Alternative Compliance Request for S-SMA-2

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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 (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) S-SMA-2 contains four solid waste management units (SWMUs) or Sites, only one of which is the subject of this alternative compliance request. S-SMA-2 is located in the central portion of Technical Area 03 (TA-03), as shown in Figure 2. Confirmation monitoring samples collected in 2011 from S-SMA-2 showed detections of copper, zinc, 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 Part I.E.2(a) through 2(d) or E.3 of the Individual Permit for the Sites located within this SMA. The deadline for completing corrective action is November 1, 2013, because the four Sites in S-SMA-2 are 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 one of the four Sites within this SMA, Site 03-056(c), can achieve completion of corrective action only through the alternative compliance process 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. This section also describes the path forward for Sites 03-012(b), 03-045(b), and 03-045(c).
- *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 S-SMA-2 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 S-SMA-2,* details the baseline control measures that were installed in S-SMA-2.
- *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 does not, however, regulate storm water discharges associated with current conventional industrial activities at the Laboratory. This distinction is important at TA-03, which is subject to the Laboratory's NPDES Multi-Sector General Permit ([MSGP] No. NMR05GB21). The covered industrial sectors that apply to TA-03 are Sector AA, fabricated metal products, and Sector O, steam electric-generating facilities. Pursuant to the MSGP, the Laboratory has site-specific storm water pollution prevention plans (SWPPPs) and performs benchmark storm water monitoring for the two relevant industrial sectors within TA-03. The SWPPP is a written assessment of potential sources of pollutants in storm water runoff and the control measures that are implemented at each site to minimize the discharge of these pollutants in runoff. These control measures include site-specific best management practices (BMPs), maintenance plans, inspections, employee training, and reporting.

Under the MSGP, the Laboratory successfully reduced the monitored constituents for the TA-03 building 34 metal shop (Sector AA) from aluminum, iron, nitrate, nitrite nitrogen, and zinc to only zinc. The TA-03 power and steam plant (Sector O) is currently monitored for iron. In addition, three NPDES-permitted outfalls located in TA-03 (Figure 3) are currently monitored for the following pollutants: total residual chlorine, E. coli, total suspended solids, aluminum, phosphorous, copper, PCBs, and whole effluent toxicity.

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).

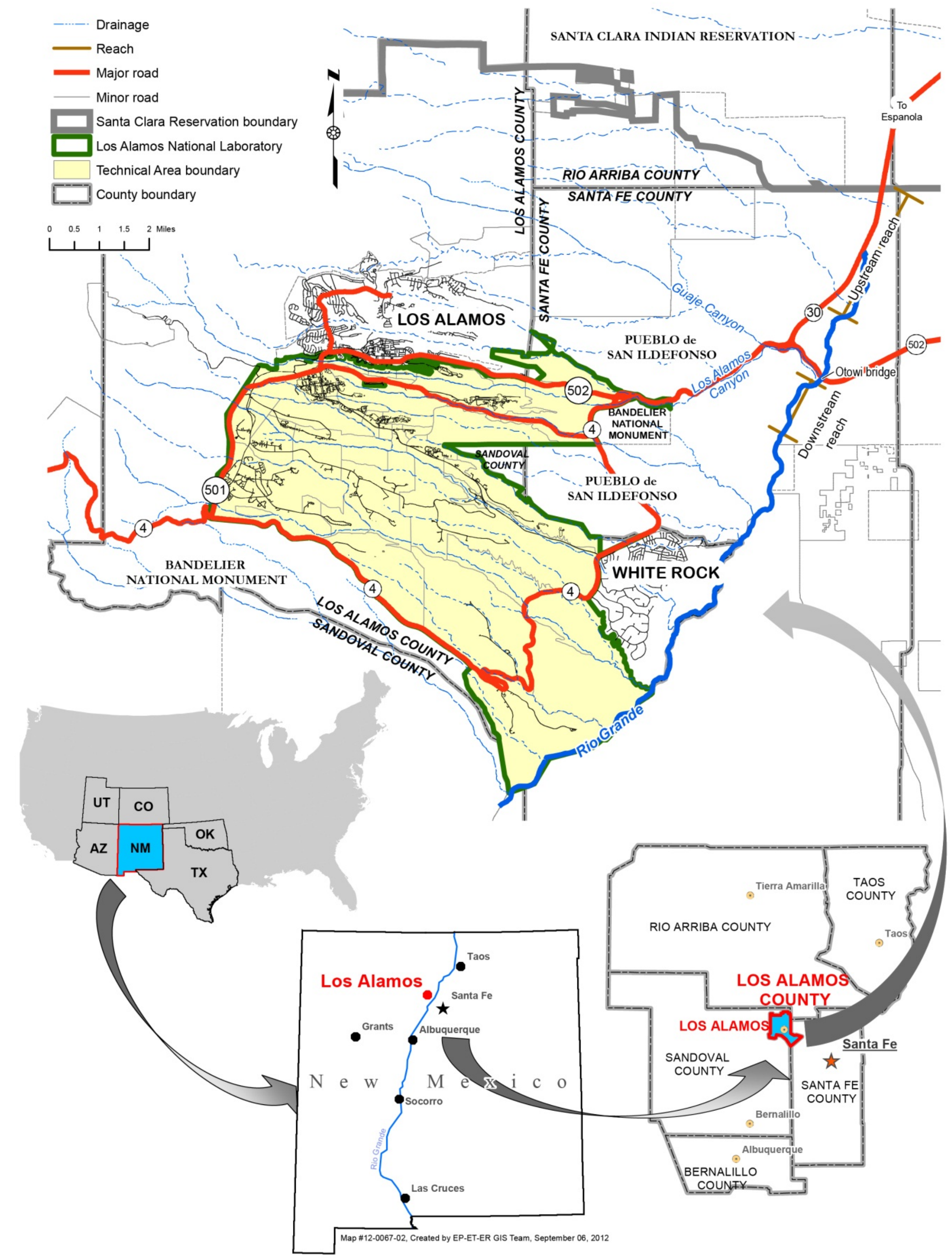


Figure 1 Location of the Laboratory with insets of New Mexico State and Los Alamos County

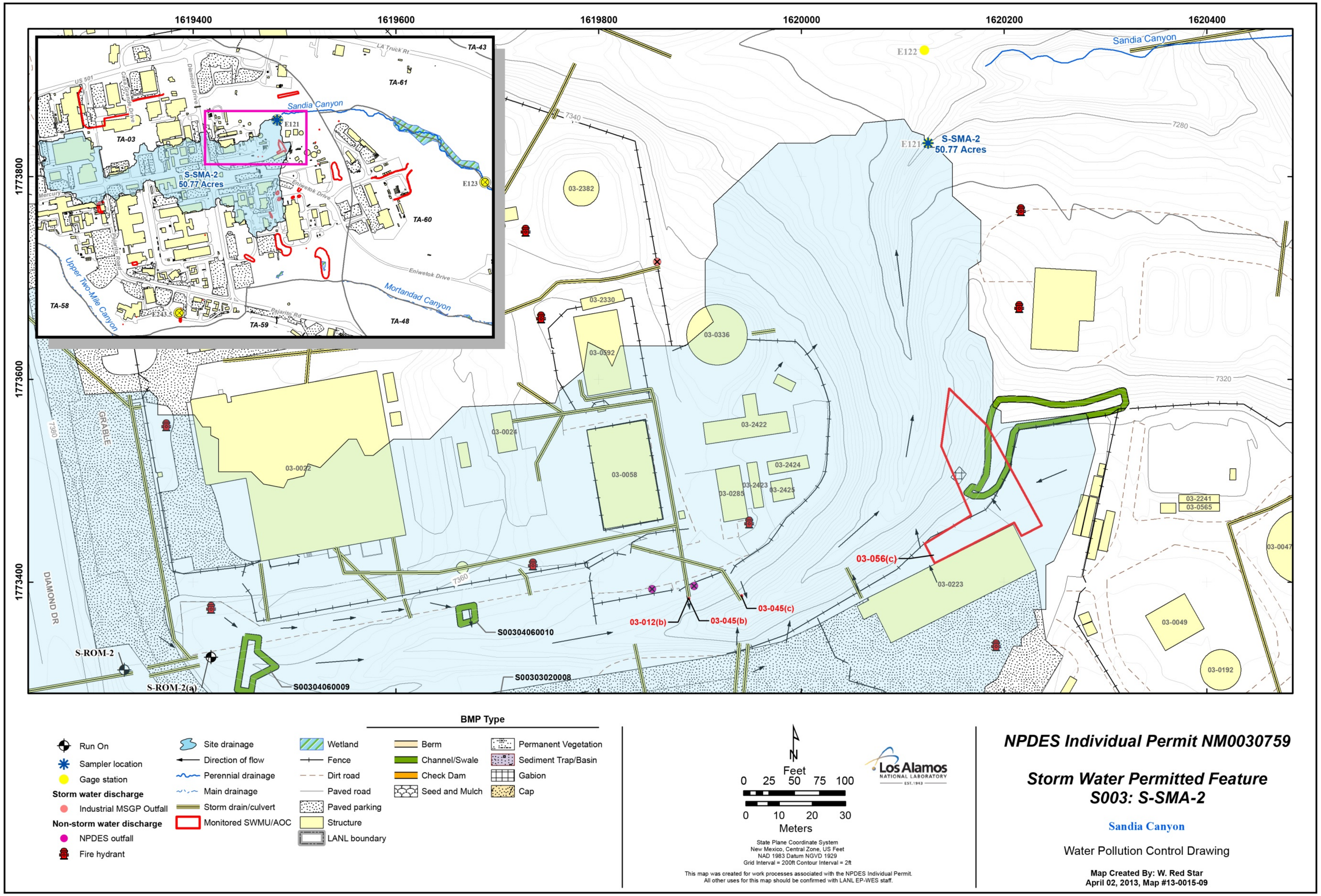


Figure 2 Project map of S-SMA-2 showing monitored Sites, sampler locations, gage stations, and baseline controls

Figure 3 NPDES-permitted outfalls in TA-03

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 (VOCs), semivolatile organic compounds (SVOCs), PCBs, and nitrate and perchlorate.

As the phased investigations proceed under the Consent Order, some AOCs and SWMUs will be eligible for no further action status (e.g., the data reveal no hazardous constituents were released). For the remaining SWMUs and AOCs, the phased 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 the Site poses no unacceptable risk to human health and the environment under current and reasonably foreseeable future land use. The investigation and remediation of SWMUs and AOCs under the Consent Order began before the effective date of the Individual Permit and continues concurrently with implementation of the Permit.

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 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 results 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 4). 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.

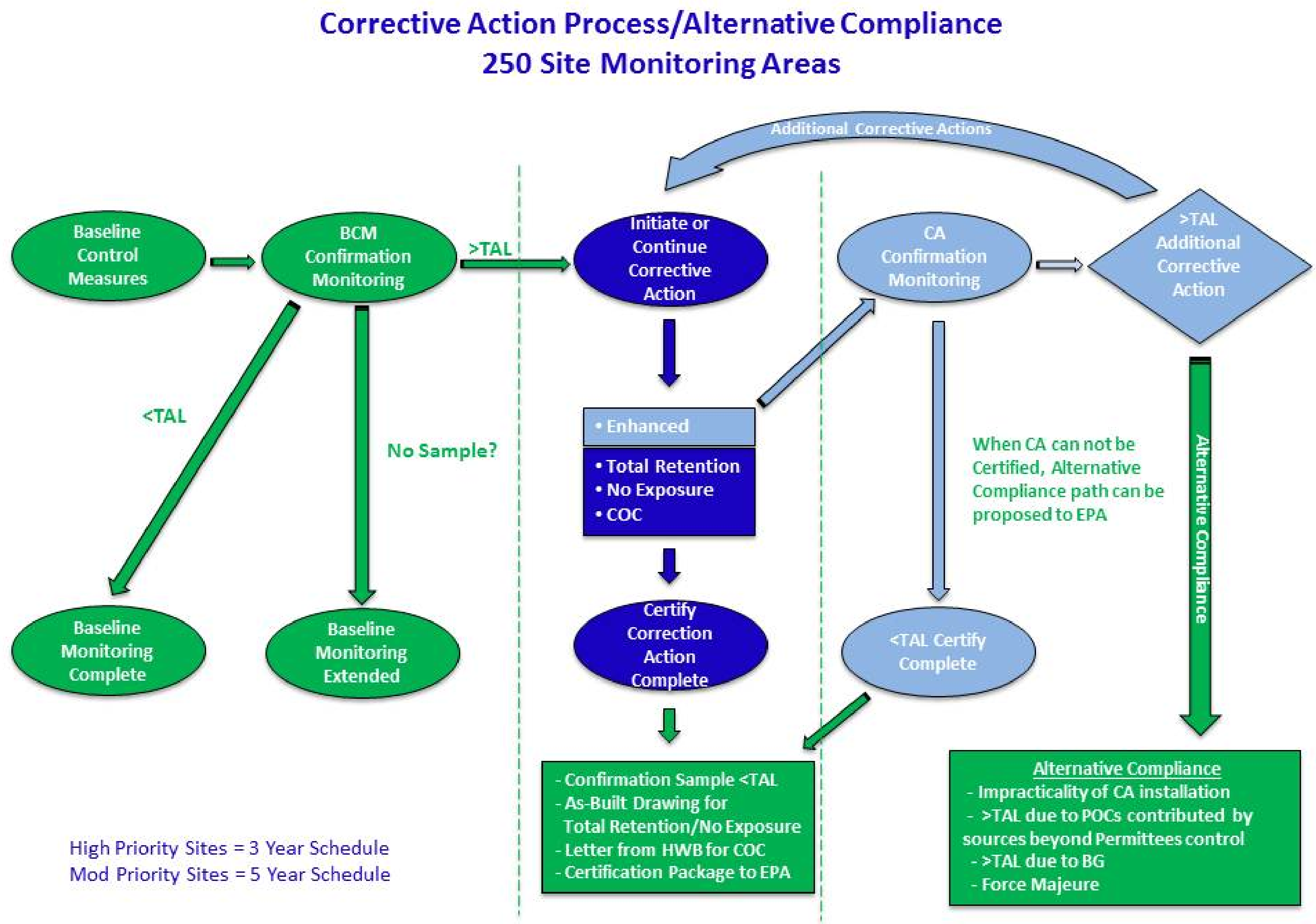


Figure 4 Flow chart of the corrective action process/alternative compliance

2.2 Path Forward for Sites 03-012(b), 03-045(b), and 03-045(c)

Four Sites are located within S-SMA-2: 03-012(b), 03-045(b), 03-045(c), and 03-056(c). Only Site 03-056(c) is the subject of this alternative compliance request. The path forward for the remaining three Sites within S-SMA-2 is discussed below.

2.2.1 Site 03-012(b)

Site 03-012(b) was identified in the 1990 SWMU Report (LANL 1990) because of operational releases from the TA-03 power plant (building 03-22) and associated cooling towers, including cooling tower drift (Figure 2). A gas turbine generator and cogeneration plant, along with supporting utilities, were installed east of the power plant within the eastern portion of Site 03-012(b) in 2007, and the original power plant is maintained for backup purposes. Industrial materials historically associated with operation of the TA-03 power plant include chromium, which was used as an additive to cooling water until the early 1970s, and petroleum products associated with power plant operations.

Site 03-012(b) is eligible for a certificate of completion under the Consent Order because all investigation results for SWMU 03-012(b) indicate the nature and extent of contamination are defined and the site poses no unacceptable risk to human health and the environment under current and reasonably foreseeable future land use. Investigation results were less than the residential soil screening levels (SSLs), except for one PCB result, which was less than industrial SSLs. The Individual Permit requires that the Permittees complete corrective action at high priority Sites within 3 yr of the Permit's effective date of November 1, 2010. As discussed during the October 29, 2012, meeting between EPA and the Permittees, DOE, LANS, and NMED have established a technical team under the January 5, 2012, Framework Agreement to review the characterization efforts undertaken to date pursuant to the Consent Order to identify those sites where the nature and extent of contamination have been adequately characterized and to shift efforts to cleanup for those sites. The Upper Sandia Canyon Aggregate Area, which includes Site 03-012(b), will be the first revised package submitted to NMED for certificates of completion.

If DOE/LANS do not receive the certificate of completion from NMED by September 13, 2013, the Permittees will submit a request for force majeure pursuant to Part I.E.4(c). Part I.E.4(c) provides that EPA may approve an extension to this deadline if the Permittees can demonstrate a "force majeure" has resulted, or will result, in a delay in meeting the obligation to complete corrective action. Force majeure includes, among other things, "*the inability to obtain the necessary authorizations, approvals, permits or licenses due to an action or inaction by another governmental authority*" (emphasis added).

2.2.2 Sites 03-045(b) and 045(c)

Site 03-045(b) is an active NPDES-permitted outfall (Outfall 001) that receives treated sanitary effluent from the TA-46 Sanitary Wastewater System Consolidation Plant that has received further treatment at the Sanitary Effluent Reclamation Facility (SERF). Other wastewater treated at SERF and discharged through the outfall includes wastewater from makeup water production and boiler blowdown water from the cogeneration plant, and occasional releases of cooling tower blowdown and other discharges from the TA-03 power plant (building 03-22). The NPDES permit number for the outfall was previously identified as EPA 01A001 but is currently permitted as 001 on the 2007 NPDES authorization permit. This outfall discharges onto sand and gravel southeast of building 03-22 and into a small tributary of Sandia Canyon (Figure 3).

This outfall historically received effluent from power plant cooling tower 03-25. Cooling tower 03-25 was demolished in 1990, and a new cooling tower structure, 03-592, was constructed at the same location in 1998. Cooling towers 03-58 and 03-592 are currently operated during testing of the backup power plant and discharge intermittently to Outfall 001 [Site 03-045(b)] after treatment at SERF. Outfall 001 is currently monitored for the following parameters: pH, total residual chlorine, E. coli, temperature, total suspended solids, aluminum, PCBs, and whole-effluent toxicity.

Site 03-045(c) is a second active NPDES-permitted outfall (EPA 03A027) that is located approximately 55 ft east of Site 03-045(b) (Figure 3). Site 03-045(c) currently receives blowdown from the cooling towers at the Strategic Computing Complex (building 03-2327), which became operational in 2002. Site 03-045(c) also formerly received effluent from cooling tower 03-285, which was constructed in 1968 to serve the generators powering a Laboratory computer system. Cooling tower 03-285 was taken out of service in 2006. Site 03-045(c) may have historically received chromate-treated water. Outfall 03A027 is currently monitored for the following parameters: pH, total residual chlorine, total suspended solids, phosphorous, copper, and whole-effluent toxicity.

The Permittees will submit a request to EPA to remove these two Sites from the Individual Permit because they are active permitted NPDES outfalls.

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 Part I.E.2(a) through (d), individually or collectively. Part I.E.3(b) requires the Permittees to file a written request with EPA on, or at least 6 mo before, the applicable deadlines for completion of corrective action. The applicable deadlines to complete corrective action at high priority Sites and moderate priority Sites are October 31, 2013, and October 31, 2015, respectively.

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 of provides examples of the type of conditions that 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 Part 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. Although not required by the Individual Permit, the Permittees have scheduled a public meeting on June 4, 2013, at Fuller Lodge in Los Alamos, New Mexico.

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 DESCRIPTIONS

The 50.8-acre S-SMA-2, which includes four Sites [03-012(b), 03-045(b), 03-045(c), and 03-056(c)], is located in the central portion of TA-03 and encompasses numerous office, laboratory, and support facilities, paved roads and parking lots (Figure 2). The core operational facilities for the Laboratory are located at TA-03, including the principal administration buildings, the library, the Chemistry and Metallurgy Research (CMR) Building, the Beryllium Technology Facility, a gas-fired electrical generating plant, and a former sanitary wastewater treatment plant (WWTP) and supporting structures.

TA-03 was originally built as a firing site in 1945 that was decommissioned and cleared in 1949. In the early 1950s, operational facilities from former TA-01 (located in the Los Alamos townsite) were relocated to TA-03. Early TA-03 facilities included the Van de Graaff accelerator building, a laboratory and support structures, the communications building, the CMR Building, the general and chemical warehouses, the cryogenics laboratory, the administration building, the Sigma Building, a fire house, and the physics building. Additional new construction continued through the 1960s and 1970s, when storage areas, shops, office buildings, a WWTP, asphalt batch plant, cement batch plant, and numerous transportable structures were added. Support structures for these facilities included an automotive repair garage, a gas station, steam-cleaning facility, and warehouses. The Oppenheimer Study Center was constructed in 1977, and an annex was added to the administration building in 1981. A computer facility and several national centers for various scientific activities were constructed in the 1990s. The National Security Sciences Building and an associated parking structure were completed in 2006.

Site 03-056(c) is an inactive outdoor storage area located at TA-03 on the north side of a utilities shop, building 03-223 (Figure 2). The Site extends along the length of building 03-223 to the south and is bounded by a security fence to the north. The storage area was used from 1967 to 1992 to store electrical equipment, capacitors, and transformers with polychlorinated biphenyl– (PCB-) containing dielectric fluid.

The Site is currently consists of a sloped, asphalt lot with a curb cut draining runoff into upper Sandia Canyon. The paved lot is next to the Laboratory’s utilities control center, an approximately 9000 ft^2 metal-sided and -roofed building. The immediate area above Site 03-056(c) includes metal storage sheds, transportainers, utility equipment and materials staging, and roughly 1200 ft of chainlink fencing around the utilities control center perimeter

In addition to PCBs, industrial materials potentially released at this Site during its operating life include halogenated solvents. The types of solvents used at the Site from 1967 to approximately 1981 are not known. It is believed that the maintenance crew disposed of all these waste materials at an approved waste-disposal facility. Viking R30 (1,1,1-trichloroethane) was used from 1981 to 1990. From 1990 to 1992, a nonhazardous citrus-based solvent was used as a substitute for halogenated solvents. In addition, Transclene, which contains tetrachloroethene, may have been stored at the site because it was used by an electrical equipment maintenance subcontractor to fill transformers in the field. The 1990 SMWU Report (LANL 1990) identified soil-staining at the Site that might have indicated past releases.

4.1 Summary of Consent Order and Other Investigations

Two actions have been performed at SWMU 03-056(c) to remove historical PCB contamination. Approximately 1000 yd^3 of PCB-contaminated soil was removed from August to November 1995. The objective of the 1995 removal action was to remove all soil with PCB concentrations above 10 ppm.

An additional 2400 yd^3 of material was removed from September 2000 to March 2001. This second removal action was initiated through a voluntary corrective action (VCA) (LANL 2001). PCB-contaminated soil was removed from the western and northern slope areas and the ephemeral slope drainage areas. Because of the site’s proximity to a watercourse, the PCB cleanup targets were less than 1 ppm of PCBs in soil in accordance with the Toxic Substances Control Act (TSCA). The VCA plan was approved by NMED in 2002 (NMED 2002). The VCA also included placing clean backfill in excavated areas, stabilizing exposed backfill, seeding, stabilizing soil around trees, and the installing a gabion apron to dissipate the energy of storm water running off the asphalt pad on the edge of the mesa. Following removal of PCB-contaminated soil and tuff, a total of 93 confirmation samples were collected from 83 locations and analyzed for PCBs. Twenty-one samples were also analyzed for metals and volatile organic compounds (VOCs). Arsenic and tetrachloroethene were identified as chemicals of potential concern because of detected concentrations greater than background values and their respective risk-based screening action levels, but assessment of the residual risk at the site after the VCA indicated no unacceptable risks to human receptors. The VCA report for SWMU 03-056(c) was approved by EPA in November 2001 (EPA 2001) and by NMED in September 2002 (NMED 2002).

NMED issued a certificate of completion with controls for SWMU 03-056(c) on February 18, 2011 (NMED 2011). In its certificate NMED stated that the nature and extent of contamination were defined, confirmatory sample results indicated the Site met the EPA's PCB cleanup criterion, and the Site poses no potential unacceptable human health and ecological risks from PCBs or VOCs. The required controls were to institute and maintain a control on the Site by monitoring storm water discharge for potential off-site transport of residual PCB contamination. The basis for the required control under the Consent Order was the possibility that storm water discharge may mobilize residual contamination from the Site. NMED also indicated the storm water monitoring was currently implemented pursuant to the Individual Permit.

4.2 Rationale for Inclusion of Sites in the Individual Permit

Identification of SWMUs 03-012(b), 03-045(b), 03-045(c), and 03-056(c) as high priority PCB Sites in the Individual Permit was based on the detection of PCBs in storm water samples collected from Sandia E-station E-121 (Figure 2) pursuant to the Federal Facility Compliance Agreement. At the time the application was submitted, Aroclor-1254 and Aroclor-1260 were detected at 0.71 µg/L and 1.2 µg/L, respectively, at station E-121 (Sandia right fork at Power Plant).

5.0 DESCRIPTION OF CONTROL MEASURES INSTALLED WITHIN S-SMA-2

A number of baseline control measures were installed within S-SMA-2 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 used at the site.

Table 1
Active Control Measures for S-SMA-2

Control ID	Control Name	Run-on Control?	Runoff Control?	Sediment Control?	Erosion Control?	Control Status
S00304060011	Channel/Swale-Rip Rap	X			X	B
S00303020008	Berms-Base Course	X		X		CB
S00304060009	Channel/Swale-Rip Rap	X			X	CB
S00304060010	Channel/Swale-Rip Rap	X			X	CB
S00302010007	Established Vegetation-Grasses and Shrubs				X	CB
S00307020006	Gabion Blanket		X	X		CB
S00304060005	Channel/Swale-Rip Rap	X			X	CB
TBD	Channel/Swale-Rip Rap	X			X	EC
TBD	Rip Rap Inlet Protection	X				EC
TBD	Rip Rap Inlet Protection	X				EC
TBD	Rock Check Dams (4)	X		X		EC
TBD	Rock Mulch	X			X	EC

Notes: Blank cell indicates control type does not apply. TBD: Control ID to be determined.
B: Additional baseline control measure.
CB: Certified baseline control measure.
EC: Enhanced control measure to be certified in 2013.

Rain gage RG121.9 recorded two storm events at S-SMA-2 during the 2012 season. These rain events triggered two 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 during 2011 and 2012

Inspection Type	Inspection Reference (from The Maintenance Connection)	Inspection Date
Preventive Maintenance	BMP-14026	07-11-2011
Storm Rain Event	BMP-16266	08-09-2011
Storm Rain Event	BMP-17236	08-24-2011
Storm Rain Event	BMP-18911	09-14-2011
TAL Exceedance	COMP-20168	10-19-2011
S-SMA-2: Annual Erosion Evaluation	COMP-20015	10-19-2011
S-SMA-2: Annual Erosion Evaluation 2012	COMP-22637	05-08-2012
Storm Rain Event	BMP-25249	07-24-2012
Storm Rain Event	BMP-28706	10-23-2012

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

Table 3
Maintenance during 2011 and 2012

Maintenance Reference	Maintenance Conducted	Maintenance Date	Response Time	Response Discussion
BMP-23538	Installed riprap S00304060011 as outlet protection at outlet west of existing riprap-0009.	05-29-12	21 day(s)	Maintenance conducted as soon as practicable
BMP-25864	Reshaped and built up base course berm S00303020008.	7-31-12	7 day (s)	Maintenance conducted in a timely manner
BMP-25865	Added rock to riprap S00304060009.	8-8-12	15 day (s)	Maintenance conducted as soon as practicable
BMP-29158	Riprap S00304060009 extended south to span entire width of channel.	11-6-12	14 day (s)	Maintenance conducted in timely manner.

Note: No maintenance activities were conducted in 2011.

6.0 STORMWATER MONITORING RESULTS

The location of the sampler for S-SMA-2 is shown in Figure 2. Baseline confirmation samples were collected from S-SMA-2 on July 28, 2011, and August 13, 2011, showing exceedances for copper, total PCB, and zinc. These data are summarized in Table 4. The results of this sampling effort are presented in graphs as a ratio of the respective maximum target action level (MTAL) or average target action level (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
Copper	µg/L	2	5.8 to 8.3	n/a*	n/a	n/a	4.3	2
Total PCB	µg/L	2	0.14 to 0.19	0.00064	0.163	255	n/a	n/a
Zinc	µg/L	2	23.8 to 62.6	n/a	n/a	n/a	42	1

*n/a = Not applicable.

7.0 BASIS OF ALTERNATIVE COMPLIANCE REQUEST

NMED issued a certificate of completion with controls for SWMU 03-056(c) on February 18, 2011. NMED stated that its issuance of a certificate of completion with controls was because "storm water discharge may mobilize residual [PCB] contamination from the site" (NMED 2011), and therefore, NMED directed the Permittees to implement and maintain a control on the Site by monitoring storm water discharge for potential off-site transport of residual PCB contamination. Furthermore, NMED stated the storm water monitoring was currently implemented pursuant to the Individual Permit. The storm water monitoring performed under the Individual Permit identified PCBs above TALs.

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 three categories to the feasibility of implementing corrective action options at Site 03-056(c) are detailed below.

7.1 Sources of Pollutants

Based upon a review of historical site use and soil sampling performed under the Consent Order, copper and zinc are not associated with industrial materials historically managed at Site 03-056(c). There are two likely sources of PCBs: the historical releases at Site 03-056(c) and anthropogenic urban "background" sources.

7.1.1 Copper and Zinc

Because the two metals that exceed TALs from S-SMA-2, copper and zinc, are also common in urban storm water, a literature search was performed to identify potential sources of copper and zinc in storm water from industrial and urban areas. The sources of metals in urban storm water are numerous including, but not limited to, automobile tires, roofing and down spouts, metal culverts, and chainlink fencing. These pollutants accumulate until the first significant storm of the season (Rosenbloom 2009).

The following potential sources of were consistently identified in the literature search.

Galvanized Metals

Galvanization is the process of coating iron or steel with zinc, which acts to protect the metal from corrosion or rust. Galvanized metal storm water sewer pipes and chainlink fences are common sources of zinc in storm water runoff at industrial and commercial sites. Chainlink fencing has a considerable area of exposed galvanized material: a linear inch of a 6-ft-high fence has a surface area comparable to a 1 in. wide by 7-ft long galvanized metal roof (Golding 2006). Other typical galvanized surfaces include metal roofs and siding; roof heating, ventilation, and air-conditioning (HVAC) systems, ductwork, turbines, and equipment boxes; downspouts and gutters; and light poles (Golding 2008).

Parking and Paved Areas Subject to Vehicle Traffic

Contributions of zinc to the parking areas, loading docks, and paved grounds common to industrial facility sites appear to come from two primary sources: motor oil and tire wear (Golding 2006).

Motor oil is known to contain high levels of zinc and may also contain copper. Major brands of motor oil contain zinc from 0.11%–0.20% zinc by weight (Golding 2006). Motor oil accumulating on paved surfaces during periods of little or no precipitation and areas where motor oil leaks, such as parking areas and loading docks, contribute to an industrial facility's storm water discharge (Golding 2006).

Tire material consists of 1% zinc by weight, which is released with tire wear as particulate dust or as deposits onto pavement. This release of zinc from tire wear has been found to be a source in storm water runoff (Golding 2006).

Vehicle brake emissions are one of the most important sources of copper in the urban environment (Sondhi 2010). Copper and other metal additives have been used in brake pads since the 1960s. Between 1998 and 2002, the use of copper in domestic brake pads increased by 90% to meet new federal safety regulations. The content of copper in brake pads varies from 15%–25% at present and accounted for an estimated 47% of copper in a Maryland urban residential neighborhood. Brake emissions in California were estimated to contribute 80% of the copper found in urban storm water runoff leading to the South San Francisco Bay (Sondhi 2010).

7.1.2 Regional Background Metals Study and Run-on Data Evaluation

Storm water samples were collected from 2009 to 2012 at developed urban monitoring locations throughout the Laboratory and within the Los Alamos County townsite to determine background values for metals. These results are summarized in a recent Laboratory publication analyzing background and baseline metals in northern New Mexico, titled "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 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 wide variety of bedrock source areas and sediment texture. Water-quality conditions measured at background sites and at urban locations reflect the contaminant levels in storm runoff that were derived from the landscape.

The monitoring locations evaluated in the Background Metals Report (LANL 2013) were upstream (upgradient) from Sites and considered representative of a developed landscape associated with buildings, parking lots, and roads. The results were analyzed using Statistica 8.0 (StatSoft 2007, Statistica 8.0, Statistics and Analytical Software Package, Tulsa, OK) and ProUCL 4.1.01 (available at http://www.epa.gov/nerlesd1/databases/datahome.htm). Statistical analyses were considered significant at $p<0.05$. An upper tolerance limit ([UTL] 95%; 95% confidence) was calculated to represent a background value to compare with TAL exceedances observed at SMA monitoring locations that experience run-on from urban sources (Table 5).

The Permittees also collected run-on storm water samples during the 2012 field season to support this alternative compliance request. The samples were taken upstream of the SMA, and the locations of the run-on samplers are shown in Figure 2.

The results of the comparison of urban "background" and site-specific run-on data for copper and zinc with the analytical results obtained under the Individual Permit are summarized below.

Copper

The copper background UTL for storm water runoff from an urban/developed landscape on the Pajarito Plateau is 32.3 µg/L, greater than both Individual Permit storm water results of 5.8 µg/L and 8.3 µg/L. This relationship confirms the source of copper in storm water at S-SMA-2 is not from the historical release of industrial materials at the Sites.

Site-specific storm water run-on samples collected within the SMA, but upgradient of the Sites, contained copper at concentration ranging from 4.78 µg/L to 21.3 µg/L, greater than the TAL of 4.3 µg/L, and in several results greater than concentrations detected in storm water runoff from the SMA. These data confirm the TAL exceedance is not related to historical use of industrial materials at the Site and strongly indicate the copper is associated with storm water run-on from urban development. These findings are also consistent with likely sources of copper identified in the literature. The parking lots at TA-03 serve as collection points for pollutants from brakes pads and motor oil that are deposited on the impervious pavement.

The absence of a Site source of copper is confirmed by the lack of an observable difference between concentrations of copper in storm water collected running on to the Sites, at the SMA, and running off from the SMA at E-121 (Figure 5).

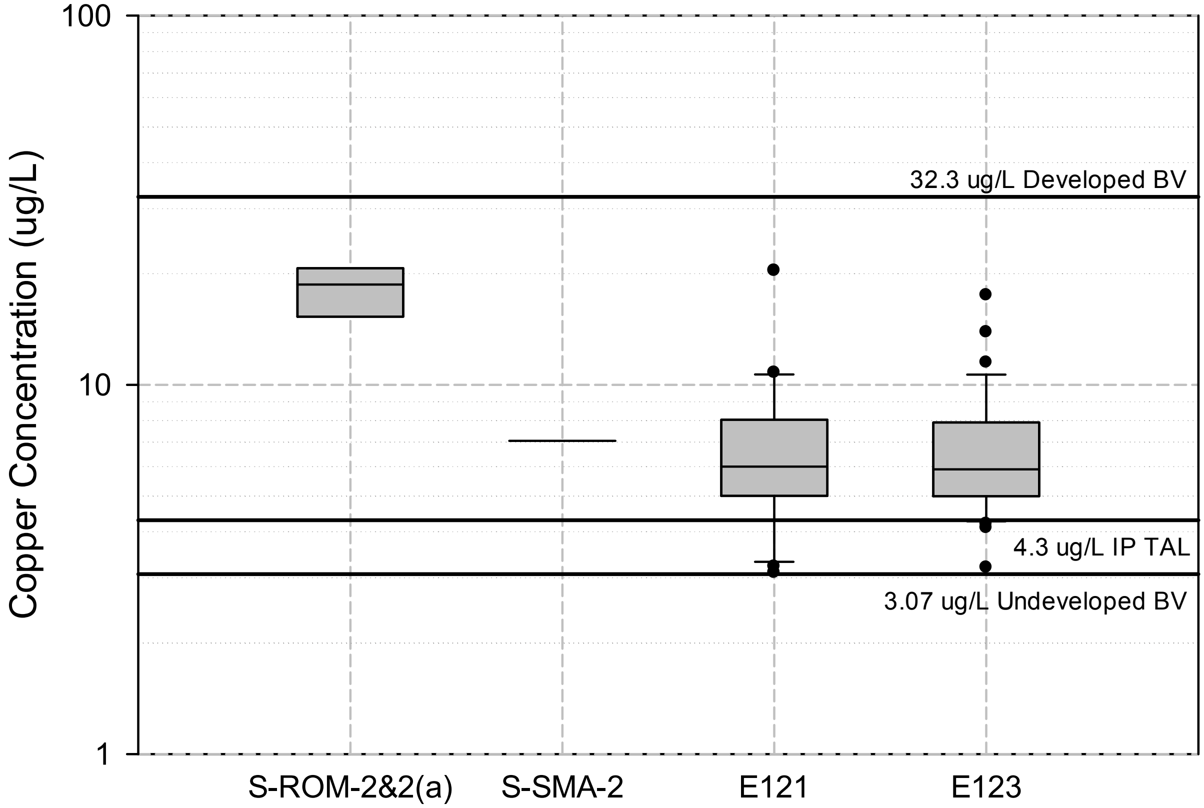


Figure 5 **Statistical range of copper in storm water running onto the SWMU [S-ROM-2 and S-ROM-2(a)], in discharges from the SWMU itself (S-SMA-2), and at downstream gage stations E121 and E123**

Table 5
Comparison of Background Value and TAL Exceedances at SMA Locations

		Water																	
		Individual Permit Compliance			Hardness Adjusted TAL at S-SMA-2		Hardness Adjusted TAL at E121		Urban Background Comparison		BLM-Adjusted TALs		Run-On Location 1 [S-ROM-2(a)]		Run-On Location 2 [S-ROM-2]		E121 (Storm Water) at Downstream of S-SMA-2	
Location	Analyte	Individual Permit TAL (µg/L)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Hardness-Adjusted TAL at S-SMA-2[a] (µg/L)	No. of Detects/Total No. of Analyses (% Hardness-Adjusted TAL Exceedance)	Hardness Adjusted TAL at E121 (µg/L)	No. of Detects/Total No. of Analyses (% Hardness-Adjusted TAL Exceedance)	Background UTL from Urban Landscape in µg/L[b]	% Permit Results Exceedance Background UTL	Criterion Maximum Concentration in µg/L[c]	No. of Detects/Total No. of Analyses (% CMC Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)
S-SMA-2	Copper	4.3	5.8–8.3	2/2 (100%)	5.35	2/2 (100%)	3.34	2/2 (100%)	32.3	0%	62	2/2 (0%)	18.7–21.3 (20.2)	4/4 (100%)	4.78–16.9 (12.4)	3/3 (100%)	3.1–20.4	20/20 (80%)
S-SMA-2	Zinc	42	23.8–62.6	2/2 (50%)	65.7	2/2 (0%)	41.7	2/2 (50%)	1120	0%	na[d]	na	48.1–104 (79.9)	4/4 (100%)	30.9–61.2 (44.4)	3/3 (66.7%)	5.1–259	19/20 (5%)
S-SMA-2	Total PCB	0.00064	0.14–0.19 (0.163)	2/2 (100%)	0.00064	2/2 (100%)	0.00064	2/2 (100%)	0.098	100%	na	na	0.00756–0.0312 (0.0167)	5/5 (100%)	0.00439 to 0.0341 (0.0141)	3/3 (100%)	0.11–0.25 (0.147)	4/4 (100%)

		Water									
		E121 (Base Flow)		E121 (Snowmelt)		E123 (Storm Water)		E123 (Base Flow)		E123 (Snowmelt)	
Location	Analyte	Concentration Range in µg/L (Geometric Mean)	Total No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)	Concentration Range in µg/L (Geometric Mean)	No. of Detects/Total No. of Analyses (% Permit TAL Exceedance)
S-SMA-2	Copper	3–6.39 (10)	13/15 (60%)	3.8	1/1 (0%)	4.1–17.5	33/36 (86%)	3–6.72 (10)	18/25 (24%)	3.7	1/1 (0%)
S-SMA-2	Zinc	32.4–390	15/15 (60%)	51.4	1/1 (100%)	11.1–108	35/36 (25%)	10.8–99	25/25 (28%)	11.5	1/1 (0%)
S-SMA-2	Total PCB	0.00647–0.00938 (0.00813)	3/3 (100%)	na	na	0.43–0.9 (0.612)	4/4 (100%)	0.03–0.05 (0.0387)	2/2 (100%)	na	0/0

Table 5 (continued)

		All Horizon Soil and Rock											
		Consent Order Compliance		03-012(b) ALLH		03-045(b) ALLH		03-045(c) ALLH		03-056(c) ALLH		03-056(c) QBT	
Location	Analyte	ALLH Background in mg/kg[e]	QBT4 BV in mg/kg[f]	Concentration Range in mg/kg	No. of Detects/No. Total Analyses (% ALLH BV Exceedance)	Concentration Range in mg/kg	No. of Detects/No. Total Analyses (% ALLH BV Exceedance)	Concentration Range in mg/kg	No. of Detects/No. Total Analyses (% ALLH BV Exceedance)	Concentration Range in mg/kg	No.# of Detects/No. Total Analyses (% ALLH BV Exceedance)	Concentration Range in mg/kg	No. of Detects/No. Total Analyses (% QBT BV Exceedance)
S-SMA-2	Copper	14.7	4.66	1.97–12.3	24/24 (0%)	4.95	1/1 (0%)	3.52–12.3	4/4 (0%)	2.7–15	9/9 (22%)	1.3–5.3	5/5 (40%)
S-SMA-2	Zinc	48.8	63.5	17.8–54.6	24/24 (25%)	53.4	1/1 (100%)	40.4–52.1	4/4 (50%)	24–69	9/9 (11%)	14–64	5/5 (20%)
S-SMA-2	Total Aroclor PCB	na	na	na	na	na	na	na	na	na	na	na	na
S-SMA-2	Aroclor-1254	na	na	0.0085–0.812	9/15 (na)	0.0803	1/5 (na)	0.021–0.812	4/4 (na)	na	0/37 (na)	na	0/39 (na)
S-SMA-2	Aroclor-1260	na	na	0.0312–7.6	14/15 (na)	0.117–7.6	5/5 (na)	0.0905–3.19	4/4 (na)	0.043–4.1	29/37 (na)	0.041–19	22/39 (na)

[a] The hardness-adjusted TAL for metals using the calculated hardness at a specific SMA.

[b] Background UTL value calculated from all storm water runoff results from a developed urban landscape on the Pajarito Plateau; see text for more detail.

[c] Criteria maximum concentration (CMC). The new criterion or TAL calculated by the biotic ligand model (BLM) using a full chemical analysis and considering copper complexes and pH. This is an estimate of the highest concentration of copper in ambient water to which an aquatic community can be *exposed briefly* without resulting in an unacceptable adverse effect. This is the acute criterion and represents a more applicable TAL for copper.

[d] na = Not available.

[e] Background value for all horizons (ALLH) soil media.

[f] Background value for Unit 4 of the Bandelier Tuff (QBT4).

In addition to evaluating the regional and site-specific background sources of copper in storm water, the Permittees also applied the biotic ligand model (BLM) to develop the criteria maximum concentration (CMC). The CMC calculated by the BLM uses a full chemical analysis, including hardness, and identifies copper complexes and free copper concentrations that may produce a biological insult to a target organism in an aquatic ecosystem. This value is an estimate of the highest concentration of copper in ambient water to which an aquatic community can be *exposed briefly* without resulting in an unacceptable adverse effect. A conservative approach was used to calculate the CMC value of 62 µg/L for storm water at S-SMA-2, which is higher than the TAL of 4.3 µg /L. This value was calculated using bulk chemistry of run-on storm water and the lowest hardness and highest copper value in storm water runoff from the Site. All copper results in Site runoff are below the CMC.

Zinc

The zinc background UTL calculated for storm water runoff from an urban/developed landscape on the Pajarito Plateau is 1120 µg/L (LANL 2013), greater than both Individual Permit storm water results of 23.8 µg/L and 62.6 µg/L by 2 orders of magnitude. This relationship confirms the source of zinc in storm water at S-SMA-2 is not from the historical release of industrial materials at the Site 03-056(c).

Site-specific storm water run-on samples collected within the SMA, but above the Sites, contained zinc at concentrations ranging from 30.9 µg/L to 61.2 µg/L. In most cases, zinc in storm water run-on is greater than the TAL of 42 µg/L. These data confirm the TAL exceedance is not related to historical use of industrial materials at the Site and strongly indicate the zinc is associated with storm water run-on from urban development.

These findings are also consistent with likely sources of zinc identified in the literature. The parking lots at TA-03 serve as collection points for pollutants from engine oil, tires, and brakes pads deposited on the impervious pavement. Galvanized fencing, building materials, and culverts at TA-03 are also sources of zinc.

The absence of a Site source of zinc is confirmed by the lack of a detectable difference between concentrations of zinc in storm water collected running onto the Sites at the SMA and running off the SMA at E121 (Figure 6).

PCBs

Two likely sources of the PCBs were found above the TAL in S-SMA-2: the historical releases at Site 03-056(c) and anthropogenic urban “background” sources. The historical releases and Site status after the VCA are described in section 4.1 above. The anthropogenic sources of PCBs are described below.

PCBs are common anthropogenic constituents as a result of environmental cycling 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 Laboratory. The May 2012 report, titled “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.

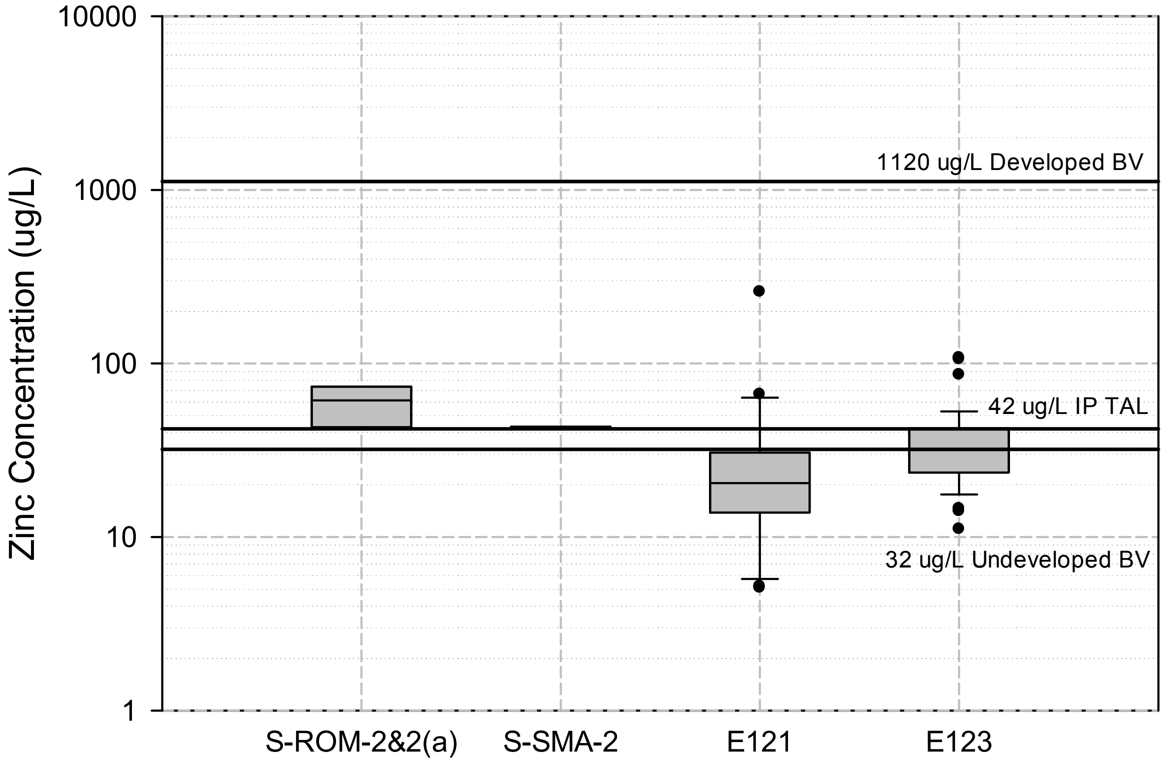


Figure 6 **Statistical range of zinc in storm water running onto the SWMU [S-ROM-2 and S-ROM-2(a)], in discharges from the SWMU itself (S-SMA-2), and at downstream gage stations E121 and E123**

This study was designed to characterize PCB levels in precipitation and storm water in the non-industrialized 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 6 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 the high sediment load carried by small tributaries during periods of storm runoff. Table 16 [of the PCB Background Report] shows that concentrations greater than the New Mexico human health WQC were measured in 91% of stormwater samples collected from tributaries to the Rio Chama and Rio Grande, in 28% to 78% in ephemeral channels on the Pajarito Plateau, and in 38% of stormwater samples from the Rio Grande or Rio Chama.

Sources of PCBs detected in water may include recognizable discrete local-scale PCB sources as well as ubiquitously dispersed sources. 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 (above 100 ng/L) were compared with upper ranges in baseline or Rio Grande storm runoff. 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 numerous studies that report PCB concentrations in stormwater 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 7 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 6
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.

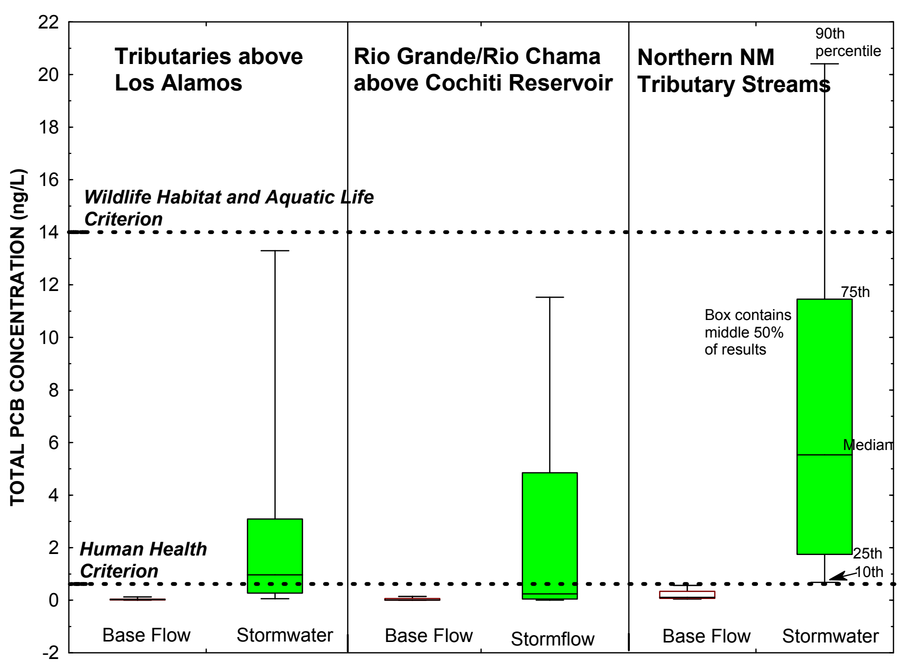


Figure 7 **Box plots of base flow and storm runoff PCB concentrations for various drainages in the upper Rio Grande system**

The PCB background UTL for storm water runoff from an urban/developed landscape on the Pajarito Plateau is 0.098 µg/L, less than both Individual Permit storm water results of 0.14 µg/L to 0.19 µg/L (LANL 2012). The presence of a Site source of PCBs is confirmed by an observable difference between concentrations of PCBs in storm water collected running on to the Sites, at the SMA, and running off from the SMA at E-121 (Figure 8). These data confirm the residual concentrations of PCBs at 03-056(c) are a source of PCBs to storm water.

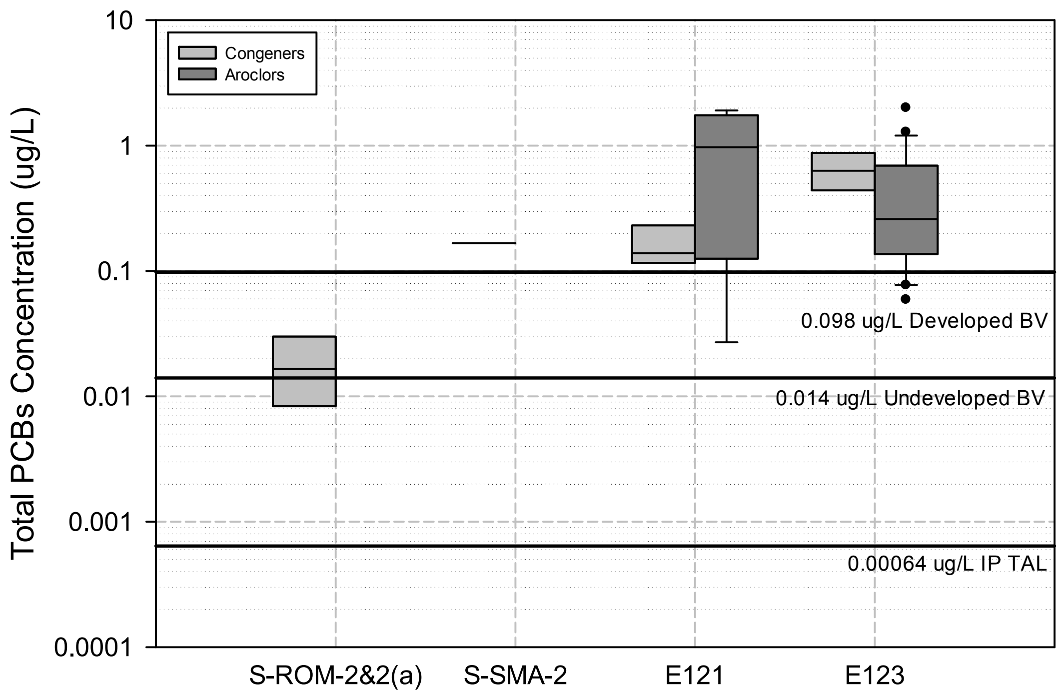


Figure 8 **Statistical range of total PCBs in storm water running onto the SWMU [S-ROM-2 and S-ROM-2(a)], in discharges from the SWMU itself (S-SMA-2), and at downstream gage stations E121 and E123. Note: storm water collected at S-ROM-2 and S-ROM-2(a) was analyzed using PCB congener methods, and storm water collected from E121 and E123 was analyzed using both the Aroclor and congener methods.**

Site-specific storm water run-on samples collected within the SMA also demonstrate that urban "background" PCBs contribute to the TAL exceedance. Although Site 03-056(c) is the only Site-related source of PCBs identified in S-SMA-2, the run-on samples contained PCBs at concentrations ranging from 0.00439 µg/L to 0.0341 µg/L, which are less than PCBs detected in storm water runoff from the Site but greater than the 0.00064 µg/L TAL. The regional background UTL of 0.098 µg/L is also higher than the TAL.

7.2 Technical Feasibility and Practicability

Because Site 03-056(c) is not the source of the zinc or copper TAL exceedances, the construction of enhanced controls, a cap or other cover on exposed portions of the Site, or a total retention structure will not affect the concentrations of these constituents in runoff from this Site. The urban storm water discharges specifically associated with current conventional industrial activities at TA-03, are covered under the MSGP and described in section 2.1.

Although an enhanced control, cap, or total retention structure may improve water quality related to residual concentrations of PCBs from Site 03-056(c), technical feasibility and practicability issues prevent the Permittees from using any of these corrective action options to certify completion of corrective action. In addition, the anthropogenic background sources of PCBs, which are unrelated to industrial materials managed at Site 03-056(c) or the other three Sites within S-SMA 2.0, would likely still result in a TAL exceedance even if all sources of residual PCBs at Site 03-056(c) were no longer exposed to storm water or totally contained.

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 03-056(c). An engineering evaluation was performed to determine if the construction of enhanced controls, total retention structures, or a cap would successfully address the TAL exceedances at Site 03-056(c) and will allow the Permittees to certify completion of corrective action under Part I.E.2. Although Site 03-056(c) has a certificate of completion with controls under the Consent Order, the PCB TAL exceedances from the storm water samples collected in the summer of 2011 demonstrate the residual PCBs remaining at the Site after soil removal to TSCA standards are still a source of PCBs to storm water.

This evaluation of corrective action options was based on the following assumptions: (1) Site 03-056(c) is not the source of the copper or zinc TAL exceedances, (2) residual PCBs at Site 03-056(c) are the primary source of the PCB TAL exceedance, and (3) urban “background” PCBs also contribute to the PCB TAL exceedance.

8.1 Enhanced Control Measures to Meet the TAL

The Permittees evaluated a potential approach for an enhanced control measure to determine if it could reasonably be expected to achieve compliance with TALs for all Sites within the SMA drainage area. As discussed above, the only Site that has been determined to be a source of industrial pollutants is Site 03-056(c). This evaluation focused on how to control the run-on from the parking lot and road directly above Site 03-056(c) and convey this run-on downslope so it does not come in contact with the Site surface (Figure 9).

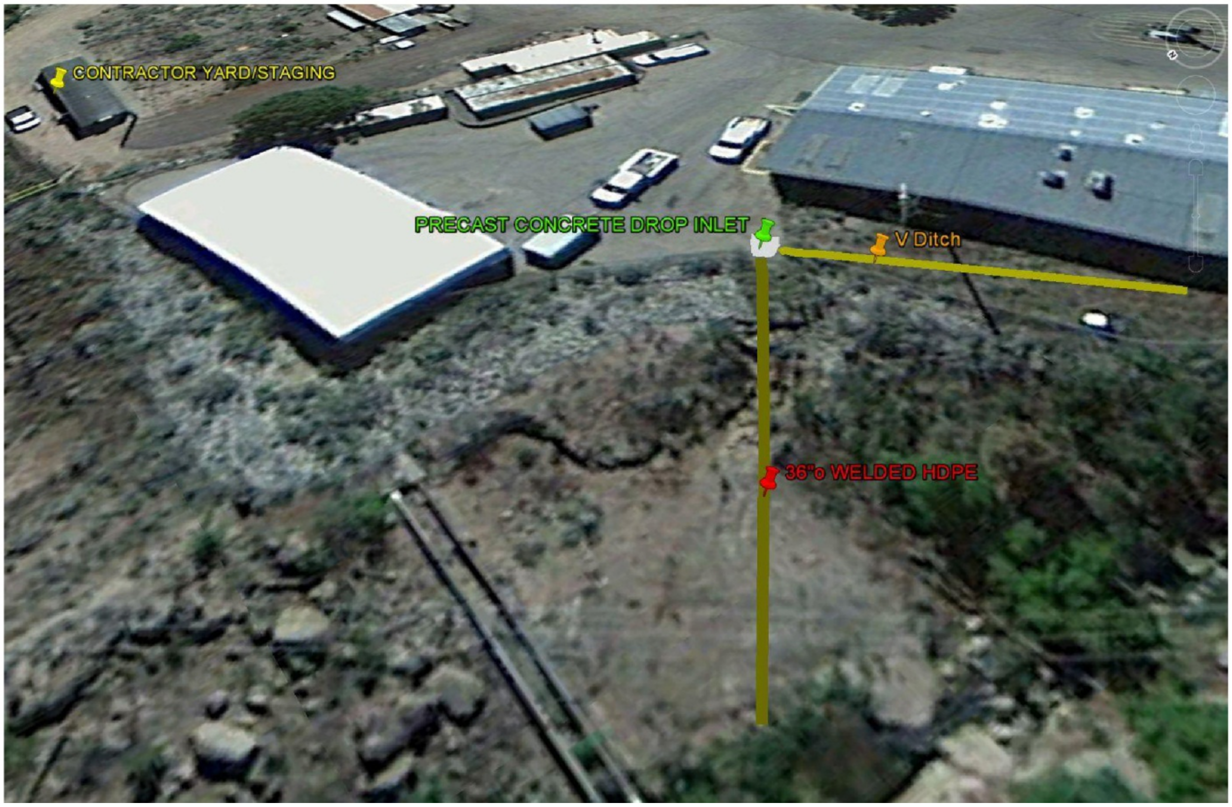


Figure 9 No exposure inlet and conveyance alternative for S-SMA-2

Run-on from the paved and gravel parking areas, roof drains from building 03-223, and a covered parking area to the south are a significant source of run-on to Site 03-056(c). This approach would control this run-on by directing it to a drop inlet directly above the Site, followed by a manhole and conveyance pipe to the canyon bottom. It would serve as the replacement for the current curb cut and existing damaged gabion system, which currently directs storm water from the catchment area directly over the Site.

This option would include the following components:

- Partially removing riprap along the top of the hill at the edge of the parking lot.
- Cutting a shallow V-ditch between building 223 and the existing chainlink fence to convey water to the catch basin.
- Excavating and installing a new precast drop inlet, catch basin, manhole, and pipe across the SWMU to the canyon bottom.

Although this enhanced control is technically feasible and could be constructed at this Site, it would not allow the Permittees to achieve TALs and certify completion of corrective action under Part I.E.2(a) for the following reasons:

- Precipitation would continue to fall on the Site and potentially mobilize residual PCB contamination, and
- Urban "background" PCBs within the SMA watershed would not be affected by the control measure.

8.2 Control Measures That Totally Retain and Prevent Storm Water Discharge

The Permittees performed a total retention engineering evaluation for Site 03-056(c) to determine if it is feasible to build a control measure that would totally retain and prevent the discharge of storm water from the Site. Because it is not practical to design a total retention structure for the Site alone, the Permittees evaluated a combination retention structure for S-SMA-2 and S-SMA-0.25, located to the west of S-SMA-2 in TA-03, that would utilize the “land bridge” below where these two watersheds converge (Figure 10) as a total retention structure.

The approximate amount of impervious surface for S-SMA-0.25 is 90%. The approximate amount of impervious surface for S-SMA-2 is 80%. For the combined watershed retention structure, the Permittees were conservative and assumed 100% runoff from both watersheds. Out of the 50-acre watershed, only approximately 0.9 acres or 1.8% of the watershed discharges over Site 03-056(c). The total storage required for these two watersheds is approximately 9 acre-ft of water. The area just above the land bridge is the only location at TA-03 where it is possible to construct a retention structure of this magnitude. The retention depth required to hold 9 acre-ft behind the land bridge is 26 ft, which is not technically practicable. Figure 10 shows the total retention alternatives for S-SMA-0.25 and S-SMA-2 in Upper Sandia Canyon.

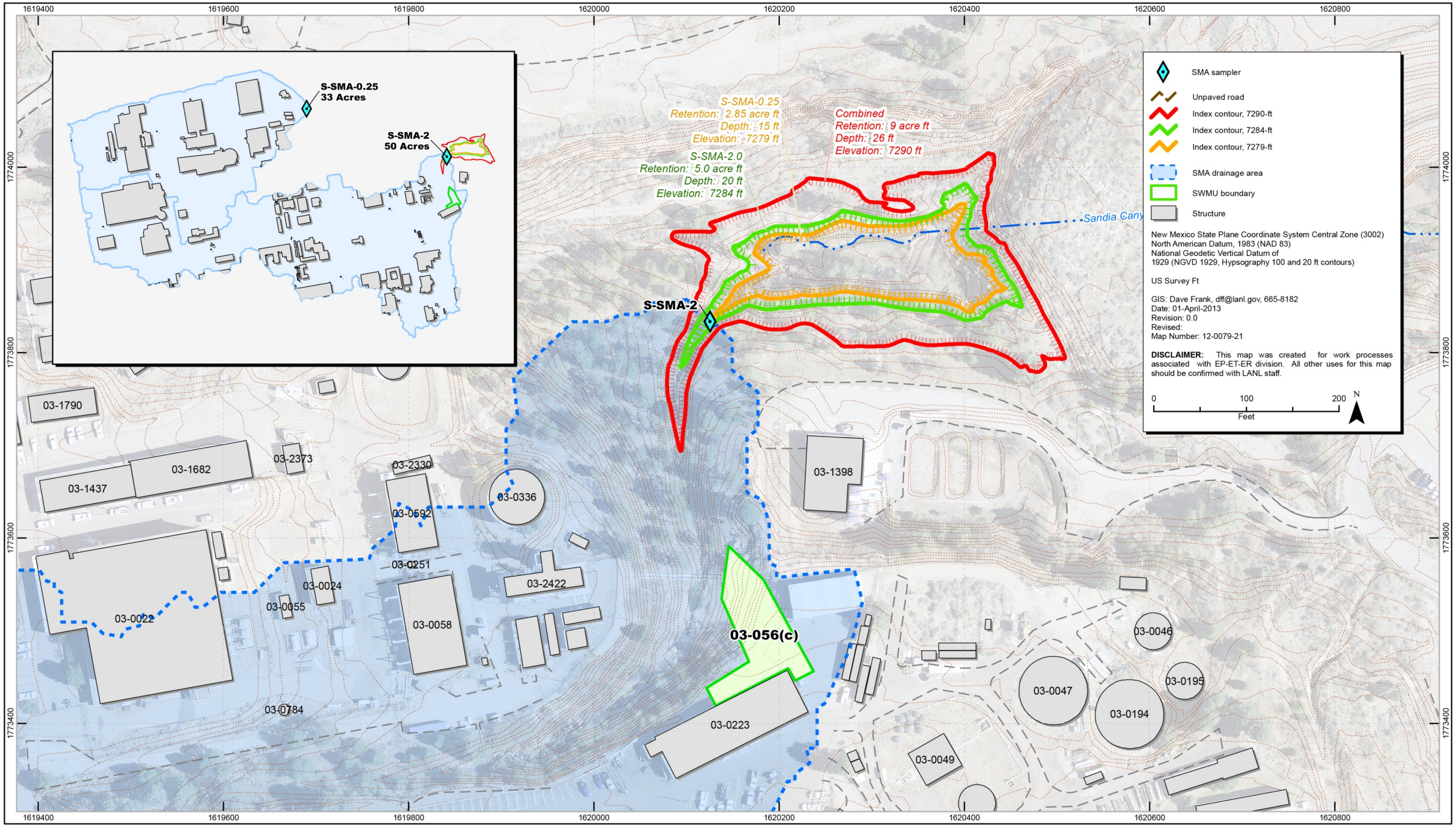


Figure 10 Total retention alternatives for S-SMA-0.25 and S-SMA-2 in Upper Sandia Canyon

The construction of this total retention structure would include the following components:

- Performing a geotechnical investigation to determine the stability of the land bridge and the foundation materials.
- Building an access road to the top and bottom of the land bridge.
- Removing the upstream face of the land bridge to a depth of approximately 20 ft and rebuilding it to an engineered standard using quality-control processes to ensure structural stability.
- Installing an impervious upstream liner on the upstream face of the land bridge, including extending the liner to key it into bedrock or upstream to form a partial seepage cutoff barrier.
- Exposing the welded high-density polyethylene storm drain to canyon bottom and holding it in place with two concrete cast blocks.
- Constructing a spillway at the proper elevation including a downstream discharge area to safely discharge storm events greater than the design capacity of the structure.
- Excavating the upstream end of the existing 72-in. corrugated metal pipe that carries storm flows under the land bridge.
- Constructing a reinforced concrete riser that has openings in the sides gaged to release flows from the reservoir over a period of days and prevent water from ponding for long periods of time.
- Clearing the reservoir area of trees and unwanted vegetation below the storage level.

Although it is technically feasible to build this total retention option, site conditions make it impracticable to pursue this option for the following reasons.

- Base flows are required to prevent overtopping of the land bridge. As a result, this option would become a detention structure, not a “total retention” structure.
- Two active NPDES outfalls [Site 03-045(b) and Site 03-045(c)] would have to be rerouted around the land bridge and then discharged into the Sandia wetlands.
- The retention depth of 15 to 31 ft of water behind the land bridge could result in increased hydraulic head at the location of the source of contamination associated with the chromium plume and potentially increase migration of contamination to groundwater.

In addition, even if this total retention structure was built, the Permittees would still not be able to certify completion of corrective action under Part I.E.2(b) because TAL exceedances would still occur as a result of urban “background” PCBs within the SMA watershed.

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

The Permittees performed an engineering evaluation of control measures to determine if it is feasible to build a control measure that would totally eliminate the exposure of residual PCBs at Site 03-056(c). One technically feasible option was evaluated: shotcrete and soil nailing. This option includes the following components:

- Removing riprap river rock (control S-00304060005) and chainlink fencing slope protection to allow access for the crew along the top of the hill.
- Installing rock bolts into the exposed vertical canyon face.
- Installing soil nails in exposed extreme grade areas.

- Regrading an existing trail to create access for small equipment and construct a staging area.
- Cleaning out the existing sediment in the stream bed directly below the Site.
- Constructing a small concrete bridge with 12 structural piers to protect existing effluent pipes.
- Excavating a new bench lengthwise across the Site in the least difficult, most level area for the drill rig or other small equipment access.

Although it is technically feasible to construct a cover on Site 03-056(c), site conditions make it impracticable to pursue this option for the following reasons:

- Constructing a cover at Site 03-056(c) could result in increased stream flows that would mobilize contaminants in currently stable sediment and degrade water quality.
- The steep slope and limited access at Site 03-056(c) (Figure 11) will result in significant environmental impacts over a larger footprint than the current Site, including, but not limited to, the construction of significant temporary storm water control measures (e.g., temporarily rerouting the Sandia channel).
- Covering the Site with shotcrete will result in significant environmental damage, including the potential damage to the Sandia wetlands caused by significant increase in storm water flows.
- Covering the Site with shotcrete will require costly maintenance through time.

In addition, even if this cover were built, the Permittees would still not be able to certify completion of corrective action under Part I.E.2(b) because TAL exceedances would still occur as a result of urban "background" PCBs within the SMA watershed.

While economic achievability is not the controlling factor when evaluating corrective action options under the Individual Permit, Part I does allow the Permittees to consider cost when evaluating site-specific control measures. The significant cost of this option, approximately $2.19 million for construction costs alone, combined with the technical challenges, led the Permittees to reject this option.

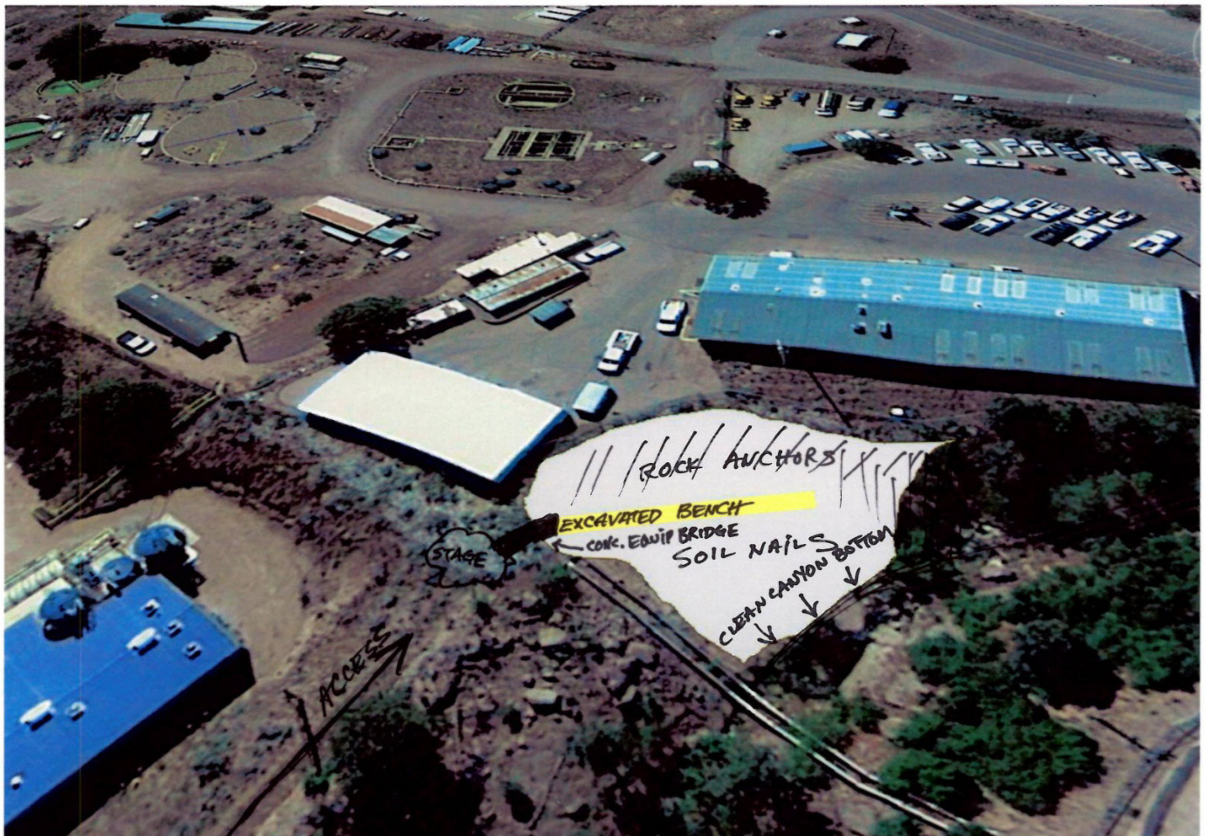


Figure 11 No exposure shotcrete option at Site 03-056(c)

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

Site 03-056(c) is unusual in that it has a certificate of completion with controls under the Consent Order, but the required control is linked to the Individual Permit. The required controls were to institute and maintain a control on the Site by monitoring storm water discharge for potential off-site transport of residual contamination. The basis for the required control was the possibility that storm water discharge may mobilize residual contamination from the Site. The PCB TAL exceedances from the storm water samples collected in the summer of 2011 demonstrate the residual PCBs remaining after soil removal to TSCA standards are still a source of PCBs to storm water. Therefore, the Permittees have submitted this alternative compliance request to EPA despite having a certificate of completion for Site 03-056(c).

9.0 PROPOSED ALTERNATIVE COMPLIANCE APPROACH

Based on this evaluation of corrective action options, the Permittees have concluded that they would not be able to certify completion of corrective action for Site 03-056(c) under Parts I.E.2(a) through E.2(d). If EPA concurs with the Permittees' corrective action evaluation and places this Site into alternative compliance, the Permittees request that EPA consider the run-on control described in Section 8.1 as part of its individually tailored work plan for Site 03-056(c).

Installing a catch basin and routing storm water across the SWMU via a pipe to the canyon bottom will likely result in a measureable improvement to storm water quality because it will reduce the contact of storm water with the residual PCB contamination at the Site and will minimize erosion.

In addition to any requirements that EPA will issue if this alternative compliance request is granted, the Laboratory is also performing work under the Consent Order downstream of the Site in Upper Sandia Canyon. The Laboratory is working with NMED under the Consent Order to ensure the Sandia wetlands continue to maintain the hydrologic and geochemical conditions that minimize contaminant migration. This work includes constructing a series of three stepped-grade-control structures followed by a cascade pool to arrest a headcut taking place in the lower portion of the wetland (Figure 12). Construction began in April 2013 and is scheduled to be completed in June 2013. The objective of this scope of work, which was approved by NMED on November 15, 2011, is to ensure that the Sandia wetlands continue to maintain their hydrologic and geochemical conditions to minimize contaminant migration.

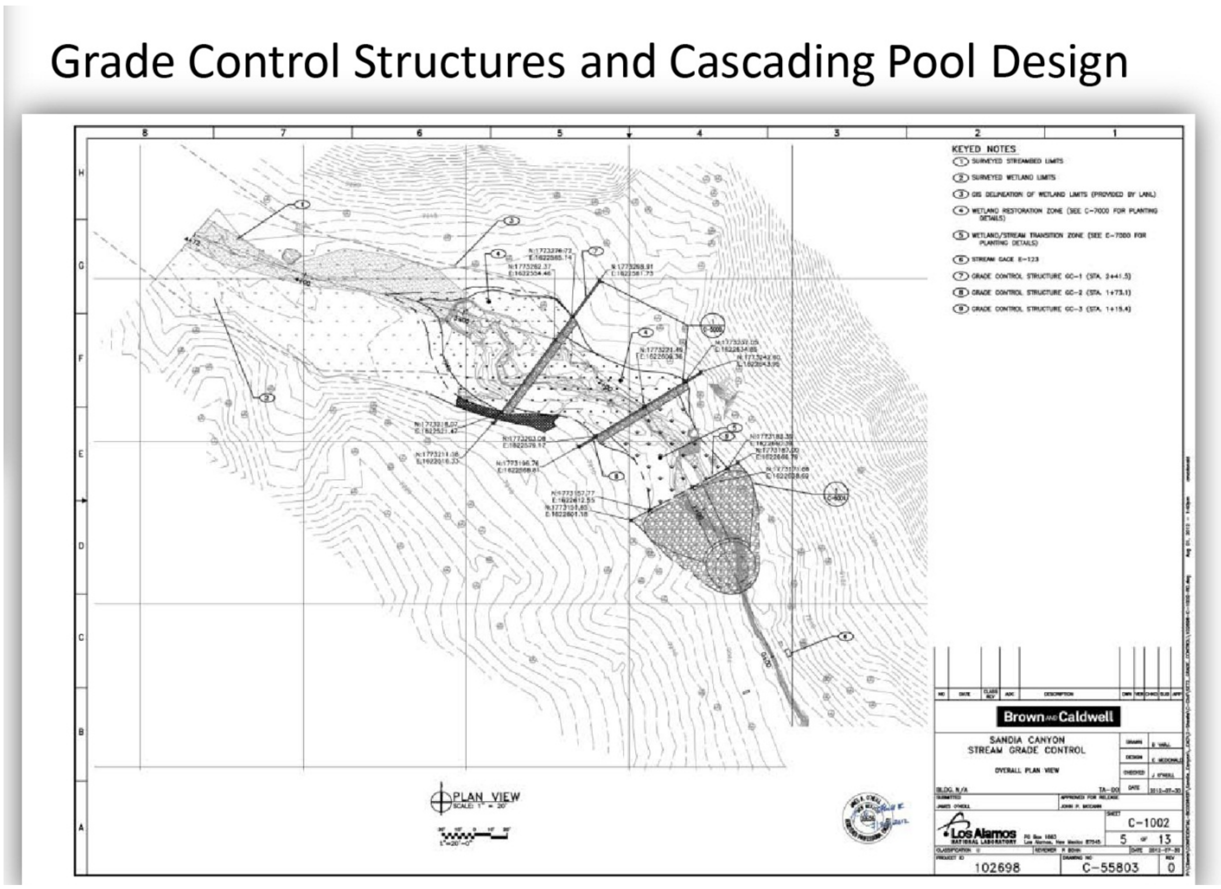


Figure 12 Current and future conditions of the terminus of Sandia Canyon wetlands

10.0 REFERENCES

EPA (U.S. Environmental Protection Agency), November 28, 2001. "Approval of the VCA Report under the Toxic Substance and Control Act (TSCA) 761.61(c) for PCB Site 3-056(c) at Los Alamos National Laboratory (LANL)," U.S. Environmental Protection Agency letter to M. Johansen (DOE-LAAO) from D. Neleigh (EPA Region 6), Dallas, Texas.

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.

Golding, S., January 2006. "A Survey of Zinc Concentrations in Industrial Stormwater Runoff," Watershed Ecology Section, Environmental Assessment Program, Washington State Department of Ecology, Publication No. 06-03-99, Olympia, Washington.

Golding, S., June 2008. "Suggested Practices to Reduce Concentrations in Industrial Stormwater Discharges," Water Quality Program, Environmental Assessment Program, Washington State Department of Ecology, Publication No. 08-10-025, Olympia, Washington.

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-0 through TA-9), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), September 2001. "Voluntary Corrective Action Completion Report for Potential Release Site 03-056(c)," Los Alamos National Laboratory document LA-UR-01-5349, 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.

NMED (New Mexico Environment Department), September 20, 2002. "Approval of VCA Completion Report for PRS 3-056(c)," New Mexico Environment Department letter to J.C. Browne (LANL Director) and E. Trollinger (DOE-OLASO) from J.E. Young (NMED-HWB), Santa Fe, New Mexico.

NMED (New Mexico Environment Department), February 18, 2011. "Certificates of Completion, Upper Sandia Canyon Aggregate Area," New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M.J. Graham (LANL) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico.

Rosenbloom, N., April 2009. "Water Quality Assessment of a Restored Urban Stream: Measuring Success of Best Management Practices at Minimizing Impacts of Stormwater Runoff in Strawberry Creek," senior thesis, University of California, Berkeley, California.

Sondhi, A., 2010. "Release and Uptake of Copper from Composite Materials in the Environment," Abstract of Ph. D. dissertation, University of Delaware, Newark, Delaware.

Attachment A

Certification of Completion of Baseline Controls at S-SMA-2

LOS ALAMOS NATIONAL LABORATORY

LA-UR-10-07681

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
S001	S-SMA-0.25
S003	S-SMA-2
S006	S-SMA-3.6

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

11/22/10
Date

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

11/17/10
Date

PF: S003 SMA: S-SMA-2

Baseline Control Measures Required :

Type of Control Measure	Erosion Control (EC)	Run-Off Control (ROF)	Run-On Control (RON)	Sediment Control (SC)
Channel/Swale	X		X	
Established Vegetation	X			
Gabions		X		X

Baseline Control Measures Installed :

BMP ID	Type of Control Measure	Control Measure	Photo ID	EC	ROF	RON	SC
S003030020008	Berms	Base Course Berm	7600-1.JPG			X	X
S003040060005	Channel/Swale	Rip Rap	7600-4.JPG	X		X	
S003040060010	Channel/Swale	Rip Rap	7600-5.JPG	X		X	
S003040060009	Channel/Swale	Rip Rap	7600-2.JPG	X		X	
S003020010007	Established Vegetation	Permanent Vegetation Grasses and Shrubs	7600-3.JPG	X			
S003070020006	Gabions	Gabion Blanket	7600-6.JPG		X		X

Comments

None applicable.

Photo 7600-1.JPG (taken 08/03/10) S00303020008 : Berms - Base Course Berm.

PF: S003 SMA: S-SMA-2

Photo 7600-2.JPG (taken 08/03/10) S00304060009 : Channel/Swale - Rip Rap.

Photo 7600-3.JPG (taken 08/03/10) S00302010007 : Established Vegetation - Permanent Vegetation Grasses and Shrubs.

PF: S003 SMA: S-SMA-2

Photo 7600-4.JPG (taken 08/03/10) S00304060005 : Channel/Swale - Rip Rap.

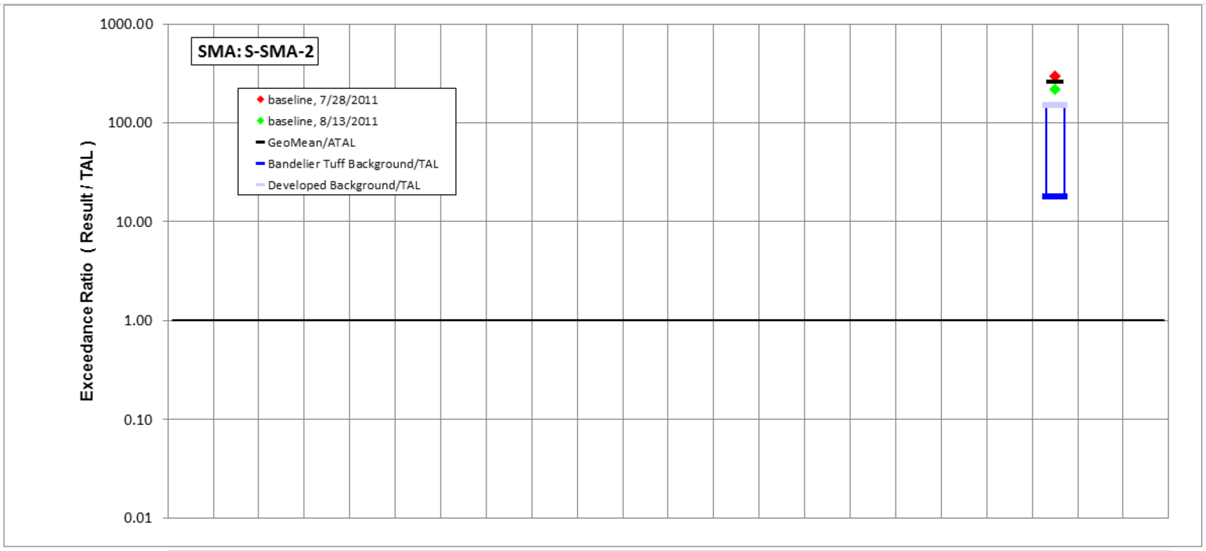
Photo 7600-5.JPG (taken 08/03/10) S00304060010 : Channel/Swale - Rip Rap.

PF: S003 SMA: S-SMA-2

Photo 7600-6.JPG (taken 08/03/10) S00307020006 : Gabions - Gabion Blanket.

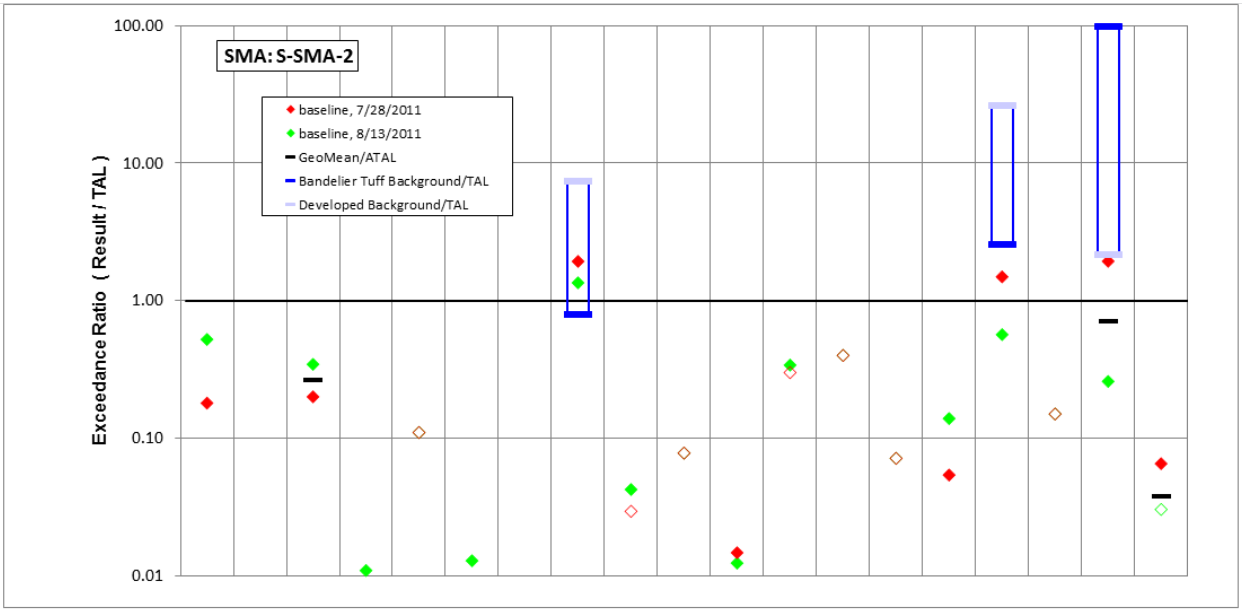
Attachment B

Storm Water Exceedances in Baseline Confirmation Samples at S-SMA-2



	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
8/13/2011 result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.14**	-	-
result / TAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**220**	-	-
7/28/2011 result	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**0.19**	-	-
result / TAL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**300**	-	-

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



	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
8/13/2011 result	392	1.4	3.1	54.6	*0.11*	2.7	1.8	**5.8**	0.72	*0.06*	2.1	1.7	*0.2*	*0.45*	13.9	23.8	*0.002*	3.88	*0.91*
result / TAL	0.52	0.0022	0.34	0.011	*0.11*	0.013	0.0018	**1.3**	0.042	*0.078*	0.012	0.34	*0.4*	*0.071*	0.14	0.57	*0.15*	0.26	*0.03*
7/28/2011 result	135	1.8	1.8	32	*0.11*	*2*	1.8	**8.3**	*0.5*	*0.06*	2.5	*1.5*	*0.2*	*0.45*	5.4	**62.6**	*0.002*	**29**	1.96
result / TAL	0.18	0.0028	0.2	0.0064	*0.11*	*0.01*	0.0018	**1.9**	*0.029*	*0.078*	0.015	*0.3*	*0.4*	*0.071*	0.054	**1.5**	*0.15*	**1.9**	0.065

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