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Lawrence Livermore National Laboratory
Livermore Site
Annual Storm Water Monitoring Report
for Waste Discharge Requirements 95-174

Annual Report
2009–2010

August 2010

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Livermore Site Annual Storm Water
Monitoring Report
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Acronyms and Definitions

ALP	Arroyo Las Positas
ALPE	Arroyo Las Positas East (storm water influent sampling location)
ALPO	Arroyo Las Positas Outfall (storm water influent sampling location)
ASS2	Arroyo Seco South (storm water influent sampling location)
ASW	Arroyo Seco West (storm water effluent sampling location)
AWQC	ambient water quality criteria
B	building
BMP	best management practice
Bq/L	becquerel/liter
CA	California
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
COD	chemical oxygen demand
DO	dissolved oxygen
DOE	Department of Energy
DRB	Drainage Retention Basin, renamed Lake Hausmann
gpm	gallons per minute
GRNE	Greenville Road East (storm water influent sampling location)
HMMA	Hazardous Materials Management Area
hr	hour
LLNL	Lawrence Livermore National Laboratory
LLNS	Lawrence Livermore National Security, LLC
LOEC	lowest observed effects concentration
MCL	maximum contaminant level
µg/L	micrograms per liter
mg/L	milligrams per liter
MUSD	Maintenance and Utilities Services Department
N/A	not analyzed
NOEC	no observed effects concentration
NPDES	National Pollutant Discharge Elimination System
O&G	oil and grease
pCi	picocurie
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
ppb	parts per billion
QA/QC	quality assurance/quality control
RHWM	Radioactive and Hazardous Waste Management
SC	specific conductance
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SI	système internationale

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Acronyms and Definitions (Continued)

SM	standard method
SWPPP	Storm Water Pollution Prevention Plan
SY2	Switch Yard 2
T	trailer
TDS	total dissolved solids
TF	treatment facility
TOC	total organic carbon
TSS	total suspended solids
U.S. EPA	United States Environmental Protection Agency
VOC	volatile organic compound
WDR	Waste Discharge Requirements
WPDC	West Perimeter Drainage Channel (storm water effluent sampling location)

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EXECUTIVE SUMMARY

Results of the storm water quality monitoring program at Lawrence Livermore National Laboratory (LLNL) in Livermore, California are reported as required in the Waste Discharge Requirements (WDR) 95-174, National Pollutant Discharge Elimination System (NPDES) Permit No. CA0030023. This report presents results for the 2009–2010 water year including: the Storm Water Pollution Prevention Plan (SWPPP) facility inspection results, wet and dry season observations, storm water discharge analytical data, and a summary interpretation of the data.

The facility inspection results indicated a few minor instances at the Livermore site in which best management practices (BMPs) listed in the SWPPP were not properly implemented, but that corrective actions have either been made or are in progress. Other than minor debris accumulation (primarily leaves and sticks) at some sampling locations, storm water observations did not identify any pollutants. Although there are no numeric effluent limits placed on storm water discharges, data are compared with various criteria to determine if water quality remains similar to natural or upstream conditions, or that concentrations are below levels of concern. Acute and chronic fish toxicity testing indicated no toxicity in effluent storm water samples. Five constituents of storm water samples (diuron, lead, nitrate, gross alpha, and gross beta) were above LLNL site-specific threshold comparison criteria; however, with one exception, all of the data exceeding LLNL thresholds during 2009–2010 are attributed to off-site activities upstream of the Laboratory. Only one sample from the Arroyo Seco West (ASW) effluent location showed a nitrate concentration that, while comparable to Arroyo Las Positas influent concentrations, was above the LLNL threshold. LLNL responded by discussing the BMPs for fertilizer application with Landscape Services personnel and nitrate concentrations in effluent samples collected during the second storm were below the LLNL-specific comparison criteria. All other effluent monitoring results for chemical and radioactive parameters were less than comparison criteria. These results suggest that LLNL's current BMPs are effective and that operations at the LLNL Livermore site during 2009–2010 did not impact storm water quality.

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1.0 Introduction

This report discusses the results of the 2009–2010 Livermore site storm water monitoring program. Storm water quality monitoring results for the LLNL Livermore site are summarized, fulfilling the annual reporting requirements of WDR 95-174, issued by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) on August 23, 1995, (hereafter referred to as “the Permit”). The Permit expired on August 23, 2000. LLNL submitted a Report of Waste Discharge (and an NPDES permit application) to renew the Permit on February 18, 2000, meeting the requirement to submit a renewal application 180 days in advance of permit expiration. SFBRWQCB staff confirmed the administrative continuance in November 2000 (Morse 2000).

The Livermore site is a 3.28-km² facility that is crossed by two intermittent streams, Arroyo Las Positas and Arroyo Seco. The average annual rainfall at the Livermore site is 34.6 cm; whereas the rainfall for the 2009–2010 reporting period was 36.47 cm. Monthly rainfall totals are presented in **Table 1**. LLNL monitors influent and effluent water quality as required by the Permit. The six perimeter storm water sampling locations are shown in **Figure 1**, along with three internal (on-site) monitoring locations around the drainage retention basin, renamed Lake Haussmann.

Table 1. Monthly rainfall totals (in cm) collected at the LLNL site meteorological station.

Date	Monthly Total (cm)
May 2009	0.84
June 2009	0.15
July 2009	0.00
August 2009	0.00
September 2009	0.99
October 2009	7.14
November 2009	0.43
December 2009	4.65
January 2010	7.54
February 2010	5.56
March 2010	4.17
April 2010	5.00
Water Year TOTAL	36.47

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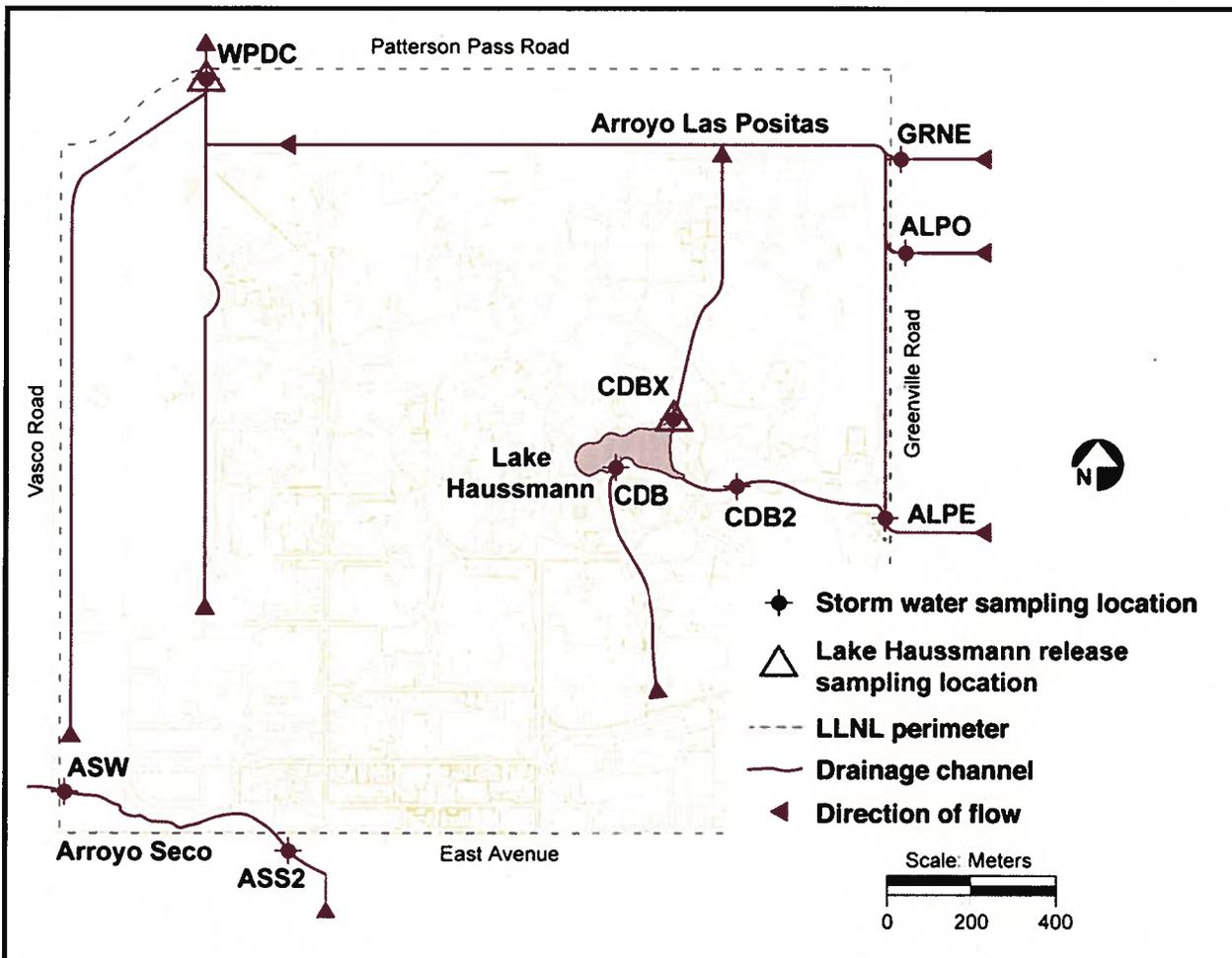


Figure 1. Routine storm water sampling and observation locations.

2.0 Nonstorm Water Discharges

The SFBRWQCB issued the Permit to LLNL, allowing storm water discharges associated with industrial activities and four categories of nonstorm water discharges, including mechanical equipment sources (e.g., air conditioners), building and grounds maintenance (e.g., landscape irrigation), fire suppression and safety systems (e.g., hydrant testing), and water systems (e.g., backflow preventors). In addition, the Permit allows LLNL to administratively control several building conduits that remain open because they are impractical to seal.

LLNL tracks authorized nonstorm water discharge sources through the Building Drain Management database and key plans, and an internal drain connection permitting process. As required by the Permit, Provision C.8, LLNL evaluates all new construction, remodeling, and equipment upgrades to determine if it is practical to eliminate permitted discharge sources. If it is practical to do so, the discharge is eliminated. Modifications that result in new connections to building conduits are added to the Building Drain Management database.

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Authorized nonstorm water discharge sources and open building conduits are included in LLNL's Dry Season Observation Program. These observations help LLNL verify that the BMPs applied to these discharge sources continue to be properly implemented. Areas in the Dry Season Observation Program include secondary containment areas, loading and receiving areas, floor drains open to the storm drainage system, and automatic sump pumps. These locations and observation results are discussed in detail in this report in Section 4.0, Visual Observations. Nonroutine releases are summarized in **Appendix A, Table A-1**. This table includes unplanned releases reportable under the Permit, Provision C.1, and nonroutine releases allowed under the Permit but requiring prior notification under Provision C.7.

3.0 Annual Site Inspections

Each of the Principal Directorates (LLNL's high level organizational unit) at LLNL conducts an annual inspection of its facilities to verify implementation of the SWPPP and ensure that measures to reduce pollutant loading to storm water runoff are adequately and properly implemented. The Principal Associate Directors for each of the Principal Directorates certify that their facilities comply with the provisions of the Permit and the SWPPP. Each Principal Directorate documents and keeps on file the annual inspection results (as required by the Permit). These records include the dates, places, and times of the site inspections and the names of individuals performing the inspections. Because of the large number of facilities inspected (more than 500 buildings and trailers), the detailed inspection results are not included in this report, but the individual inspection records are available for submittal or review upon request. All inspections were completed; findings and deficiencies are summarized in **Appendix A, Table A-2**.

A few inspections noted inconsistent or incomplete implementation of BMPs in the annual SWPPP inspections. All of these issues have either been corrected or are in the process of being corrected as described in **Appendix A, Table A-2**. All other inspections indicated that the applicable BMPs were implemented correctly and adequately.

4.0 Visual Observations

Dry season observations were performed and are provided in **Appendix A, Table A-3**. The Permit requires that observations be conducted at least twice during the dry season (May through September). These observations occurred on June 30 and September 21, 2009, at storm water effluent sampling locations (**Figure 1**, ASW and West Perimeter Drainage Channel [WPDC]), at storm water influent sampling locations (**Figure 1**, Arroyo Seco South [ASS2], Arroyo Las Positas East [ALPE], Arroyo Las Positas Outfall [ALPO], and Greenville Road East [GRNE]), at areas with a "high potential" of storm water pollution, and at nonstorm water discharge locations to determine the presence of stains, sludges, odors, and other anomalous conditions. "High potential" areas include areas with automatic (e.g., sump pumps) or direct connections to the

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surface and areas where activities may result in accidental releases to the surface (e.g., loading/receiving areas and open rinse areas).

To determine the "high potential" areas, LLNL compiled and categorized potential storm water pollution areas, using information from the following sources:

- *LLNL Livermore Site Annual Storm Water Monitoring Report* (Brandstetter 1994);
- LLNL's Building Drain Management Database;
- LLNL's *Report of Waste Discharges*, March 1995 (Mathews and Welsh 1995); and
- LLNL's Observation Records.

LLNL then conducted inspections, visual observations, and assessments of these potential areas for storm water pollution. Areas determined as "high potential" are included in the dry season observation program as follows:

- Arroyo Seco and Arroyo Las Positas (observations conducted at influent and effluent locations);
- Avenue K storm drain;
- Automatic sump pump area at Building 191;
- Loading/receiving areas in Buildings 194 and 341;
- Concrete wash area near Parking Lot F-2; and
- Floor drain areas open to the environment in Buildings 111, 194, 391, and 551.

During this reporting period, the dry season observations did not identify any unusual discharges. Observed evidence of flow at some locations was from discharges of treated groundwater allowed under the *Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Record of Decision* (US Department of Energy 1992). All indications of nonstorm water flows were attributable to permitted discharges or natural sources.

Wet season observations are summarized in **Appendix A, Table A-4**. The Permit requires that wet season observations be conducted monthly during the wet season (October 2009 through April 2010) when significant storm events occur (a significant storm is defined as runoff lasting more than one hour). These observations are conducted at storm water influent and effluent sampling locations. Observations often indicated turbidity at both influent and effluent locations, but no unusual conditions or anomalies were observed. Storm event observations occurred in October and December 2009, and January, February, March, and April 2010; although significant runoff was only associated with the October, February, March, and April observations. Wet season observations were also conducted during the month of November 2009. However, due to storm events not occurring or occurring during non-work hours, the November observations did not coincide with a storm event.

5.0 Storm Water Sampling and Analysis

The Permit requires collection of two samples each wet season at effluent locations ASW and WPDC and at influent locations ALPE, ALPO, ASS2, and GRNE. Permit-driven storm water

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samples were collected on October 13, 2009, and February 23, 2010; however, there was insufficient runoff at ALPO during the second storm to sample this influent location. Samples were collected as soon as possible after runoff began (most within the first hour). Water quality data from these storm water samples for the 2009–2010 reporting period are presented in **Appendix A, Tables A-5 and A-6**. Quality assurance and quality control (QA/QC) checks are performed on all sampling and analysis from LLNL. All data analysis included standard QA/QC practices. LLNL reports on QA annually in the Site Annual Environmental Report (Gallegos et al. 2009); this information is available upon request.

The Permit currently does not contain numeric limits for storm water effluent. Therefore, site-specific comparison criteria were developed from historical data to identify out-of-the ordinary data values (**Table 2**). These criteria are used to identify data values that require further investigation and explanation. In addition to the Livermore site-specific comparison criteria, storm water results are compared to other published values, including: United States Environmental Protection Agency* (U.S. EPA) benchmarks; *The Water Quality Control Plan, San Francisco Bay Basin (Region 2)* (Basin Plan) (SFBRWQCB 1995); US EPA and State maximum contaminant levels (MCLs) and Ambient Water Quality Criteria (AWQC). Although these latter criteria were established for other regulatory programs, use of a broad range of criteria can help LLNL evaluate the quality of Livermore site storm water effluent and determine the adequacy of BMPs. If a measured concentration is found to be higher than the comparison criteria, but the value is the same or higher at the influent location, the source is assumed to be unrelated to Livermore site operations; therefore, further analysis is not warranted.

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Table 2. Livermore site-specific threshold comparison criteria for selected water quality parameters for storm water runoff.

Parameter	Comparison criteria
Total suspended solids (TSS)	750 mg/L ^a
Chemical oxygen demand (COD)	200 mg/L ^a
pH	<6.0, >8.5 ^a
Nitrate (as NO ₃)	10 mg/L ^a
Ortho-phosphate	2.5 mg/L ^a
Beryllium	1.6 mg/L ^a
Chromium(VI)	15 mg/L ^a
Copper	36 mg/L ^a
Lead	15 mg/L ^b
Mercury	Above RL ^c
Zinc	350 mg/L ^a
Diuron	14 mg/L ^a
Oil and grease	9 mg/L ^a
Tritium	36 Bq/L ^a
Gross alpha	0.34 Bq/L ^a
Gross beta	0.48 Bq/L ^a

Note: The sources of values above these are examined to determine if any action is necessary.

a Site-specific value calculated from historical data and studies. These values are lower than the MCLs and EPA benchmarks except for zinc, total suspended solids (TSS), and chemical oxygen demand (COD).

b California and EPA drinking water action level

c RL = reporting limit = 0.0002 mg/L for mercury

5.1 Toxicity Monitoring

As required by the Permit, grab samples were collected from the site storm water effluent location, WPDC, and analyzed for acute and chronic toxicity using fathead minnows (*Pimephales promelas*) as the test species. These tests are required only at effluent location WPDC and are not conducted with water from corresponding influent locations. The testing laboratory provides water for the control sample, which consists of EPA synthetic moderately-hard water.

In the acute test, 96-hour survival is observed in undiluted storm water collected from location WPDC. The Permit states that an acceptable survival rate is 20 percent lower than a control sample. If the acute toxicity test is failed, the Permit requires LLNL to conduct toxicity testing during the next significant storm event. After failing two consecutive tests, LLNL must perform a toxicity reduction evaluation to identify the source of the toxicity. The 96-hour acute toxicity test results from the October 13, 2009, sample collected at WPDC (95 percent survival, compared to 95 percent survival in the laboratory control sample) showed that this water was not acutely toxic to fathead minnow survival (**Table 3a**).

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The 7-day chronic fish toxicity test, using the October 13, 2009, sample collected at WPDC, was cancelled by the contract laboratory due to mortality of the fish in the control group. The control group exhibited pathogenic death; therefore, no calculations could be made concerning the chronic toxicity of the sample. WPDC was resampled for the chronic toxicity test during the next significant storm event (February 23, 2010); however, this sample was analyzed using the wrong method by the contract laboratory. On April 20, 2010, LLNL again collected a sample at WPDC, in conjunction with storm run-off at that location, and that sample was used to perform the required 7-day chronic fish toxicity test.

In the 7-day chronic fish toxicity test, storm water dilutions at 0 (Laboratory Control), 12.5, 25, 50, 75, and 100 percent (undiluted storm water at WPDC, collected on April 20, 2010) were used to determine a dose-response relationship, if any, for both survival and growth of the fathead minnow (**Table 3b**). From these data, no observed effect concentrations (NOECs) and lowest observed effect concentrations (LOECs) were calculated. The NOECs and LOECs for survival and growth were both 100 percent. The results demonstrate that there was no observed toxicity in LLNL storm water effluent.

Table 3a. Single point acute fish toxicity test results for October 13, 2009, at WPDC.

Location	Influent or Effluent	% Survival		
		Replicate A	Replicate B	Mean
Laboratory Control	EPA synthetic "moderately hard" water	90	100	95
WPDC	Site Effluent	90	100	95

Table 3b. Chronic fish toxicity test results for April 20, 2010, at WPDC.

Sample	7-day survival	7-day weight ^a
Concentration (%)	Avg. (%)	Avg. (mg)
Laboratory Control	100	0.27
12.5	100	0.32
25	100	0.29
50	95	0.30
75	100	0.34
100	97.5	0.30

^a Weight of the fathead minnows at the end of the 7-day toxicity test.

5.2 Nonradioactive Parameters

Table 4 lists the constituents that exceeded the threshold comparison criteria in **Table 2** during storms sampled in 2009–2010 (full results are in **Appendix A, Tables A-5 and A-6**). Note that with one exception, only influent samples showed constituent concentrations above the threshold comparison criteria. Upstream activities near the Livermore site on the Arroyo Seco and Arroyo

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Las Positas include another scientific research institution, grape vineyards, an electrical transfer station, and cattle ranching; these activities are potential sources for the constituents shown in **Table 4**.

Table 4. Constituents in storm water greater than the LLNL-specific threshold comparison criteria.

Constituent	Date (2009/2010)	Location	Influent or Effluent	Result	LLNL Threshold Criteria
Diuron	10/13/09	GRNE	Influent	130 µg/L	14 µg/L
Diuron	10/13/09	ALPE	Influent	100 µg/L	14 µg/L
Lead	10/13/09	ALPO	Influent	17 µg/L	15 µg/L
Nitrate (as NO ₃)	10/13/09	ALPO	Influent	12 mg/L	10 mg/L
Nitrate (as NO ₃)	10/13/09	ALPE	Influent	17 mg/L	10 mg/L
Nitrate (as NO ₃)	10/13/09	ASW	Effluent	15 mg/L	10 mg/L
Nitrate (as NO ₃)	2/23/10	GRNE	Influent	11 mg/L	10 mg/L
Gross Alpha	10/13/09	GRNE	Influent	0.38 ± 0.15 Bq/L	0.34 Bq/L
Gross Alpha	10/13/09	ALPO	Influent	0.44 ± 0.24 Bq/L	0.34 Bq/L
Gross Beta	10/13/09	GRNE	Influent	0.53 ± 0.13 Bq/L	0.48 Bq/L
Gross Beta	10/13/09	ALPO	Influent	1.00 ± 0.24 Bq/L	0.48 Bq/L

Both of the diuron concentrations found to exceed the LLNL-specific comparison criteria of 14 µg/L occurred at influent locations, thus originate off-site, and are unrelated to LLNL operations. Storm water samples collected from influent locations exhibited diuron concentrations that ranged from <1 µg/L to 130 µg/L and <1 µg/L to 9.7 µg/L during the first and second storms, respectively. Diuron was not detected in any effluent sample. Diuron, used on site as a pre-emergent herbicide, is commonly applied at off-site locations upstream of the Livermore site. Elevated diuron concentrations from upstream sampling locations have been observed most every year since first observed in 2001 (Campbell et al. 2004).

A lead concentration of 17 µg/L, above the 15 µg/L LLNL-specific comparison criteria, was found in the sample collected at ALPO during the first storm. Because ALPO is another influent location, this result is attributed to off-site activities and is not related to LLNL operations. The maximum concentration of lead in any effluent location sample was 7.2 µg/L, collected at WPDC during the first storm.

Nitrate concentrations, above the comparison criteria of 10 mg/L, were found in samples collected from ALPO, ALPE, and ASW on October 13, 2009, and from GRNE on February 23,

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2010 (**Table 4**). However, three of these locations (ALPO, ALPE, and GRNE) are influent locations and therefore, their elevated nitrate values are not related to LLNL activities. The 15 mg/L nitrate concentration reported for the October 13, 2009, effluent sample collected at ASW, while comparable to results for influent samples from Arroyo Las Positas collected during that same storm, was greater than the 2.9 mg/L nitrate concentration reported for the upstream Arroyo Seco influent sampling location (ASS2). One possible source of nitrate in the ASW sample is runoff from recently installed landscape between the ASS2 and ASW sampling locations. This area had been fertilized in September, not anticipating a mid-October storm that would produce runoff. BMPs for fertilizer application have been reviewed with LLNL's Landscape Services personnel. Nitrate concentrations in effluent samples collected during the second storm were below the LLNL-specific comparison criteria.

As in past years, bromacil and glyphosate (both widely used herbicides) were detected in storm water samples. Concentrations of bromacil at influent locations ranged from <0.5 µg/L to 8 µg/L, while the maximum concentration reported in an effluent sample was <0.5 µg/L. Similarly, concentrations of glyphosate at influent locations ranged from 14 µg/L to 210 µg/L; the maximum concentration reported in an effluent sample was <20 µg/L). (See **Appendix A, Tables A-5 and A-6**).

One unusual compound, pentachlorophenol (PCP), had been identified at low levels in several samples collected during the 2007–2008 and 2008–2009 storm years. This year, however, PCP was not detected at any influent or effluent sampling location. Since 1987, most of the PCP used in the U.S. has been restricted to the treatment (as a wood preservative) of utility poles and railroad ties.

5.3 Radioactive Parameters

Environmental measurements are reported in *Système Internationale* (SI) units. The SI unit for radioactivity is the becquerel (Bq), equal to 1 nuclear disintegration per second. The more commonly used unit, picocurie (pCi), is equal to 1 nuclear disintegration per 27 seconds. Results for tritium, gross alpha, and gross beta activities from storm water samples collected during 2009–2010 are included in **Appendix A, Tables A-5 and A-6**. The gross alpha and gross beta measurements of radioactivity were above their LLNL specific comparison criteria (0.34 Bq/L and 0.48 Bq/L, respectively) at both the GRNE and ALPO locations on October 13, 2009 (**Table 4**). Given that GRNE and ALPO are influent locations, upstream of LLNL activities, these results appear to be unrelated to LLNL operations. All other results for gross alpha, gross beta, and tritium activities were less than their respective comparison criteria (**Table 2**).

LLNL began analyzing storm water for plutonium in runoff in 1998. Samples were analyzed from the Arroyo Seco and Arroyo Las Positas effluent locations (ASW and WPDC). The plutonium activities measured in samples from ASW and WPDC on October 13, 2009, and February 23, 2010, were below the detection limit (0.0037 Bq/L, or 0.100 pCi/L). (See **Appendix A, Tables A-5 and A-6**)

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6.0 Summary and Conclusions

The storm water monitoring program at LLNL goes beyond the requirements of the Permit by sampling at more locations and for more parameters than the Permit requires. This additional monitoring is called for under the environmental monitoring requirements of various Department of Energy (DOE) Orders. Furthermore, LLNL investigates water quality parameters that are found to be above historic levels as demonstrated by the site-specific comparison criteria in **Table 2**.

Storm water observations were performed monthly during the wet season and quarterly during the dry season, with no major deficiencies noted. Inspections of BMPs listed in the SWPPP revealed some areas for improvement, for which corrective actions have either been made or are in progress.

Five constituents of storm water samples (diuron, lead, nitrate, gross alpha, and gross beta) were above LLNL site-specific threshold comparison criteria; however, with one exception, all of the data exceeding LLNL thresholds during 2009–2010 are attributed to off-site activities upstream of the Laboratory. Only one sample from the Arroyo Seco West effluent location showed a nitrate concentration that, while comparable to Arroyo Las Positas influent concentrations, was above the LLNL threshold. LLNL responded by discussing the BMPs for fertilizer application with Landscape Services personnel and nitrate concentrations in effluent samples collected during the second storm were below the LLNL-specific comparison criteria. All other effluent monitoring results for chemical and radioactive parameters were less than comparison criteria. In addition, the acute and the chronic fish toxicity tests showed no toxicity in LLNL storm water effluent. These results suggest that LLNL's current BMPs are effective and that operations at the LLNL Livermore site during 2009–2010 did not impact storm water quality.

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- | | |
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APPENDIX A TABLES

Tables A-1 through A-6

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
5/5/09	B391	Less than 10 gallons of city water from a chilled water coil were released to ground; the water did not reach the storm drain.
5/8/09	B392	Approximately 1 cup of castor oil leaked from a capacitor onto asphalt and was cleaned up with dryorb. No oil reached soil or a storm drain.
5/18/09	B482	A personal vehicle leaked gasoline at a very slow rate (about one drop per minute) for several days in the D-7 parking lot. Absorbent was applied, but due to the slow nature of the leak, no puddling of gasoline was visible.
5/19/09	B191	Approximately one gallon of gasoline spilled from a personal vehicle onto the asphalt in the A-10 parking lot. Radioactive and Hazardous Waste Management (RHW) technicians applied absorbent material to the spill, which was cleaned up and removed for management as hazardous waste.
5/22/09	B696	Approximately 10 gallons of hydraulic oil spilled from a forklift just East of B696. Oil-soaked soil and asphalt was excavated. The contaminated soil and asphalt, along with oil soaked absorbent pads, were packaged into two 55-gallon drums for disposal as hazardous waste.
5/25/09	B298	A water release occurred to the Arroyo Las Positas during fire fighting activities near B298. A small grass fire began on the south side of the arroyo and spread to the north bank. While fire-fighting water is an authorized non-storm water discharge, there was the potential for other pollutants, such as sediments or burned materials, to flow off-site along with the existing water in the Arroyo. The release was reported to the SFBRWQCB.
6/6/09	B622 Corp Yard	A transformer leaked a small amount of oil from the tap changer compartment. Some of the oil leaked down the side to the dirt, which was dug up and placed in a bag and stored in a 55-gallon drum. The main transformer tank had been tested for PCB and the results were 32.6 ppm. The oil in the tap changer tank is separate from the main tank but was treated as containing PCB.
6/18/09	B543	Water supply line to toilet developed a leak and discharged 40 - 50 gallons of clean water to the first floor inside the building. The water was squeegeed into the parking lot where it evaporated.

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
7/5/09	T4352	Approximately 20,000 gallons of potable water was released from a line leading to an icemaker. The water flowed to a nearby storm drain leading to the Drainage Retention Basin (DRB). The DRB flows to the Arroyo Las Positas and the comingled water could have potentially flowed off-site. The area of the release is not known to have contamination and there is no reason to suspect that this drinking water release contained any reportable quantities of chemical constituents. The release was reported to the SFBRWQCB.
7/27/09	1400 area	An LLNL excavator blew a hydraulic line. About 6 gallons of hydraulic oil were contained and never reached the ground and another 2 gallons sprayed onto hard packed soil in the surrounding area. The contaminated soil was immediately dug up and containerized for disposal.
7/27/09	B391	Hydraulic oil leaked from a forklift onto the asphalt in front of the rollup door to Bay 3. Absorbents were used to contain the fluid and RHWM technicians removed all hydraulic fluid outside of the footprint of the forklift, approximately 20 feet by 10 feet. A spill pan, absorbent pads, and absorbent material were left under the forklift until it was retrieved the next morning and the area cleaned. No hydraulic fluid reached the storm drain; total amount spilled was approximately 5 gallons.
8/15/09	B519	Approximately 5 gallons of oil was spilled from an auto lift that was moved from B511 to B519. Absorbent was used to soak up the oil and it was disposed of by RHWM.
8/29/09	B131	A hot water line leaked and approximately 50 gallons of water flowed into the hallway outside of room 1268. This area of the building is not used as laboratory space, and the water did not come in contact with hazardous or radioactive materials. Approximately 20 gallons of water flowed South and out of the building to the paved courtyard in the center area of the facility. A mat was placed over the storm drain and prevented water from entering the drain. All standing water (inside and outside of the facility) was cleaned up and transferred to the sanitary sewer.
9/16/09	B453	Approximately 2,000 to 5,000 gallons of cooling tower water overflowed onto the gravel area. The water did not enter the storm drain system and was contained within a 250-foot distance from the point of discharge from the cooling tower basin. No water left the site.

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
9/20/09	PTU-10	Approximately 3,360 gallons of water with a total of 1.3 grams of volatile organic compounds (VOCs) were released from a burst pipe at a groundwater treatment unit. The discharge was stopped and the pipe to the groundwater treatment unit was repaired. Untreated groundwater did reach the storm drain. The release was reported to the SFBRWQCB.
9/30/09	T4378	A garbage truck blew a hydraulic fluid line and approximately 30 gallons of hydraulic fluid discharged to asphalt, including 5 gallons that ran off into adjacent soil. The oil was soaked up with absorbent, which was collected along with contaminated soil for disposal by RHWM.
10/2/09	B216	Approximately 18,000 to 20,000 gallons of potable water from a broken water main flowed northwest along First Street and Avenue B until it entered a catch basin located on the southeast corner of the intersection of Avenue B and Second Street. This catch basin is part of a storm drain line that flows north to the Arroyo Las Positas. Water flow in that storm drain may have commingled with treated groundwater discharges from the site and flowed off-site. The drinking water discharge flowed mostly in the storm drain system and did not come into contact with areas of known soil contamination. The release was reported to the SFBRWQCB.
10/19/09	B438	A storm drain south of B438 was deluged and water flooded the south end of the building. RHWM vacuumed up all puddles outside the building downstream from where the water had been discharged. They also picked up approximately 50 gallons of water that had been vacuumed from inside the building and discharged to 30-gallon poly drums. Foam-like bubbles, observed in some of the vacuumed water, were determined to be from residual carpet cleaner. All the recovered liquid was discharged to the sanitary sewer.

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
11/02/09	B581	<p>A sprinkler pipe damaged by a forklift released approximately 1,000 gallons of water in Switch Yard 2 (SY2). That water made its way down the grated floors of SY2 and some entered the Hazardous Materials Management Area (HMMA). In addition, no more than 500 gallons of sprinkler standpipe water was discharged to a sump in the HMMA. During the event, the sump pump activated and discharged the contents of the sump to the storm drain, which discharges to a culvert that runs north to Arroyo Las Positas in the vicinity of B591. Standing water was observed at the culvert and at the Arroyo, but no flow was observed. The water in the culvert and Arroyo is believed to be from other sources and not associated with the release at B581.</p> <p>The 1,000 gallons of water inside the building were collected in 55-gallon drums and moved outside for discharge to sanitary sewer. Water that was collected in 4 drums (that had been previously used to manage concrete cuttings) showed a pH of approximately 12 (due to the residual concrete slurry in the drums) and could not be discharged to the sanitary sewer. Those 4 drums were managed through RHWM.</p>
11/9/09	B491	<p>Approximately 5,000 to 10,000 gallons of water were released from an underground irrigation line that percolated up through the soil near one of the D-9 parking lot islands and through the cracks in the asphalt. Water Shop personnel shut down the main feed line and stopped the flow.</p> <p>The released water traveled northwest across the parking lot and was significantly diminished by the time it reached North Outer Loop Road. A small amount of water was absorbed into the soil above the banks of the drainage channel located between the C-9 and D-9 parking lots. Although the drainage channel was flowing with water from upstream Environmental Restoration Department treatment facility discharges, no water from the release was observed entering the channel. The release did not occur in a contaminated area, and water did not get into the arroyo or travel off-site.</p>
11/18/09	B490	<p>Approximately two gallons of diesel fuel spilled onto asphalt from a large diesel generator. Absorbent was applied to the spill, left overnight, and cleaned up the next day. The spill affected an asphalt area approximately 3 feet wide and 15 feet long. No fuel reached the ground or any storm drain.</p>

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
11/24/09	B453, B531	<p>A hydraulic oil release from a crane affected an area of approximately 4 feet by 8 feet west of B453, where the crane was originally parked. The crane traveled along LLNL streets, and finally parked on the south side of B531 on a compacted dirt/baseroack surface. A small amount of hydraulic oil was released along the driving route. The crane continued to leak hydraulic oil at its final parking spot, affecting an area of approximately 3 feet by 6 feet.</p> <p>Absorbent was worked into spill locations on the road using brooms and shovels. A plastic sheet was placed under the dripping crane to eliminate the continued release to soil until the crane could be repaired. Due to the extremely compacted soil/baseroack material in this area, the hydraulic oil only penetrated to a depth of approximately one to three inches. The affected area was excavated to a depth of approximately six inches to assure complete removal of the contaminated soil.</p> <p>It is estimated that less than five gallons of hydraulic fluid was released during the entire event. All of the released material was cleaned and managed by RHWM for disposal as hazardous waste.</p>
11/30/09	East Buffer Zone	<p>An irrigation valve malfunctioned after 7:00 PM on Thursday, November 26, and released water at a rate of about 50 gallons per minute, until the leak was discovered and stopped at approximately 8:00 AM Monday, November 30, resulting in a total estimated discharge of 252,000 gallons. The discharge flowed into the LLNL storm drain system and to a dry sediment retention basin on-site. Visual inspection did not reveal any evidence that the water had flowed past the sediment basin into the on-site DRB. It did not appear that any of the water reached the receiving water at the Arroyo Las Positas. The water contained in the sediment basin was allowed to infiltrate and evaporate. The release was reported to the SFRBWQCB.</p>

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
12/8/09	B231	<p>Water was noticed leaking from an office ceiling and adjacent areas in B231. The water leak inside the building was contained using absorbent and a mop, along with a 55-gallon wet vacuum to assist in collecting water inside the building.</p> <p>Upon further inspection, water was also observed flowing outside the building; along the east side, coming from a 1/2 inch PVC pipe that serves as the condensate drain line for air conditioning unit ACU-19. An inspection of this unit revealed there was approximately 3 inches of standing water inside the unit, which was removed using a submersible pump. Approximately 570 gallons of water was collected from ACU-19 and the leaks in the building. This water was sampled and analyzed for pH and metals to verify it met sanitary sewer discharge parameters.</p> <p>Approximately 650 gallons of chiller water was discharged to the asphalt on the east and north side of B231. Some of the water reached Third Street on the north side of B231. RHW personnel collected and managed the pools of water outside B231.</p>
12/15/09	B253	<p>A release of coolant water was discovered on the roof of B253. The release rate was estimated to be 0.5 to 1.0 gallons per minute. The discharge may have continued for approximately 41 hours, which would result in a total of approximately 1,230 to 2,460 gallons of coolant water. The coolant water consists of potable city water with a sodium nitrate inhibitor added. When the system leaks, make-up water is added that is potable city water, which would weaken the concentration.</p> <p>The spill reached a north-south lateral storm drain under Avenue B. That storm drain reaches the receiving water at the Arroyo Los Positas in the northwest corner of the Laboratory. The distance from the storm drain behind B253 to this discharge point into Arroyo Los Positas is about 3,000 feet.</p> <p>A downstream discharge of treated groundwater from Treatment Facility (TF) C-East into the same storm drain, and a small amount of rainfall that day, both provided additional dilution. After reaching Arroyo Los Positas, the diluted coolant water would have blended with the flow in the Arroyo; so even after these initial dilutions, the discharge would experience another dilution of approximately 600 to 1,200 times in the receiving water before flowing off-site. This release was reported to the SFRWQCB.</p>

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
12/17/09	B581	Approximately 10 ounces of hydraulic oil were released from a port-a-potty service truck to the parking lot west of the area between B581 and B582. The oil dripped over an area about 4 feet wide by 20 feet long. All oil spilled onto asphalt and was cleaned up immediately with absorbent. None of the spilled oil reached soil or the storm drain.
12/21/09	B431	A black powdery substance, consistent with copier toner or graphite, was discovered on the asphalt outside the south door of B431. Although a vehicle had tracked the material in the immediate vicinity, there was no evidence of the powder entering a storm drain located 6-8 feet to the east. RHW cleaned up the powder with absorbent.
12/25/09	B324	A sewer line backed up and spilled approximately two gallons of sewage in landscaping on the west side of B324. The spill soaked into the soil and did not reach a storm drain.
12/28/09	West Buffer Zone	Approximately five gallons of muddy water spilled from a drilling rig located just north of TFB in the west buffer zone. Approximately three gallons ran under the silt fence and waddle, and approximately two gallons ran into the storm drain, where cattails and other vegetation prevented the muddy water from reaching the arroyo.
01/4/10	B391	Approximately one quart of oil spilled from a transformer to the asphalt on the north side of the B391 Pump Shed. Absorbent was spread beneath the unit, on the shelf directly below the leak, and on all oil on the asphalt. The absorbent was cleaned up and disposed of in a municipal dumpster, the transformer was resealed to prevent future leaks. The oil has been verified to be free of PCBs by a previous bulk oil sample; no oil reached soil or a storm drain.
01/4/10	B551E	Water was noticed pooling near B551E. A leak in the nearby irrigation piping was thought to be the cause, so water to the irrigation system was turned off and the water in the area began to slowly dissipate. There is no evidence that the water reached the storm drain or an arroyo, and it did not exceed 10,000 gallons.
01/6/10	Well W-1211 at TFE-NW	Approximately ten gallons of untreated groundwater spilled onto asphalt because of a broken valve. The well shut down immediately due to its low flow interlock. The untreated groundwater contained approximately 17 ppb total VOCs and 0.011 mg/L of hexavalent chromium (sample date: Oct.15, 2009). It did not reach the storm drain system or the arroyos.

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
01/6/10	B611	Approximately half a gallon of gasoline was spilled at the B611 fueling station when the dispenser was left unattended and fuel overflowed. Fleet Management staff immediately used absorbent to clean up the spill. The spill was contained and did not reach the storm drain system or the arroyo.
01/12/10	B611	Approximately half a gallon of diesel was spilled at the B611 fueling station. Fleet Management staff immediately used absorbent to clean up the spill. Since the spill was under the canopy (out of the intermittent rain), it did not spread out onto the wet asphalt and did not reach the storm drain system or the arroyo.
01/29/10	B253	Sewage was released from a manhole and sewer line cleanout on the north side of B253. Overflow went onto the landscaped area around the manhole, across the sidewalk and Fifth Street, and entered the storm drain. Approximately 200 to 500 gallons of sewage was released and an unknown quantity reached the two adjacent storm drains that flow north to the Arroyo Las Positas beneath Avenue B. For health and safety purposes, the surface area was cleaned using a light spray of 1:9 bleach solution, which was applied in a manner to prohibit discharge to the storm drain system. As an additional preventative measure, pigs were applied around the storm drain catch basins. This release was reported to the SFBRWQCB.
02/07/10	B482	A four-inch irrigation mainline break on the east side of B482 was discovered and stopped the morning of February 8th. The discharge was estimated to have started the prior evening and to be approximately 31,200 gallons (40 gpm x 13 hr x 60 min/hr), which flowed to two storm drain catch basins. The storm drains flow north to the Arroyo Las Positas, which flows west and then north off the site. This release was reported to the SFBRWQCB.
02/15/10	B695	The water pump on the boiler in B695, room 1033 developed a leak, allowing boiler water to leak into the room. The boiler water is treated with inhibiting chemicals that contain sodium nitrite. Maintenance and Utility Services Department (MUSD) personnel responded and found water in room 1033 and in the lobby of B695. MUSD stopped the leak and shut down the boiler. Approximately 250 to 350 gallons of water were released and some of the boiler water flowed under the exterior door on to the concrete and asphalt area south of B695. That water absorbed into the asphalt and did not enter the storm drainage system; the amount of water released outside is unknown. The boiler water in room 1033 drained into the three floor drains connected to the sanitary sewer system; a small quantity was absorbed through the concrete floor of the room. The wet carpet area in the B695 lobby was dried using fans to evaporate the water.

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
02/24/10	Avenue H	A vehicle accident that occurred on Avenue H, just north of South Outer Loop Road, resulted in about 50 milliliters of brake fluid spilling onto the asphalt, which was cleaned up immediately.
3/10/10	B453	<p>Water containing a low concentration of a corrosion inhibitor and a biocide was released from a cooling tower near B453. A valve was stuck on for over a 4.5-hour period, discharging at a rate of 20-25 gallons per minute; the total release was between 5,400 and 6,750 gallons. The pH of the water was between 8.0 and 8.5, no residual chlorine was detected, and the water was observed to be clear (free of turbidity). An absorbent pig was placed in front of the storm drain as a precautionary measure.</p> <p>The coolant water flowed through a landscaped area and a parking lot to Fifth Street, in the street gutter to a catch basin on the southeast corner of Fifth Street and West Inner Loop Road, then into a storm drain that flows north to the Arroyo Las Positas. Approximately two hours later, no water or wet sediment was observed in the downstream channel, suggesting that the coolant water soaked into the ground before reaching the Arroyo Las Positas. The release was reported to the SFBRWQCB.</p>
3/16/10	B517-A	<p>Laundry wash water containing a non-hazardous hydrogen peroxide based bleach and a non-hazardous, phosphate-free laundry detergent was released on the west side of B517-A when a lint trap was blocked. The wash water flowed across the paved street and into a storm drain located at the southeast corner of B511. Surfactant absorbent pads were placed around the storm drain to filter out the detergent.</p> <p>Approximately 50 gallons flowed into the storm drain, which flows west and then north off the site. None of this release flowed off-site into Arroyo Las Positas. This release was reported to the SFBRWQCB.</p>

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Table A-1. May 1, 2009 - April 30, 2010 – Summary of nonroutine releases, Livermore Site.

Date	Location	Description
3/16/10	B517-A	Laundry wash water containing a non-hazardous hydrogen peroxide based bleach and a non-hazardous, phosphate-free laundry detergent was released on the west side of B517-A from a sanitary sewer line being blocked, causing wash water to overflow onto the asphalt. (The lint trap that had been blocked that morning was cleared. However, it in itself was not the sole cause of the first release. Plumbers were called out to unblock the sewer line.) The wash water again flowed northward across the paved street and into a storm drain located at the southeast corner of B511. The discharge was estimated to have been a maximum of 50 gallons that flowed into the storm drain. The storm drains flow north to the Arroyo Las Positas, which flows west and then north off the site. After visual inspection by walking the storm drain line in the vicinity of the release, it was determined that none of this release flowed off-site into Arroyo Las Positas. This release was reported to the SFBRWQCB.
3/22/10	B411	A recently installed transformer located on the north side of B411 leaked approximately 10 gallons of Envirotemp® FR3® fluid (vegetable oil) onto the concrete pad and adjacent asphalt. A RHWM technician used oil absorbent (diatomaceous earth) to clean up the spill, which did not reach a storm drain. The used diatomaceous earth was sent to the Altamont Landfill under LLNL's trash non-compacted profile.
3/26/10	B361	Water and steam were observed percolating up through the asphalt on the northeastern corner of B361. An area of the asphalt was wet approximately six inches in diameter, but there was evidence that an area of about three feet by four feet had been wetted by the leak. Excavation revealed that a hot water supply line from the boiler in B361 to B366 was leaking. Repairs were completed and the line was returned to service. It appears that all discharges from the leak percolated into the ground and evaporated from the surface; there is no evidence that the water reached a storm drain or an arroyo.
4/29/10	T3626	About five gallons of clear water (no odor or solids) came up from a sanitary sewer manhole onto an asphalt pedestrian walkway. It was thought that water from a nearby cooling tower deluged the sewer system, causing the overflow. The walkway was cordoned off and a dilute bleach solution was applied for health and safety purposes. The discharged water and bleach solution evaporated from the surface. There was no discharge to storm drains.

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Table A-2. Summary of best management practice inspections in potential pollutant source/industrial activity areas

Principal Directorate Responsible for Potential Pollutant Source/Industrial Activity	Deficiencies in BMPs or BMP Implementation and Additional/Revised BMPs or Corrective Actions.
1 – Director’s Office/Security Organization	No direct responsibility for facilities at the Livermore Site. (Facilities managed by Operations & Business)
2 – Science & Technology	<u>B041, B453</u> : Storm drains blocked in a small number of locations and debris will be cleared. <u>B117</u> : Roof downspouts blocked with debris. Maintenance has been requested. <u>B453/East & North Sides</u> : Construction project will apply BMPs to power upgrade excavation areas and facility perimeter locations.
3 – Global Security	No direct responsibility for facilities at the Livermore Site. (Facilities managed by Operations & Business)
4 – Weapons and Complex Integration	No deficiencies were found.
5 – National Ignition Facility and Photon Science	<u>B298 Corpyard</u> : Dispose of vacuum pump, hydraulic lifts, and welding rods. Improve general housekeeping.

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Table A-2. Summary of best management practice inspections in potential pollutant source/industrial activity areas.

Principal Directorate Responsible for Potential Pollutant Source/Industrial Activity	Deficiencies in BMPs or BMP Implementation and Additional/Revised BMPs or Corrective Actions.
6 – Operations and Business	<p><u>B174</u>: Improve management of vacuum pump oil. Drained oil and drip pans with oil/water mixture should not be stored outside and uncovered. Properly dispose of waste oil in a timely manner.</p> <p><u>T1886</u>: Erosion noted where downspouts and fire sprinkler test port discharge to ground. Redirect or modify discharges to prevent erosion.</p> <p><u>B161</u>: Outdoor fire safety cabinet (containing chemicals) needs seismic protection to prevent the cabinet from falling over and releasing chemicals to the environment.</p> <p><u>B433</u>: An open container of flammable liquid was found outside the nearby flammable storage cabinet - two locations. Containers were closed and returned to the storage cabinets immediately.</p> <p><u>T6205</u>: A car battery was placed adjacent to an outdoor “self-help” supplies box. Uncovered storage of materials in outdoor areas could degrade storm water quality. Battery was removed in a timely manner.</p> <p><u>B121</u>: Lead based paint is peeling from exterior walls near loading dock. Clean up peeled paint on ground and manage as waste. Sample soil for lead content and remediate as necessary.</p> <p><u>U291</u>: A sewer cleaning machine with a hydraulic leak was stored uncovered in an outdoor area. Although a drip pan had been placed under the leak, that pan was filled with a hydraulic fluid/water mixture. Liquid from the drip pan was collected for disposal and the equipment was covered with a tarp. The area will be monitored until the equipment is repaired.</p>

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Table A-3. Record of dry season visual observations.

Location	Inspector	Date	Time	Discharge Observations		
				Floating Material, Debris, Odor, Discolorations, or Oil and Grease?	Observations	Description
ALPE	Karl Brunckhorst	30-Jun-09	10:36 AM	Leaves, sticks, paper		
ALPO	Karl Brunckhorst	30-Jun-09	10:33 AM	Leaves, sticks, paper, plastic		
ASS2	Karl Brunckhorst	30-Jun-09	9:31 AM	Leaves, sticks		
ASW	Karl Brunckhorst	30-Jun-09	9:43 AM	Leaves, sticks		ERD'S Treatment Facility "A" is discharging
AVE. K	Karl Brunckhorst	30-Jun-09	9:08 AM	Leaves, sticks, paper, plastic		Discharge of irrigation water observed
B111	Karl Brunckhorst	30-Jun-09	9:38 AM	Leaves, sticks		
B191/HEAF	Karl Brunckhorst	30-Jun-09	11:15 AM		Clean	
B194	Karl Brunckhorst	30-Jun-09	11:10 AM		Clean	
B341	Karl Brunckhorst	30-Jun-09	11:01 AM	Leaves, sticks, paper, plastic		No work activity going on
B391	Karl Brunckhorst	30-Jun-09	11:06 AM	Leaves, sticks		
B551W	Karl Brunckhorst	30-Jun-09	10:06 AM	Leaves, sticks		
GRNE	Karl Brunckhorst	30-Jun-09	10:31 AM	Leaves, sticks, plastic		

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Table A-3. Record of dry season visual observations.

Location	Inspector	Date	Time	Discharge Observations		
				Floating Material, Debris, Odor, Discolorations, or Oil and Grease?	Observations	Description
LABOR ONLY Lot F-2	Karl Brunckhorst	30-Jun-09	9:12 AM			Evidence of rinsing activities inside containment area where non-hazardous materials are being removed, no corrective action needed
WPDC	Karl Brunckhorst	30-Jun-09	10:24 AM	Leaves, sticks, plastic		Lake Hausmann & ERD Treatment Facility B discharging, no corrective action needed
ALPE	Karl Brunckhorst	21-Sep-09	10:25 AM	Leaves, sticks, plastic		
ALPO	Karl Brunckhorst	21-Sep-09	10:20 AM	Leaves, sticks, paper, plastic		Grading and soil disturbing activities observed near sample location. Soil stockpiles near sample location
ASS2	Karl Brunckhorst	21-Sep-09	10:01 AM	Leaves, sticks		
ASW	Karl Brunckhorst	21-Sep-09	10:10 AM	Leaves, sticks, plastic		ERD's Treatment Facility "A" is discharging, no corrective action needed
AVE. K	Karl Brunckhorst	21-Sep-09	11:10 AM	Leaves, sticks, paper, plastic, cans		
B111	Karl Brunckhorst	21-Sep-09	10:04 AM	Leaves, sticks		Discharge of irrigation water observed
B191/HEAF	Karl Brunckhorst	21-Sep-09	10:56 AM		Clean	
B194	Karl Brunckhorst	21-Sep-09	10:54 AM		Clean	
B341	Karl Brunckhorst	21-Sep-09	10:47 AM		Clean	
B391	Karl Brunckhorst	21-Sep-09	10:50 AM	Leaves, sticks		

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Table A-3. Record of dry season visual observations.

Location	Inspector	Date	Time	Discharge Observations	
				Floating Material, Debris, Odor, Discolorations, or Oil and Grease? Leaves, sticks	Observations Description
B551W	Karl Brunckhorst	21-Sep-09	10:30 AM		
GRNE	Karl Brunckhorst	21-Sep-09	10:18 AM	Leaves, sticks, paper, plastic	
LABOR ONLY Lot F-2	Karl Brunckhorst	21-Sep-09	9:56 AM	Sediment, gravel	Evidence of rinsing activities inside containment area where non-hazardous materials are being removed, no corrective action needed
WPDC	Karl Brunckhorst	21-Sep-09	10:14 AM	Leaves, sticks, plastic	Lake Haussmann and ERD's Treatment Facility "B" is discharging, no corrective action needed

(concluded)

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Table A-4. Record of wet season visual observations.

Location	Inspector	Date	Time	Discharge Observations				Comments
				Floating Material, Debris, Odor, Discolorations, or Oil and Grease?	Turbidity	Runoff	Runoff	
ALPE	Chris Campbell	13-Oct-09	9:45 AM	Leaves	Moderate	Significant	Significant	
ALPO	Renee Needens, Chris Campbell, Karl Brunckhorst	13-Oct-09	9:30AM, 3:45PM, and 4:20PM	Leaves, sticks	High	Significant	Significant	No runoff was observed during the first two inspections and significant runoff was observed during the last inspection
ASS2	Crystal Foster	13-Oct-09	9:45 AM	Leaves, sticks	Moderate	Significant	Significant	
ASW	Crystal Foster	13-Oct-09	10:10 AM	Leaves, sticks	Moderate	Significant	Significant	
GRNE	Renee Needens	13-Oct-09	9:45 AM	Grass	High	Significant	Significant	
WPDC	Crystal Foster	13-Oct-09	10:30 AM	Leaves, sticks	Moderate	Significant	Significant	ERD Treatment Facility B and Lake Haussmann discharging
ALPE	Karl Brunckhorst	30-Nov-09	3:18 PM	Leaves, sticks, plastic	No	No Runoff	No Runoff	
ALPO	Karl Brunckhorst	30-Nov-09	3:11 PM	Leaves, sticks, paper, plastic	No	No Runoff	No Runoff	
ASS2	Karl Brunckhorst	30-Nov-09	2:48 PM	Leaves, sticks	No	No Runoff	No Runoff	
ASW	Karl Brunckhorst	30-Nov-09	3:00 PM	Leaves, sticks	Low	No Runoff	No Runoff	ERD's Treatment Facility "A" discharging
GRNE	Karl Brunckhorst	30-Nov-09	3:06 PM	Leaves, sticks, paper, plastic	No	No Runoff	No Runoff	

(continued)

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Table A-4. Record of wet season visual observations.

		Discharge Observations						
Location	Inspector	Date	Time	Floating Material, Debris, Odor, Discolorations, or Oil and Grease? Leaves, sticks	Turbidity	Runoff	Comments	
WPDC	Karl Brunckhorst	30-Nov-09	3:03 PM	Leaves, sticks	Low	No Runoff	Lake Hausmann & ERD Treatment Facility B discharging	
ALPE	Karl Brunckhorst	7-Dec-09	8:26 AM	Leaves, sticks, paper	Moderate	Insignificant		
ALPO	Karl Brunckhorst	7-Dec-09	8:23 AM	Leaves, sticks, paper, plastic	No	No Runoff		
ASS2	Karl Brunckhorst	7-Dec-09	8:03 AM	Leaves, sticks	No	No Runoff		
ASW	Karl Brunckhorst	7-Dec-09	8:10 AM	Leaves, sticks	Low	Insignificant	ERD's Treatment Facility "A" discharging	
GRNE	Karl Brunckhorst	7-Dec-09	8:21 AM	Leaves, sticks, plastic	No	No Runoff		
WPDC	Karl Brunckhorst	7-Dec-09	8:14 AM	Leaves, sticks, plastic	Moderate	Insignificant	Lake Hausmann & ERD Treatment Facility B discharging	
ALPE	Karl Brunckhorst	11-Dec-09	3:29 PM	Leaves, sticks, paper	Moderate	Insignificant	Flow insufficient to collect sample	
ALPO	Karl Brunckhorst	11-Dec-09	3:32 PM	Leaves, sticks, paper, plastic	No	No Runoff		
ASS2	Karl Brunckhorst	11-Dec-09	3:50 AM	Leaves, sticks	No	Insignificant	Flow insufficient to collect sample	
ASW	Karl Brunckhorst	11-Dec-09	3:47 AM	Leaves, sticks, plastic	Low	Insignificant	ERD's Treatment Facility "A" discharging. Flow insufficient to collect sample.	
GRNE	Karl Brunckhorst	11-Dec-09	3:35 PM	Leaves, sticks, plastic	Moderate	Insignificant	Flow insufficient to collect sample	

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Table A-4. Record of wet season visual observations.

		Discharge Observations					
Location	Inspector	Date	Time	Floating Material, Debris, Odor, Discolorations, or Oil and Grease?	Turbidity	Runoff	Comments
WPDC	Karl Brunckhorst	11-Dec-09	3:41 PM	Leaves, sticks	Moderate	Insignificant	Lake Hausmann & ERD Treatment Facility B discharging. Flow insufficient to collect sample.
ALPE	Karl Brunckhorst	13-Jan-10	10:31 AM	Leaves, sticks, Plastic	Moderate	Insignificant	Non-Qualifying event, Runoff likely occurred during non-operating hours
ALPO	Karl Brunckhorst	13-Jan-10	10:26 AM	Leaves, sticks, paper, plastic	Moderate	Insignificant	Non-Qualifying event, Runoff likely occurred during non-operating hours
ASS2	Karl Brunckhorst	13-Jan-10	10:12 AM	Leaves, sticks	Moderate	Insignificant	Non-Qualifying event, Runoff likely occurred during non-operating hours
ASW	Karl Brunckhorst	13-Jan-10	10:16 AM	Leaves, sticks	Moderate	Insignificant	Non-Qualifying event, Runoff likely occurred during non-operating hours
GRNE	Karl Brunckhorst	13-Jan-10	10:23 AM	Leaves, sticks, paper, plastic	Low	Insignificant	Non-Qualifying event, Runoff likely occurred during non-operating hours
WPDC	Karl Brunckhorst	13-Jan-10	10:20 AM	Leaves, sticks	Moderate	Insignificant	Lake Hausmann & ERD Treatment Facility B discharging
ALPE	Karl Brunckhorst	23-Feb-10	1:25 PM	Leaves, sticks	Moderate	Significant	
ALPO	Karl Brunckhorst	23-Feb-10	1:30 PM	Leaves, sticks, paper	Moderate	No Runoff	
ASW	Karl Brunckhorst	23-Feb-10	2:00 PM	Leaves, sticks	Moderate	Significant	
ASS2	Crystal Foster	23-Feb-10	1:35 PM	Leaves, sticks	Moderate	Significant	
GRNE	Karl Brunckhorst	23-Feb-10	1:35 PM	Leaves, sticks, plastic	Moderate	Significant	Styrofoam

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Table A-4. Record of wet season visual observations.

		Discharge Observations						
Location	Inspector	Date	Time	Floating Material, Debris, Odor, Discolorations, or Oil and Grease?	Turbidity	Runoff	Comments	
WPDC	Karl Brunckhorst	23-Feb-10	2:20 PM	Leaves, sticks	Moderate	Significant	Lake Haussmann & ERD Treatment Facility B discharging	
ALPE	Karl Brunckhorst	3-Mar-10	9:04 AM	Leaves, sticks	Moderate	Significant		
ALPO	Karl Brunckhorst	3-Mar-10	9:06 AM	Leaves, sticks, paper, plastic	High	Significant	Soil stockpiles observed near sample location	
ASS2	Karl Brunckhorst	3-Mar-10	8:26 AM	Leaves, sticks	High	Significant	Highly turbid flow observed coming on to Sandia Lab property at Greenville Rd.	
ASW	Karl Brunckhorst	3-Mar-10	8:31 AM	Leaves, sticks, plastic	High	Significant	ERD's Treatment Facility "A" discharging	
GRNE	Karl Brunckhorst	3-Mar-10	9:08 AM	Leaves, sticks, styrofoam	Moderate	Significant		
WPDC	Karl Brunckhorst	3-Mar-10	8:36 AM	Leaves, sticks	Moderate	Significant	Lake Haussmann & ERD Treatment Facility B discharging	
ASS2-additional observation 2 days after significant rain event	Karl Brunckhorst	5-Mar-10	10:05 AM	Leaves, sticks	Low	Significant	Natural ephemeral flow observed approx. 5 miles upstream from where flow enters Sandia Lab property	
ALPE	Karl Brunckhorst	20-Apr-10	8:27 AM	Leaves, sticks, paper	Low	Insignificant		
ALPO	Karl Brunckhorst	20-Apr-10	8:24 AM	Leaves, sticks, paper, plastic	No	No Runoff		
ASS2	Karl Brunckhorst	20-Apr-10	8:35 AM	Leaves, sticks	Low	Significant		

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Table A-4. Record of wet season visual observations.

		Discharge Observations					
Location	Inspector	Date	Time	Floating Material, Debris, Odor, Discolorations, or Oil and Grease?	Turbidity	Runoff	Comments
ASW	Karl Brunckhorst	20-Apr-10	8:39 AM	Leaves, sticks, paper	Moderate	Significant	ERD's Treatment Facility "A" discharging
GRNE	Karl Brunckhorst	20-Apr-10	8:22 AM	Leaves, sticks, paper	Low	Insignificant	
WPDC	Karl Brunckhorst	20-Apr-10	8:15 AM	Leaves, sticks	Moderate	Significant	Lake Haussmann & ERD Treatment Facility B discharging. Sample collected and re-submitted for E1000TOX

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	DATE/TIME OF SAMPLE COLLECTION	TIME DISCHARGE STARTED	ANALYTICAL RESULTS For First Storm Event							
			BASIC PARAMETERS				OTHER PARAMETERS			
			pH	TSS	O&G	TOC	DO	Aluminum	Arsenic	
WPDC (ALP Effluent)	10/13/09	Ongoing	7.23	140	<5	31	11	2.5	<0.002	
	10:30 AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>								
GRNE (ALP Influent)	10/13/09	Ongoing	6.85	140	<5	7.9	11	N/A	N/A	
	9:45 AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>								
ALPO (ALP Influent)	10/13/09	Ongoing	7.18	580	<5	22	7.9	N/A	N/A	
	AM <input type="checkbox"/> 16:20 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>								
ALPE (ALP Influent)	10/13/09	Ongoing	7.00	64	<5	19	9.8	N/A	N/A	
	9:45 AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>								
TEST REPORTING UNITS:			pH Units	mg/L	mg/L	mg/L	mg O/L	mg/L	mg/L	
TEST METHOD USED:			SM-4500HB	SM-2540D	E1664HEM	SM-5310C	SM-4300OG	E200.7	E200.8	
ANALYZED BY (SELF/LAB):			BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	

ALP - Arroyo Las Positas
 TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For First Storm Event						
	OTHER PARAMETERS						
	Barium	Beryllium	Boron	Bromacil	Cadmium	Chemical Oxygen Demand	
WPDC (ALP Effluent)	0.087	<0.002	0.28	<0.5	<0.0005	120	
GRNE (ALP Influent)	N/A	<0.002	N/A	7.4	<0.0002	47	
ALPO (ALP Influent)	N/A	<0.002	N/A	<0.57	<0.0002	120	
ALPE (Influent)	N/A	<0.002	N/A	<0.5	<0.0002	94	
TEST REPORTING UNITS:	mg/L	mg/L	mg/L	ug/L	mg/L	mg O/L	
TEST METHOD USED:	E210.2	E210.2	E213.2	E410.4	E213.2	E410.4	
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	

ALP - Arroyo Las Positas
 TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS										
	For First Storm Event										
	OTHER PARAMETERS										
	Chromium	Copper	Diazinon	Diuron	Glyphosate	Hexavalent Chromium	Lead	Mercury			
WPDC (ALP Effluent)	0.021	0.022	<0.2	<1	<5	<0.0002	0.0072	<0.0002			
GRNE (ALP Influent)	N/A	0.017	<0.2	130	45	0.00056	0.0057	<0.0002			
ALPO (ALP Influent)	N/A	0.03	<0.23	<1	210	0.00077	0.017	<0.0002			
ALPE (ALP Influent)	N/A	0.015	<0.2	100	45	0.00036	0.0067	<0.0002			
TEST REPORTING UNITS:	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L	mg/L			
TEST METHOD USED:	E200.8	E200.8	E525.2	E632	E547	E218.6	E200.8	E245.1			
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs			

ALP - Arroyo Las Positas
 TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS									
	For First Storm Event									
	OTHER PARAMETERS									
	Nickel	Nitrate (asNO3)	Ortho-Phosphate	Pentachloro-phenol	Pyrene	Simazine	Total Dissolved Solids	Zinc		
WPDC (ALP Effluent)	0.017	7.6	1	<1	<0.1	<0.3	190	0.23		
GRNE (ALP Influent)	N/A	8.4	0.62	<1	<0.1	<0.3	73	0.037		
ALPO (ALP Influent)	N/A	12	2.1	<1.1	<0.11	<0.34	270	0.092		
ALPE (Influent)	N/A	17	0.69	<1	<0.1	<0.3	120	0.056		
TEST REPORTING UNITS:	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L		
TEST METHOD USED:	E200.8	E300.0	E365.1	E525.2	E525.2	E525.2	SM-2540C	E200.8		
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

ALP - Arroyo Las Positas
 TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed

Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For First Storm Event			
	OTHER PARAMETERS			
	Gross alpha	Gross beta	Tritium	Plutonium 239+240
WPDC (ALP Effluent)	0.14689±0.06808	0.21275±0.0666	4.736±1.8093	-0.00016872±0.0007289
GRNE (ALP Influent)	0.3774±0.14948	0.5254±0.13357	1.0397±1.4356	N/A
ALPO (ALP Influent)	0.4403±0.23569	0.999±0.24161	0.06327±1.3357	N/A
ALPE (Influent)	0.07437±0.05624	0.19277±0.0666	0.3848±1.369	N/A
TEST REPORTING UNITS:	Bq/L	Bq/L	Bq/L	Bq/L
TEST METHOD USED:	E900	E900	E906	AS:PUISO
ANALYZED BY (SELF/LAB):	GEL Labs	GEL Labs	GEL Labs	GEL Labs

Radioactivities are reported as the measured concentration and an uncertainty (s +/-2 counting error). If the concentration is less than or equal to the uncertainty, the result is considered to be a nondetection.

ALP - Arroyo Las Positas

TSS - Total Suspended Solids

SC - Specific Conductance

O&G - Oil & Grease

TOC - Total Organic Carbon

DO - Dissolved Oxygen

N/A - Not Analyzed

Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	DATE/TIME OF SAMPLE COLLECTION	TIME DISCHARGE STARTED	ANALYTICAL RESULTS For First Storm Event						
			BASIC PARAMETERS						
			pH	TSS	O&G	TOC	DO		
ASW (Arroyo Seco Effluent)	10/13/09	Ongoing							
	10:10 AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	7.88	34.	<5	18.	11		
ASS2 (Arroyo Seco Influent)	10/13/09	Ongoing							
	9:45 AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	AM <input checked="" type="checkbox"/> PM <input type="checkbox"/>	6.65	18.	<5	15.	11		
TEST REPORTING UNITS:			pH Units	mg/L	mg/L	mg/L	mg O/L		
TEST METHOD USED:			SM-4500HB	SM-2540D	E1664HEM	SM-5310C	SM-4500OG		
ANALYZED BY (SELF/LAB):			BC Labs	BC Labs	BC Labs	BC Labs	BC Labs		

TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For First Storm Event			
	OTHER PARAMETERS			
	Beryllium	Bromacil	Cadmium	Chemical Oxygen Demand
ASW (Arroyo Seco Effluent)	<0.002	<0.5	<0.0002	54.
ASS2 (Arroyo Seco Influent)	<0.002	<0.5	<0.0002	45.
TEST REPORTING UNITS:	mg/L	ug/L	mg/L	mg O/L
TEST METHOD USED:	E210.2	E525.2	E213.2	E410.4
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs

TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For First Storm Event							
	OTHER PARAMETERS							
	Copper	Diazinon	Diuron	Glyphosate	Hexavalent Chromium	Lead	Mercury	
ASW (Arroyo Seco Effluent)	0.011	<0.2	<1	9.2	0.0038	<0.005	<0.0002	
ASS2 (Arroyo Seco Influent)	0.0092	<0.2	<1	14.	0.00036	<0.005	<0.0002	
TEST REPORTING UNITS:	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L	mg/L	mg/L
TEST METHOD USED:	E200.8	E525.2	E632	E547	E218.6	E200.8	E245.1	
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For First Storm Event							
	OTHER PARAMETERS							
	Nitrate (asNO3)	Ortho-Phosphate	Pentachloro-phenol	Pyrene	Simazine	Total Dissolved Solids	Zinc	
ASW (Arroyo Seco Effluent)	15.	0.83	<1	0.19	<0.3	220.	0.096	
ASS2 (Arroyo Seco Influent)	2.9	0.67	<1	0.21	<0.3	49.	0.093	
TEST REPORTING UNITS:	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L	mg/L
TEST METHOD USED:	E300.0	E365.1	E525.2	E525.2	E525.2	SM-2540C	E200.7	
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-5. Storm water quality data for October 13, 2009.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For First Storm Event			
	OTHER PARAMETERS			
	Gross alpha	Gross beta	Tritium	Plutonium 239+240
ASW (Arroyo Seco Effluent)	0.09139±0.05735	0.12358±0.04625	1.3357±1.4282	0±0.0006327
ASS2 (Arroyo Seco Influent)	0.0015059±0.025752	0.014578±0.05846	0.06438±1.3579	N/A
TEST REPORTING UNITS:	Bq/L	Bq/L	Bq/L	Bq/L
TEST METHOD USED:	E900	E900	E906	AS:PUISO
ANALYZED BY (SELF/LAB):	GEL Labs	GEL Labs	GEL Labs	GEL Labs

Radioactivities are reported as the measured concentration and an uncertainty (s +/-2 counting error). If the concentration is less than or equal to the uncertainty, the result is considered to be a nondetection.

- TSS - Total Suspended Solids
- SC - Specific Conductance
- O&G - Oil & Grease
- TOC - Total Organic Carbon
- DO - Dissolved Oxygen
- N/A - Not Analyzed

Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	DATE/TIME OF SAMPLE COLLECTION	TIME DISCHARGE STARTED	ANALYTICAL RESULTS For Second Storm Event									
			BASIC PARAMETERS				OTHER PARAMETERS					
			pH	TSS	O&G	TOC	DO	Aluminum	Arsenic			
WPDC (ALP Effluent)	2/23/10	Ongoing	7.98	41	<5.7	7						
	AM <input type="checkbox"/> 14:20 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>										
GRNE (ALP Influent)	2/23/10	Ongoing	7.36	32	<5	3.9			12			
	AM <input type="checkbox"/> 13:35 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>										
ALPO (ALP Influent)	2/23/10	No Runoff	N/A	N/A	N/A	N/A			N/A			
	AM <input type="checkbox"/> 13:30 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>										
ALPE (ALP Influent)	2/23/10	Ongoing	7.52	68	<5	7.3			11			
	AM <input type="checkbox"/> 13:25 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>										
TEST REPORTING UNITS:			pH Units	mg/L	mg/L	mg/L	mg/L	mg O/L	mg/L	mg/L	mg/L	
TEST METHOD USED:			SM-4500HB	SM-2540D	E1664HEM	SM-5310C	SM-4500OG	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs
ANALYZED BY (SELF/LAB):			BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

ALP - Arroyo Las Positas
 TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event						
	OTHER PARAMETERS						
	Barium	Beryllium	Boron	Bromacil	Cadmium	Chemical Oxygen Demand	
WPDC (ALP Effluent)	N/A	<0.0002	N/A	<0.5	<0.0002	<25	
GRNE (ALP Influent)	N/A	<0.0002	N/A	8	<0.0002	<25	
ALPO (ALP Influent)	N/A	N/A	N/A	N/A	N/A	N/A	
ALPE (Influent)	N/A	<0.0002	N/A	2.9	0.00063	62	
TEST REPORTING UNITS:	mg/L	mg/L	mg/L	ug/L	mg/L	mg O/L	
TEST METHOD USED:	E210.2	E210.2	E213.2	E525.2	E213.2	E410.4	
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	

ALP - Arroyo Las Positas
TSS - Total Suspended Solids
SC - Specific Conductance
O&G - Oil & Grease
TOC - Total Organic Carbon
DO - Dissolved Oxygen
N/A - Not Analyzed
Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event									
	OTHER PARAMETERS									
	Chromium	Copper	Diazinon	Diuron	Glyphosate	Hexavalent Chromium	Lead	Mercury		
WPDC (ALP Effluent)	N/A	0.0063	<0.2	<1	<20	0.0024	<0.005	<0.0002		
GRNE (ALP Influent)	N/A	0.011	<0.2	9.7	48	<0.002	0.0057	<0.0002		
ALPO (ALP Influent)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
ALPE (ALP Influent)	N/A	0.011	<0.2	1.8	190	<0.002	0.0072	<0.0002		
TEST REPORTING UNITS:	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L	mg/L		
TEST METHOD USED:	E200.8	E200.8	E525.2	E632	E547	E218.6	E200.8	E245.1		
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs

ALP - Arroyo Las Positas
TSS - Total Suspended Solids
SC - Specific Conductance
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N/A - Not Analyzed
Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event									
	OTHER PARAMETERS									
	Nickel	Nitrate (asNO3)	Ortho-Phosphate	Pentachloro-phenol	Pyrene	Simazine	Total Dissolved Solids	Zinc		
WPDC (ALP Effluent)	N/A	5.8	0.21	<1	<0.1	<0.3	200	<0.2		
GRNE (ALP Influent)	N/A	11	0.5	<1	<0.1	<0.3	87	<0.2		
ALPO (ALP Influent)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
ALPE (Influent)	N/A	3.8	0.51	<1	<0.1	<0.3	61	<0.2		
TEST REPORTING UNITS:	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L		
TEST METHOD USED:	E200.8	E300.0	E365.1	E525.2	E525.2	E525.2	SM-2540C	E200.8		
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs		

ALP - Arroyo Las Positas
TSS - Total Suspended Solids
SC - Specific Conductance
O&G - Oil & Grease
TOC - Total Organic Carbon
DO - Dissolved Oxygen
N/A - Not Analyzed
Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event			
	OTHER PARAMETERS			
	Gross alpha	Gross beta	Tritium	Plutonium 239+240
WPDC (ALP Effluent)	0.07178±0.05476	0.08251±0.04662	2.9378±2.3828	0.0008362±0.0016613
GRNE (ALP Influent)	0.06216±0.0518	0.07511±0.04699	1.2765±2.1682	N/A
ALPO (ALP Influent)	N/A	N/A	N/A	N/A
ALPE (Influent)	0.10508±0.06179	0.09953±0.06512	1.0508±2.1867	N/A
TEST REPORTING UNITS:	Bq/L	Bq/L	Bq/L	Bq/L
TEST METHOD USED:	E900	E900	E906	AS:PUISO
ANALYZED BY (SELF/LAB):	GEL Labs	GEL Labs	GEL Labs	GEL Labs

Radioactivities are reported as the measured concentration and an uncertainty (s +/-2 counting error). If the concentration is less than or equal to the uncertainty, the result is considered to be a nondetection.

- ALP - Arroyo Las Positas
- TSS - Total Suspended Solids
- SC - Specific Conductance
- O&G - Oil & Grease
- TOC - Total Organic Carbon
- DO - Dissolved Oxygen
- N/A - Not Analyzed
- Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	DATE/TIME OF SAMPLE COLLECTION	TIME DISCHARGE STARTED	ANALYTICAL RESULTS For Second Storm Event						
			BASIC PARAMETERS						
			pH	TSS	O&G	TOC	DO		
ASW (Arroyo Seco Effluent)	2/23/10	Ongoing							
	AM <input type="checkbox"/> 14:00 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>	7.8	10.	<5	6.1	11.		
ASS2 (Arroyo Seco Influent)	2/23/10	Ongoing							
	AM <input type="checkbox"/> 13:35 PM <input checked="" type="checkbox"/>	AM <input type="checkbox"/> PM <input checked="" type="checkbox"/>	7.07	15.	<5.7	4.9	11.		
TEST REPORTING UNITS:			pH Units	mg/L	mg/L	mg/L	mg O/L		
TEST METHOD USED:			SM-4500HB	SM-2540D	E1664HEM	SM-5310C	SM-4500OG		
ANALYZED BY (SELF/LAB):			BC Labs	BC Labs	BC Labs	BC Labs	BC Labs		

TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
 Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event			
	OTHER PARAMETERS			
	Beryllium	Bromacil	Cadmium	Chemical Oxygen Demand
ASW (Arroyo Seco Effluent)	<0.0002	<0.5	<0.0002	25.
ASS2 (Arroyo Seco Influent)	<0.0002	<0.5	<0.0002	<25
TEST REPORTING UNITS:				
TEST METHOD USED:				
ANALYZED BY (SELF/LAB):				
TSS - Total Suspended Solids				
SC - Specific Conductance				
O&G - Oil & Grease				
TOC - Total Organic Carbon				
DO - Dissolved Oxygen				
N/A - Not Analyzed				
Test Method Used: E is EPA Method and SM is Standard methods for the examination of water and wastewater				
	mg/L	ug/L	mg/L	mg O/L
E210.2	E525.2	E213.2	E410.4	
BC Labs	BC Labs	BC Labs	BC Labs	

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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event							
	OTHER PARAMETERS							
	Copper	Diazinon	Diuron	Glyphosate	Hexavalent Chromium	Lead	Mercury	
ASW (Arroyo Seco Effluent)	0.0052	<0.2	<1	<20	<0.002	<0.005	<0.0002	
ASS2 (Arroyo Seco Influent)	0.0047	<0.2	<1	35.	<0.002	<0.005	<0.0002	
TEST REPORTING UNITS:	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L	mg/L	
TEST METHOD USED:	E200.8	E525.2	E632	E547	E218.6	E200.8	E245.1	
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	

TSS - Total Suspended Solids
 SC - Specific Conductance
 O&G - Oil & Grease
 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
 N/A - Not Analyzed
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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event									
	OTHER PARAMETERS									
	Nitrate (asNO3)	Ortho-Phosphate	Pentachloro-phenol	Pyrene	Simazine	Total Dissolved Solids	Zinc			
ASW (Arroyo Seco Effluent)	3.5	0.33	<1	<0.1	<0.3	98.	<0.2			
ASS2 (Arroyo Seco Influent)	1.2	0.45	<1	<0.1	<0.3	26.	<0.2			
TEST REPORTING UNITS:	mg/L	mg/L	ug/L	ug/L	ug/L	mg/L	mg/L			
TEST METHOD USED:	E300.0	E365.1	E525.2	E525.2	E525.2	SM-2540C	E200.7			
ANALYZED BY (SELF/LAB):	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs	BC Labs			

TSS - Total Suspended Solids
 SC - Specific Conductance
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 TOC - Total Organic Carbon
 DO - Dissolved Oxygen
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Table A-6. Storm water quality data for February 23, 2010.

DESCRIBE DISCHARGE LOCATION	ANALYTICAL RESULTS For Second Storm Event			
	OTHER PARAMETERS			
	Gross alpha	Gross beta	Tritium	Plutonium 239+240
ASW (Arroyo Seco Effluent)	0.08621±0.05772	0.10656±0.06364	7.178±2.8749	0.00036852±0.0010397
ASS2 (Arroyo Seco Influent)	0.006142±0.031672	0.05032±0.06105	2.5789±2.3088	N/A
TEST REPORTING UNITS:	Bq/L	Bq/L	Bq/L	Bq/L
TEST METHOD USED:	E900	E900	E906	AS:PUISO
ANALYZED BY (SELF/LAB):	GEL Labs	GEL Labs	GEL Labs	GEL Labs

Radioactivities are reported as the measured concentration and an uncertainty (s +/-2 counting error). If the concentration is less than or equal to the uncertainty, the result is considered to be a nondetection.

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