Alternative Compliance Request for M-SMA-7.9

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC (LANS). The Laboratory, located in Los Alamos County in northern New Mexico, covers approximately 36 mi^2 (Figure 1). It is situated on the Pajarito Plateau, which is made up of a series of finger-like mesas separated by deep west-to-east-oriented canyons cut by predominantly ephemeral and intermittent streams. On February 13, 2009, the U.S. Environmental Protection Agency (EPA), Region 6, issued National Pollutant Discharge Elimination System (NPDES) Permit No. NM0030759 (hereafter, the Individual Permit or Permit) to DOE and LANS (collectively, the Permittees). The Individual Permit incorporating the latest modifications became effective on November 1, 2010 (EPA 2010).

Site monitoring area (SMA) M-SMA-7.9 contains one solid waste management unit (SWMU) or Site, which is the subject of this alternative compliance request. SMA M-SMA-7.9 is located in Technical Area 50 (TA-50), as shown in Figure 2. Confirmation monitoring samples collected in 2013 from M-SMA-7.9 showed detections of gross-alpha radioactivity and total polychlorinated biphenyls (PCBs) at concentrations above the applicable target action levels (TALs). Because of these TAL exceedances, the Permittees are required to implement corrective action in accordance with Parts I.E.2(a) through 2(d) or E.3 of the Individual Permit for the Site located within this SMA. The deadline for completing corrective action is October 28, 2014, because the Site in M-SMA-7.9 is high priority.

Under the Individual Permit, the Permittees can place a Site into Alternative Compliance where they have installed measures to minimize pollutants in their storm water discharges, as required by Part I.A of the Permit at a Site or Sites, but are unable to certify completion of corrective action under Sections E.2(a) through E.2(d) (individually or collectively). As described below, the Permittees have determined that Site 50-006(d) that comprises this SMA can achieve completion of corrective action only through the alternative compliance process described in Part I.E.3.

This alternative compliance request is organized as follows.

- *Section 2.0, Regulatory Framework,* summarizes the scope of the Individual Permit, the relationship between the Individual Permit and the March 2005 Compliance Order on Consent (Consent Order), administered by the New Mexico Environment Department (NMED), and its associated corrective action processes.
- *Section 3.0, Overview of the Alternative Compliance Process,* summarizes the requirements in Part I.E.3(b) for making an alternative compliance request to EPA.
- *Section 4.0, Site Descriptions,* summarizes the historical operations that led to the identification of Sites in M-SMA-7.9 as SWMUs in the 1990 SWMU Report (LANL 1990), the current use of the Sites, any Consent Order investigations and remedial actions conducted at the Sites, and the current status of the Sites under the Consent Order.
- *Section 5.0, Description of Control Measures Installed within M-SMA-7.9,* details the baseline control measures that were installed in M-SMA-7.9.
- *Section 6.0, Storm Water Monitoring Results,* describes the confirmation monitoring results and TAL exceedances.
- *Section 7.0, Basis of Alternative Compliance Request,* summarizes the underlying studies and technical information that led the Permittees to conclude certification of completion of corrective action cannot be achieved under Parts I.E.2(a) through 2(d).

- *Section 8.0, Evaluation of Corrective Action Options,* details the Permittees' evaluation of each of the corrective action options in Parts I.E.2(a) through 2(d) and the basis for the conclusion that certification of completion of corrective action is not possible.
- *Section 9.0, Proposed Alternative Compliance Approach,* describes the storm water controls proposed by the Permittees to achieve completion of corrective action under Part I.E.3.

2.0 REGULATORY FRAMEWORK

2.1 Background

The Individual Permit regulates storm water discharges associated with industrial activities from specified Sites. The Individual Permit treats the potential historical releases at a Site as an "industrial activity" that creates a "point source discharge" and directs the Permittees to monitor storm water discharges from Sites at specified sampling points known as SMAs. An SMA is a single drainage area within a subwatershed and typically includes more than one Site. Storm water from a Site may drain to multiple subwatersheds and may be associated with multiple SMAs.

The Sites regulated under the Individual Permit are a subset of the SWMUs and areas of concern (AOCs) that are being addressed under the Consent Order issued by NMED. The Consent Order fulfills the corrective action requirements in §3004(u) and §3008(h) of the Resource Conservation and Recovery Act (RCRA).

A SWMU is a discernible unit at which solid wastes may have been "routinely and systematically released," possibly resulting in a release of hazardous constituents. The identification and investigation of SWMUs and AOCs is an iterative process. The initial identification process is conservative—that is, it errs on the side of inclusion if there is any indication in the record a possible historical release of hazardous wastes or hazardous constituents. The Consent Order requires initial investigations to run broad, conservative analytical scans regardless of what the historical reviews indicate may have been released. As a result, all samples in the first phase of investigations under the Consent Order are typically analyzed for EPA target analyte list metals, total cyanide, volatile organic compounds, semivolatile organic compounds, PCBs, nitrate, and perchlorate.

As the investigations under the Consent Order proceed, some SWMUs and AOCs will be eligible for corrective action complete status (e.g., the data reveal no hazardous constituents were released). For the remaining SWMUs and AOCs, the investigations proceed until the nature and extent of contamination from the historical release have been defined in all relevant media, and it can be shown that the Site poses no unacceptable risk to human health and the environment under current and reasonably foreseeable future land use. The investigations of SWMUs and AOCs under the Consent Order began before the effective date of the Individual Permit and continue concurrently with implementation of the Permit.

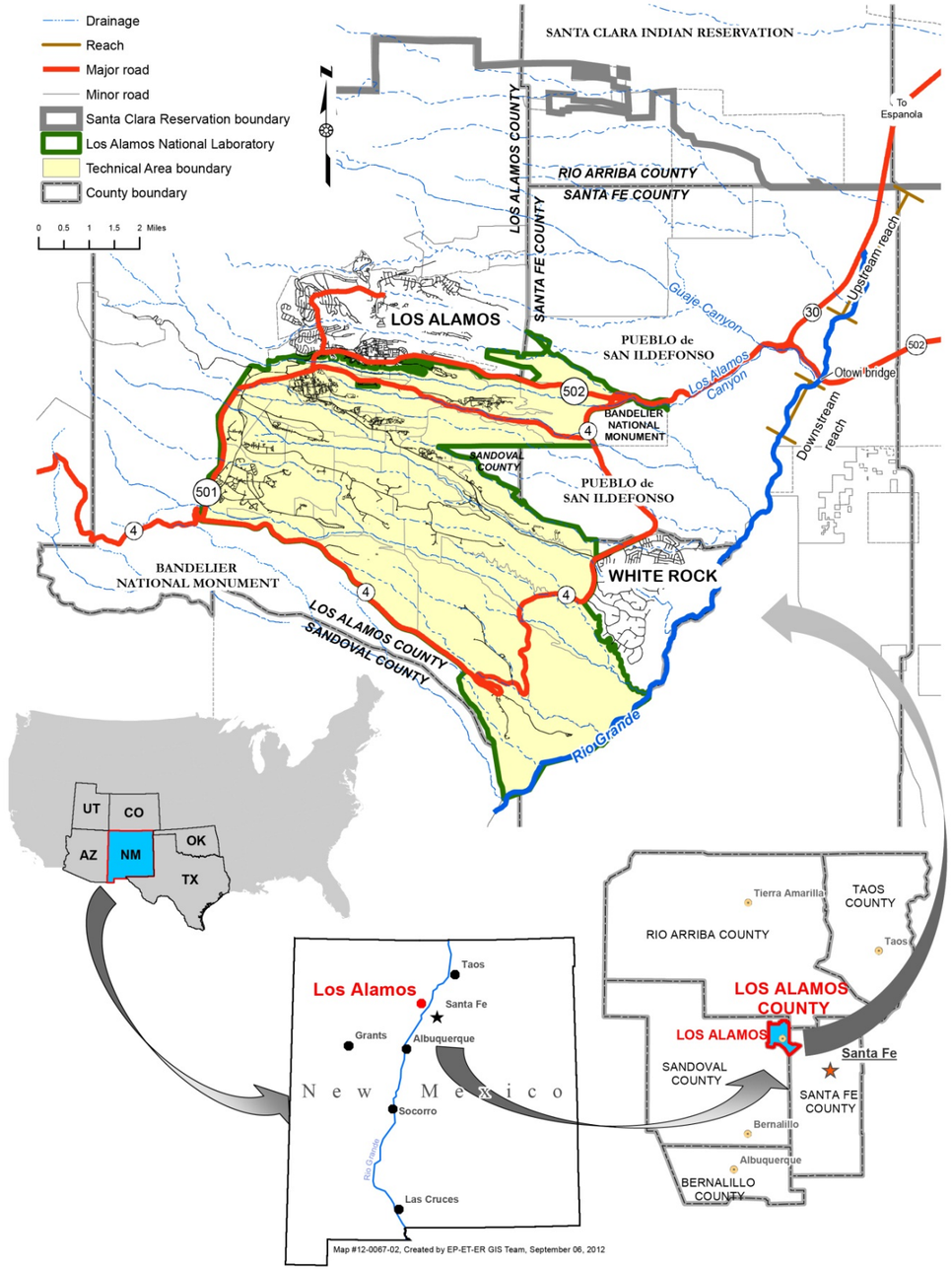


Figure 1 Location of the Laboratory with insets of New Mexico State and Los Alamos County

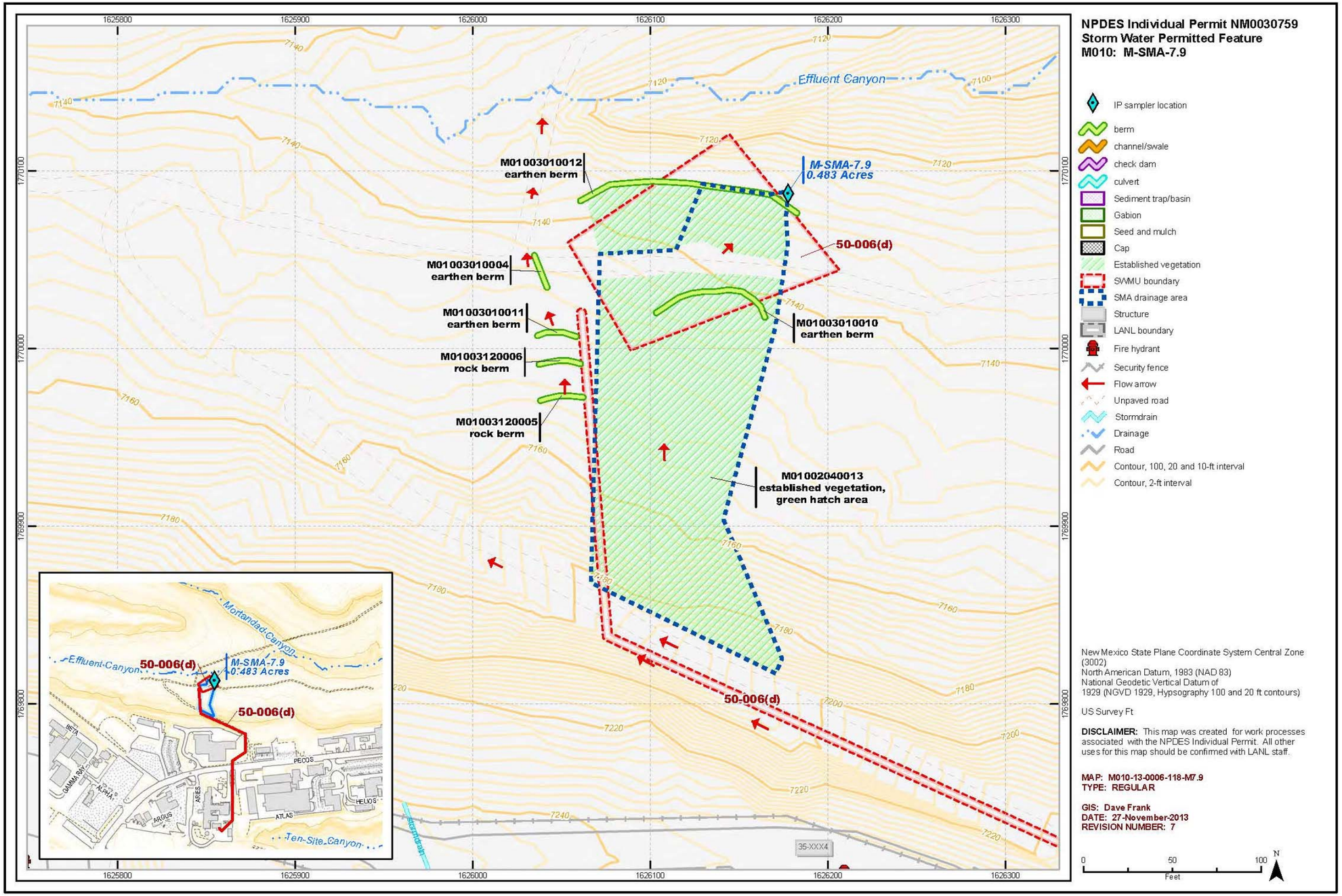


Figure 2 Project map of M-SMA-7.9 showing monitored Sites, sampler location, and baseline controls

A Site that has met the definition of a SWMU or AOC was evaluated for inclusion in the Individual Permit based on the following criteria: (1) the SWMU/AOC is exposed to storm water (e.g., not capped or subsurface); (2) the SWMU/AOC contains "significant industrial material" (e.g., not cleaned up or has contamination in place); and (3) the SWMU/AOC potentially impacts surface water. The selection of SWMUs and AOCs for inclusion in the Individual Permit was based on historical information and any storm water data available at the time the Permit application was submitted.

The Individual Permit contains nonnumeric technology-based effluent limitations, coupled with a comprehensive, coordinated inspection and monitoring program, to minimize pollutants in the Permittees' storm water discharges associated with historical industrial activities from specified Sites. The Permittees are required to implement site-specific control measures (including best management practices [BMPs]) to address the nonnumeric technology-based effluent limits, as necessary, to minimize pollutants from the Sites in their storm water discharges.

The Permit establishes TALs that are equivalent to New Mexico State water-quality criteria. These TALs are used as benchmarks to determine the effectiveness of control measures implemented under the Permit. That is, confirmation monitoring sample results for an SMA are compared with applicable TALs. If one or more confirmation monitoring result exceeds a TAL, the Permittees must take corrective action. Part I.E.2 of the Individual Permit defines "completion of corrective action" as follows:

- Analytical results from confirmation sampling show pollutant concentrations for all pollutants of concern at a Site to be at or below applicable TALs;
- Control measures that totally retain and prevent the discharge of storm water have been installed at the Site;
- Control measures that totally eliminate exposure of pollutants to storm water have been installed at the Site; or
- The Site has achieved RCRA corrective action complete with or without controls status or a certificate of completion under the Consent Order.

Under certain circumstances, the Individual Permit allows the Permittees to submit a request to EPA to have a Site or Sites placed into "Alternative Compliance" (Figure 3). Part I.E.3, Alternative Compliance, addresses the criteria and requirements for making a request for an alternative compliance and the actions EPA will take in response to the request.

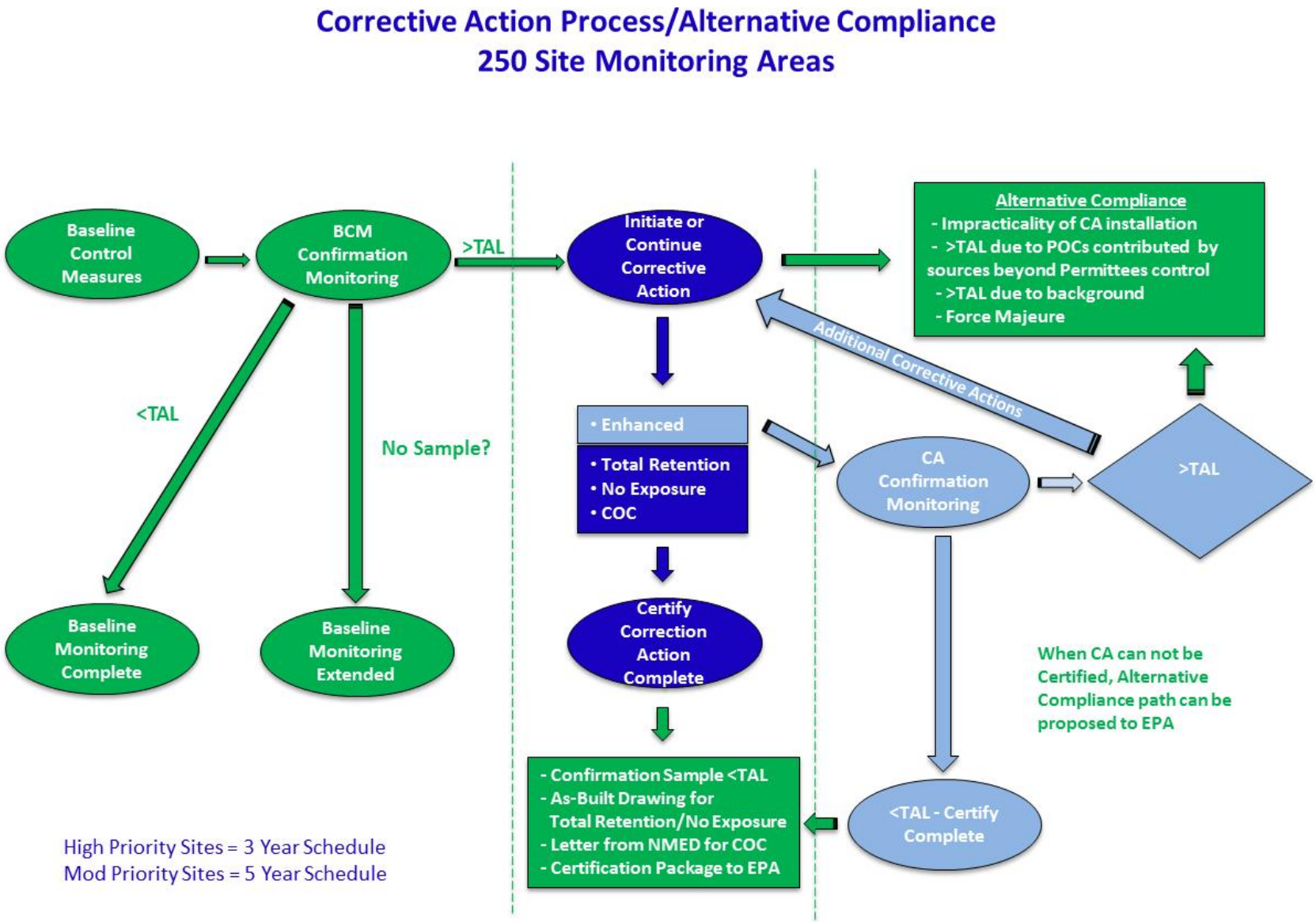


Figure 3 **Flow chart of the corrective action process/alternative compliance**

3.0 OVERVIEW OF ALTERNATIVE COMPLIANCE PROCESS

The Permittees may seek to place a Site or Sites into alternative compliance when they have installed baseline control measures to minimize pollutants in storm water discharges but are unable to certify completion of corrective action under Parts I.E.2(a) through (d), individually or collectively. Under the Individual Permit, the Permittees must certify completion of corrective action for High Priority Sites on or before November 1, 2013, unless a confirmation sample could not be collected from a measurable storm event at an individual Site before the second year of the Permit (or before September 30, 2012) (see Part E.1.d). Part E.1.d further provides that the compliance deadline for corrective action under Part E.4 is "extended for a one (1) year period following the first successful confirmation sampling event." Part E.3.b, in turn, provides that if the Permittees seek to place a Site into alternative compliance, they shall not be out of compliance with the applicable deadlines for achieving completion of corrective action under Part E.4, provided the request and supporting documentation are submitted to EPA on or at least six (6) months before the applicable deadlines.

If EPA grants the alternative compliance request in whole or in part, it will issue a new individually tailored work plan for the Site or Sites. EPA will also extend the compliance deadline for completion of corrective action, as necessary, to implement this work plan. If EPA denies the alternative compliance request, it will promptly notify the Permittees of the specifics of its decision and of the time frame under which completion of corrective action must be completed under Parts I.E.2(a) through I.E.2(d).

The first requirement that must be met to qualify for alternative compliance is that the Permittees must have "installed measures to minimize pollutants in their storm water discharges as required by Part. I.A of the Permit at a Site or Sites…." Part I.A describes the nonnumeric technology-based effluent limitations required under the Individual Permit to minimize pollutants in storm water discharges. The erosion and sedimentation and run-on and runoff controls identified in Part I.A were installed as baseline controls measures within the first 6 mo of the effective date of the Permit, and certifications of completion were submitted to EPA. The other nonnumeric technology-based effluent limitations include employee training and the elimination of non–storm water discharges not authorized by an NPDES permit.

The second requirement is that the Permittees must demonstrate they will not be able to certify completion of corrective action under Parts I.E.2(a) through I.E.2(d), individually or collectively. Part I.E.3 lists the following examples of conditions that could prevent the Permittees from certifying corrective action complete: force majeure events, background concentrations of pollutants of concern, site conditions that make installing further control measures impracticable, or pollutants of concern contributed by sources beyond the Permittees' control. This list provides examples of the types of conditions EPA will consider as the basis for an alternative requirements request; it is not an inclusive list.

The third requirement is that the Permittees develop a detailed demonstration of how they reached the conclusion that they are unable to certify completion of corrective action under Parts I.E.2(a) through (d), individually or collectively. This demonstration should include any underlying studies and technical information.

Once completed, the alternative compliance request and all supporting documentation must be submitted to EPA and made available for public review and comment for a period of 45 days.

The Permittees will issue a public notice of issuance of the alternative compliance request and the public meeting by publishing a notice in the *Los Alamos Monitor* and the *Santa Fe New Mexican*, by mailing a copy of the notice to those individuals on the NMED-maintained LANL Facility Mailing List and to NMED and by posting the notice on the Individual Permit section of the Laboratory's public website.

This public notice will include the following:

- The subject, the time, and the place of the public meeting and the ways in which interested persons may present their views;
- The name and address of the EPA office processing the alternative compliance request for which notice is being given;
- The name, address and telephone number of a person from whom interested persons may obtain further information; and
- A description of where interested persons may secure hard copies of the alternative compliance request.

At the conclusion of the public comment period and the public meeting, the Permittees will prepare a written response to all relevant and significant comments and concerns raised during the comment period. This response will be provided to each person who requests a copy in writing by mail or email, including those who check the option for a copy on the online comment submittal form. The response will also be posted in the Individual Permit section of the Laboratory's public website.

The Permittees will then submit the alternative compliance request, along with the complete record of public comment and the Permittees' response to comments, to EPA Region 6 for a final determination on the request.

4.0 SITE DESCRIPTION

The 0.483-acre M-SMA-7.9, which includes one Site [50-006(d)], is located in Effluent Canyon, which receives urban runoff from non-Site-related Laboratory facilities in TA-50. The Site is associated with the drainline from the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF) that discharged treated wastewater to NPDES permitted Outfall 051. A detailed Site description and a description of potential significant materials exposed to storm water are provided below.

4.1 Site 50-006(d)

SWMU 50-006(d) consists of a drainline (structure 50-64) and associated NPDES-permitted Outfall 051 in Mortandad Canyon for treated wastewater from the TA-50 RLWTF. Structure 50-64 is a 6-in.-diameter iron discharge pipe rerouted in 1983 to accommodate construction of the TA-35 target fabrication facility (building 35-213). The subsurface drainline runs from the southern end of TA-50 RLWTF to the north under Pecos Drive to the outfall in upper Mortandad Canyon. In 1985, EPA Region 6 issued an administrative order to DOE requiring modification of the outfall to mitigate ongoing stream bank erosion caused by the discharge pipe ending 25 ft short of the stream channel. DOE extended the pipe into the stream channel, and subsequently EPA Region 6 closed the order in 1986. No discharges to Outfall 051 have occurred since November 2010; the effluent is currently evaporated using a mechanical evaporator. SWMU 50-006(d) is permitted under the Laboratory's NPDES industrial and sanitary Permit, NM0028355.

4.2 Significant Materials Exposed to Storm Water

In 2013, the concentration of PCBs and the gross-alpha radioactivity in an extended baseline storm water monitoring sample for M-SMA-7.9 exceeded the TALs for PCBs and adjusted gross-alpha radioactivity. The following describes the Consent Order and other investigations for each constituent that exceeded TALs at the SMA.

PCBs

Low-level PCBs were associated with industrial materials historically managed at this Site. Two PCB mixtures (Aroclor-1254 and Aroclor-1260) were detected in three to nine shallow (i.e., less than 3 ft below ground surface) Consent Order and RCRA facility investigation (RFI) samples at maximum concentrations 0.11% and 2.39% of the residential SSLs in tuff and soil samples, respectively. PCBs have been detected in radioactive liquid waste effluent discharged at the outfall, and the NPDES permit specifies a PCB limit for effluent discharged from the outfall. These low concentrations in soil demonstrate that PCBs do not constitute a significant industrial material.

Gross-Alpha Radioactivity

The TAL in the Individual Permit is for adjusted gross-alpha radioactivity, which excludes radon-222, uranium, and source, special nuclear, and byproduct material as defined by the Atomic Energy Act (AEA) of 1954. Alpha-emitting radionuclides known to have been associated with industrial materials historically managed at this Site are isotopes of americium and plutonium and possibly other alpha-emitting isotopes (e.g., uranium and thorium). However, these isotopes are excluded from the definition of adjusted gross-alpha radioactivity and are not regulated under the Individual Permit. Consent Order and RFI samples were not analyzed specifically for gross-alpha radioactivity.

4.3 Rationale for Inclusion of Sites in the Individual Permit

Site 50-006(d) was identified as a High Priority Site in the Individual Permit. This determination was based on the detection of PCBs in storm water samples collected pursuant to the Federal Facility Compliance Agreement. This determination was made independently of the Site's history, which is described in section 4.0 above.

5.0 DESCRIPTION OF CONTROL MEASURES INSTALLED WITHIN M-SMA-7.9

A number of baseline control measures were installed within M-SMA-7.9 in accordance with Part I.A. All active control measures are listed in Table 1, and their locations are shown on the project map (Figure 2). Copies of the certification packages, including photographs, are provided in Attachment A. Table 1 presents descriptions of each of the baseline control measures installed at the SMA.

Table 1
Active Control Measures for M-SMA-7.9

Control ID	Control Name	Run-on Control?	Runoff Control?	Erosion Control?	Sediment Control?	Control Status
M01002040013	Established Vegetation		X	X		Additional Control
M01003010004	Earthen Berm	X			X	Baseline
M01003010010	Earthen Berm	X			X	Baseline
M01003010011	Earthen Berm	X			X	Baseline
M01003010012	Earthen Berm		X		X	Additional Control
M01003120005	Rock Berm	X			X	Baseline
M01003120006	Rock Berm	X			X	Baseline

Rain gage RG200.5 associated with M-SMA-7.9 has recorded 10 storm rain events with intensity greater than or equal to 0.25 in. within 30 min since the initiation of the Permit. These storm rain events generated 8 post-storm inspections. Post-storm inspections and all other inspection activity conducted at the SMA are summarized in Table 2.

Table 2
Control Measure Inspections since Initiation of the Individual Permit

Inspection Type	Inspection Reference*	Inspection Date
IP Rain Event on June 15, 2011, at RG200.5	BMP-13936	7/7/2011
IP Rain Event on August 19, 2011, at RG200.5	BMP-17272	8/24/2011
IP Rain Event on September 1, 2011, at RG200.5	BMP-18387	9/7/2011
IP Rain Event on September 7, 2011, at RG200.5	BMP-18950	9/14/2011
Annual Erosion Evaluation Inspection	COMP-20293	10/17/2011
Annual Erosion Evaluation Inspection	COMP-23413	5/29/2012
IP Rain Event on Oct 12, 2012, at RG200.5	BMP-28724	10/18/2012
Annual Erosion Evaluation Inspection	COMP-30791	4/30/2013
IP Rain Event on June 30, 2013, at RG200.5	BMP-32998	7/11/2013
IP Rain Event on July 12, 2013, at RG200.5	BMP-33627	7/23/2013
IP Rain Event on July 26, 2013, at RG200.5	BMP-34234	8/7/2013
IP Rain Event on Sept 13, 2013, at RG200.5	BMP-35756	9/25/2013
Annual Erosion Evaluation Inspection	COMP-36730	11/19/2013
TAL Exceedance Inspection at M-SMA-7.9 for PCBs and Gross Alpha, Sample Date September 13, 2013	COMP-36884	11/19/2013

*Source: The Maintenance Connection database.

Maintenance activities performed at the SMA are summarized in the Table 3.

Table 3
Maintenance Activities Conducted since Initiation of Individual Permit

Maintenance Reference	Maintenance Conducted	Maintenance Date	Response Time	Response Discussion
BMP-34415	Apply clean fill to damaged/degraded areas of berm and compact Add clean fill to raise height of berm approximately 2 ft. Add clean fill to extend both ends of berm to marked stakes in field. Compact all fill. Add rock to spillway. Apply seed and matting over repaired areas and any other areas as necessary. Apply seed and mulch to any disturbed areas (e.g. heavy equipment tracks). Contour a spillway in berm and line with filter fabric. Install seed and matting over repaired areas and other areas as necessary.	12/2/2013	132 days	IP Rain Event Inspection conducted on July 23, 2013

6.0 STORM WATER MONITORING RESULTS

The location of the sampler for M-SMA-7.9 is shown in Figure 2. A baseline confirmation monitoring sample was collected from M-SMA-7.9 on September 13, 2013, and the Permittees received the results on October 22, 2013. The results showed the concentration of PCBs and the gross-alpha radioactivity to exceed the TALs for PCBs and adjusted gross-alpha radioactivity. Although the sample was analyzed for gross-alpha radioactivity instead of adjusted gross-alpha radioactivity, this result was conservatively reported as a TAL exceedance for adjusted gross-alpha radioactivity. These data are summarized in Table 4. The results of this sampling effort are presented in graphs as a ratio of the respective average (ATAL) in Attachment B.

Table 4
Summary of Storm Water Data

Analyte	Unit	Number of Detects	Concentration Range	ATAL	Geometric Mean	Geometric Mean/ ATAL Ratio	MTAL	Number of MTAL Exceedances
Gross alpha	pCi/L	1	51.4	15[a]	51.4	3.4267	n/a[b]	n/a
Total PCB	µg/L	1	0.00215	0.00064	0.0022	3.3594	n/a	n/a

[a] ATAL is for adjusted gross-alpha radioactivity rather than gross alpha.

[b] n/a = Not applicable.

7.0 BASIS OF ALTERNATIVE COMPLIANCE REQUEST

Part I.E.3(a) lists a number of factors that could prevent the Permittees from certifying the completion of corrective action under Parts I.E.2(a) through E.2 (d), individually or collectively. These factors include, but are not limited to, force majeure events, background concentrations of pollutants of concern, site conditions that make it impracticable to install further control measures, and pollutants of concern contributed by sources beyond the Permittees' control. The evaluation of these factors was divided into the following two categories:

- Sources of pollutants
- Technical feasibility and practicability

The underlying studies, technical information, engineering evaluations, and other factors related to the applicability of these two categories to the feasibility of implementing corrective action options at Site 50-006(d) are detailed below.

7.1 Sources of Pollutants

Based upon a review of historical site use and soil sampling performed under the Consent Order, PCBs are associated with industrial materials historically managed at Site 50-006(d), but TAL exceedance concentrations are well below tuff background and urban background concentrations, and the Site is not considered to be a source contributing to the TAL exceedance. Alpha-emitting radionuclides are known to be associated with industrial materials historically managed at this Site; however, these radionuclides are excluded from the definition of adjusted gross-alpha radioactivity and, therefore, are not regulated under the Individual Permit. The gross-alpha radioactivity in the SMA sample is also well below the tuff background concentration. Therefore, the Site is not considered a source of the TAL exceedance. The potential sources of each TAL exceedance constituent is described below.

7.1.1 PCBs

Three sources of the PCBs were found that potentially could be contributing to the TAL exceedance in the M-SMA-7.9 watershed: potential contaminants associated with the Site, undeveloped tuff sources, and developed “baseline” sources.

PCB Sources within the SMA

M-SMA-7.9 currently receives runoff from weathered Bandelier Tuff and previously received discharges of treated wastewater from the NPDES outfall. PCBs were managed at Site 50-006(d); however, Consent Order soil sampling investigations detected PCBs at very low concentrations (2.4% or less than the residential soil screening levels). These low concentrations demonstrate that PCBs do not constitute a significant industrial material.

Storm water samples collected at the SMA are orders of magnitude less than PCB background upper tolerance limits (UTLs) from remote reference watersheds and urban landscape. The PCB background UTLs for storm water runoff from remote reference watersheds and urban landscape on the Pajarito Plateau are 11.7 ng/L and 98 ng/L, respectively (LANL 2012), the SMA sampling result is 2.15 ng/L. Although Site 50-006(d) does not directly receive runoff from urban areas (i.e., buildings, roads, and parking lots), two run-on locations directly above the Site were monitored for PCBs where they had been detected at concentrations ranging from 0.65 ng/L to 4 ng/L. These values bracket what was detected in the storm water sample from Site 50-006(d).

PCB Sources in Developed and Nondeveloped Landscapes

PCBs are common anthropogenic constituents as a result of environmental cycling on a global scale of past releases of PCBs. DOE, the NMED–DOE Oversight Bureau, and LANS conducted a multiyear cooperative study to characterize PCBs in certain surface waters located in the upper Rio Grande watershed and in areas in and around the Los Alamos townsite and Laboratory. The May 2012 report, entitled “Polychlorinated Biphenyls in Precipitation and Stormwater within the Upper Rio Grande Watershed” (hereafter, the PCB Background Report), was submitted to EPA on February 1, 2013. This study was designed to characterize PCB levels in precipitation and storm water in the nonindustrialized portions of the upper Rio Grande watershed (LANL 2012). The principal objectives of the study were to determine (1) baseline levels of PCB concentrations in precipitation and snowpack in northern New Mexico; (2) baseline levels of PCB concentrations in storm water in northern New Mexico streams and arroyos that are tributaries to the Rio Grande and Rio Chama; (3) the range of PCB concentrations found in the Rio Grande during base-flow and storm-flow conditions; (4) baseline levels of PCBs in storm water from undeveloped watersheds of the Pajarito Plateau; (5) the concentrations of PCBs in urban runoff from the Los Alamos townsite and Laboratory property; and (6) how these findings may be used to target significant pollution sources. The following excerpt from the PCB Background Report (LANL 2012) summarizes the findings relative to these objectives.

> Total PCB concentrations for precipitation and stormwater are summarized in Table 16 [of the PCB Background Report, presented as Table 5 in this request]. The concentrations in precipitation were generally low, probably reflecting the rural nature of the study area….
>
> Although PCB concentrations in precipitation and snowpack are relatively low, those sources still play a major indirect role in impacting surface-water quality. Over long periods of time—perhaps decades—precipitation events leave behind an inventory of

PCBs on surface soil. The quality of nearby surface water deteriorates once the surface soil is eroded and carried by runoff into watercourses. Temporary deterioration of water quality is observed in drainages both small and large. Storm flow occurs infrequently. These flow events are generally very short lived, with flows lasting from less than an hour to—rarely—several days….

Environmental monitoring results show that small tributaries carrying a moderate amount of suspended soil/sediment likely will have total PCB concentrations above human health WQC [water-quality criteria] (0.64 ng/L) and occasionally the wildlife habitat WQC (14 ng/L), even in the absence of industrial pollution. PCB concentrations above the WQC would be expected in the most remote parts of the drainage system because of atmospheric deposition, accumulation in sediments, and the high sediment load carried by small tributaries during periods of storm runoff….

Sources of PCBs detected in storm water may include recognizable discrete local-scale, [i.e., developed landscape] PCB sources as well as ubiquitously dispersed source, [i.e., remote reference watersheds]. The upper ranges of PCB concentrations in baseline or Rio Grande storm runoff were approximately an order of magnitude larger than those for precipitation (less than 1 ng/L in precipitation and 10 ng/L to 50 ng/L in storm runoff). This increase was primarily from the presence of PCBs associated with suspended sediment in runoff. Similarly, another order of magnitude increase in PCB concentrations was evident when upper ranges in urban runoff (above100 ng/L) were compared with upper ranges in baseline or Rio Grande storm flow. The higher concentrations associated with the urban runoff likely resulted from the contribution of additional diffuse local sources in the urban environment. This finding is consistent with information in the toxicological profile for PCBs published by the Agency for Toxic Substances and Disease Registry as well as numerous studies that report PCB concentrations in storm water in urban areas are higher than in rural locations….

The disparity between PCB concentrations during base-flow (ambient) and storm-flow periods because of suspended sediment is significant. While concentrations are elevated during storm runoff events in perennial or intermittent segments, they may recover quickly to lower levels during the intervening periods of base flow (unless impacted by a significant pollution source). On a time-weighted basis, average exposure levels in the water column would be relatively low, yet the perennial segment could exceed NMWQCC [New Mexico Water Quality Control Commission] criteria if the assessment data set includes samples collected when runoff was occurring.

To illustrate the role of suspended sediment in affecting PCB concentrations in surface water, data for base-flow periods were compiled for these same drainage areas. Figure 48 [of the PCB Background Report, presented as Figure 4 in this request] shows that PCB concentrations were only rarely above the New Mexico human health WQC under base-flow conditions because suspended sediment concentrations associated with base flow were very low, typically less than 100 mg/L. For perennial or intermittent surface waters, base flow predominates perhaps 90% or more of the time. Consequently, on any given day, the PCB concentrations in the water column of perennial or intermittent surface water would be relatively small. (LANL 2012)

Table 5
Summary of Total PCB Concentrations in Upper Rio Grande Watershed

Category	Median (ng/L)	UTL (ng/L)	Max Conc. (ng/L)	Percentage of Results Greater Than NM Health Standard (0.64 ng/L)	Percentage of Results Greater Than NM Wildlife Standard (14 ng/L)
Precipitation	0.12	0.68	0.61	0	0
Snowpack	0.14	0.7	0.65	8	0
Rio Grande/Rio Chama					
Base Flow	0.01	—*	1.36	6	0
Storm Water (Runoff)	0.24	—	51.4	39	3
Northern New Mexico Tributaries Storm Water	5.5	24	30.6	91	22
Baseline Pajarito Plateau Storm Water					
Reference Sites (Flows Originating on Pajarito Plateau)	0.4	11.7	11.6	28	0
Western Boundary Sites (Flows Originating in Jemez Mountains)	2.1	19.5	20.7	78	17
Reference and Western Boundary Combined	0.97	13	20.7	56	10
Urban Runoff Los Alamos Townsite	12	98	144	98	46

*— = Not available.

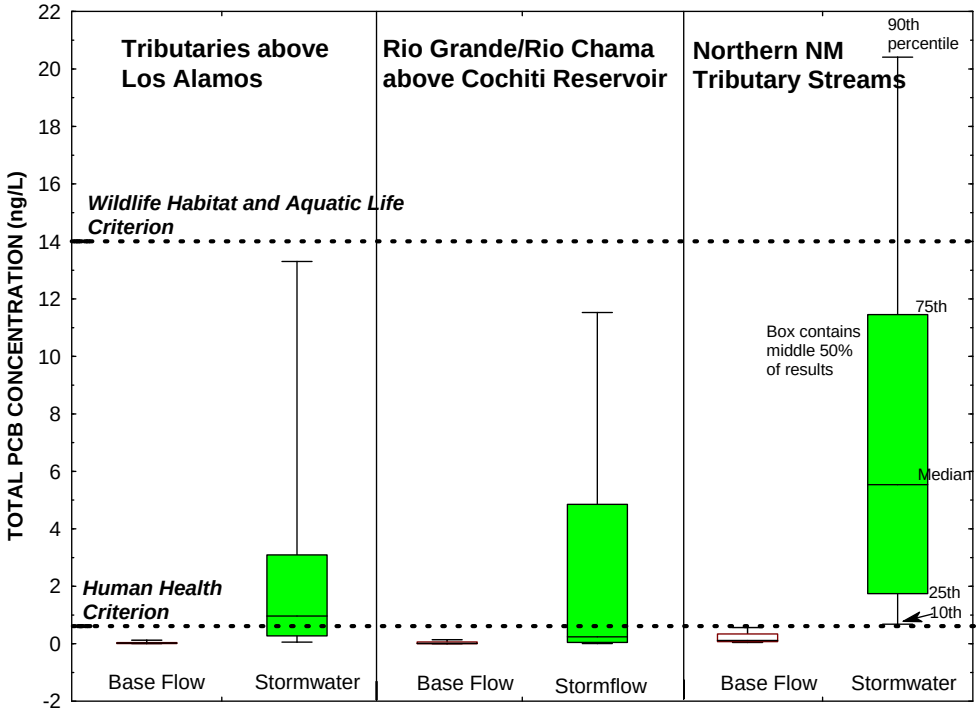


Figure 4 **Box plots of base flow and storm runoff PCB concentrations for various drainages in the upper Rio Grande system**

The basic footprint of the developed portions of the Los Alamos townsite has changed little over decades. Retail stores, county government operations, and business offices are concentrated together in the downtown area and are situated on a mesa top within a zone roughly 2 or 3 mi across. Away from the commercial center, land use transitions to a residential mix of apartment complexes and single-family houses. The townsite has been laid out in this general configuration since the 1960s. A portion of this development was built upon ground that once housed the research activities of the Manhattan Project. Buildings from that earlier era were removed, and several rounds of remediation of the surface have been performed; remaining SWMUs and AOCs have been delineated and are under investigation. Most of the townsite has long been covered with imported fill dirt, new buildings, pavement or park land, in essence forming caps over the original ground.

Storm water sampling was conducted in the townsite vicinity to measure PCB concentrations in locations representing storm water runoff from a relatively small urban environment. Samplers were placed in ephemeral tributary channels around the edge of the urban development; no urban samplers were placed below any known areas of concentrated contamination. A majority of samplers were located to collect storm water samples from housing developments, schools, and a golf course. In addition to monitoring the townsite perimeter, sampling was also conducted in drainage channels downstream from Laboratory administrative offices. The median PCB concentration was 12 ng/L. All but 1 of the 41 (98%) results were above the New Mexico human health standard, and 19 of 41 (46%) were above the wildlife habitat standard. The UTL for the area is 98 ng/L, which is within the measured values detected in runoff from a developed urban landscape (LANL 2012).

7.1.2 Gross Alpha

Alpha-emitting radionuclides were detected above background values (BVs)/fallout values in soil and tuff samples at Site 50-006(d) and are associated with industrial materials present at this Site. Americium and plutonium isotopes and possibly other alpha-emitting isotopes are known to have been associated with industrial materials historically managed at this Site. However, these isotopes are excluded from the definition of adjusted gross-alpha radioactivity and, therefore, are not regulated under the Individual Permit. Although Site-related radionuclides may be associated with the gross-alpha radioactivity detected in the Individual Permit sample, they are excluded from the definition of adjusted gross-alpha radioactivity.

The Individual Permit establishes TALs that are equivalent to New Mexico State water-quality criteria. The latter are contained in the New Mexico Water Quality Control Commission regulations (New Mexico Administrative Code 20.6.4), which define adjusted gross alpha radioactivity as “total radioactivity due to alpha particle emission as inferred from measurements on a dry sample, including radium-226, but excluding radon-222 and uranium. Also excluded are source, special nuclear and by-product material as defined by the Atomic Energy Act of 1954.” Naturally occurring uranium is considered to be the primary source of elevated gross-alpha results. Other naturally occurring alpha emitters, such as those belonging to the thorium decay series, are known to be present in the tuff and are also likely contributors to the elevated gross-alpha values. Uranium and thorium isotopes, however, are excluded from the definition of adjusted gross-alpha radioactivity, on which the TAL is based.

The Individual Permit samples were analyzed for gross-alpha radioactivity rather than adjusted gross-alpha radioactivity. Because the constituents comprising adjusted gross-alpha radioactivity are a subset to those comprising gross-alpha radioactivity, the adjusted gross-alpha radioactivity of a sample will always be less than the gross-alpha radioactivity. The gross-alpha radioactivity results were compared with the TAL for adjusted gross-alpha radioactivity. This result was conservatively reported as a TAL

exceedance even though it does not confirm that constituents regulated as adjusted gross alpha exceeded the TAL.

Gross-Alpha Sources within the SMA

Site 50-006(d) receives runoff from weathered Bandelier Tuff and discharges of treated wastewater from the NPDES outfall. Site 50-006(d) is not a source of the regulated constituents included in the definition of adjusted gross-alpha radioactivity. In addition, storm water samples collected at the SMA are orders of magnitude less than the gross-alpha background UTLs from remote reference watersheds and urban landscapes. The gross-alpha background UTLs for storm water runoff from remote reference watersheds and urban landscape on the Pajarito Plateau are 1490 pCi/L and 32.5 pCi/L respectively, while the SMA gross-alpha sampling result is 51.4 pCi/L (LANL 2012).

Gross-Alpha Sources in Developed and Nondeveloped Landscapes

Storm water samples were collected from 2009 to 2012 in remote watersheds on the Pajarito Plateau and developed urban monitoring locations throughout the Laboratory and within the Los Alamos County townsite to determine BVs for metals and radioactivity, including gross alpha. These results are summarized in the Laboratory publication analyzing background and baseline metals in northern New Mexico, entitled “Background Metals Concentrations and Radioactivity in Storm Water on the Pajarito Plateau, Northern New Mexico” (hereafter, the Background Metals Report [LANL 2013]). The principal objectives of the study were (1) to determine background concentrations in runoff from remote background (reference) watersheds for metals and radionuclide constituents and (2) to determine the baseline concentrations of metals and radionuclide constituents in urban runoff from the Los Alamos townsite and Laboratory property. Sampling locations were selected to avoid any known contamination and to provide reasonable estimates of baseline concentrations, including a variety of bedrock source areas and sediment texture. The predominant sediment was composed of weathered Bandelier Tuff. Water-quality conditions measured at background sites and at urban locations reflect the contaminant levels in storm runoff that were derived from the respective landscapes.

The monitoring locations evaluated in the Background Metals Report (LANL 2013) were both remote background locations upgradient of Sites and locations considered to be representative of an urban landscape associated with buildings, parking lots, and roads. The gross-alpha UTL calculated for in storm water runoff from remote watersheds composed primarily of weathered Bandelier Tuff is 1490 pCi/L, and the gross-alpha UTL for runoff from an urban landscape is 32.5 pCi/L (LANL 2013).

7.2 Technical Feasibility and Practicability

Because Site 50-006(d) is not considered to have contributed to the TAL exceedances for PCBs or adjusted gross-alpha radioactivity, the construction of enhanced controls, a cap or other cover on exposed portions of the Sites, or a total retention structure will not affect the concentrations of these constituents in runoff from the Site.

8.0 EVALUATION OF CORRECTIVE ACTION OPTIONS

A request to place a Site or Sites in alternative compliance must include a detailed demonstration of how the Permittees reached the conclusion that they are unable to certify completion of corrective action under Parts I.E.2(a) through E.2(d). The Permittees have thoroughly evaluated these corrective action

options and reached the conclusion that they are unable to certify completion of corrective action for Site 50-006(d) by the deadlines required in the Permit.

Site 50-006(d) was evaluated using the Individual Permit screening process for corrective action (Standard Operating Procedure EP-DIV-SOP-20176, Revision 1) to determine if the construction of enhanced controls, total retention structures, or a cap would successfully address the TAL exceedances at the Site and would allow the Permittees to certify completion of corrective action under Part I.E.2.

The evaluation of corrective action options was based on the following assumptions: (1) the Site is not considered to have contributed to the TAL exceedances (2) undeveloped and developed "background" PCBs likely contribute to the TAL exceedance and (3) undeveloped background concentrations of naturally occurring alpha-emitting radionuclides contribute to gross-alpha radioactivity in excess of the TAL for adjusted gross-alpha radioactivity. Because the Site is not considered a source of the TAL exceedances, no installation of storm water controls would be reasonably expected to reduce the concentration TAL constituents from the Site.

8.1 Enhanced Control Measures to Meet the TAL

No enhanced controls were identified that would reasonably be expected to reduce or eliminate contributions from the Site to the TAL exceedances and therefore achieve TALs because the Site is not considered to have contributed to the TAL exceedances.

8.2 Control Measures That Totally Retain and Prevent Storm Water Discharge

No control measures that totally retain and prevent storm water discharge were identified that would reasonably be expected to reduce or eliminate contributions from the Site to the TAL exceedances and therefore achieve TALs because the Site is not considered to have contributed to the TAL exceedances.

8.3 Control Measures That Totally Eliminate the Exposure of Pollutants to Storm Water

No control measures that totally eliminate the exposure of pollutants to storm water were identified that would reasonably be expected to reduce or eliminate contributions from the Site to the TAL exceedances and therefore achieve TALs because the Site is not considered to have contributed to the TAL exceedances.

8.4 Receipt of an NMED-Issued Certificate of Completion under the RCRA Consent Order

SWMU 50-006(d) was investigated under the Consent Order in 2009 and 2010 and recommended for additional sampling to define the extent of contamination and to remove soil and sediment primarily with elevated cesium-137 (a gamma emitter). Consent Order investigation sampling and removal of contaminated soil are scheduled to be performed between March and November of 2015. Following completion of the Consent Order work, it is expected the Permittees will request a certificate of completion from NMED.

9.0 PROPOSED ALTERNATIVE COMPLIANCE APPROACH

Based on this evaluation of corrective action options, the Permittees are not able to certify completion of corrective action for Site 50-006(d) under Parts I.E.2(a) through E.2(d) based on the applicable deadline.

Based on the data presented in section 7.1 of this request, the Site is not considered to have contributed to the PCB TAL exceedance or to an exceedance of the TAL for adjusted gross alpha radioactivity, and the installation of additional controls would not be effective in reducing or eliminating contributions from the Site to the TAL exceedances. The likely source of the PCBs and gross alpha contributing to the TAL exceedances is non-Site-related "background" concentrations of constituents.

The Permittees propose the corrective action for Site 50-006(d) is to receive a certificate of completion under the Consent Order. Consent Order investigation and remediation for Site 50-006(d) are planned for 2015. Following NMED's approval of the investigation report to be submitted in 2015, the Permittees will submit a request for a certificate of completion. The Permittees believe that after the request is submitted, NMED will issue a certificate of completion under the Consent Order for Site 50-006(d) by the end of calendar year 2016.

The Permittees believe that no corrective action is required for the adjusted gross-alpha TAL exceedance because the Site is not a source of adjusted gross-alpha constituents, the primary source of adjusted gross alpha constituents in the reported value is natural background from the Bandelier Tuff, and furthermore, any Site-related alpha-emitting radionuclides are exempt and are not regulated under the Individual Permit.

10.0 REFERENCES

EPA (U.S. Environmental Protection Agency), September 30, 2010. "Authorization to Discharge under the National Pollutant Discharge Elimination System, NPDES Permit No. NM 0030759," Region 6, Dallas, Texas.

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-00 through TA-09), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), May 2012. "Polychlorinated Biphenyls in Precipitation and Stormwater within the Upper Rio Grande Watershed," Los Alamos National Laboratory document LA-UR-12-1081, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), April 2013. "Background Metals Concentrations and Radioactivity in Storm Water on the Pajarito Plateau, Northern New Mexico," Los Alamos National Laboratory document LA-UR-13-22841, Los Alamos, New Mexico.

Attachment A

Certification of Completion of Baseline Controls at M-SMA-7.9

CERTIFICATION OF COMPLETION OF BASELINE CONTROL MEASURE IMPLEMENTATION AT THE FOLLOWING PERMITTED FEATURES / SITE MONITORING AREAS

NPDES Permit No. NM0030759

PERMITTED FEATURE	SITE MONITORING AREA
B001	B-SMA-0.5
B002	B-SMA-1
D002	DP-SMA-0.4
D004	DP-SMA-1
D006	DP-SMA-2.35
D008	DP-SMA-4
J027	PJ-SMA-20
R001	R-SMA-0.5
R003	R-SMA-1.95
R006	R-SMA-2.5

CERTIFICATION OF COMPLETION OF BASELINE CONTROL MEASURE IMPLEMENTATION AT THE FOLLOWING PERMITTED FEATURES / SITE MONITORING AREAS

NPDES Permit No. NM0030759

CERTIFICATION STATEMENT OF AUTHORIZATION

"I certify under penaly of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."

A R Grieggs

Anthony R. Grieggs
Group Leader, ENV-RCRA
Environmental Protection Division
Los Alamos National Laboratory

12/15/10
Date

Gene Turner

Gene Turner, Environmental Permitting
Los Alamos Site Ofiice
National Nuclear Security Administration

12/16/10
Date

PF: M010 SMA: M-SMA-7.9

Baseline Control Measures Required :

Type of Control Measure	Erosion Control (EC)	Run-Off Control (ROF)	Run-On Control (RON)	Sediment Control (SC)
Berms		X	X	X
Established Vegetation	X			
Seed and Mulch	X			

Baseline Control Measures Installed :

BMP ID	Type of Control Measure	Control Measure	Photo ID	EC	ROF	RON	SC
M01003010011	Berms	Earthen Berm	10549-1r.JPG			X	X
M01003010004	Berms	Earthen Berm	7465-5.JPG			X	X
M01003010010	Berms	Earthen Berm	8663-1r.JPG			X	X
M01003120005	Berms	Rock Berm	10549-1r.JPG			X	X
M01003120006	Berms	Rock Berm	10549-1r.JPG			X	X
M01003060009	Berms	Straw Wattles	7465-1.JPG		X		X
M01003060007	Berms	Straw Wattles	7465-3.JPG			X	X
M01003060008	Berms	Straw Wattles	7465-2.JPG		X		X
M01002020003	Established Vegetation	Permanent Vegetation Forested/Needle Cast	7465-6.JPG	X			
M01002010002	Established Vegetation	Permanent Vegetation Grasses and Shrubs	7465-6.JPG	X			
M01001010001	Seed and Mulch	Seed and Wood Mulch	7465-2.JPG	X			

Comments

None applicable.

PF: M010 SMA: M-SMA-7.9

Photo 10549-1r.JPG (taken 09/20/10) M01003010011 : Berms - Earthen Berm; M01003120005 : Berms - Rock Berm; M01003120006 : Berms - Rock Berm.

Photo 7465-1.JPG (taken 08/06/10) M01003060009 : Berms - Straw Wattles.

PF: M010 SMA: M-SMA-7.9

Photo 7465-2.JPG (taken 08/06/10) M01001010001 : Seed and Mulch - Seed and Wood Mulch; M01003060008 : Berms - Straw Wattles.

Photo 7465-3.JPG (taken 08/06/10) M01003060007 : Berms - Straw Wattles.

PF: M010 SMA: M-SMA-7.9

Photo 7465-5.JPG (taken 08/06/10) M01003010004 : Berms - Earthen Berm.

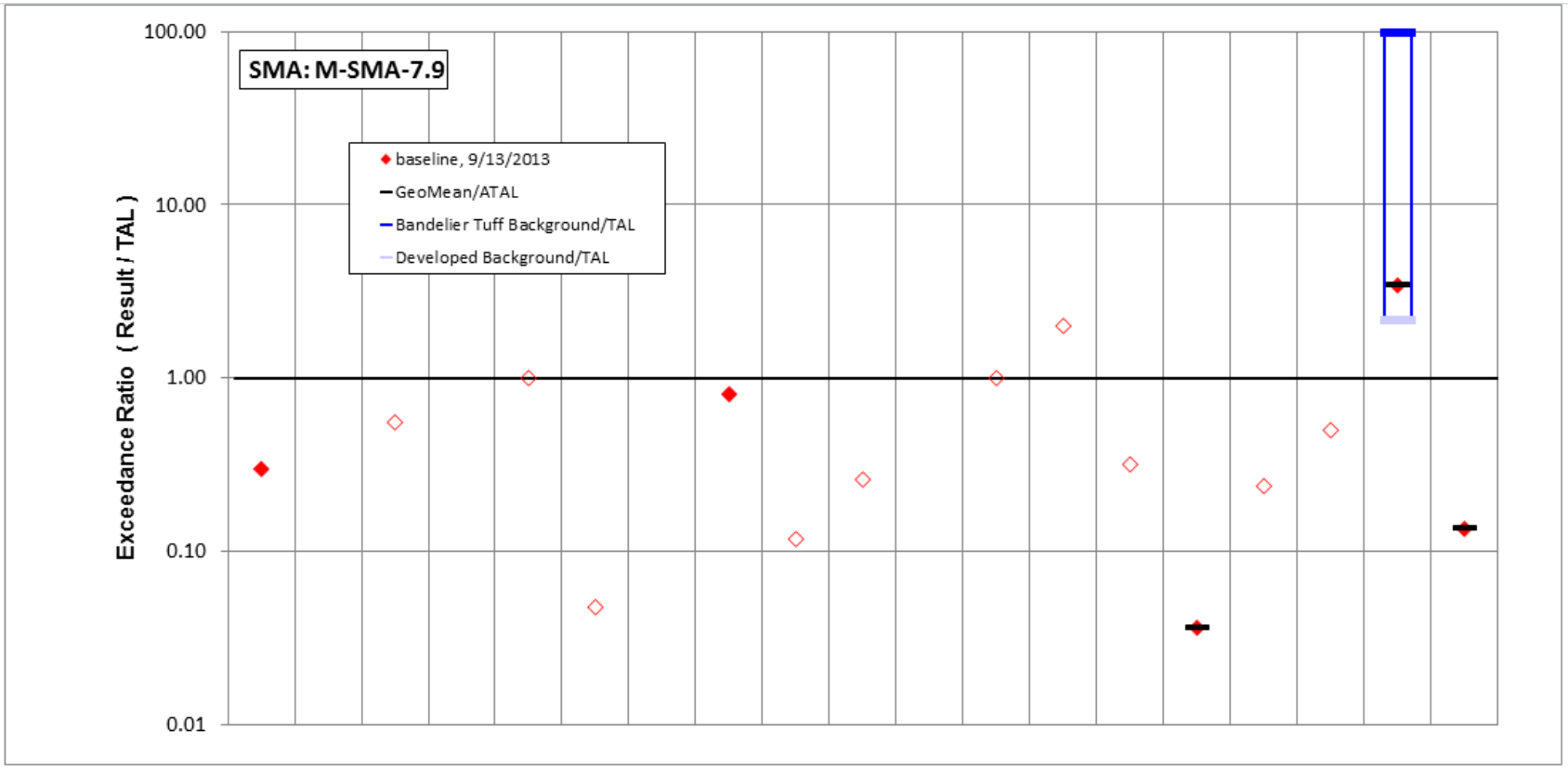
Photo 7465-6.JPG (taken 08/06/10) M01002010002 : Established Vegetation - Permanent Vegetation Grasses and Shrubs; M01002020003 : Established Vegetation - Permanent Vegetation Forested/Needle Cast.

PF: M010 SMA: M-SMA-7.9

Photo 8663-1r.JPG (taken 09/03/10) M01003010010 : Berms - Earthen Berm.

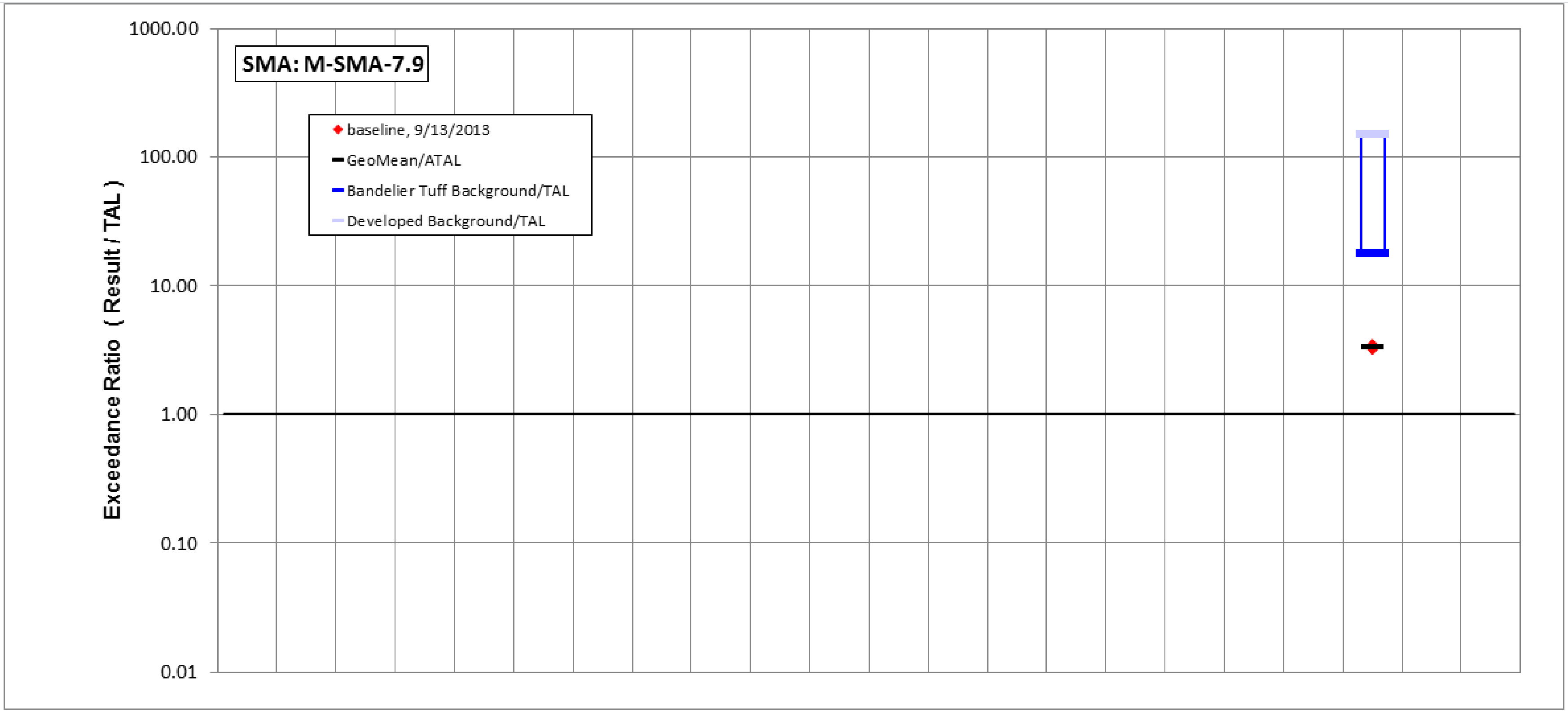
Attachment B

Storm Water Exceedances in Baseline Confirmation Samples at M-SMA-7.9



	Aluminum	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Mercury	Nickel	Selenium	**Silver**	Thallium	Vanadium	Zinc	Cyanide, weak acid dissociable	**Gross alpha**	Radium-226 and Radium-228
std used in ratio calculations	MTAL	ATAL	ATAL	ATAL	MTAL	MTAL	ATAL	MTAL	MTAL	ATAL	MTAL	ATAL	MTAL	ATAL	ATAL	MTAL	ATAL	ATAL	ATAL
std value	750	640	9	5000	1	210	1000	4.3	17	0.77	170	5	0.5	6.3	100	42	0.01	15	30
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	mg/L	pCi/L	pCi/L
9/13/2013 result	224	*3*	*5*	18	*1*	*10*	1.52	3.47	*2*	*0.2*	1.28	*5*	***1***	*2*	3.62	*10*	*0.005*	**51.4**	4.04
result / TAL	0.3	*0.005*	*0.56*	0.0036	*1*	*0.048*	0.0015	0.81	*0.12*	*0.26*	0.0075	*1*	***2***	*0.32*	0.036	*0.24*	*0.5*	**3.4**	0.13

Bold font indicates result>TAL; italic font indicates undetected results; "-" is used if no analytical results were available.



	Aldrin	Benzo(a)pyrene	BHC[gamma-]	Chlordane (alpha/gamma)	Chlordane[alpha-]	Chlordane[gamma-]	DDD[4,4'-]	DDE[4,4'-]	DDT[4,4'-]	Dieldrin	Endosulfan I	Endosulfan II	Endrin	Heptachlor	Heptachlor Epoxide	Hexachlorobenzene	Pentachlorophenol	RDX	Tetrachlorodibenzo dioxin[2,3,7,8-]	**Total PCB**	Toxaphene (Technical Grade)	Trinitrotoluene [2,4,6-]
std used in ratio calculations	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	ATAL	-	-
std value	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6E-04	-	-
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	ug/L	ug/L	ug/L
9/13/2013 result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.002**	-	-
result / TAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**3.4**	-	-

Bold font indicates result>TAL; italic font indicates undetected results; "-" is used if no analytical results were available.