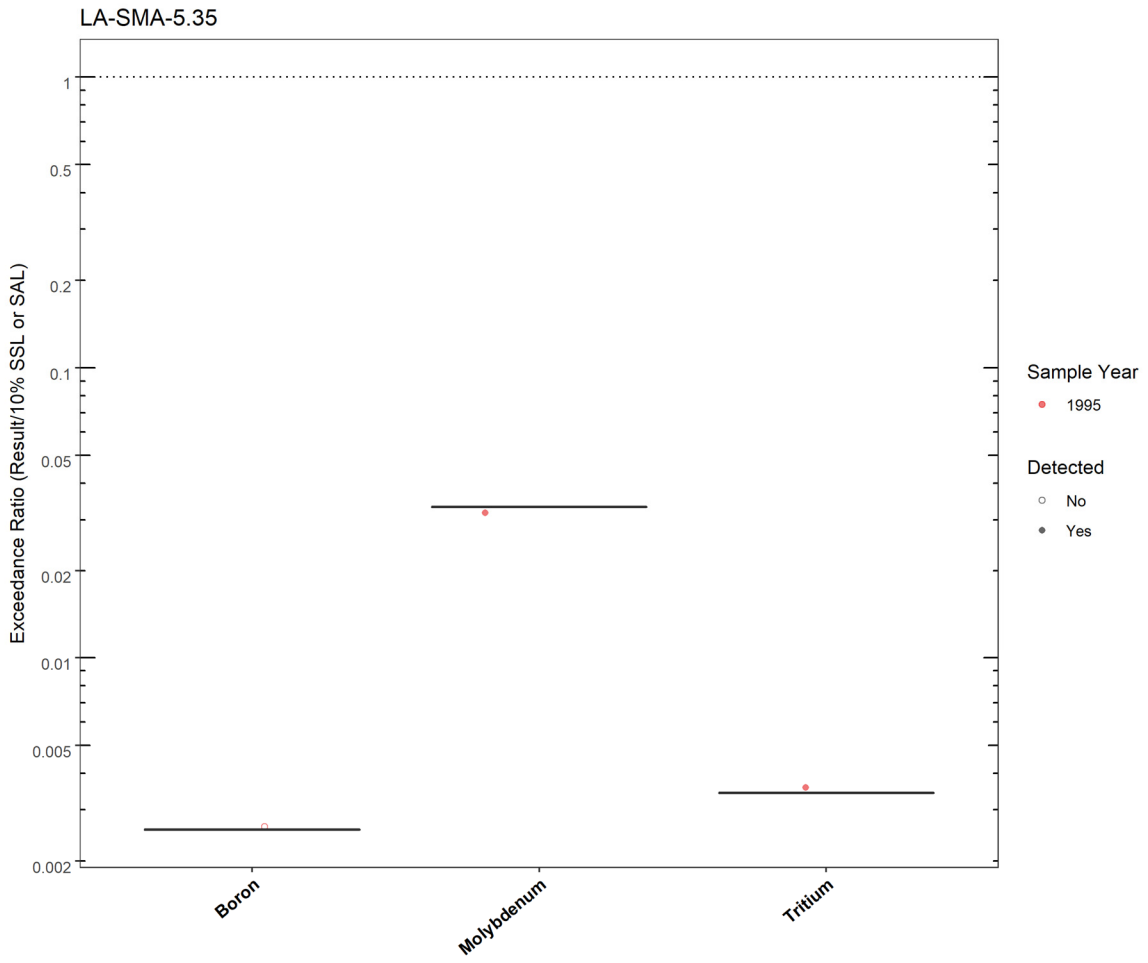

Figure 33.3-2 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.35 (Plot 2)

LA-SMA-5.35

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Copper	LA-SMA-5.35	Cu	Y	BTV	14.7	67.0	1995-02-27
Lead	LA-SMA-5.35	Pb	Y	BTV	22.3	24.9	1995-02-27
Uranium	LA-SMA-5.35	U	Y	BTV	1.82	3.20	1995-02-27
Zinc	LA-SMA-5.35	Zn	Y	BTV	48.8	140	1995-02-27

Figure 33.3-3 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.35

33.4 Stormwater Evaluation

33.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective-action stormwater samples were collected in June and July 2014; analytical results from those samples are presented in Figures 33.4-1 and 33.4-2.

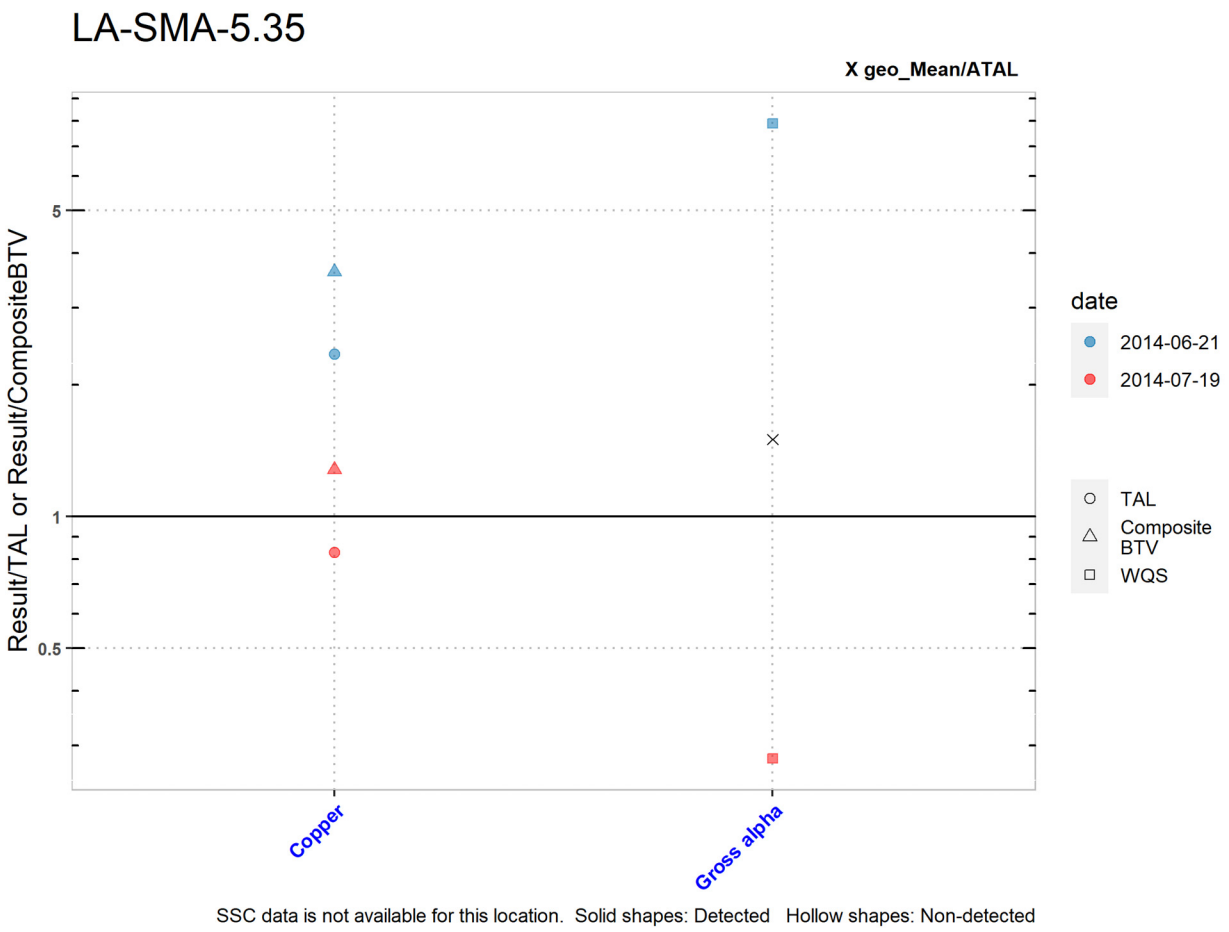

Figure 33.4-1 Analytical Results from Stormwater Samples, LA-SMA-5.35 (Plot)

LA-SMA-5.35

	Copper	Gross alpha
MQL	0.5	NA
ATAL	NA	15
MTAL	4.8	NA
Composite_BTV	3.12	57.2
unit	ug/L	pCi/L
2014-06-21 result	11.3	118
2014-06-21 dT	2.35	7.9
2014-06-21 dB	3.62	NA
2014-07-19 result	3.98	4.27
2014-07-19 dT	0.829	0.28
2014-07-19 dB	1.28	NA
geo_mean/ATAL	NA	1.5
geo_mean/B	NA	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV

Figure 33.4-2 Analytical Results from Stormwater Samples, LA-SMA-5.35 (Table)

33.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.35 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The gross alpha and mercury impairments may be Site-related, based on Site history.

33.5 Site-Specific Demonstration

33.5.1 Soil Data Summary

Copper, lead, uranium and zinc exceeded the applicable screening values in soil data. Zinc and lead had previously been monitored for in stormwater and did not exceed the TAL. Copper had previously been monitored in stormwater and did exceed the TAL and BTV, while uranium had not been previously monitored in stormwater; when the Site is un-deferred, copper and uranium will be added to the SAP.

33.5.2 Stormwater Data Summary

Copper exceeded both TAL and BTV. Gross alpha exceeded TAL, and there was no paired SSC data to determine if the result was below BTV.

33.5.3 2022 Permit Status

All Sites within the SMA are deferred under the Consent Order. Therefore, the SMA is eligible for long-term stewardship pursuant to Part 1.C.3.

34.0 LA-SMA-5.361

Associated Sites	32-002(b1), 32-002(b2)
Receiving Water	Los Alamos Canyon
Drainage Area	2.09 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 32-002(b1): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls SWMU 32-002(b2): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete/Alternative Compliance Requested
2016–2018 SIP Actions	The October 2017 field visit determined that more of the impacted area should be included in the SMA. Therefore, the sampler was moved.
2022 Permit Status	Active Monitoring

34.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. While developing the 2018 SAP, a decision was made to implement the monitoring location move recommended during the 2017 SIP review. Baseline monitoring was reinitiated and a baseline stormwater sample was collected in August 2019. Analytical results from this sample initiated corrective action.

SWMU 32-002(b1) received a COC under the Consent Order in December 2012. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in December 2019 (N3B 2019, 700724).

The Permittees submitted a request for alternative compliance for SWMU 32-002(b2) to EPA per permit Part I.E.3 in October 2020 (N3B 2020, 701098). No response has been received from EPA, and stormwater monitoring has not occurred since 2019.

34.2 Site History

32-002(b1) (3/28/2022)

Former SWMU 32-002(b) is a septic system that served former buildings 32-1 and 32-2 in former TA-32. It was split into separate new SWMUs 32-002(b1 and b2) in December 2012 to expedite completion of corrective actions on the portion of the site owned by the Los Alamos School Board. SWMU 32-002(b1) is the portion of the former septic system that is located on property currently owned by the Los Alamos School Board, while the remainder of the septic system, SWMU 32-002(b2), is located on property owned by the DOE. The septic system was installed directly northwest and slightly upgradient of the SWMU 32-002(a) septic tank, near the edge of Los Alamos Canyon, when the SWMU 32-002(a) septic system could no longer meet the usage requirement of the laboratory (building 32-1).

The inlet drainline from the SWMU 32-002(a) septic system was diverted to the SWMU 32-002(b) septic system, which also received effluent from building 32-2, the medical research annex. The former septic system consisted of a reinforced concrete tank (former structure 32-8) measuring 9 ft × 5 ft × 6 ft, with an outlet drainline that discharged to an outfall at the edge of Los Alamos Canyon, approximately 15 ft southwest of the SWMU 32-002(a) outfall.

Former building 32-1 operated as a research laboratory from 1944 to 1954. Research activities in former building 32-1 involved radionuclides along with inorganic and organic chemicals. Because no industrial waste line served former TA-32, chemical and radioactive wastes may have been disposed of in sinks and drains connected to the septic system at SWMU 32-002(b1).

TA-32 was decommissioned in 1954. The septic tank was removed in 1988 and disposed of at MDA G at TA-54, and the inlet drainline was removed during a VCA in 1996.

Former TA-32 is located within the Los Alamos townsite. Los Alamos County and the Los Alamos School Board own the mesa-top portion of former TA-32. The area was recently used by Los Alamos County to store equipment and materials for roadwork and maintenance. The County demolished all structures at the site in 2010 and is developing the area for commercial use. This site is currently under an asphalt parking lot.

For investigation activities, refer to "Supplemental Remedy Completion Report for Upper Los Alamos Canyon Aggregate Area, Former Technical Area 32, Revision 1" (LANL 2013, 233950).

32-002(b2) (9/28/2021)

Former SWMU 32-002(b), a former septic system located at the edge of Los Alamos Canyon that served former buildings 32-1 and 32-2, was split into two new SWMUs [SWMUs 32-002(b1) and 32-002(b2)] in December 2012 to expedite completion of corrective actions on the mesa-top portion of the site owned by Los Alamos Public Schools. SWMU 32-002(b1) is the portion of the former septic system that is located on property currently owned by Los Alamos Public Schools. The remainder of the septic system is located on property owned by DOE and is designated as SWMU 32-002(b2).

SWMU 32-002(b2) includes the section of a former septic system, located at the edge of Los Alamos Canyon that served former buildings 32-1 and 32-2, consisting of a former inlet pipe, former septic tank 32-8, and the former outlet drainline located on a high-angle slope south of the Smiths Marketplace parking lot on property owned by DOE in former TA-32.

The former SWMU 32-002(b) septic system was installed between 1948 and 1950, directly northwest and slightly upgradient of the SWMU 32-002(a) septic tank, near the edge of Los Alamos Canyon. The SWMU 32-002(b) septic system consisted of a reinforced concrete tank (former structure 32-8) measuring 9 ft × 5 ft × 6 ft, inlet drainlines from former buildings 32-1 and 32-2, and an outlet drainline that discharged to an outfall at the edge of Los Alamos Canyon. This system was installed when the SWMU 32-002(a) septic system could no longer meet the usage requirement of the laboratory in former building 32-1. The influent line from the SWMU 32-002(a) septic system was diverted to the former SWMU 32-002(b) septic system, which also received effluent from former building 32-2, the medical research annex. The outfall of SWMU 32-002(b) was located at the edge of Los Alamos Canyon, approximately 15 ft southwest of the SWMU 32-002(a) outfall. The septic tank was removed in 1988, and the influent drainline was removed in 1996 and disposed of at TA-54, MDA G.

Research activities in former building 32-1 involved radionuclides; inorganic and organic chemicals may also have been used. Because no industrial waste line served former TA-32, it is possible chemical and radioactive wastes may have been disposed of in sinks and drains connected to the former SWMU 32-002(b) septic system.

For investigation activities, refer to "Phase II Investigation Report for Upper Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2021, 701261).

34.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 34.2-1.

Table 34.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
32-002(b1)	Septic system	Inorganic and organic chemicals, radionuclides
32-002(b2)	Septic system	Inorganic and organic chemicals, radionuclides

34.3 Consent Order Soil Data

Decision-level data for SWMU 32-002(b1) consist of results from samples collected in 1996, 2008, and 2010. Revision 1 of the 2013 supplemental remedy completion report concluded the nature and extent of contamination are defined.

Decision-level data for SWMU 32-002(b2) consist of results from samples collected in 2008, 2010, 2011, 2013, and 2015. Revision 1 of the 2021 Phase II IR concluded the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-5.361 are presented in Figures 34.3-1 through 34.3-4.

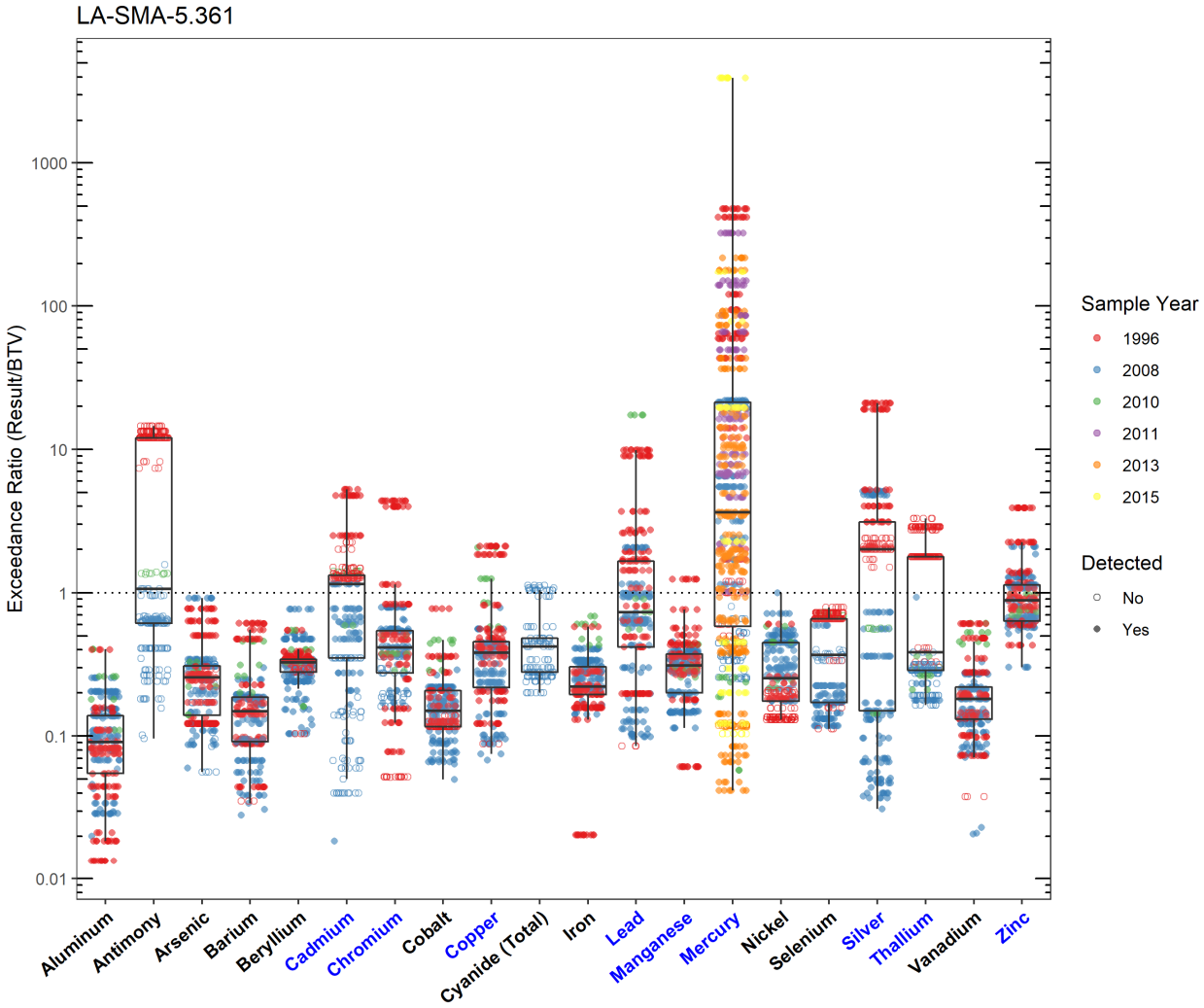

Figure 34.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.361

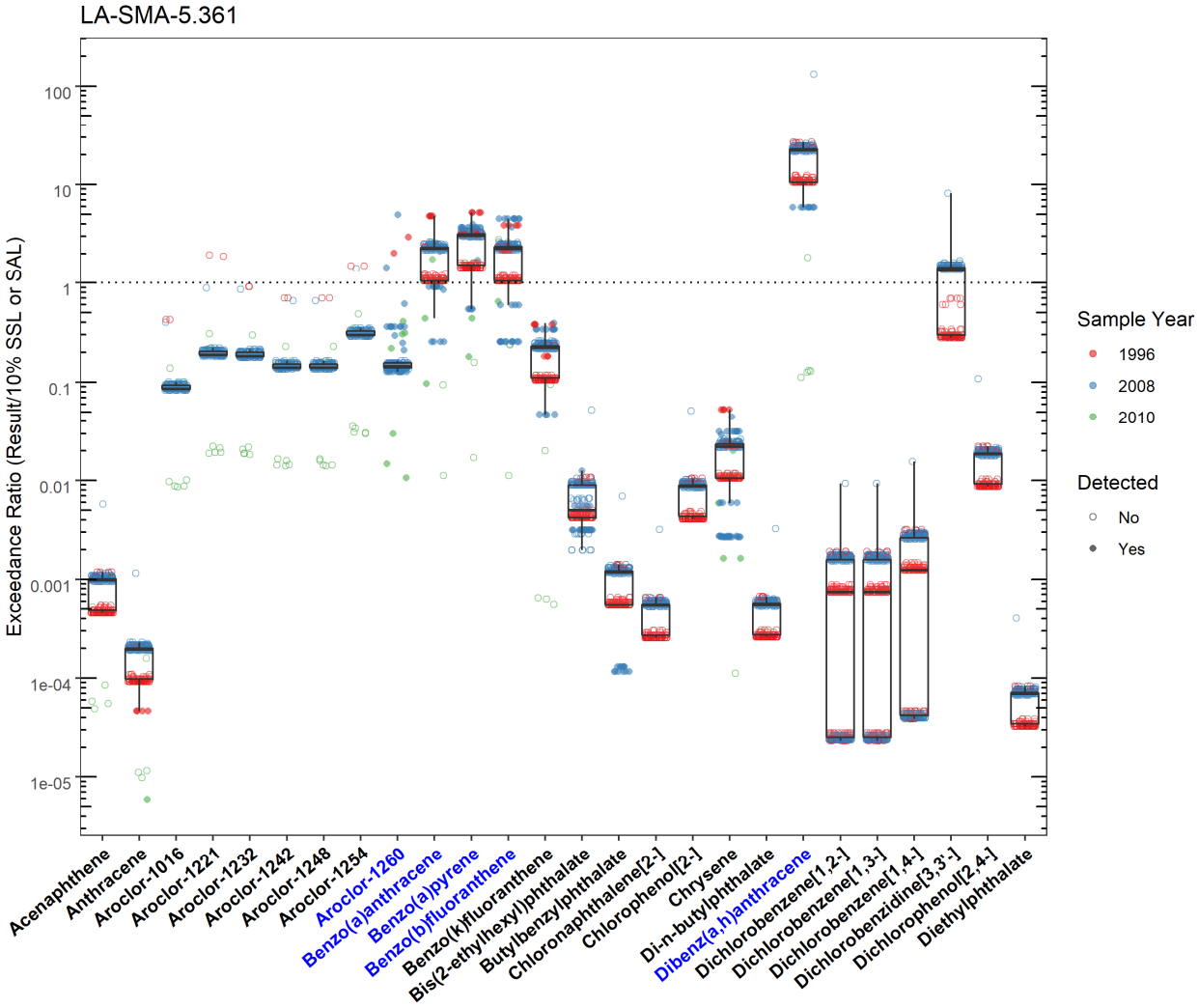

Figure 34.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.361 (Plot 1)

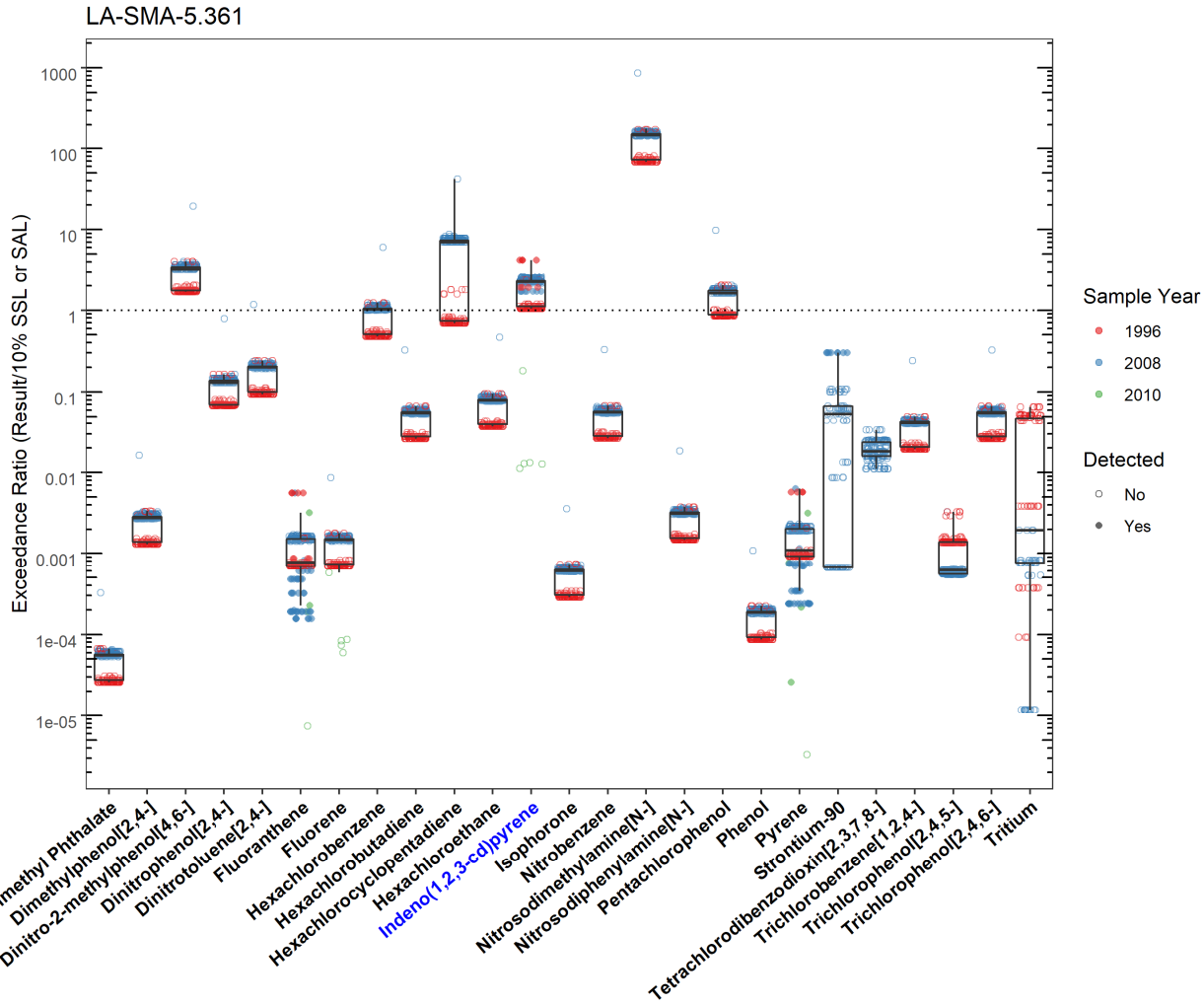

Figure 34.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.361 (Plot 2)

LA-SMA-5.361

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1260	LA-SMA-5.361	11096-82-5	Y	SSL_0.1	0.243	1.20	2008-09-30
Benzo(a)anthracene	LA-SMA-5.361	56-55-3	Y	SSL_0.1	0.153	0.730	1996-05-02
Benzo(a)pyrene	LA-SMA-5.361	50-32-8	Y	SSL_0.1	0.112	0.580	1996-05-02
Benzo(b)fluoranthene	LA-SMA-5.361	205-99-2	Y	SSL_0.1	0.153	0.690	2008-09-25
Cadmium	LA-SMA-5.361	Cd	Y	BTV	0.400	2.10	1996-05-06
Chromium	LA-SMA-5.361	Cr	Y	BTV	19.3	84.0	1996-03-28
Copper	LA-SMA-5.361	Cu	Y	BTV	14.7	31.0	1996-03-28
Dibenz(a,h)anthracene	LA-SMA-5.361	53-70-3	Y	SSL_0.1	0.0153	0.0900	2008-09-25
Indeno(1,2,3-cd)pyrene	LA-SMA-5.361	193-39-5	Y	SSL_0.1	0.153	0.640	1996-04-26
Lead	LA-SMA-5.361	Pb	Y	BTV	22.3	386	2010-03-02
Manganese	LA-SMA-5.361	Mn	Y	BTV	671	830	1996-05-06
Mercury	LA-SMA-5.361	Hg	Y	BTV	0.100	395	2015-05-05
Silver	LA-SMA-5.361	Ag	Y	BTV	1.00	21.0	1996-03-28
Thallium	LA-SMA-5.361	Tl	Y	BTV	0.730	1.30	1996-05-06
Zinc	LA-SMA-5.361	Zn	Y	BTV	48.8	190	1996-03-28

Figure 34.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.361

34.4 Stormwater Evaluation

34.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in August 2019. Analytical results from this sampling are presented in Figures 34.4-1 through 34.4-4.

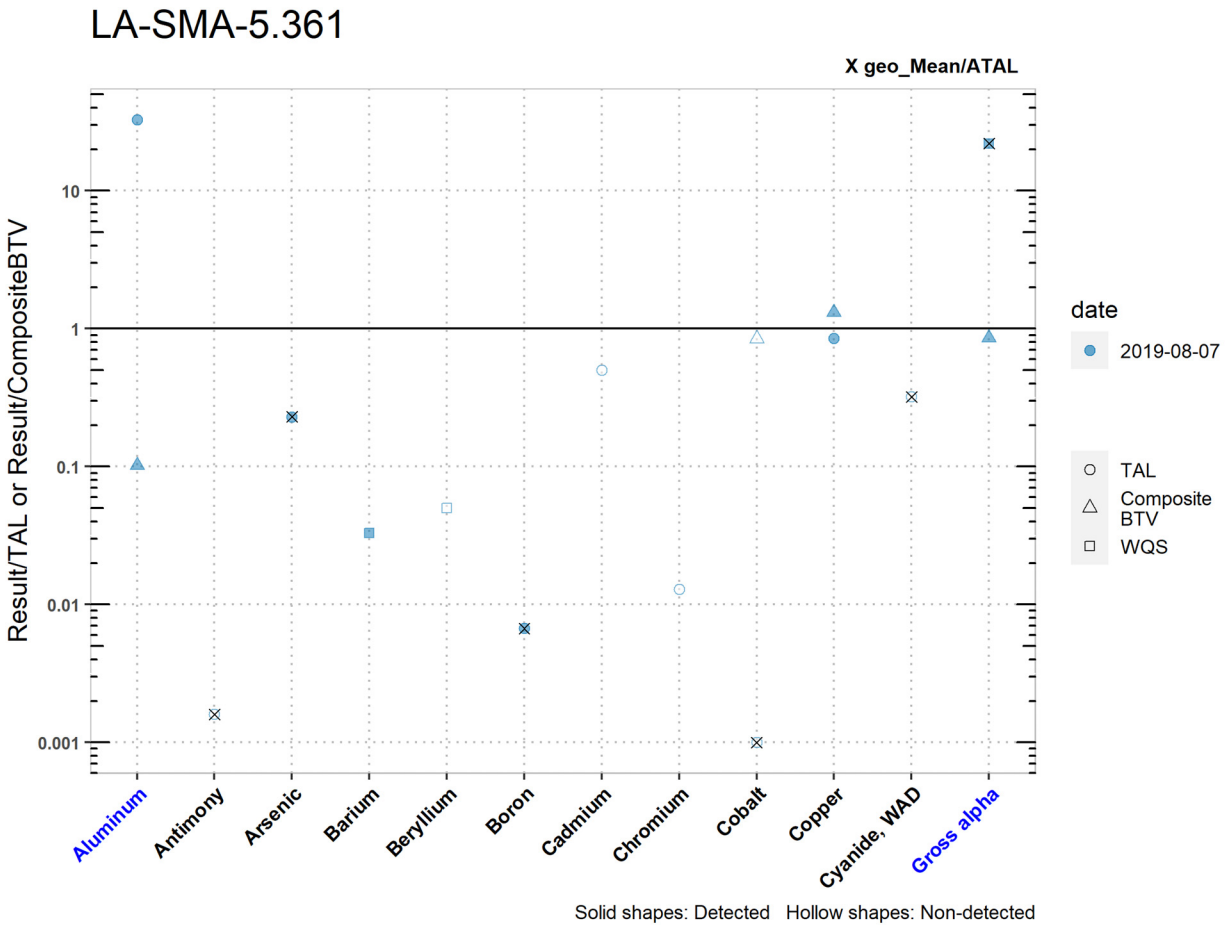

Figure 34.4-1 Analytical Results from Stormwater Sample, LA-SMA-5.361 (Plot 1)

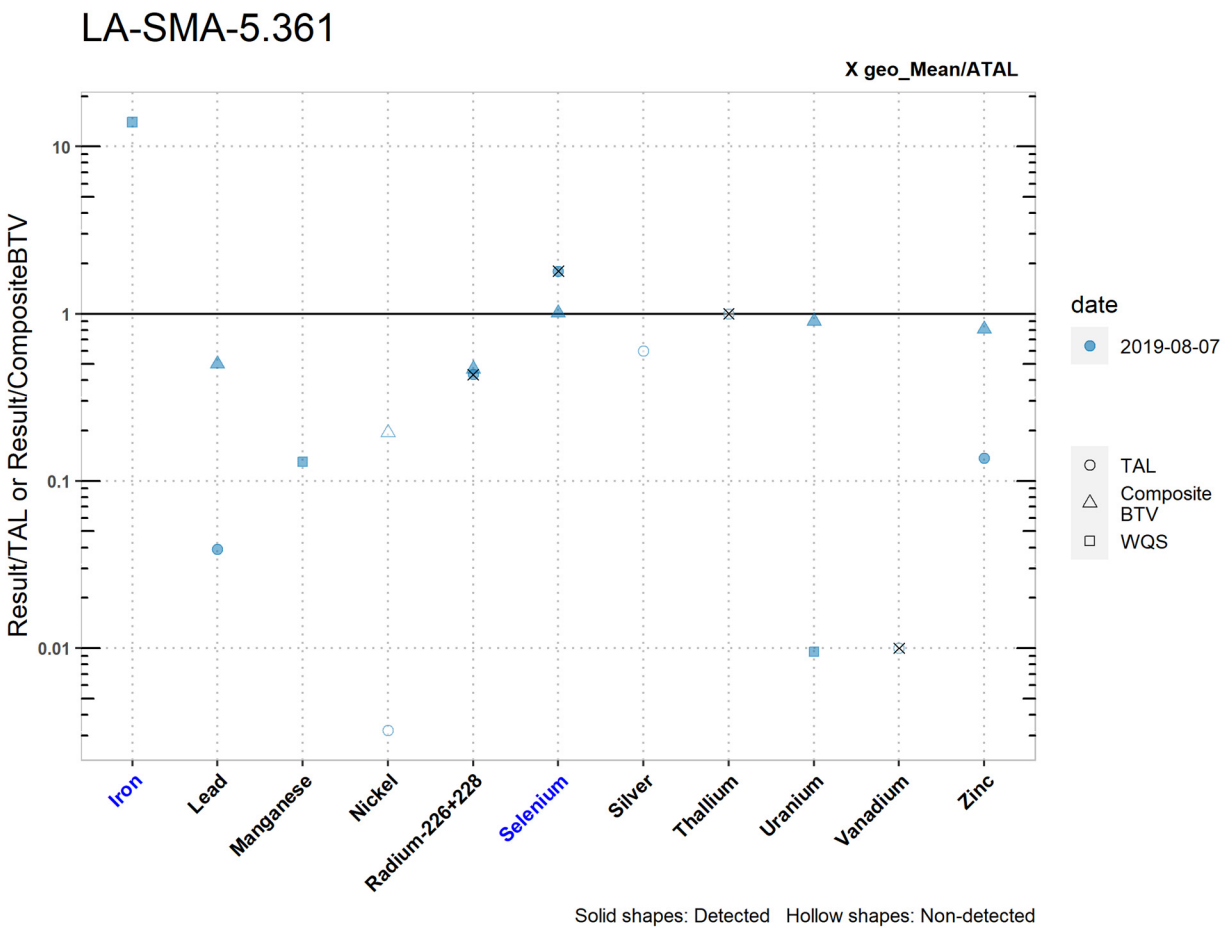

Figure 34.4-2 Analytical Results from Stormwater Sample, LA-SMA-5.361 (Plot 2)

LA-SMA-5.361

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	37400	NA	NA	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2019-08-07 result	25100	*1.00*	2.08	65.5	*0.200*	33.7	*0.300*	*3.00*	*1.00*	4.08	*1.67*	325
2019-08-07 dT	32.8	NA	0.23	0.033	NA	0.0067	NA	NA	NA	0.850	NA	22
2019-08-07 dB	0.102	NA	NA	NA	NA	NA	NA	NA	NA	1.31	NA	0.861
geo_mean/ATAL	NA	0.0016	0.23	NA	NA	0.0067	NA	NA	0.0010	NA	0.321	22

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 34.4-3 Analytical Results from Stormwater Sample, LA-SMA-5.361 (Table 1)

LA-SMA-5.361

	Iron	Lead	Manganese	Nickel	Radium-226+228	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.5	NA	5	0.5	0.5	NA	50	20
ATAL	NA	NA	NA	NA	30	5	NA	0.47	NA	100	NA
MTAL	NA	19.3	NA	186	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	NA	1.50	NA	3.10	4.21	8.98	NA	NA	0.315	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2019-08-07 result	13800	0.752	15.4	*0.600*	13.0	9.03	*0.300*	*0.600*	0.285	*1.00*	8.10
2019-08-07 dT	14	0.0390	0.13	NA	0.433	1.8	NA	NA	0.0095	NA	0.137
2019-08-07 dB	NA	0.501	NA	NA	0.468	1.01	NA	NA	0.905	NA	0.810
geo_mean/ATAL	NA	NA	NA	NA	0.433	1.8	NA	1	NA	0.010	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g

Figure 34.4-4 Analytical Results from Stormwater Sample, LA-SMA-5.361 (Table 2)

34.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.361 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The impairments may be Site-related, based on Site history.

34.5 Site-Specific Demonstration

34.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and mercury. The remaining metals, which exceeded the applicable screening value in soil data, were previously monitored in stormwater data and did not exceed the TAL.

34.5.2 Stormwater Data Summary

Aluminum and gross alpha exceeded TALs but were below BTVs. Selenium exceeded both TAL and BTV.

34.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

34.5.4 Sampling and Analysis Plan

Table 34.5-1 is the proposed SAP for LA-SMA-5.361.

Table 34.5-1 Proposed SAP, LA-SMA-5.361

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment, Site history (organics), and soil data
Total selenium (1) and mercury (1)	Impairments, Site history (metals), stormwater data (selenium), and soil data (mercury)
Cyanide (1)	Impairment and Site history (inorganics)
SVOCs	Site history (organics) and soil data
DOC	Permit requirement
SSC	Permit requirement

35.0 LA-SMA-5.362

Associated Sites	32-003
Receiving Water	Los Alamos Canyon
Drainage Area	0.02 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC 32-003: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	The October 2017 field visit determined that the current sampling location did not adequately address runoff from the SWMU (specifically PCB contamination at soil location 32-603602). A follow-up visit determined that the best solution would be to add gravel bags to direct flow towards the current sampler location. The gravel bags were installed in November 2018.
2022 Permit Status	Active Monitoring

35.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection at LA-SMA-5.362. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

35.2 Site History

32-003 (3/28/2022)

AOC 32-003 is the location of a former transformer station (former structure 32-10), which consisted of three transformers, suspended approximately 20 ft off the ground on poles, on a wooden platform at former TA-32. AOC 32-003 was discovered northwest of the former SWMU 32-002(b) septic tank and directly south of former building 32-1 during the 1993 Phase I RFI at former TA-32. The pile of wood debris at this location was initially thought to be the location of the SWMU 32-002(a) wood-frame septic tank, but was determined to be from the wooden transformer platform. Contaminated soil was excavated during a 1996 VCA and the Site was backfilled with clean soil.

For investigation activities, refer to “Supplemental Remedy Completion Report for Upper Los Alamos Canyon Aggregate Area, Former Technical Area 32” (LANL 2012, 226638).

35.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 35.2-1.

Table 35.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
32-003	Transformer site (former location)	PCBs

35.3 Consent Order Soil Data

Decision-level data for AOC 32-003 consist of results from samples collected in 2008 and 2010. Analytical results from those samples are presented in Figures 35.3-1 through 35.3-4. Revision 1 of the 2011 remedy completion report concluded that the nature and extent of contamination are defined.

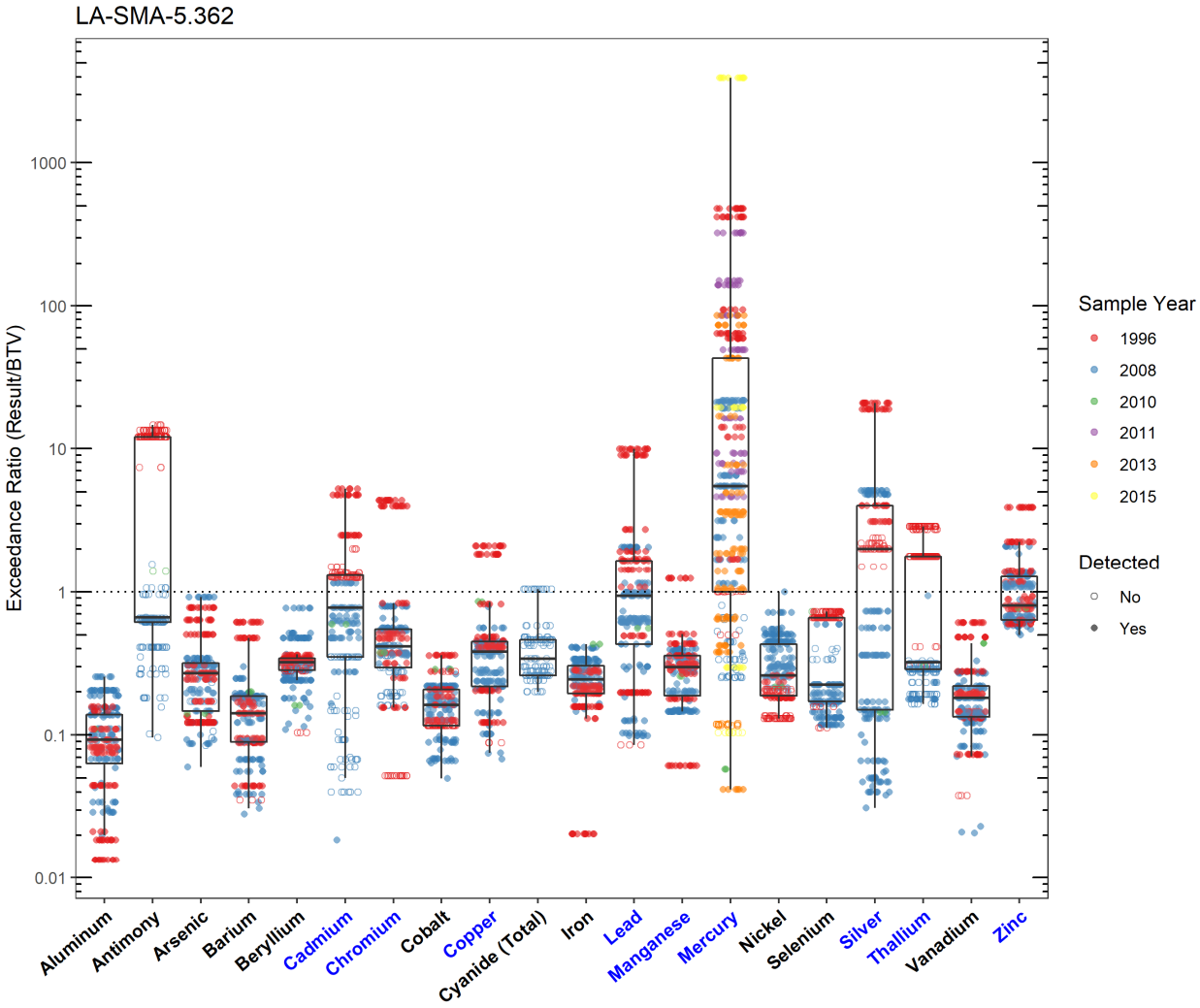

Figure 35.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.362

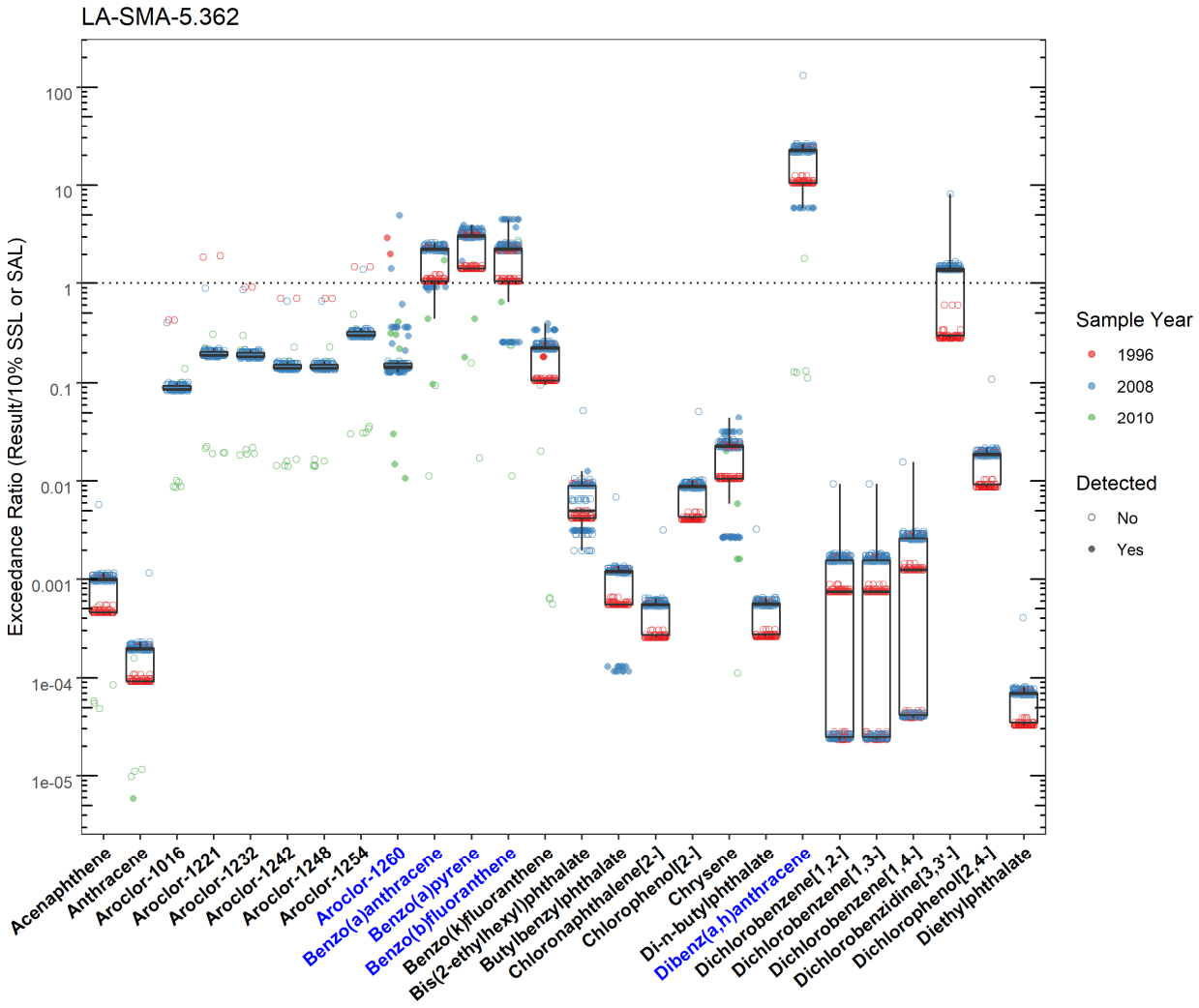

Figure 35.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.362 (Plot 1)

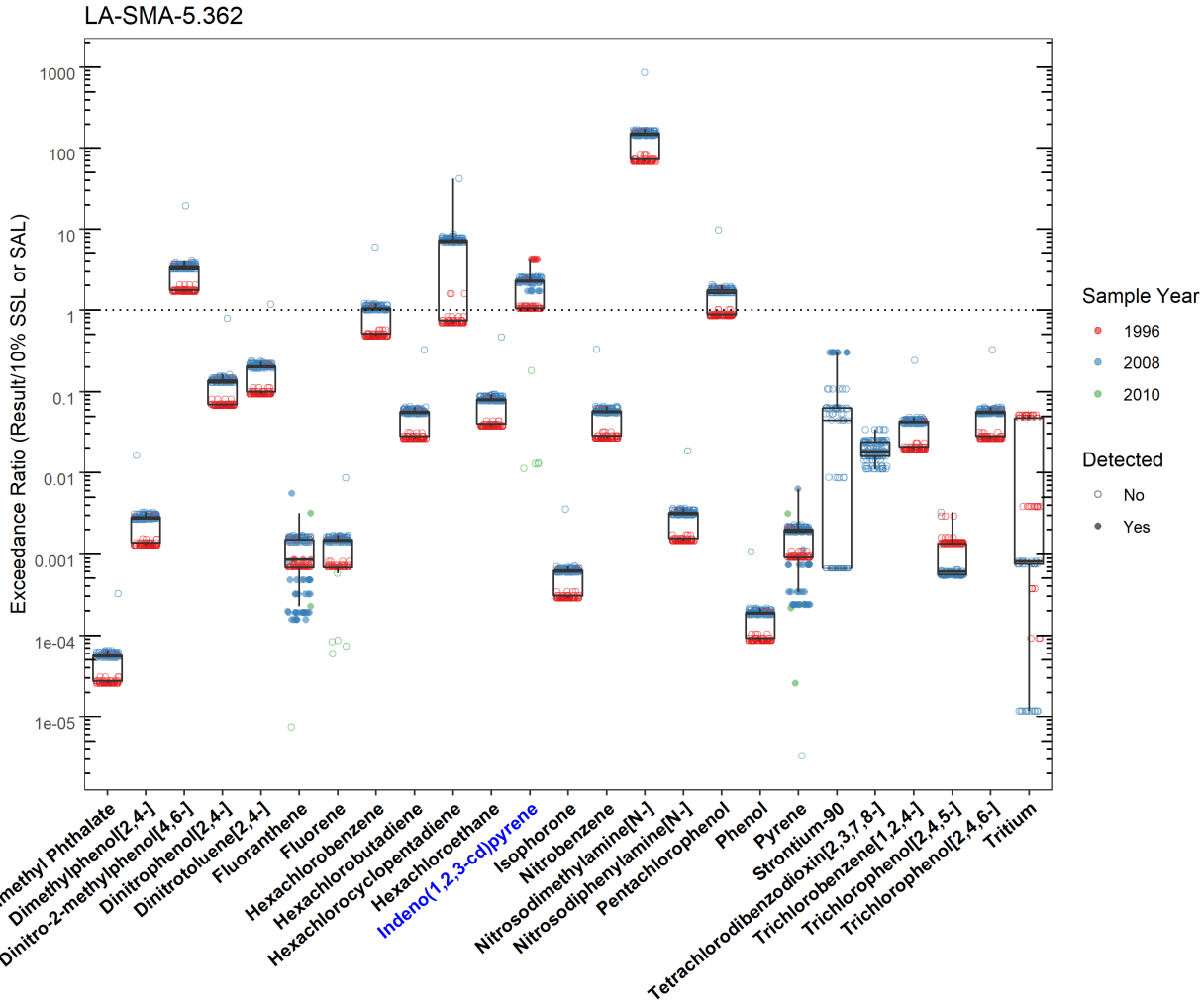

Figure 35.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.362 (Plot 2)

LA-SMA-5.362

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1260	LA-SMA-5.362	11096-82-5	Y	SSL_0.1	0.243	1.20	2008-09-30
Benzo(a)anthracene	LA-SMA-5.362	56-55-3	Y	SSL_0.1	0.153	0.320	2008-09-30
Benzo(a)pyrene	LA-SMA-5.362	50-32-8	Y	SSL_0.1	0.112	0.440	2008-09-30
Benzo(b)fluoranthene	LA-SMA-5.362	205-99-2	Y	SSL_0.1	0.153	0.690	2008-09-25
Cadmium	LA-SMA-5.362	Cd	Y	BTV	0.400	2.10	1996-05-06
Chromium	LA-SMA-5.362	Cr	Y	BTV	19.3	84.0	1996-03-28
Copper	LA-SMA-5.362	Cu	Y	BTV	14.7	31.0	1996-03-28
Dibenz(a,h)anthracene	LA-SMA-5.362	53-70-3	Y	SSL_0.1	0.0153	0.0900	2008-09-25
Indeno(1,2,3-cd)pyrene	LA-SMA-5.362	193-39-5	Y	SSL_0.1	0.153	0.640	1996-04-26
Lead	LA-SMA-5.362	Pb	Y	BTV	22.3	220	1996-03-28
Manganese	LA-SMA-5.362	Mn	Y	BTV	671	830	1996-05-06
Mercury	LA-SMA-5.362	Hg	Y	BTV	0.100	395	2015-05-05
Silver	LA-SMA-5.362	Ag	Y	BTV	1.00	21.0	1996-03-28
Thallium	LA-SMA-5.362	Tl	Y	BTV	0.730	1.30	1996-05-06
Zinc	LA-SMA-5.362	Zn	Y	BTV	48.8	190	1996-03-28

Figure 35.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.362

35.4 Stormwater Evaluation

35.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

35.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.362 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The PCB impairment may be Site-related, based on Site history.

35.5 Site-Specific Demonstration

35.5.1 Soil Data Summary

Aroclor-1260 is the only Site-related POC that exceeded the applicable screening value in soil data; it has not yet been measured in stormwater. The remaining exceedances of the applicable screening value in soil data are not Site-related POCs and will not be added to the SAP.

35.5.2 Stormwater Data Summary

No confirmation-monitoring data.

35.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

35.5.4 Sampling and Analysis Plan

Table 35.5-1 is the proposed SAP for LA-SMA-5.362.

Table 35.5-1 Proposed SAP, LA-SMA-5.362

Monitoring Constituent	Background for Monitoring
Total PCBs	Impairment, Site history, soil data
DOC	Permit requirement
SSC	Permit requirement

36.0 LA-SMA-5.51

Associated Sites	02-003(a), 02-003(e), 02-004(a), 02-005, 02-006(b), 02-006(c), 02-006(d), 02-006(e), 02-008(a), 02-009(b), 02-011(a), 02-011(b), 02-011(c), 02-011(d), 02-014
Receiving Water	Los Alamos Canyon
Drainage Area	9.6 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC 02-003(a): In Progress AOC 02-003(e): In Progress AOC 02-004(a): In Progress SWMU 02-005: In Progress AOC 02-006(b): In Progress AOC 02-006(c): In Progress SWMU 02-006(d): In Progress SWMU 02-006(e): In Progress SWMU 02-008(a): In Progress SWMU 02-009(b): In Progress AOC 02-011(a): In Progress AOC 02-011(b): In Progress AOC 02-011(c): In Progress AOC 02-011(d): In Progress SWMU 02-014: In Progress
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	The October 2017 field visit determined that PCB contamination in soil was not being monitored by the current SMA location (west of the reactor area, soil sampling locations 02-613291, 02-612376, 02-613290, 02-600561, 02-612377, 02-612376, 02-613622, and 02-612379); however, no sampler move was recommended.
2022 Permit Status	Active Monitoring

36.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in July 2013. Analytical results from this sample initiated corrective action.

Following the July 2014 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2014, 257905), corrective action monitoring was initiated. Since that time, stormwater flow has not been sufficient for full-volume corrective action sample collection; monitoring is ongoing.

36.2 Site History

02-003(a) (9/3/2019)

AOC 02-003(a) was the site of the stack-gas valve house (former structure 02-19) and associated gaseous effluent vent lines (former lines 117, 118, and 119), as shown on engineering drawing C-1718. Line 117 was a 4-in. cast-iron line through which three other lines passed. Line 118 was a smaller diameter stainless-steel line that served a temporary gas vent or sampling line. Line 119 was a 3-in.

stainless-steel line which carried gaseous effluent from building 02-19 to the intersection with the Omega West Reactor vent line. This system was associated with the WBR, a homogeneous liquid-fueled reactor at TA-02 which was fueled by an enriched uranyl-salt compound. The stack-gas valve house and gaseous effluent vent lines were installed in 1944 and received off-gas from the WBR. The off-gas contained fission products, including cesium-137, strontium-90, technetium-99, and iodine-131.

The stack-gas valve house was primarily aboveground and was constructed of reinforced concrete, 11 ft x 9 ft x 10 ft high, with 18-in.-thick walls. From 1944 to 1948, gaseous effluent entered the stack-gas valve house from line 117 and was directed via line 118 to the southeast. Line 118 was used as a temporary gas vent until July 1948, when the condensate trap and line 119 [AOC 02-003(b)] became operational. Line 118 was left in place from 1948 until its removal in 1985. Lines 117 and 119, and the stack-gas valve house, remained in use until 1974 when they became inactive. They were removed and disposed of during D&D efforts in 1985 and 1986.

02-003(e) (9/3/2019)

AOC 02-003(e) is the former location of an Alloy 800-L holding tank (former structure 02-62) that was located near the former WBR at TA-02. The tank was installed in approximately 1944, adjacent to the stack-gas valve house (former structure 02-19), to collect reactor cooling water in the event of a cooling-coil breach.

The tank was housed in a 6 ft × 4 ft × 3 ft wooden shed and was operational until approximately 1974, when the WBR was placed in safe-shutdown mode. The holding tank was removed and disposed of during D&D activities in 1985 and 1986. During D&D, the tank reportedly showed no sign of having been used. However, reports of a “surge tank” overflowing indicate that an original tank may have been used and replaced during its active life.

02-004(a) (9/3/2019)

AOC 02-004(a) is the former OWR facility (building 02-01), and comprises the former OWR fuel handling area, cooling-liquid recirculating piping, gaseous effluent vent lines, the OWR material storage area, and the WBR at TA-02. The description of AOC 02-004(a) is divided into the following four areas: OWR, Fuel-Handling Area, Cooling-Liquid Recirculating Piping, and Gaseous Effluent Vent Line.

A 25-kilowatt fast-neutron research reactor, Clementine, was formerly located in the western third of building 02-01. The reactor was self-contained and operated from 1946 to 1953. Clementine was the precursor to the OWR and was dismantled in 1954. The OWR was built above the former Clementine Site in the western third of building 02-01. The OWR was an 8-megawatt water-cooled tank-type research reactor fueled by enriched solid uranium. It was put online in 1956 and operated until it was put on standby status in 1993. The reactor remained inactive until it was decommissioned, removed, and disposed of in 2003.

The OWR fuel-handing area consisted of a fuel pit and a closed recirculating system that serviced only the fuel pit. It was located adjacent to the OWR and was used for temporary storage of fuel rods before they were recycled.

The OWR operated with a cooling-liquid recirculating system that consisted of a series of closed-loop pipes in a 100-ft-long corridor that extended from the OWR west to the reactor facility equipment building [building 02-44, AOC 02-004(f)]. The water was routed through pumps, filters, and chillers in the reactor facility equipment building and returned to the reactor. The cooling tower (structure 02-49) was added in 1959 to supplement the building 02-44 chillers in this closed system. The recirculating system was active from 1956 to 1993, when it was put on standby status during the OWR shutdown.

Off-gas from the OWR was routed through the gaseous effluent vent line to a connection into line 119 on the east side of TA-02, where the effluent continued up to the mesa-top stack [structure 02-09, SWMU) 02-006(a)]. The gaseous effluent vent line teed off from the piping corridor between the OWR and OWR equipment building (02-44), as shown on engineering drawing C-10473.

OWR Material Storage Area

Operation of the OWR included the temporary storage of material (isotope columns, through-put port metal sleeves, etc.) that became activated during contact in the reactor neutron flux field. The material was stored in a structure adjacent to the guard quarters (building 02-04), located south of the reactor, to await final disposition. The material storage structure was present in as-built engineering drawing R-391 in 1958 and was removed in 2000.

WBR

WBR was the name collectively used to describe a series of three small research reactors (LOPO, HYPO, and SUPO), each progressively stronger in power output, located in the eastern third of the OWR building (02-01). The reactors each consisted generally of a 1-ft-diameter sphere filled with liquid fuel, and each was surrounded with neutron-reflecting blocks on a graphite base. The LOPO reactor became functional in May 1944, and was dismantled, removed, and disposed of in September 1944. The HYPO reactor became operational in December 1944 and was later upgraded to SUPO, which became operational in 1951. The SUPO was decommissioned, removed, and disposed of in 1990.

The reactors were surrounded by a 15-ft × 15-ft × 11-ft concrete biological shield. A shallow sand pit and a utility trench beneath the reactor sphere were used to collect liquids and gases from the reactor and transport them to support structures on the east side of building 02-01. Six external concrete structures and 435 ft of contaminated underground piping associated with the gaseous effluent vent line system were dismantled, removed, and disposed of in 1986. Cesium-137 contamination was found in the OWR building (02-01) near the sand pit and the utility trench during D&D activities. The soil was removed and disposed of during D&D activities.

At peak operation, the WBR generated approximately 0.25 L/min of excess gas containing some fission products. These gases were managed through the WBR gaseous effluent vent line system. Some radionuclides may have been deposited on the ground surface as gaseous effluent drifted from this system, and condensate from the gaseous effluent may have leaked from portions of the vent line system. These releases are identified as AOCs 02-003(a, b, c, and d).

The OWR experienced a cooling system water leak in January 1993. As a result, the reactor was put on standby status in 1993 and remained inactive until it was decommissioned in 2003.

02-005 (9/3/2019)

SWMU 02-005 consists of an area of potential soil contamination from airborne drift of potassium dichromate that was used to inhibit corrosion in the OWR cooling tower (former structure 02-49) at TA-02. SWMU 02-005 is located north and upgradient of all the former TA-02 structures. The cooling tower was installed and became operational in 1957. It was constructed with aluminum heat exchangers prone to corrosion, so potassium dichromate was added to the make-up water as a corrosion inhibitor. Stainless-steel heat exchangers were installed in 1975 to eliminate the use of potassium dichromate.

The cooling tower operated until the OWR was shut down in 1993; the cooling tower was decommissioned in 1995. In 2000, the cooling tower structure and equipment were removed and disposed of at TA-54. The remaining buried drainlines and drains were removed and disposed of at TA-54 or Envirocare in 2003.

02-006(b) (9/3/2019)

SWMU 02-006(b) was an acid-waste line that carried effluent from several laboratories in the center of the former OWR Building (former building 02-01) south to an outfall in Los Alamos Creek at TA-02. Construction of the OWR Building and associated laboratory rooms, sinks, and the acid-waste line [SWMU 02-006(b)] was completed in 1946 and became operational in 1956. The acid-waste line was a 95-ft long, 4-in.-diameter Durion pipe with Ookum fittings and lead joints. The outfall in Los Alamos Creek was covered with a 0.25-in. × 0.25-in. mesh rodent screen as shown in Engineering Drawings 4-C-701 and C-1750. The acid-waste line was reportedly taken out of service in the 1960s; however, there is no record of its removal at that time. The SWMU 02-006(b) waste line and all connecting lines were removed and disposed of during D&D activities in 2003.

A 1990 Environmental Safety and Health Division memorandum indicates that the OWR acid-waste line was proposed to be connected to the new RLW line that would connect the drains from south side of the OWR directly to the acid pit/transfer pump [former structure 02-53, AOC 02-004(e)] for transfer to the TA-50 RLWTF for treatment. There is no documentation confirming that this was done.

02-006(c) (9/3/2019)

AOC 02-006(c) was a sanitary sewer line that served office areas in the OWR Building (former building 02-01) to the septic tank (structure 02-43, SWMU 02-007 at TA-02. The 1990 SWMU Report identified AOC 02-006(c) as a drainline that was connected to the chemical room in the OWR Building (former building 02-01) and several OWR laboratories. This was incorrect; closer review of the available engineering drawings, including C-1703 and C-1750, showed that AOC 02-006(c) was the sanitary sewer line that served the office or central portion of the OWR Building, 02-01 to the septic tank (structure 02-43, SWMU 02-007 at TA-02. This drainline was separate from the OWR acid-waste line [SWMU 02-006(b)] that connected to the OWR laboratories.

The AOC 02-006(c) sanitary sewer line was a 6-in. clay drainline that received discharges from the evaporative cooler and drinking fountain associated with the control room, restrooms, office areas, and groundwater seepage from a sump in the building 02-01 basement, and discharged to the AOC 02-007 septic system west of the OWR Building. In the mid-1970s, sanitary discharges associated with AOC 02-006(c) were tied into the TA-41 WWTP west of TA-02; however, the drainline continued to discharge groundwater seepage from the OWR Building basement to the AOC 02-007 septic system.

During the Phase I D&D activities conducted at TA-02 in 1985 and 1986, the 6-in. clay drainline [AOC 02-006(c)] was disconnected from septic tank 02-43 (AOC 02-007) as the tank was being removed. The AOC 02-006(c) drainline was tied into a new 6-in. PVC outlet drainline and continued to discharge seepage from the OWR Building basement to a new outfall into the Los Alamos Creek [AOC 02-008(c)(i)].

The OWR experienced a cooling-system water leak in January 1993. As a result, the reactor was put on standby status in 1993 and remained inactive until it was decommissioned in 2003. The AOC 02-006(c) sewer line was removed and disposed of during D&D activities in 2003.

02-006(d) (4/12/2017)

AOC 02-006(d) is a duplicate of 02-006(c).

02-006(e) (9/3/2019)

AOC 02-006(e) was a sump (former structure 02-26) and outlet drainline that received effluent from the OWR Building (former building 02-01) reactor room floor drains and mezzanine and discharged to an outfall Los Alamos Creek at TA-02. The AOC 02-006(e) drainline became operational in 1944. A second

collection sump (former structure 02-82) was added to the AOC 02-006(e) drainline in 1990, as shown on engineering drawing C-45924. A drainline from the structure 02-82 sump was connected directly to the AOC 02-004(e) acid pit/transfer sump (former structure 02-53), possibly replacing the AOC 02-006(e) direct discharge to Los Alamos Creek. The AOC 02-006(e) drainlines and sumps were located south of the OWR Building, in close proximity to the AOC 02-011(a)(vii) drainline and outfall.

The OWR experienced a cooling-system water leak in January 1993. As a result, the reactor was put on standby status in 1993 and remained inactive until it was decommissioned in 2003. The original sump (former structure 02-26) and the original drainline remained in place until they were removed and disposed of during D&D activities in 2003. The second sump (former structure 02-82) and the drainline to former structure 02-53 [AOC 02-004(e)] were also removed during D&D activities in 2003.

02-008(a) (9/3/2019)

SWMU 02-008(a) is a former NPDES-permitted outfall (EPA 03A020) and associated drainline that discharged cooling water blowdown from the OWR cooling tower (structure 02-49) to an outfall [AOC 02-011(e)] in Los Alamos Creek at TA-02. Equipment building 02-44, which became operational in 1954, had floor drains that discharged to Los Alamos Creek through the SWMU 02-008(a) outfall. Modifications to the OWR cooling water system, with the addition of the cooling tower (former structure 02-49), were made in 1957, as shown on engineering drawing C-21327. The drain from the OWR equipment building was connected to the cooling tower outfall in 1959, as shown on engineering drawing C-48768. The outfalls in Los Alamos Creek were physically the same [location of SWMU 02-008(a)]. The cooling tower facility began use of potassium dichromate to control corrosion of aluminum heat exchangers in 1959. The aluminum heat exchangers were replaced by stainless-steel exchangers in 1975, eliminating the use of potassium dichromate. The shutdown of the OWR in 1993 placed the cooling tower on standby status; in 1995, all liquid waste was drained from the system. In 2000, the cooling tower structure and equipment were decommissioned and removed. In 2003, the remaining buried pipes and drains were removed. The outfall (EPA 03A020) was removed from the LANL NPDES permit in July 1990.

02-009(b) (9/3/2019)

SWMU 02-009(b) is an area of radioactively-contaminated soil (beta/gamma radiation) located north of the former stack-gas valve house (structure 02-19) and the east bridge at TA-02. SWMU 02-009(b) was identified during radiological surveys conducted across the area during the 1985–1986 D&D of the WBR and associated facilities. Detectable beta/gamma radioactivity was identified in the area used for truck staging during the D&D activities and within a fenced area north of former building 02-19.

02-011(a) (9/3/2019)

AOC 02-011(a) consists of 11 inactive drains, drainline segments, and associated former outfalls at TA-02. These drains and drainlines discharged either directly or indirectly to Los Alamos Creek, and were associated with former building 02-01, the former OWR facility. AOC 02-011(a) consists of the following subunits:

i. An approximately 50-ft-long concrete storm drain (also described as a concrete flume), located northwest of the former OWR (building 02-01), that drained into a drop inlet/catch basin (structure 02-36), as shown on engineering drawing R-5102, sheet 2 of 2. There is no information indicating that the drain handled anything but stormwater.

ii. A 24-in.-diameter, 8-ft-long underground CMP between catch basin 02-36 and catch basin 02-27. There is no information that this drain line handled anything but stormwater.

iii. An 85-ft-long concrete storm drain (e.g., concrete flume), located northwest of the former OWR (building 02-01), that drains into catch basin 02-27. The drain was reportedly used periodically for discharge of water from the fuel transfer pit. Contaminated aluminum shards were commonly discharged with the water and settled into the drain. The storm drain was reportedly cleaned out in 1970.

iv. A 15-in.-diameter, 15-ft-long concrete storm drain west of the former OWR (building 02-01) that drains into catch basin 02-28 (surface inlet). There is no information that the drain handled anything but stormwater.

v. A 24-in.-diameter, 30-ft-long concrete storm drain between catch basins 02-27 and 02-28. This drain may have handled the fuel transfer pit water coming from the concrete flume, with associated contaminated aluminum shards.

vi. A 30-in.-diameter, 75-ft-long CMP between a catch basin (structure 02-28) and Los Alamos Creek. This drainline may have handled the fuel transfer pit water coming from the concrete flume, with associated contaminated aluminum shards.

vii. AOC 02-011(a)(vii), a 6-in.-diameter, 18-ft-long pipe between the OWR Building and the salvage basin (structure 02-026) and Los Alamos Creek, is a duplicate of AOC 02-006(e), as noted in the 1990 SWMU report.

viii. An 18-in.-diameter, 75-ft-long CMP between the former OWR (building 02-01) catch basin (unnumbered structure within building 02-01) and Los Alamos Creek. There is no information that this drainline handled anything but stormwater runoff. The AOC 02-011(a)(viii) storm drain was removed in 2003.

ix. A 3-in.-diameter, 75-ft-long drainline between the former OWR (building 02-01) and the outfall to Los Alamos Creek. Wastewater system design memoranda indicate that floor drains from the eastern side of the WBR area drained to this outfall before 1990. The AOC 02-011(a)(ix) drainline was removed in 2003.

x. A 12-in.-diameter, 30-ft-long concrete storm drain located northeast of the former OWR (building 02-01) that discharged to Los Alamos Creek through a series of concrete ditches and a CMP along the east side of the former OWR Building. The total length of the drain and ditches to Los Alamos Creek is approximately 130 ft. There is no information that this rain handled anything but stormwater. The AOC 02-011(a)(x) storm drains and concrete ditches were removed in 2003

xi. AOC 02-011(a)(xi), a 4-in.-diameter, 95-ft-long drainline between the former OWR (building 02-01) and Los Alamos Creek, is a duplicate of the OWR acid-waste line[SWMU 02-006(b)].

The AOC 02-011(a) drains and drainlines date from approximately the time of construction of the reactor building in 1944. Drains and drainlines from operational areas of the facility may have received effluent until the 2003 decontamination and decommissioning (D&D) of the OWR facility; however, the reactor was inactive from 1993 to 2003. The AOC 02-011(a)(viii) drainline, (ix) drainline, and (x) storm drain were removed during 2003 D&D activities; the remaining storm drains, drainlines, or some portion of them, remain in place.

02-011(b) (9/3/2019)

AOC 02-011(b) consists of two drains, drainlines, and associated outfalls associated with the former stack-gas valve house [former structure 02-19 (AOC 02-003(a)] at TA-02. One drainline was a 9-ft-long ×

15-in.-diameter CMP between the stack-gas valve house and the catch basin (structure 02-35). The other drainline was a 9-ft-long × 24-in.-diameter CMP that drained from the catch basin (structure 02-35) to Los Alamos Creek outside the east fence around the former facility. The drains, drainlines, and associated outfalls were presumably installed in 1944 when the stack-gas valve house [AOC 02-003(a)] was constructed. The stack-gas valve house operated through 1974 when it was deactivated; the structure was subsequently removed during 1985 D&D activities. The actual purpose of the drainlines and catch basin is not documented; however, there is no information to indicate these drains and drainlines handled anything but stormwater. The drains and drainlines were removed in 2003.

02-011(c) (9/3/2019)

AOC 02-011(c) consists of two drains, drainlines, and associated outfalls associated with the former stack-gas valve house [former structure 02-19 (AOC 02-003(a)] at TA-02. One drainline was a 9-ft-long × 15-in.-diameter CMP between the stack-gas valve house and the catch basin (structure 02-35). The second drain line was a 9-ft-long × 24-in.-diameter CMP that drained from the catch basin (structure 02-35) to Los Alamos Creek outside the east fence around the former facility. The drains, drainlines, and associated outfalls were presumably installed in 1944 when the stack-gas valve house [AOC 02-003(a)] was constructed. The stack-gas valve house operated through 1974 when it was deactivated; the structure was subsequently removed during 1985 D&D activities. The actual purpose of the drainlines and catch basin is not documented; however, there is no information to indicate these drains and drainlines handled anything but stormwater. The drains and drainlines were removed in 2003.

02-011(d) (9/3/2019)

AOC 02-011(d) is a former NPDES-permitted outfall and associated drainline that discharged effluent from the former OWR equipment building [former building 02-44, AOC 02-004(f)] to Los Alamos Creek at TA-02. The discharge consisted primarily of regenerate water from the ion-exchange system. The outfall drainline ran from the equipment building south-southwest, past the west side of the cooling tower (former structure 02-49), to Los Alamos Creek. The outfall at AOC 02-011(d) became operational in 1949. The AOC 02-011(d) drainline was rerouted to discharge through the former OWR RLW storage tanks 02-53, 02-54, and 02-55 [AOCs 02-004(b,c,d)], which discharged to the liquid acid-waste line tied to the TA-50 RLWTF, beginning in 1963. The outfall was removed from the NPDES permit in 1995. The drainline was removed and disposed of offsite during the 2003 Omega West decommissioning project.

02-014 (6/3/2021)

SWMU 02-014 consists of three former electrical transformer stations (former structures 02-31, 02-45, and 02-51) that served buildings in TA-02. This Site was not identified as a SWMU or AOC in the 1990 SWMU Report, but was identified during efforts to discover the source of PCB contamination detected during Phase II Consent Order investigation sampling at AOC 02-011(a)(ii), a former storm drain. Notification of a Newly Discovered Solid Waste Management Unit was submitted to the NMED on April 26, 2018. Historical records, including engineering drawings and photographs, were reviewed, and three potential sources of PCBs were identified.

- Former structure 02-31 was an electrical transformer station located 40 ft behind former building 02-01. The transformer station was built in 1944 and removed in 1950.
- Former structure 02-45 was built in 1954 to serve former building 02-44, and consisted of three transformers approximately 14 ft above the ground, mounted across two telephone poles. The

transformer station was replaced with another transformer station (former structure 02-51) in 1961.

- Former structure 02-51 was an electrical transformer station, located approximately 20 ft southwest of former structure 02-31 and 20 ft southeast of former structure 02-45. Historical records indicated that PCB-containing transformer oil was used in equipment at this former transformer station. Structure 02-51 was constructed in 1961 and demolished in 2003.

For investigation activities for Sites 02-003(a), 02-003(e), 02-004(a), 02-005, 02-006(b), 02-006(c), 02-006(d), 02-006(e), 02-008(a), 02-009(b), 02-011(a), 02-011(b), 02-011(c), 02-011(d), refer to "Phase II Investigation Report for Middle Los Alamos Canyon Aggregate Area, Revision 2" (N3B 2018, 700091). For investigation activities for 02-014, refer to "Addendum to the Phase II Investigation Report for Middle Los Alamos Canyon Aggregate Area, Revision 1" (N3B 2020, 700846).

36.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 36.2-1.

Table 36.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
02-003(a)	Valve house and gaseous effluent vent lines	Cesium-137, strontium-90, technetium-99, iodine-131
02-003(e)	Soil contamination associated with former holding tank	Sodium-24, manganese-86
02-004(a)	Omega West Reactor facility	Uranium, plutonium, tritium, mercury, metals, asbestos
02-005	Soil contamination from drift loss, cooling tower blowdown	Hexavalent chromium
02-006(b)	Former acid waste line	Radionuclides, inorganic and organic chemicals
02-006(c)	Drainline	Inorganic and organic chemicals
02-006(d)	Sanitary wastewater	Inorganic and organic chemicals
02-006(e)	Former sump	Radionuclides
02-008(a)	Former permitted outfall from structure 02-49	Hexavalent chromium, arsenic, aluminum
02-009(b)	Non-intentional release	Radionuclides
02-011(a)	Storm drain and outfall	Radionuclides, aluminum
02-011(b)	Former drains and associated potential soil contamination	No known POCs
02-011(c)	Former storm drain	No known POCs
02-011(d)	Outfall from building 02-44	Activation products (antimony-124, chromium-51, cobalt-60, manganese-56, sodium-24, zinc-65)
02-014	Former transformer stations	PCBs

36.3 Consent Order Soil Data

Decision-level data for AOC 02-003(a), AOC 02-003(e), SWMU 02-009(b), AOC 02-011(b) consist of results from samples collected in 2000, 2007, and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for AOC 02-004(a) consist of results from samples collected in 2003, 2007, and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 02-005 consist of results from samples collected in 2007, 2010, and 2011. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 02-006(b) and AOC 02-006(e) consist of results from samples collected in 2000, 2003, 2007, and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for AOC 02-006(c) and AOC 02-011(c) consist of results from samples collected in 2007 and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

AOC 02-006(d) is a duplicate of 02-006(c). All investigation results for AOC 02-006(d) are addressed under AOC 02-006(c).

Decision-level data for SWMU 02-008(a) consist of results from samples collected at in 2000 and 2007. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

AOC 02-011(a)(i,ii,iii,iv,v,vi) is located near the west end of the former OWR. Because each segment of the AOC 02-011(a) storm drain system was interconnected, the investigation data for the six segments were combined for evaluations.

- Decision-level data for AOC 02-011(a)(i,ii,iii,iv,v,vi) consist of results from samples collected in 2007 and 2010.
- Decision-level data for AOC 02-011(a)(viii) consist of results from samples collected in 2000, 2003, 2007, and 2010.
- Decision-level data for AOC 02-011(a)(ix) consist of results from samples collected in 2000, 2003, 2007, and 2010.
- Decision-level data for AOC 02-011(a)(x) consist of results from samples collected in 2000, 2003, 2007, and 2010.

The 2018 Phase II IR, revision 2, concluded that the lateral and vertical extent of inorganic, organic, and radionuclide contaminants is defined or no further sampling for extent is warranted at AOC 02-011(a)(i,ii,iii,iv,v,vi,viii,ix, and x). Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted for AOC 02-011(a).

Decision-level data for AOC 02-011(d) consist of results from samples collected in 2000, 2007, 2010, and 2017. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 02-014 consist of results from samples collected in 2007, 2010, 2011, 2017 and 2018. The 2020 addendum to the Phase II IR, Revision 1, concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-5.51 are presented in Figures 36.3-1 through 36.3-4.

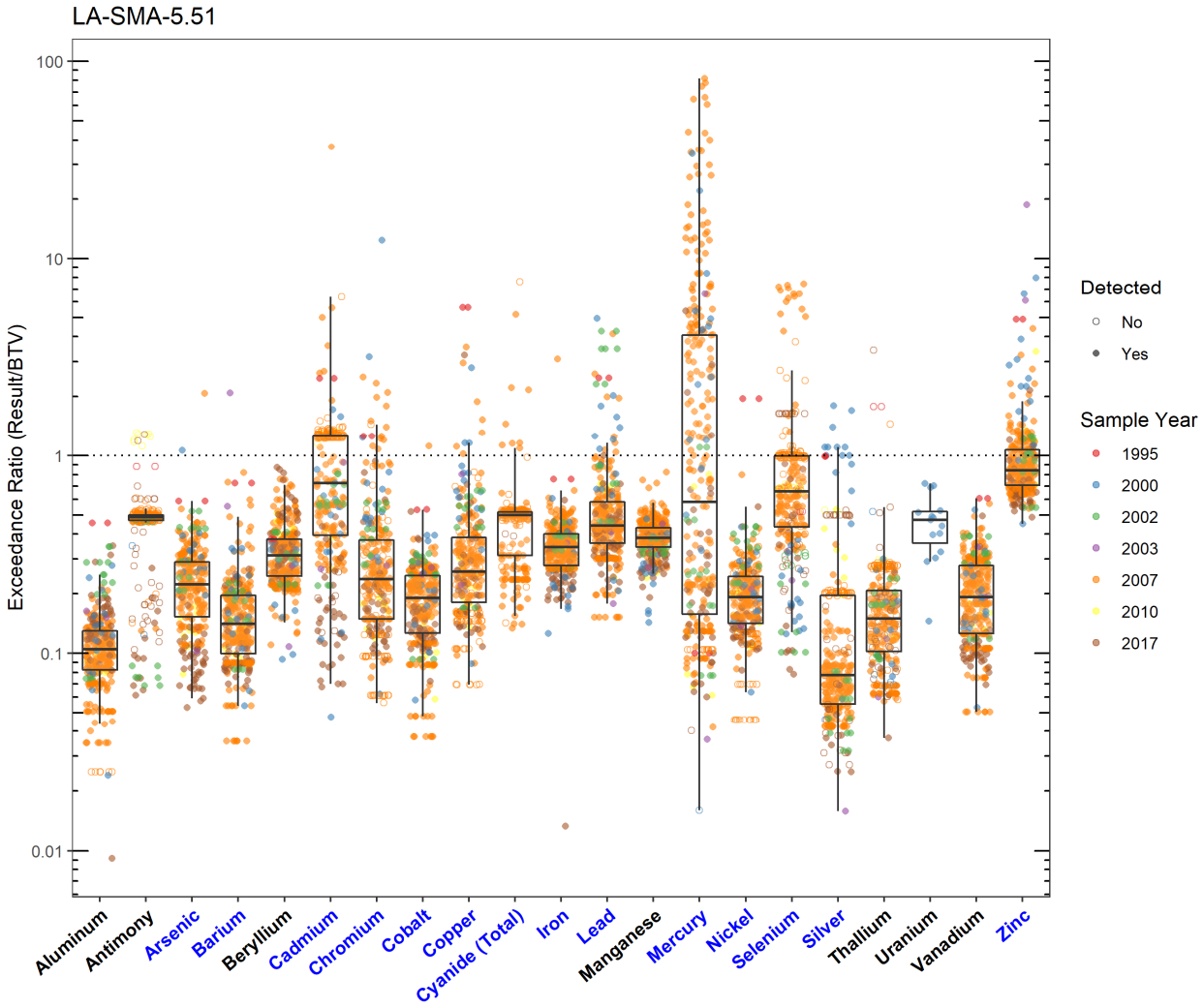

Figure 36.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.51

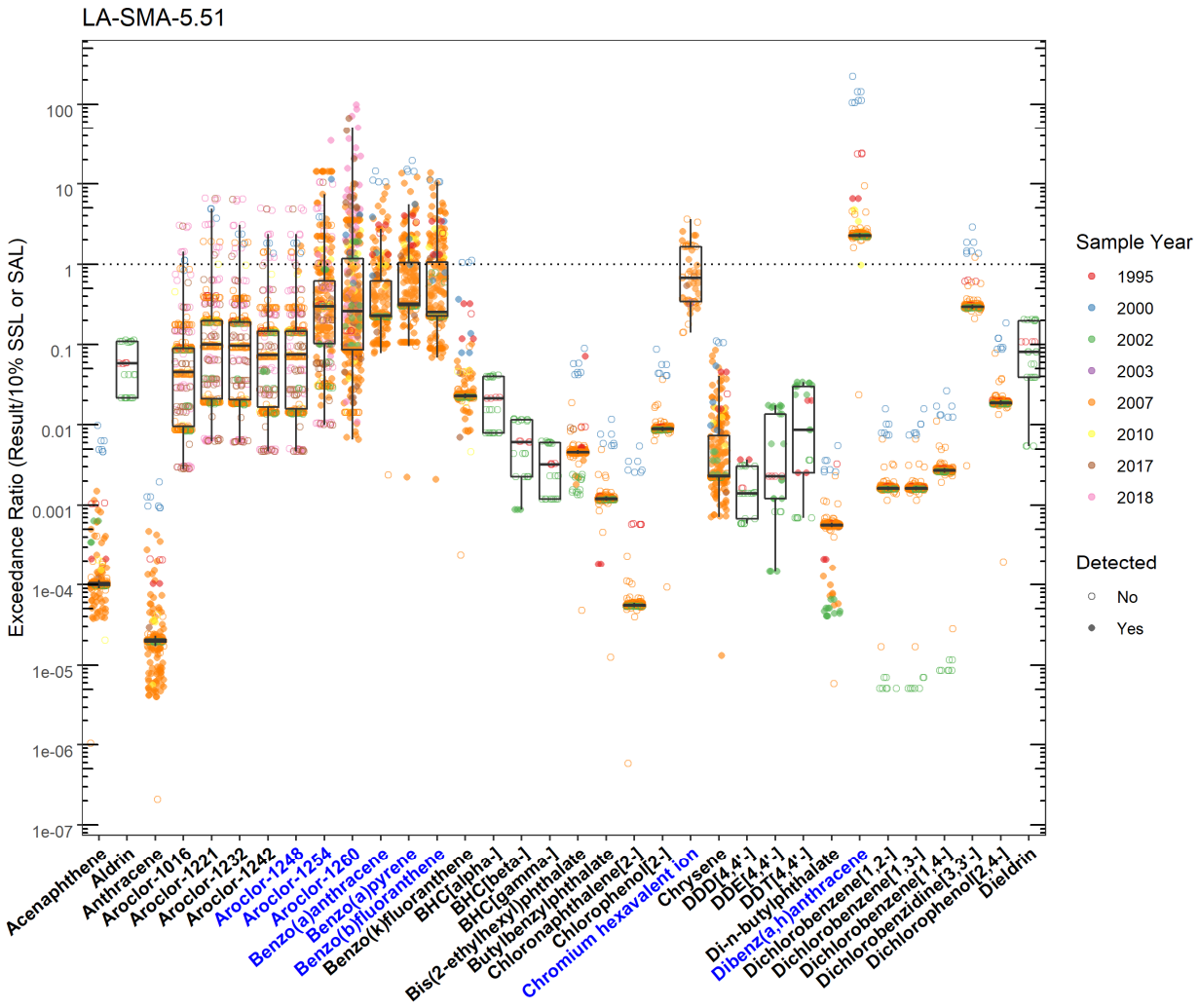

Figure 36.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.51 (Plot 1)

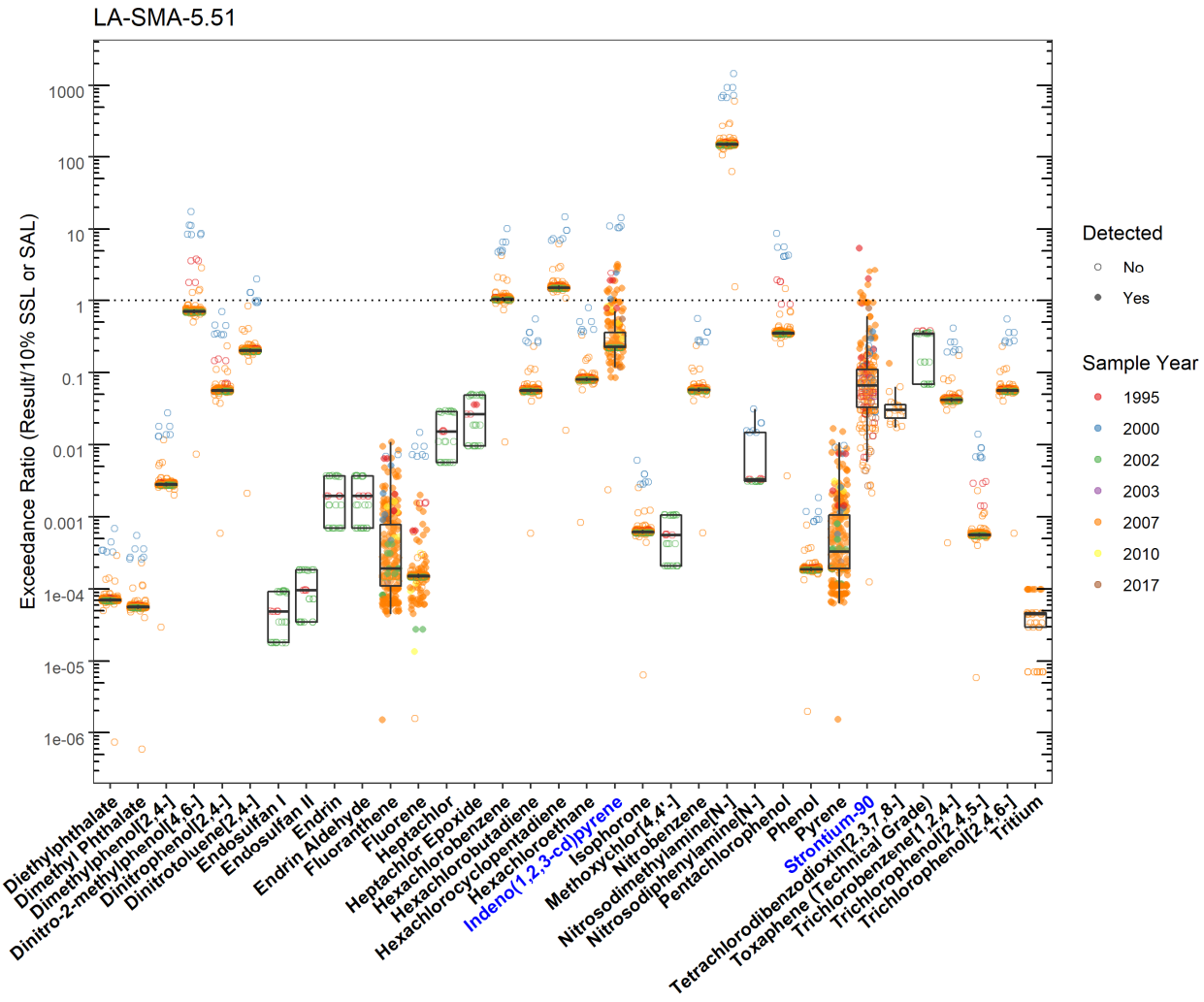

Figure 36.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.51 (Plot 2)

LA-SMA-5.51

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1248	LA-SMA-5.51	12672-29-6	Y	SSL_0.1	0.243	0.408	2007-08-08
Aroclor-1254	LA-SMA-5.51	11097-69-1	Y	SSL_0.1	0.114	3.93	2018-01-30
Aroclor-1260	LA-SMA-5.51	11096-82-5	Y	SSL_0.1	0.243	23.9	2018-01-10
Arsenic	LA-SMA-5.51	As	Y	BTV	8.17	16.9	2007-08-23
Barium	LA-SMA-5.51	Ba	Y	BTV	295	614	2003-07-11
Benzo(a)anthracene	LA-SMA-5.51	56-55-3	Y	SSL_0.1	0.153	1.40	2007-08-16
Benzo(a)pyrene	LA-SMA-5.51	50-32-8	Y	SSL_0.1	0.112	1.51	2007-08-16
Benzo(b)fluoranthene	LA-SMA-5.51	205-99-2	Y	SSL_0.1	0.153	2.10	2007-08-16
Cadmium	LA-SMA-5.51	Cd	Y	BTV	0.400	14.8	2007-08-03
Chromium	LA-SMA-5.51	Cr	Y	BTV	19.3	240	2000-09-13
Chromium hexavalent ion	LA-SMA-5.51	Cr(VI)	Y	SSL_0.1	0.305	0.775	2007-09-12
Cobalt	LA-SMA-5.51	Co	Y	BTV	8.64	9.67	2007-08-23
Copper	LA-SMA-5.51	Cu	Y	BTV	14.7	82.4	1995-08-01
Cyanide (Total)	LA-SMA-5.51	CN(TOTAL)	Y	BTV	0.500	2.59	2007-09-17
Dibenz(a,h)anthracene	LA-SMA-5.51	53-70-3	Y	SSL_0.1	0.0153	0.100	1995-08-09
Indeno(1,2,3-cd)pyrene	LA-SMA-5.51	193-39-5	Y	SSL_0.1	0.153	0.501	2007-08-16
Iron	LA-SMA-5.51	Fe	Y	BTV	21500	66400	2007-08-23
Lead	LA-SMA-5.51	Pb	Y	BTV	22.3	110	2000-09-14
Mercury	LA-SMA-5.51	Hg	Y	BTV	0.100	8.20	2007-08-22
Nickel	LA-SMA-5.51	Ni	Y	BTV	15.4	30.1	1995-08-01
Selenium	LA-SMA-5.51	Se	Y	BTV	1.52	11.3	2007-09-14
Silver	LA-SMA-5.51	Ag	Y	BTV	1.00	1.80	2000-09-15
Strontium-90	LA-SMA-5.51	Sr-90	Y	SAL_0.1	1.50	8.13	1995-03-21
Zinc	LA-SMA-5.51	Zn	Y	BTV	48.8	914	2003-07-11

Figure 36.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.51

36.4 Stormwater Evaluation

36.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current stage at the SMA.

36.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.51 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The impairments may be Site-related, based on Site history.

36.5 Site-Specific Demonstration

36.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: barium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chromium (hexavalent ion), dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, iron, and strontium-90.

The remaining Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs, therefore they will not be added to the SAP.

36.5.2 Stormwater Data Summary

No data for the current monitoring stage have been collected. Gross alpha exceeded TALs in the previous monitoring stage and there was no paired SSC result to confirm whether it was below BTVs. Therefore, it will be added to the SAP.

Mercury and PCBs exceeded the TAL and BTV in the previous monitoring stage, and will be added to the SAP.

36.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

36.5.4 Sampling and Analysis Plan

Table 36.5-1 is the proposed SAP for LA-SMA-5.51.

Table 36.5-1 Proposed SAP, LA-SMA-5.51

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, and stormwater data
Total mercury and iron	Impairment (mercury), Site history (metals), soil data, stormwater data
Total PCBs	Impairment, Site history (organics), and soil data
Asbestos	Site history
Hexavalent chromium	Site history and soil data
Strontium-90	Site history (radionuclides) and soil data
SVOCs	Site history (organics) and soil data
Dissolved barium	Site history (metals) and soil data
DOC	Permit requirement
SSC	Permit requirement

37.0 LA-SMA-5.52

Associated Sites	02-003(b), 02-007, 02-008(c)
Receiving Water	Los Alamos Canyon
Drainage Area	1.24 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	AOC 02-003(b): In Progress SWMU 02-007: In Progress AOC 02-008(c): In Progress
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the October 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

37.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in July 2014. Analytical results from this sample initiated corrective action.

Following the October 2015 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2015, 600980), corrective action monitoring was initiated. Since that time, stormwater flow has not been sufficient for full-volume corrective action sample collection, and monitoring is ongoing.

37.2 Site History

02-003(b) (9/3/2019)

AOC 02-003(b) consists of the former condensate trap (structure 02-048) and an associated stainless-steel gaseous effluent vent line (line 119) that were part of the off-gas system for the WBR, a homogeneous liquid-fueled reactor fueled by an enriched uranyl-salt compound, at TA-02. The WBR off-gas system consisted of the stack-gas valve house (former structure 02-19), the condensate trap, a mesa-top vent stack located above TA-02 at TA-61, and associated stainless-steel gaseous effluent vent lines.

The condensate trap was a concrete-manhole superstructure and a small-diameter standpipe. It was located at the lowest point of line 119, between the stack-gas valve house [structure 02-19, AOC 02-003(a)] and the delay tanks [structure 02-131, AOC 02-003(c)], as shown on engineering drawing C-1718. Line 119 consisted of an approximately 78-ft-long 3-in. stainless steel line that ran east-west from the stack-gas valve house (structure 02-19) to the condensate trap, and another 205-ft-long section of 3-in. stainless-steel line that ran north-south from the condensate trap to the delay tanks.

Line 119 continued from the delay tanks to the junction with the main OWR gaseous effluent vent line and up to the mesa-top stack (structure 02-09) and French drain [SWMU 02-006(a)] located at TA-61. The upper portion of the gaseous effluent vent line (line 119) from the delay tanks to the mesa-top stack is addressed as AOC 02-003(d).

The stack-gas valve house and gaseous effluent vent lines were installed in 1944 and received off-gas from the WBR. The off-gas contained gaseous fission products, including cesium-137, strontium-90, technetium-99, and iodine-131.

The condensate trap and line 119 from the stack-gas valve house (structure 02-19) to the delay tanks remained in use through 1974. The units were inactive from 1974 to 1985, and were removed and disposed of during D&D efforts in 1985 and 1986.

02-007 (9/3/2019)

SWMU 02-007 is a former septic system that received effluent from drains in the OWR facility (former building 02-01) at TA-02. The septic system consisted of a septic tank (former structure 02-43), an inlet drainline, an overflow outlet drainline, a leach field [SWMU 02-009(c)], and an outfall in Los Alamos Creek. The septic tank (former structure 02-43) was constructed of reinforced concrete and measured 13 ft long × 8 ft wide × 6 ft deep. The SWMU 02-007 septic system was installed in 1944 and removed in 1985.

Overflow from the tank discharged to the stream channel through a 6-in.-diameter VCP. The actual outfall location is not known. Laboratory wastes were discharged to the septic system. In 1947, the chemical waste shack [former building 02-03, AOC 02-010] was connected to the septic system, and remained connected until the structure was decommissioned in 1971. The septic tank, overflow outfall, and surrounding soils were removed and disposed of in 1986.

02-008(c) (9/3/2019)

AOC 02-008(c) consists of two former unpermitted outfalls and associated drainlines [AOC 02-008(c)(i) and AOC 02-008(c)(ii)] that received discharges of ground water seepage from the basement of the OWR Building (former building 02-01) at TA-02.

During the Phase I D&D activities conducted at TA-02 in 1985 and 1986, the 6-in. clay drainline [AOC 02-006(c)] was disconnected from septic tank 02-43 (AOC 02-007) as the tank was being removed. The AOC 02-006(c) drainline was tied into a new 6-in. PVC outlet drainline, and continued to discharge groundwater seepage from the OWR Building basement to a new outfall to the Los Alamos Creek [AOC 02-008(c)(i)].

In 1988, the AOC 02-008(c)(i) outfall drainline became plugged and was abandoned in place. A second drainline was installed to discharge groundwater seepage from the basement sump of the OWR Building (02-01) to Los Alamos Creek; the AOC 02-008(c)(ii) outfall located 100 ft west of the AOC 02-008(c)(i) outfall.

The OWR experienced a cooling system water leak in January 1993. As a result, the reactor was put on standby status in 1993 and remained inactive until it was decommissioned in 2003. Both AOC 02-008(c) drainlines were removed in 2003 during D&D activities implemented at the Site.

For investigation activities at the Sites, refer to “Phase II Investigation Report for Middle Los Alamos Canyon Aggregate Area, Revision 2” (N3B 2018, 700091).

37.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 37.2-1.

Table 37.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
02-003(b)	Gaseous effluent condensate	Fission products, cesium-137, strontium-90, technetium-99, iodine-131
02-007	Septic system	Inorganic and organic chemicals, strontium-90, cesium-137, uranium
02-008(c)	Outfall from building 02-01	Chromium, mercury, uranium, plutonium, fission products

37.3 Consent Order Soil Data

Decision-level data for AOC 02-003(b) consist of results from samples collected in 2000, 2007, and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 02-007 consist of results from samples collected in 2007 and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for 02-008(c) consist of results from samples collected in 2007 and 2010, and decision-level data for AOC 02-008(c)(ii) consist of results from samples collected in 2007 and 2010. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-5.52 are presented in Figures 37.3-1 through 37.3-4.

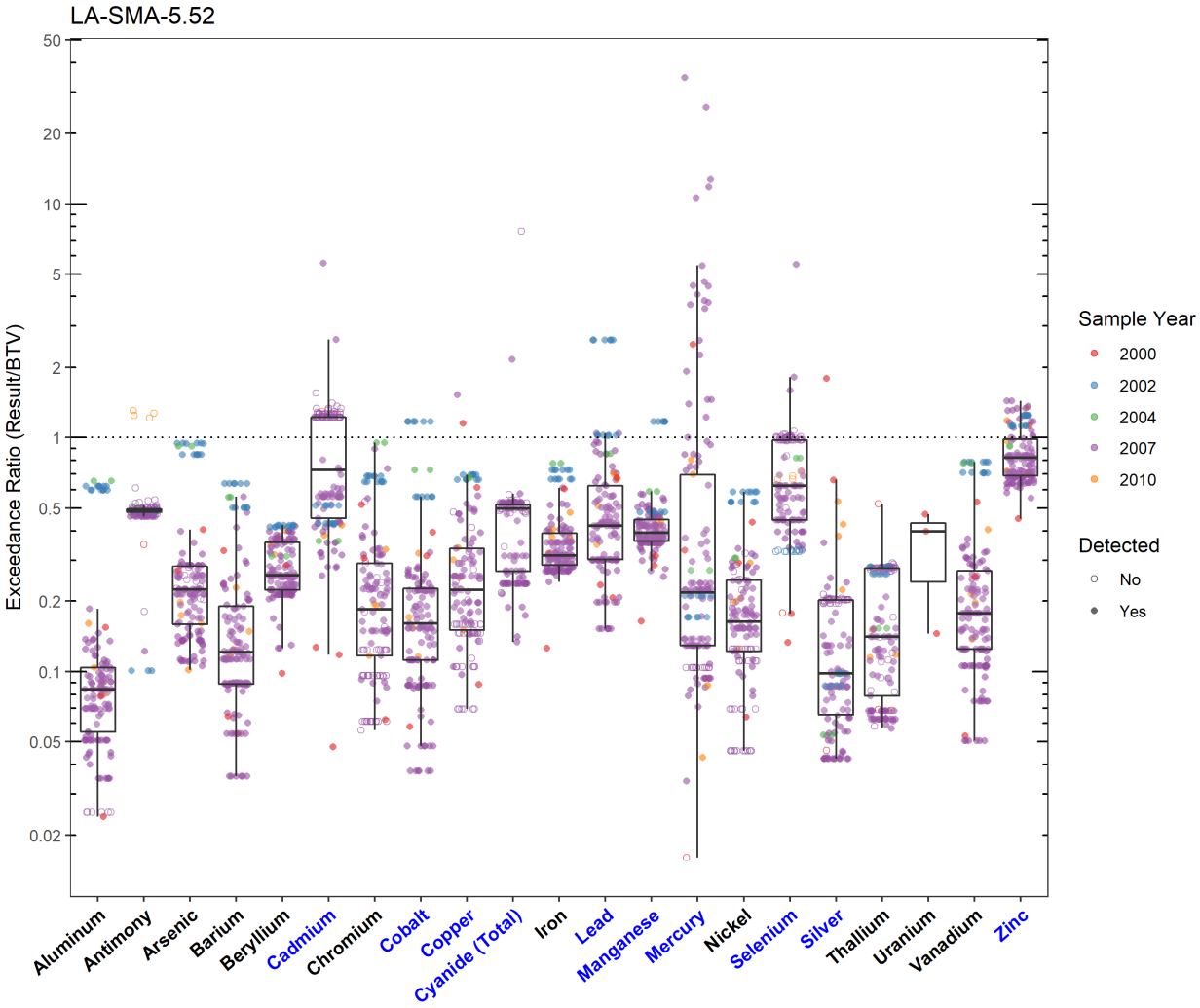

Figure 37.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.52

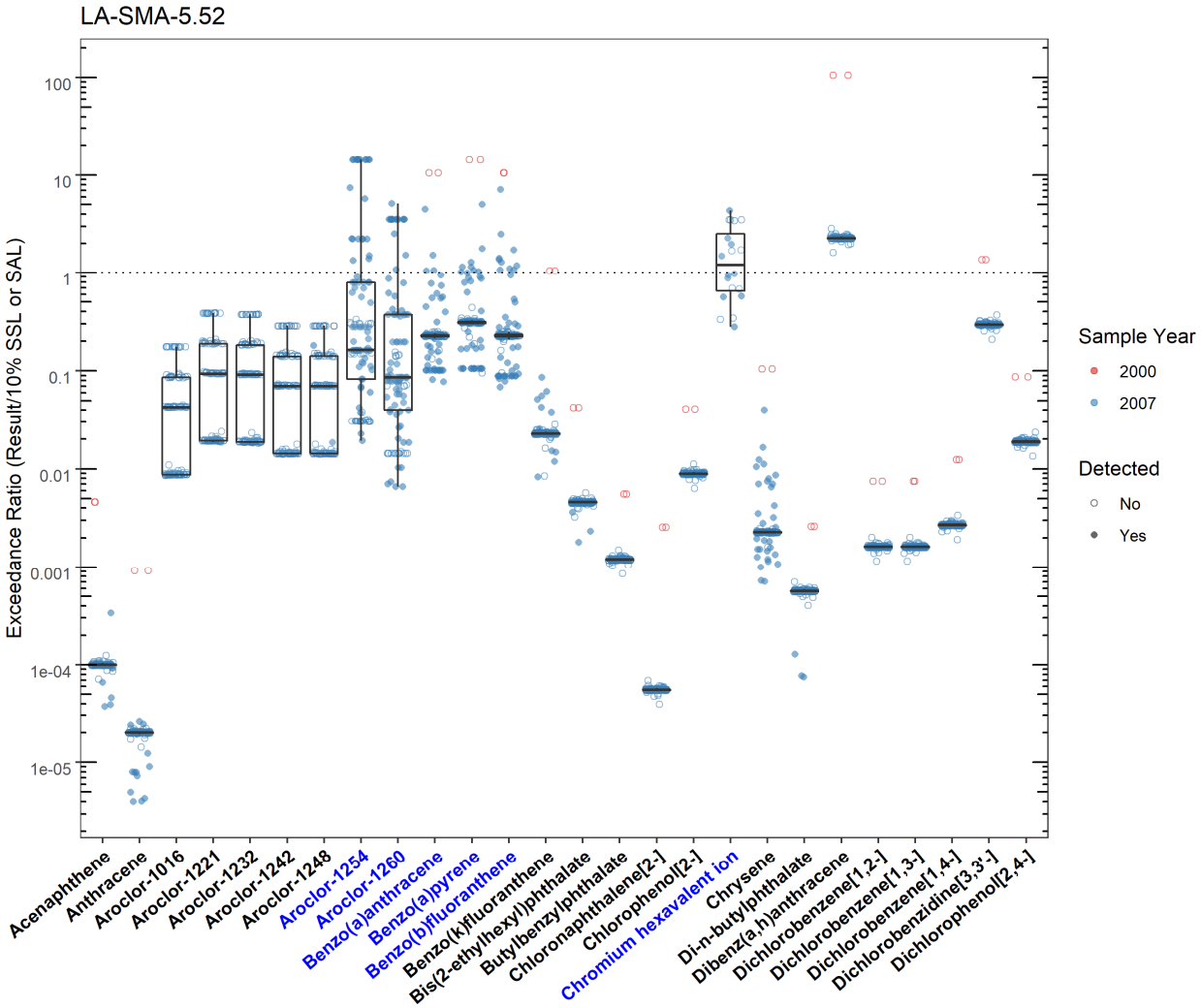

Figure 37.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.52 (Plot 1)

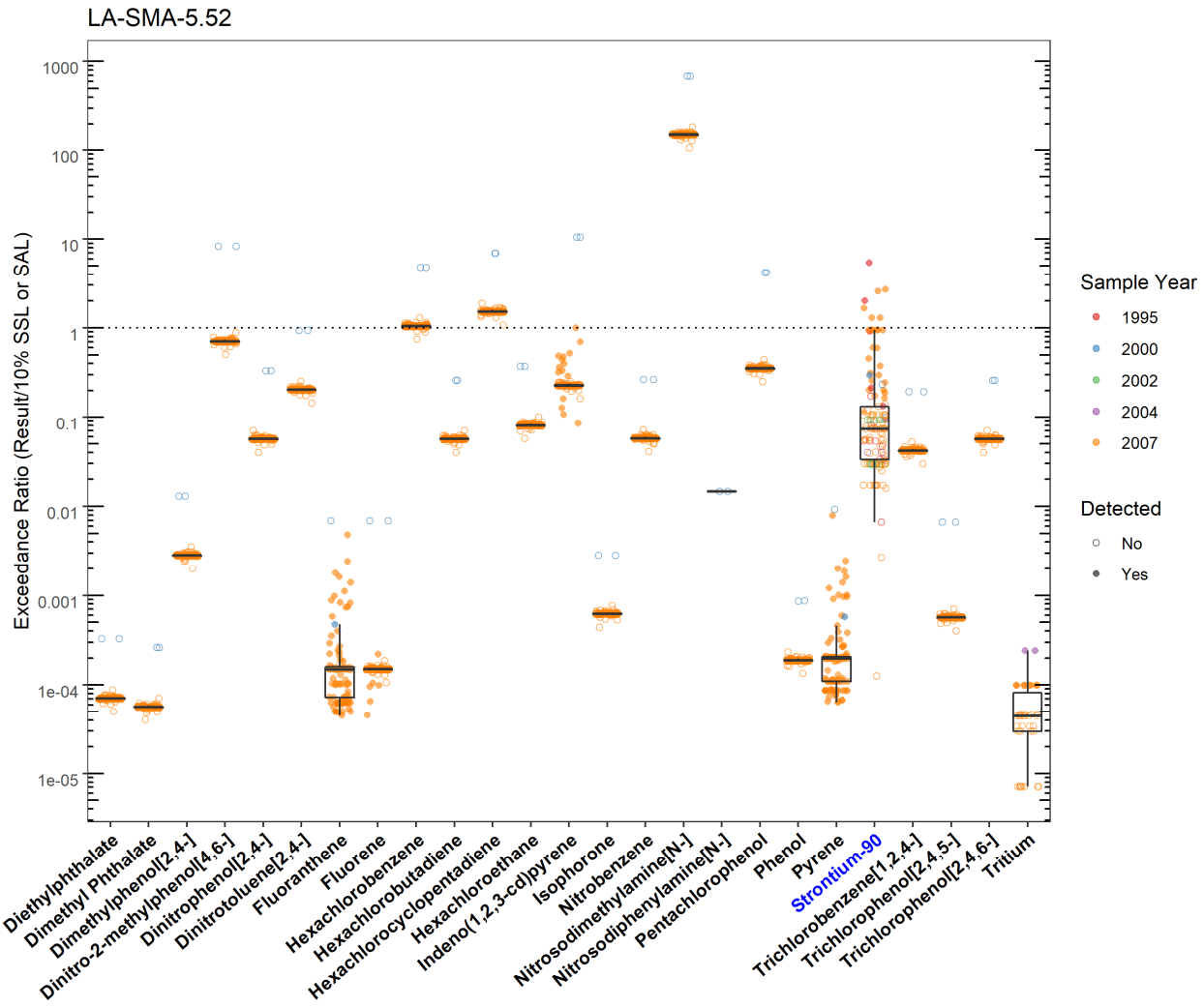

Figure 37.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.52 (Plot 2)

LA-SMA-5.52

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-5.52	11097-69-1	Y	SSL_0.1	0.114	1.63	2007-08-18
Aroclor-1260	LA-SMA-5.52	11096-82-5	Y	SSL_0.1	0.243	1.25	2007-08-15
Benzo(a)anthracene	LA-SMA-5.52	56-55-3	Y	SSL_0.1	0.153	0.682	2007-08-23
Benzo(a)pyrene	LA-SMA-5.52	50-32-8	Y	SSL_0.1	0.112	0.559	2007-08-23
Benzo(b)fluoranthene	LA-SMA-5.52	205-99-2	Y	SSL_0.1	0.153	1.09	2007-08-23
Cadmium	LA-SMA-5.52	Cd	Y	BTV	0.400	2.23	2007-08-17
Chromium hexavalent ion	LA-SMA-5.52	Cr(VI)	Y	SSL_0.1	0.305	1.33	2007-08-20
Cobalt	LA-SMA-5.52	Co	Y	BTV	8.64	10.2	2002-05-24
Copper	LA-SMA-5.52	Cu	Y	BTV	14.7	22.5	2007-08-23
Cyanide (Total)	LA-SMA-5.52	CN(TOTAL)	Y	BTV	0.500	1.08	2007-09-12
Lead	LA-SMA-5.52	Pb	Y	BTV	22.3	58.1	2002-05-24
Manganese	LA-SMA-5.52	Mn	Y	BTV	671	794	2002-05-24
Mercury	LA-SMA-5.52	Hg	Y	BTV	0.100	3.46	2007-08-23
Selenium	LA-SMA-5.52	Se	Y	BTV	1.52	8.37	2007-09-19
Silver	LA-SMA-5.52	Ag	Y	BTV	1.00	1.80	2000-09-15
Strontium-90	LA-SMA-5.52	Sr-90	Y	SAL_0.1	1.50	8.13	1995-03-21
Zinc	LA-SMA-5.52	Zn	Y	BTV	48.8	70.5	2007-08-16

Figure 37.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.52

37.4 Stormwater Evaluation

37.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current stage at the SMA.

37.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.52 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The impairments may be Site-related, based on Site history.

37.5 Site-Specific Demonstration

37.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and strontium-90.

The remaining Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

37.5.2 Stormwater Data Summary

No data for the current monitoring stage have been collected. Mercury and total PCBs exceeded TAL and BTV in the previous monitoring stage. Dissolved aluminum and gross alpha exceeded the TAL in the previous monitoring stage.

37.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected the current stage at this location.

37.5.4 Sampling and Analysis Plan

Table 37.5-1 is the proposed SAP for LA-SMA-5.52.

Table 37.5-1 Proposed SAP, LA-SMA-5.52

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, and stormwater data
Total mercury	Impairment, Site history, and stormwater data
Total PCBs	Impairment, Site history (organics), soil data, stormwater data
SVOCs	Site history (organics), soil data
Strontium-90	Soil data and Site history
DOC	Permit requirement
SSC	Permit requirement

38.0 LA-SMA-5.53

Associated Sites	02-009(a)
Receiving Water	Los Alamos Canyon
Drainage Area	1.14 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 02-009(a): In Progress
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the October 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

38.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection at LA-SMA-5.53. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

38.2 Site History

02-009(a) (9/3/2019)

SWMU 02-009(a) consists of an area of radioactively-contaminated soil (beta/gamma radiation), located around a boulder south of the southeast fence corner, east of the former Omega-50 storage building (former building 02-50) at TA-02. SWMU 02-009(a) was identified during radiological surveys conducted during the 1985–1986 D&D of the WBR and associated facilities. No other information regarding the origin of contamination at this SWMU is available. A limited amount of contaminated soil was removed from the Site in 1986, and the remaining contaminated soil was removed in 2000.

For investigation activities, refer to “Phase II Investigation Report for Middle Los Alamos Canyon Aggregate Area, Revision 2” (N3B 2018, 700091).

38.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 38.2-1.

Table 38.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
02-009(a)	Soil contamination associated with former water boiler reactor	Radionuclides

38.3 Consent Order Soil Data

Decision-level data for SWMU 02-009(a) consist of results from samples collected in 2000, 2007, and 2010. Analytical results from those samples are presented in Figures 38.3-1 through 38.3-4. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

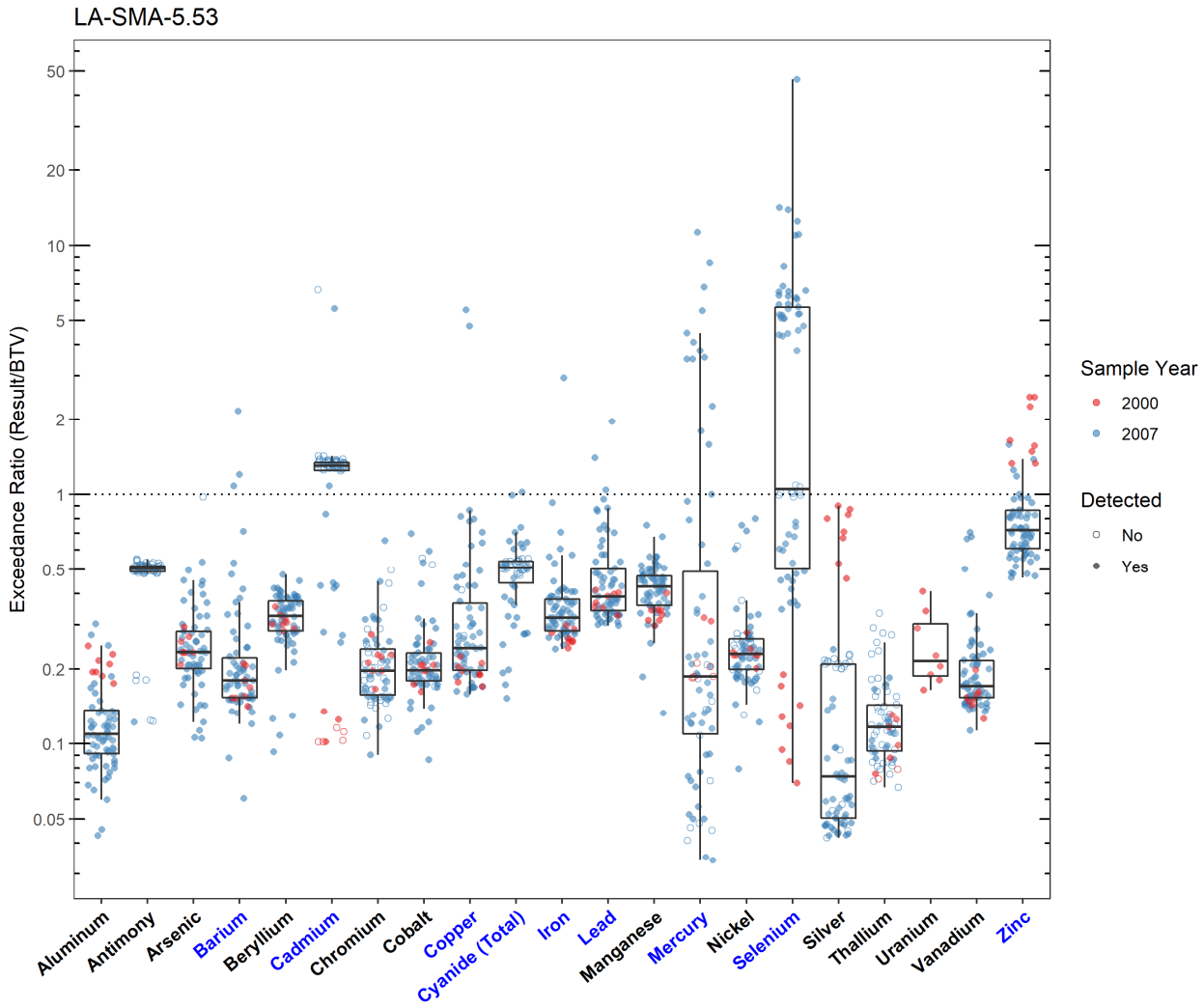

Figure 38.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.53

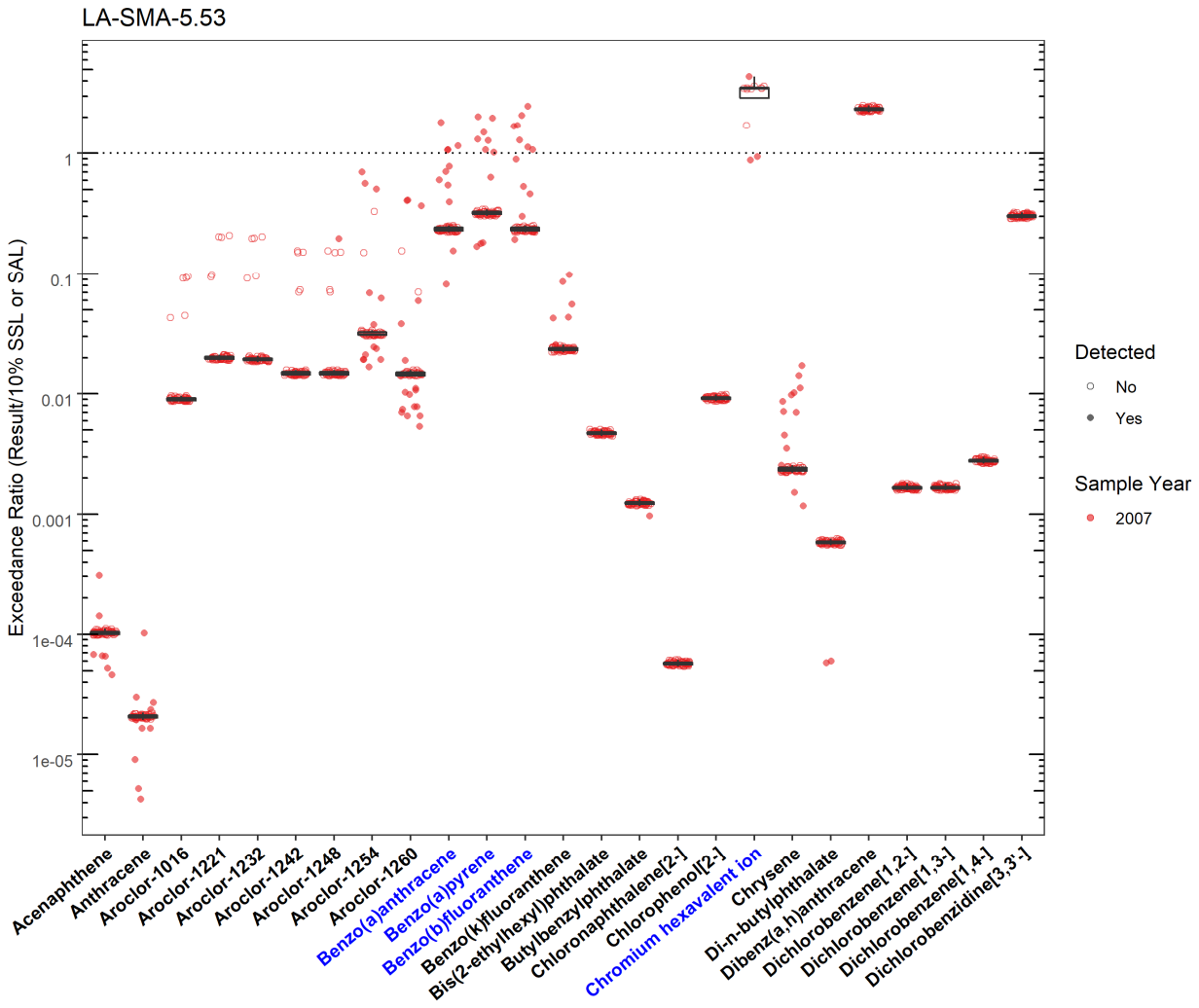

Figure 38.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.53 (Plot 1)

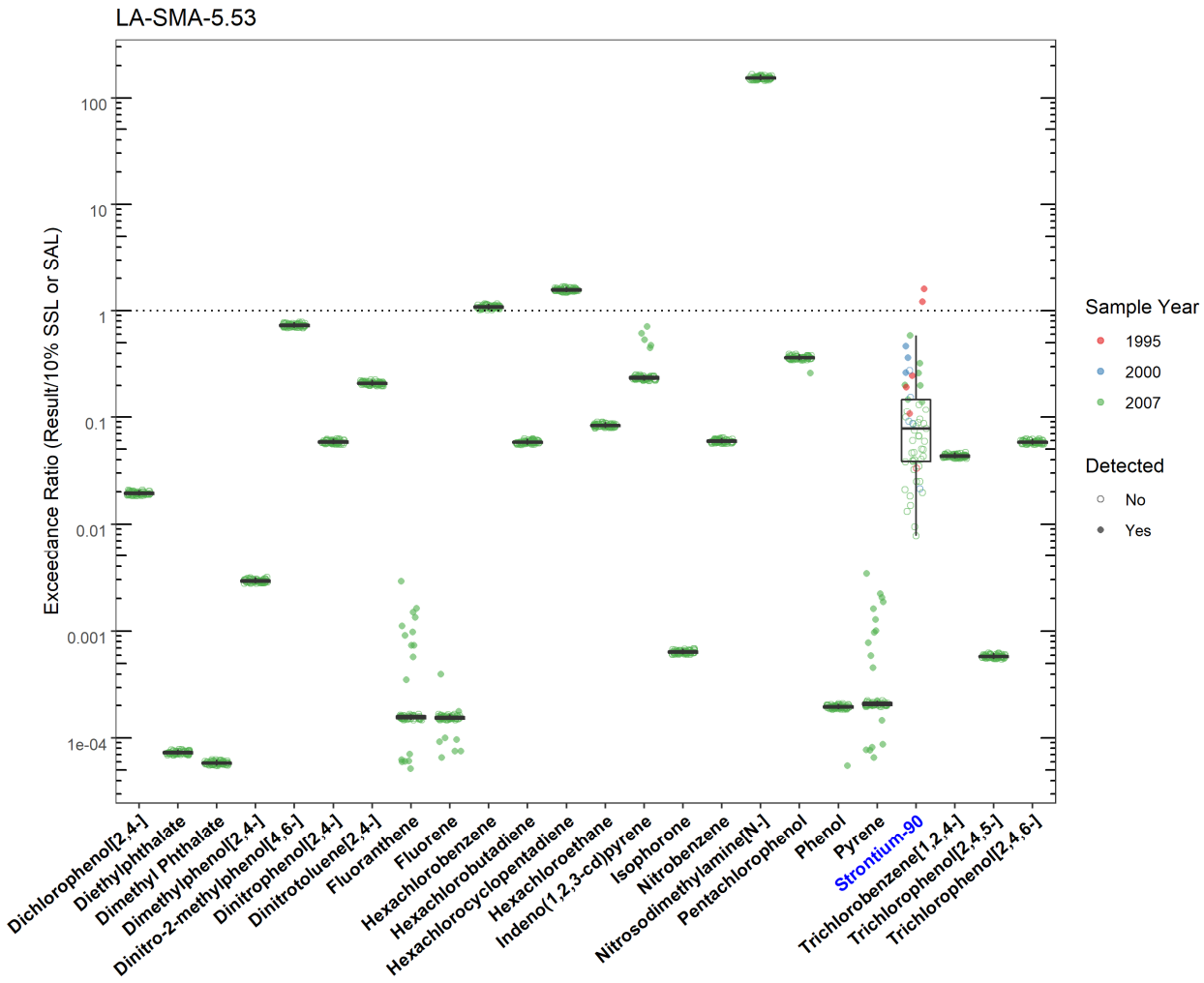

Figure 38.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.53 (Plot 2)

LA-SMA-5.53

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Barium	LA-SMA-5.53	Ba	Y	BTV	295	636	2007-08-20
Benzo(a)anthracene	LA-SMA-5.53	56-55-3	Y	SSL_0.1	0.153	0.277	2007-08-20
Benzo(a)pyrene	LA-SMA-5.53	50-32-8	Y	SSL_0.1	0.112	0.226	2007-08-20
Benzo(b)fluoranthene	LA-SMA-5.53	205-99-2	Y	SSL_0.1	0.153	0.379	2007-08-20
Cadmium	LA-SMA-5.53	Cd	Y	BTV	0.400	2.23	2007-08-17
Chromium hexavalent ion	LA-SMA-5.53	Cr(VI)	Y	SSL_0.1	0.305	1.33	2007-08-20
Copper	LA-SMA-5.53	Cu	Y	BTV	14.7	80.7	2007-09-16
Cyanide (Total)	LA-SMA-5.53	CN(TOTAL)	Y	BTV	0.500	0.510	2007-09-18
Iron	LA-SMA-5.53	Fe	Y	BTV	21500	63200	2007-09-16
Lead	LA-SMA-5.53	Pb	Y	BTV	22.3	43.7	2007-09-14
Mercury	LA-SMA-5.53	Hg	Y	BTV	0.100	1.13	2007-08-20
Selenium	LA-SMA-5.53	Se	Y	BTV	1.52	70.5	2007-09-16
Strontium-90	LA-SMA-5.53	Sr-90	Y	SAL_0.1	1.50	2.38	1995-03-22
Zinc	LA-SMA-5.53	Zn	Y	BTV	48.8	120	2000-09-29; 2000-10-02

Figure 38.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.53

38.4 Stormwater Evaluation

38.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

38.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.53 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

38.5 Site-Specific Demonstration

38.5.1 Soil Data Summary

Strontium-90 exceeded the applicable screening value in soil data and has not yet been measured in stormwater; it will be added to the SAP. The remaining parameters which exceeded the applicable screening value in soil data are not Site-related POCs and will not be added to the SAP.

38.5.2 Stormwater Data Summary

No confirmation-monitoring data.

38.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

38.5.4 Sampling and Analysis Plan

Table 38.5-1 is the proposed SAP for LA-SMA-5.53.

Table 38.5-1 Proposed SAP, LA-SMA-5.53

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
Radium-226 and radium-228	Site history (radionuclides)
Strontium-90	Site history (radionuclides) and soil data
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

39.0 LA-SMA-5.54

Associated Sites	02-009(c)
Receiving Water	Los Alamos Canyon
Drainage Area	0.24 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 02-009(c): In Progress
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring
2016–2018 SIP Actions	Based on the October 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

39.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

Following the September 2014 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2014, 261903), the sampler was relocated to a more representative location and corrective action monitoring was initiated. Since that time, stormwater flow has not been sufficient for full-volume corrective action sample collection and monitoring is ongoing.

39.2 Site History

02-009(c) (9/3/2019)

SWMU 02-009(c) consists of a former leach field and an area of radioactively-contaminated soil (beta/gamma radiation) located on the north and south sides of Los Alamos Creek, south of the former condensate trap [former structure 02-48, AOC 02-003(b)] at TA-02.

During removal of the condensate trap and the SWMU 02-007 septic tank (former structure 02-48) as part of the 1985–1986 D&D activities, remnants of a leach field were discovered. The leach field consisted of two parallel 6-in.-diameter VCP lengths running east from the condensate trap area, parallel to Los Alamos Creek. The pipes measured 34 ft and 20 ft long, and were lying in a sand- and crushed-rock bed, approximately 2 ft below the overflow drainpipe from the nearby septic tank (former structure 02-43, SWMU 02-007), at depths between 3–8 ft bgs. The SWMU 02-007 septic system received effluent from drains in the former WBR facility (former building 02-01). All structures, including the drainlines and adjacent contaminated soils down to the saturated zone, were removed during the 1985–1986 D&D activities.

For investigation activities refer to “Phase II Investigation Report for Middle Los Alamos Canyon Aggregate Area, Revision 2” (N3B 2018, 700091).

39.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 39.2-1.

Table 39.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
02-009(c)	Soil contamination associated with condensate trap and leach field	Radionuclides

39.3 Consent Order Soil Data

Decision-level data for SWMU 02-009(c) consist of results from samples collected in 2000, 2007, and 2010. Analytical results from these samples are presented in Figures 39.3-1 through 39.3-4. Revision 2 of the 2018 Phase II IR concluded the nature and extent of contamination have been defined and no further sampling for extent is warranted.

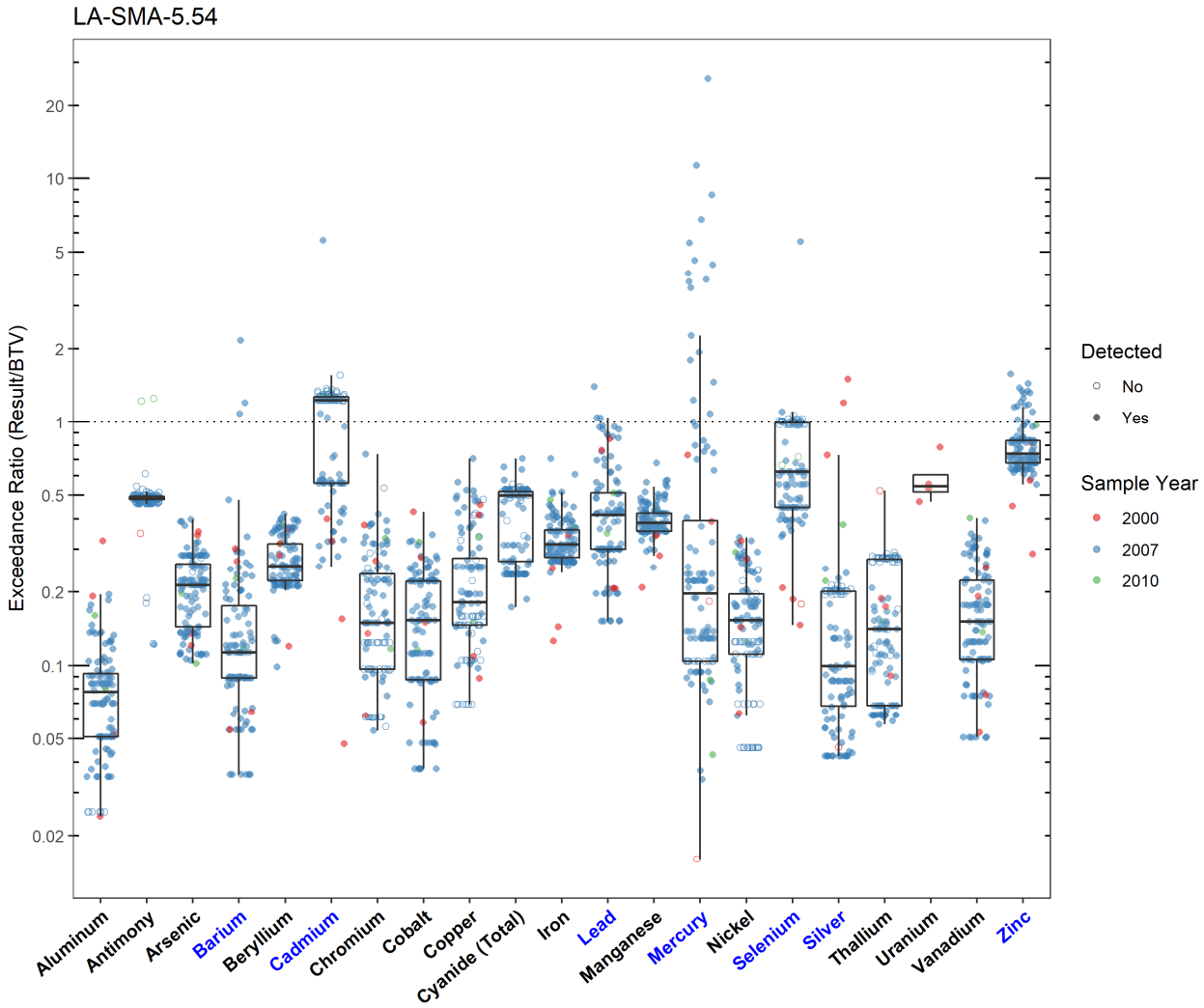

Figure 39.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.54

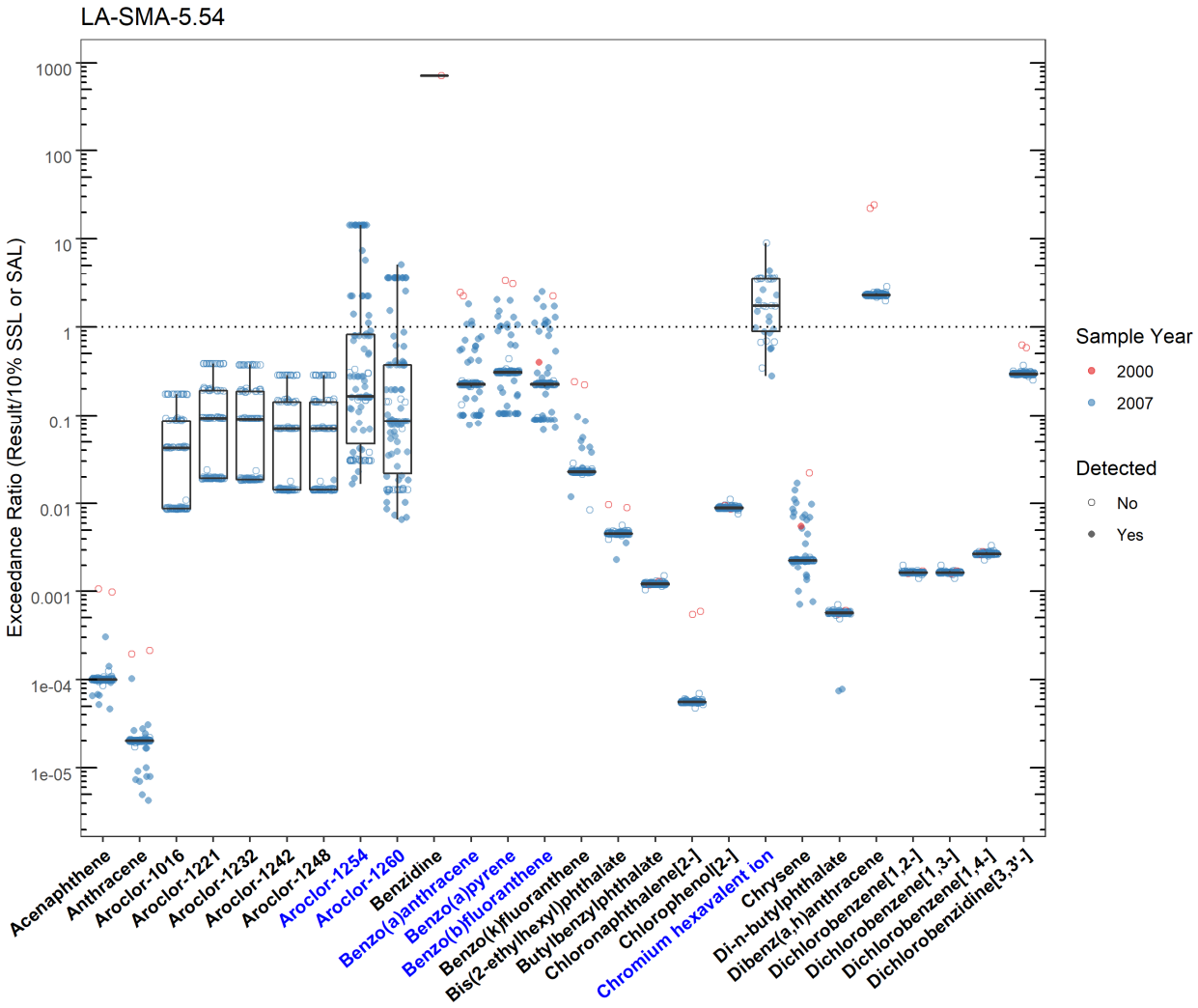

Figure 39.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.54 (Plot 1)

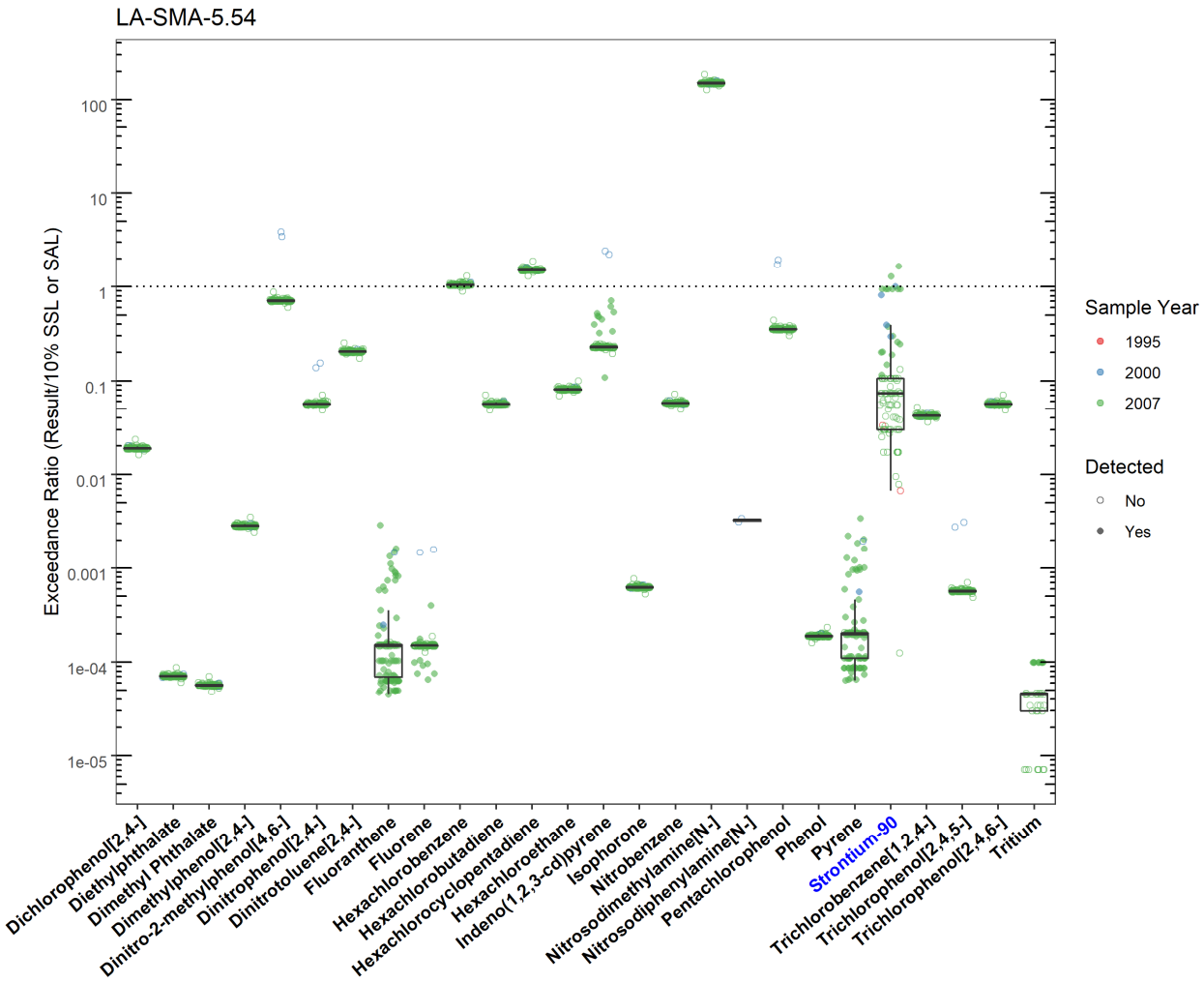

Figure 39.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.54 (Plot 2)

LA-SMA-5.54

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-5.54	11097-69-1	Y	SSL_0.1	0.114	1.63	2007-08-18
Aroclor-1260	LA-SMA-5.54	11096-82-5	Y	SSL_0.1	0.243	1.25	2007-08-15
Barium	LA-SMA-5.54	Ba	Y	BTV	295	636	2007-08-20
Benzo(a)anthracene	LA-SMA-5.54	56-55-3	Y	SSL_0.1	0.153	0.277	2007-08-20
Benzo(a)pyrene	LA-SMA-5.54	50-32-8	Y	SSL_0.1	0.112	0.226	2007-08-20
Benzo(b)fluoranthene	LA-SMA-5.54	205-99-2	Y	SSL_0.1	0.153	0.379	2007-08-20
Cadmium	LA-SMA-5.54	Cd	Y	BTV	0.400	2.23	2007-08-17
Chromium hexavalent ion	LA-SMA-5.54	Cr(VI)	Y	SSL_0.1	0.305	1.33	2007-08-20
Lead	LA-SMA-5.54	Pb	Y	BTV	22.3	31.2	2007-08-20
Mercury	LA-SMA-5.54	Hg	Y	BTV	0.100	2.58	2007-08-18
Selenium	LA-SMA-5.54	Se	Y	BTV	1.52	8.37	2007-09-19
Silver	LA-SMA-5.54	Ag	Y	BTV	1.00	1.50	2000-08-30
Strontium-90	LA-SMA-5.54	Sr-90	Y	SAL_0.1	1.50	2.49	2007-08-16
Zinc	LA-SMA-5.54	Zn	Y	BTV	48.8	77.2	2007-08-20

Figure 39.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.54

39.4 Stormwater Evaluation

39.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the current location at the SMA.

39.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.54 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

39.5 Site-Specific Demonstration

39.5.1 Soil Data Summary

Strontium-90 exceeded the applicable screening value in soil data and has not yet been measured in stormwater, therefore it will be added to the SAP. The remaining exceedances of the applicable screening value in soil data are not Site-related POCs and will not be added to the SAP.

39.5.2 Stormwater Data Summary

No confirmation-monitoring data.

39.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected at the current location.

39.5.4 Sampling and Analysis Plan

Table 39.5-1 is the proposed SAP for LA-SMA-5.54.

Table 39.5-1 Proposed SAP, LA-SMA-5.54

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history (radionuclides), and stormwater data
Strontium-90	Site history and soil data
Total PCBs	Soil data and stormwater data
DOC	Permit requirement
SSC	Permit requirement

40.0 LA-SMA-5.91

Associated Sites	21-009, 21-021, 21-023(c), 21-027(d)
Receiving Water	BV Canyon – Tributary to Los Alamos Canyon
Drainage Area	4.31 acres
Landscape Characteristics	20% impervious, 80% pervious
Consent Order Site Status	AOC 21-009: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 21-021: In Progress SWMU 21-023(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 21-027(d): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete/Alternative Compliance Requested/Force Majeure Request
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

40.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2011. Analytical results from this sample initiated corrective action.

SWMU 21-023(c) received a COC under the Consent Order in June 2011. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in November 2012 (LANL 2012/2013, 232273) and resubmitted in August 2013 (LANL 2013, 250035).

Following the July 2013 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2013, 244386), corrective-action stormwater samples were collected in September 2013 and July 2014. Analytical results from these samples initiated corrective action.

AOC 21-009 received a COC under the Consent Order in January 2016. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in March 2016 (LANL 2017, 602213). The Permittees submitted a request for alternative compliance for SWMU 21-021 to EPA per permit Part I.E.3 in May 2015 (LANL 2015, 600417), and a force majeure request for an extension for completion of corrective action at SWMU 21-027(d) to EPA per Permit part I.E.4(c) in October 2015 (LANL 2015, 600979). No response has been received from EPA for these submittals, and stormwater monitoring has not occurred since 2014.

40.2 Site History

21-009 (1/25/2022)

AOC 21-009 is a former waste treatment laboratory (former building 21-33) that was located in the western portion of DP West at TA-21. Former building 21-33 was built on concrete pillars in 1948, of wood-frame construction on a single level with a wooden floor, and measured 16 ft × 48 ft × 12 ft high.

The former waste treatment laboratory operated until 1965 when it was destroyed by intentional burning.

Research into methods of recovering additional plutonium from liquid waste streams was conducted at building 21-33. Building components and laboratory furniture were reportedly contaminated with plutonium dust. Perchloric acid was used in research work and may have contaminated the former exhaust hoods. Laboratory waste was discharged to the SWMU 21-023(c) septic system south of the building.

AOC 21-009 has been referred to as a SWMU in historical documents and reports. For investigation activities, refer to "Phase II Investigation Report for Delta Prime Site Aggregate Area, Revision 1" (LANL 2010, 110772.33).

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination, resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21. TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006.

Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to "Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation" (LANL 1994, 026073) and "Final Reponses to EPA's Notice of Deficiency on Phase Report" (LANL 1995, 062415).

21-023(c) (9/28/2021)

SWMU 21-023(c) is a former septic system that served the former waste treatment laboratory [former building 21-33; AOC 21-009] that was located directly west of former MDA V [SWMU 21-018(a)] in the southwest portion of DP West at TA-21. The septic system consisted of a septic tank (former structure 21-62), inlet and outlet lines, and an outfall. Former septic tank 21-62 was constructed of reinforced concrete and measured 3.5 ft wide × 7 ft long × 5.8 ft deep, with 4-in.-diameter VCP inlet and outlet drainlines, and an outfall 40 ft southwest of the septic tank. The septic system was reportedly intended only for sanitary waste and served the former waste treatment laboratory (former building 21-33) from 1948 to 1965. Sewage was pumped from a sump in former building 21-33 through the septic tank and was discharged through an outlet drainline to an outfall 40 ft southwest of the septic tank, approximately 30 ft north of the southern edge of BV Canyon, a tributary to Los Alamos Canyon. The volume of wastewater handled by the septic system is not known. The septic tank was removed in 1966 and disposed of at MDA G at TA-54. The date that the inlet/outlet drainlines were removed is not known; however, the 2005–2006 Site investigation activities confirmed that none of the septic system components remained in place at that time.

For investigation activities refer to "Supplemental Tritium Report for Material Disposal Area V" (LANL 2011, 111513).

21-027(d) (4/26/2019)

SWMU 21-027(d) consists of a former outfall and associated outlet drainline from the former concrete secondary containment structure and sump for a former AST (structure 21-47, AOC C-21-028), located south of MDA B and southwest of MDA V in the southwest portion of TA-21. The AST was installed in 1945 on a 9-in.-thick concrete slab on the mesa top adjacent to DP Road, directly west of the former laundry building [building 21-20, SWMU 21-018(b)]. The former AST was installed to store No. 2 diesel fuel for the operation of the boiler in the DP laundry (former building 21-20). The boiler was reportedly diesel powered; however, former employees stated, and photographs show, that the DP laundry was tied to the DP steam plant via overhead steam lines. Therefore, the storage tank and boiler may have been used to provide power when the structure was built and remained in place as a backup source of power for the laundry. There are no records of the tank being serviced (i.e., filled with fuel).

A ditch originally drained stormwater away from the concrete slab and AST, and extended to the southwest toward BV Canyon south of MDAs B and V. In 1948, a concrete secondary containment structure was built around the former AST to contain any potential releases from the tank. A sump was constructed in the center of the south side of the containment, and a drainline [SWMU 21-027(d)] was installed in the drainage ditch from the tank containment. The first segment of the outlet drainline from the containment structure was a 4-in.-diameter steel pipe, approximately 5 ft in length, installed on the ground surface from the sump to a gate valve just outside the containment wall. At the gate valve, the drainline was changed to a VCP.

When the wastewater treatment laboratory (former building 21-33, SWMU 21-009) was constructed in 1948, the drainage ditch from the AST containment was rerouted around building 21-33 and south toward the south rim of DP Mesa. A new outlet drainline from the AST containment was then installed below ground. The outfall for the drainline was located near the mesa edge; any discharge from the containment would have flowed down the canyon hillside into BV Canyon. The AST and concrete containment were removed in 1960, and the SWMU 21-027(d) drainline was removed in March 1965.

For investigation activities, refer to the “Voluntary Corrective Measures Completion Report for Potential Release Site 21-027(d)-99 at Technical Area 21” (LANL 2002, 073107).

40.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 40.2-1.

Table 40.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-009	Waste treatment laboratory	Plutonium
21-021	Systematic release (sitewide)	Americium-241, plutonium-isotopes, strontium-90
21-023(c)	Septic system	Plutonium
21-027(d)	Soil contamination from former drainline	PAHs

40.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those Sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-023(c) consist of results from soil and tuff samples collected in 2005 and 2006.

Decision-level data for SWMU 21-027(d) consist of results from samples collected in 1992 and 1999. The 2002 VCM report concluded that the nature and extent of contamination have been defined.

Analytical results from all decision-level soil samples collected for LA-SMA-5.91 are presented in Figures 40.3-1 through 40.3-4.

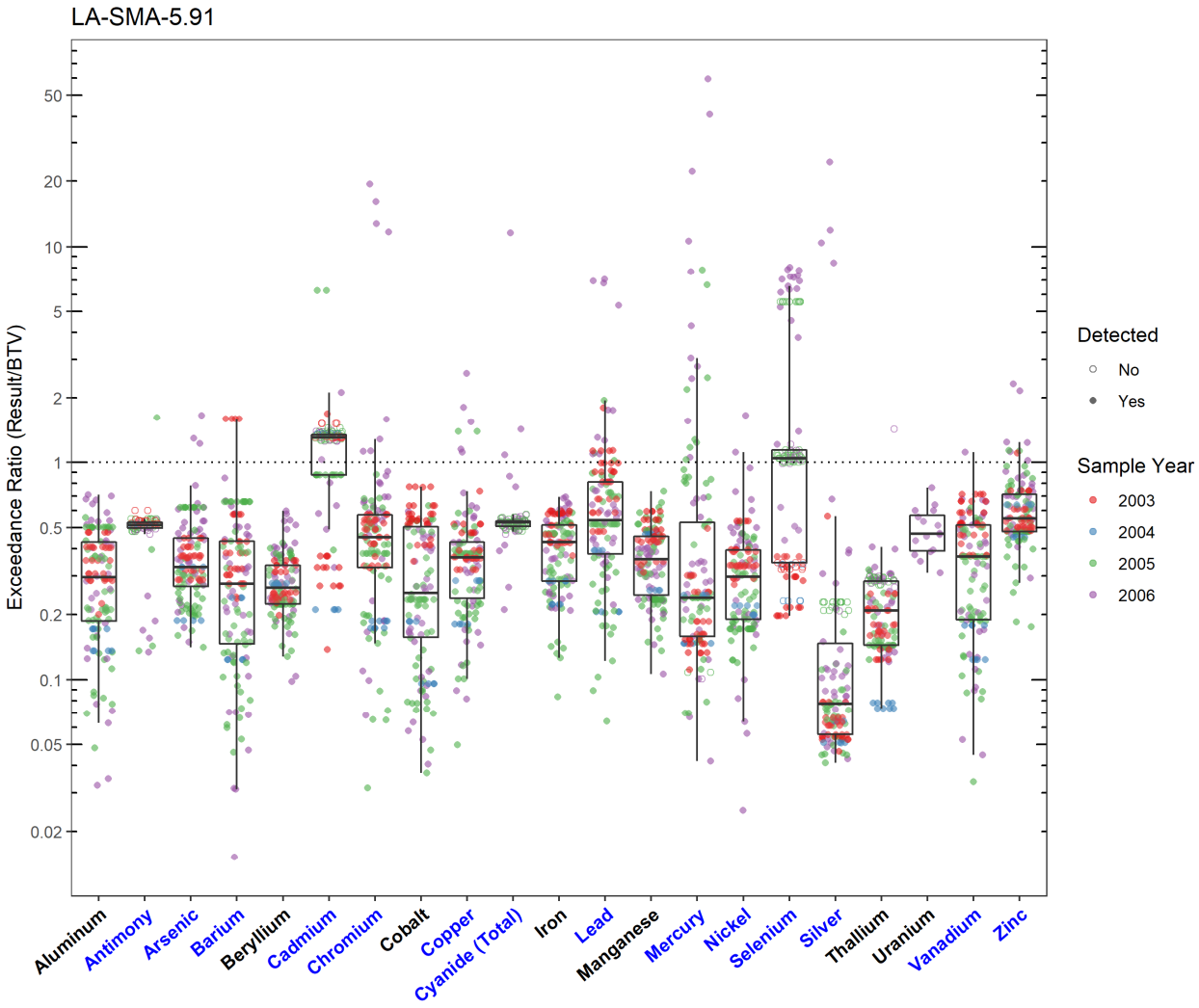

Figure 40.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.91

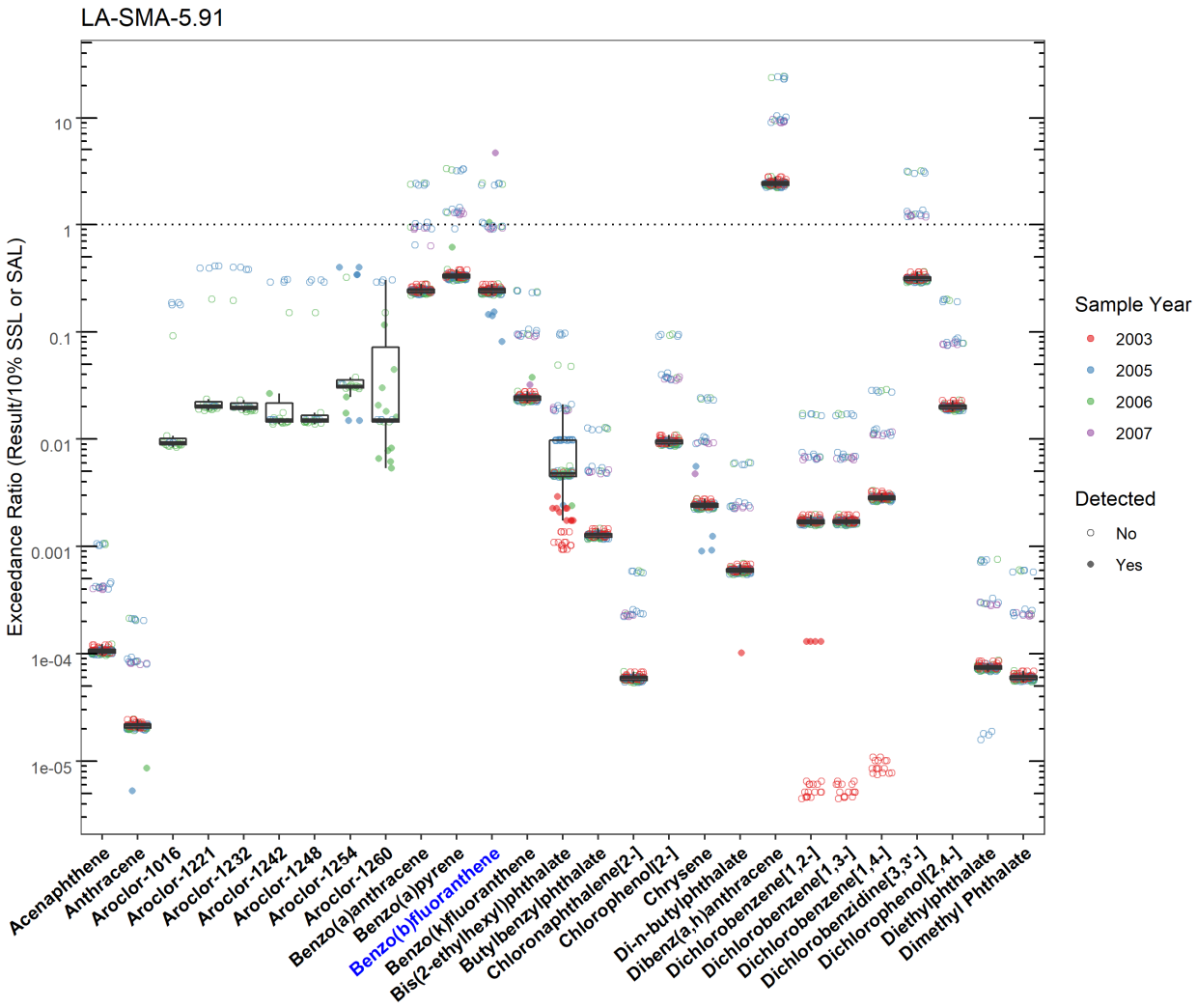

Figure 40.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.91 (Plot 1)

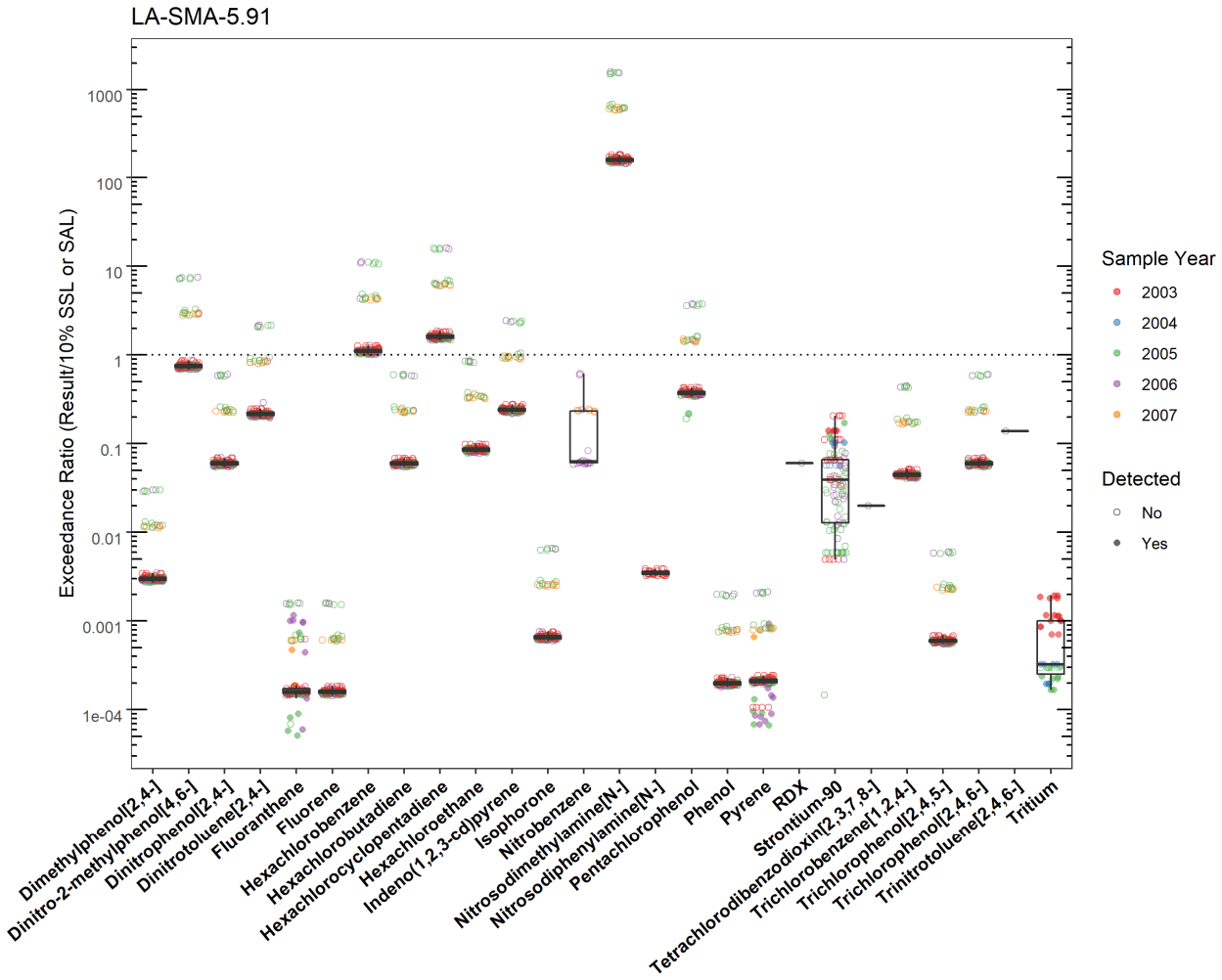

Figure 40.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.91 (Plot 2)

LA-SMA-5.91

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-5.91	Sb	Y	BTV	0.830	1.34	2005-12-07
Arsenic	LA-SMA-5.91	As	Y	BTV	8.17	13.5	2006-04-27
Barium	LA-SMA-5.91	Ba	Y	BTV	295	468	2003-02-19
Benzo(b)fluoranthene	LA-SMA-5.91	205-99-2	Y	SSL_0.1	0.153	0.708	2007-05-11
Cadmium	LA-SMA-5.91	Cd	Y	BTV	0.400	2.50	2005-09-15
Chromium	LA-SMA-5.91	Cr	Y	BTV	19.3	375	2006-04-27
Copper	LA-SMA-5.91	Cu	Y	BTV	14.7	38.1	2006-04-27
Cyanide (Total)	LA-SMA-5.91	CN(TOTAL)	Y	BTV	0.500	5.78	2006-03-27
Lead	LA-SMA-5.91	Pb	Y	BTV	22.3	157	2006-04-27
Mercury	LA-SMA-5.91	Hg	Y	BTV	0.100	5.95	2006-04-27
Nickel	LA-SMA-5.91	Ni	Y	BTV	15.4	25.4	2006-04-27
Selenium	LA-SMA-5.91	Se	Y	BTV	1.52	12.2	2006-08-03
Silver	LA-SMA-5.91	Ag	Y	BTV	1.00	24.5	2006-03-27
Vanadium	LA-SMA-5.91	V	Y	BTV	39.6	44.0	2006-04-27
Zinc	LA-SMA-5.91	Zn	Y	BTV	48.8	113	2006-08-03

Figure 40.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.91

40.4 Stormwater Evaluation

40.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in September 2013 and July 2014. Analytical results from those samples are presented in Figures 40.4-1 and 40.4-2.

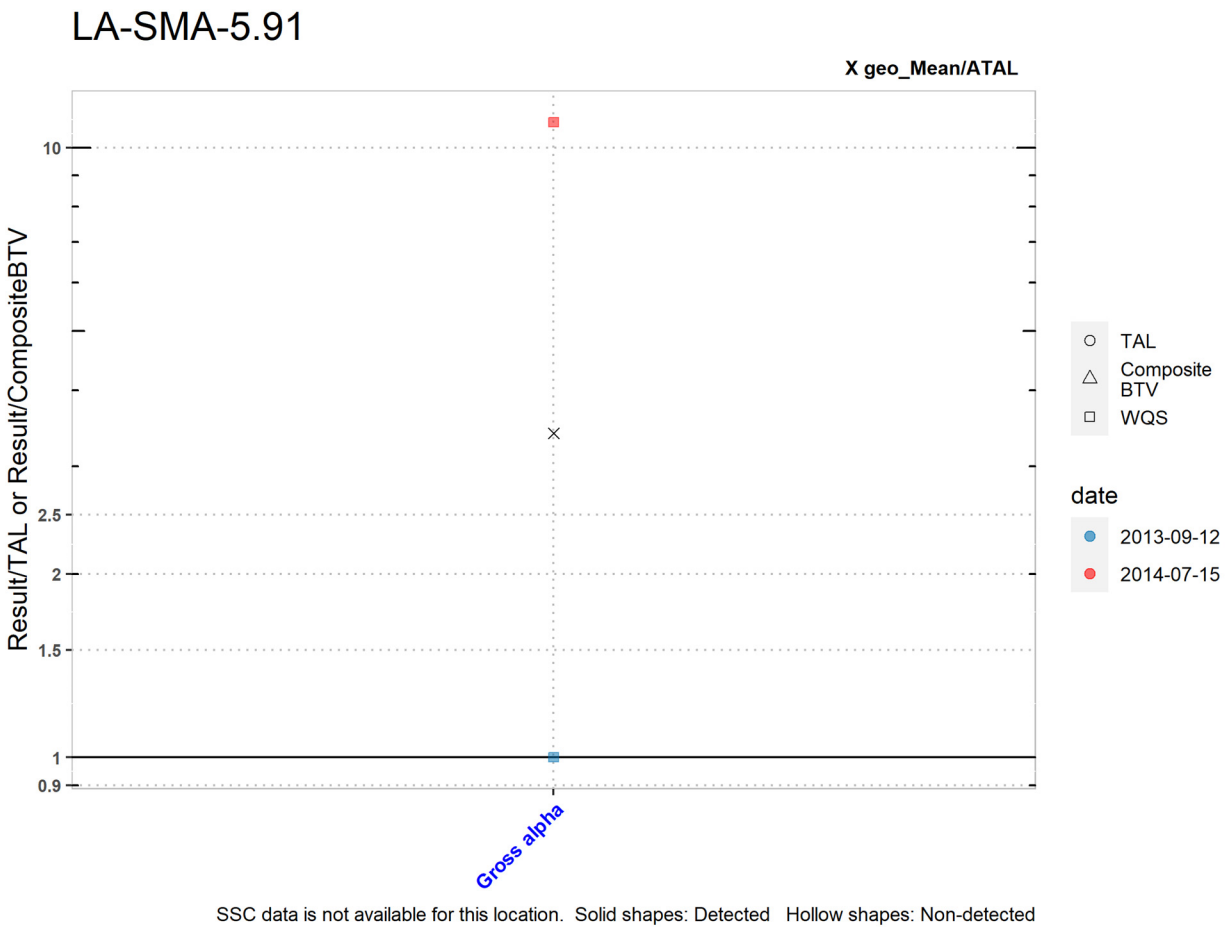

Figure 40.4-1 Analytical Results from Stormwater Samples, LA-SMA-5.91 (Plot)

LA-SMA-5.91

	Gross alpha
MQL	NA
ATAL	15
MTAL	NA
Composite_BTV	55.7
unit	pCi/L
2013-09-12 result	15.7
2013-09-12 dT	1.0
2013-09-12 dB	NA
2014-07-15 result	169
2014-07-15 dT	11
2014-07-15 dB	NA
geo_mean/ATAL	3.4
geo_mean/B	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV

Figure 40.4-2 Analytical Results from Stormwater Samples, LA-SMA-5.91 (Table)

40.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.91 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

40.5 Site-Specific Demonstration

40.5.1 Soil Data Summary

Benzo(b)fluoranthene is the only Site-related POC that exceeded the applicable screening value in soil data and has not yet been measured in stormwater. All other Site-related POCs that exceeded the applicable screening value in soil data previously measured in stormwater data and did not exceed TALs, therefore they will not be added to the SAP.

40.5.2 Stormwater Data Summary

Gross alpha exceeded TAL in 2014 stormwater data and there was no paired SSC result to confirm whether it was below BTVs. Therefore, it will be added to the SAP.

40.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

40.5.4 Sampling and Analysis Plan

Table 40.5-1 is the proposed SAP for LA-SMA-5.91.

Table 40.5-1 Proposed SAP, LA-SMA-5.91

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, and stormwater data
SVOCs	Site history (PAHs) and soil data
DOC	Permit requirement
SSC	Permit requirement

41.0 LA-SMA-5.92

Associated Sites	21-013(b), 21-013(g), 21-018(a), 21-021
Receiving Water	BV Canyon – Tributary to Los Alamos Canyon
Drainage Area	0.80 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 21-013(b): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls AOC 21-013(g): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 21-018(a): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 21-021: In Progress
2010 AC Permit Final Status	Enhanced Control Corrective Action Monitoring/ Corrective Action Complete
2016–2018 SIP Actions	The January 2018 field visit determined that the current SMA sampling location did not adequately monitor runoff from Sites 21-013(g) and 21-018(a); however, a sampler move was not recommended.
2022 Permit Status	Active Monitoring

41.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in July 2013. Analytical results from this sample initiated corrective action.

AOC 21-013(g) and SWMUs 21-013(b) and 21-018(a) received COCs under the Consent Order in June 2011. The Permittees submitted a certification of completion of corrective action for the Sites to EPA per Permit part I.E.2(d) in November 2013 (LANL 2013, 251270).

Following the October 2015 submittal to EPA of certification of enhanced control installation as a corrective action for SWMUs 21-013(b) and 21-021 (LANL 2015, 600980), corrective action monitoring was initiated. Since that time, stormwater flow has not been sufficient for full-volume corrective action sample collection, and monitoring is ongoing.

41.2 Site History

21-013(b) (9/28/2021)

SWMU 21-013(b) is a former surface-disposal area that was located southwest of former MDA V on the south-facing slope of BV Canyon, in the southwest corner of DP West at TA-21. This area contained the external concrete piers, concrete building foundations, and other building debris derived from the 1965 demolition of the laundry facility [former building 21-20; SWMU 21-018(b)] and a waste treatment laboratory (former building 21-33; AOC 21-009). Other debris at the site included asphalt and concrete poured onto the slope before it solidified, broken asphalt, concrete, piping, and miscellaneous building materials. The origin of the additional debris is not documented.

A radiological survey of the former waste-treatment laboratory interior before demolition showed that various surfaces were contaminated with plutonium dust. It is not known if other materials were disposed of at SWMU 21-013(b) or how long this site received building debris; however, it did not

receive wastes after 1994. All debris was removed and the entire site was re-graded as part of a VCA implemented in 2005.

21-013(g) (9/28/2021)

AOC 21-013(g) is a former surface disposal area used for the disposal of construction debris that was located directly south and downgradient of MDA V [SWMU 21-018(a)], on the south-facing slope of BV Canyon at the west end of DP West at TA-21. The disposal area consisted of discarded drainlines, concrete piers, concrete building foundations, and other building debris from the 1965 removal of the laundry facility [former building 21-20, SWMU 21-018(b)] and a waste treatment laboratory (former building 21-33, AOC 21-009), along with broken asphalt and other miscellaneous building debris. It is not known how long this site received building debris; however, it did not receive any waste after 1994. All debris was removed and the site was re-graded in 2005.

21-018(a) (9/28/2021)

SWMU 21-018(a) is the former MDA V. It consisted of three parallel interconnected RLW absorption beds that were located directly south of the former DP laundry facility [former building 21-20, SWMU 21-018(b)], within the southwest portion of DP West at TA-21. The three former cobble- and gravel-filled absorption beds, each measuring 25 ft wide × 220 ft long × 5 ft to 6 ft deep, were constructed to receive RLW from the former laundry facility [former building 21-20, SWMU 21-018(b)] and the former sump [AOC 21-030] in former waste laboratory building 21-45 (AOC C-21-015) that was occupied by the LANL Waste Studies Group. The laundry facility cleaned clothing from staff working in plutonium refinement operations at DP West, and the Waste Studies Group developed processes to recover plutonium, uranium, and other scarce metals from process waste streams. The absorption beds were designed to enhance liquid infiltration into the tuff.

The average discharge rate to MDA V was 6000 to 8,000 gal./day. Discharged RLW flowed into pit 1, which overflowed into pit 2 and then into pit 3, by means of a series of 4-in.-diameter iron overflow drainlines, and collection and distribution drainlines buried within the absorption beds. Historical evidence shows that the absorption beds were under-designed for the volume of wastewater discharged, resulting in overflow into adjacent drainages and BV Canyon.

The absorption beds were used continuously from 1945 to 1961 and remained on standby status until September 1963, when they were permanently removed from service. In 1984, a chainlink fence was constructed around the absorption bed area. A soil cover was placed over the site to repair erosion damage in 1985.

In 1999, a NTISV cold demonstration was performed near MDA V in preparation of a plan to vitrify a portion of one of the contaminated absorption beds at MDA V. In 2000, the NTISV hot demonstration was conducted in absorption bed 1 at MDA V. The SWMU 21-018(a) absorption beds, including all distribution lines and absorption bed material, were removed during remediation activities implemented at MDA V in 2005 and 2006. Following excavation, all three absorption beds were backfilled with clean fill material.

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21. TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium

research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006.

Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities at SWMU 21-021, refer to "Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation" (LANL 1994, 026073) and "Final Reponses to EPA's Notice of Deficiency on Phase Report" (LANL 1995, 062415).For investigation activities at the AOC 21-013(g) and SWMUs 21-013(b) and 21-018(a), refer to "Supplemental Investigation Report for Consolidated Unit 21-018(a)-99, Material Disposal Area V, at Technical Area 21, Revision 1" (LANL 2008, 101892.22).

41.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 41.2-1.

Table 41.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POCs Source	Potential POCs
21-013(b)	Surface disposal site	Plutonium
21-013(g)	Surface disposal site	Metals, radionuclides
21-018(a)	MDA V	Plutonium isotopes, uranium isotopes, americium-241, strontium-90, gamma-emitting isotopes, inorganic chemicals
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90

41.3 Consent Order Soil Data

Decision-level data for SWMU 21-013(b) and AOC 21-013(g) consist of results from samples collected in 2005 and 2007. Revision 1 of the 2008 supplemental IR concluded that the nature and extent of contamination have been defined.

Decision level data for SWMU 21-018(a) consist of results from soil and tuff samples collected in 1994, 1996, 2005, 2006, and 2007. Revision 1 of the 2008 supplemental IR concluded that the nature and extent of contamination are defined.

Analytical results from all decision-level soil samples collected for LA-SMA-5.92 are presented in Figures 41.3-1 through 41.3-4.

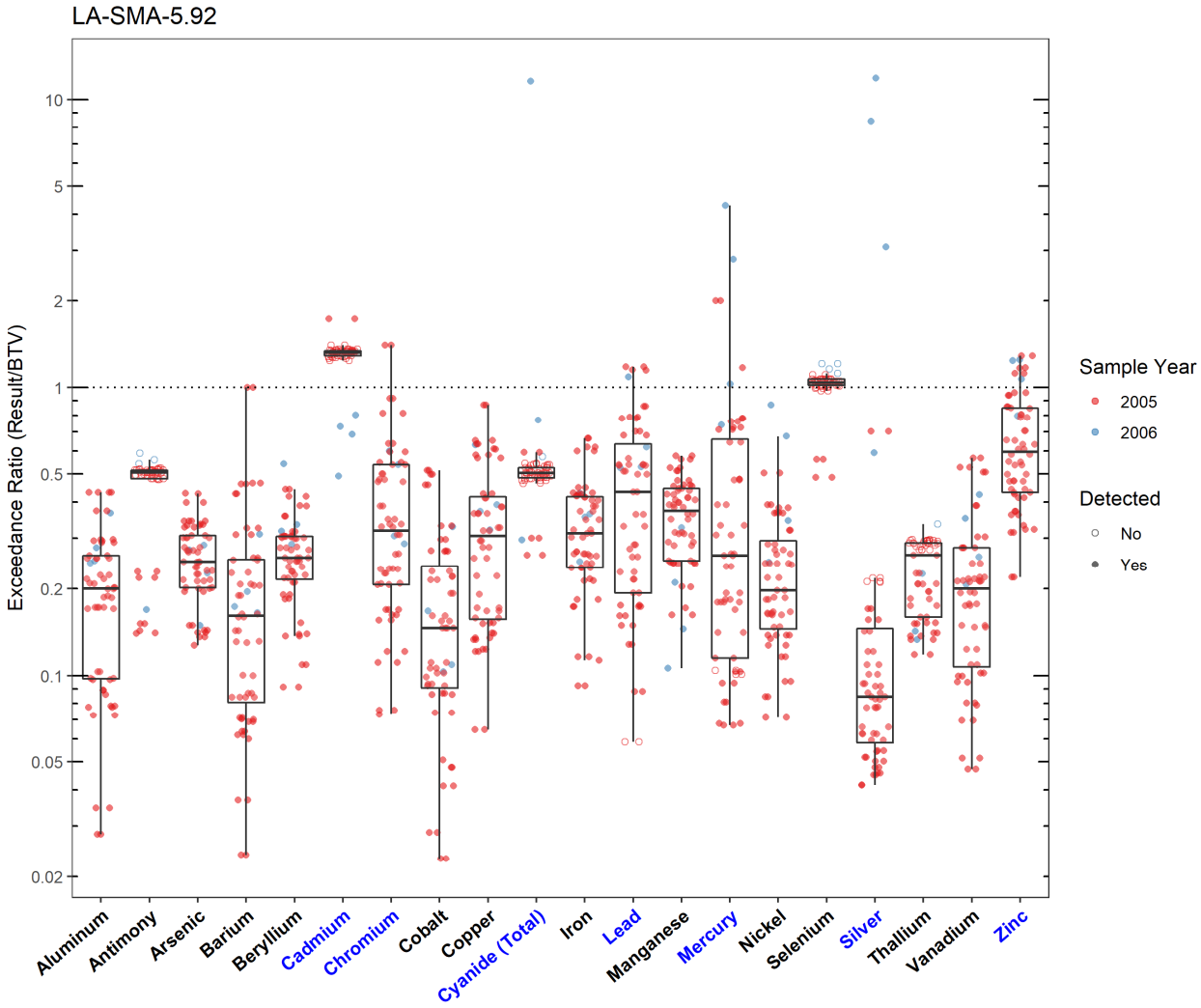

Figure 41.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-5.92

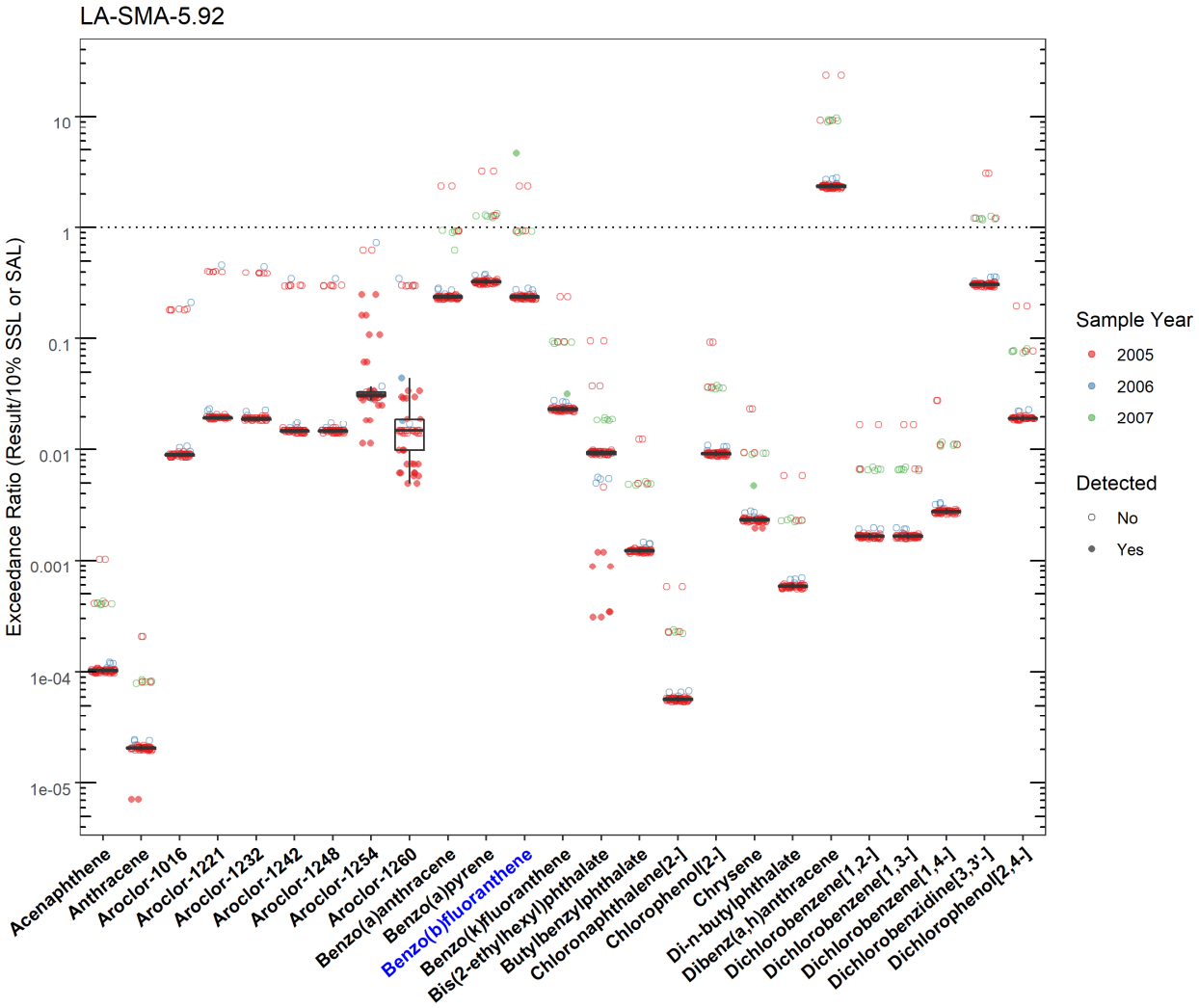

Figure 41.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.92 (Plot 1)

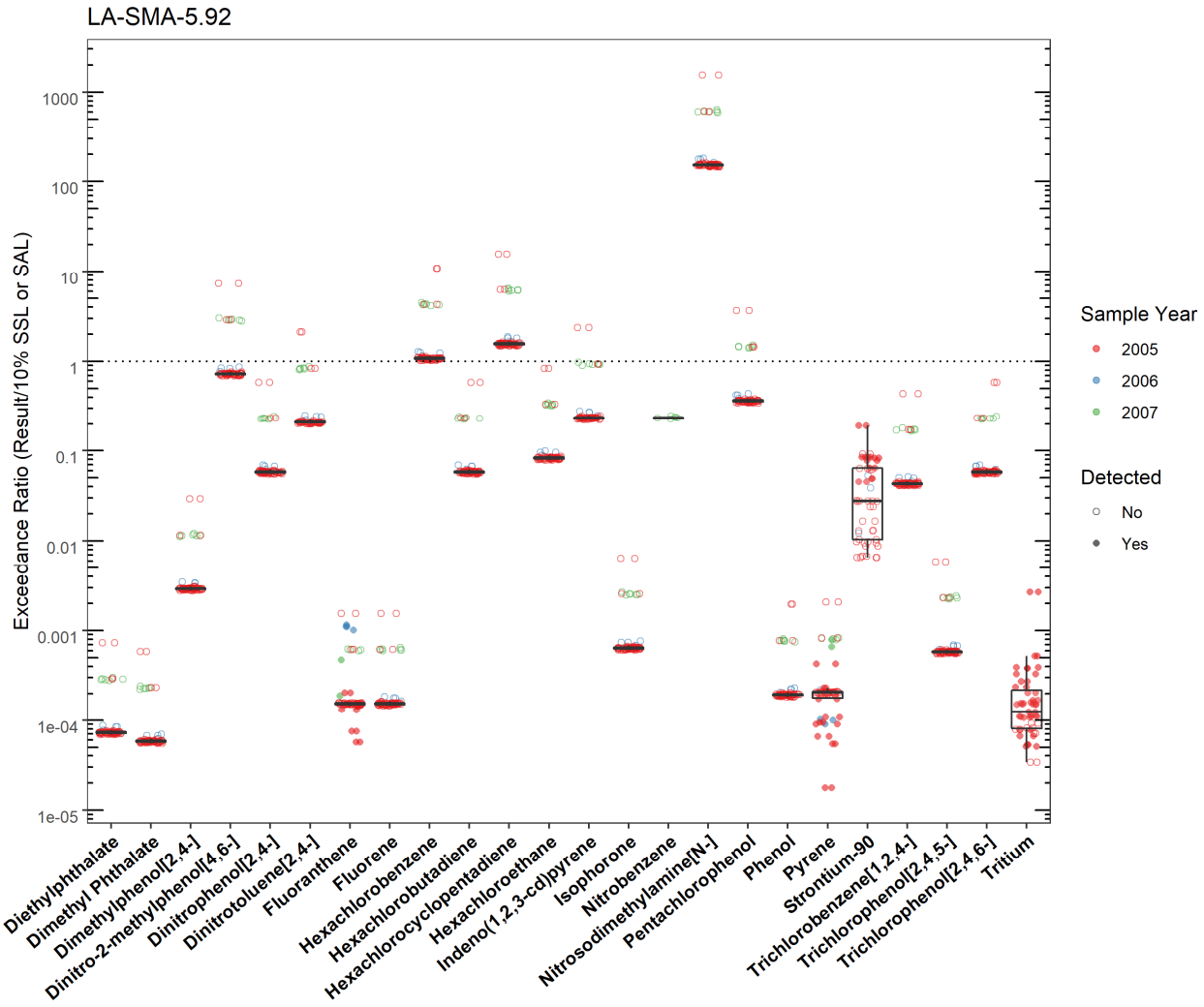

Figure 41.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-5.92 (Plot 2)

LA-SMA-5.92

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(b)fluoranthene	LA-SMA-5.92	205-99-2	Y	SSL_0.1	0.153	0.708	2007-05-11
Cadmium	LA-SMA-5.92	Cd	Y	BTV	0.400	0.691	2005-09-12
Chromium	LA-SMA-5.92	Cr	Y	BTV	19.3	27.1	2005-09-13
Cyanide (Total)	LA-SMA-5.92	CN(TOTAL)	Y	BTV	0.500	5.78	2006-03-27
Lead	LA-SMA-5.92	Pb	Y	BTV	22.3	26.4	2005-09-12
Mercury	LA-SMA-5.92	Hg	Y	BTV	0.100	0.429	2006-03-27
Silver	LA-SMA-5.92	Ag	Y	BTV	1.00	11.9	2006-03-27
Zinc	LA-SMA-5.92	Zn	Y	BTV	48.8	62.9	2005-09-12

Figure 41.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-5.92

41.4 Stormwater Evaluation

41.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected in the current stage at the SMA.

41.4.2 Assessment Unit and Stream Impairments

LA-SMA-5.92 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha, cyanide, and metals impairments may be Site-related, based on Site history.

41.5 Site-Specific Demonstration

41.5.1 Soil Data Summary

Mercury exceeded the applicable screening value in soil data soil data and TALs in stormwater data. All remaining Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

41.5.2 Stormwater Data Summary

No data for the current monitoring stage have been collected. Copper and mercury exceeded TAL and BTV in the previous monitoring stage. Gross alpha exceeded TAL in 2013 stormwater data, and there was no paired SSC result to confirm whether it was below BTVs; therefore, it will be added to the SAP.

41.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected in the current stage.

41.5.4 Sampling and Analysis Plan

Table 41.5-1 is the proposed SAP for LA-SMA-5.92.

Table 41.5-1 Proposed SAP, LA-SMA-5.92

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, stormwater data
Total mercury	Impairment, Site history (metals), soil data, stormwater data
Dissolved copper	Site history (metals), stormwater data
DOC	Permit requirement
SSC	Permit requirement

42.0 LA-SMA-6.25

Associated Sites	21-021, 21-024(d), 21-027(c)
Receiving Water	Los Alamos Canyon
Drainage Area	1.07 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(d): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 21-027(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

42.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection at LA-SMA-6.25. Baseline monitoring is ongoing until one confirmation sample is collected from this SMA.

42.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21. TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006.

Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(d) (2/27/2019)

SWMU 21-024(d) is the former location of a sanitary septic system in the southwest portion of former DP West at Technical Area TA-21, which received sanitary waste from former building 21-001 from 1945 to the early 1960s. The septic system was located south of former building 21-001, and consisted of a

reinforced concrete septic tank (former structure 21-106) measuring 17.5-ft × 9.5-ft × 8.83-ft deep, two 6-in. VCP inlet drainlines, a single outlet drainline, and an outfall on the south rim of DP Mesa above Los Alamos Canyon.

Building 21-001 was constructed as an office building in 1945. The sanitary sewer system routed sewage via 6-in. VCP lines through the septic tank and outlet drainline which discharged on the south rim of DP Mesa above Los Alamos Canyon. Building 21-001 was removed in the early 1960s and the septic system was abandoned. In 1995, the septic tank was filled with pea gravel and left in place; the inlet and outlet drainlines were grouted with concrete and left in place. During the 2007 Consent Order investigation, the inactive septic tank and all remaining inlet and outlet drainlines were removed.

For investigation activities, refer to "Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1" (LANL 2016, 601598).

21-027(c) (9/28/2021)

SWMU 21-027(c) is a former 4-in. VCP outlet drainline that exited former building 21-06 (a cafeteria and machine shop) and discharged to an outfall south of the building on the south rim of DP Mesa, within DP West at TA-21. Former building 21-06 was constructed in 1945 and was removed in 1966; the pipe was left in place. In 2007, the outlet drainline extending from former building 21-06 to the outfall was removed.

For investigation activities, refer to "Phase II Investigation Report for Delta Prime Site Aggregate Area, Revision 1" (LANL 2010, 110772.33).

42.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 42.2-1.

Table 42.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(d)	Septic system	Radionuclides, inorganic and organic chemicals
21-027(c)	Outfall from former building 21-06	PAHs

42.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-024(d) consist of results from samples collected in 2007, 2008, 2009, 2010, and 2011. The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Decision-level data for SWMU 21-027(c) consist of results from samples collected in 2007 and 2009. Revision 1 of the 2010 Phase II IR concluded that the nature and extent of contamination were defined.

Analytical results from all decision-level soil samples collected for LA-SMA-6.25 are presented in Figures 42.3-1 through 42.3-4.

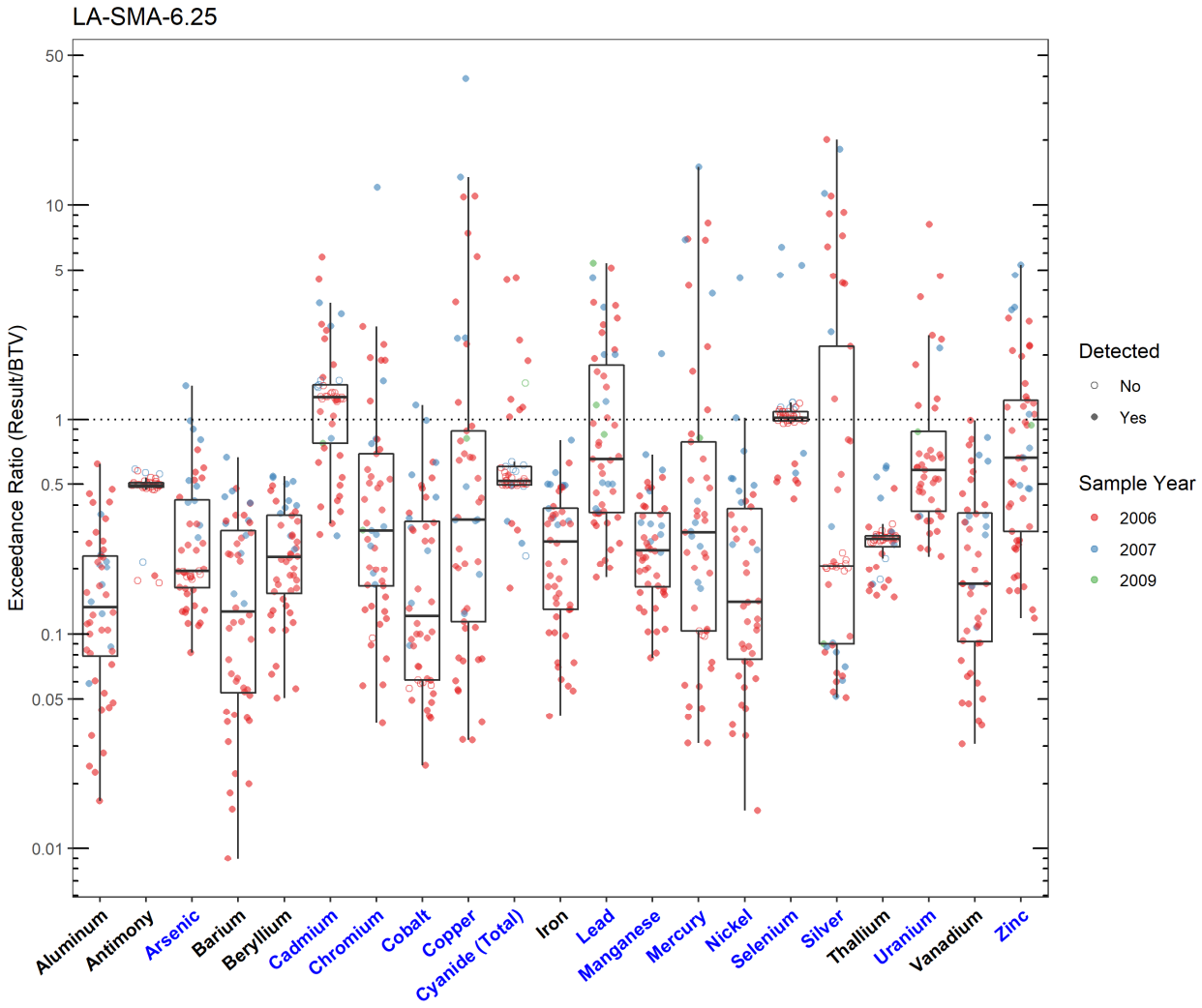

Figure 42.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.25

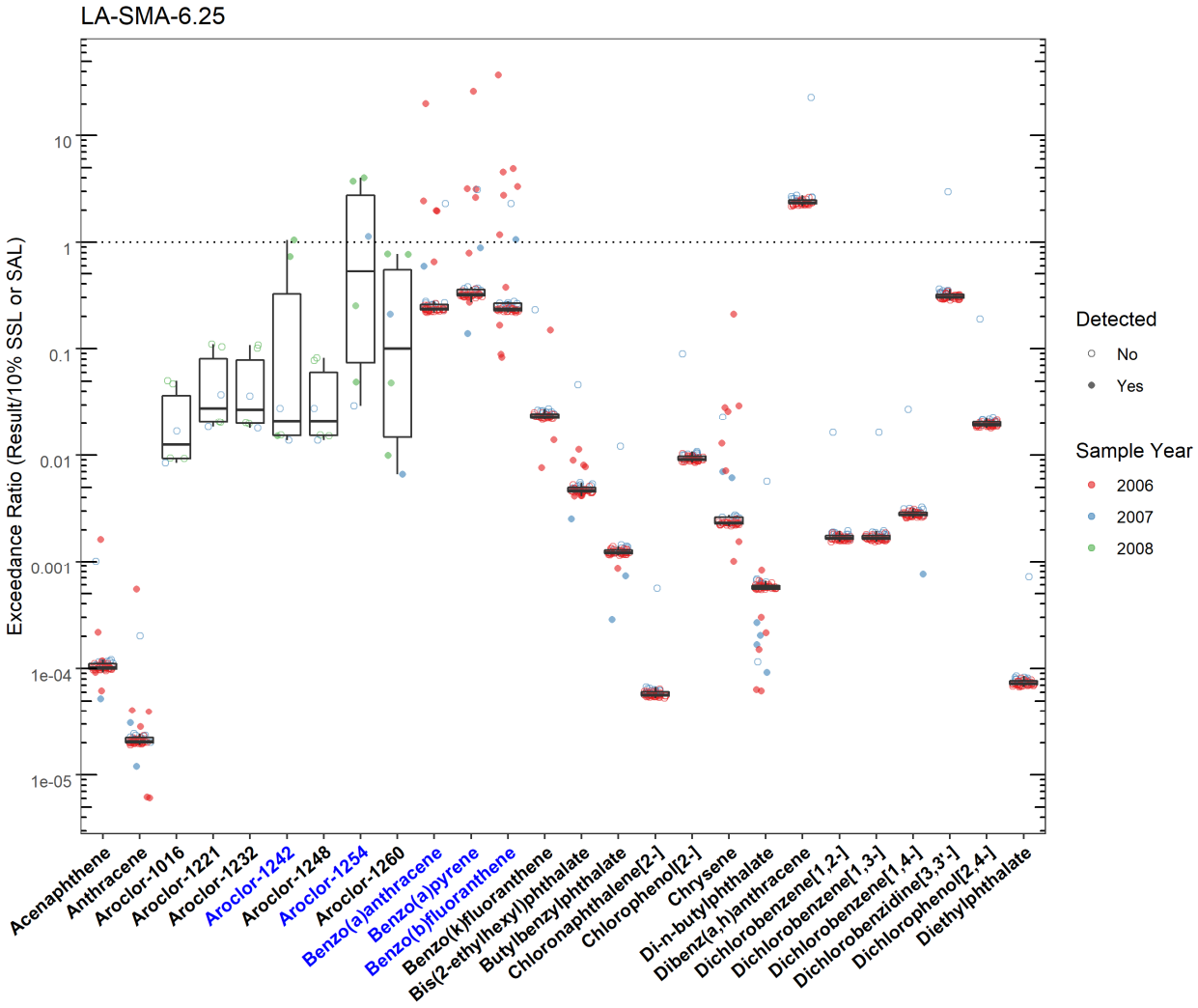

Figure 42.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.25 (Plot 1)

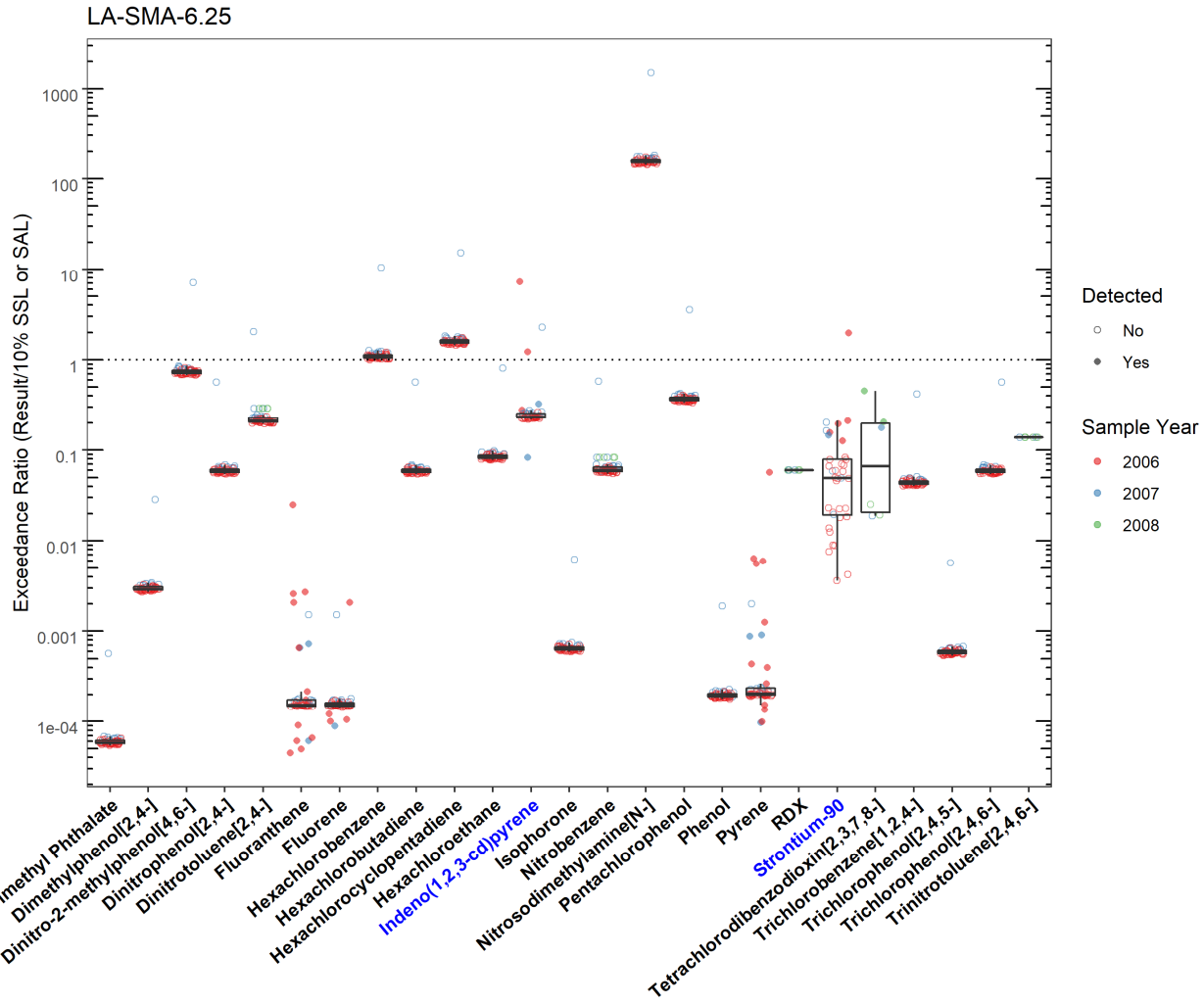

Figure 42.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.25 (Plot 2)

LA-SMA-6.25

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1242	LA-SMA-6.25	53469-21-9	Y	SSL_0.1	0.243	0.256	2008-01-22
Aroclor-1254	LA-SMA-6.25	11097-69-1	Y	SSL_0.1	0.114	0.457	2008-01-22
Arsenic	LA-SMA-6.25	As	Y	BTV	8.17	11.8	2007-10-11
Benzo(a)anthracene	LA-SMA-6.25	56-55-3	Y	SSL_0.1	0.153	3.08	2006-12-18
Benzo(a)pyrene	LA-SMA-6.25	50-32-8	Y	SSL_0.1	0.112	2.93	2006-12-18
Benzo(b)fluoranthene	LA-SMA-6.25	205-99-2	Y	SSL_0.1	0.153	5.67	2006-12-18
Cadmium	LA-SMA-6.25	Cd	Y	BTV	0.400	2.30	2006-12-11
Chromium	LA-SMA-6.25	Cr	Y	BTV	19.3	233	2007-10-11
Cobalt	LA-SMA-6.25	Co	Y	BTV	8.64	10.1	2007-10-11
Copper	LA-SMA-6.25	Cu	Y	BTV	14.7	575	2007-10-11
Cyanide (Total)	LA-SMA-6.25	CN(TOTAL)	Y	BTV	0.500	2.28	2006-12-11
Indeno(1,2,3-cd)pyrene	LA-SMA-6.25	193-39-5	Y	SSL_0.1	0.153	1.11	2006-12-18
Lead	LA-SMA-6.25	Pb	Y	BTV	22.3	120	2009-06-22
Manganese	LA-SMA-6.25	Mn	Y	BTV	671	1360	2007-10-11
Mercury	LA-SMA-6.25	Hg	Y	BTV	0.100	1.50	2007-10-11
Nickel	LA-SMA-6.25	Ni	Y	BTV	15.4	70.4	2007-10-11
Selenium	LA-SMA-6.25	Se	Y	BTV	1.52	9.70	2007-10-11
Silver	LA-SMA-6.25	Ag	Y	BTV	1.00	20.1	2006-12-06
Strontium-90	LA-SMA-6.25	Sr-90	Y	SAL_0.1	1.50	2.97	2006-12-18
Uranium	LA-SMA-6.25	U	Y	BTV	1.82	14.8	2006-12-06
Zinc	LA-SMA-6.25	Zn	Y	BTV	48.8	258	2007-10-11

Figure 42.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.25

42.4 Stormwater Evaluation

42.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

42.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.25 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The impairments may be Site-related, based on Site history.

42.5 Site-Specific Demonstration

42.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: arsenic, Aroclor-1242, Aroclor-1254, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, cadmium, chromium, cobalt, copper, cyanide (weak acid dissociable), indeno(1,2,3-cd)pyrene, lead, manganese, mercury, nickel, selenium, silver, strontium-90, uranium, and zinc.

42.5.2 Stormwater Data Summary

No confirmation-monitoring data.

42.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

42.5.4 Sampling and Analysis Plan

Table 42.5-1 is the proposed SAP for LA-SMA-6.25.

Table 42.5-1 Proposed SAP, LA-SMA-6.25

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Total cyanide, mercury and selenium	Impairment, Site history (metals), and soil data
Total PCBs	Impairment, Site history (organics), soil data
Dissolved arsenic, cadmium, cobalt, chromium, copper, nickel, manganese, lead, silver, uranium, zinc	Site history (metals) and soil data
Radium-226 and radium-228	Site history (radionuclides)
Strontium-90	Site history and soil data
SVOCs	Site history (organics) and soil data
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

43.0 LA-SMA-6.3

Associated Sites	21-006(b)
Receiving Water	Los Alamos Canyon
Drainage Area	1.65 acres
Landscape Characteristics	4% impervious, 96% pervious
Consent Order Site Status	SWMU 21-006(b): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Long-Term Stewardship per Permit Part I.C.3.a criterion

43.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in July 2019. Analytical results from this sample initiated corrective action.

SWMU 21-006(b) received a COC under the Consent Order in September 2018. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) in December 2019 (N3B 2019, 700724). Stormwater monitoring has not occurred since 2019.

43.2 Site History

21-006(b) (2/22/2019)

SWMU 21-006(b) is an inactive seepage pit consisting of a brick manhole constructed in a trench (structure 21-118), an inlet acid drainline, an outlet vapor drainline, and an outfall in the southwest portion of TA-21. The brick seepage pit measures 13 ft × 4 ft × 6 ft deep with a wooden cover. The seepage pit and associated drainlines were installed during the construction of building 21-003 in 1945. A 3-in. Jennite-coated (coal tar sealer) cast-iron inlet drainline exited the southeast side of former building 21-002, and extended approximately 160 ft southward to the seepage pit (structure 21-118). A 2-in. steel outlet drainline ran approximately 100 ft southward from the pit to an outfall approximately 8 ft above the bench surface below the mesa top above Los Alamos Canyon. The drainlines and seepage pit were installed to receive ether waste from the ethyl ether extraction process as part of the original TA-21 plutonium-purification process conducted in building 21-002.

The ether extraction process was discontinued in September of 1945. Documentation is not available to confirm that all discharges to the seepage pit also ceased in 1945. The location of the seepage pit and associated drainlines has not been conclusively identified. Plutonium processing work was moved to TA-55 in the late 1970s. Building 21-002 was decommissioned in the 1990s and demolished in 2010.

For investigation activities, refer to “Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1” (LANL 2016, 601598).

43.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 43.2-1.

Table 43.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POC
21-006(b)	Disposal pit	Plutonium

43.3 Consent Order Soil Data

Decision-level data for SWMU 21,006(b) consist of results from samples collected in 2007, 2009, 2010, and 2011. Analytical results from those samples are presented in Figures 43.3-1 through 43.3-4. The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

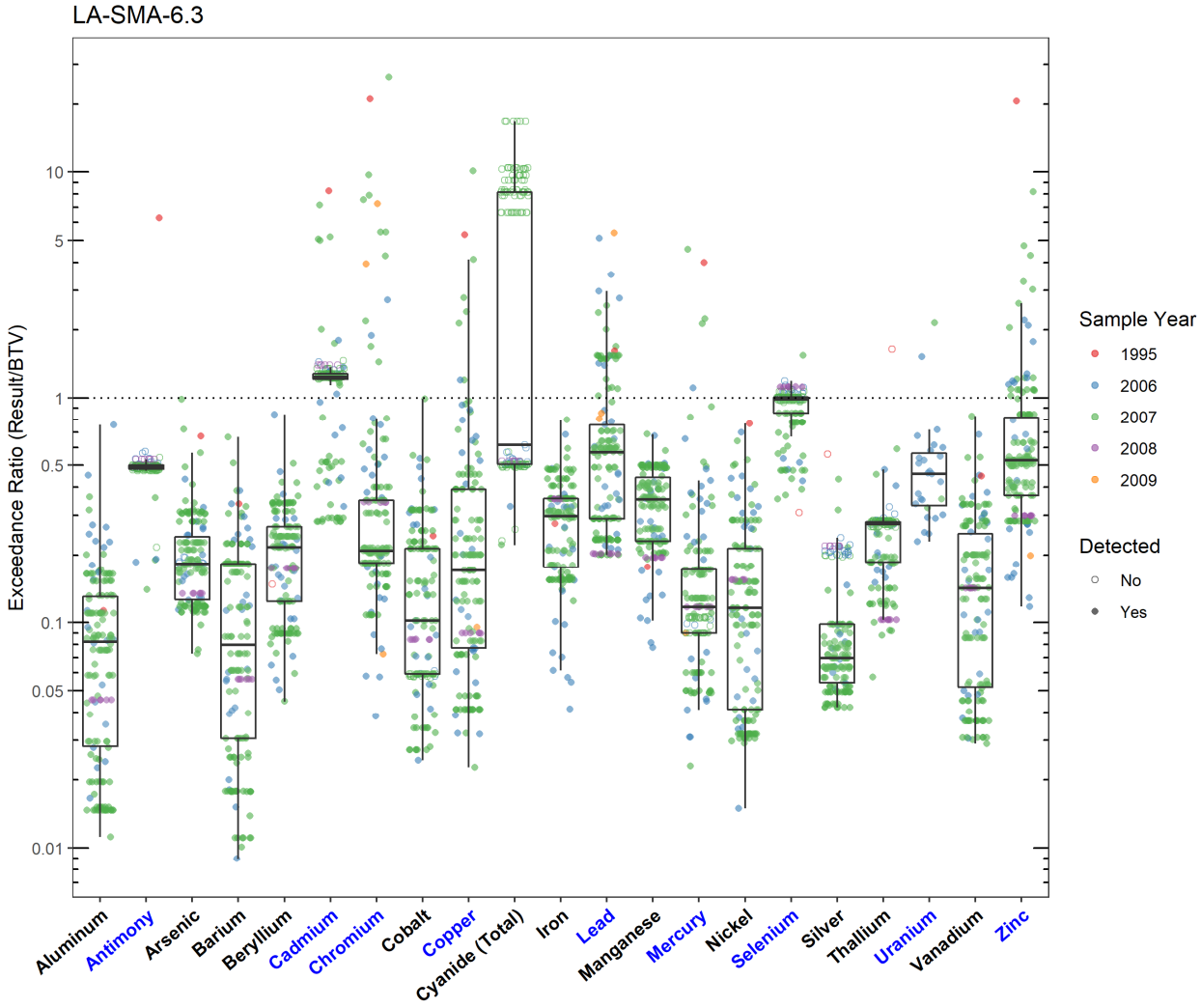

Figure 43.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.3

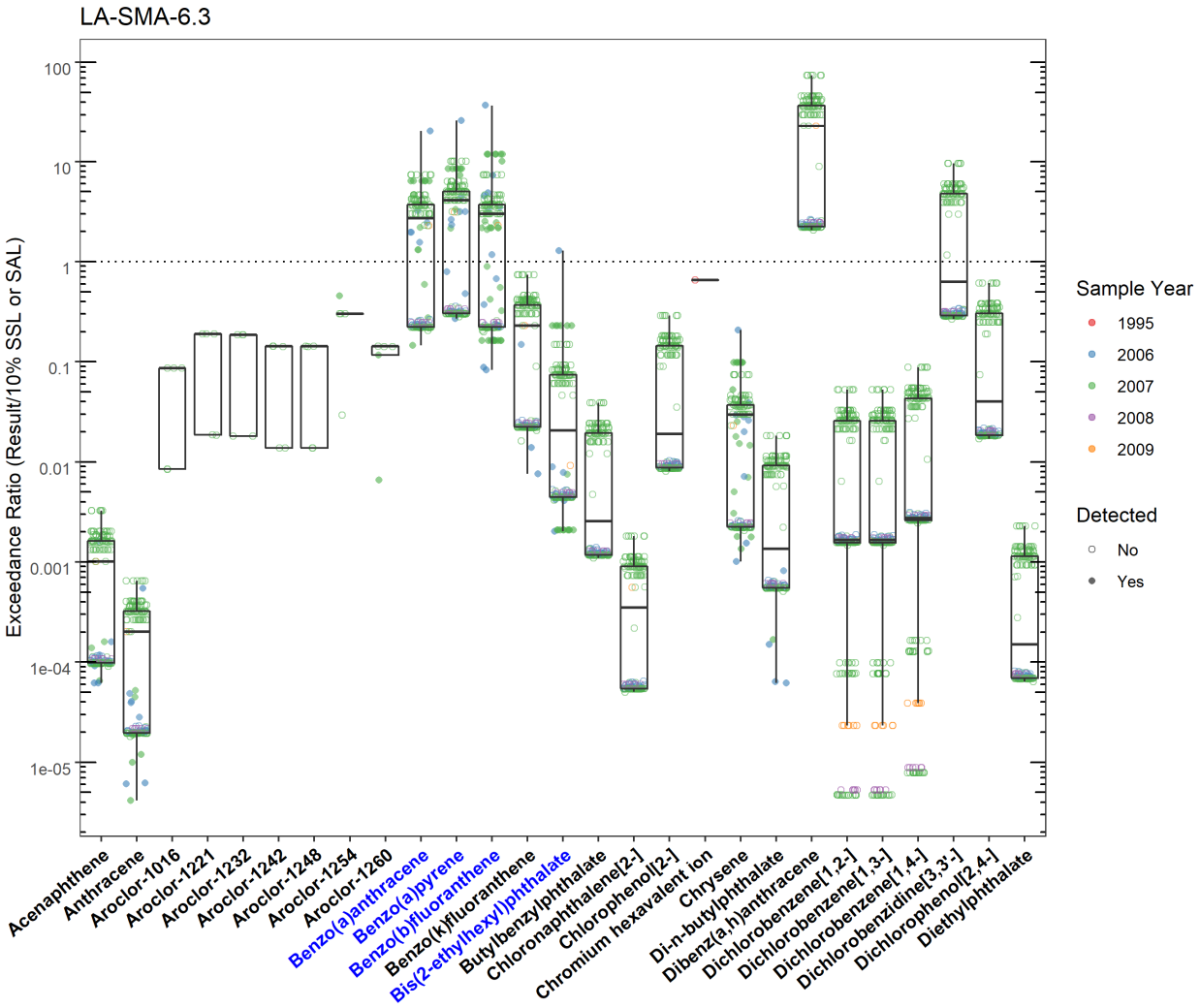

Figure 43.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.3 (Plot 1)

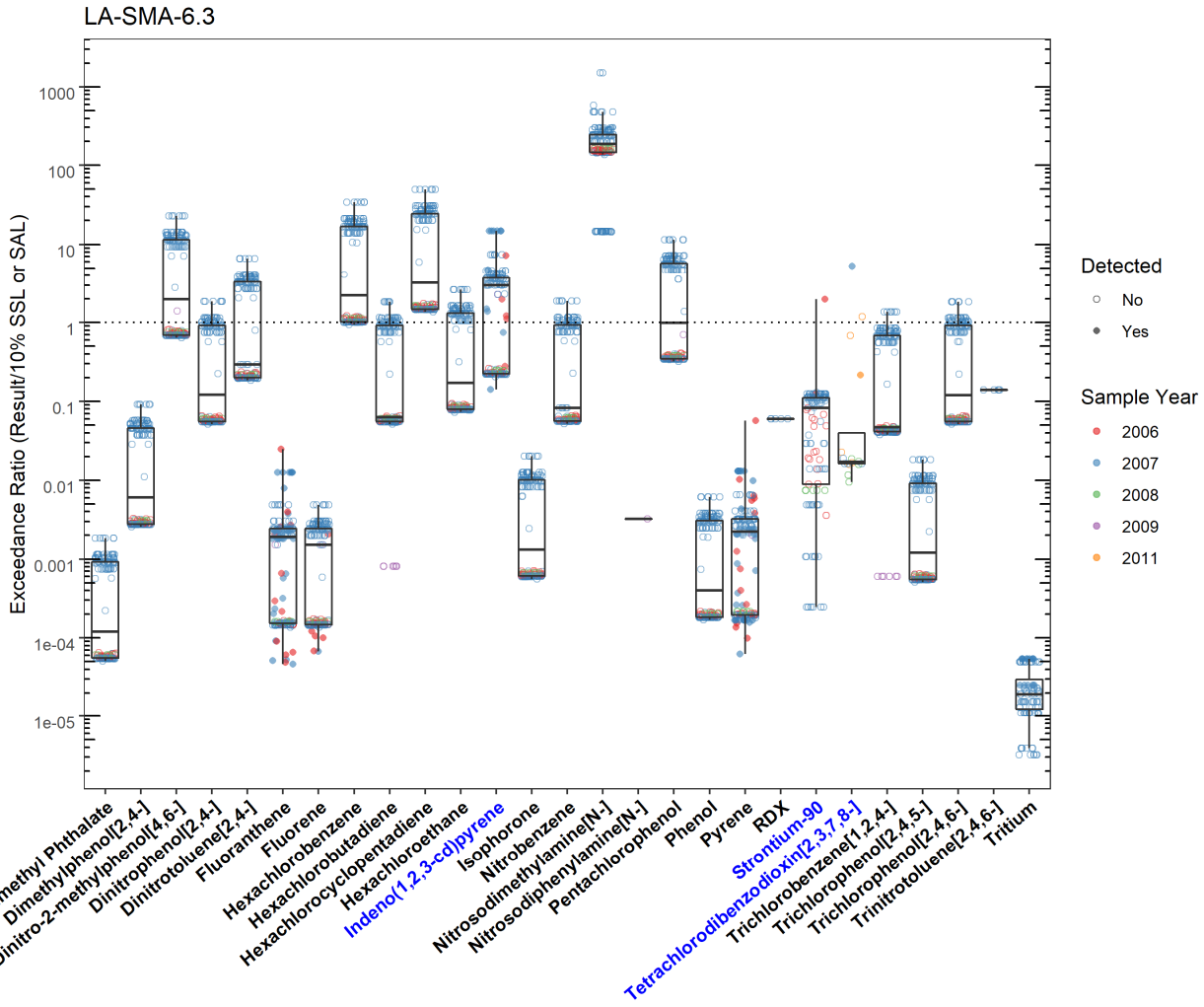

Figure 43.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.3 (Plot 2)

LA-SMA-6.3

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-6.3	Sb	Y	BTV	0.830	5.20	1995-10-06
Benzo(a)anthracene	LA-SMA-6.3	56-55-3	Y	SSL_0.1	0.153	3.08	2006-12-18
Benzo(a)pyrene	LA-SMA-6.3	50-32-8	Y	SSL_0.1	0.112	2.93	2006-12-18
Benzo(b)fluoranthene	LA-SMA-6.3	205-99-2	Y	SSL_0.1	0.153	5.67	2006-12-18
Bis(2-ethylhexyl)phthalate	LA-SMA-6.3	117-81-7	Y	SSL_0.1	38.0	48.8	2006-12-18
Cadmium	LA-SMA-6.3	Cd	Y	BTV	0.400	3.30	1995-10-06
Chromium	LA-SMA-6.3	Cr	Y	BTV	19.3	509	2007-07-10
Copper	LA-SMA-6.3	Cu	Y	BTV	14.7	148	2007-07-10
Indeno(1,2,3-cd)pyrene	LA-SMA-6.3	193-39-5	Y	SSL_0.1	0.153	2.25	2007-05-24
Lead	LA-SMA-6.3	Pb	Y	BTV	22.3	120	2009-06-22
Mercury	LA-SMA-6.3	Hg	Y	BTV	0.100	0.457	2007-07-10
Selenium	LA-SMA-6.3	Se	Y	BTV	1.52	2.34	2007-08-22
Strontium-90	LA-SMA-6.3	Sr-90	Y	SAL_0.1	1.50	2.97	2006-12-18
Tetrachlorodibenzodioxin[2,3,7,8-]	LA-SMA-6.3	1746-01-6	Y	SSL_0.1	0.00000490	0.0000259	2007-07-17
Uranium	LA-SMA-6.3	U	Y	BTV	1.82	3.92	2007-07-12
Zinc	LA-SMA-6.3	Zn	Y	BTV	48.8	1010	1995-10-06

Figure 43.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.3

43.4 Stormwater Evaluation

43.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective-action stormwater sample was collected in July 2019. Analytical results from that sample are presented in Figures 43.4-1 through 43.4-4.

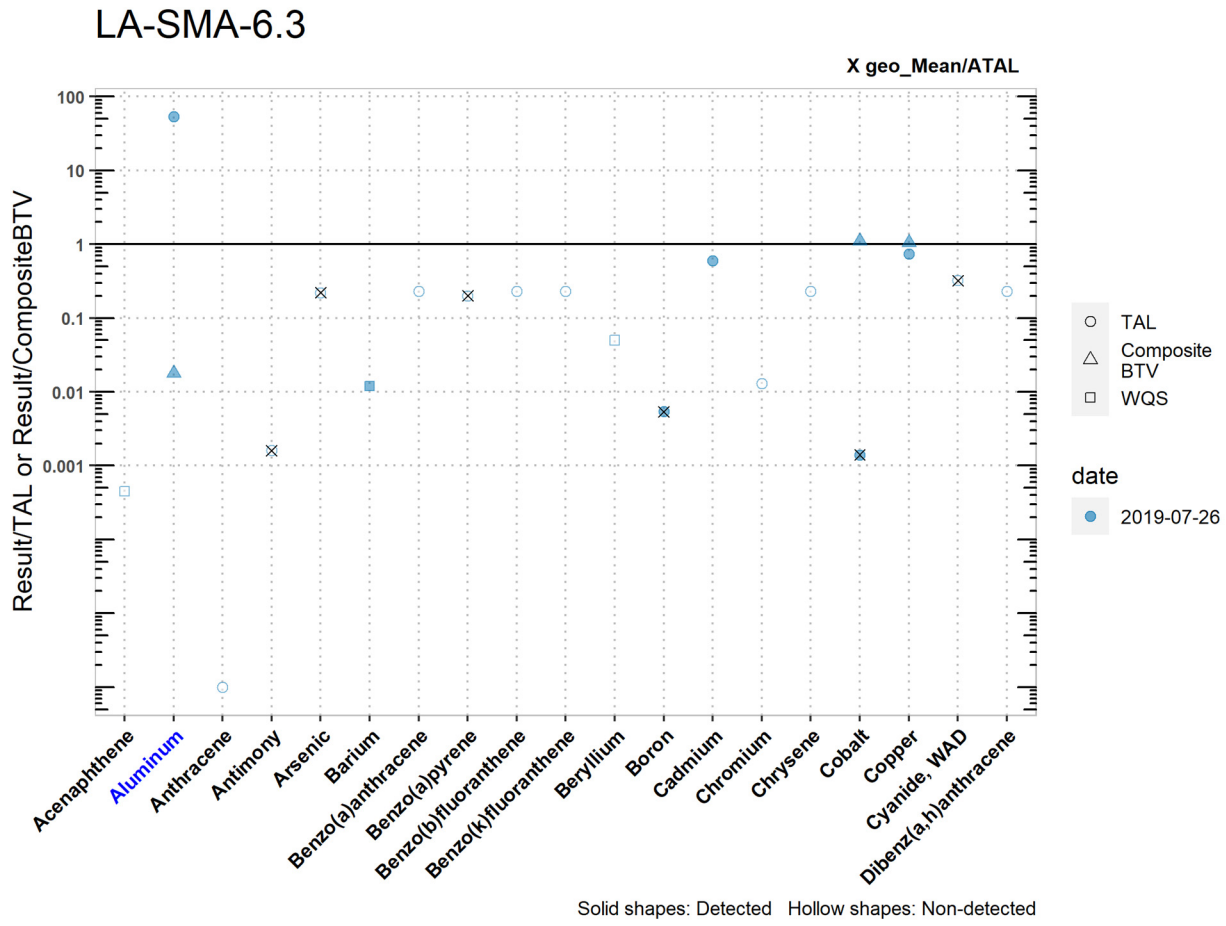

Figure 43.4-1 Analytical Results from Stormwater Sample, LA-SMA-6.3 (Plot 1)

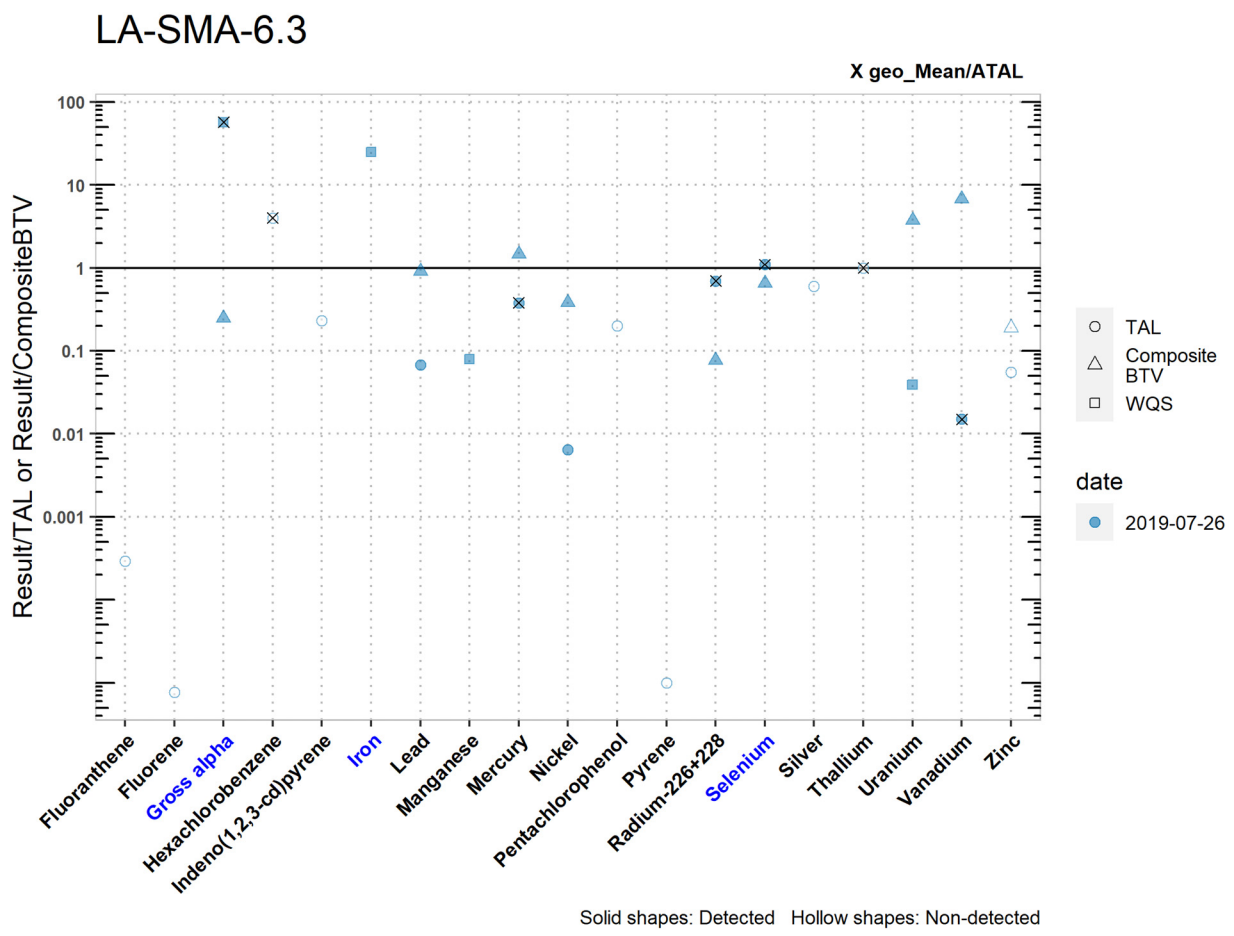

Figure 43.4-2 Analytical Results from Stormwater Sample, LA-SMA-6.3 (Plot 2)

LA-SMA-6.3

	Acenaphthene	Aluminum	Anthracene	Antimony	Arsenic	Barium	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Beryllium	Boron	Cadmium	Chromium	Chrysene	Cobalt	Copper	Cyanide, WAD	Dibenz(a,h)anthracene
MQL	NA	2.5	0.064	1	0.5	NA	0.064	0.064	0.064	0.064	NA	100	1	10	0.064	50	0.5	10	0.064
ATAL	NA	NA	NA	640	9	NA	NA	0.18	NA	NA	NA	5000	NA	NA	NA	1000	NA	5.2	NA
MTAL	NA	765	NA	NA	340	NA	0.18	NA	0.18	0.18	NA	NA	0.65	233	0.18	NA	4.8	22	0.18
Composite_BTV	NA	37300	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.22	3.35	NA	NA
unit	ug/L	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2019-07-26 result	*0.0408*	40900	*0.0408*	*1.00*	*2.00*	23.8	*0.0408*	*0.0408*	*0.0408*	*0.0408*	*0.200*	27.1	0.410	*3.00*	*0.0408*	1.36	3.53	*1.67*	*0.0408*
2019-07-26 dT	NA	53.5	NA	NA	NA	0.012	NA	NA	NA	NA	NA	0.0054	0.6	NA	NA	0.0014	0.735	NA	NA
2019-07-26 dB	NA	0.0180	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1.11	1.05	NA	NA
geo_mean/ATAL	NA	NA	NA	0.0016	0.22	NA	NA	0.2	NA	NA	NA	0.0054	NA	NA	NA	0.0014	NA	0.321	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
**SSC normalized unit is mg/kg

Figure 43.4-3 Analytical Results from Stormwater Sample, LA-SMA-6.3 (Table 1)

LA-SMA-6.3

	Fluoranthene	Fluorene	Gross alpha	Hexachlorobenzene	Indeno(1,2,3-cd)pyrene	Iron	Lead	Manganese	Mercury	Nickel	Pentachlorophenol	Pyrene	Radium-226+228	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
MQL	0.064	0.064	NA	5	0.064	NA	0.5	NA	0.005	0.5	5	0.064	NA	5	0.5	0.5	NA	50	20
ATAL	NA	NA	15	0.0029	NA	NA	NA	NA	0.77	NA	NA	NA	30	5	NA	0.47	NA	100	NA
MTAL	140	5300	NA	NA	0.18	NA	19.3	NA	NA	186	19	4000	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	NA	NA	56.9	NA	NA	NA	1.44	NA	0.200	3.10	NA	NA	4.45	8.63	NA	NA	0.310	0.219	17.4
unit	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2019-07-26 result	*0.0408*	*0.0408*	857	*0.0120*	*0.0408*	25200	1.31	9.44	0.292	1.19	*3.80*	*0.0408*	20.9	5.66	*0.300*	*0.600*	1.17	1.48	*3.30*
2019-07-26 dT	NA	NA	57	NA	NA	25	0.0679	0.079	0.38	0.00640	NA	NA	0.697	1.1	NA	NA	0.039	0.015	NA
2019-07-26 dB	NA	NA	0.248	NA	NA	NA	0.910	NA	1.46	0.384	NA	NA	0.0772	0.656	NA	NA	3.77	6.76	NA
geo_mean/ATAL	NA	NA	57	4	NA	NA	NA	NA	0.38	NA	NA	NA	0.697	1.1	NA	1	NA	0.015	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g

Figure 43.4-4 Analytical Results from Stormwater Sample, LA-SMA-6.3 (Table 2)

43.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.3 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

43.5 Site-Specific Demonstration

43.5.1 Soil Data Summary

No Site-related POCs exceeded the applicable screening value in soil data.

43.5.2 Stormwater Data Summary

Total aluminum, gross alpha, and selenium exceeded TALs but not BTVs.

Iron exceeded the water quality standard; however, there is no TAL in the Permit for iron. Only POCs with TALs are used in the SSD.

43.5.3 2022 Permit Status

The SMA is eligible for long-term stewardship. All Site-related POCs with TALs were below their respective composite BTVs (Part I.C.3.a).

44.0 LA-SMA-6.31

Associated Sites	21-027(a)
Receiving Water	Los Alamos Canyon
Drainage Area	0.65 acres
Landscape Characteristics	2% impervious, 98% pervious
Consent Order Site Status	SWMU 21-027(a): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

44.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection. Monitoring is ongoing until one confirmation sample is collected from this SMA.

44.2 Site History

21-027(a) (no date)

SWMU 21-027(a) consists of drainlines that received effluent from floor drains in former building 21-003, a surface storm drainage system, and a former NPDES-permitted outfall that discharges to the mesa edge and into Los Alamos Canyon in the southwest portion of DP West at TA-21. Building 21-003 was constructed in 1945 as part of original DP West plutonium processing facilities. A 4-in. VCP ran beneath a paved area south of the former building 21-03 footprint for about 30 ft and emptied into a storm drain. A 12-in. culvert ran from the storm drain underground for about 50 ft, emptying onto the ground at a ponding area on the southwest corner of the footprint of former cooling tower [former structure 21-143, AOC C-21-027]. From the cooling tower footprint, runoff flowed in an unlined ditch to a 24-in.-diameter CMP culvert that carried runoff beneath the south perimeter road to the mesa edge. The CMP extended about 3 ft over the mesa edge. The outfall was permitted as Outfall EPA03A031 under NPDES Permit No. NM0028355 in 1994.

Building 21-003, the drains and the outlet drainlines beneath the surface, and cooling tower 21-143 (AOC C-21-007) were removed during D&D activities in 1994–1995. The 4-in. drainline beneath the paved area was left in place, as was the storm drain that collects runoff from nearby parking lots. The outfall was removed from the LANL NPDES permit, effective July 11, 1995. During the 2007 DP Site Aggregate Area investigation, remaining drainlines were removed, along with the top foot of soil at the former ponding area. The section of drainline beneath the south TA-21 perimeter road was left in place because the road was active and continued to service DP East.

For investigation activities refer to “Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1” (LANL 2016, 601598).

44.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 44.2-1.

Table 44.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-027(a)	Industrial or sanitary wastewater treatment	Radionuclides, inorganic and organic chemicals

44.3 Consent Order Soil Data

Decision-level data for SWMU 21-027(a) consist of results from samples collected in 2007, 2008, 2009, and 2011. Analytical results from those samples are presented in Figures 44.3-1 through 44.3-4. The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

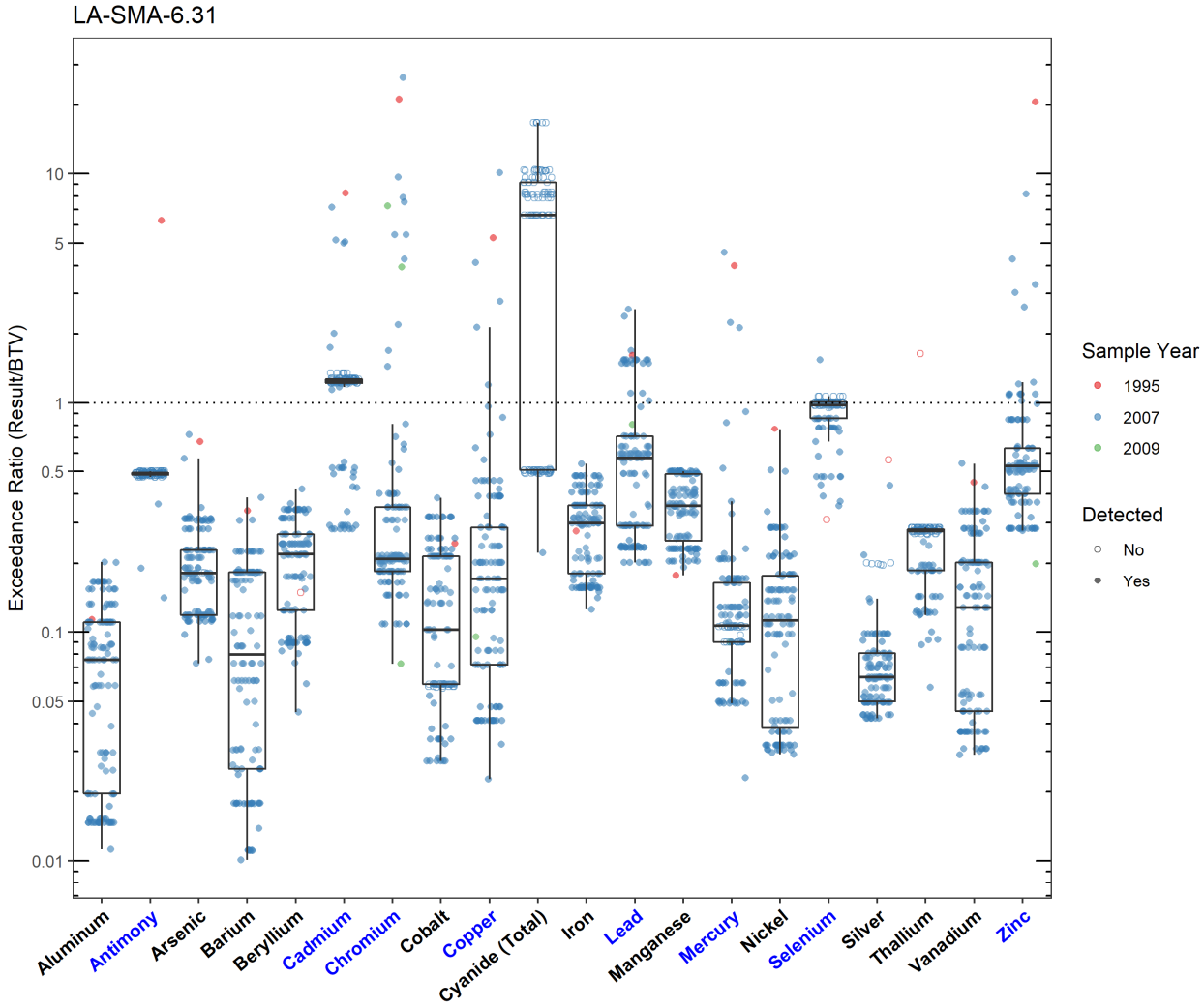

Figure 44.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.31

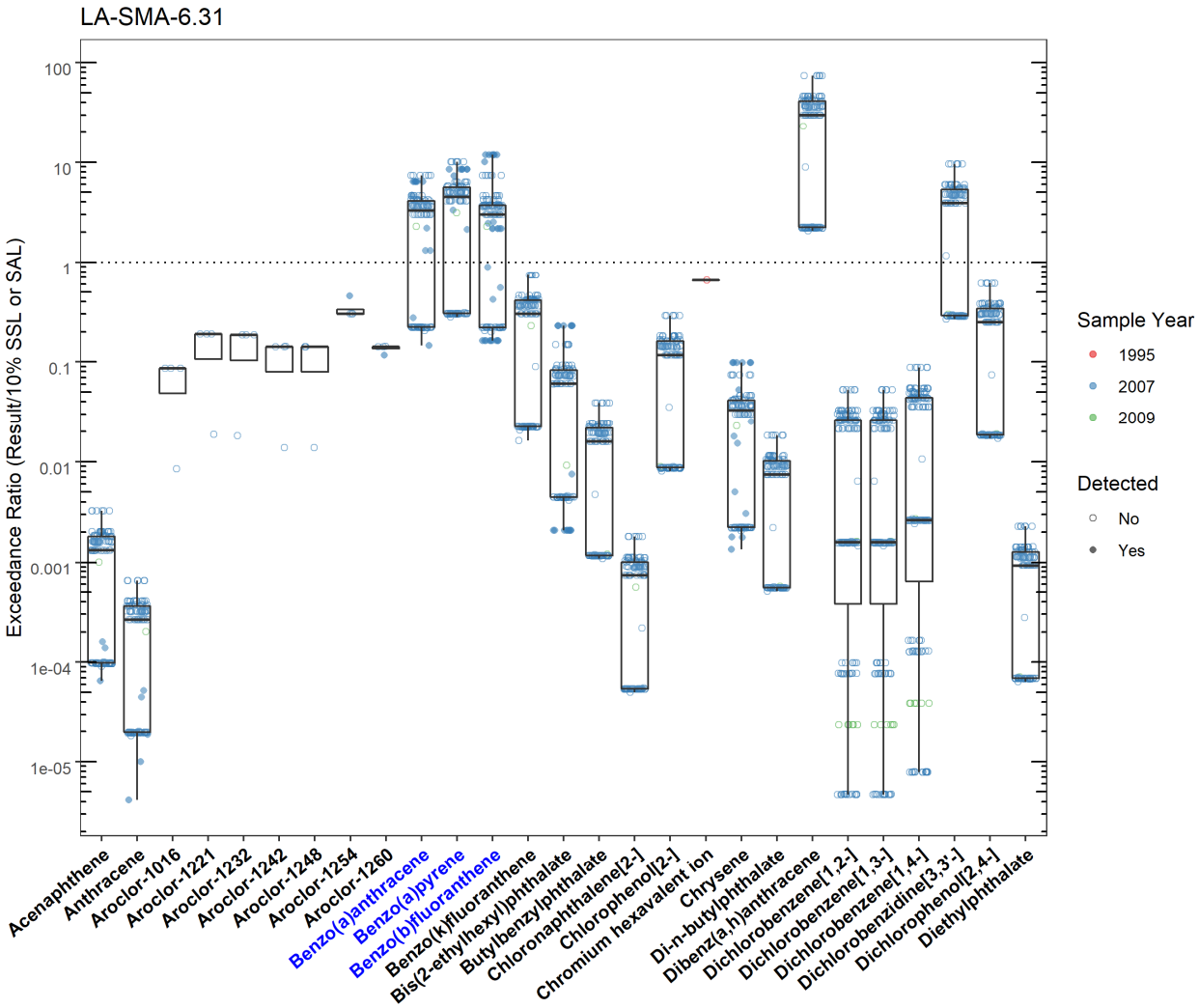

Figure 44.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.31 (Plot 1)

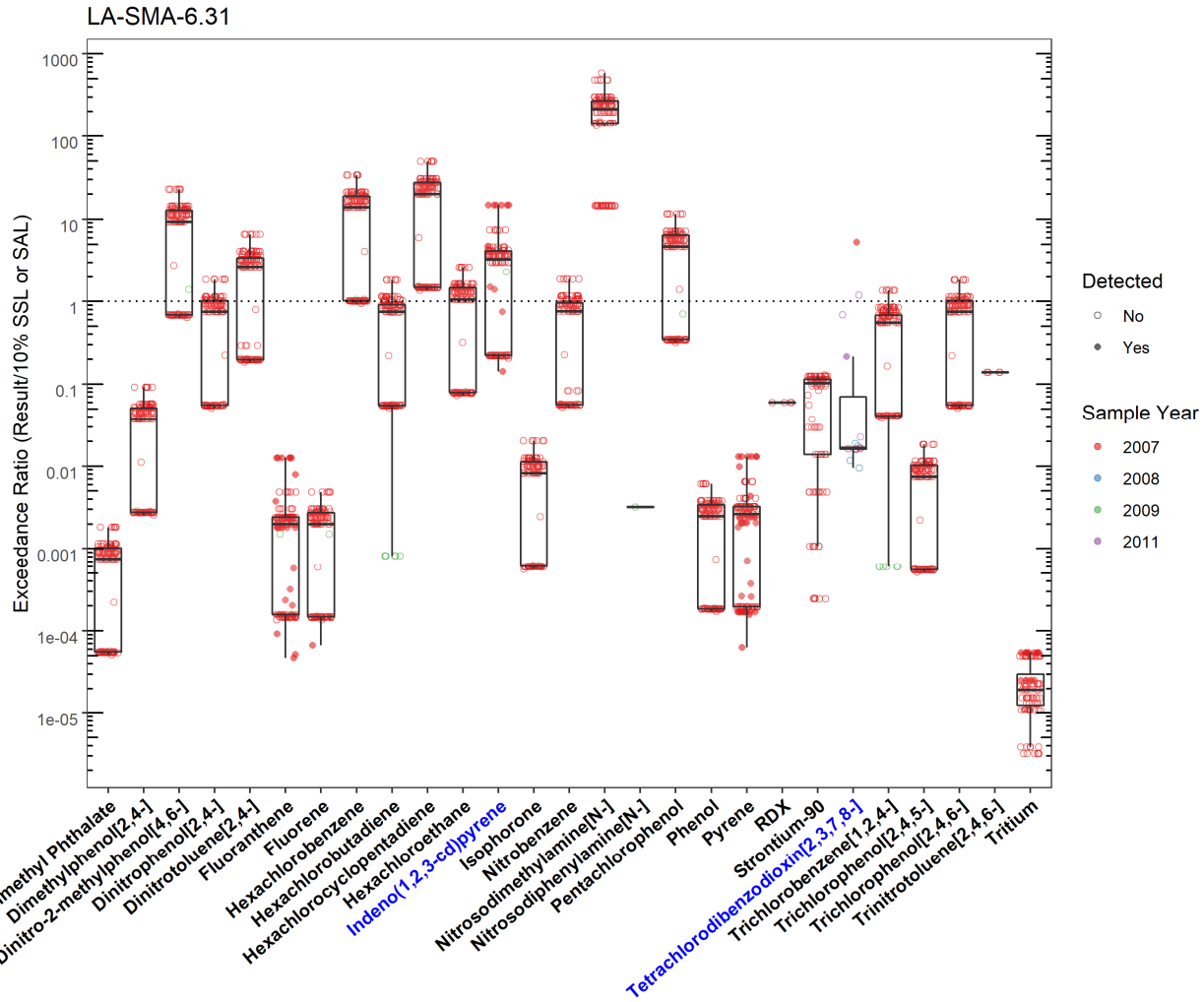

Figure 44.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.31 (Plot 2)

LA-SMA-6.31

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-6.31	Sb	Y	BTV	0.830	5.20	1995-10-06
Benzo(a)anthracene	LA-SMA-6.31	56-55-3	Y	SSL_0.1	0.153	0.980	2007-05-24
Benzo(a)pyrene	LA-SMA-6.31	50-32-8	Y	SSL_0.1	0.112	0.948	2007-05-24
Benzo(b)fluoranthene	LA-SMA-6.31	205-99-2	Y	SSL_0.1	0.153	1.81	2007-05-24
Cadmium	LA-SMA-6.31	Cd	Y	BTV	0.400	3.30	1995-10-06
Chromium	LA-SMA-6.31	Cr	Y	BTV	19.3	509	2007-07-10
Copper	LA-SMA-6.31	Cu	Y	BTV	14.7	148	2007-07-10
Indeno(1,2,3-cd)pyrene	LA-SMA-6.31	193-39-5	Y	SSL_0.1	0.153	2.25	2007-05-24
Lead	LA-SMA-6.31	Pb	Y	BTV	22.3	57.0	2007-07-10
Mercury	LA-SMA-6.31	Hg	Y	BTV	0.100	0.457	2007-07-10
Selenium	LA-SMA-6.31	Se	Y	BTV	1.52	2.34	2007-08-22
Tetrachlorodibenzodioxin[2,3,7,8-]	LA-SMA-6.31	1746-01-6	Y	SSL_0.1	0.00000490	0.0000259	2007-07-17
Zinc	LA-SMA-6.31	Zn	Y	BTV	48.8	1010	1995-10-06

Figure 44.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.31

44.4 Stormwater Evaluation

44.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

44.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.31 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history.

44.5 Site-Specific Demonstration

44.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: antimony, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, cadmium, chromium, copper, indeno(1,2,3-cd)pyrene, lead, mercury, selenium, and zinc.

PCBs were measured in soil data and did not exceed the applicable screening value in soil data.

44.5.2 Stormwater Data Summary

No confirmation-monitoring data.

44.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

44.5.4 Sampling and Analysis Plan

Table 44.5-1 is the proposed SAP for LA-SMA-6.31.

Table 44.5-1 Proposed SAP, LA-SMA-6.31

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
Total cyanide, mercury, and selenium	Impairments and Site history (inorganics), soil data
Total PCBs	Impairment and Site history
Dissolved cadmium, chromium, copper, lead, antimony, and zinc	Site history (inorganics) and soil data
SVOCs	Soil data and Site history (organics)
Radium-226 and radium-228	Site history (radionuclides)
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

45.0 LA-SMA-6.32

Associated Sites	21-021
Receiving Water	Los Alamos Canyon
Drainage Area	0.01 acres
Landscape Characteristics	37% impervious, 63% pervious
Consent Order Site Status	SWMU 21-021: In Progress
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

45.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection. Monitoring is ongoing until one confirmation sample is collected from this SMA.

45.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

45.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 45.2-1.

Table 45.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90

45.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

45.4 Stormwater Evaluation

45.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

45.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.32 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. The adjusted gross alpha impairment may be Site-related, based on Site history.

45.5 Site-Specific Demonstration

45.5.1 Soil Data Summary

No Consent Order soil data available.

45.5.2 Stormwater Data Summary

No confirmation-monitoring data.

45.5.3 2022 Permit Status

The SMA is in active monitoring. A confirmation-monitoring sample has not been collected.

45.5.4 Sampling and Analysis Plan

Table 45.5-1 is the proposed SAP for LA-SMA-6.32.

Table 45.5-1 Proposed SAP, LA-SMA-6.32

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Strontium-90	Site history
DOC	Permit requirement
SSC	Permit requirement

46.0 LA-SMA-6.34

Associated Sites	21-021, 21-022(h)
Receiving Water	Los Alamos Canyon
Drainage Area	0.70 acres
Landscape Characteristics	2% impervious, 98% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-022(h): In Progress
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

46.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection. Monitoring is ongoing until one confirmation sample is collected from this SMA.

46.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to the “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-022(h) (9/3/2019)

SWMU 21-022(h) consists of a former sump (former structure 21-202), inlet and outlet drainlines, and a former NPDES-permitted outfall (EPA 03A032), south of former building 21-150 in the south-central portion of TA-21. Building 21-150 was constructed in 1963 as a plutonium-fuels development building, including the development of plutonium-238 heat sources for space electric-power applications. Building 21-150 became operational in 1963.

Former structure 21-202 consisted of a 36-in.-diameter CMP designed to receive industrial wastewater from the building 21-150 basement floor and roof drains, and route effluent through a 150-ft-long, 6-in.-diameter drainline that discharged to an outfall in Los Alamos Canyon. Releases of plutonium-238 occurred in several rooms in former building 21-150, resulting in contamination on soil adjacent to, and the roof above, room 605A, and in the basement from leaks in vacuum pump leaks. Building 21-150 was decontaminated between 1978 and 1981 to allow continued occupancy for non-plutonium research operations. All plutonium processing equipment was removed along with the building roof and soil contamination outside room 605A. The circulating chilled-water system was decontaminated and left place for continued use.

The LANL Inorganic and Structural Chemistry Group (CNC-4) began operating former building 21-150 as a molecular-chemistry laboratory with offices in the early 1980s. By 1991, the 6-in. outlet drain line had been replaced with a 24-in. drainline and only treated cooling water was being discharged to the SWMU 21-022(h) sump system and outfall. Building 21-150 was subsequently decommissioned in the early 1990s.

The SWMU 21-022(h) sump (structure 21-202) and associated inlet and outlet drainlines were removed in 2007. The section of the outlet drainline located beneath the southern branch of DP Road was left in place because the road was, and remains, active to access DP East. Building 21-150 was demolished down to the concrete slab in November 2010.

For investigation activities, refer to “Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1” (LANL 2016, 601598).

46.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 46.2-1.

Table 46.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-022(h)	Waste lines	Plutonium, inorganic and organic chemicals, radionuclides

46.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-022(h) consist of results from samples collected in 2007, 2009 and 2011. The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-6.34 are presented in Figures 46.3-1 through 46.3-4.

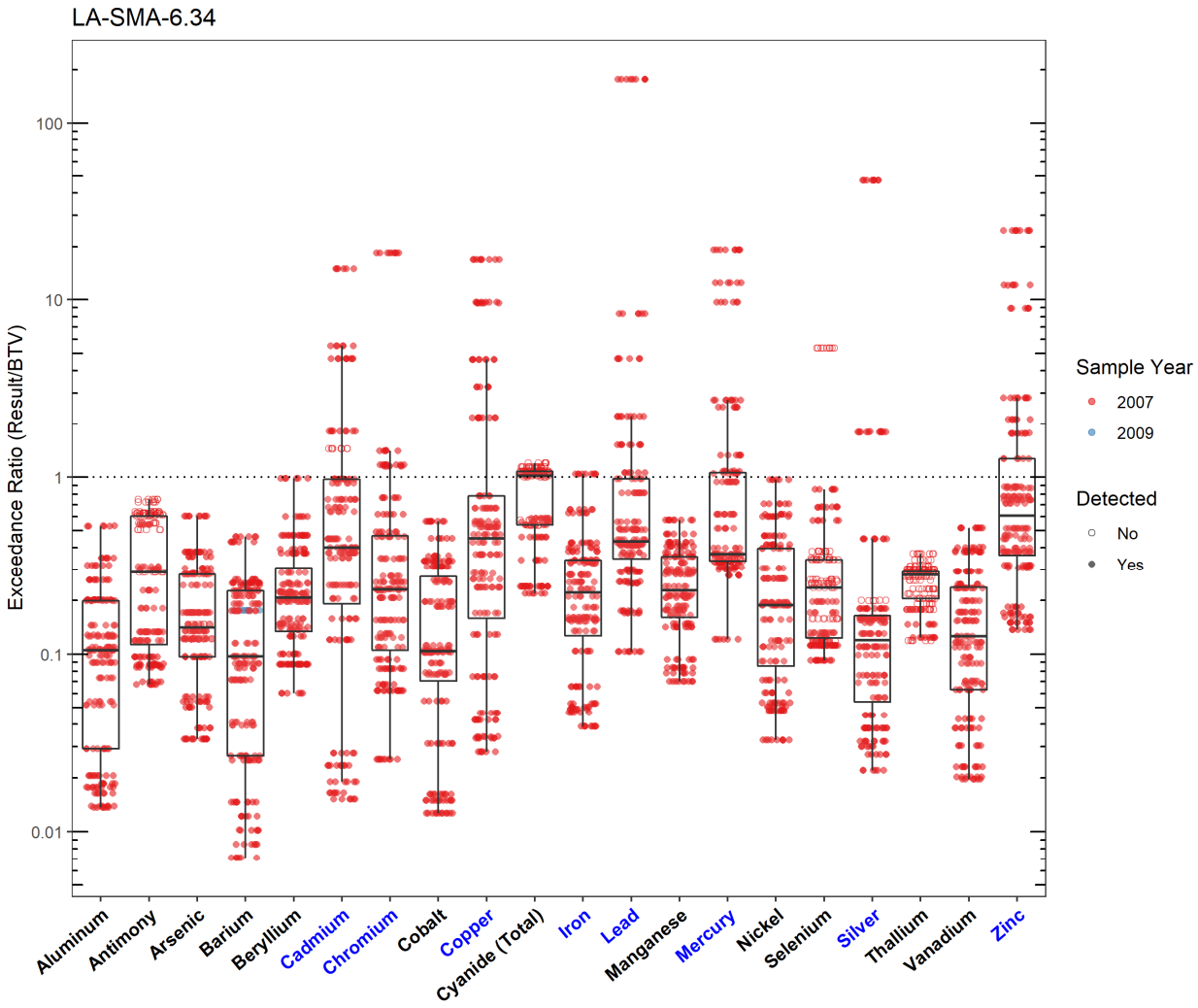

Figure 46.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.34

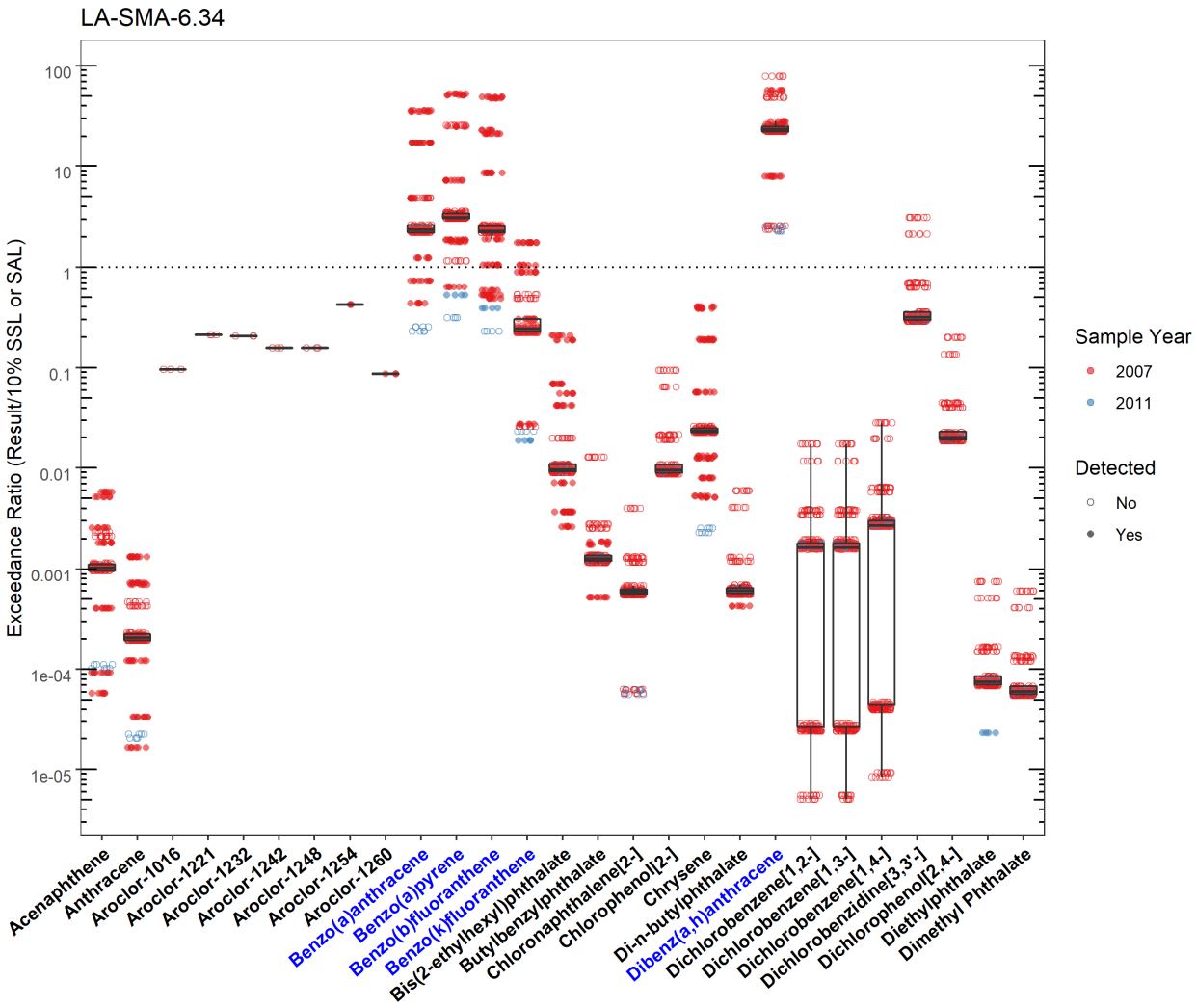

Figure 46.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.34 (Plot 1)

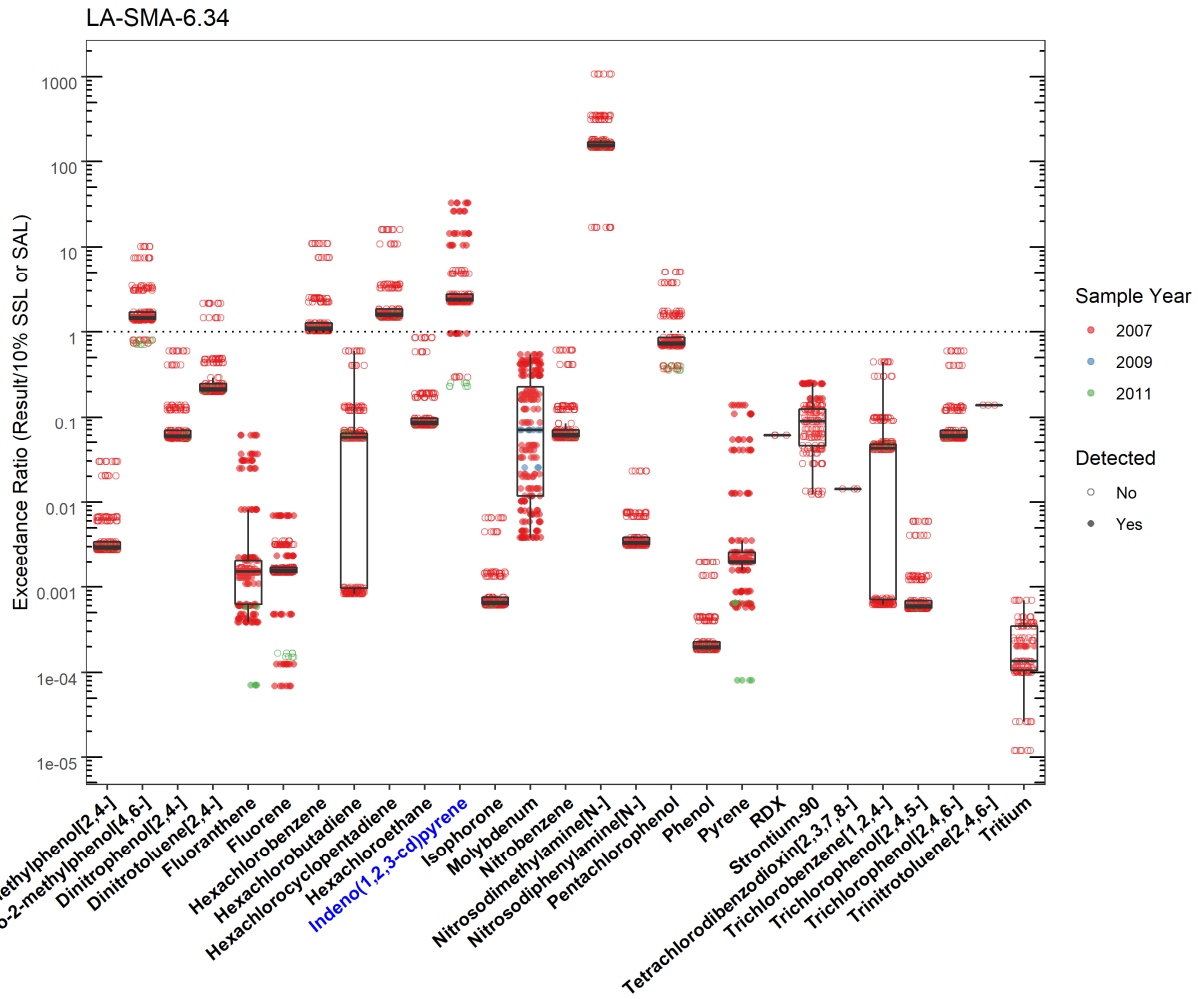

Figure 46.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.34 (Plot 2)

LA-SMA-6.34

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	LA-SMA-6.34	56-55-3	Y	SSL_0.1	0.153	5.50	2007-05-23
Benzo(a)pyrene	LA-SMA-6.34	50-32-8	Y	SSL_0.1	0.112	5.90	2007-05-23
Benzo(b)fluoranthene	LA-SMA-6.34	205-99-2	Y	SSL_0.1	0.153	7.50	2007-05-23
Benzo(k)fluoranthene	LA-SMA-6.34	207-08-9	Y	SSL_0.1	1.53	2.70	2007-05-23
Cadmium	LA-SMA-6.34	Cd	Y	BTV	0.400	6.00	2007-05-23
Chromium	LA-SMA-6.34	Cr	Y	BTV	19.3	356	2007-05-29
Copper	LA-SMA-6.34	Cu	Y	BTV	14.7	249	2007-05-29
Dibenz(a,h)anthracene	LA-SMA-6.34	53-70-3	Y	SSL_0.1	0.0153	0.870	2007-05-23
Indeno(1,2,3-cd)pyrene	LA-SMA-6.34	193-39-5	Y	SSL_0.1	0.153	5.00	2007-05-23
Iron	LA-SMA-6.34	Fe	Y	BTV	21500	22400	2007-05-29
Lead	LA-SMA-6.34	Pb	Y	BTV	22.3	3940	2007-05-29
Mercury	LA-SMA-6.34	Hg	Y	BTV	0.100	1.92	2007-05-29
Silver	LA-SMA-6.34	Ag	Y	BTV	1.00	47.3	2007-05-29
Zinc	LA-SMA-6.34	Zn	Y	BTV	48.8	1200	2007-05-29

Figure 46.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.34

46.4 Stormwater Evaluation

46.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

46.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.34 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history.

46.5 Site-Specific Demonstration

46.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, dibenz(a,h)anthracene, indeno(1,2,3-cd)pyrene, cadmium, chromium, copper, iron, lead, mercury, silver, and zinc.

46.5.2 Stormwater Data Summary

No confirmation-monitoring data.

46.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

46.5.4 Sampling and Analysis Plan

Table 46.5-1 is the proposed SAP for LA-SMA-6.34.

Table 46.5-1 Proposed SAP, LA-SMA-6.34

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history
Total cyanide, mercury, selenium, and iron	Impairment (cyanide, mercury, and selenium), Site history (inorganics), and soil data
Total PCBs	Impairment and Site history (organics)
Radium-226 and radium-228	Site history (radionuclides)
Dissolved cadmium, chromium, copper, lead, silver and zinc	Site history (inorganics) and soil data
SVOCs	Site history (organic chemicals) and soil data
DOC	Permit requirement
SSC	Permit requirement

47.0 LA-SMA-6.38

Associated Sites	21-021, 21-024(c)
Receiving Water	Los Alamos Canyon
Drainage Area	0.77 acres
Landscape Characteristics	2% impervious, 98% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, the current SMA sampling location did not adequately monitor runoff from Site 21-024(c). Therefore, the sampler was moved to monitor runoff from the former outfall area at 21-024(c), which is the regulated portion of this SWMU.
2022 Permit Status	Active Monitoring

47.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. While developing the 2018 SAP, a decision was made to implement the monitoring location move recommended during the 2018 SIP review. To date, stormwater flow has not been sufficient for full-volume sample collection and monitoring is ongoing until one confirmation sample is collected from this SMA.

47.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(c) (2/22/2019)

SWMU 21-024(c) is an inactive septic system that served former buildings 21-054 and 21-061 in the southwest portion of TA-21. The septic system consisted of a septic tank (former structure 21-056), inlet drainlines from former buildings 21-054 and 21-061, an outlet drainline, and an outfall on the south rim

of Los Alamos Canyon. The reinforced concrete septic tank (former structure 21-056) measured 4.0 ft long × 8.0 ft wide × approximately 5.0 ft deep, and was located 6.0 ft bgs. The inlet and outlet drainlines were 4-in.-diameter VCPs.

Building 21-054 was constructed in 1945 and housed a machine shop and warehouse. The septic system was installed in 1945 to route sewage from building 21-054. Building 21-061 was constructed in 1950 to house a laboratory to support classified plutonium research. The building and the unpaved area east of the building, along with the container storage area (SWMU 21-003), were ultimately used for the storage of PCB-containing capacitors and transformers, PCB-contaminated pumps and drums containing PCB-contaminated oil, solvents, and trash. The building was connected to the SWMU 21-024(c) septic system in 1950. In 1966, use of the septic system ceased and the system was abandoned in place.

Building 21-054 was demolished in 1969. PCB waste storage was moved from SWMU 21-003 to TA-54 in 1989; building 21-061 was decommissioned and the interior of the building was decontaminated in accordance with the TSCA 40 CFR 761. Building 21-061 was demolished in 2002. The SWMU 21-024(c) septic tank and inlet and outlet drainlines were removed in 2006, along with PCB-contaminated soil and tuff from SWMU 21-003. Additional PCB-contaminated soil and tuff associated with SWMU 21-003 were removed in 2009.

For investigation activities, refer to “Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1” (LANL 2016, 601598).

47.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 47.2-1.

Table 47.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(c)	Septic system	Radionuclides, inorganic and organic chemicals, PCBs

47.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-024(c) consist of results from samples collected in 2006, 2007, 2009, and 2011.

The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for LA-SMA-6.38 are presented in Figures 47.3-1 through 47.3-4.

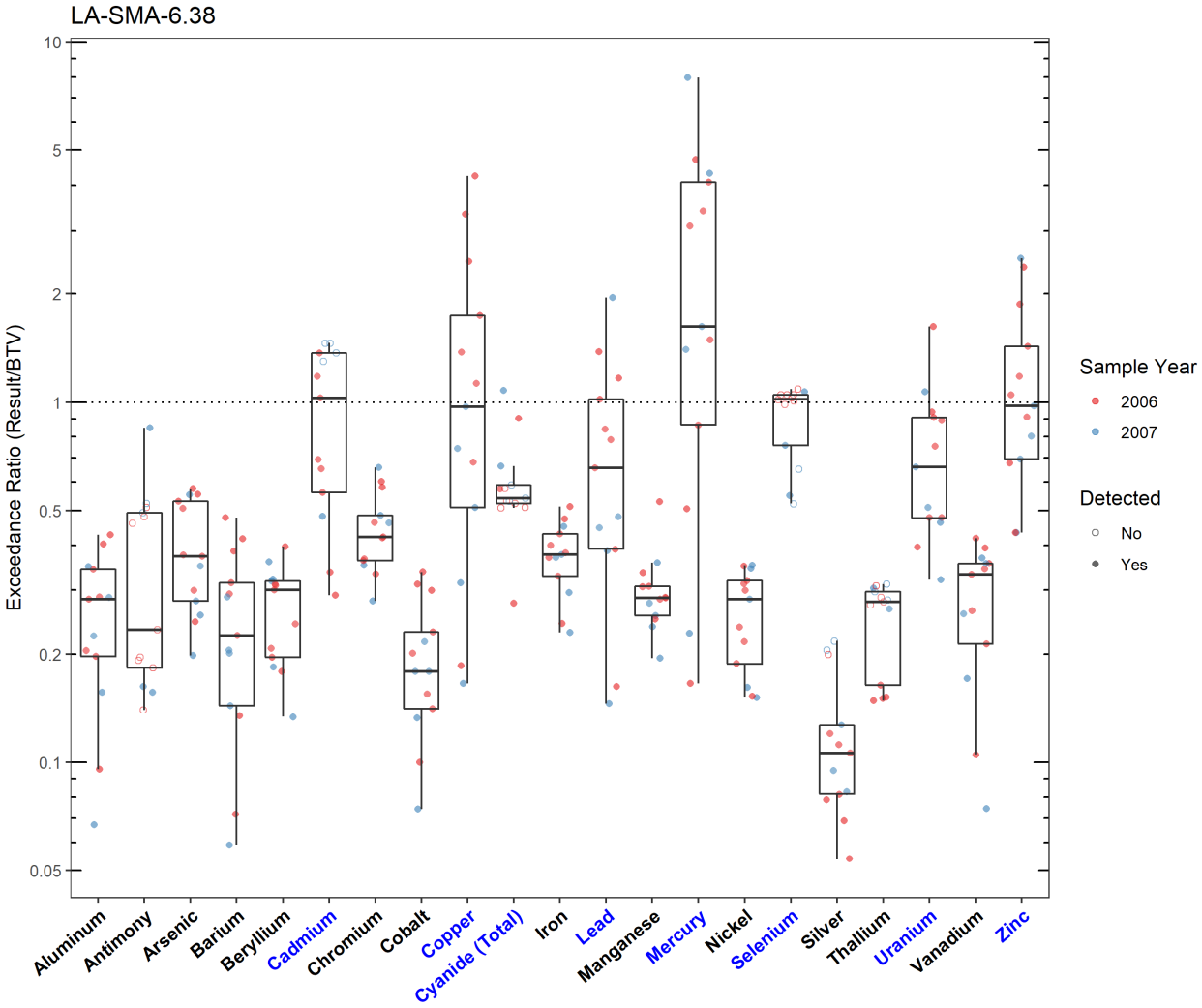

Figure 47.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.38

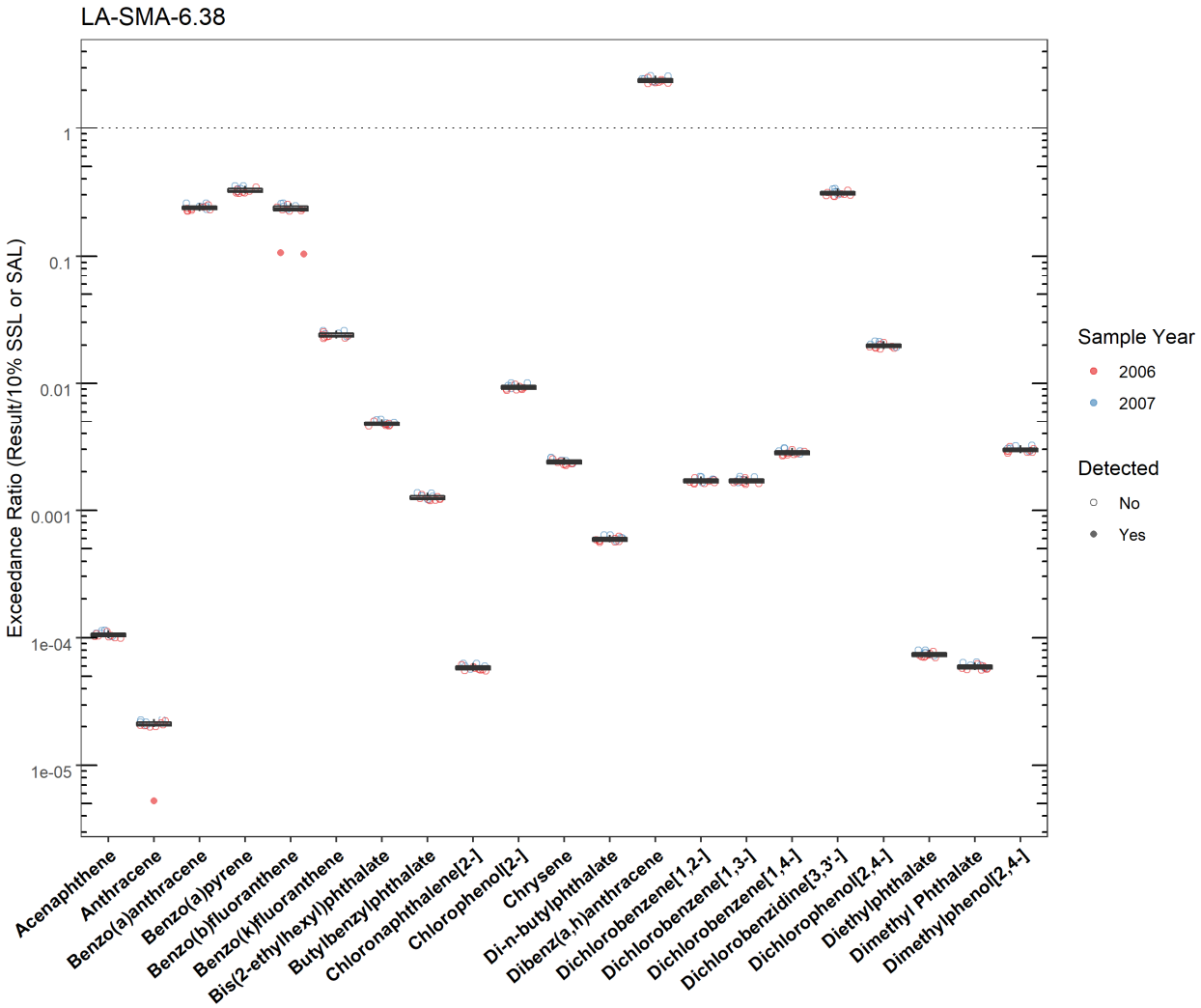

Figure 47.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.38 (Plot 1)

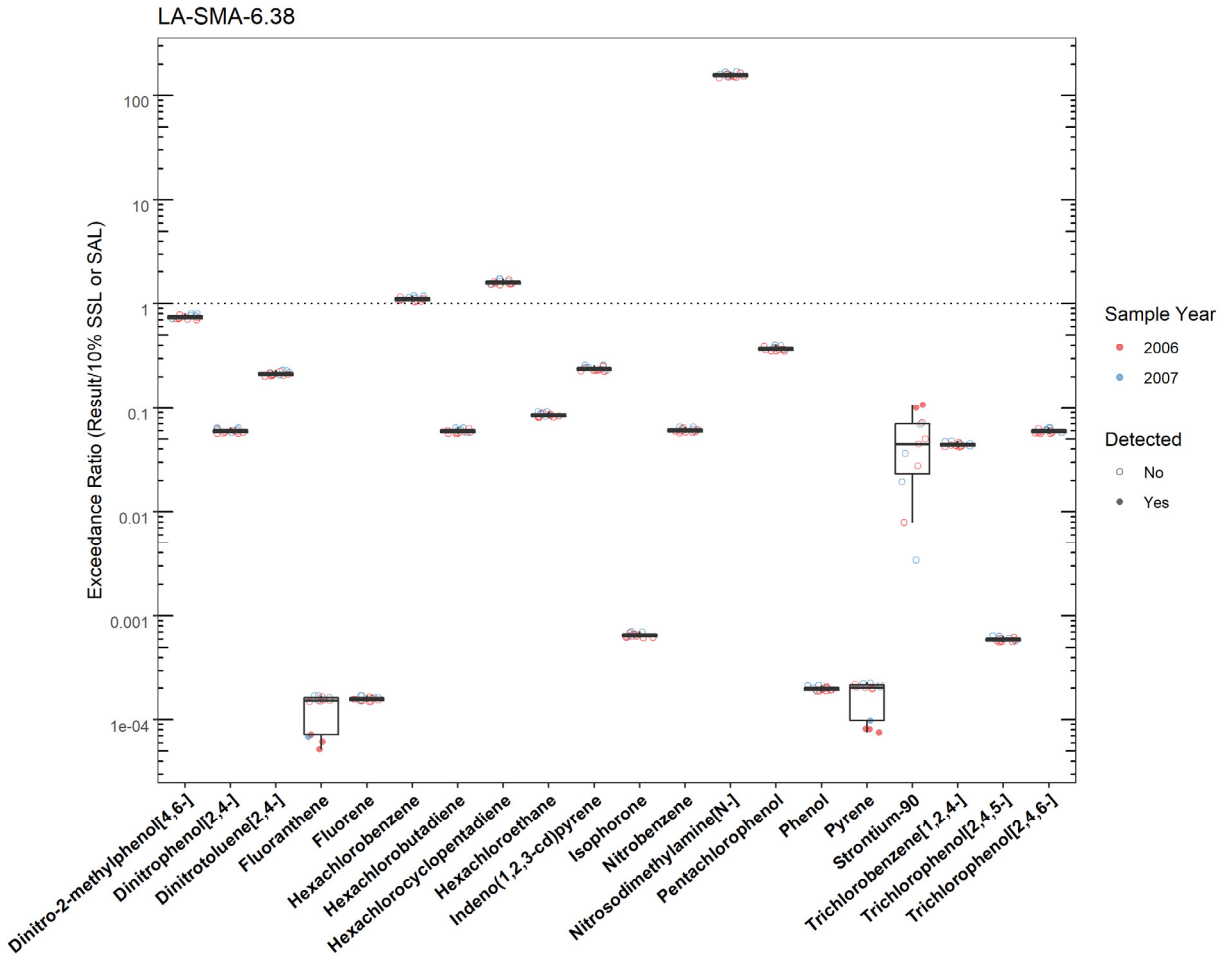

Figure 47.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.38 (Plot 2)

LA-SMA-6.38

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Cadmium	LA-SMA-6.38	Cd	Y	BTV	0.400	0.548	2006-12-13
Copper	LA-SMA-6.38	Cu	Y	BTV	14.7	62.4	2006-12-13
Cyanide (Total)	LA-SMA-6.38	CN(TOTAL)	Y	BTV	0.500	0.542	2007-03-01
Lead	LA-SMA-6.38	Pb	Y	BTV	22.3	43.5	2007-02-26
Mercury	LA-SMA-6.38	Hg	Y	BTV	0.100	0.798	2007-02-26
Selenium	LA-SMA-6.38	Se	Y	BTV	1.52	1.63	2007-02-27
Uranium	LA-SMA-6.38	U	Y	BTV	1.82	2.95	2006-12-13
Zinc	LA-SMA-6.38	Zn	Y	BTV	48.8	123	2007-02-26

Figure 47.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.38

47.4 Stormwater Evaluation

47.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

47.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.38 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history.

47.5 Site-Specific Demonstration

47.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: cadmium, copper, lead, mercury, selenium, uranium, and zinc.

47.5.2 Stormwater Data Summary

No confirmation-monitoring data.

47.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

47.5.4 Sampling and Analysis Plan

Table 47.5-1 is the proposed SAP for LA-SMA-6.38.

Table 47.5-1 Proposed SAP, LA-SMA-6.38

Monitoring Constituent	Background for Monitoring
Total cyanide, mercury and selenium	Impairments, Site history (inorganic chemicals), and soil data
Gross alpha	Impairment and Site history
Total PCBs	Impairment and Site history (organic chemicals)
Dissolved cadmium, copper, lead, uranium, and zinc	Site history (inorganic chemicals) and soil data
Radium-226 and radium-228	Site history (radionuclides)
Tritium	Site history (radionuclides)
SVOCs	Site history (organic chemicals)
DOC	Permit requirement
SSC	Permit requirement

48.0 LA-SMA-6.395

Associated Sites	21-021, 21-024(j)
Receiving Water	Los Alamos Canyon
Drainage Area	3.58 acres
Landscape Characteristics	3% impervious, 97% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(j): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Alternative Compliance Requested/Corrective Action Complete
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

48.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

SWMU 21-024(j) received a COC under the Consent Order in January 2016. The Permittees submitted a certification of completion of corrective action for the Site to EPA per Permit part I.E.2(d) for the Site in March 2017 (LANL 2017, 602213). The Permittees submitted a request for alternative compliance for SWMU 21-021 to EPA per permit Part I.E.3 in May 2015 044 (LANL 2015, 600418). No response has been received from EPA for this request, and stormwater monitoring has not occurred since 2013.

48.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(j) (9/28/2021)

SWMU 21-024(j) is a former septic system that served former building 21-155, a warehouse and laboratory within the northeast portion of DP East at TA-21. The septic system was constructed in 1961 and consisted of a reinforced concrete septic tank (former structure 21-194) that measured 5 ft × 3 ft × 6 ft deep; 4-in. VCP inlet and outlet drainlines; and an outfall that discharged to the south rim of DP Mesa, above Los Alamos Canyon. The septic tank was located adjacent to the southwest corner of building 21-155 near the southern DP Mesa perimeter road. The septic tank was decommissioned in 1966, pumped out, filled with earth, and abandoned in place. The septic tank, along with the associated inlet and outlet drainlines, were removed in 2007.

For investigation activities, refer to "Phase II Investigation Report for Delta Prime Site Aggregate Area, Revision 1" (LANL 2010, 110772.33).

48.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 48.2-1.

Table 48.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(j)	Septic system	Radionuclides, inorganic and organic chemicals

48.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-024(j) consist of results from samples collected in 2007, 2008, and 2009. Revision 1 of the 2010 Phase II IR concluded that the nature and extent of contamination are defined.

Analytical results from all decision-level soil samples collected for LA-SMA-6.395 are presented in Figures 48.3-1 through 48.3-4.

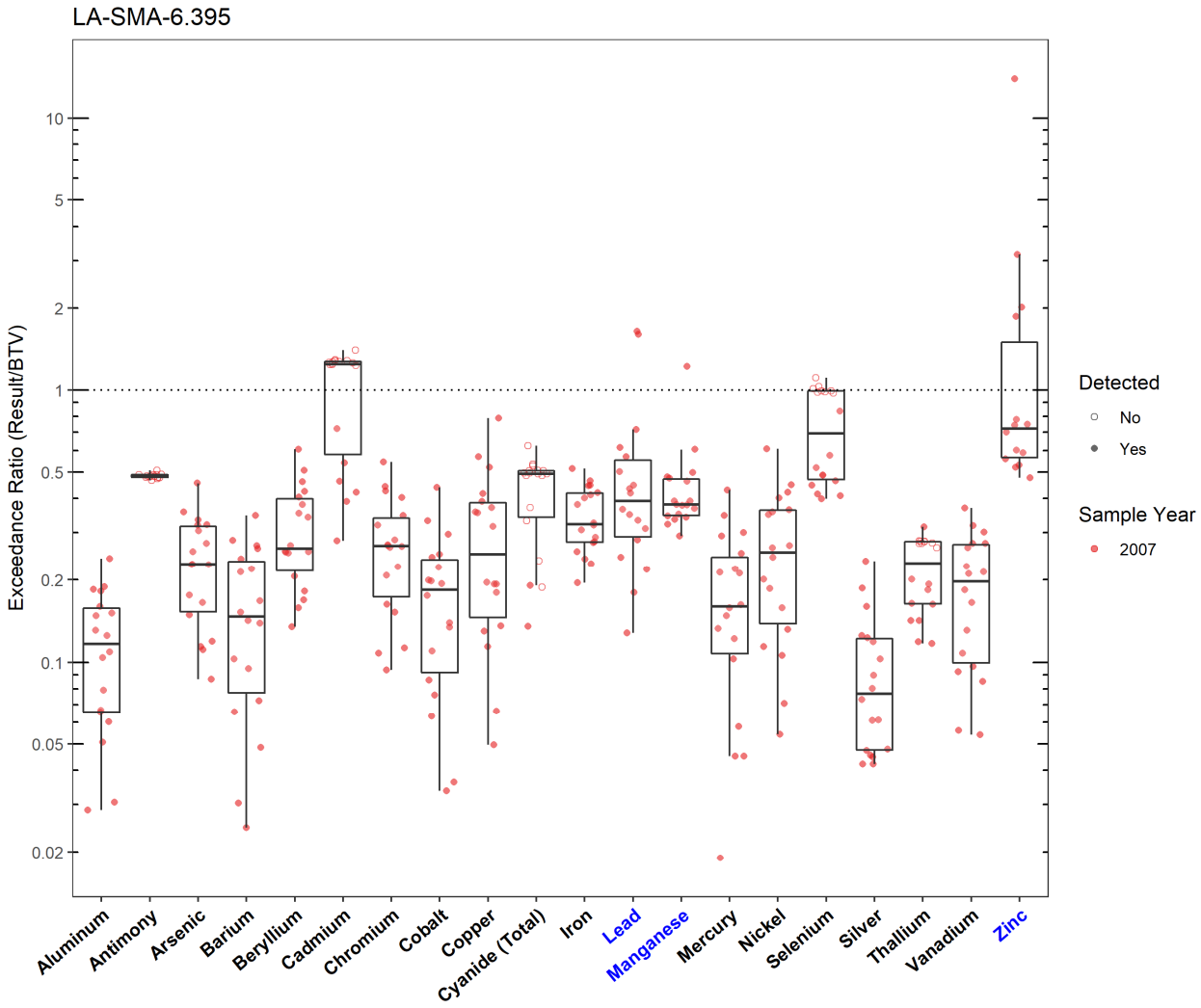

Figure 48.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.395

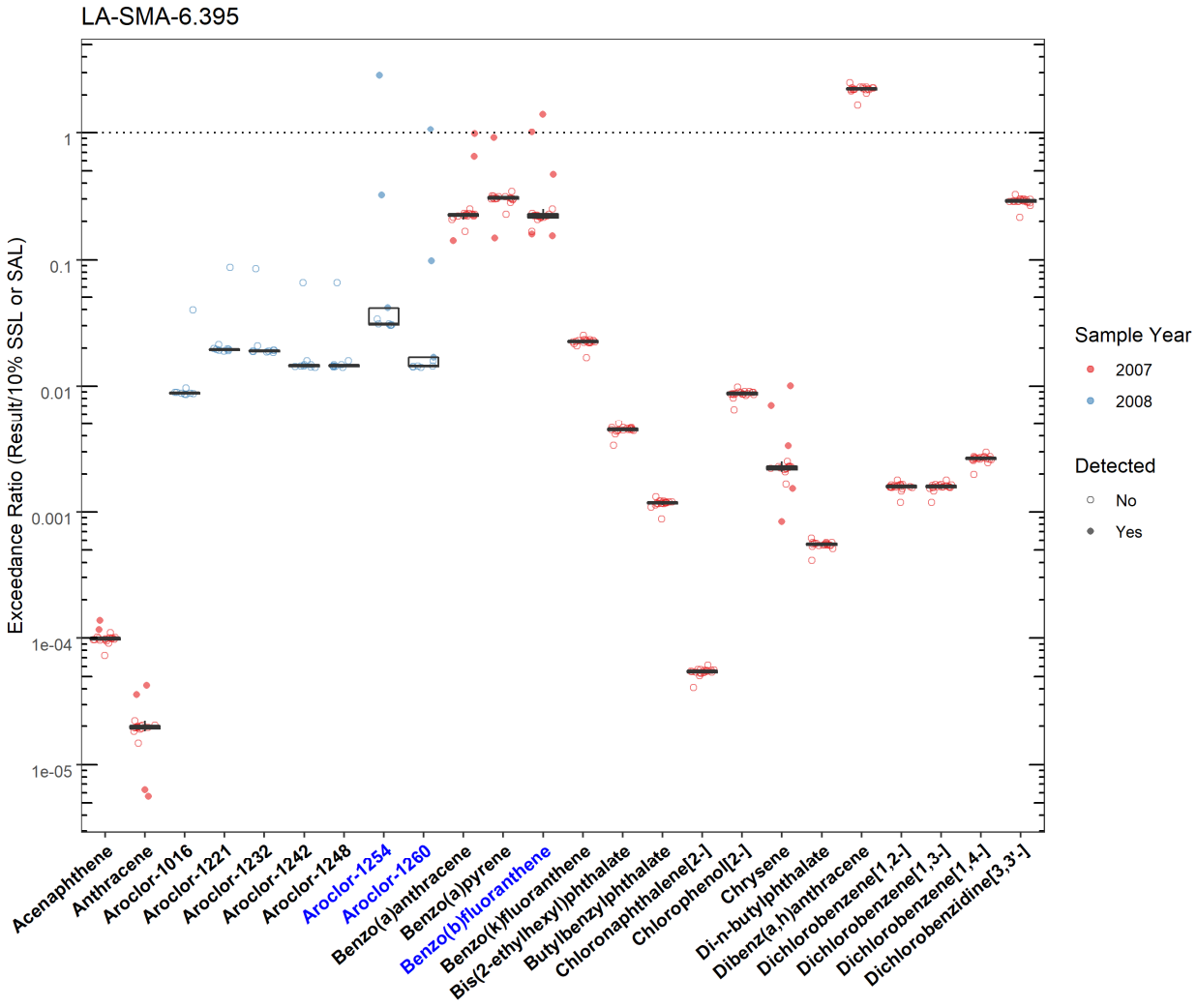

Figure 48.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.395 (Plot 1)

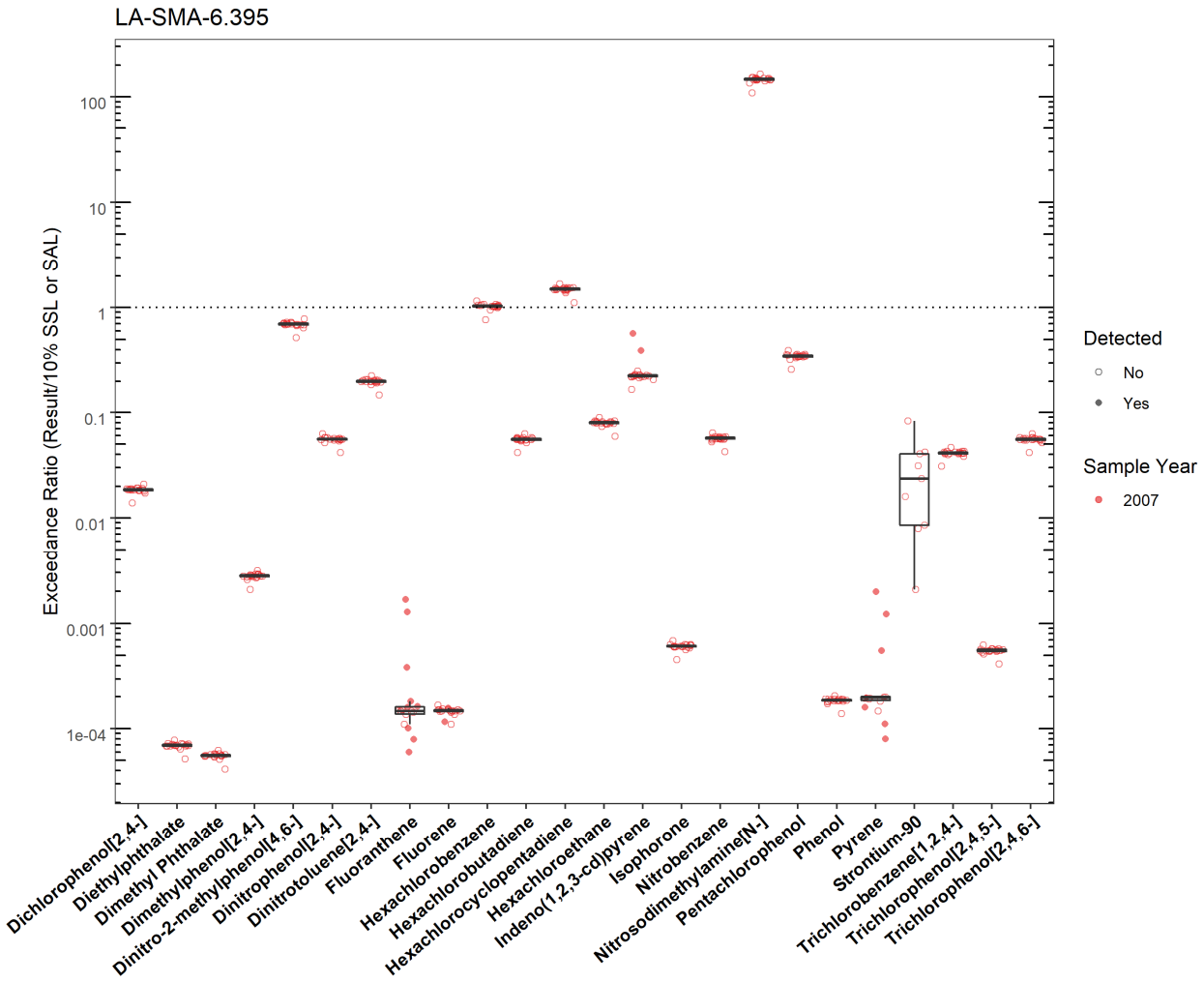

Figure 48.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.395 (Plot 2)

LA-SMA-6.395

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aroclor-1254	LA-SMA-6.395	11097-69-1	Y	SSL_0.1	0.114	0.326	2008-01-16
Aroclor-1260	LA-SMA-6.395	11096-82-5	Y	SSL_0.1	0.243	0.260	2008-01-16
Benzo(b)fluoranthene	LA-SMA-6.395	205-99-2	Y	SSL_0.1	0.153	0.215	2007-06-25
Lead	LA-SMA-6.395	Pb	Y	BTV	22.3	36.5	2007-07-05
Manganese	LA-SMA-6.395	Mn	Y	BTV	671	818	2007-06-25
Zinc	LA-SMA-6.395	Zn	Y	BTV	48.8	685	2007-06-25

Figure 48.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.395

48.4 Stormwater Evaluation

48.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective-action stormwater sample was collected in September 2013. Analytical results from that sample are presented in Figures 48.4-1 and 48.4-2.

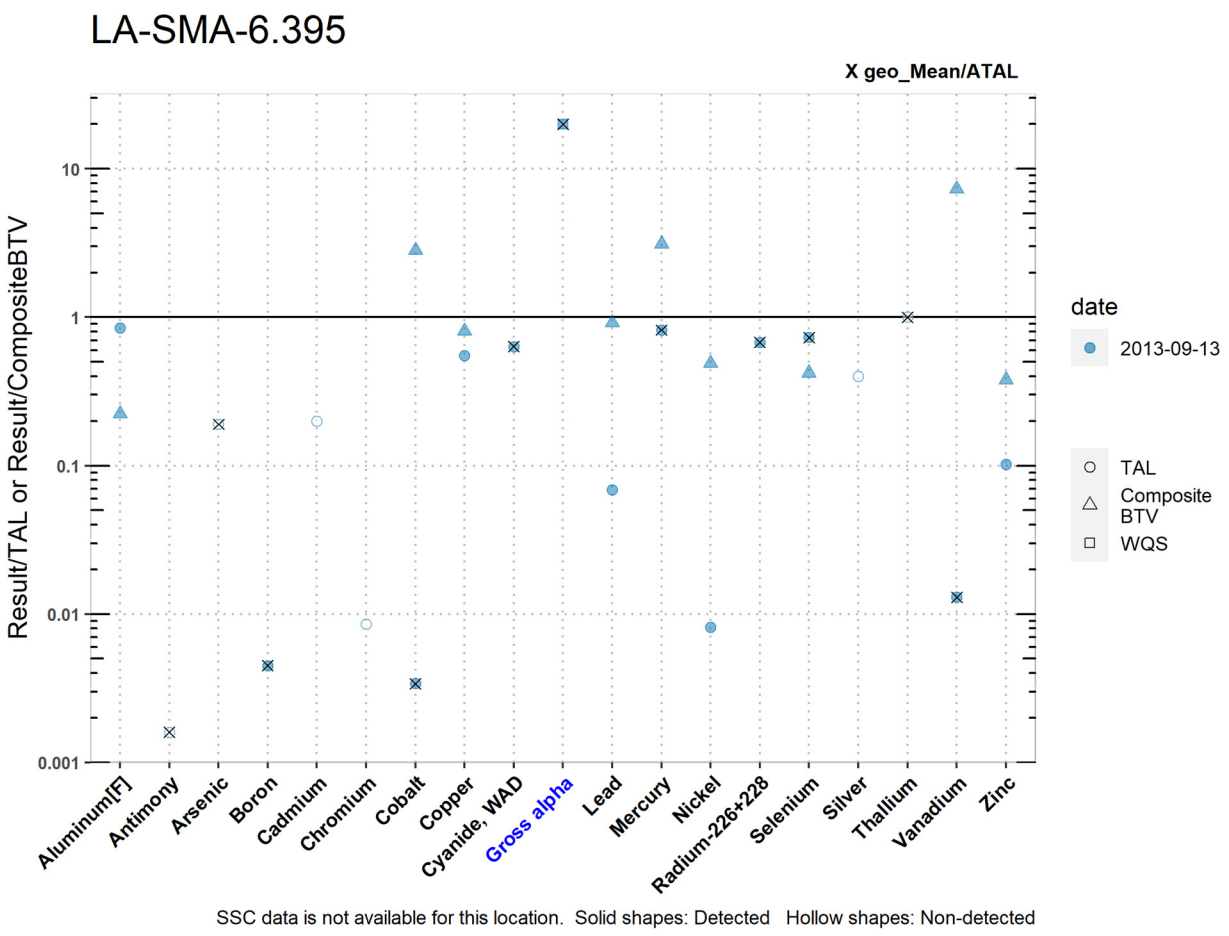

Figure 48.4-1 Analytical Results from Stormwater Sample, LA-SMA-6.395 (Plot)

LA-SMA-6.395

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	2860	NA	NA	NA	NA	NA	1.21	3.30	NA	57.0	1.45	0.202	3.10	4.40	8.70	NA	NA	0.175	15.9
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-09-13 result	637	*1.00*	*1.70*	22.7	*0.110*	*2.00*	3.40	2.66	3.30	300	1.33	0.630	1.52	20.3	3.66	*0.200*	*0.450*	1.28	6.03
2013-09-13 dT	0.849	NA	NA	0.0045	NA	NA	0.0034	0.554	0.635	20	0.0689	0.82	0.00817	0.677	0.73	NA	NA	0.013	0.102
2013-09-13 dB	0.223	NA	NA	NA	NA	NA	2.81	0.806	NA	NA	0.917	3.12	0.490	NA	0.421	NA	NA	7.31	0.379
geo_mean/ATAL	NA	0.0016	0.19	0.0045	NA	NA	0.0034	NA	0.635	20	NA	0.82	NA	0.677	0.73	NA	1	0.013	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 48.4-2 Analytical Results from Stormwater Sample, LA-SMA-6.395 (Table)

48.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.395 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history.

48.5 Site-Specific Demonstration

48.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: Aroclor-1254, Aroclor-1260, and benzo(b)fluoranthene.

Although there is an impairment for mercury, the applicable screening value was not exceeded in soil data and the TAL was not exceeded in stormwater data. Therefore, it will not be added to the SAP.

48.5.2 Stormwater Data Summary

Gross alpha exceeded TAL in 2013 stormwater data and there was no paired SSC result to confirm whether it was below BTVs. Therefore, it will be added to the SAP.

48.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

48.5.4 Sampling and Analysis Plan

Table 48.5-1 is the proposed SAP for LA-SMA-6.395.

Table 48.5-1 Proposed SAP, LA-SMA-6.395

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history (radionuclides), and stormwater data
Total PCBs	Impairment, Site history (organic chemicals), and soil data
SVOCs	Site history (organic chemicals) and soil data
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

49.0 LA-SMA-6.5

Associated Sites	21-021, 21-024(i)
Receiving Water	Los Alamos Canyon
Drainage Area	1.15 acres
Landscape Characteristics	1% impervious, 99% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(i): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 AC Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

49.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection. Monitoring is ongoing until one confirmation sample is collected from this SMA.

49.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073), and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(i) (9/28/2021)

SWMU 21-024(i) consists of a former septic system that served the former polonium research/processing laboratory (former building 21-152) and two former cooling towers (former structures 21-166 and 21-167), all located within DP East at TA-21. The 1990 SWMU Report describes SWMU 21-024(i) as a septic system consisting of a 5-ft × 10-ft × 7-ft-9-in. inactive septic tank (former structure 21-181); an inlet drainline serving former building 21-152 and former structures 21-166 and

21-167; a sump (former structure 21-175); an outlet drainline; and an outfall that discharged to the southeast rim of DP Mesa, above Los Alamos Canyon.

Engineering drawings ENG-R 1196 (pg. 8 of 8) and ENG-C 2213 show that the septic system received discharges from building 21-152 via 6-in.-diameter VCP inlet drainline, through a sump (structure 21-175) to the reinforced concrete septic tank (former structure 21-181, shown as 6-ft × 10-ft × 8-ft-deep on this drawing). Blowdown drainlines from two cooling towers (former structures 21-166 and 21-167) were also connected to sump 21-175 and septic tank 21-181. Effluent was routed via 6-in.-diameter VCP outlet line to the surface in a broad open area with a gentle slope extending approximately 30 ft to the southeastern edge of DP Mesa above Los Alamos Canyon. The sump and portions of the pipe currently lie under building 21-209.

The septic system received effluent from 21-152 and floor drain effluent from cooling towers 21-166 and 21-167 from 1945 to 1964. A portion of the inlet line, the tank and its contents, and the outlet line were left in place following deactivation in 1964 when building 21-209 was built on top of the existing inlet lines from building 21-152, structure 21-166, and structure 21-167. New blowdown pipelines from structures 21-166 and 21-167 were connected into the SWMU 21-024(k) septic system.

Former building 21-209 was situated over a section of the inlet drainline that previously connected to the sump (former structure 21-175). The portion of the inlet line from the fence to the septic tank, the septic tank, and the outlet drainline to the outfall were removed in 2001 as part of an IA, and the remaining portion of the inlet line was removed in 2007. Building 21-209 and both cooling towers were removed in 2010.

For investigation activities, refer to “Phase II Investigation Report for Delta Prime Site Aggregate Area, Revision 1” (LANL 2010, 110772.33).

49.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 49.2-1.

Table 49.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(i)	Septic system	Radionuclides, inorganic and organic chemicals

49.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-024(i) consist of results from samples collected in 1993, 1997, 1998, 2001, 2002, 2008 and 2009. Revision 1 of the 2010 phase II IR concluded that the nature and extent of contamination are defined.

Analytical results from all decision-level soil samples collected for LA-SMA-6.5 are presented in Figures 49.3-1 through 49.3-4.

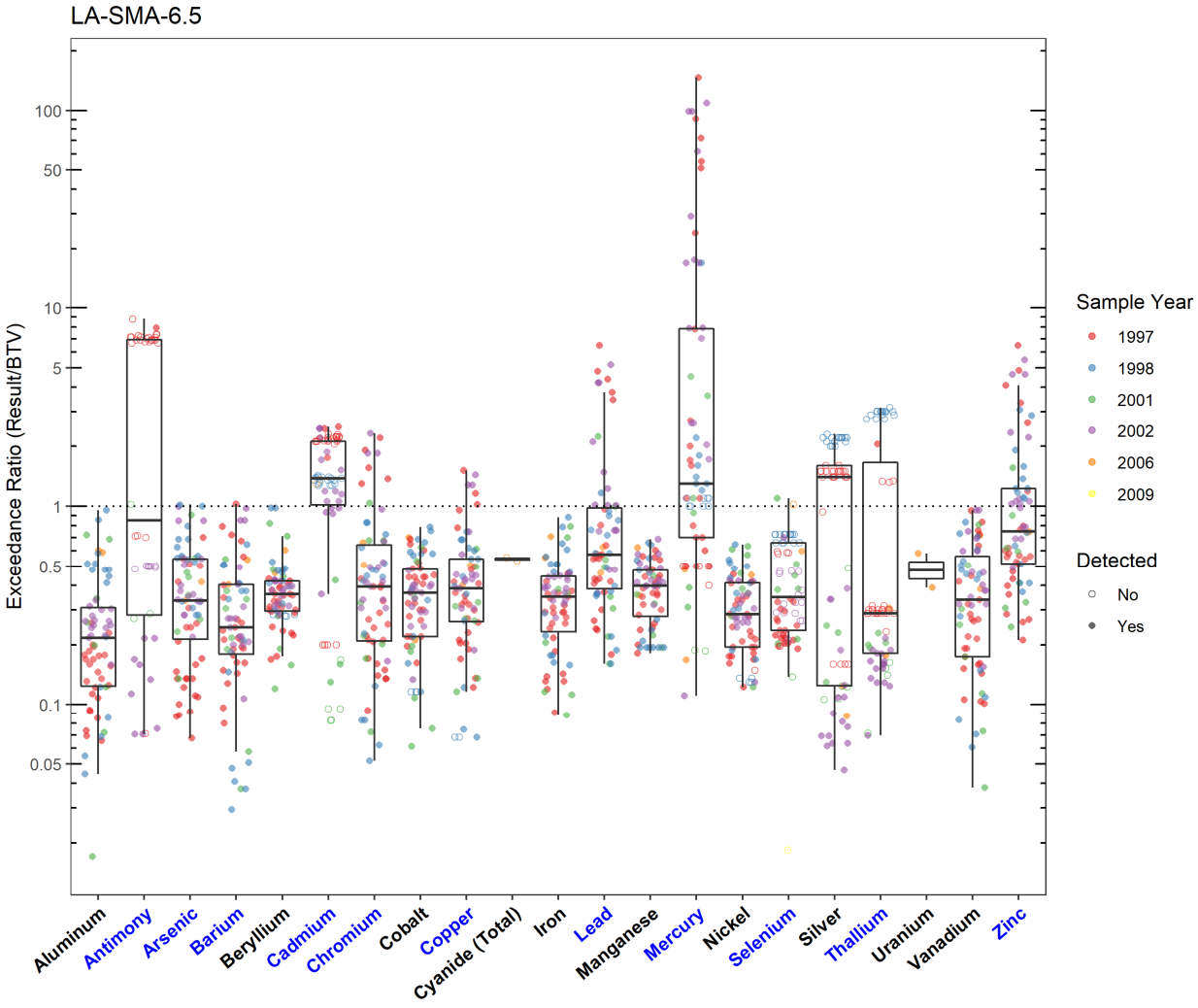

Figure 49.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-6.5

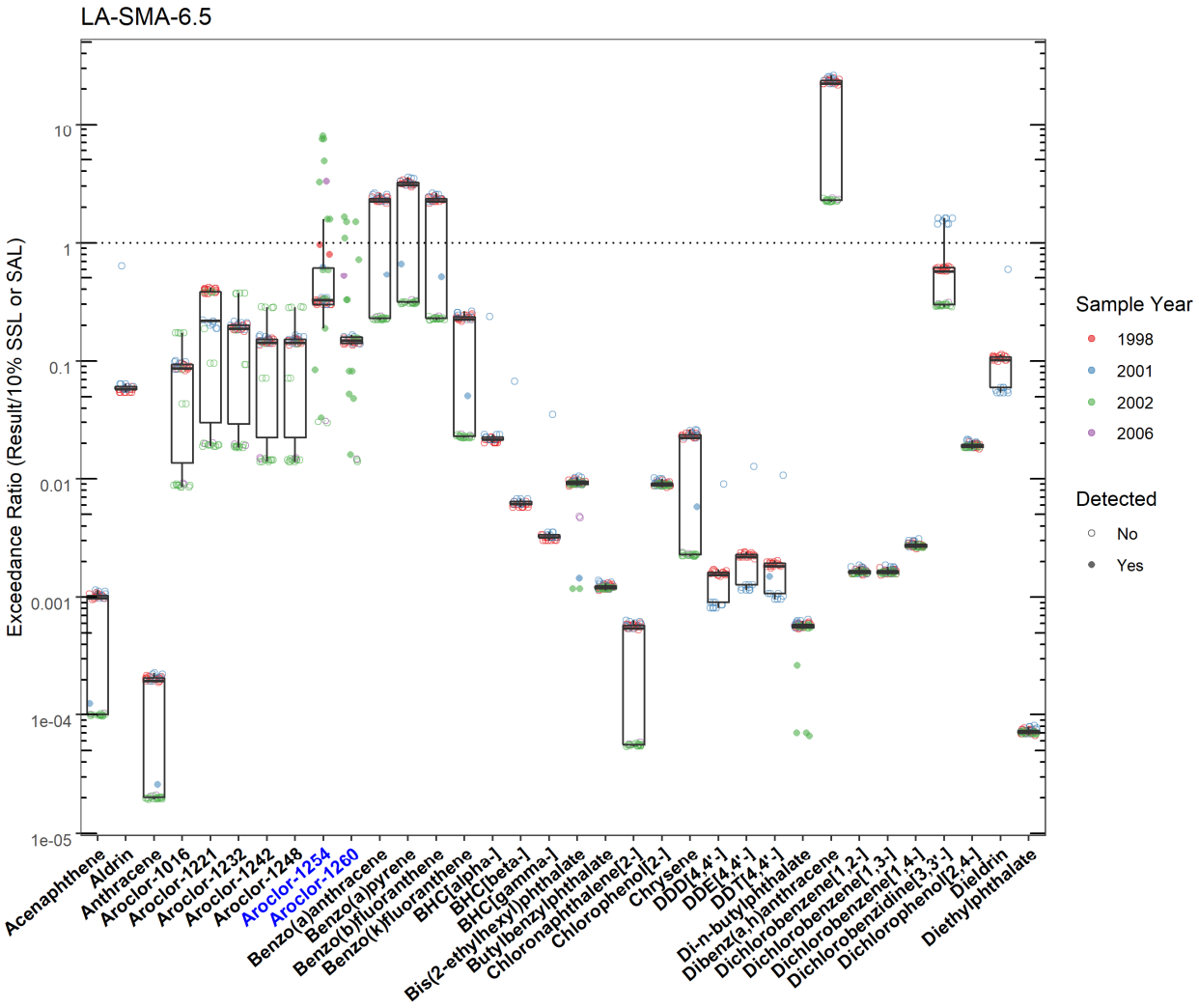

Figure 49.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.5 (Plot 1)

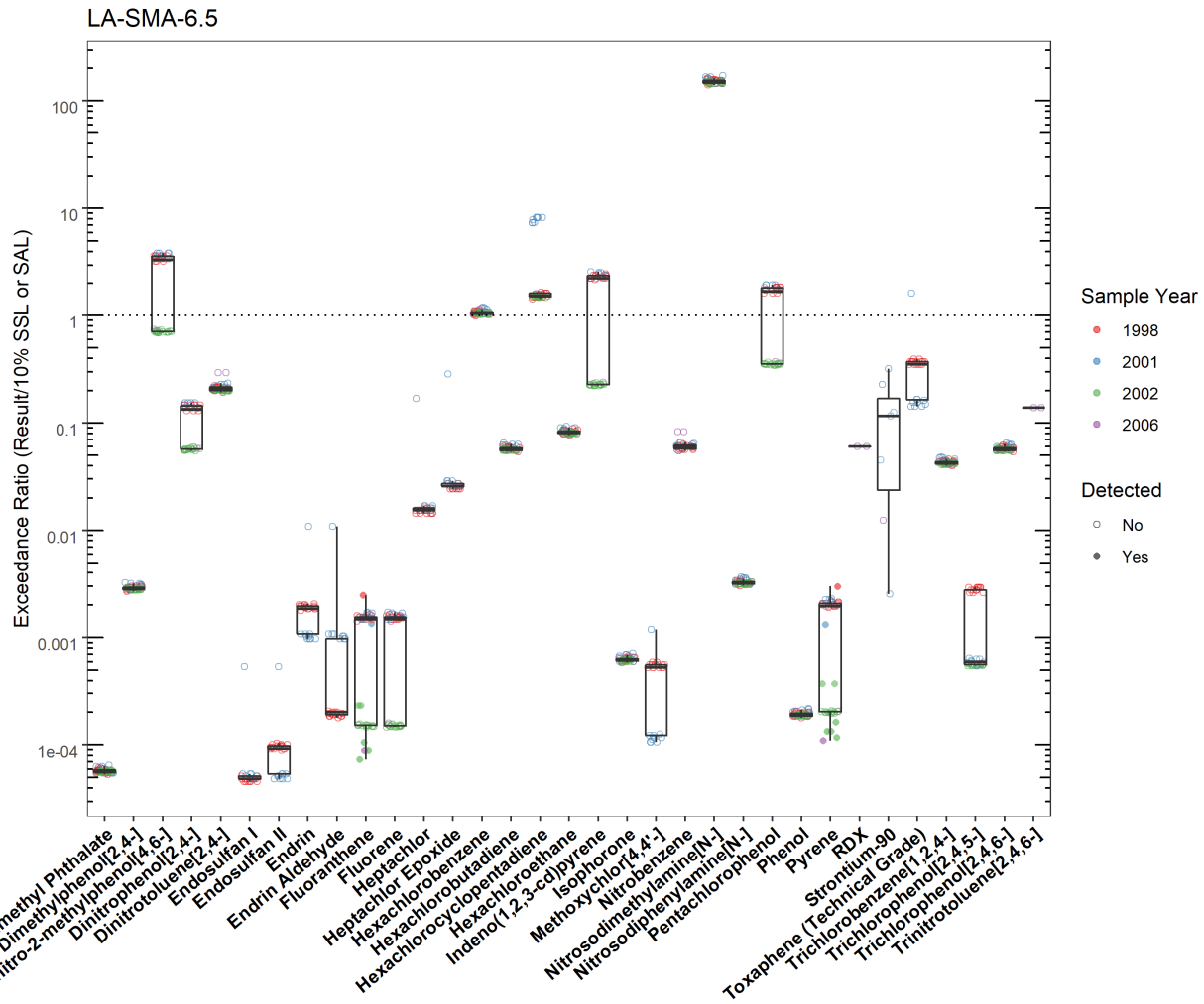

Figure 49.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-6.5 (Plot 2)

LA-SMA-6.5

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-6.5	Sb	Y	BTV	0.830	6.60	1997-03-31
Aroclor-1254	LA-SMA-6.5	11097-69-1	Y	SSL_0.1	0.114	0.906	2002-09-26
Aroclor-1260	LA-SMA-6.5	11096-82-5	Y	SSL_0.1	0.243	0.400	2002-09-26
Arsenic	LA-SMA-6.5	As	Y	BTV	8.17	8.30	1998-10-08
Barium	LA-SMA-6.5	Ba	Y	BTV	295	304	1997-03-31
Cadmium	LA-SMA-6.5	Cd	Y	BTV	0.400	1.00	1997-03-31
Chromium	LA-SMA-6.5	Cr	Y	BTV	19.3	44.7	2002-09-26
Copper	LA-SMA-6.5	Cu	Y	BTV	14.7	22.2	1997-03-31
Lead	LA-SMA-6.5	Pb	Y	BTV	22.3	144	1997-03-31
Mercury	LA-SMA-6.5	Hg	Y	BTV	0.100	14.7	1997-03-31
Selenium	LA-SMA-6.5	Se	Y	BTV	1.52	1.67	2001-01-24
Thallium	LA-SMA-6.5	Tl	Y	BTV	0.730	1.50	1997-11-06
Zinc	LA-SMA-6.5	Zn	Y	BTV	48.8	316	1997-03-31

Figure 49.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-6.5

49.4 Stormwater Evaluation

49.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

49.4.2 Assessment Unit and Stream Impairments

LA-SMA-6.5 drains to Los Alamos Canyon (DP Canyon to upper LANL boundary), which has impairments for total recoverable cyanide, total recoverable selenium, PCBs, adjusted gross alpha, and total mercury. These impairments may be Site-related, based on Site history.

49.5 Site-Specific Demonstration

49.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: antimony, Aroclor-1254, Aroclor-1260, arsenic, barium, cadmium, chromium, copper, lead, mercury, selenium, thallium, and zinc.

49.5.2 Stormwater Data Summary

No confirmation-monitoring data.

49.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected.

49.5.4 Sampling and Analysis Plan

Table 49.5-1 is the proposed SAP for LA-SMA-6.5.

Table 49.5-1 Proposed SAP, LA-SMA-6.5

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
Total cyanide, mercury, and selenium	Impairment, Site history (inorganic chemicals), and soil data
Total PCBs	Impairment, Site history (organic chemicals), and soil data
Dissolved arsenic, barium, cadmium, chromium, copper, lead, antimony, thallium, and zinc	Site history (inorganic chemicals) and soil data
Radium-226 and radium-228	Site history (radionuclides)
SVOCs	Site history (organic chemicals)
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

50.0 LA-SMA-9

Associated Sites	26-001, 26-002(a), 26-002(b), 26-003
Receiving Water	Los Alamos Canyon
Drainage Area	5.27 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 26-001: In Progress SWMU 26-002(a): In Progress SWMU 26-002(b): In Progress SWMU 26-003: In Progress
2010 AC Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the October 2017 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

50.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2014. Analytical results from this sample initiated corrective action.

The Permittees submitted a request for alternative compliance for all four sites to EPA per permit Part I.E.3 in May 2015 044 (LANL 2015, 600418). No response has been received from EPA for this request, and stormwater monitoring has not occurred since 2014.

50.2 Site History

26-001 (9/3/2019)

SWMU 26-001 is an inactive surface disposal area on the south-facing slope of Los Alamos Canyon that contains debris from a former five-room concrete storage vault (former structure 26-01) at former TA-26, formerly known as D-Site. D-Site was established for the Los Alamos Scientific Laboratory Chemistry and Metallurgical Research division, for the purpose of storing radioactive materials. The vault was constructed in 1946 and was decommissioned and dismantled in 1966.

Although the vault was constructed for storing radioactive materials, documentation describing the specific type and quantity of radioactive materials stored is not available. One documents states that the vault “stored friable containers which now contain, or have contained radioactive material.” The vault was later used for storing HE.

Before the vault was dismantled in 1966, all contaminated contents that could be removed, including shelving, a drainage system [SWMU 26-002(b)], a sump [SWMU 26-002(a)], and duct work, were removed and disposed of at MDA C. The remaining portions of the vault, including concrete walls and foundation, were bulldozed over the edge of the mesa top onto the south-facing slope of Los Alamos Canyon. When all rubble had been pushed over the edge of the mesa top, soil was pushed over the side to cover the rubble to a minimum depth of 3 ft.

In the 1970s, most of the vault debris was observed on the bench below the mesa top; however, some debris may have fallen as far as the canyon floor. Former TA-26 is currently located within the boundary of TA-73.

26-002(a) (9/3/2019)

SWMU 26-002(a) is the former acid sump system that served the concrete storage vault at former building 26-1, known as the East Gate vault, within the former D-Site at TA-26. D-Site was established for the Los Alamos Scientific Laboratory Chemistry and Metallurgical Research division for the purpose of storing radioactive materials. The former acid sump system consisted of a 6-in.-diameter VCP floor drain in the south center room of the vault., connected to a collection sump (former structure 26-6) via an inlet drainline; the sump discharged through an outlet drainline to an outfall into Los Alamos Canyon.

Engineering records describe the sump as having an internal diameter of 4 ft and a depth of 10 ft. The collection sump (former structure 26-6) was located outside and directly south of the vault (former building 26-1). The vault and its associated structures were constructed in 1946 and decommissioned and demolished in 1966. The sump and its drainlines were removed before demolition of the storage vault and disposed of at MDA C. Former TA-26 is currently located within the boundary of TA-73.

26-002(b) (9/3/2019)

SWMU 26-002(b) is the former equipment room drainage system constructed in 1946 for the concrete storage vault (former structure 26-1) at TA-26, formerly known as D-Site. D-Site was established for the Los Alamos Scientific Laboratory Chemistry and Metallurgical Research division for the purpose of storing radioactive materials. The drainage system was installed during construction of the storage vault in 1946. It carried effluent that likely included wash water and minor spills from the former equipment room through a 4-in.-diameter VCP floor drain that discharged directly to the south-facing slope of Los Alamos Canyon. The former drainline was not connected to the SWMU 26-002(a) sump system or the SWMU 26-003 septic system. The former drainline ran south from structure 26-1, parallel to the SWMU 26-003 septic system drainlines, and discharged at a point near the septic system outfall, directly above the SWMU 26-001 surface disposal area. The drainlines were removed before demolition of the vault structure in 1966. All removable material, including the drainlines, was disposed of at MDA C. Former TA-26 is currently located within the boundary of TA-73.

26-003 (9/3/2019)

SWMU 26-003 is the former septic system that served sanitary facilities in the east room of the concrete storage vault (former structure 26-1) at former TA-26, formerly known as D-Site. D-Site was established for the Los Alamos Scientific Laboratory Chemistry and Metallurgical Research division for the purpose of storing radioactive materials. The septic system consisted of a 4-in.-diameter VCP inlet drainline connected to the 250-gal. steel septic tank (former structure 26-50), and an overflow outlet drainline that discharged to an outfall on the south-facing slope of Los Alamos Canyon below the mesa top. The septic system was installed in August 1948 south of building 26-1.

It was assumed that the septic system was free from radioactive contamination because the system served only the toilet and sink in the least contaminated room of the storage vault. However, because radioactive contamination was found in the vault, it is possible that contaminants were introduced into the septic system. The former SWMU 26-002(b) drainline ran south from the storage vault (former building 26-1), parallel to the SWMU 26-003 septic system drainlines, and discharged at a point near the septic system outfall.

The SWMU 26-003 septic system may have been removed at the same time as the sump system [SWMU 26-002(a)] and other removable components associated with the vault were removed in 1966, but no clear documentation is available. The drainlines were removed before demolition of the vault structure in 1966. All removable material, including the drainlines, was disposed of at MDA C. Former TA-26 is currently located within the boundary of TA-73.

For investigation activities at the Sites, refer to "Phase II Investigation Report for Middle Los Alamos Canyon Aggregate Area, Revision 2" (N3B 2018, 700091).

50.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 50.2-1.

Table 50.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
26-001	Surface disposal site	Radionuclides, HE
26-002(a)	Soil contamination from former acid sump system	Uranium, tritium
26-002(b)	Drainline associated with Vault 26-01	Uranium, tritium
26-003	Septic system	Uranium, tritium, inorganic and organic chemicals

50.3 Consent Order Soil Data

Decision-level data for SWMU 26-001, SWMU 26-002(a), SWMU 26-002(b), and SWMU 26-003 consist of results from samples collected in 2007 and 2010. Analytical results from those samples are presented in Figures 50.3-1 through 50.3-4. Revision 2 of the 2018 Phase II IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

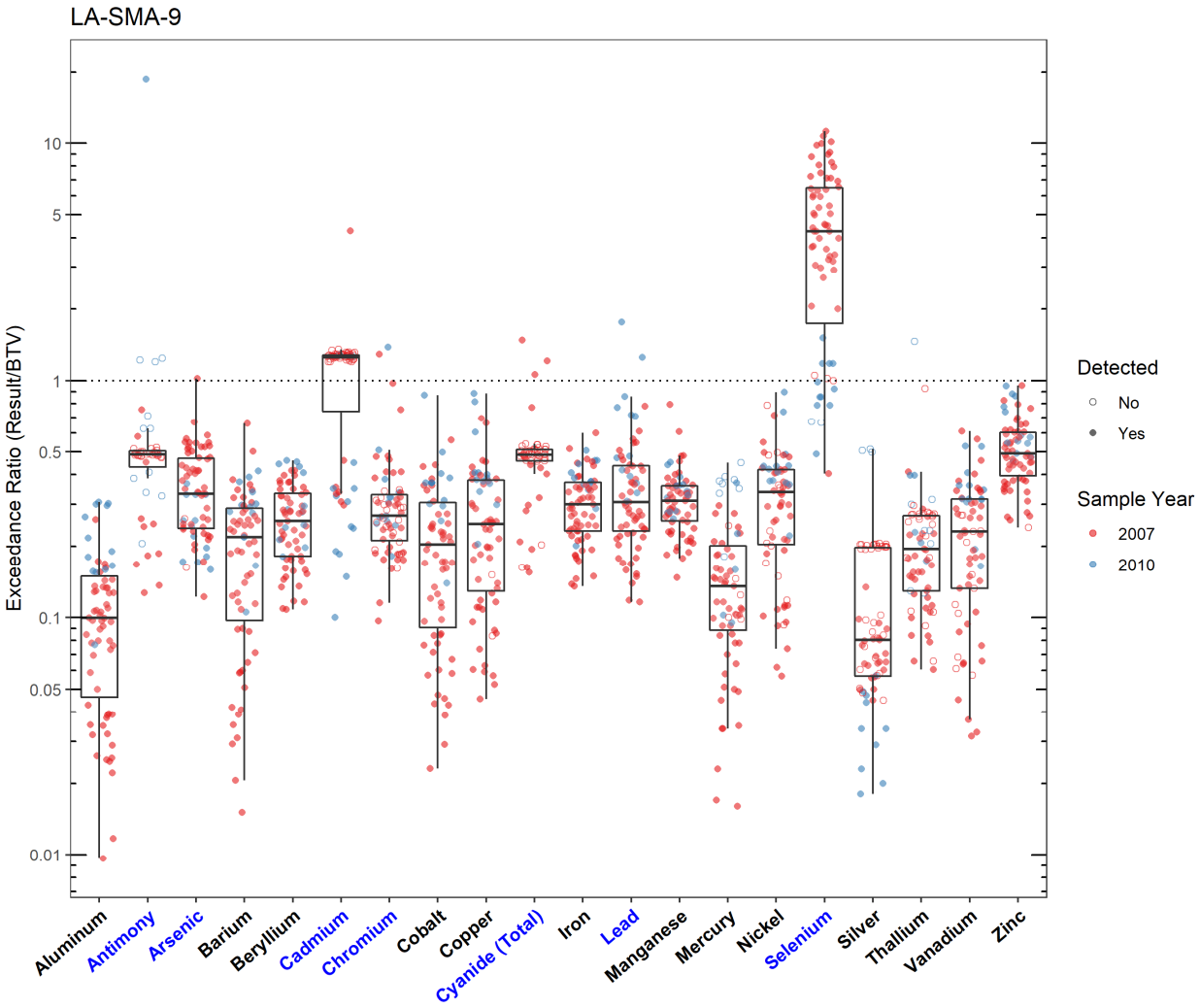

Figure 50.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-9

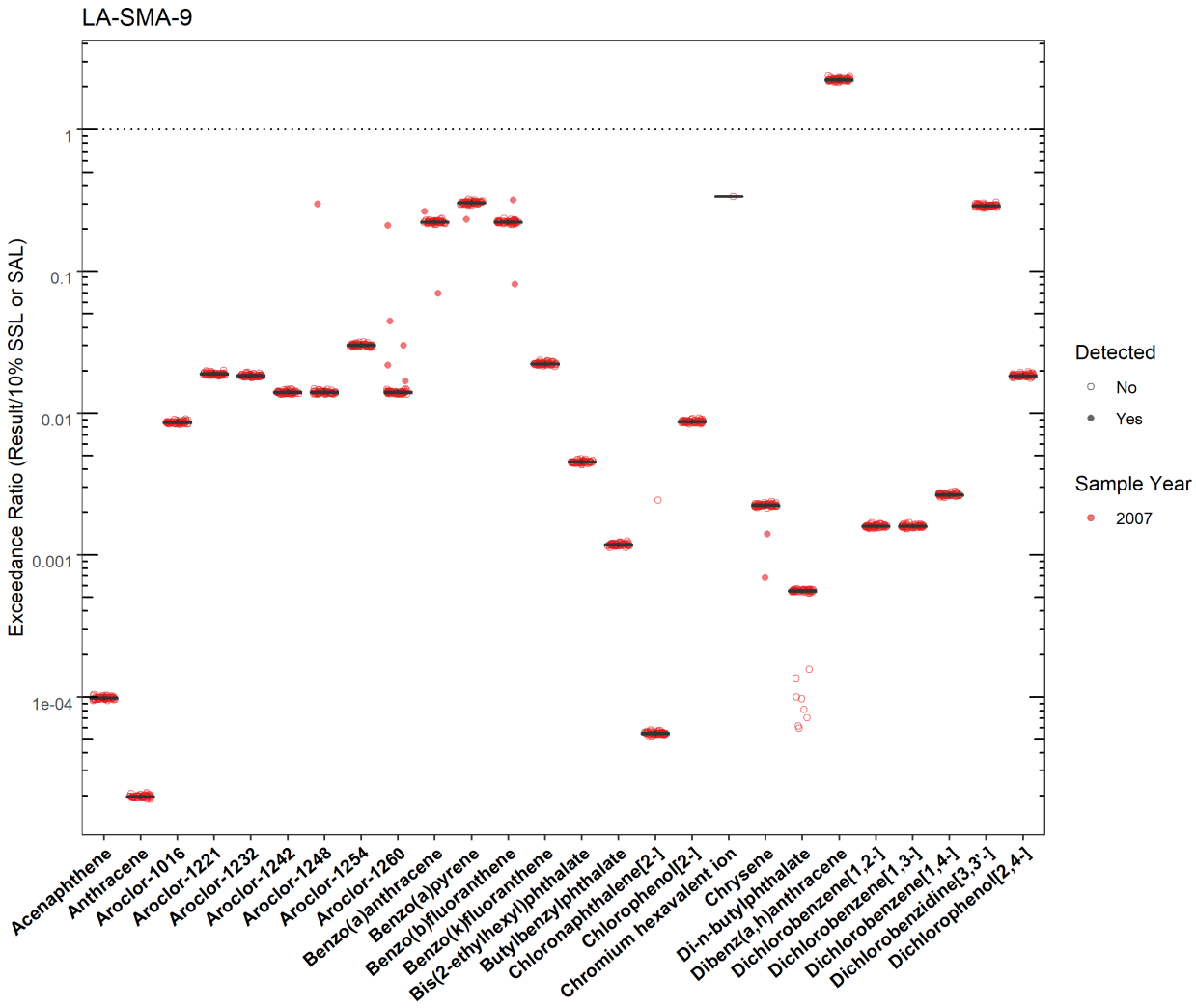

Figure 50.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-9 (Plot 1)

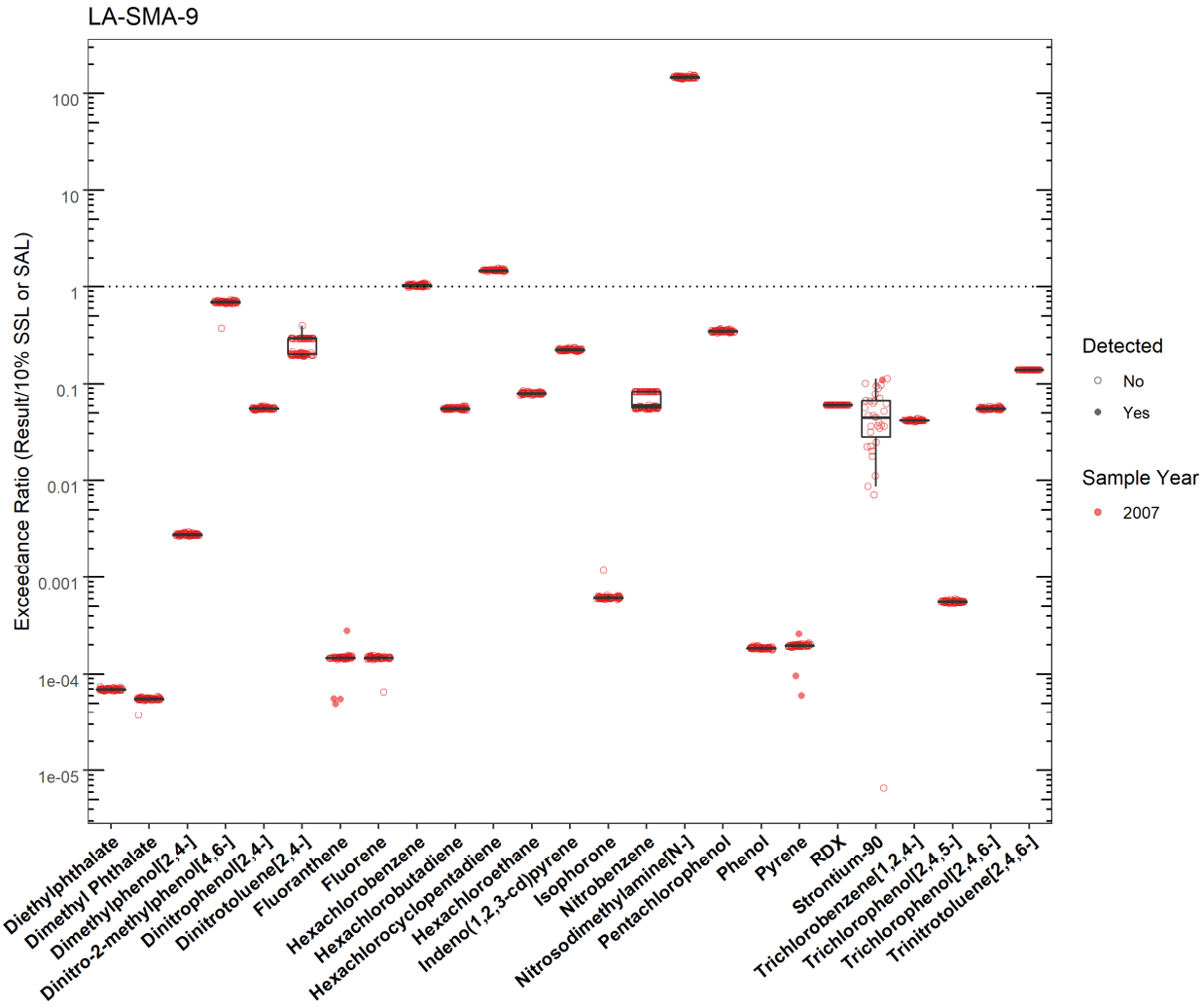

Figure 50.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-9 (Plot 2)

LA-SMA-9

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-9	Sb	Y	BTV	0.830	15.5	2010-07-26
Arsenic	LA-SMA-9	As	Y	BTV	8.17	8.34	2007-10-04
Cadmium	LA-SMA-9	Cd	Y	BTV	0.400	1.71	2007-10-01
Chromium	LA-SMA-9	Cr	Y	BTV	19.3	26.6	2010-07-21
Cyanide (Total)	LA-SMA-9	CN(TOTAL)	Y	BTV	0.500	0.740	2007-10-03
Lead	LA-SMA-9	Pb	Y	BTV	22.3	39.2	2010-07-21
Selenium	LA-SMA-9	Se	Y	BTV	1.52	17.0	2007-10-05

Figure 50.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-9

50.4 Stormwater Evaluation

50.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in August 2014; analytical results from that sample is presented in Figures 50.4-1 and 50.4-2.

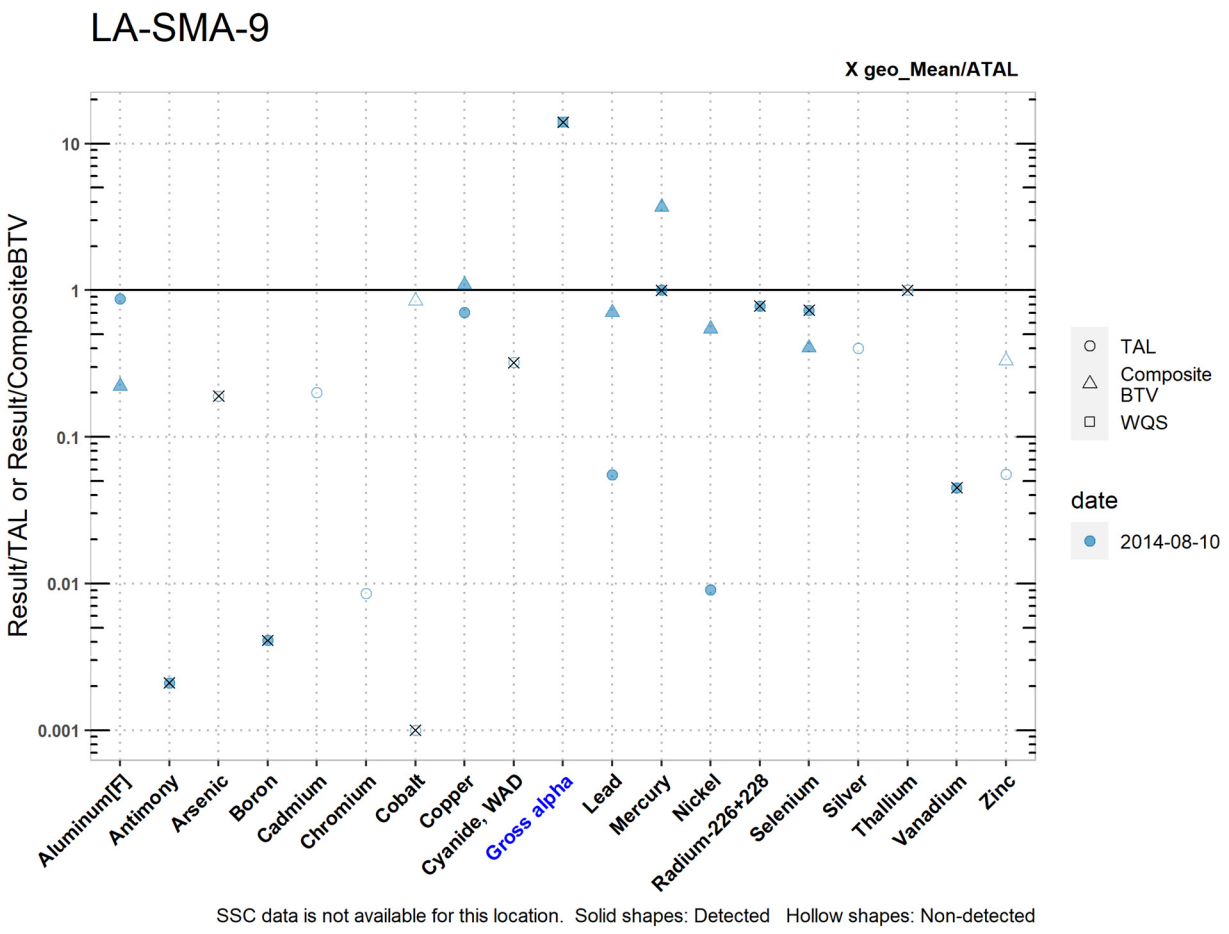

Figure 50.4-1 Analytical Results from Stormwater Sample, LA-SMA-9 (Plot)

LA-SMA-9

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	2950	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2	1.50	0.208	3.10	4.21	8.98	NA	NA	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2014-08-10 result	656	1.32	*1.70*	20.5	*0.110*	*2.00*	*1.00*	3.40	*1.67*	208	1.06	0.767	1.69	23.4	3.65	*0.200*	*0.450*	4.54	*3.30*
2014-08-10 dT	0.875	0.0021	NA	0.0041	NA	NA	NA	0.708	NA	14	0.0549	1.0	0.00909	0.780	0.73	NA	NA	0.045	NA
2014-08-10 dB	0.222	NA	NA	NA	NA	NA	NA	1.09	NA	NA	0.707	3.69	0.545	NA	0.406	NA	NA	NA	NA
geo_mean/ATAL	NA	0.0021	0.19	0.0041	NA	NA	0.0010	NA	0.321	14	NA	1.0	NA	0.780	0.73	NA	1	0.045	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 50.4-2 Analytical Results from Stormwater Sample, LA-SMA-9 (Table)

50.4.2 Assessment Unit and Stream Impairments

LA-SMA-9 drains to Los Alamos Canyon (NM-4 to DP Canyon), which has impairments for total recoverable aluminum, PCBs, total recoverable cyanide, radium, adjusted gross alpha, and total recoverable selenium. These impairments may be Site-related, based on Site history.

50.5 Site-Specific Demonstration

50.5.1 Soil Data Summary

All Site-related POCs that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

50.5.2 Stormwater Data Summary

Gross alpha was the only TAL exceedance, and there was no paired SSC value to confirm whether it was below BV. Therefore, it will be added to the SAP.

50.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

50.5.4 Sampling and Analysis Plan

Table 50.5-1 is the proposed SAP for LA-SMA-9.

Table 50.5-1 Proposed SAP, LA-SMA-9

Monitoring Constituent	Background for Monitoring
Gross alpha (1)	Impairment, Site history (radionuclides), and stormwater data
Cyanide (1)	Impairment and soil data
Tritium	Site history
Dissolved uranium	Site history
DOC	Permit requirement
SSC	Permit requirement

51.0 LA-SMA-10.12

Associated Sites	53-008
Receiving Water	Los Alamos Canyon
Drainage Area	0.68 acres
Landscape Characteristics	2% impervious, 98% pervious
Consent Order Site Status	AOC 53-008: In Progress
2010 AC Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	The October 2017 field visit determined that the current sampler location did not adequately address runoff from the AOC. Therefore, the sampler intake will be moved slightly south to the top of the spillway to address chromium in soil at location 53-612513.
2022 Permit Status	Active Monitoring

51.1 2010 Administratively Continued Permit Summary

Following the May 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2011. Analytical results from this sample initiated corrective action.

Following the December 2012 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2012, 232349), corrective action monitoring was initiated and stormwater samples were collected in September 2013 and July 2015. Analytical results from these samples had no TAL exceedances.

The Permittees submitted a certification of completion of corrective action for the Site to EPA per permit Part I.E.2.(a) in March 2016 (LANL 2016, 601270). Stormwater monitoring has not occurred since 2015.

51.2 Site History

53-008 9/29/2021

AOC 53-008 is an unpaved open area (referred to as a “boneyard”) used to store used materials and equipment associated with experiments conducted at TA-53. This storage area, approximately 3 to 4 acres in size, is irregularly shaped, and located east and south of the former TA-53 surface impoundments [former Consolidated Unit 53-002(a)-99]. Most of the storage area is vegetated with grasses, shrubs, and juniper trees, and several dirt trails also run through it.

Materials shown to be present at the Site in 1989 photographs include vacuum pumps, metal ducting, concrete shielding blocks, empty overpack drums, and drums containing steel bearings. The Site was inspected in September 1993 and was found to contain shielding blocks (magnetite concrete and steel), concrete, steel, other metallic debris, and other miscellaneous items. No hazardous materials or chemicals were observed, with the exception of lead stored in a shed (structure 53-621) at the south end of the Site.

This area has been used for storage from approximately 1972 to the present. Currently, much of the material previously stored at the Site has been removed.

For investigation activities, refer to “Supplemental Investigation Report for Lower Sandia Canyon Aggregate Area, Revision 1” (N3B 2021, 701448).

51.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 51.2-1.

Table 51.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
53-008	Storage area	Metals, radionuclides

51.3 Consent Order Soil Data

Decision-level data for AOC 53-008 consist of results from samples collected in 2010. Analytical results from those samples are presented in Figures 51.3-1 through 51.3-4. Revision 1 of the 2021 supplemental IR concluded that the nature and extent of contamination have been defined except for the vertical extent of chromium and the lateral extent of cyanide.

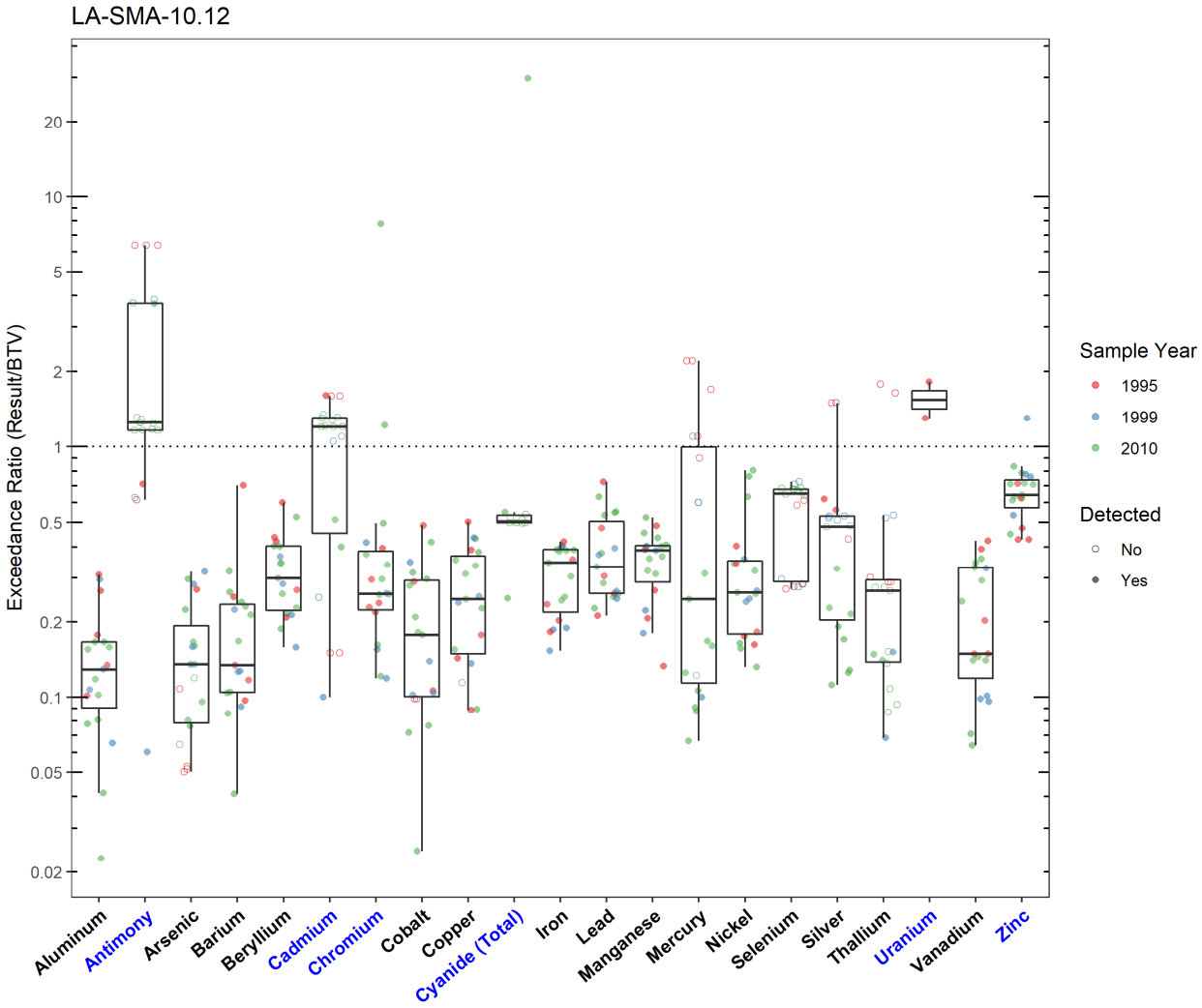

Figure 51.3-1 Inorganics Analytical Results from Soil Samples Associated with LA-SMA-10.12

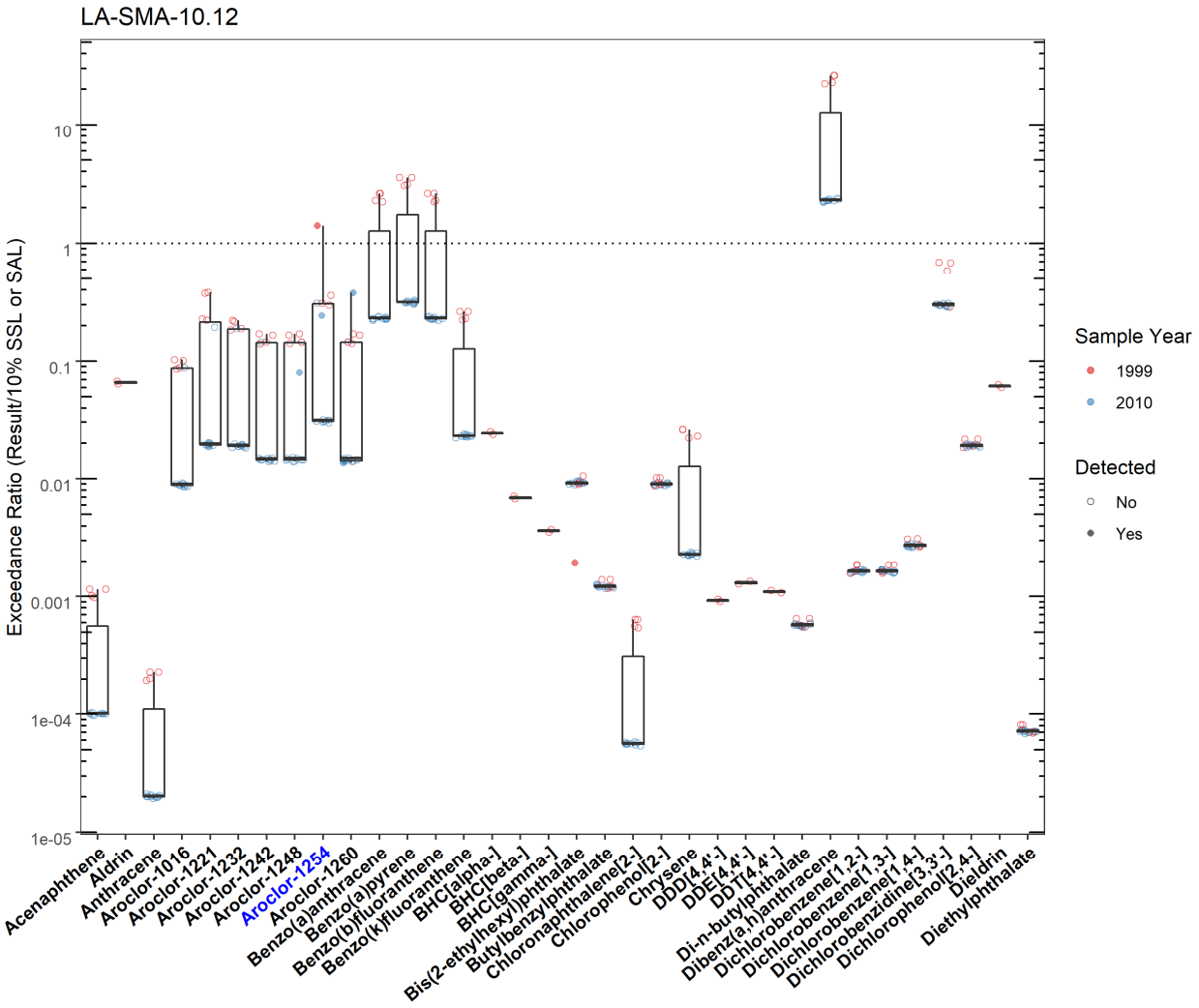

Figure 51.3-2 Organics Analytical Results from Soil Samples Associated with LA-SMA-10.12 (Plot 1)

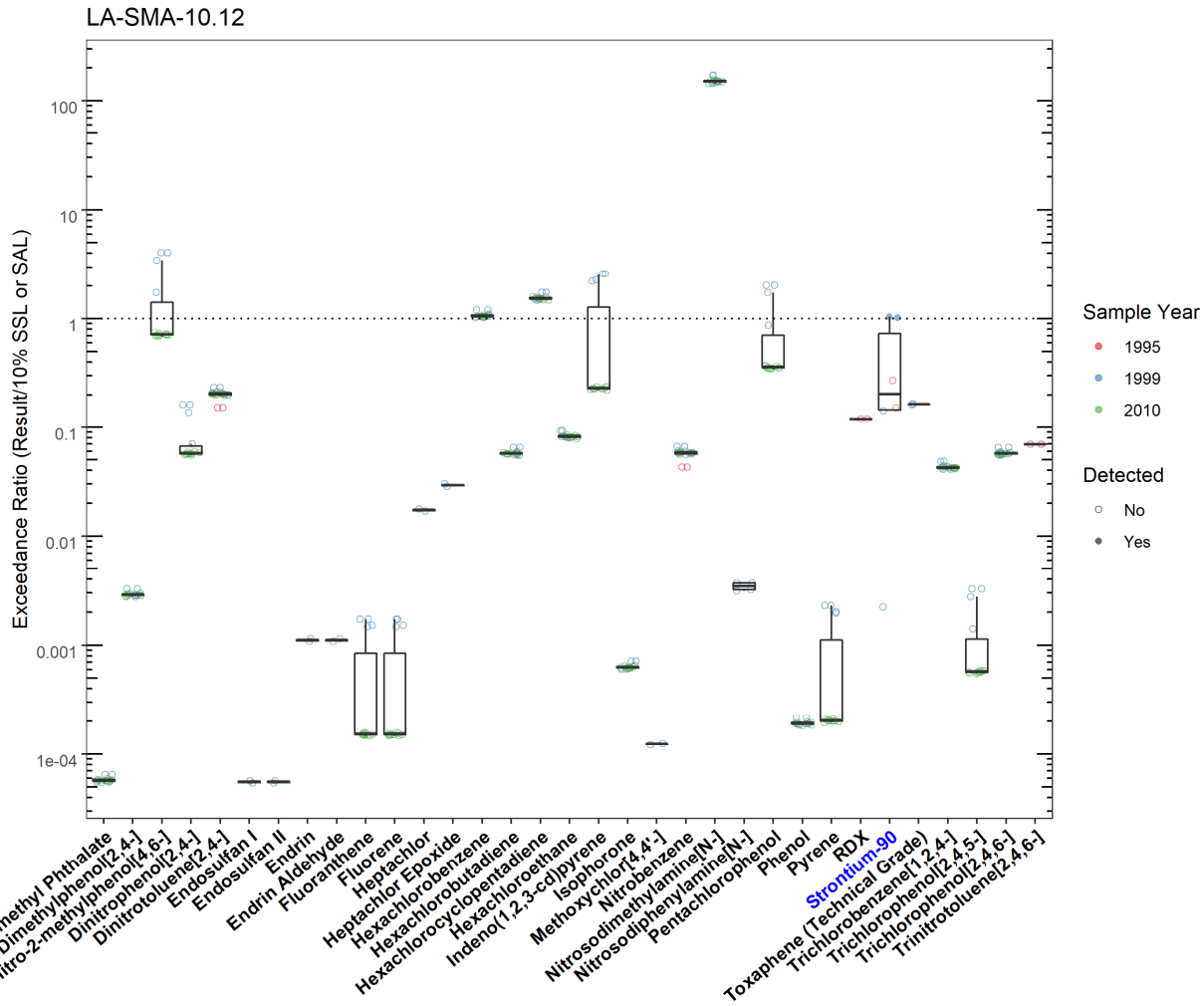

Figure 51.3-3 Organics Analytical Results from Soil Samples Associated with LA-SMA-10.12 (Plot 2)

LA-SMA-10.12

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	LA-SMA-10.12	Sb	Y	BTV	0.830	3.08	2010-08-10
Aroclor-1254	LA-SMA-10.12	11097-69-1	Y	SSL_0.1	0.114	0.160	1999-07-09
Cadmium	LA-SMA-10.12	Cd	Y	BTV	0.400	0.640	1995-05-10
Chromium	LA-SMA-10.12	Cr	Y	BTV	19.3	150	2010-08-10
Cyanide (Total)	LA-SMA-10.12	CN(TOTAL)	Y	BTV	0.500	14.9	2010-08-11
Strontium-90	LA-SMA-10.12	Sr-90	Y	SAL_0.1	1.50	1.56	1999-08-24
Uranium	LA-SMA-10.12	U	Y	BTV	1.82	3.31	1995-05-18
Zinc	LA-SMA-10.12	Zn	Y	BTV	48.8	63.4	1999-07-09

Figure 51.3-4 Screening-Level Exceedances from Soil Samples Associated with LA-SMA-10.12

51.4 Stormwater Evaluation

51.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in September 2013 and July 2015; analytical results from these samples are presented in Figures 51.4-1 and 51.4-2.

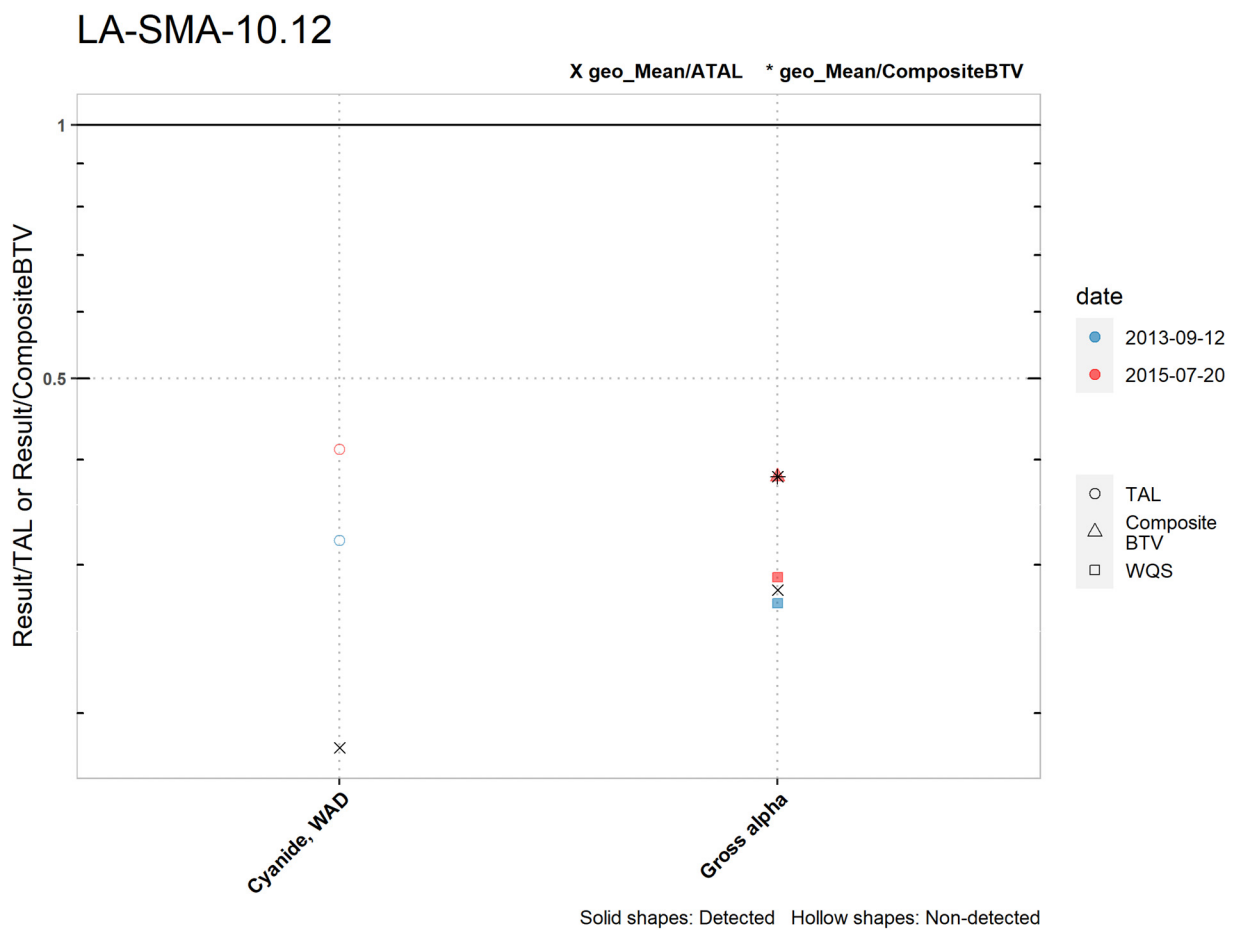

Figure 51.4-1 Analytical Results from Stormwater Samples, LA-SMA-10.12 (Plot)

LA-SMA-10.12

	Cyanide, WAD	Gross alpha
MQL	10	NA
ATAL	5.2	15
MTAL	22	NA
Composite_BTV	NA	57.1
unit	ug/L	pCi/L*
2013-09-12 result	*1.67*	4.07
2013-09-12 dT	NA	0.27
2013-09-12 dB	NA	NA
2015-07-20 result	*2.14*	4.36
2015-07-20 dT	NA	0.29
2015-07-20 dB	NA	0.382
geo_mean/ATAL	0.182	0.28
geo_mean/B	NA	0.382

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g

Figure 51.4-2 Analytical Results from Stormwater Samples, LA-SMA-10.12 (Table)

51.4.2 Assessment Unit and Stream Impairments

LA-SMA-10.12 drains to Los Alamos Canyon (NM-4 to DP Canyon), which has impairments for total recoverable aluminum, PCBs, total recoverable cyanide, radium, adjusted gross alpha, and total

recoverable selenium. The metals, radium, and gross alpha impairments may be Site-related, based on Site history.

51.5 Site-Specific Demonstration

51.5.1 Soil Data Summary

Strontium-90 is the only Site-related POC that exceeded the applicable screening value in soil data and has not yet been measured in stormwater.

51.5.2 Stormwater Data Summary

Cyanide and gross alpha were measured in the most current stage of monitoring and were below TALs.

51.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

51.5.4 Sampling and Analysis Plan

Table 51.5-1 is the proposed SAP for LA-SMA-10.12.

Table 51.5-1 Proposed SAP, LA-SMA-10.12

Monitoring Constituent	Background for Monitoring
Strontium-90	Site history (radionuclides) and soil data
Tritium	Site history (radionuclides)
DOC	Permit requirement
SSC	Permit requirement

52.0 DP-SMA-0.3

Associated Sites	21-029
Receiving Water	DP Canyon
Drainage Area	1.59 acres
Landscape Characteristics	41% impervious, 59% pervious
Consent Order Site Status	SWMU 21-029: Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 Administratively Continued Permit Final Status	Corrective Action Complete
2016–2018 SIP Actions	The January 2018 field visit determined that the current sampler location did not monitor runoff from the impacted area. Therefore, it was proposed that the sampler be moved into the main channel, upgradient from the county yard. Due to construction of an apartment complex on top of the SWMU footprint since the SIP review, it was determined that current sampler location is now more representative of the area; therefore, the sampler will not be moved, and the drainage area will be updated.
2022 Permit Status	Active Monitoring

52.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in August 2011. Analytical results from this sample initiated corrective action.

Following the July 2013 submittal to EPA of certification of enhanced control installation as a corrective action (LANL 2013, 244386), corrective action monitoring was initiated and stormwater samples were collected in July and September 2013. Analytical results from these samples initiated corrective action.

SWMU 21-029 received a COC under the Consent Order in January 2016. The Permittees submitted a certification of completion of corrective action for the Site per Permit part I.E.2(d) in March 2017 (LANL 2017, 602213). Stormwater monitoring has not occurred since 2013.

52.2 Site History

21-029 (9/28/2021)

SWMU 21-029 is the former DP Tank Farm, located entirely on the mesa top within the very western portion of DP West and TA-21. DP Tank Farm consisted of 15 ASTs and USTs that contained various petroleum hydrocarbon products, and two fill stations (East and West) that were located just inside the earthen berm along the northern perimeter of the tank farm, on a 3.5-acre site between the eastern boundary of the Knights of Columbus property line and the western boundary of the Los Alamos County Fire and Training Station. Structures at the site included fuel tanks, fill ports, valve boxes, the East and West Fill Stations, access roads, and a large earthen berm on the north side of the Site, extending from just east of the West Fill Station to the east end of the Site. Other structures included two CMPs that previously discharged stormwater runoff from DP Road into DP Canyon (AOC C-00-021) and the western portion of the facility access road.

DP Tank Farm was the primary fueling station supporting LASL operations until the late 1970s, when some of the fuel storage and distribution operations were moved to TA-03. The tank farm remained

operational until February 1985. Thirteen of the tanks were installed belowground, and two were installed aboveground. The approximate tank capacities reportedly ranged from 21,000 gal. to 51,000 gal. To contain any petroleum hydrocarbon releases, an earthen berm was constructed along the northern perimeter of the Site sometime between 1974 and 1986. The berm was approximately 397 ft long × 4 ft high.

All storage tanks and structures (including piping, two fill stations, and valve boxes) were decommissioned and removed in 1988. The excavation for each UST was backfilled with the soil that had covered the tanks. During decommissioning activities, one tank (structure-21-ATF-10) had a leaking gasket, and 4 yd^3 of soil were removed. Approximately 75 yd^3 of soil were also removed from the areas around the two fill stations, where the soil was stained with petroleum hydrocarbons. The remaining tanks were reportedly in excellent condition, as documented during corrosion inspections conducted in 1980. Minor spills and leaks during the 39 yr of day-to-day operations at the Site resulted in the release of diesel fuel, kerosene, ethanol/alcohol, No. 2 diesel fuel oil, and leaded gasoline into the environment at the tank farm, including two petroleum hydrocarbon seeps in DP Canyon (AOC C-00-021).

For investigation activities, refer to "Phase II RFI Report for Potential Release Site 21-029, DP Tank Farm" (LANL 2001, 071303) and "Response to Request for Supplemental Information for the Phase II RFI Report for Potential Release Site 21-029, DP Tank Farm" (LANL 2001, 073436).

52.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 51.2-1.

Table 51.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-029	Former DP Tank Farm	PAHs, lead

52.3 Consent Order Soil Data

Decision-level data for SWMU 21-029 consist of samples collected in 2001. Analytical results from those samples are presented in Figures 52.3-1 through 52.3-4. The 2001 Phase II IR for SWMU 21-029 concluded that the nature and extent of mesa-top contamination had been defined.

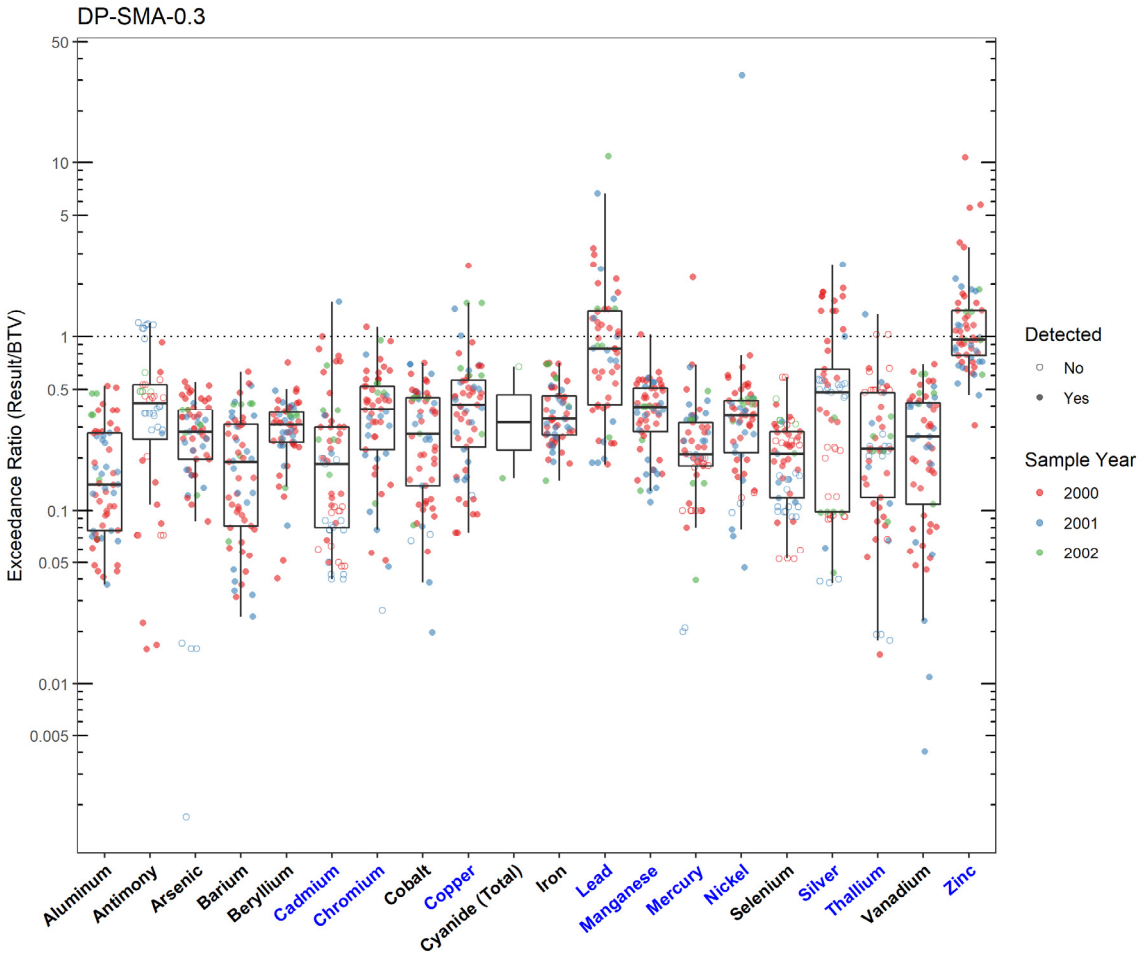

Figure 52.3-1 Inorganics Analytical Results from Soil Samples Associated with DP-SMA-0.3

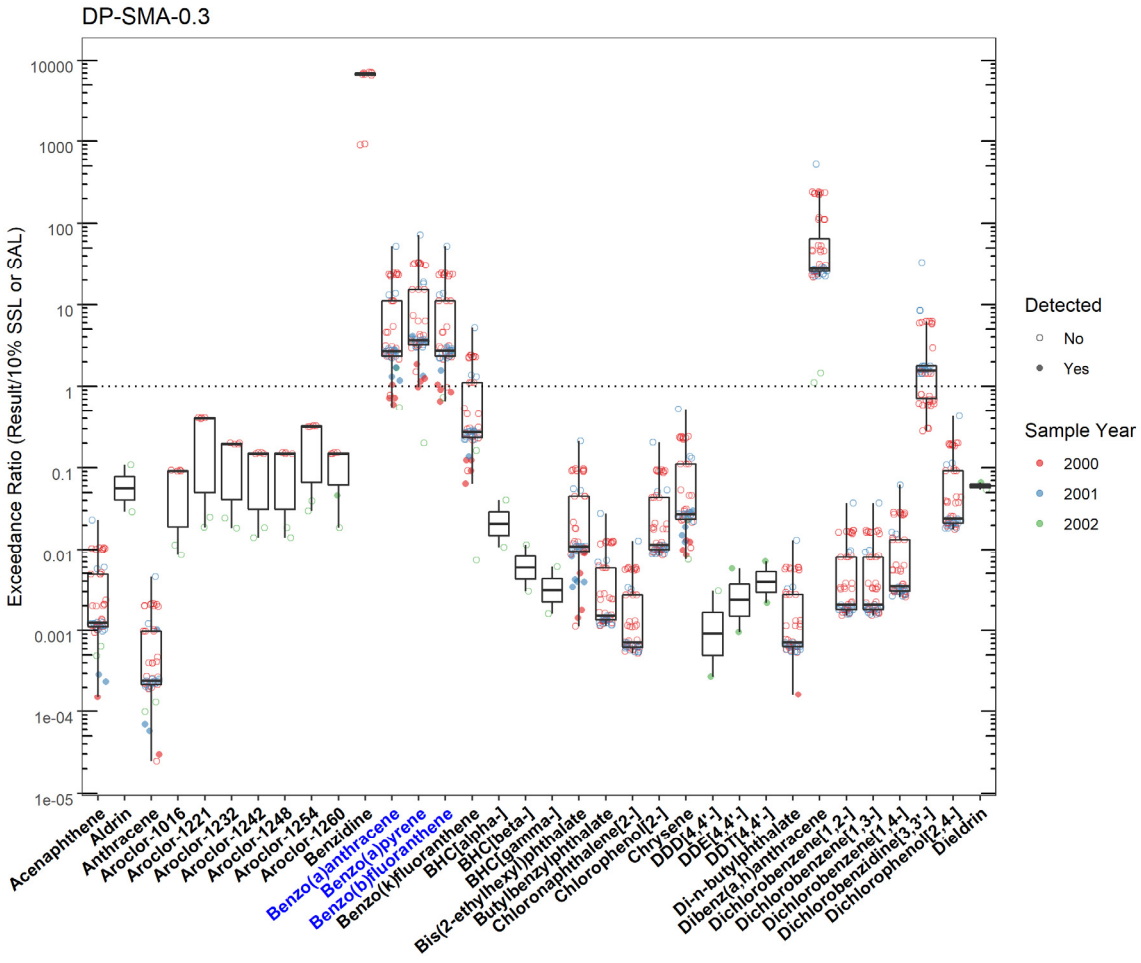

Figure 52.3-2 Organics Analytical Results from Soil Samples Associated with DP-SMA-0.3 (Plot 1)

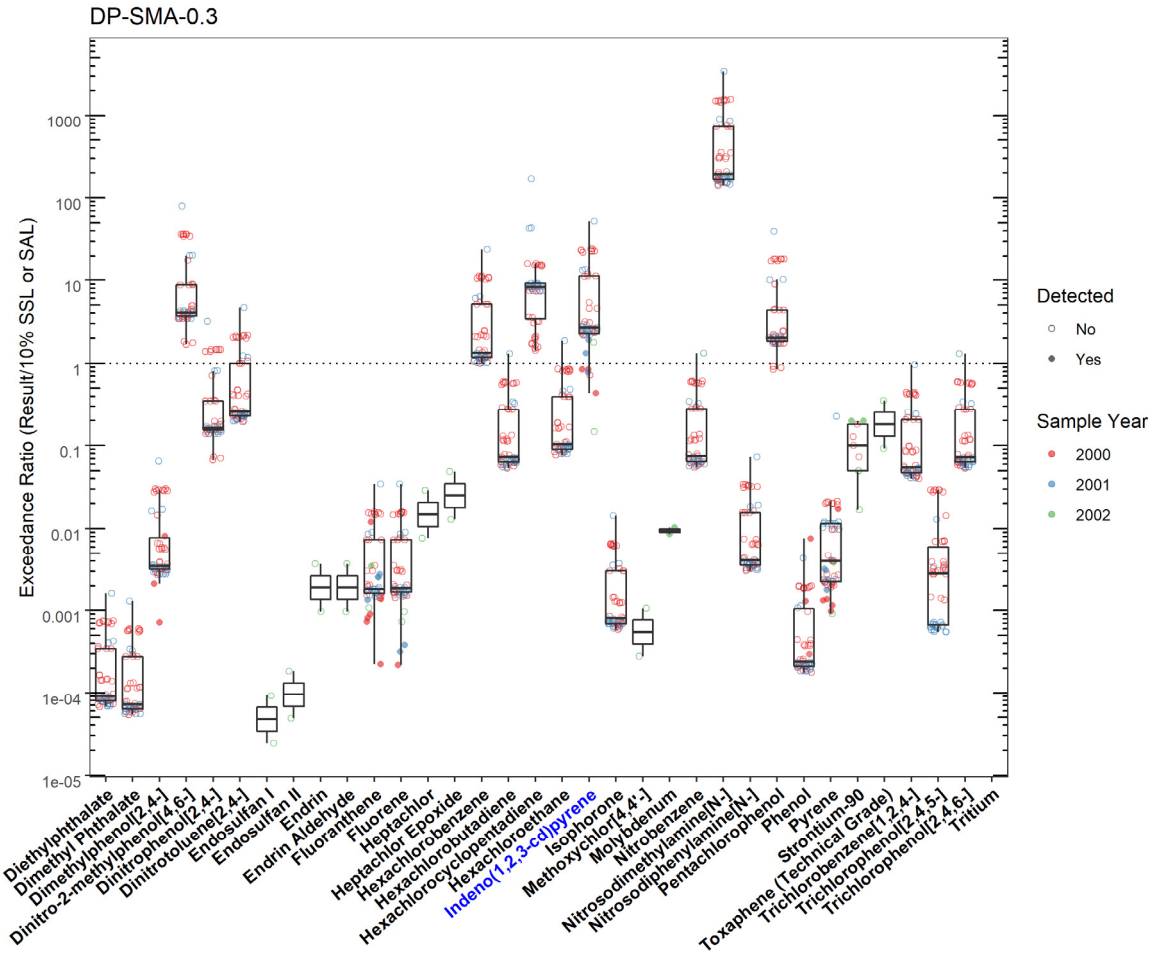

Figure 52.3-3 Organics Analytical Results from Soil Samples Associated with DP-SMA-0.3 (Plot 2)

DP-SMA-0.3

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	DP-SMA-0.3	56-55-3	Y	SSL_0.1	0.153	0.430	2001-05-15
Benzo(a)pyrene	DP-SMA-0.3	50-32-8	Y	SSL_0.1	0.112	0.460	2001-05-15
Benzo(b)fluoranthene	DP-SMA-0.3	205-99-2	Y	SSL_0.1	0.153	0.470	2001-05-15
Cadmium	DP-SMA-0.3	Cd	Y	BTV	0.400	0.630	2001-06-21
Chromium	DP-SMA-0.3	Cr	Y	BTV	19.3	22.0	2000-08-09
Copper	DP-SMA-0.3	Cu	Y	BTV	14.7	37.7	2000-07-10
Indeno(1,2,3-cd)pyrene	DP-SMA-0.3	193-39-5	Y	SSL_0.1	0.153	0.290	2001-05-15
Lead	DP-SMA-0.3	Pb	Y	BTV	22.3	244	2002-07-31
Manganese	DP-SMA-0.3	Mn	Y	BTV	671	690	2000-08-09
Mercury	DP-SMA-0.3	Hg	Y	BTV	0.100	0.220	2000-08-07
Nickel	DP-SMA-0.3	Ni	Y	BTV	15.4	496	2001-05-15
Silver	DP-SMA-0.3	Ag	Y	BTV	1.00	2.60	2001-06-08
Thallium	DP-SMA-0.3	Tl	Y	BTV	0.730	0.980	2001-06-04
Zinc	DP-SMA-0.3	Zn	Y	BTV	48.8	520	2000-06-22

Figure 52.3-4 Screening-Level Exceedances from Soil Samples Associated with DP-SMA-0.3

52.4 Stormwater Evaluation

52.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Due to soil disturbance within the SMA, new confirmation-monitoring samples must be collected at the current monitoring location.

52.4.2 Assessment Unit and Stream Impairments

DP-SMA-0.3 drains to DP Canyon (400 m upstream of grade control to upper LANL boundary), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. These impairments are not likely to be Site-related, based on Site history.

52.5 Site-Specific Demonstration

52.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(b)fluoranthene, benzo(a)pyrene, benzo(a)anthracene, indeno(1,2,3-cd)pyrene, and lead. The remaining metals that exceeded the applicable screening value in soil data are not Site-related POCs, therefore they will not be added to the SAP.

52.5.2 Stormwater Data Summary

No confirmation-monitoring data have been collected after soil disturbance was conducted in the SMA.

52.5.3 2022 Permit Status

The SMA is in active monitoring. A confirmation-monitoring sample has not been collected at this location.

52.5.4 Sampling and Analysis Plan

Table 52.5-1 is the proposed SAP for DP-SMA-0.3.

Table 52.5-1 Proposed SAP, DP-SMA-0.3

Monitoring Constituent	Background for Monitoring
SVOCs	Site history (PAHs) and soil data
Dissolved lead	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement

53.0 DP-SMA-0.4

Associated Sites	21-021
Receiving Water	DP Canyon
Drainage Area	0.13 acres
Landscape Characteristics	12% impervious, 88% pervious
Consent Order Site Status	SWMU 21-021: In Progress
2010 Administratively Continued Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

53.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

The Permittees submitted a request for alternative compliance for the Site per permit Part I.E.3 in May 2015 044 (LANL 2015, 600418). No response has been received from EPA, and stormwater monitoring has not occurred since 2013.

53.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

53.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 53.2-1.

Table 53.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90

53.3 Consent Order Soil Data

No Consent Order soil data.

53.4 Stormwater Evaluation

53.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in September 2013. Analytical results from that sample are presented in Figures 53.4-1 and 53.4-2.

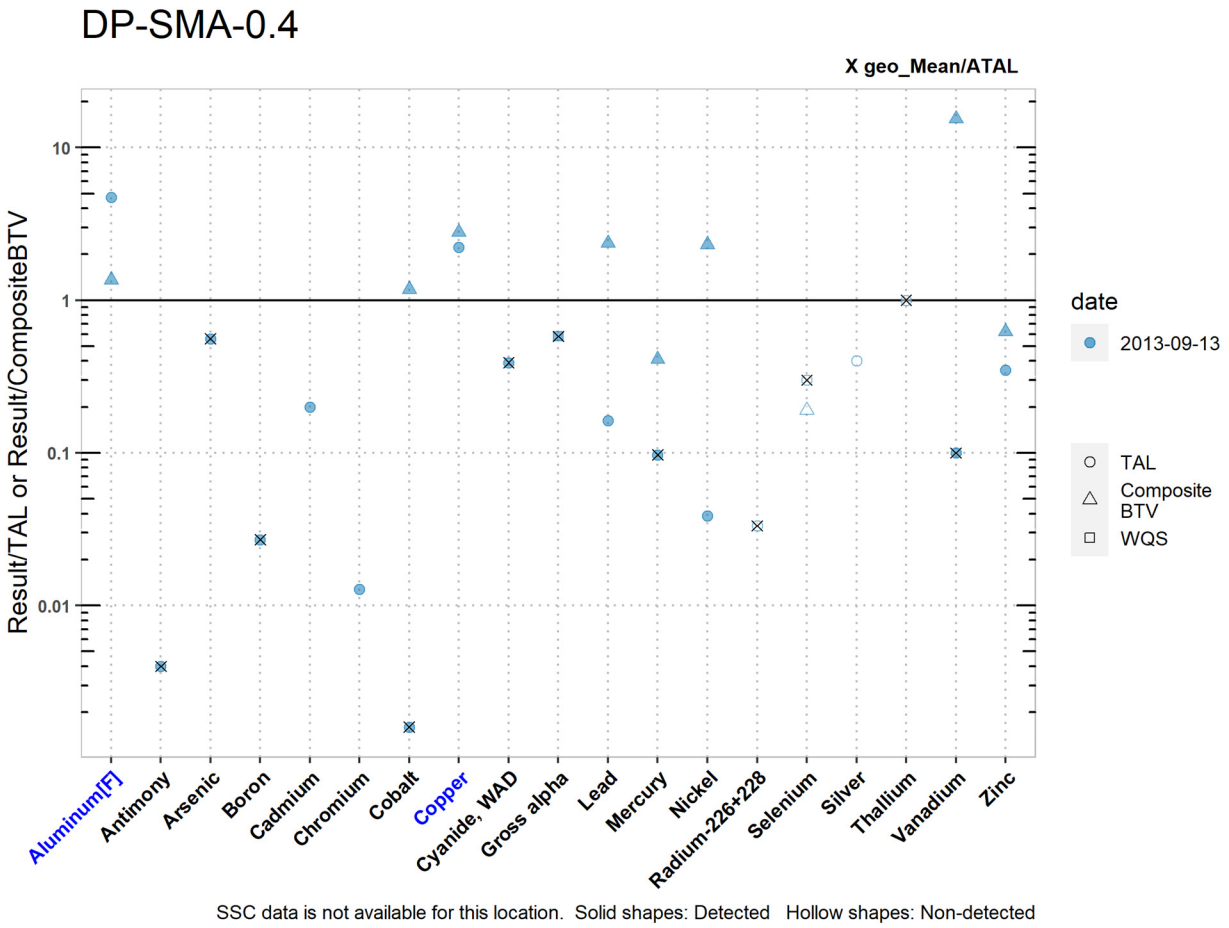

Figure 53.4-1 Analytical Results from Stormwater Sample, DP-SMA-0.4 (Plot)

DP-SMA-0.4

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	2610	NA	NA	NA	NA	NA	1.31	3.84	NA	56.3	1.32	0.183	3.10	4.96	7.89	NA	NA	0.682	33.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-09-13 result	3540	2.53	5.04	135	0.135	2.98	1.55	10.7	2.03	8.71	3.13	0.0750	7.19	*1.00*	*1.50*	*0.200*	*0.450*	10.5	20.6
2013-09-13 dT	4.72	0.0040	0.56	0.027	0.2	0.0128	0.0016	2.23	0.390	0.58	0.162	0.097	0.0387	NA	NA	NA	NA	0.10	0.348
2013-09-13 dB	1.36	NA	NA	NA	NA	NA	1.18	2.79	NA	NA	2.37	0.410	2.32	NA	NA	NA	NA	15.4	0.624
geo_mean/ATAL	NA	0.0040	0.56	0.027	NA	NA	0.0016	NA	0.390	0.58	NA	0.097	NA	0.0333	0.30	NA	1	0.10	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 53.4-2 Analytical Results from Stormwater Sample, DP-SMA-0.4 (Table)

53.4.2 Assessment Unit and Stream Impairments

DP-SMA-0.4 drains to DP Canyon (400m upstream of grade control to upper LANL boundary), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The adjusted gross alpha impairment may be Site-related, based on Site history.

53.5 Site-Specific Demonstration

53.5.1 Soil Data Summary

No Consent Order soil data.

53.5.2 Stormwater Data Summary

Aluminum and copper exceeded the TAL and BTV.

53.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were analyzed for in past samples.

53.5.4 Sampling and Analysis Plan

Table 53.5-1 is the proposed SAP for DP-SMA-0.4.

Table 53.5-1 Proposed SAP, DP-SMA-0.4

Monitoring Constituent	Background for Monitoring
Total aluminum (1)	Stormwater data
Dissolved copper (1)	Stormwater data
Strontium-90	Site history
DOC	Permit requirement
SSC	Permit requirement

54.0 DP-SMA-0.6

Associated Sites	21-021, 21-024(l)
Receiving Water	DP Canyon
Drainage Area	0.03 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(l): Pending Inclusion in Permit Modification Request. Certificate of Completion Received With Controls
2010 Administratively Continued Permit Final Status	Alternative Compliance Requested/Corrective Action Complete
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Long-Term Stewardship per Permit Part I.C.3.a criterion

54.1 2010 Administratively Continued Permit Summary

Following the April 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in July 2019. Analytical results from this sample initiated corrective action.

SWMU 21-024(l) received a COC under the Consent Order in September 2018. The Permittees submitted a certification of completion of corrective action for the Site per Permit part I.E.2(d) in December 2019 (N3B 2019, 700724). The Permittees submitted a request for alternative compliance for 21-021 per permit Part I.E.3 in October 2020 (N3B 2020, 701098). No response has been received from EPA. Stormwater monitoring has not occurred since 2019.

54.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(l) (2/27/2019)

SWMU 21-024(l) consists of a former outfall that received liquid waste from the floor drain in the building 21-021 mechanical room via a 3-in. cast-iron drainline. Building 21-021 was constructed in 1946 at TA-21 and was used as a secure vault to store special fissile material, including uranium and plutonium metal. Building 21-021 was decommissioned in 1978 and remained vacant until it was demolished. The SWMU 21-024(l) drainline was removed during the 2006–2007 Consent Order Phase I investigation.

For investigation activities, refer to "Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1" (LANL 2016, 601598).

54.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 54.2-1.

Table 54.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(l)	Outfall from building 21-021	Plutonium, uranium

54.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for former Consolidated Unit 21-024(l)-99, which includes SWMU 21-024(l), consist of results from samples collected at locations in 2007 and 2009. The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for DP-SMA-0.6 are presented in Figures 54.3-1 through 54.3-4.

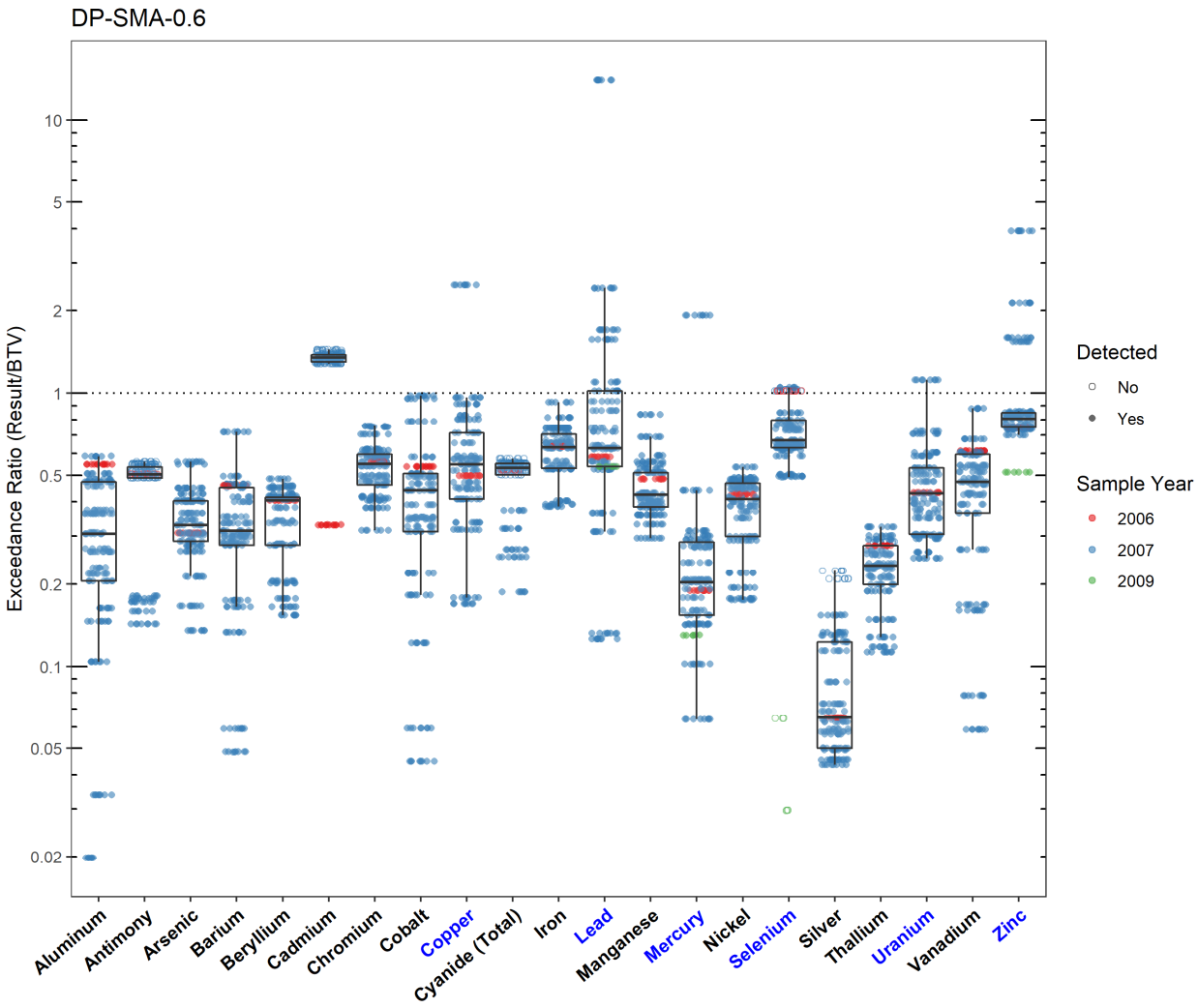

Figure 54.3-1 Inorganics Analytical Results from Soil Samples Associated with DP-SMA-0.6

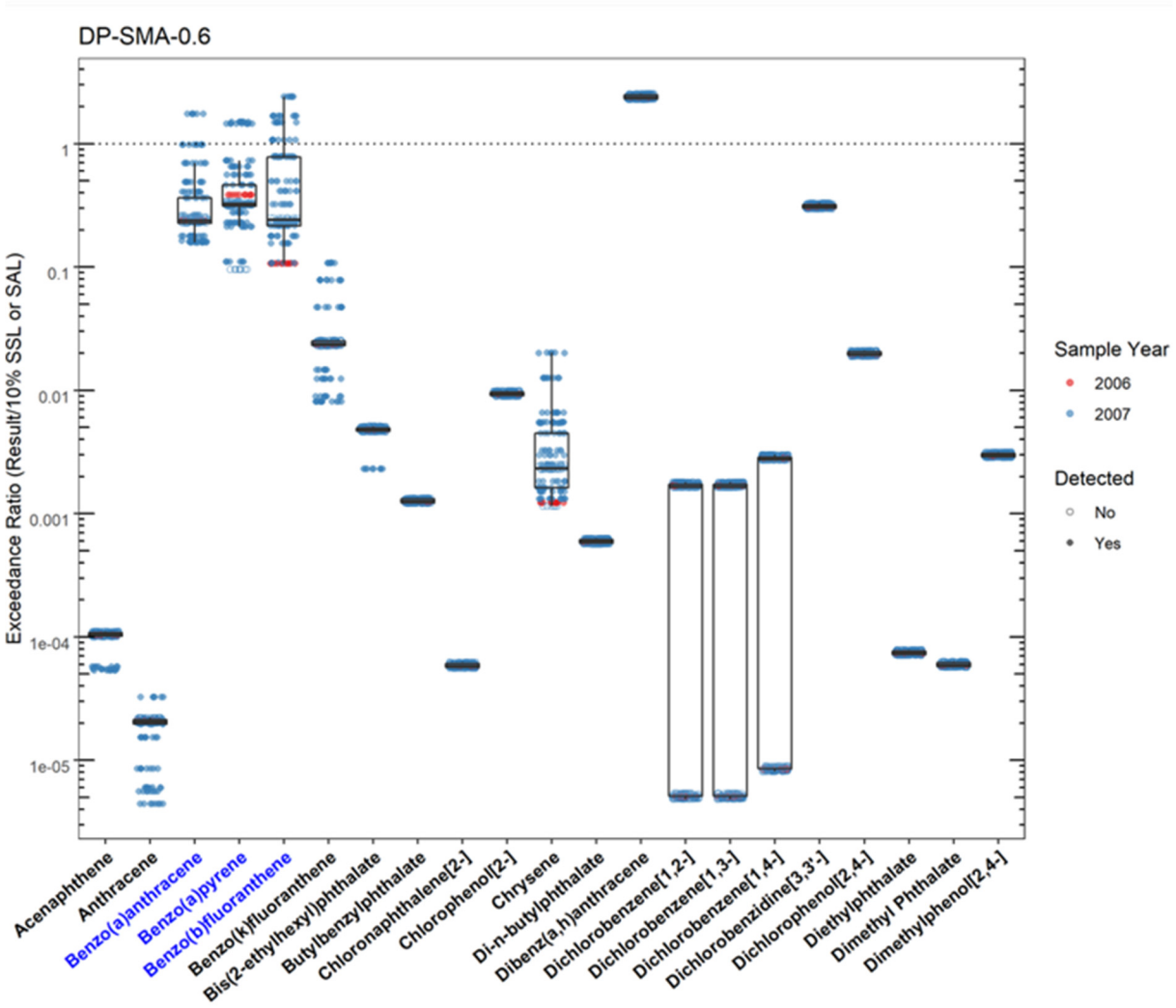

Figure 54.3-2 Organics Analytical Results from Soil Samples Associated with DP-SMA-0.6 (Plot 1)

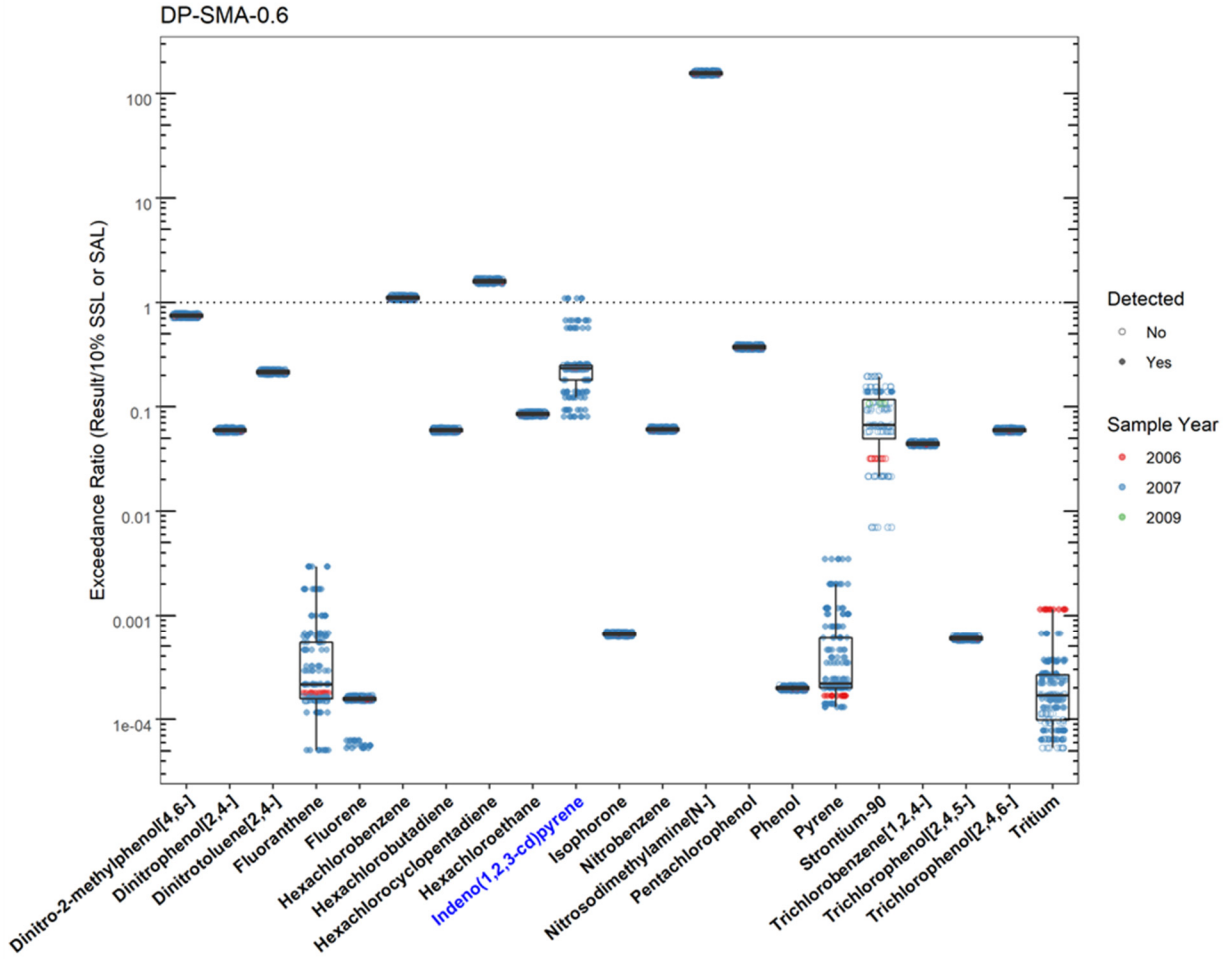

Figure 54.3-3 Organics Analytical Results from Soil Samples Associated with DP-SMA-0.6 (Plot 2)

DP-SMA-0.6

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Benzo(a)anthracene	DP-SMA-0.6	56-55-3	Y	SSL_0.1	0.153	0.267	2007-06-12
Benzo(a)pyrene	DP-SMA-0.6	50-32-8	Y	SSL_0.1	0.112	0.168	2007-06-13
Benzo(b)fluoranthene	DP-SMA-0.6	205-99-2	Y	SSL_0.1	0.153	0.368	2007-06-12
Copper	DP-SMA-0.6	Cu	Y	BTV	14.7	36.4	2007-06-13
Indeno(1,2,3-cd)pyrene	DP-SMA-0.6	193-39-5	Y	SSL_0.1	0.153	0.167	2007-06-12
Lead	DP-SMA-0.6	Pb	Y	BTV	22.3	312	2007-06-13
Mercury	DP-SMA-0.6	Hg	Y	BTV	0.100	0.192	2007-01-10
Selenium	DP-SMA-0.6	Se	Y	BTV	1.52	1.59	2007-06-12
Uranium	DP-SMA-0.6	U	Y	BTV	1.82	2.03	2007-06-12
Zinc	DP-SMA-0.6	Zn	Y	BTV	48.8	192	2007-06-13

Figure 54.3-4 Screening-Level Exceedances from Soil Samples Associated with DP-SMA-0.6

54.4 Stormwater Evaluation

54.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in July 2019; results of the analysis of that sample are presented in Figures 54.4-1 through 54.4-4.

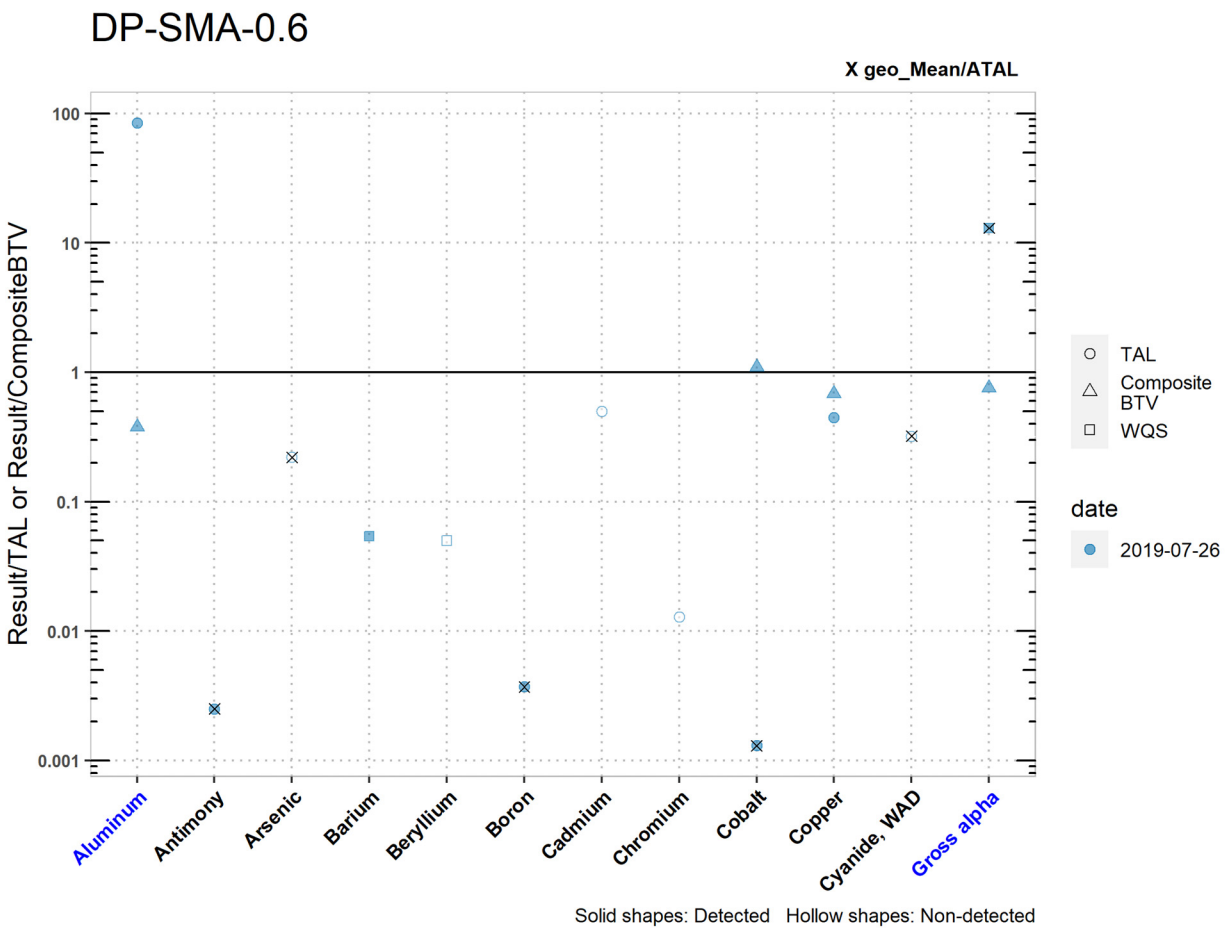

Figure 54.4-1 Analytical Results from Stormwater Sample, DP-SMA-0.6 (Plot 1)

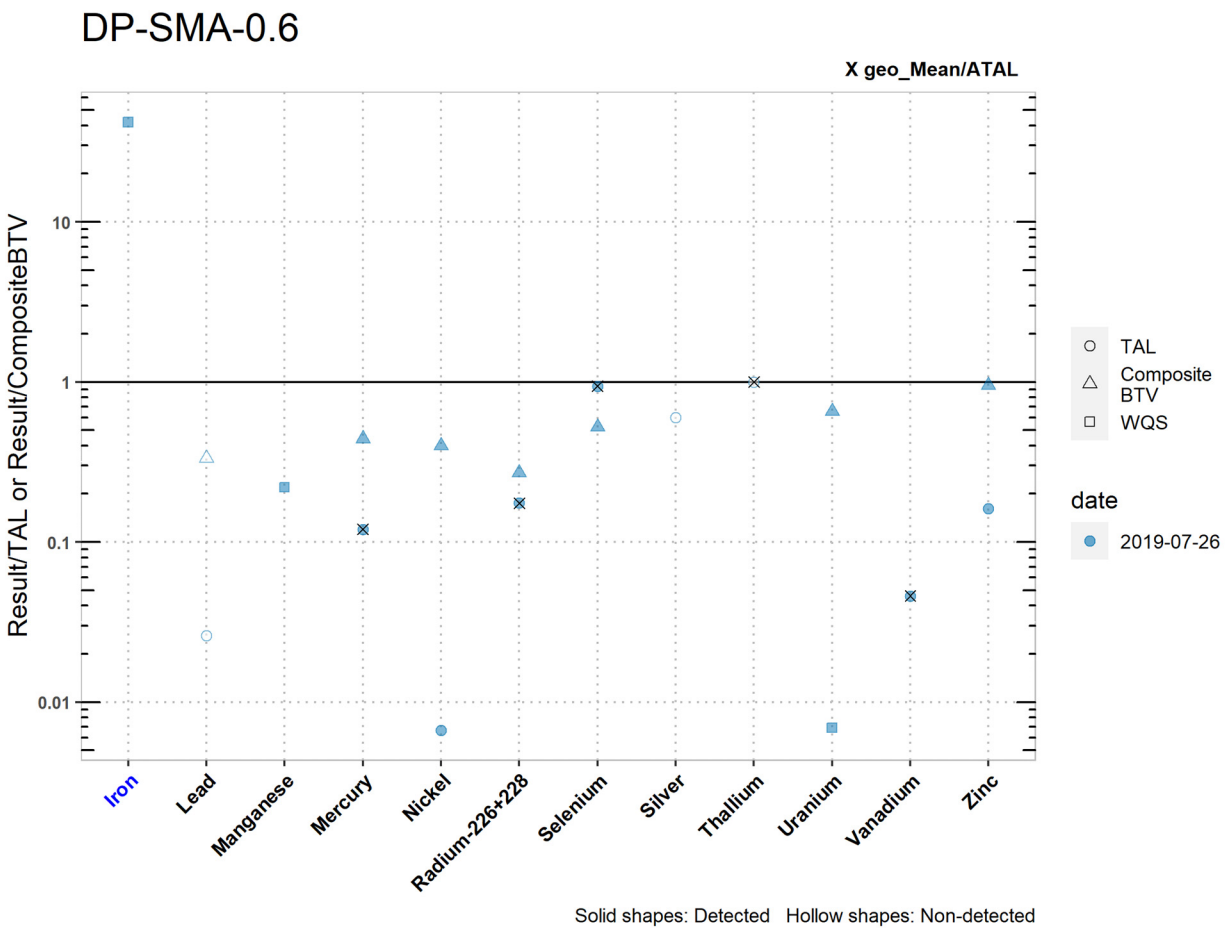

Figure 54.4-2 Analytical Results from Stormwater Sample, DP-SMA-0.6 (Plot 2)

DP-SMA-0.6

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	37400	NA	NA	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2019-07-26 result	64800	1.57	*2.00*	107	*0.200*	18.5	*0.300*	*3.00*	1.30	2.14	*1.67*	199
2019-07-26 dT	84.7	0.0025	NA	0.054	NA	0.0037	NA	NA	0.0013	0.446	NA	13
2019-07-26 dB	0.377	NA	NA	NA	NA	NA	NA	NA	1.10	0.686	NA	0.756
geo_mean/ATAL	NA	0.0025	0.22	NA	NA	0.0037	NA	NA	0.0013	NA	0.321	13

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 54.4-3 Screening Results from Stormwater Sample, DP-SMA-0.6 (Table 1)

DP-SMA-0.6

	Iron	Lead	Manganese	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.005	0.5	NA	5	0.5	0.5	NA	50	20
ATAL	NA	NA	NA	0.77	NA	30	5	NA	0.47	NA	100	NA
MTAL	NA	19.3	NA	NA	186	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	NA	1.50	NA	0.208	3.10	4.21	8.98	NA	NA	0.315	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2019-07-26 result	42200	*0.500*	26.2	0.0920	1.24	5.24	4.71	*0.300*	*0.600*	0.207	4.62	9.52
2019-07-26 dT	42	NA	0.22	0.12	0.00667	0.175	0.94	NA	NA	0.0069	0.046	0.161
2019-07-26 dB	NA	NA	NA	0.442	0.400	0.271	0.524	NA	NA	0.657	NA	0.952
geo_mean/ATAL	NA	NA	NA	0.12	NA	0.175	0.94	NA	1	NA	0.046	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
*SSC normalized unit is pCi/g

Figure 54.4-4 Screening Results from Stormwater Sample, DP-SMA-0.6 (Table 2)

54.4.2 Assessment Unit and Stream Impairments

DP-SMA-0.6 drains to DP Canyon (400 m upstream of grade control to upper LANL boundary), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The adjusted gross alpha impairment may be Site-related, based on Site history.

54.5 Site-Specific Demonstration

54.5.1 Soil Data Summary

Uranium is a Site-related POCs that exceeded the applicable screening value in soil data, and was previously measured in stormwater data and did not exceed TAL. Therefore, it will not be added to the SAP.

The remaining exceedances of the applicable screening value in soil data are not Site-related POCs and will not be added to the SAP.

54.5.2 Stormwater Data Summary

Gross alpha and total aluminum results were above TALs but below BTVs.

54.5.3 2022 Permit Status

The SMA is eligible for long- term stewardship. All Site-related POCs with TALs were below their respective composite background threshold values (Part I.C.3.a).

55.0 DP-SMA-1

Associated Sites	21-011(k), 21-021
Receiving Water	DP Canyon
Drainage Area	1.52 acres
Landscape Characteristics	26% impervious, 74% pervious
Consent Order Site Status	SWMU 21-011(k): In Progress SWMU 21-021: In Progress
2010 Administratively Continued Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the November 2016 field visit, the sampler location was moved towards the Site discharge area to determine potential impacts from the Site. The former location was being impacted by an area that was not associated with 21-011(k).
2022 Permit Status	Active Monitoring

55.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater monitoring was initiated. While developing the 2017 SAP, a decision was made to implement the monitoring location move recommended during the 2016 SIP review. A baseline stormwater sample was collected in June 2022. Analytical results from this sample initiated corrective action.

55.2 Site History

21-011(k) (4/26/2019)

SWMU 21-011(k) was the NPDES-permitted outfall (EPA 050050) for treated industrial wastewater from the former RLWTF in building 21-257 [SWMU 21-011(a)] at the north boundary of MDA T at TA-21. Prior to being permitted, the outfall also received treated industrial wastewater from the former RLWTF in former building 21-35 [SWMU 21-010(a)]. The SWMU consisted of a drainline from two holding tanks containing treated wastewater [structures 21-112 and -113, SWMUs 21-011(f and g)] and an outfall area on the north-facing slope of DP Canyon. The original drainline from tanks 21-112 and -113 consisted of a 4-in. VCP that discharged to an outfall ditch excavated into soil and tuff. The VCP was replaced in 1976 with a 4-in. cast-iron drainline that was installed within the same trench as the original drainline. The discharge end of the 4-in. cast-iron drainline was located approximately 80 ft north of the TA-21 perimeter road. The former outfall drainline terminated at a gently sloping, rocky surface extending approximately 30 ft to the south rim of DP Canyon.

TA-21 is the former plutonium processing facility at the Laboratory. The first RLWTF in former building 21-35, [SWMU 21-010(a)] was activated in 1952, and operated until 1967 when the new industrial RLWTF in Building 21-257 [SWMU 21-011(a)] came online. Both facilities treated RLW from DP West and DP East, consisting of liquids remaining after plutonium extraction and processing of radioactive materials for nuclear weapons and aeronautical research projects. Treatment did not fully neutralize the wastewater but raised the pH to the then current acceptable discharge levels for the SWMU 21-011(k) outfall. The treatment system effluent was piped northeast toward DP Canyon and discharged to an outfall on the north side of DP Mesa [SWMU 21-011(k)]. This effluent contained a variety of radionuclides and chemicals, primarily inorganic chemicals.

Discharges of treated wastewater to the outfall were discontinued in July 1986. Building 21-257 was used between 1986 and 2006 for the treatment of tritiated wastewater from the TSTA (Building 21-155). The treated wastewater was stored in holding tanks 21-112 and 21-113 [SWMUs 21-011(f and g)], and was routinely transported by tanker truck to the RLWTF at TA-50.

In January 2001, approximately 55 gal. of partially treated tritiated wastewater were unintentionally released from holding tank 21-113 through the SWMU 21-011(k) drainline when a faulty gauge caused the tank to overfill. The wastewater in the tank originated from the TSTA facility. The released wastewater infiltrated into the ground within 50 ft of the end of the drainline within the outfall area of SWMU 21-011(k). The Release/Discharge Notification submitted to NMED and EPA Region 6 indicates that the wastewater did not reach a watercourse. The area impacted was approximately 2 ft × 50 ft and was covered with snow at the time of the release. The outlet drainline from holding tanks 21-112 and -113 was permanently plugged in January 2001 as part of the release response, and was subsequently removed during the 2003 VCM conducted at the Site. SWMU 21-011(k) is located directly northeast of the MDA T NES boundary.

For investigation activities, refer to "Voluntary Corrective Measure Completion Report for Solid Waste Management Unit 21-011(k) at Technical Area 21" (LANL 2003, 082260) and "Response to the Notice of Disapproval for the Voluntary Corrective Measure Completion Report for Solid Waste Management Unit 21-011(k) at Technical Area 21" (LANL 2005, 091501).

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to "Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation" (LANL 1994, 026073) and "Final Reponses to EPA's Notice of Deficiency on Phase Report" (LANL 1995, 062415).

55.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 55.2-1.

Table 55.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-011(k)	Former outfall from building 21-257	Anericium-241, cesium-137, plutonium isotopes, thorium isotopes, strontium-90, uranium isotopes, metals, inorganic chemicals, tritium
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90

55.3 Consent Order Soil Data

Decision-level data for SWMU 21-011(k) consist of results from samples collected at locations in 1996, 2001, and 2003 that were not excavated during the VCM. The 2003 VCM completion report concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Analytical results from all decision-level soil samples collected for DP-SMA-1 are presented in Figures 55.3-1 through 55.3-4.

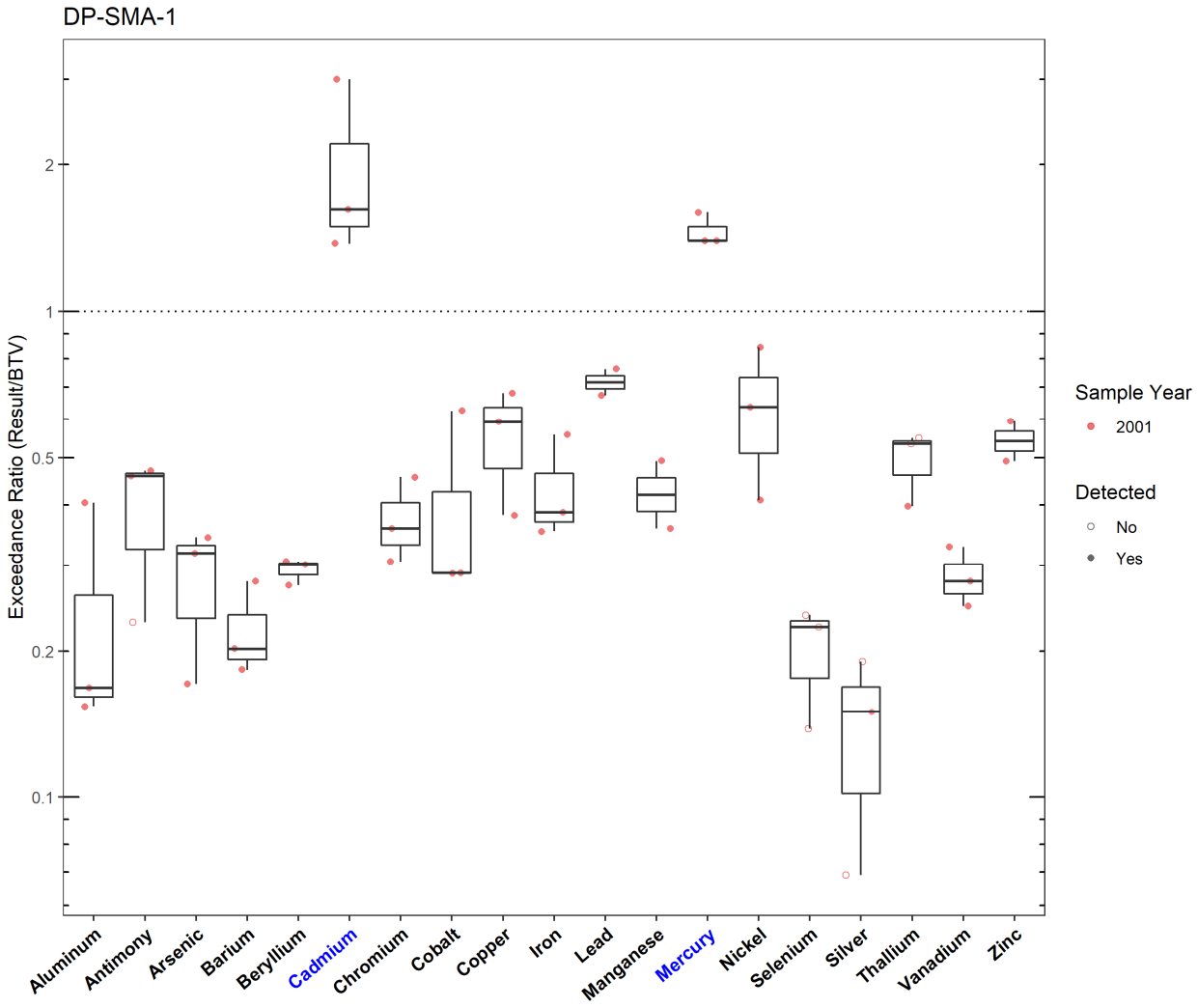

Figure 55.3-1 Inorganics Analytical Results from Soil Samples Associated with DP-SMA-1

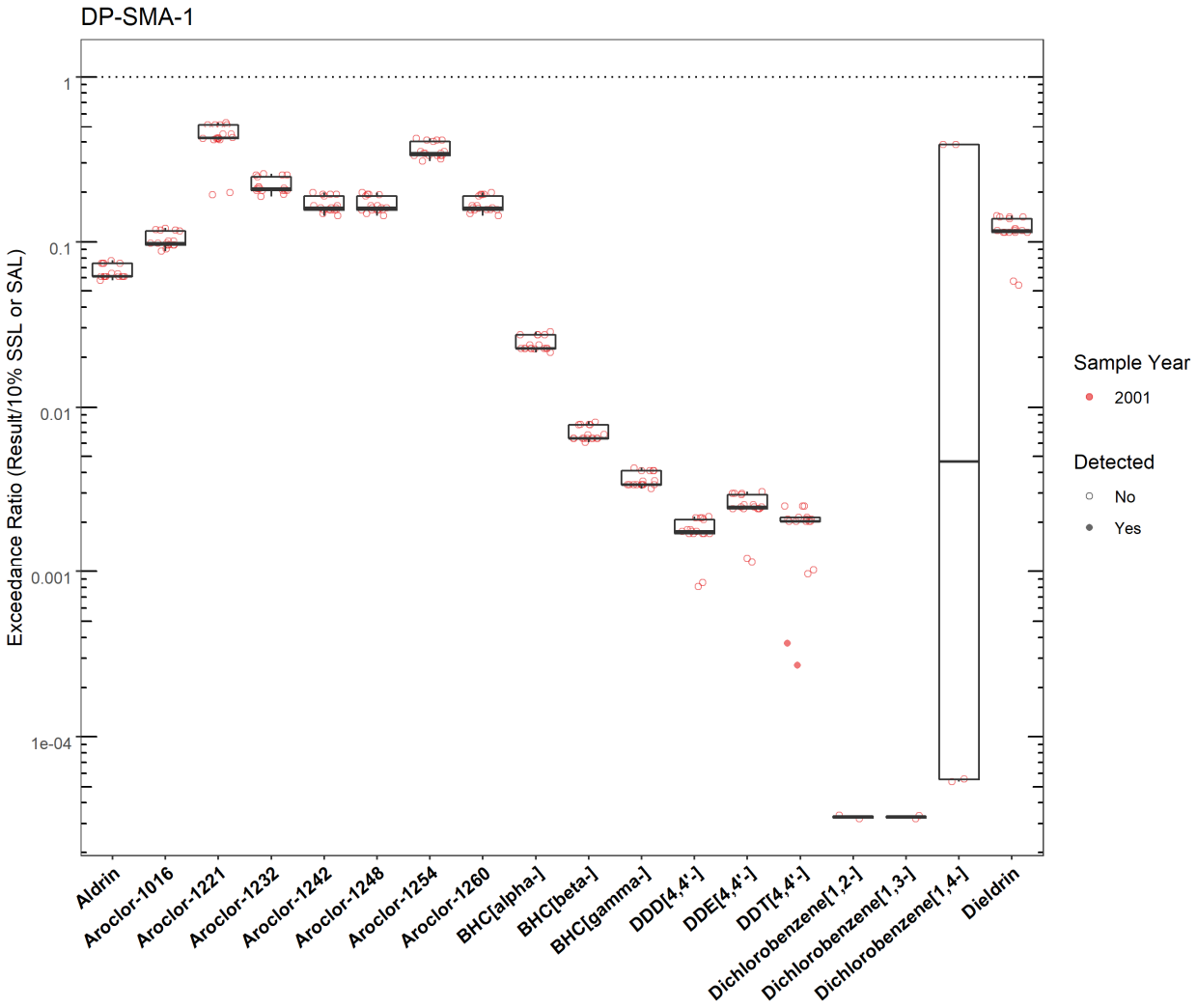

Figure 55.3-2 Organics Analytical Results from Soil Samples Associated with DP-SMA-1 (Plot 1)

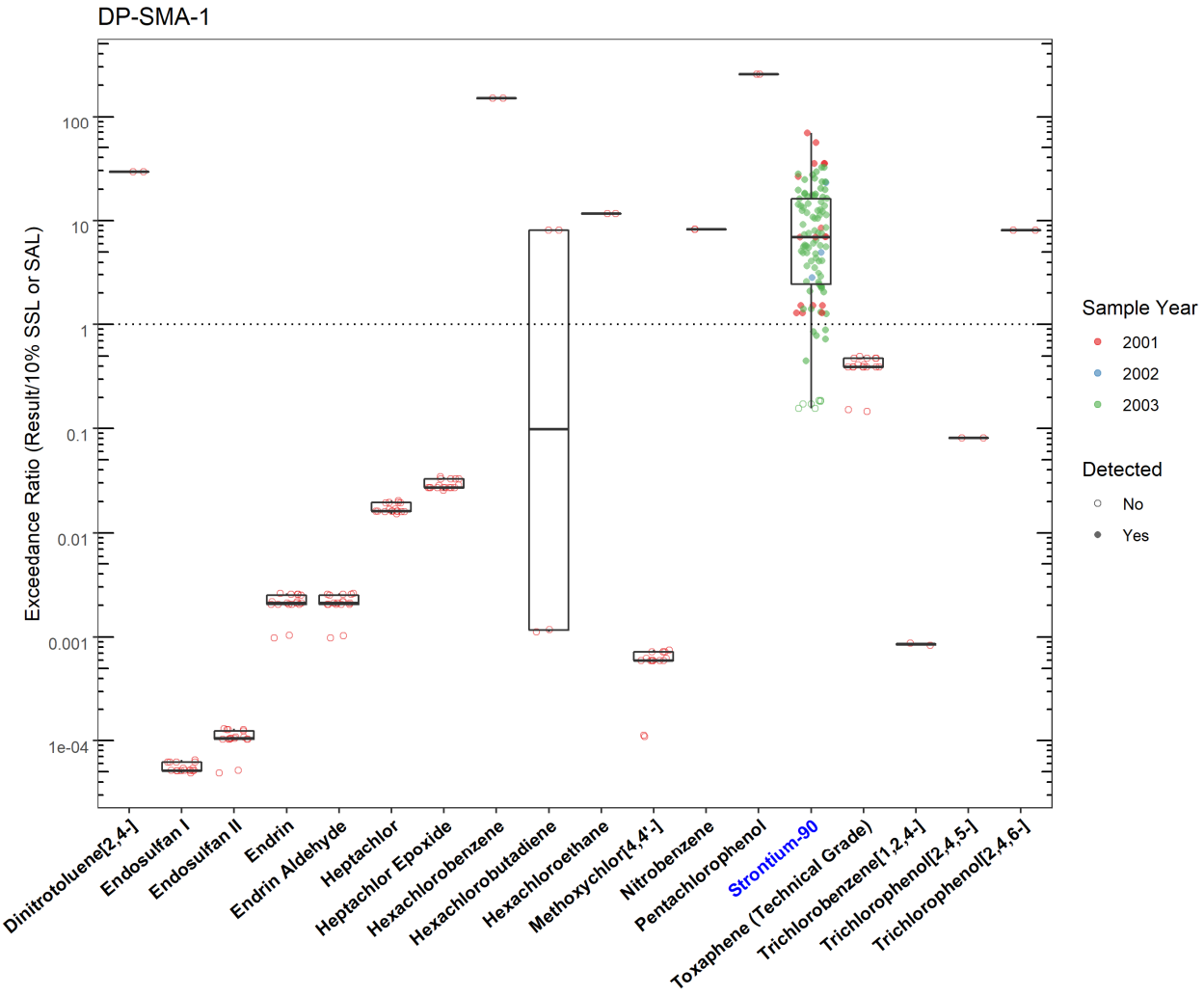

Figure 55.3-3 Organics Analytical Results from Soil Samples Associated with DP-SMA-1 (Plot 2)

DP-SMA-1

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Cadmium	DP-SMA-1	Cd	Y	BTV	0.400	1.20	2001-03-09
Mercury	DP-SMA-1	Hg	Y	BTV	0.100	0.160	2001-03-09
Strontium-90	DP-SMA-1	Sr-90	Y	SAL_0.1	1.50	103	2001-03-09

Figure 55.3-4 Screening-Level Exceedances from Soil Samples Associated with DP-SMA-1

55.4 Stormwater Evaluation

55.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

55.4.2 Assessment Unit and Stream Impairments

DP-SMA-1 drains to DP Canyon (100-m downstream grade control to 400-m upstream grade control), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The adjusted gross alpha, copper, and aluminum impairments may be Site-related, based on Site history.

55.5 Site-Specific Demonstration

55.5.1 Soil Data Summary

Cadmium, mercury, and strontium-90 exceeded the applicable screening value in soil data.

55.5.2 Stormwater Data Summary

No confirmation-monitoring data.

55.5.3 2022 Permit Status

The SMA is in active monitoring. A confirmation-monitoring sample has not been collected.

55.5.4 Sampling and Analysis Plan

Table 55.5-1 is the proposed SAP for DP-SMA-1.

Table 55.5-1 Proposed SAP, DP-SMA-1

Monitoring Constituent	Background for Monitoring
Dissolved copper and cadmium	Impairment (copper), Site history (metals), and soil data
Total aluminum	Impairment and Site history (metals)
Gross alpha	Impairment and Site history
Total mercury	Site history (metals) and soil data
Strontium-90	Site history and soil data
Tritium	Site history
DOC	Permit requirement
SSC	Permit requirement

56.0 DP-SMA-2

Associated Sites	21-021, 21-024(h)
Receiving Water	DP Canyon
Drainage Area	0.54 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(h): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 Administratively Continued Permit Final Status	Baseline Monitoring Extended
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Site.
2022 Permit Status	Active Monitoring

56.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, baseline stormwater monitoring was initiated. To date, stormwater flow has not been sufficient for full-volume sample collection, and monitoring is ongoing until one confirmation sample is collected from this SMA.

56.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(h) (9/28/2021)

SWMU 21-024(h) is a former septic system associated with former administration building and shop (former building 21-151) and a former polonium-processing and high-temperature laboratory (former building 21-152), within the northeast portion of DP East at TA-21. The former septic system consisted of a reinforced-concrete septic tank (former structure 21-163) that measured 11.33 ft × 6.33 ft × 8.67 ft deep, 6-in.-diameter VCP inlet and outlet drainlines, and an outfall that discharged to the surface

of the north rim of DP Mesa above DP Canyon. The septic system was constructed in 1945 at the same time as building 21-151. Building 21-151 was removed in the early 1960s, and in 1965, the building 21-152 septic system was tied into the existing septic tank (former structure 21-163). The septic system was decommissioned in 1966 and was abandoned in place. The septic tank and inlet and outlet drainlines were subsequently removed in 2007. Building 21-152 was removed in 2010.

For investigation activities, refer to "Phase II Investigation Report for Delta Prime Site Aggregate Area, Revision 1" (LANL 2010, 110772.33).

56.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 56.2-1.

Table 56.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(h)	Septic system	Radionuclides, polonium, tritium, inorganic and organic chemicals

56.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-024(h) consist of results from samples collected at locations in 2007 and 2009. Revision 1 of the 2010 Phase II IR concluded that the nature and extent of contamination have been defined.

Analytical results from all decision-level soil samples collected for DP-SMA-2 are presented in Figures 56.3-1 through 56.3-4.

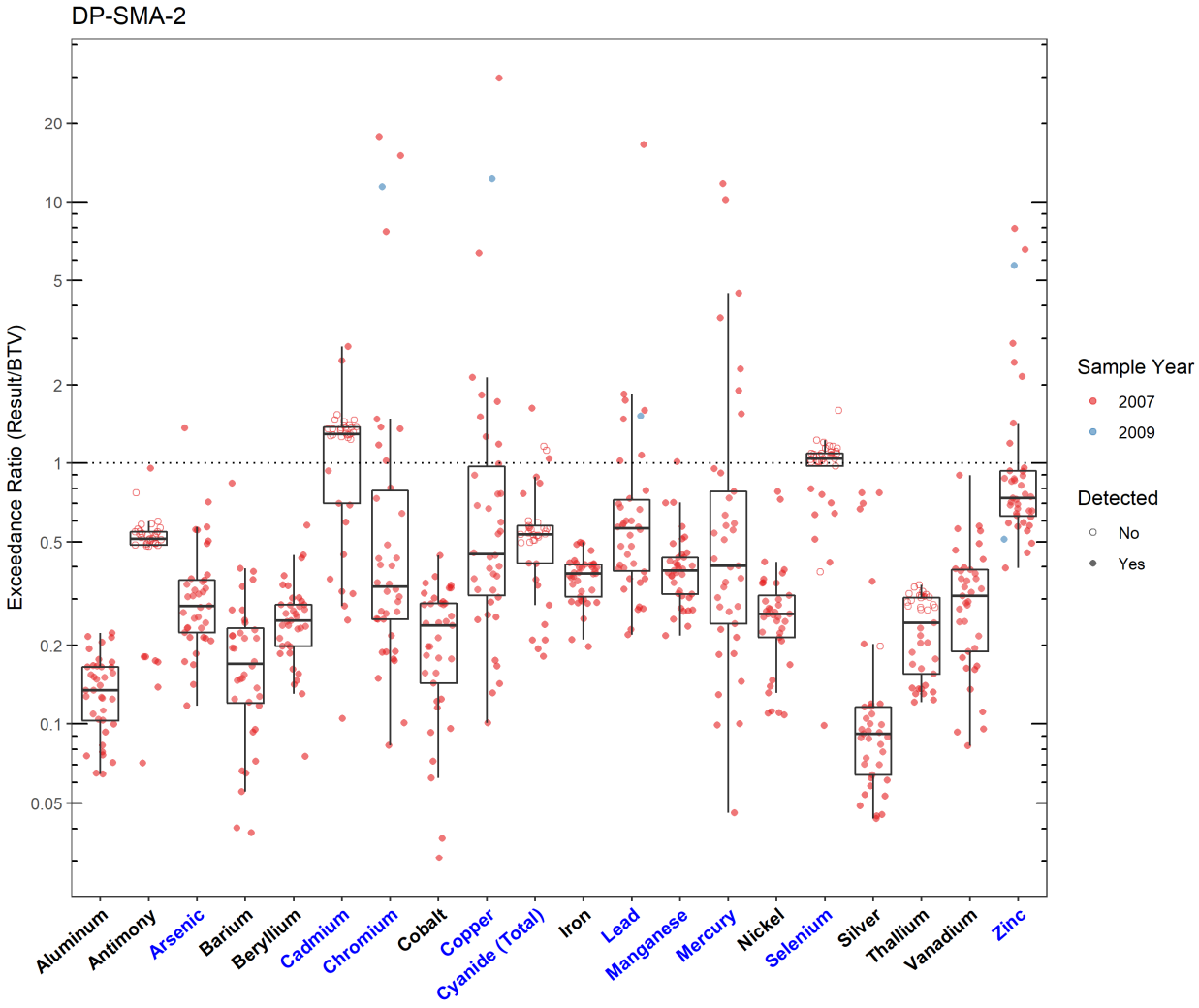

Figure 56.3-1 Inorganics Analytical Results from Soil Samples Associated with DP-SMA-2

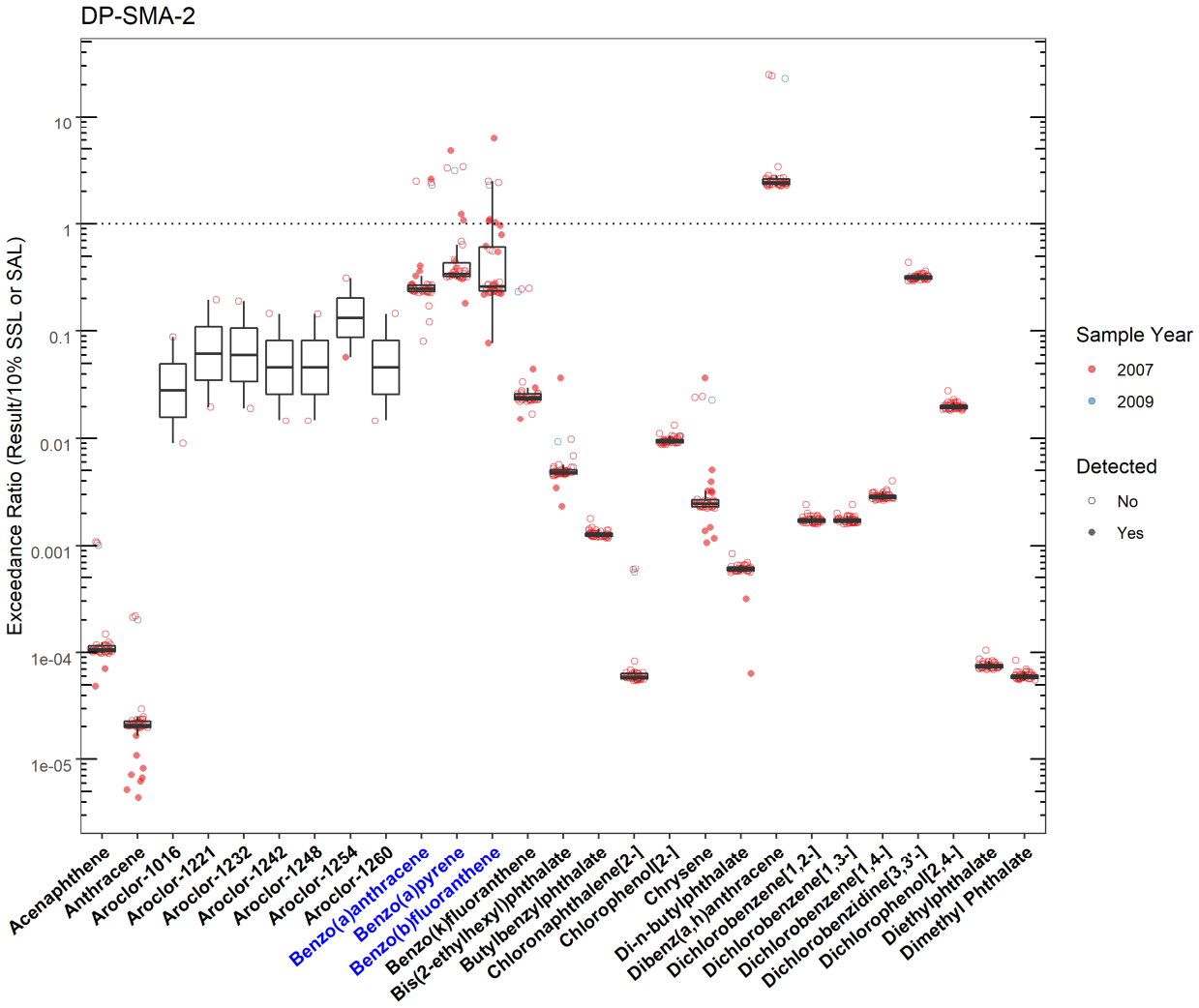

Figure 56.3-2 Organics Analytical Results from Soil Samples Associated with DP-SMA-2 (Plot 1)

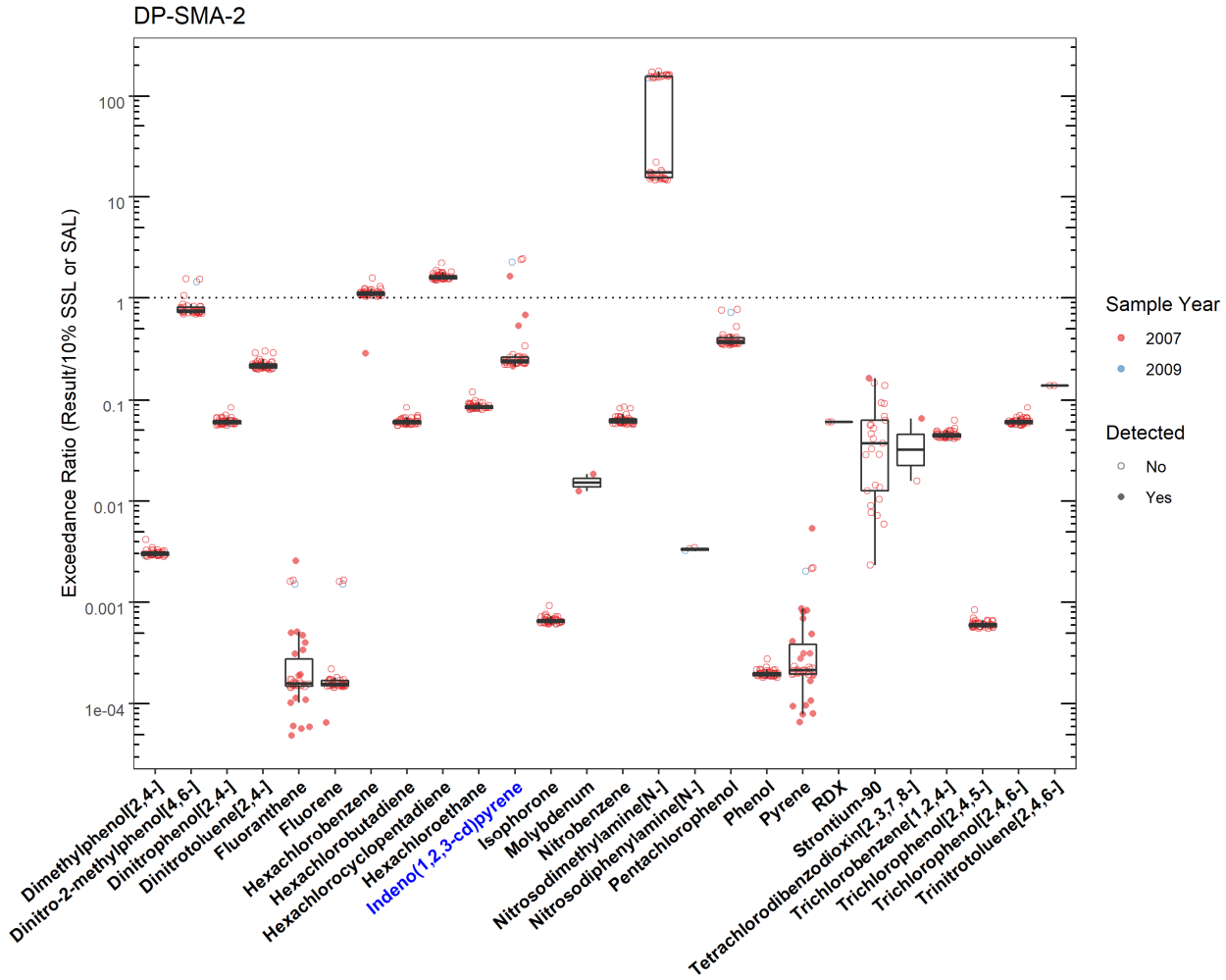

Figure 56.3-3 Organics Analytical Results from Soil Samples Associated with DP-SMA-2 (Plot 2)

DP-SMA-2

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Arsenic	DP-SMA-2	As	Y	BTV	8.17	11.1	2007-06-13
Benzo(a)anthracene	DP-SMA-2	56-55-3	Y	SSL_0.1	0.153	0.400	2007-06-13
Benzo(a)pyrene	DP-SMA-2	50-32-8	Y	SSL_0.1	0.112	0.540	2007-06-13
Benzo(b)fluoranthene	DP-SMA-2	205-99-2	Y	SSL_0.1	0.153	0.955	2007-06-13
Cadmium	DP-SMA-2	Cd	Y	BTV	0.400	1.12	2007-06-13
Chromium	DP-SMA-2	Cr	Y	BTV	19.3	341	2007-06-13
Copper	DP-SMA-2	Cu	Y	BTV	14.7	438	2007-06-13
Cyanide (Total)	DP-SMA-2	CN(TOTAL)	Y	BTV	0.500	0.815	2007-05-30
Indeno(1,2,3-cd)pyrene	DP-SMA-2	193-39-5	Y	SSL_0.1	0.153	0.250	2007-06-13
Lead	DP-SMA-2	Pb	Y	BTV	22.3	369	2007-06-13
Manganese	DP-SMA-2	Mn	Y	BTV	671	681	2007-05-30
Mercury	DP-SMA-2	Hg	Y	BTV	0.100	1.17	2007-04-24
Selenium	DP-SMA-2	Se	Y	BTV	1.52	1.64	2007-05-29
Zinc	DP-SMA-2	Zn	Y	BTV	48.8	387	2007-06-13

Figure 56.3-4 Screening-Level Exceedances from Soil Samples Associated with DP-SMA-2

56.4 Stormwater Evaluation

56.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. No confirmation-monitoring stormwater samples have been collected at the SMA.

56.4.2 Assessment Unit and Stream Impairments

DP-SMA-2 drains to DP Canyon (100-m downstream grade control to 400-m upstream grade control), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The impairments may be Site-related, based on Site history.

56.5 Site-Specific Demonstration

56.5.1 Soil Data Summary

The following parameters exceeded the applicable screening value in soil data: arsenic; benzo(a)anthracene; benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3-cd)pyrene, cadmium, chromium, copper, cyanide (weak acid dissociable), lead, manganese, mercury, selenium, and zinc.

56.5.2 Stormwater Data Summary

No confirmation-monitoring data.

56.5.3 2022 Permit Status

The SMA is in active monitoring. A confirmation-monitoring sample has not been collected.

56.5.4 Sampling and Analysis Plan

Table 56.5-1 is the proposed SAP for DP-SMA-2.

Table 56.5-1 Proposed SAP, DP-SMA-2

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment and Site history (radionuclides)
PCBs	Impairment and Site history (organics)
Dissolved arsenic, cadmium, chromium, copper, lead, manganese, and zinc	Impairment (copper), Site history (inorganics), and soil data
Radium-226/228	Site history (radionuclides)
Tritium	Site history
SVOCs	Site history (organics) and soil data
Total cyanide, mercury, and selenium	Site history (inorganics) and soil data
DOC	Permit requirement
SSC	Permit requirement

57.0 DP-SMA-2.35

Associated Sites	21-021, 21-024(n)
Receiving Water	DP Canyon
Drainage Area	0.70 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 21-021: In Progress SWMU 21-024(n): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls
2010 Administratively Continued Permit Final Status	Alternative Compliance Requested
2016–2018 SIP Actions	Based on the January 2018 field visit, all parties agreed that the current SMA sampling location was the best representation of stormwater discharge from the Sites.
2022 Permit Status	Active Monitoring

57.1 2010 Administratively Continued Permit Summary

Following the December 2010 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in September 2013. Analytical results from this sample initiated corrective action.

The Permittees submitted a request for alternative compliance for both sites per permit Part I.E.3 in May 2015 (LANL 2015, 600419). No response has been received from EPA. Stormwater monitoring has not occurred since 2013.

57.2 Site History

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to “Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation” (LANL 1994, 026073) and “Final Reponses to EPA’s Notice of Deficiency on Phase Report” (LANL 1995, 062415).

21-024(n) (2/27/2019)

SWMU 21-024(n) was identified in the 1990 SWMU Report as a CMP that exited a concrete bulkhead on the north side of former building 21-155 and discharged to an outfall north of former building 21-213,

directly south of the DP Mesa perimeter road, and west of MDA U (SWMU 21-017) in the northeast portion of TA-21. From the outfall, the effluent flowed north to a ditch paralleling the north DP Mesa perimeter road, and then east to a culvert that passed under the northern DP Mesa perimeter road and into DP Canyon.

Building 21-155 was constructed in 1949 and housed a warehouse and laboratory. Engineering drawings and results from the 2004 geophysical survey identified three additional drainlines originating from former building 21-155 (or next to former building 21-155), that followed a parallel path to, and west of, the original SWMU 21-024(n) drainline. Each of these parallel drainlines discharged to an outfall on the same hillside as the original SWMU 21-024(n) outfall. Effluent from all four former outfalls flowed downslope, via the ditch on the south side of the DP Mesa perimeter road, to one of two culverts (one to the east and one to the west) that crossed under the perimeter road, and emptied on the surface and into DP Canyon. All four drainlines were removed in 2007 except sections of drainlines under former building 21-213, which were inaccessible.

For investigation activities, refer to "Phase III Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1" (LANL 2014, 600091).

57.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 57.2-1.

Table 57.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90
21-024(n)	Drainline	Zinc, plutonium, tritium, PAHs

57.3 Consent Order Soil Data

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Decision-level data for SWMU 21-024(n) consist of results from samples collected at locations in 2007, 2009, 2010, and 2011. The 2016 Phase III IR concluded that the nature and extent of contamination have been defined and no further sampling for extent is warranted.

Analytical results from all decision-level soil samples collected for DP-SMA-2.35 are presented in Figures 57.3-1 through 57.3-4.

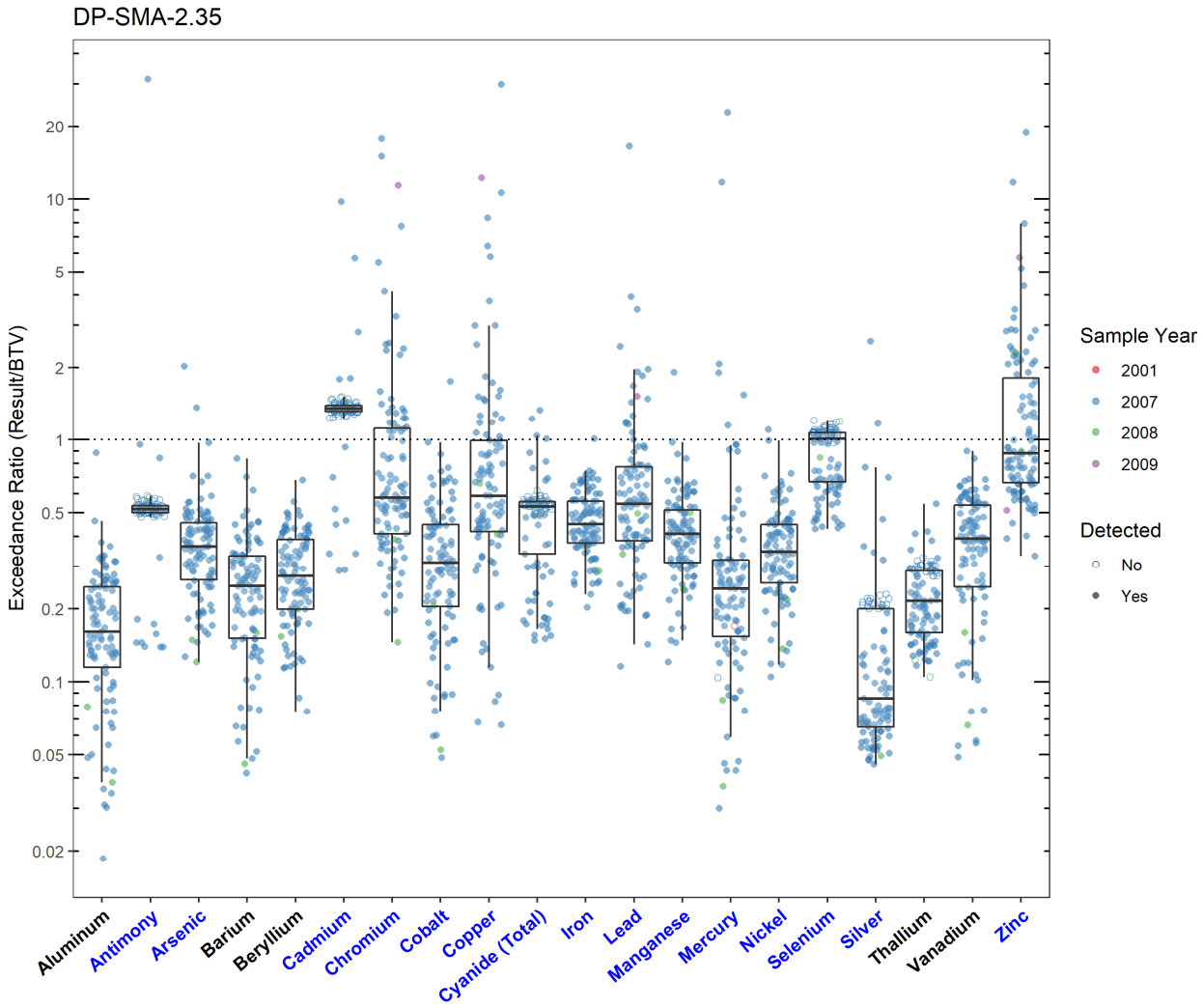

Figure 57.3-1 Inorganics Analytical Results from Soil Samples Associated with DP-SMA-2.35

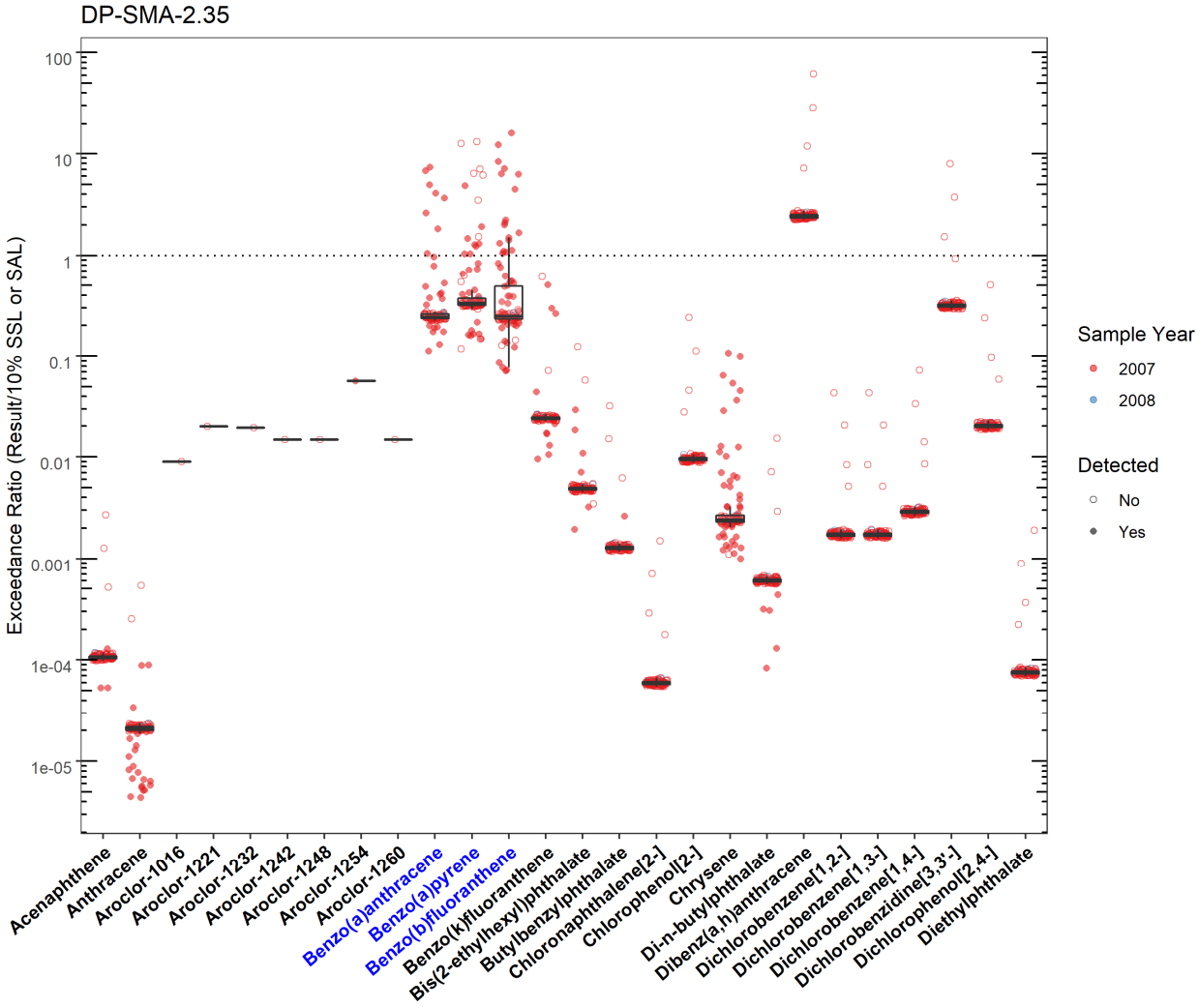

Figure 57.3-2 Organics Analytical Results from Soil Samples Associated with DP-SMA-2.35 (Plot 1)

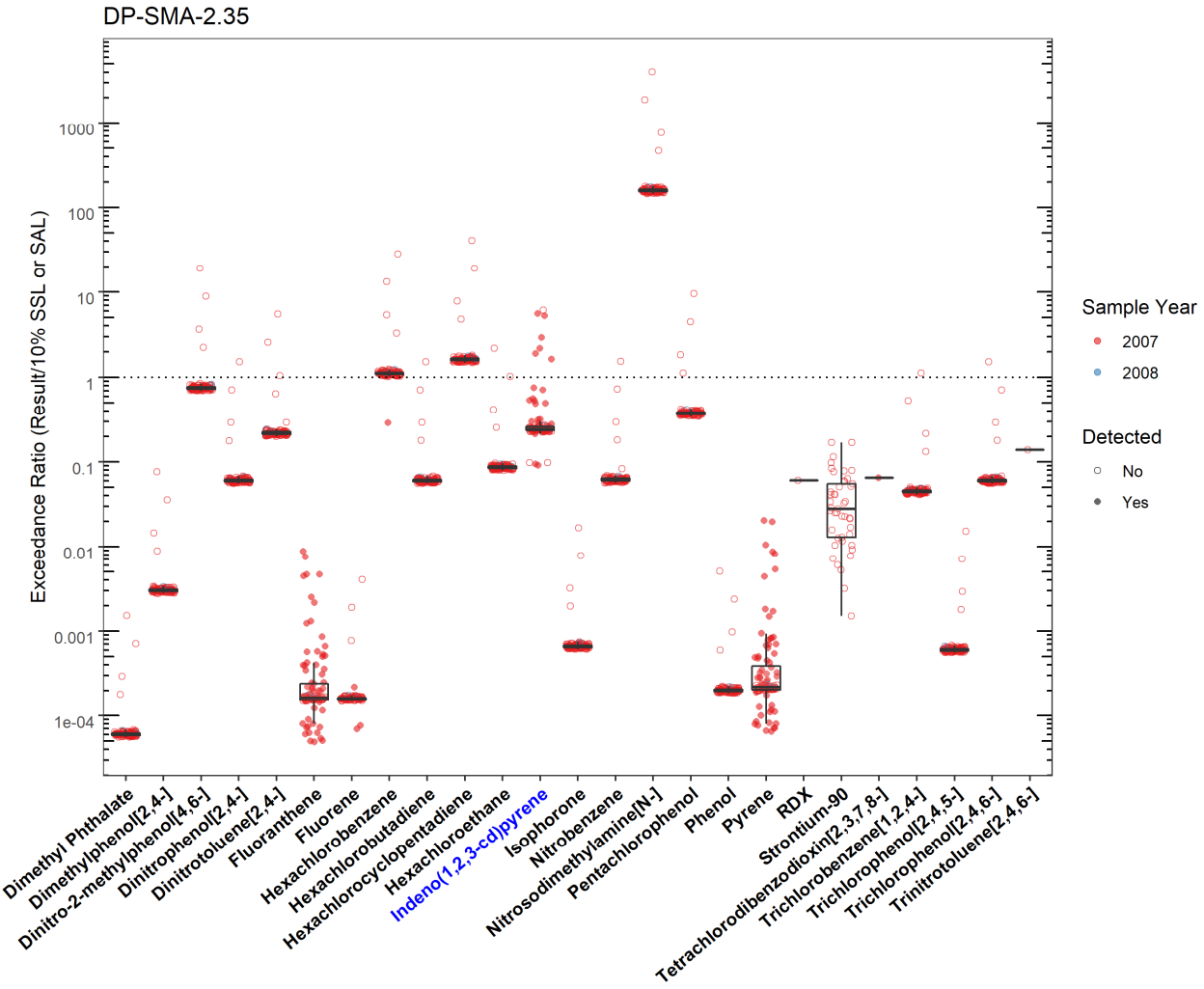

Figure 57.3-3 Organics Analytical Results from Soil Samples Associated with DP-SMA-2.35 (Plot 2)

DP-SMA-2.35

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Antimony	DP-SMA-2.35	Sb	Y	BTV	0.830	26.1	2007-06-20
Arsenic	DP-SMA-2.35	As	Y	BTV	8.17	16.6	2007-06-21
Benzo(a)anthracene	DP-SMA-2.35	56-55-3	Y	SSL_0.1	0.153	1.12	2007-06-20
Benzo(a)pyrene	DP-SMA-2.35	50-32-8	Y	SSL_0.1	0.112	0.540	2007-06-13
Benzo(b)fluoranthene	DP-SMA-2.35	205-99-2	Y	SSL_0.1	0.153	2.45	2007-06-20
Cadmium	DP-SMA-2.35	Cd	Y	BTV	0.400	3.90	2007-06-20
Chromium	DP-SMA-2.35	Cr	Y	BTV	19.3	341	2007-06-13
Cobalt	DP-SMA-2.35	Co	Y	BTV	8.64	15.1	2007-06-13
Copper	DP-SMA-2.35	Cu	Y	BTV	14.7	438	2007-06-13
Cyanide (Total)	DP-SMA-2.35	CN(TOTAL)	Y	BTV	0.500	0.663	2007-06-20
Indeno(1,2,3-cd)pyrene	DP-SMA-2.35	193-39-5	Y	SSL_0.1	0.153	0.854	2007-06-20
Iron	DP-SMA-2.35	Fe	Y	BTV	21500	21700	2007-06-18
Lead	DP-SMA-2.35	Pb	Y	BTV	22.3	369	2007-06-13
Manganese	DP-SMA-2.35	Mn	Y	BTV	671	1280	2007-06-13
Mercury	DP-SMA-2.35	Hg	Y	BTV	0.100	2.28	2007-04-24
Nickel	DP-SMA-2.35	Ni	Y	BTV	15.4	17.0	2007-06-20
Selenium	DP-SMA-2.35	Se	Y	BTV	1.52	1.68	2007-06-15
Silver	DP-SMA-2.35	Ag	Y	BTV	1.00	2.57	2007-04-24
Zinc	DP-SMA-2.35	Zn	Y	BTV	48.8	915	2007-06-20

Figure 57.3-4 Screening-Level Exceedances from Soil Samples Associated with DP-SMA-2.35

57.4 Stormwater Evaluation

57.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. A corrective action stormwater sample was collected in September 2013; analytical results from that sample are presented in Figures 57.4-1 and 57.4-2.

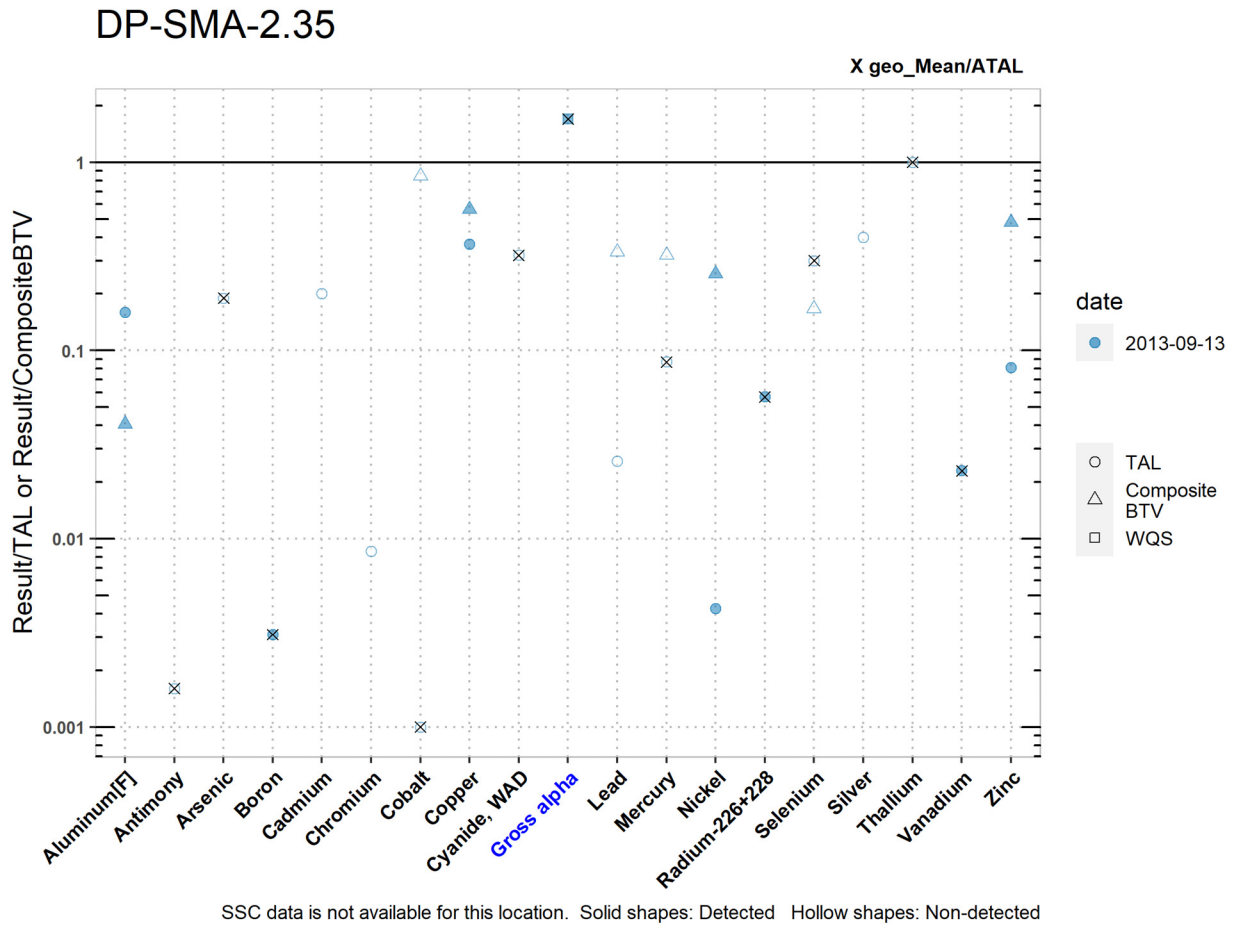

Figure 57.4-1 Analytical Results from Stormwater Sample, DP-SMA-2.35 (Plot)

DP-SMA-2.35

	Aluminum [F]	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha	Lead	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Vanadium	Zinc
MQL	2.5	1	0.5	100	1	10	50	0.5	10	NA	0.5	0.005	0.5	NA	5	0.5	0.5	50	20
ATAL	NA	640	9	5000	NA	NA	1000	NA	5.2	15	NA	0.77	NA	30	5	NA	0.47	100	NA
MTAL	750	NA	340	NA	0.65	233	NA	4.8	22	NA	19.3	NA	186	NA	20	0.49	NA	NA	59.2
Composite_BTV	2950	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2	1.50	0.208	3.10	4.21	8.98	NA	NA	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	pCi/L	ug/L	ug/L	ug/L	ug/L	ug/L
2013-09-13 result	120	*1.00*	*1.70*	15.7	*0.110*	*2.00*	*1.00*	1.76	*1.67*	25.0	*0.500*	*0.0670*	0.791	1.70	*1.50*	*0.200*	*0.450*	2.33	4.81
2013-09-13 dT	0.160	NA	NA	0.0031	NA	NA	NA	0.367	NA	1.7	NA	NA	0.00425	0.0567	NA	NA	NA	0.023	0.0812
2013-09-13 dB	0.0407	NA	NA	NA	NA	NA	NA	0.564	NA	NA	NA	NA	0.255	NA	NA	NA	NA	NA	0.481
geo_mean/ATAL	NA	0.0016	0.19	0.0031	NA	NA	0.0010	NA	0.321	1.7	NA	0.087	NA	0.0567	0.30	NA	1	0.023	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV

Figure 57.4-2 Analytical Results from Stormwater Sample, DP-SMA-2.35 (Table)

57.4.2 Assessment Unit and Stream Impairments

DP-SMA-2.35 drains to DP Canyon (100-m downstream grade control to 400-m upstream grade control), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The adjusted gross alpha impairment may be Site-related, based on Site history.

57.5 Site-Specific Demonstration

57.5.1 Soil Data Summary

The following Site-related POCs exceeded the applicable screening value in soil data and have not yet been measured in stormwater: benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene.

The metals and cyanide that exceeded the applicable screening value in soil data were previously measured in stormwater data and did not exceed TALs. Therefore, they will not be added to the SAP.

57.5.2 Stormwater Data Summary

Gross alpha exceeded TAL in 2013 stormwater data. There was no paired SSC value to confirm whether it was below BTV, therefore it will be added to the SAP.

57.5.3 2022 Permit Status

The SMA is in active monitoring; a confirmation-monitoring sample has not been collected for the current stage.

57.5.4 Sampling and Analysis Plan

Table 57.5-1 is the proposed SAP for DP-SMA-2.35.

Table 57.5-1 Proposed SAP, DP-SMA-2.35

Monitoring Constituent	Background for Monitoring
Gross alpha	Impairment, Site history, and stormwater data
Tritium	Site history
SVOCs	Site history (PAHs) and soil data
DOC	Permit requirement
SSC	Permit requirement

58.0 DP-SMA-3

Associated Sites	21-013(c), 21-021
Receiving Water	DP Canyon
Drainage Area	0.24 acres
Landscape Characteristics	100% pervious
Consent Order Site Status	SWMU 21-013(c): Pending Inclusion in Permit Modification Request. Certificate of Completion Received Without Controls SWMU 21-021: In Progress
2010 Administratively Continued Permit Final Status	Corrective Action Complete/Alternative Compliance Requested
2016–2018 SIP Actions	The January 2018 field visit determined that the current sampler location had been moved too far from the previous IP sampler location to be representative of the Site. Therefore, the sampler was returned to the location where the IP sampler was formerly located.
2022 Permit Status	Active Monitoring

58.1 2010 Administratively Continued Permit Summary

Following the February 2011 submittal of certification of baseline control installation to EPA, a baseline stormwater sample was collected in July 2011. Analytical results from this sample initiated corrective action.

Following the September 2012 submittal to EPA of certification of enhanced control installation (LANL 2012, 227785), corrective action monitoring was initiated and stormwater samples were collected in July and August 2019. Analytical results from these samples initiated corrective action.

SWMU 21-013(c) received a COC under the Consent Order in January 2016. The Permittees submitted a certification of completion of corrective action per Permit part I.E.2(d) for the Site in March 2017 (LANL 2017, 602213). The Permittees submitted a request for alternative compliance for SWMU 21-021 per permit Part I.E.3 in October 2020 (N3B 2020, 701098). No response has been received from EPA. Stormwater monitoring has not occurred since 2019.

58.2 Site History

21-013(c) (9/28/2021)

SWMU 21-013(c) is a former surface disposal area that was located northeast of the High Temperature Chemistry Building (former building 21-209), at the eastern end of DP Mesa at TA-21. The Site consisted of mounds of earth; an excavated trench; and an earthen berm that contained scattered concrete, asphalt, and metal debris. Four large concrete pylons and several piles of soil, asphalt, and concrete also were located at the Site. Other surface debris included glass, scrap metal, wood, cans, paper, and plastic. The Site had been disturbed in the past and appeared to contain only construction materials. It is not known when the materials were disposed of at this Site. All debris was removed from SWMU 21-013(c) during the 1995 VCA implemented at the Site, and the berm surface was recontoured.

For investigation activities, refer to “Phase II Investigation Report for Delta Prime Site Aggregate Area Revision 1” (LANL 2010, 110772.33).

21-021 (11/23/2020)

SWMU 21-021 consists of potential surface soil contamination resulting from the deposition of historical airborne releases of radionuclides from incinerators, stacks, and filter houses previously located throughout TA-21. The estimated area of potential soil contamination is approximately 300,000 m^2, and overlaps all of TA-21 and portions of DP Canyon north of TA-21.

TA-21 was used primarily for plutonium research and metal production and related activities from 1945 to 1978. After the major plutonium research and metal production activities at TA-21 ceased in 1978, subsequent unrelated office and small-scale research activities continued until approximately 2006. Historical airborne releases of radionuclides from stacks at TA-21 were documented from 1951 to 1971 and from 1973 to 1989. A minimum of approximately 2 Ci/yr of plutonium-239/240 was released from all TA-21 stacks in the 1950s. There is no documentation of nonradioactive chemical releases associated with the historical TA-21 stack emissions.

For investigation activities, refer to "Phase Report 1B, TA-21 Operable Unit RCRA Facility Investigation, Operable Unit-Wide Surface Soil, Deposition Layer and Filter Building Investigation" (LANL 1994, 026073) and "Final Reponses to EPA's Notice of Deficiency on Phase Report" (LANL 1995, 062415).

58.2.1 Known or Potential Use of POCs

POCs known to be managed or potentially used at the Site are listed in Table 58.2-1.

Table 58.2-1 POCs Known or Suspected to be Used Historically at the Site

Site	Potential POC Source	Potential POCs
21-013(c)	Surface disposal site	Metals, PAHs, phthalates
21-021	Systematic release (sitewide)	Americium-241, plutonium isotopes, strontium-90

58.3 Consent Order Soil Data

Decision-level data for SWMU 21-013(c) consist of results from samples collected in 2006 and 2009. Revision 1 of the 2010 Phase II IR concluded that the nature and extent of contamination are defined.

Most of the SWMUs and AOCs at TA-21 lie within the footprint of SWMU 21-021. Therefore, surface and shallow subsurface samples from investigation of those sites are also representative of SWMU 21-021. Data from samples collected as part of Consent Order investigations and associated remediation activities are decision-level data. The approved DP Site Aggregate Area IWP (LANL 2009, 108166.9) indicated that the investigation of SWMU 21-021 was complete and no additional investigations were required.

Analytical results from all decision-level soil samples collected for DP-SMA-3 are presented in Figures 58.3-1 through 58.3-4.

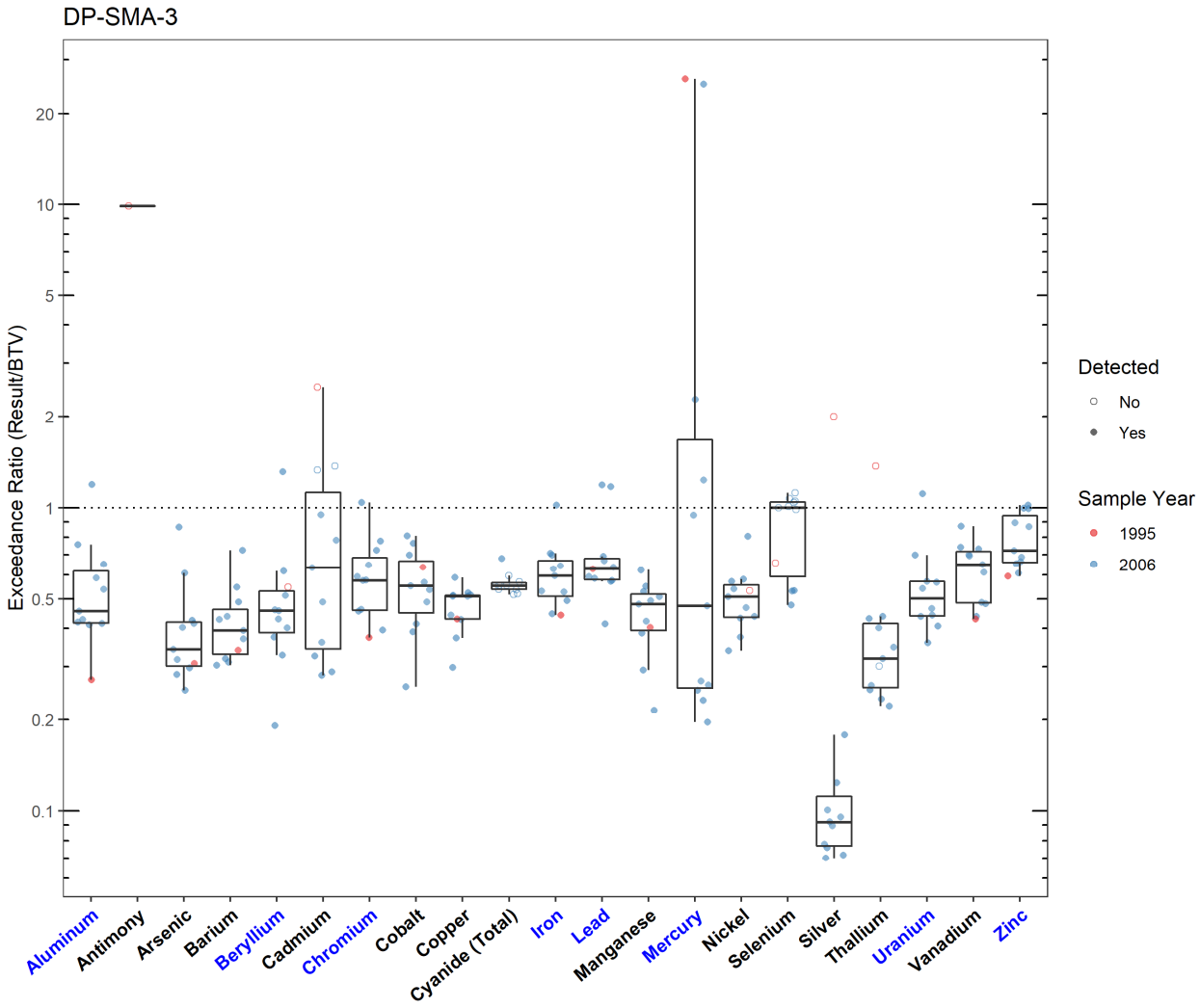

Figure 58.3-1 Inorganics Analytical Results from Soil Samples Associated with DP-SMA-3

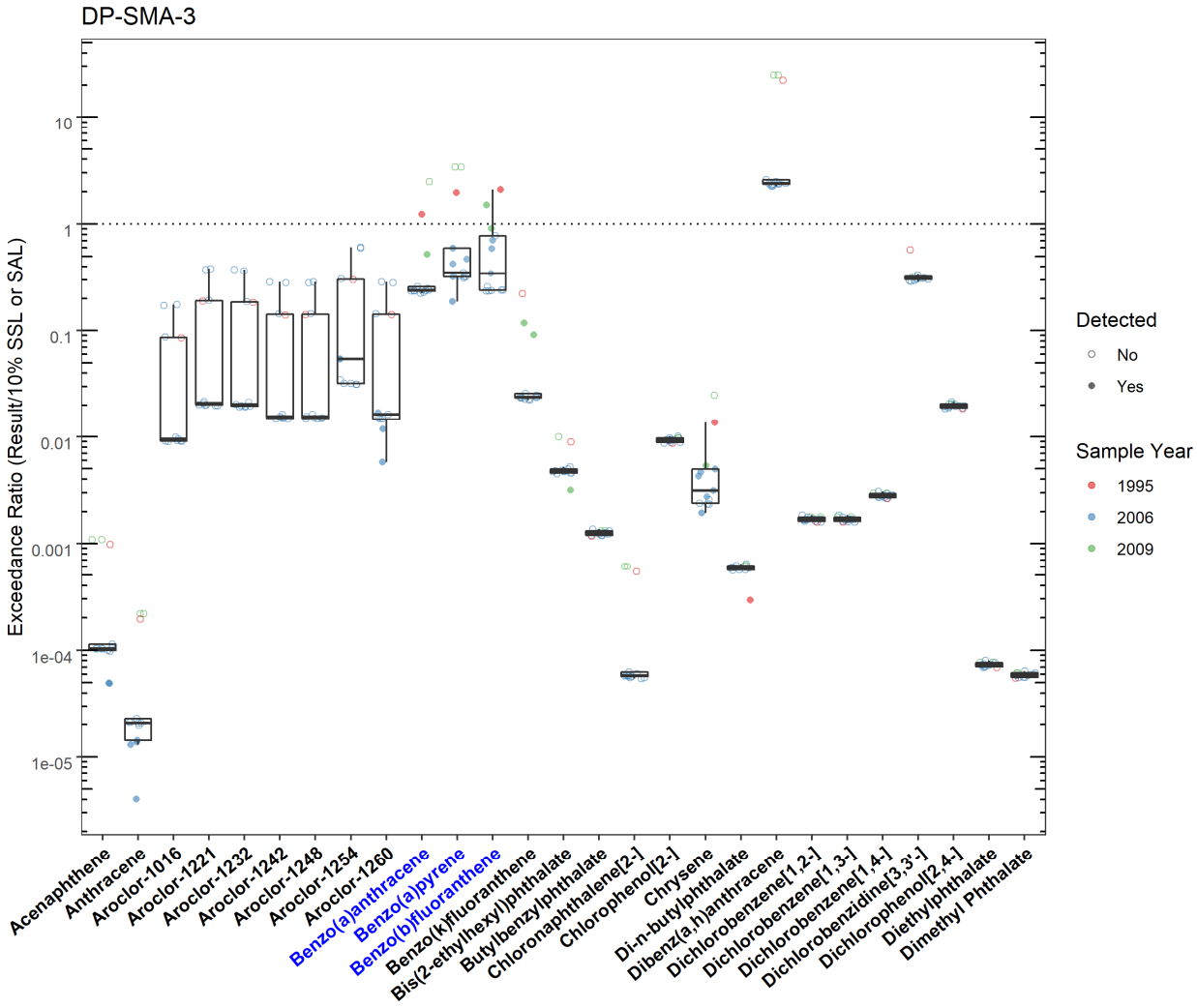

Figure 58.3-2 Organics Analytical Results from Soil Samples Associated with DP-SMA-3 (Plot 1)

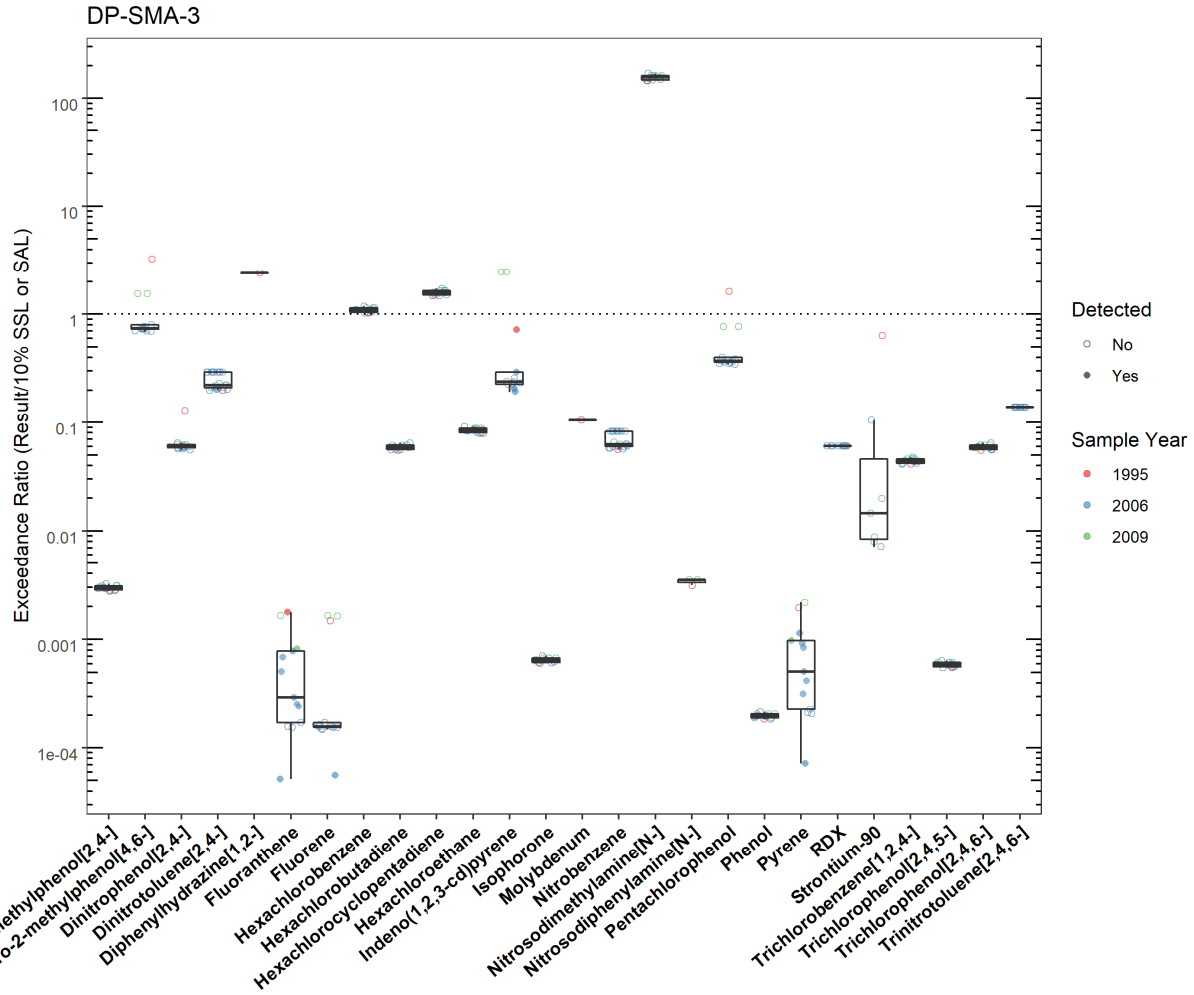

Figure 58.3-3 Organics Analytical Results from Soil Samples Associated with DP-SMA-3 (Plot 2)

DP-SMA-3

	SMA	Parameter Code	Detected	Screening Type	Screening Level (mg/kg)	Max Result (mg/kg)	Date of Max Result
Aluminum	DP-SMA-3	Al	Y	BTV	29200	34800	2006-07-27
Benzo(a)anthracene	DP-SMA-3	56-55-3	Y	SSL_0.1	0.153	0.190	1995-09-05
Benzo(a)pyrene	DP-SMA-3	50-32-8	Y	SSL_0.1	0.112	0.220	1995-09-05
Benzo(b)fluoranthene	DP-SMA-3	205-99-2	Y	SSL_0.1	0.153	0.320	1995-09-05
Beryllium	DP-SMA-3	Be	Y	BTV	1.83	2.39	2006-07-27
Chromium	DP-SMA-3	Cr	Y	BTV	19.3	20.1	2006-07-27
Iron	DP-SMA-3	Fe	Y	BTV	21500	21900	2006-07-27
Lead	DP-SMA-3	Pb	Y	BTV	22.3	26.5	2006-07-27
Mercury	DP-SMA-3	Hg	Y	BTV	0.100	2.60	1995-09-05
Uranium	DP-SMA-3	U	Y	BTV	1.82	2.02	2006-07-27
Zinc	DP-SMA-3	Zn	Y	BTV	48.8	49.6	2006-07-27

Figure 58.3-4 Screening-Level Exceedances from Soil Samples Associated with DP-SMA-3

58.4 Stormwater Evaluation

58.4.1 Summary of Stormwater Results Compared to TALs and BTVs

The 2022 Individual Permit uses current-stage compliance data for the SSD. Corrective action stormwater samples were collected in July and August 2019. Analytical results from those samples are presented in Figures 58.4-1 through 58.4-4.

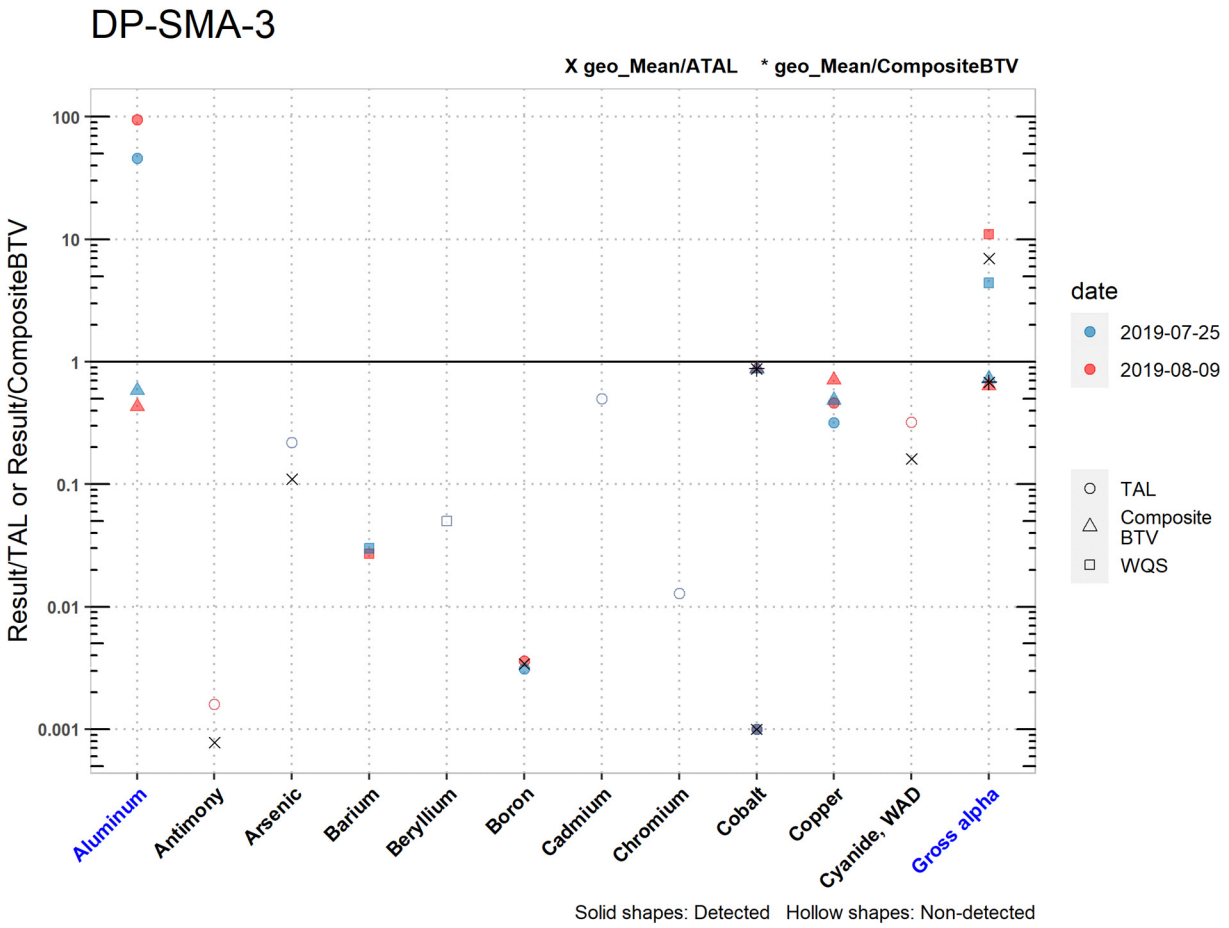

Figure 58.4-1 Analytical Results from Stormwater Samples, DP-SMA-3 (Plot 1)

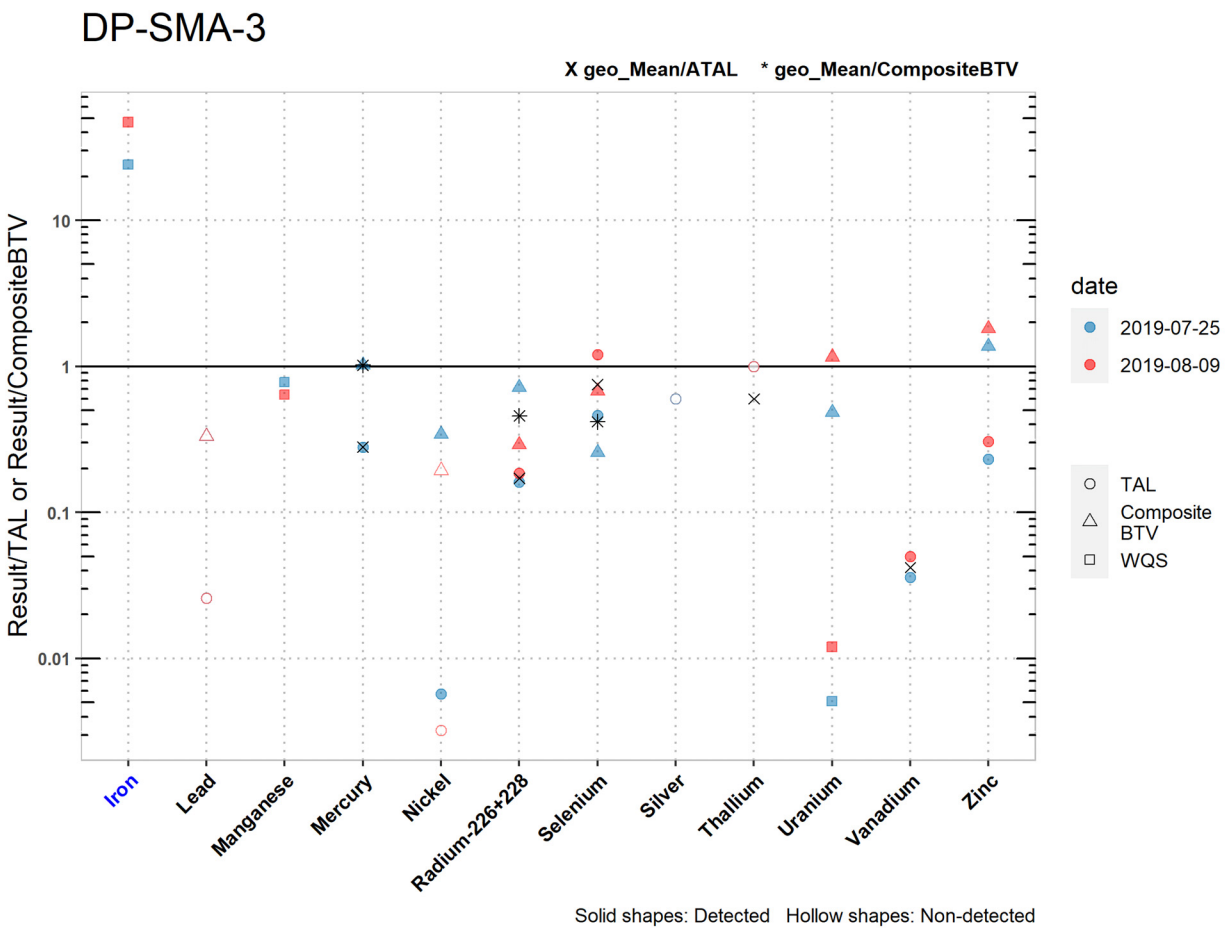

Figure 58.4-2 Analytical Results from Stormwater Samples, DP-SMA-3 (Plot 2)

DP-SMA-3

	Aluminum	Antimony	Arsenic	Barium	Beryllium	Boron	Cadmium	Chromium	Cobalt	Copper	Cyanide, WAD	Gross alpha
MQL	2.5	1	0.5	NA	NA	100	1	10	50	0.5	10	NA
ATAL	NA	640	9	NA	NA	5000	NA	NA	1000	NA	5.2	15
MTAL	765	NA	340	NA	NA	NA	0.65	233	NA	4.8	22	NA
Composite_BTV	37400	NA	NA	NA	NA	NA	NA	NA	1.18	3.12	NA	57.2
unit	ug/L**	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*
2019-07-25 result	35000	*1.00*	*2.00*	60.9	*0.200*	15.6	*0.300*	*3.00*	1.03	1.52	*1.67*	66.5
2019-07-25 dT	45.8	NA	NA	0.030	NA	0.0031	NA	NA	0.0010	0.317	NA	4.4
2019-07-25 dB	0.585	NA	NA	NA	NA	NA	NA	NA	0.873	0.487	NA	0.727
2019-08-09 result	72600	*1.00*	*2.00*	54.3	*0.200*	18.1	*0.300*	*3.00*	1.04	2.21	*1.67*	164
2019-08-09 dT	94.9	NA	NA	0.027	NA	0.0036	NA	NA	0.0010	0.460	NA	11
2019-08-09 dB	0.431	NA	NA	NA	NA	NA	NA	NA	0.881	0.708	NA	0.637
geo_mean/ATAL	NA	0.00078	0.11	NA	NA	0.0034	NA	NA	0.0010	NA	0.161	7.0
geo_mean/B	NA	NA	NA	NA	NA	NA	NA	NA	0.877	NA	NA	0.680

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g **SSC normalized unit is mg/kg

Figure 58.4-3 Analytical Results from Stormwater Samples, DP-SMA-3 (Table 1)

DP-SMA-3

	Iron	Lead	Manganese	Mercury	Nickel	Radium-226+228	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
MQL	NA	0.5	NA	0.005	0.5	NA	5	0.5	0.5	NA	50	20
ATAL	NA	NA	NA	0.77	NA	30	5	NA	0.47	NA	100	NA
MTAL	NA	19.3	NA	NA	186	NA	20	0.49	NA	NA	NA	59.2
Composite_BTV	NA	1.50	NA	0.208	3.10	4.21	8.98	NA	NA	0.315	NA	10.0
unit	ug/L	ug/L	ug/L	ug/L	ug/L	pCi/L*	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
2019-07-25 result	24000	*0.500*	93.6	0.213	1.06	4.83	2.32	*0.300*	*0.600*	0.152	3.58	13.7
2019-07-25 dT	24	NA	0.78	0.28	0.00570	0.161	0.46	NA	NA	0.0051	0.036	0.231
2019-07-25 dB	NA	NA	NA	1.02	0.342	0.717	0.258	NA	NA	0.483	NA	1.37
2019-08-09 result	47000	*0.500*	76.2	NA	*0.600*	5.54	6.08	*0.300*	*0.600*	0.364	4.99	18.2
2019-08-09 dT	47	NA	0.64	NA	NA	0.185	1.2	NA	NA	0.012	0.050	0.307
2019-08-09 dB	NA	NA	NA	NA	NA	0.292	0.677	NA	NA	1.16	NA	1.82
geo_mean/ATAL	NA	NA	NA	0.28	NA	0.172	0.75	NA	0.6	NA	0.042	NA
geo_mean/B	NA	NA	NA	1.02	NA	0.458	0.418	NA	NA	NA	NA	NA

Italic font indicates nondetect results
dT=detected_result/TAL, dB=detected_result/composite_BTV
geo_mean/B=geo_mean/composite_BTV
*SSC normalized unit is pCi/g

Figure 58.4-4 Analytical Results from Stormwater Samples, DP-SMA-3 (Table 2)

58.4.2 Assessment Unit and Stream Impairments

DP-SMA-3 drains to DP Canyon (100 m downstream grade control to 400 m upstream grade control), which has impairments for adjusted gross alpha, PCBs, total recoverable aluminum, and dissolved copper. The adjusted gross alpha, copper, and aluminum impairments may be Site-related, based on Site history.

58.5 Site-Specific Demonstration

58.5.1 Soil Data Summary

Benzo(b)fluoranthene, benzo(a)pyrene, and benzo(a)anthracene are the only Site-related POCs that exceeded the applicable screening value in soil data; they have not been monitored in stormwater.

58.5.2 Stormwater Data Summary

Gross alpha and aluminum were measured in stormwater and were above TALs but below BTVs.

58.5.3 2022 Permit Status

The SMA is in active monitoring; not all Site-related POCs were monitored for in previous samples.

58.5.4 Sampling and Analysis Plan

Table 58.5-1 is the proposed SAP for DP-SMA-3.

Table 58.5-1 Proposed SAP, DP-SMA-3

Monitoring Constituent	Background for Monitoring
SVOCs	Site history and soil data
DOC	Permit requirement
SSC	Permit requirement