



Lawrence Berkeley
National Laboratory

Site Environmental Report for 2012

Environment/Health/Safety Division

September 2013



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DISTRIBUTION

Subject: 2012 Site Environmental Report (SER) for the Ernest Orlando Lawrence Berkeley National Laboratory (LBNL)

This report, prepared by LBNL for the U.S. Department of Energy, Berkeley Site Office (DOE/BSO), provides a comprehensive summary of the environmental program activities at LBNL for calendar year 2012. SERs are prepared annually for all DOE sites with significant environmental activities, and distributed to relevant external regulatory agencies and other interested organizations or individuals.

To the best of my knowledge, this report accurately summarized the results of the 2012 environmental monitoring, compliance, and restoration programs at LBNL. This assurance can be made based on the reviews conducted by DOE/BSO, and LBNL, as well as quality assurance protocols applied to monitoring and data analyses at LBNL.

A reader survey form is posted with the SER at the LBNL website to provide comments or suggestions for future versions of the report. Your response is appreciated.

Questions or comments regarding this report may also be made directly to DOE/BSO, by contacting Mr. Kim Abbott of the Berkeley Site Office at (510) 486-7909, or by mail to the address above, or by email kim.abbott@bso.science.doe.gov.

Sincerely,

A handwritten signature in black ink, appearing to read "Aundra Richards".

Aundra Richards
Site Office Manager

Site Environmental Report for 2012

Volume I

September 2013



Lawrence Berkeley
National Laboratory

Cover photo by Roy Kaltschmidt of the Public Affairs Department

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A view across the San Francisco Bay from Berkeley Lab's Molecular Foundry, which was Berkeley Lab's first building to be awarded a U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED) gold certification. *Photograph by Daniel Parks.*

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Chicken Creek is one of the creeks monitored for water quality. Flow is generally low during the dry season, but can increase substantially during a major storm. *Photograph by Tim Bauters.*

Preface

Each year the University of California (UC), as the managing and operating contractor of the Lawrence Berkeley National Laboratory (LBNL), prepares this report to satisfy the requirements of United States Department of Energy (DOE) Order 231.1B, *Environment, Safety, and Health Reporting*.¹ The *Site Environmental Report for 2012* summarizes LBNL's environmental management performance, presents environmental monitoring results, and describes significant programs for calendar year (CY) 2012. Throughout this report, LBNL or "Berkeley Lab" refers to (1) the multi-program scientific facilities the UC manages and operates on the 202-acre university-owned site located in the hills above the UC Berkeley campus and at several off-site leased locations in the East Bay, (2) the site itself, and (3) the UC as managing and operating contractor for Berkeley Lab.

The report is separated into two volumes. Volume I is organized into an executive summary followed by six chapters that include an overview of LBNL, a discussion of its Environmental Management System (EMS), the status of environmental programs, summarized results from surveillance and monitoring activities, and quality assurance (QA) measures. Volume II contains individual data results from surveillance and monitoring activities.

Volume I also includes several sections intended to assist the reader in understanding the content of the document. Acronyms will be spelled out only during their first citation in this report, and a listing of [acronyms and](#)

abbreviations used in this report are found in a section bearing this same title. In addition, a glossary is provided for some of the technical terms that may be unfamiliar to readers. Both sections are found directly after Chapter 6.

The *Site Environmental Report* is distributed online from the Berkeley Lab Environmental Services Group (ESG) home website, located at www.lbl.gov/ehs/esg/. In addition to this report, many of the documents cited in the References section are also accessible from the ESG website or online. Compact disc and printed copies of this report are also available upon request.

The report follows Berkeley Lab's policy of using the International System of Units (SI), also known as the metric system of measurements. Whenever possible, results are also reported using the more conventional (non-SI) system of measurements, since the non-SI system is referenced by several current regulatory standards and is more familiar to some readers. Two tables are provided at the end of the Glossary to help readers: Table G-1 defines the prefixes used with SI units of measurement, and Table G-2 provides conversions to non-SI units.

Years mentioned in this report refer to calendar years unless specified as fiscal year(s). Berkeley Lab's fiscal year (FY) is October 1 to September 30, and begins in the year previous to its name. For instance, FY2012 was from October 1, 2011 to September 30, 2012.

This report was prepared under the direction of Ron Pauer, environmental manager of ESG. Please address any questions regarding this report to him by telephone at 510-486-7614 or by e-mail at ropauer@lbl.gov. The primary contributors were David Baskin, Tim Bauters, Ned Borglin, Robert Fox, Blair Horst, John Jelinski, Maram Kassis, David Kestell, Jeff Philliber, Patrick Thorson, Linnea Wahl, Petra Wehle, and Suying Xu (Volume II). Berkeley

Lab's Photography Club members and other staff contributed photos taken around the site. Photographers include Tim Bauters, Roy Kaltschmidt, Roberto Melgoza, Kei Nakamura, Daniel Parks, and Patrick Thorson.

Readers are encouraged to comment on this report by completing the survey form found at www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.



Executive Summary

LBNL is a multi-program scientific facility operated by the UC for the DOE. LBNL's research is directed toward the physical, biological, environmental, and computational sciences, in order to deliver scientific knowledge and discoveries pertinent to DOE's mission.

This annual *Site Environmental Report* covers activities conducted in CY2012. The format and content of this report satisfy the requirements of DOE Order 231.1B, *Environment, Safety, and Health Reporting*,¹ and the operating contract between UC and DOE.²

INTEGRATED SAFETY MANAGEMENT AND ENVIRONMENTAL MANAGEMENT SYSTEMS

Berkeley Lab implements DOE's policy on Integrated Safety Management, which takes a systematic approach to managing core environment, safety, and health functions for all LBNL work through the following steps:

1. Work planning
2. Hazard and risk analysis
3. Establishment of controls
4. Work performance in accordance with the controls
5. Feedback and improvement

LBNL activities are planned and conducted with full regard to protecting employees, the public, and the environment and complying with all applicable environmental, safety, and health laws and regulations.

Berkeley Lab continues to align its Environmental Management System (EMS) with its Integrated Safety Management System (ISMS). When practical, existing ISMS processes are used to support and improve environmental performance and compliance management. An external audit is required by DOE every three years, and in June 2012 such an audit of the EMS was conducted. For a discussion of audit results, see [Chapter 2](#).

The EMS promoted numerous activities for reducing Berkeley Lab's environmental impacts in areas such as energy, fuel, water use, toxic air emissions, and landfill waste, while improving performance in acquiring more environmentally sustainable and preferable products, such as computers and monitors that meet international environmental performance criteria. The EMS also plays a key role in the annual performance evaluation of Berkeley Lab, summarized below.

OPERATING PERMITS, INSPECTIONS, AND INCIDENTS

At the end of the year, Berkeley Lab held 51 environmental operating permits from various regulatory agencies for air and water quality protection and hazardous waste handling.

Berkeley Lab's environmental programs underwent 13 inspections and one audit in 2012, conducted both internally and by regulatory agencies. Three violations resulted from these inspections and one finding arose from the audit. All violations and the finding have been addressed and resolved.

For additional information on operating permits, inspections, and violations, please see [Sections 3.2.1](#) and [3.2.2](#). For details of DOE-reportable environmental incidents, see [Section 3.2.3](#).

PERFORMANCE EVALUATION

Each year, UC and DOE assess the performance of Berkeley Lab's environmental program using measures and a rating system developed jointly by

Berkeley Lab, UC, and DOE. The rating system includes possible letter grades ranging from A+ to F. In FY2012, the Lab's EMS was evaluated and given a performance rating of A- for its management of environmental measures. This rating is based on how the EMS successfully implemented the elements of the International Organization for Standardization's (ISO) International Standard 14001:2004(E) *Environmental Management Systems—Requirements with Guidance for Use*³ and for Berkeley Lab completing numerous projects that had favorable environmental benefits. For more information on the performance of the EMS, see [Chapter 2](#).

ENVIRONMENTAL MONITORING AND DOSE ASSESSMENT

Berkeley Lab's environmental monitoring (radiological and non-radiological) program serves several purposes:

- Demonstrate that LBNL activities operate within regulatory and DOE requirements
- Provide a historical record of LBNL impacts on the environment
- Support environmental management decisions
- Provide information on the effectiveness of emission control programs
- Assess the maximum potential radiological dose to members of the public and to biota (plants and animals)

To assess potential doses to the public resulting from Berkeley Lab operations, three types of environmental radiation are measured:

1. Penetrating radiation (gamma and neutron) from sources such as accelerators
2. Discharges of dispersible radionuclides to stack air and sanitary sewer water
3. Concentrations of radionuclides in the ambient environment (air, surface water, vegetation, soil, sediment, and groundwater)

Of these three, penetrating radiation and dispersible airborne radionuclides are the only significant contributors to the calculated dose to the public. In 2012, the maximum dose to an individual member of the public residing near Berkeley Lab from penetrating radiation and dispersible airborne radionuclides was about 1.4×10^{-3} millisievert (mSv) (0.14 millirem [mrem]). This is approximately 0.05% of the average United States natural background radiation dose (3.1 mSv [310 mrem])⁴ and about 0.1% of the DOE annual limit for the public from all sources (1.0 mSv [100 mrem]).⁵

The United States Environmental Protection Agency (U.S. EPA) has also established an annual dose limit for the public from dispersible radionuclide emissions (i.e., airborne radionuclides). When considering this form of materials released from Berkeley Lab in 2012, the estimated maximum potential dose was 5.6×10^{-5} mSv (0.0056 mrem), or about 0.06% of the U.S. EPA annual dose limit (0.10 mSv/year [10 mrem/year]).⁶

Berkeley Lab also estimates the cumulative dose impact (population dose) from penetrating radiation and dispersible airborne radionuclides to the entire population found within an 80-kilometer (km) (50-mile [mi]) radius of Berkeley Lab. This measure is the sum of all individual doses to the population residing or working within this radius. The population dose for 2012 from penetrating radiation and airborne radionuclides was estimated at 2.3×10^{-3} person-sievert (person-Sv) (0.23 person-rem). No regulatory standard exists for this measure. For comparison purposes, this same population receives an estimated dose of 12,000 person-Sv (1,200,000 person-rem) from natural background radionuclides alone.⁷ The dose to the population from Berkeley Lab is about 0.00002% of the background level, or more than five million times less than background level. For more details on radiological dose assessments conducted in 2012, see [Chapter 5](#).

During the year creek water, groundwater, sediment, soil, stormwater, and wastewater were monitored for radiological and non-radiological constituents to comply with environmental regulations, permits, and DOE requirements. Most

results were below or near analytical detection limits, or within urban background levels and below regulatory limits.

Investigations conducted as part of the Resource Conservation and Recovery Act (RCRA) Corrective Action Program (CAP) since the early 1990s have identified and characterized eleven areas of groundwater contamination at the site. Berkeley Lab is now in the Corrective Measures Implementation (CMI) phase of the RCRA CAP. The purpose of this phase is to operate, maintain, and monitor the corrective measure activities approved by the State of California Department of Toxic Substances Control (DTSC) for cleanup of the site's contaminated groundwater. Groundwater monitoring data indicate that the corrective measures have been effective in reducing concentrations of contaminants in the groundwater, the groundwater plumes are stable or reducing, and contaminants are not migrating offsite in the groundwater. Although the groundwater at Berkeley Lab is not used for domestic, irrigation, or industrial purposes, the long-term goal is to restore all groundwater at LBNL to drinking water standards wherever practicable. For more details on environmental monitoring conducted in 2012, see [Chapter 4](#).



A young buck (*Odocoileus hemionus*) takes note of one of Berkeley Lab's shuttle buses, which serve to keep traffic down to a minimum. Photograph by Roberto Melgoza.

1. Introduction

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1.1 HISTORY

Lawrence Berkeley National Laboratory was founded by Ernest O. Lawrence in 1931. Lawrence invented a unique particle accelerator – called a cyclotron – that ushered in a new era in the study of subatomic particles and earned him the Nobel Prize in physics in 1939. Through his work Lawrence launched the modern era of multidisciplinary team science, and to this day Berkeley Lab continues the tradition of multidisciplinary scientific teams working together to solve global problems in human health, technology, energy, and the environment. Twelve Nobelists have worked here, and countless other researchers have contributed to LBNL's success as an institution for furthering our nation's scientific endeavors.

Currently Berkeley Lab supports work in such diverse fields as genomics, physical biosciences, alternative fuels, nanoscience, life sciences, fundamental physics, accelerator physics and engineering, energy conservation technology, and materials science. Through its fundamental research in these fields, Berkeley Lab has achieved international recognition for its leadership and has made numerous contributions to national programs. Berkeley Lab's research embraces the following concepts to align with the DOE mission:

- Explore the complexity of energy and matter
- Advance the science needed to attain abundant clean energy
- Understand energy impacts on our living planet
- Provide extraordinary tools for multidisciplinary research

Since its beginning, Berkeley Lab has been managed by UC, and numerous Berkeley Lab scientists are faculty members on the UC Berkeley or UC San Francisco campuses. They and other Berkeley Lab researchers guide the work of graduate students pursuing advanced degrees through research at LBNL. Berkeley Lab also designs programs to enhance science education and involves teachers and students at both the university and high school levels as part of its mission.

1.2 LOCATION

Berkeley Lab is one of four DOE-affiliated laboratories in the Bay Area. Its main site is located about five km (three mi) east of San Francisco Bay on land owned by UC. LBNL also leases off-site facilities in Berkeley, Emeryville, Oakland, and Walnut Creek (see Figure 1-1). The main site is situated on approximately 82 hectares (202 acres) of land. UC provides long-term land leases to the DOE for many of the facilities and buildings at LBNL.

The main site lies in the hills above the UC Berkeley campus, on the ridges and draws of Blackberry Canyon (which forms much of the western part of the site) and adjacent Strawberry Canyon (which forms much of the southern part of the site). Elevations across the site range from 135 to 350 meters (m) (450 to 1,150 feet [ft]) above sea level. The western portion of the site is in Berkeley, the eastern portion is in Oakland, and the entire site is located within Alameda County. The population of Berkeley is estimated at nearly 113,000 and that of Oakland is approaching 391,000.¹

Adjacent land use consists of residential, institutional, and recreational areas (see Figure 1-2). The area to the south and east of LBNL, which is University land, is

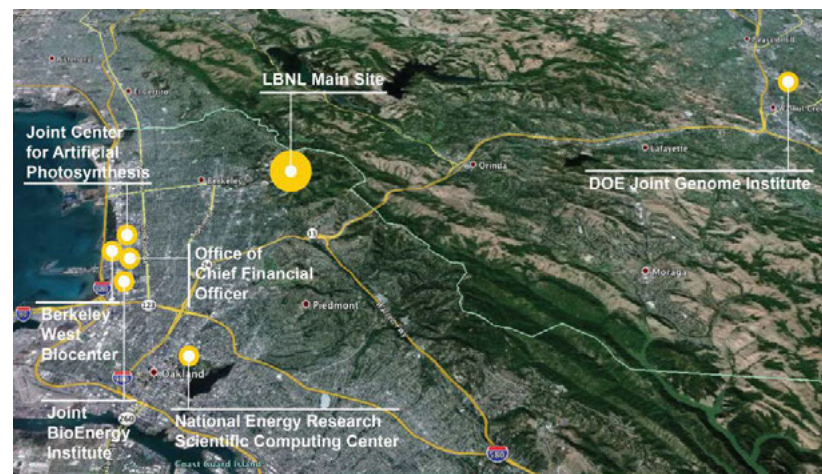


Figure 1-1 LBNL Main Site and Satellite Facilities Location

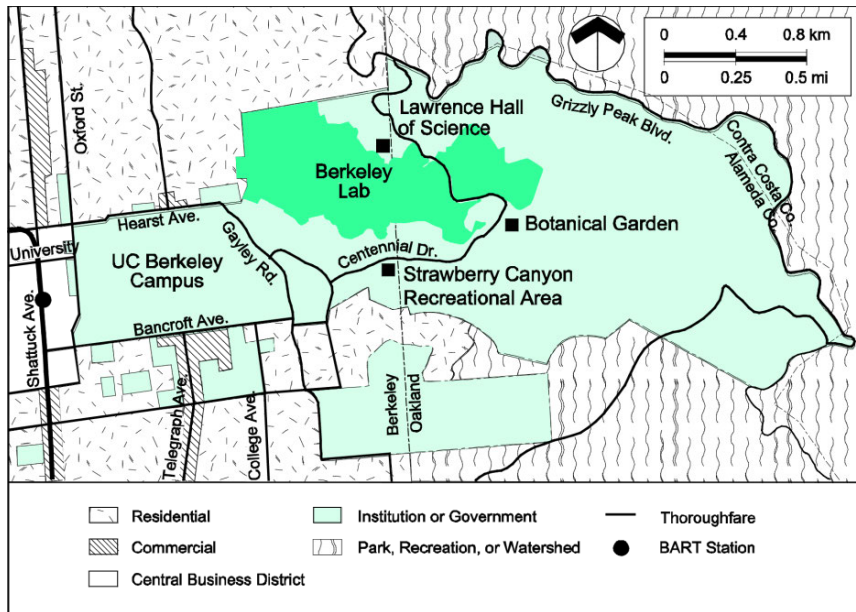


Figure 1-2 Adjacent Land Use

maintained largely in a natural or undeveloped state, but includes UC Berkeley’s Strawberry Canyon Recreational Area and Botanical Garden. To the northeast are the University’s Lawrence Hall of Science, Space Sciences Laboratory, and Mathematical Sciences Research Institute. Berkeley Lab is bordered on the north by a residential neighborhood of low-density, single-family homes and on the west by the UC Berkeley campus, as well as by multi-unit dwellings, student residence halls, and private homes. The area to the west of Berkeley Lab is highly urbanized.

1.3 POPULATION AND SPACE DISTRIBUTION

Over 2,300 scientists and support personnel, plus approximately 700 faculty and students, work at the main Berkeley Lab site. In addition, LBNL hosts over 3,200 participating guests who use its unique scientific facilities each year for varying lengths of time. Berkeley Lab also employs over 1,000 scientists and staff at off-site locations in Berkeley, Emeryville, Oakland, and Walnut Creek. Approximately 750 of LBNL’s scientists and guests are jointly affiliated with a university campus.

Berkeley Lab research and support activities are conducted in structures having a total area of about 190,000 gross square meters (gsm) (approximately 2.0 million gross square feet [gsf]). About 80% of the total space is at the main site, about 2% is on the UC Berkeley campus (e.g., Donner Laboratory), and the remaining 18% is located in other off-site leased buildings. Figure 1-3 shows the Berkeley Lab space distribution.

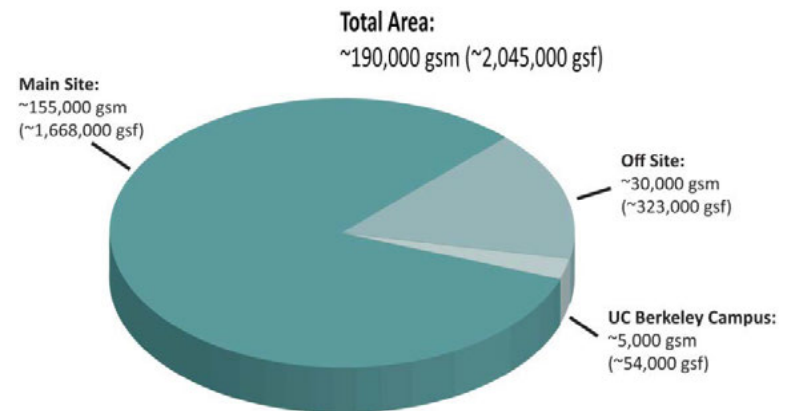


Figure 1-3 Approximate Space Distribution

1.4 ENERGY USE

All electric power for Berkeley Lab's main site is provided by the Western Area Power Administration. Power purchases are arranged through DOE's Northern California Power Purchase Consortium. This consortium serves the electric power needs of DOE facilities in the San Francisco Bay Area, namely Berkeley Lab, Lawrence Livermore National Laboratory, and the SLAC National Accelerator Laboratory. Natural gas is provided by the Defense Logistics Agency and is transported through Pacific Gas and Electric's infrastructure.

In response to DOE's accelerated renewable energy acquisition goals, Berkeley Lab set a goal to offset at least 7.5 % of its overall electric power needs (including off-site facilities) through purchasing renewable energy credits, starting in FY2010. In FY2012, these credits represented over 12% of total LBNL electric power used, significantly exceeding the 7.5% goal.

LBNL has committed to achieving an energy use intensity reduction of 30% from 2003 levels by October 2015 in response to Executive Order (EO) 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*.² Another order, EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*,³ also indirectly addresses energy use reductions by adding requirements to reduce greenhouse gas (GHG) emissions (see Section 1.6).

Energy use intensity is defined as the energy use per facility floor square footage. Excluded from this metric is energy used from any High Energy Mission Specific Facility (HEMSF) and associated floor area. HEMSFs are defined by DOE as separately constructed, mission-specific facilities, such as accelerators (particle and light sources), reactors (fusion and fission), high performance computers, and high performance lasers, as well as the closely coupled conventional facilities necessary for the operation of these facilities. LBNL presently has five HEMSFs:

- Advanced Light Source
- DOE Joint Genome Institute (JGI)
- 88-Inch Cyclotron

- Molecular Foundry
- National Energy Research Scientific Computing Center

When completed, the Computational Research and Theory facility will also be considered a HEMSF.

By the end of FY2012, Berkeley Lab's energy use intensity metric was about 8.8% more than the baseline. A portion of this increase is attributable to expanded scientific missions in non-HEMSFs, such as the Joint Center for Artificial Photosynthesis and Potter Street facilities. The recent demolition of the Bevatron and other facilities at the main site is another important factor behind the increase as these activities removed significant square footage from the denominator of the energy use intensity calculation.

1.5 WATER SUPPLY

All domestic water for LBNL's main site is supplied by the East Bay Municipal Utility District (EBMUD). The site has no drinking water wells. The domestic water originates in Sierra Nevada watershed lands and is transported to the Bay Area and ultimately to Berkeley Lab through a system of lakes, aqueducts, treatment plants, and pumping stations. EBMUD tests the water for contaminants and treats it to meet disinfection standards required by the Safe Drinking Water Act.⁴

Wisely managing water use in a region prone to periodic drought is a critical issue for LBNL. Federal requirements help create further incentives for reducing water consumption. Most recently, EO 13514 extended the earlier goal of EO 13423 for DOE to reduce water use intensity, which is the consumption per square foot of building space. The new goal increases the water use intensity reduction from the previous goal of 16% reduction by October 2015, relative to 2007, to 26% by October 2020, also relative to 2007. DOE established the water use intensity goal at contractor sites in DOE Order 436.1, *Departmental Sustainability*.⁵

During FY2009 LBNL achieved a water use intensity savings of almost 18%. Since FY2010, the savings have been decreasing from baseline largely due to new leaks in LBNL's aging water distribution piping and increased process cooling needs. Leaks are repaired as they are discovered, and other conservation measures have been implemented. However, there is an increasing need for additional cooling water to support expanding research activities, including those in Berkeley Lab's HEMSFs, which, unlike in the energy metric, may not be excluded from this metric. Increased demand, and recent demolition of the Bevatron and other facilities that removed significant square footage from the denominator of the water use intensity calculation, have resulted in the FY2012 water use intensity now 4.5% above the baseline.

Over the long term, even with a well-maintained, efficient system in place, it will be very challenging to meet October 2020 potable water savings goals. This is because planned new facilities are mostly HEMSFs and are designed to meet program needs using more cost-effective water-based cooling systems instead of much higher energy-consuming, air-based cooling systems. As a result, overall water use will continue to increase despite conservation measures.

1.6 GREENHOUSE GAS EMISSIONS

DOE Order 436.1 incorporated the requirements of EO 13423 and EO 13514. Further, it established goals to significantly reduce GHG emissions from federal facilities by October 2020. DOE has prescribed department-wide GHG reduction goals as summarized in Figure 1-4 and described in Table 2-2. As the figure shows, GHG emissions are divided into three scopes – or categories – of emissions. For federal agencies, GHG emission scopes are defined as:

- Scope 1: Local sources owned or controlled by the agency
- Scope 2: Purchased electric power, heating or cooling energy
- Scope 3: Sources not owned or directly controlled by the agency, but related to its activities

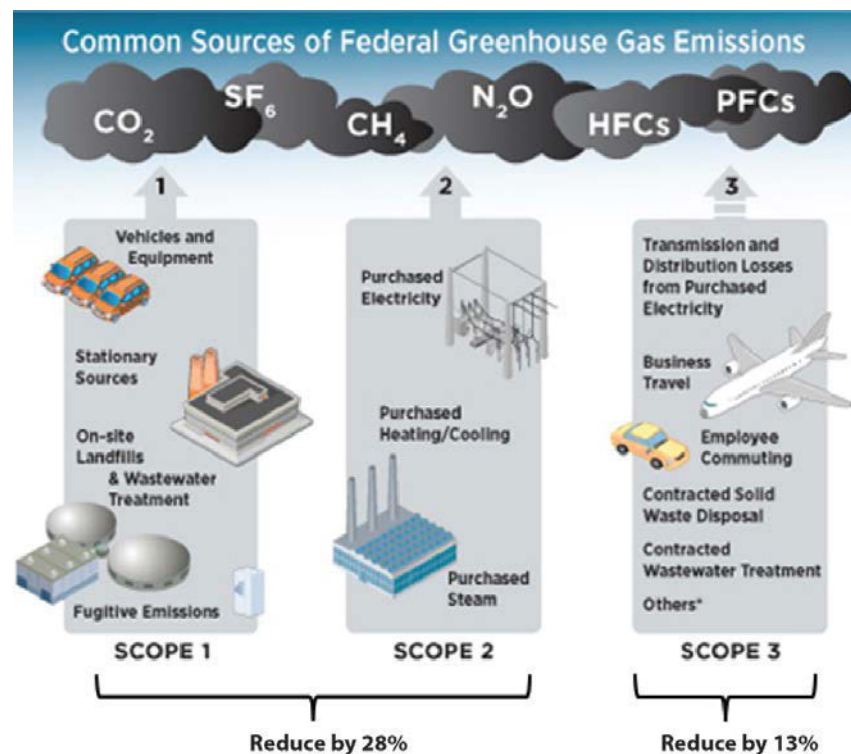


Figure 1-4 Greenhouse Gas Emission Categories and DOE Reduction Goals

Like the water use intensity reduction goal and unlike the energy use intensity reduction goal discussed above, the GHG savings goals do not allow exclusion of emissions attributed to HEMSFs, nor are adjustments allowed for new construction or related expanding scientific missions. The effects of future increases in Berkeley Lab's scientific programs – primarily those requiring enormous computing power – will overwhelm efforts to achieve the goals via energy savings efforts, unless renewable electric power sources can be found to serve future HEMSF needs at a reasonable cost, a solution LBNL is currently investigating.

1.7 METEOROLOGY

The climate at LBNL is temperate, influenced by the moderating effects of nearby San Francisco Bay and the Pacific Ocean to the west, and by the East Bay hills paralleling the eastern shore of this same bay on the east. These physical barriers contribute significantly to the relatively warm, wet winters and cool, dry summers. The average annual temperature at the site is about 13° Celsius (C) (55° Fahrenheit [F]). The temperature is in the range of 5° to 20°C (41° to 68°F) between 85% and 90% of the year. Seldom does the maximum temperature exceed 32°C (90°F) or the minimum temperature drop below 0°C (32°F).

The average annual precipitation, based on nearly 40 years of Berkeley Lab measuring records, is slightly more than 77 centimeters (cm) (30 inches [in]) of rain during the season (October 1 to September 30). Measurable snow does not fall at Berkeley Lab. Nearly 99% of the annual rainfall occurs between October and April; typically the wettest of these months are December through February. The 2011/2012 season closed with 62.33 cm (24.5 in) of rain, or about 80% of the normal amount.

On-site wind patterns change little from one year to the next. Figure 1-5 is a graphical summary of the annual wind patterns called a “wind rose,” illustrating the frequency of the predominant wind patterns. The most prevalent wind pattern occurs during fair weather, with daytime westerly winds blowing off the bay, followed by lighter nighttime southeasterly drainage winds off the East Bay hills. The other predominant wind pattern is associated with storm systems passing through the region, which usually occur during the winter months. South-to-southeast winds in advance of each storm are followed by a shift to west or northwest winds after passage of the system.

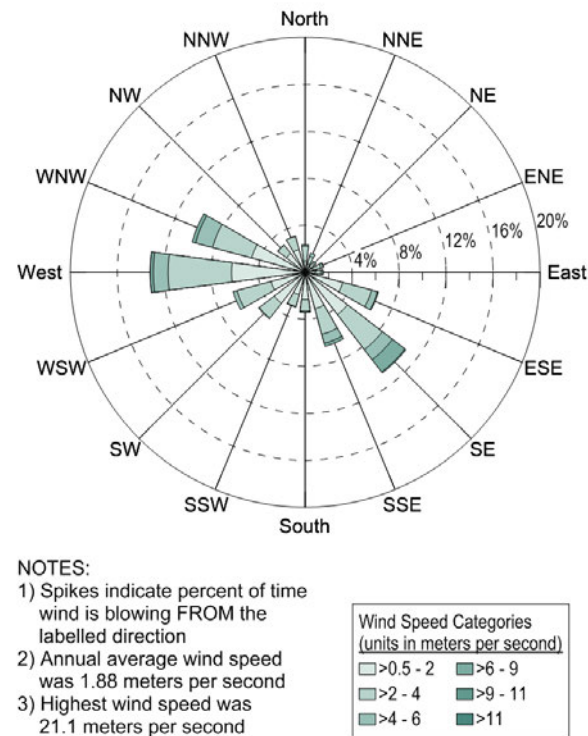


Figure 1-5 Annual Wind Patterns

1.8 VEGETATION

Vegetation on the Berkeley Lab site is a mixture of native plants, naturalized exotics, and ornamental species. The site was intensively grazed and farmed for about 150 years before Berkeley Lab development began in the 1930s. Current vegetation is managed in harmony with the local natural succession of native plant communities, and the wooded and savanna character of the areas surrounding buildings and roads is maintained. Ornamental species are generally restricted to public spaces, courtyards, and areas adjacent to buildings. The site has no known rare, threatened, or endangered plant species. Figure 1-6 shows the vegetation types on-site.

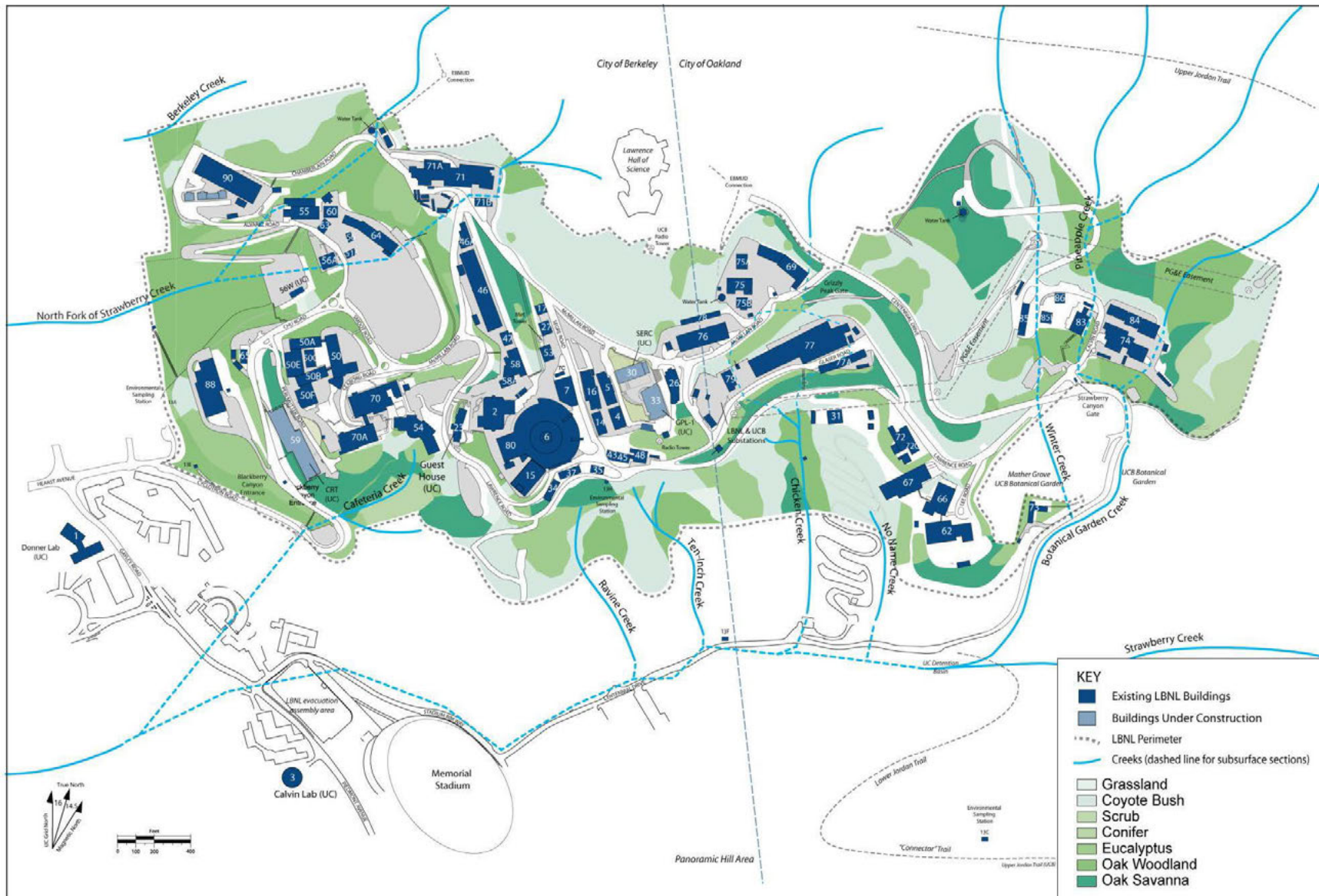


Figure 1-6 Vegetation Types

The vegetation management program is designed to minimize wildland fire damage to structures by limiting the potential flame heights of ground cover vegetation to no more than 0.9 m (3 ft).

The following vegetation management activities are conducted annually at the main site:

- Cutting off tree limbs growing below a minimum of 1.8 to 2.4 m (6 to 8 ft) from the ground (depending on species)
- Cutting grasses after the growing season ends to a height no taller than 7.6 cm (3 in)
- Removing brush, except ornamental bushes

The purpose of these vegetation management efforts is to minimize the amount of available fuel and the intensity of any future wildland fire. As a result, buildings at the main site would more likely survive such a fire, and the lower-intensity fire conditions would allow regional fire fighters to suppress the flame front so that it would not proceed to the west of LBNL. To assist in accomplishing these objectives, a herd of goats is brought in each summer to remove grasses and brush from many of the wildland areas on the main site.

As a member of the Hills Emergency Forum, Berkeley Lab collaborates with other members, including representatives from the neighboring cities of Berkeley and Oakland, EBMUD, and UC Berkeley, to improve vegetation management of the urban-wildland interface in adjacent areas.

1.9 WILDLIFE

Wildlife is abundant at Berkeley Lab because the site is adjacent to the East Bay Regional Park District and UC open spaces. Wildlife is typical of that found in disturbed (e.g., previously grazed) areas of midlatitude California featuring a Mediterranean climate. More than 120 species of birds, mammals, reptiles, and amphibians are thought to traverse or exist on the site. The most abundant large mammal is the Columbian black-tailed deer.

Habitat protected by various environmental laws exists on site as follows:

- An area on the south-facing slope of LBNL's Blackberry Canyon has been identified as a site where an arachnid called Lee's Micro-Blind Harvestman (*Microcina leei*) occurs. This area consists of a dense canopy of oak-bay woodland with undisturbed sandstone rocks embedded in the soil that provides moist conditions underneath.⁶ *Microcina leei* is listed as a "special animal" by the California Department of Fish and Wildlife (CDFW); however, it is not considered by the state to be a special-status species. It was first identified on the main site in the 1960s and again in the 1980s.
- An approximately five-acre area at the eastern boundary of LBNL is included in the U.S. Fish and Wildlife Service's designated critical habitat for the Alameda whipsnake. This snake species (*Masticophis lateralis euryxanthus*) is listed as threatened under both federal and state law and is found in open-canopied shrub communities, including coastal scrub and chaparral, and adjacent habitats including oak woodland, savanna, and grassland areas. The entire LBNL site was surveyed for whipsnake suitability in 2006. Several undeveloped areas were identified as having high and moderate "potential" or suitability for habitation by the Alameda whipsnake. In 2008, a three-month trapping survey was commissioned by LBNL and conducted by a licensed, permitted biologist. A single juvenile Alameda whipsnake was trapped in the undeveloped southeastern areas of the site.
- A number of drainages, including potentially "jurisdictional" drainages as defined under the Clean Water Act (CWA), exist on the main site. Some are ephemeral or intermittent, and others (the North Fork of Strawberry Creek and Chicken Creek) are perennial. All jurisdictional waterways warrant special protection under the CWA. These jurisdictional drainages, along with four freshwater seeps, appear to support riparian habitat.

1.10 SOILS

The Moraga Formation, the Orinda Formation, and the Great Valley Group are the three principal bedrock units underlying the site as described below:

1. The western and southern parts of Berkeley Lab are underlain by marine siltstones and shales of the Great Valley Group. The permeability of these rocks is relatively low, with groundwater flow controlled through open fractures rather than through pore spaces.
2. Non-marine sedimentary rocks of the Orinda Formation overlie the Great Valley Group and constitute the exposed bedrock over most of the developed area of the site. The Orinda Formation consists primarily of sandstones, mudstones, and conglomerates deposited in fluvial and alluvial environments. It typically has lower values of hydraulic conductivity (measure of the rate at which water can move through a permeable medium) than the underlying Great Valley Group or overlying Moraga Formation, and therefore it impedes the horizontal and vertical flow of groundwater.
3. The Moraga Formation consists of volcanic rocks that underlie most of the higher elevations of Berkeley Lab, as well as much of the central developed area (“Old Town”), and constitutes the main water-bearing unit at Berkeley Lab. Although the permeability of the rock is low, groundwater flows readily through the numerous open fractures.

In addition to the three main units described above, the Claremont Formation (primarily marine chert and shale) and San Pablo Group (primarily marine sandstones) underlie the easternmost area of the site.

Surface materials at Berkeley Lab consist primarily of soil, colluvium (soil accumulated at the foot of a slope), and artificial fill. Soil derived primarily from the bedrock units has accumulated to typical thicknesses of one to several meters across much of the site. Cutting and filling of the hilly terrain has been necessary

to provide suitable building sites, resulting in up to tens of meters of engineered cuts and fills at some locations.

1.11 GROUNDWATER

The groundwater elevation map of Berkeley Lab (Figure 1-7) shows that the water table approximately mirrors surface topography. The groundwater flow in the western portion of Berkeley Lab is generally westwards, and flow in the remainder of the site is generally southwards. The depth to groundwater varies from approximately 0 to 30 m (98 ft) below the surface. In some areas, due to the subsurface geometry and physical characteristics of various geologic units, groundwater flow directions vary from the general trends presented on the groundwater elevation map.

Groundwater at LBNL has a potential effect on slope stability and on the underground movement of contaminants (see [Section 4.5](#)). Berkeley Lab has a longstanding slope stabilization program in place that reduces the risk of property damage caused by soil movement. This program includes construction of subsurface drain lines (hydraugers), vegetation cover, and soil retention structures.

1.12 SEISMICITY

The active Hayward Fault, a branch of the San Andreas Fault System, runs from northwest to southeast along the base of the hills at the western boundary of Berkeley Lab. The inactive Wildcat Fault traverses the site from north to south along the canyon at LBNL’s eastern edge.

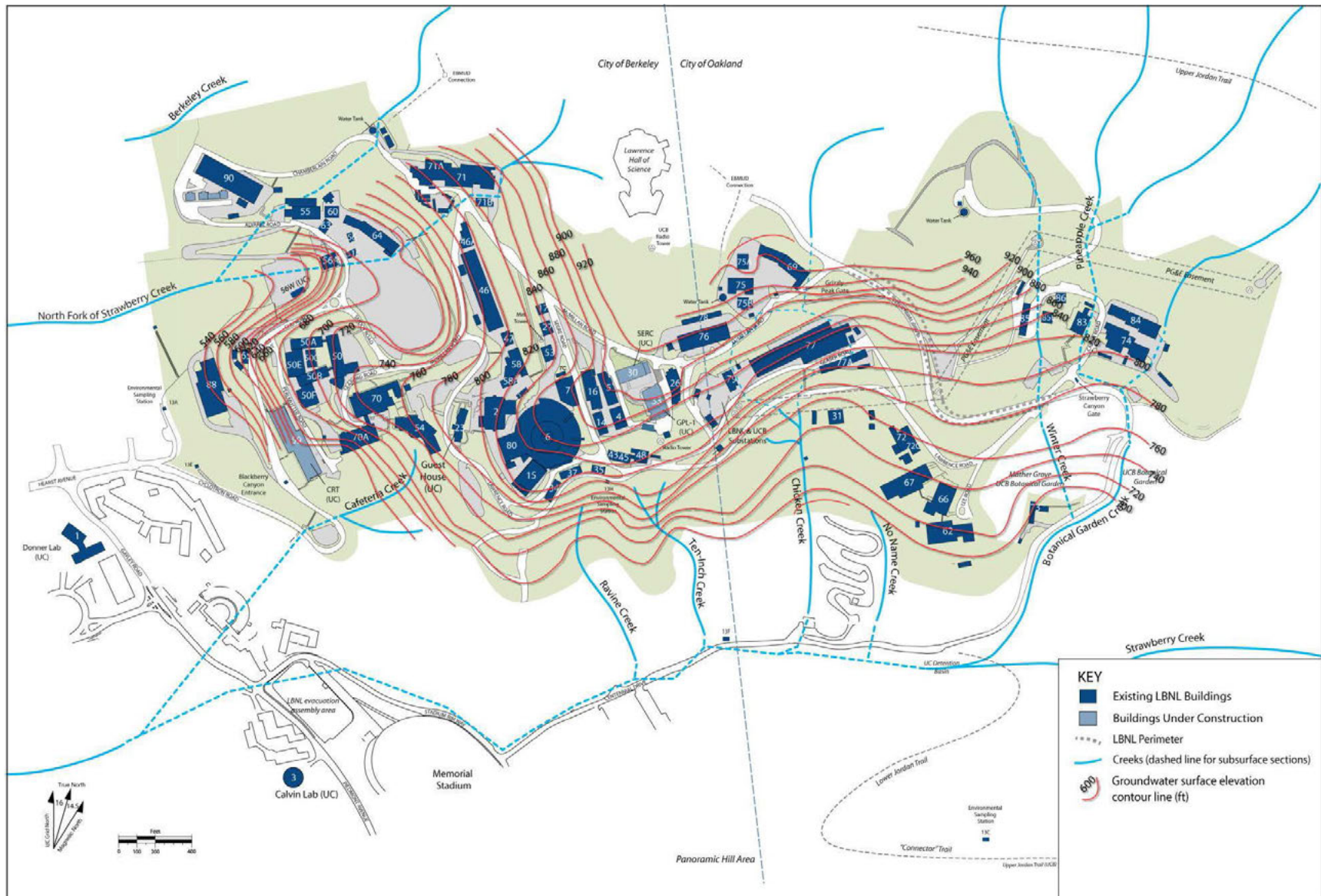


Figure 1-7 Groundwater Elevation Map

2. Environmental Management System

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Berkeley Lab's new Advanced Light Source User Support Building is the second building on site to earn LEED gold certification. It was awarded by the U.S. Green Building Council in 2012. *Photograph by Patrick Thorson.*

2.1 SUMMARY

To continually improve environmental stewardship at Berkeley Lab, an environmental management system provides a systematic approach to ensuring that environmental activities are both well-managed and provide business value by addressing regulatory compliance, program performance, and cost-effectiveness of activities.

LBNL's EMS begins with a broad-based environmental policy that commits Berkeley Lab to:

- Complying with applicable environmental, public health, and resource conservation laws and regulations
- Preventing pollution, minimizing waste, and conserving natural resources
- Correcting environmental hazards and cleaning up existing environmental problems
- Continually improving LBNL's environmental performance while maintaining operational capability
- Sustaining Berkeley Lab's overall mission

Implementation of this policy is based on a framework that includes the eighteen elements of ISO 14001:2004(E), *Environmental Management Systems—Requirements with Guidance for Use*.¹ LBNL has not sought certification of its EMS, as certification is not required by the ISO standard and Berkeley Lab has determined that certification does not provide sufficient business value to the organization. However, in lieu of certification, an external audit of the EMS by a qualified party is required every three years. LBNL arranged for such an audit to take place in June 2012.

The EMS Core Team plays a major role in guiding efforts to carry out LBNL's environmental policy, since it is tasked with completing the annual cycle of planning, implementing, evaluating, and improving processes that help carry out

policy, as well as meeting periodic requirements such as an external audit. The team is comprised of representatives from organizations key to meeting environmental objectives, namely: Environment / Health / Safety / Security (EHSS), Facilities, and the Office of the Chief Financial Officer (i.e., Procurement).

2012 EMS activity highlights include:

- Annual updating of LBNL's environmental aspects (for details see [Section 2.4.2](#))
- Performing the triennial external audit, which included preparing documentation for the audit and creating a corrective action plan to address findings and observations
- Ongoing managing of objectives and targets for environmental aspects determined to have significant impacts
- Hosting an annual review involving senior management representatives from each of the Core Team organizations to provide feedback needed for continual improvement of the system.

2.2 BACKGROUND

In early 2007, EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*,² established the policy that federal agencies:

- Use an EMS as the primary management approach for addressing environmental aspects of internal agency operations and activities, with a particular emphasis on energy and transportation functions
- Establish agency objectives and targets to ensure implementation of this order
- Collect, analyze, and report information to measure performance with implementation of this Executive Order

In the fall of 2009, EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*,³ expanded the policy to include greenhouse gas emission reductions as a top priority, while leaving the goals and requirements of EO 13423 either in place or extending them to the end of FY2020.

In response to this pair of Executive Orders, DOE first approved Order 430.2B, *Departmental Energy, Renewable Energy, and Transportation Management*,⁴ and Order 450.1A, *Environmental Protection Program*.⁵

DOE Order 430.2B mandated an energy management program that considered energy use and renewable energy, water, new and renovated buildings, and vehicle fleet activities.

DOE Order 450.1A mandated the development of an EMS reflecting the elements and framework found in ISO 14001:2004(E) to implement sustainable environmental stewardship practices that:

- Protect the air, water, land, and other natural and cultural resources potentially impacted by facility operations
- Meet or exceed applicable environmental, public health, and resource protection laws and regulations
- Implement cost-effective business practices

Then in May of 2011, DOE approved new Order 436.1, *Departmental Sustainability*.⁶ This action consolidated and eliminated Orders 430.2B and 450.1A, and was far less prescriptive than the earlier orders. However, Order 436.1 retained the requirement that a site must develop and maintain an environmental management system that conforms to ISO 14001:2004(E) standards. The consolidated Order also states that the site sustainability goals must be integrated into the EMS.

Berkeley Lab's *Environmental Management System Plan*⁷ defines how the organization will address the elements of the ISO 14001 standard. The EMS

Plan and related documentation are found on LBNL's A-Z Index (www.lbl.gov/lab-index/) as *Environmental Management System*.

Order 436.1 established a requirement to develop a site sustainability plan that identified site contribution to the DOE sustainability goals defined in its agency-level *Strategic Sustainability Performance Plan*.⁸ Berkeley Lab's most recently updated plan, the *FY2013 LBNL Site Sustainability Plan*,⁹ prepared in December 2012, sets performance goals in such areas as:

- GHG emissions reduction (e.g., energy use intensity reduction, renewable energy, sulfur hexafluoride (SF₆) reduction, Scopes 1, 2, and 3 GHG reduction)
- Fleet fuel consumption and vehicle inventory reduction
- High-performance sustainable building design
- Regional and local planning
- Water use efficiency and management
- Pollution prevention
- Waste reduction
- Sustainable acquisition
- Data center electronic stewardship
- Sustainability innovation

This plan can be found on the "Sustainable Berkeley Lab" website (<http://sbl.lbl.gov/>) on the "Resources" page.

2.3 CONTINUAL IMPROVEMENT

An integrated safety management system has been in place at LBNL longer than an EMS. Both the environmental management and integrated safety management systems strive for continual improvement through a four-step plan-do-check-act cycle (see [Figure 2-1](#)). To leverage existing familiarity with ISMS and to take advantage of processes in place, to the extent that it is practical,

existing ISMS processes are used to support environmental performance improvement. In other cases, new processes have been developed to support the EMS. This approach allows LBNL to develop an EMS that is cost-effective and to focus resources on activities with the highest potential environmental benefits.

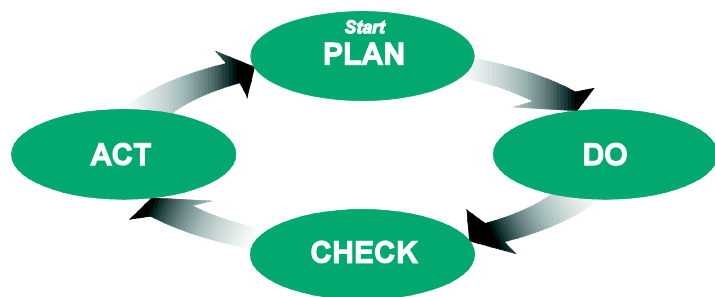


Figure 2-1 Quality Management Cycle

The plan-do-check-act cycle calls for defining the scope and purpose of the system, followed by a planning (*plan*) step to develop programs and procedures that must then be implemented (*do*). Once implemented, programs must be assessed (*check*) and any problems corrected (*act*) to improve the effectiveness of the management system and to achieve improved environment, safety, and health performance. Table 2-1 shows the parallels between EMS and ISMS within the plan-do-check-act cycle.

Table 2-1 EMS Elements and Corresponding ISMS Core Functions

	EMS	ISMS
PLAN	Planning	Define Work and Analyze Hazards
DO	Implementation and Operation	Develop & Implement Hazard Controls
CHECK	Checking and Corrective Action	Provide Feedback and Continuous Improvement
ACT	Management Review	Annual ISMS Review

2.4 IMPLEMENTATION

Six areas form the fundamental building blocks for implementing the EMS program:

1. EMS Core Team
2. Environmental aspects
3. Environmental Management Programs
4. Training
5. Appraisals
6. Management review

2.4.1 EMS Core Team

The Core Team is tasked with implementing and maintaining LBNL's EMS. The team's primary objective is reducing environmental impacts over time. As in the previous year, the Core Team consisted of key representatives from the EHSS, Facilities, and Procurement organizations that were most knowledgeable about environmental management concerns. The team is led by a representative of the EHSS organization. A representative from the DOE Berkeley Site Office is also invited to meetings to maintain operational awareness of activities. In 2012 the primary functions of the Core Team were:

- Identify environmental aspects
- Determine significant impacts
- Develop objectives and targets for the significant aspects
- Prepare and implement Environmental Management Programs (EMPs)
- Evaluate all EMPs annually
- Coordinate internal assessments of the EMS
- Review performance results
- Prepare recommendations to management to improve the EMS

- Coordinate the annual management review of the EMS
- Coordinate internal communications about the EMS

2.4.2 Environmental Aspects

The Core Team reviewed the list of identified environmental aspects, whether adverse or beneficial. This review included a significance determination of each aspect's potential impact, using the following factors to shape decisions:

- Cost
- Duration
- Effect on Berkeley Lab's mission
- Effect on public image
- Potential for improvement
- Potential legal exposure
- Probability of occurrence
- Severity of impacts

Each aspect was given a numeric rating based on a three-tiered scoring system: high (3), medium (2), and low (1). Average scores and overall ratings for each aspect provided a starting point for the significance determination. Before a final significance determination was made, Core Team members discussed and evaluated each activity and associated impacts.

2.4.3 Environmental Management Programs

EMPs are prepared for each significant aspect. At the end of 2012, seven activities were determined to be significant. Objectives and targets for reducing environmental impacts were re-evaluated for these activities:

1. Energy use
2. GHG emissions
3. Petroleum use

4. Procurement of goods and services
5. Solid waste diversion
6. Traffic congestion
7. Water use

An eighth aspect, diesel particulate matter air emissions, was closed during 2012 because the practical limit for lowering the environmental impact of the bus fleet and standby emergency generators has been reached. The shuttle bus fleet uses newer, clean-burning diesel engine vehicles, and any new standby emergency generators must meet strict emissions standards. Engines in both equipment types emit approximately 10% of the diesel particulate emissions of those in place when the EMP was created.

Each EMP established strategies and actions needed to achieve the objectives and targets; developed procedures, metrics, or techniques; and set up schedules. Each EMP is typically headed by a member of the Core Team to coordinate actions and monitor the performance, though a subject matter expert can also perform this role. [Table 2-2](#) summarizes all EMPs, including the one retired in 2012.

2.4.4 Training

Training is targeted and graded, commensurate with EMS roles and responsibilities. In order of increasing rigor, the following four levels of training were maintained during the year:

- General EMS awareness
- Comprehensive EMS awareness
- EMS implementation
- EMS auditor

Table 2-2 Current Environmental Management Programs

Aspect/Activity	Objective(s)	Target(s)
Energy Use	Implement sustainable practices to achieve energy efficiency.	Reduce energy use intensity 30% by the end of FY2015, including a minimum cumulative reduction of 18% by the end of FY2011 relative to the FY2003 baseline year.
GHG Emissions	Reduce GHG emissions from a broad range of activities.	Reduce Scopes 1 and 2 GHG emissions 28% and selected Scope 3 emissions 13% by end of FY2020, relative to FY2008 baseline.
Petroleum Use	Reduce vehicle fleet petroleum consumption.	Reduce fleet's annual petroleum consumption by 2% annually using FY2005 fleet fuel consumption as a baseline.
Procurement of Goods and Services	Increase procurement of Energy Star Products and Recycled Content Products.	Increase procurements of Recycled Content Products 5% each year using FY2005 as the baseline year.
Solid Waste Generation (Diversion)	Increase diversion of solid waste.	Increase solid waste diversion by 5% by the end of FY2012 relative to the previous fiscal year.
Traffic Congestion	Reduce LBNL commute traffic through Transportation Demand Management	Optimize parking; facilitate/promote non-single-occupant vehicle commuting; enhance shuttle bus operations; plan for off-site construction truck trips within the limits of the Long Range Development Plan's Environmental Impact Report.
Water Use	Implement sustainable practices to reduce water use intensity.	Reduce potable water use consumption intensity 26% by the end of FY2020 from FY2007 base: reduce industrial/agricultural water use 20% by FY2020 year end from FY2010 base. Update and execute annual Water Metering Plan.
Diesel Particulate Matter (DPM) Air Emissions	Implement alternatives for reducing DPM emissions from mobile and stationary sources.	Reduce DPM emissions 5% per year relative to a 2005 baseline year. [NOTE: This EMP was closed October 2012]

General EMS awareness training lasts approximately one hour and is usually tailored to the individual's role. General EMS awareness and its integration with safety and ISMS principles is also included in course EHS 0010, *Introduction to EHSS at LBNL*, which is a requirement for all employees new to LBNL. In contrast, EMS implementation and auditor training are multi-day courses taught by specialized organizations and are generally reserved for EMS professionals. The intended audience for the intermediate level comprehensive EMS awareness training is EMS core team members.

2.4.5 Appraisals

Under DOE Order 436.1, the most recent external audit of the Berkeley Lab EMS was completed in June 2012. A formal external audit includes the following elements:

1. An audit plan that reflects the audit scope and schedule
2. A review of background documents before the audit site visit
3. A physical audit site visit to evaluate ISO standard conformity, consistency among EMS element implementations, and continual improvement of the EMS
4. Preparation of an audit report outlining audit findings
5. A briefing with LBNL senior managers to review audit findings

From the document review and interviews with LBNL personnel, the 2012 external audit concluded with the following set of findings:

- Minor Nonconformance – Management Review
- Observation 1 – Document Control
- Observation 2 – Internal Audits
- Strength 1 – Safety Coordinators and Programmatic Awareness
- Strength 2 – Sustainability Transformation Team
- Strength 3 – EMS Core Team

Berkeley Lab prepared a corrective actions plan to address the one minor nonconformance, which was the lack of a discussion in the annual management review of all the items required by the ISO 14001 standard. Three issues and five corrective actions were developed to resolve the one finding and two observations, and all corrective actions were completed by May 2013.

The most recent EMS internal review was conducted in September 2010. This review satisfied periodic program assessment requirements described in the EHSS Assurance Systems Manual, which is administered by the EHSS Division's Assurance Management Group. An internal review, termed a program self-assessment in the EHSS Assurance Systems Manual, must examine all aspects of a program within a three-year period. The intent is for the EMS program to conduct such an internal review at approximately the midpoint between external audits, which currently take place every three years.

2.4.6 Management Review

The EMS is reviewed annually by Berkeley Lab's senior management to determine any changes that may be needed in the overall EMS program. Factors such as improved assessment methodologies or major changes to the facility's mission, products, and processes are considered in determining the need for adjustments to the EMS. The management review in the fall of 2012 included senior management representatives from EHSS, Facilities, and the Office of Chief Financial Officer divisions, plus LBNL's Chief Sustainability Officer. Topics discussed included all inputs required by the ISO standard, namely:

- Results of internal audits and evaluations of compliance with legal and other requirements
- Communications from external interested parties
- Environmental performance of the organization
- The extent to which objectives and targets have been met
- Status of corrective and preventive actions

- Follow-up actions from previous management reviews
- Changing circumstances, including developments in legal and other requirements
- Recommendations for improvement

2.4.7 Environmental Management Performance

In the *FY2012 Performance Evaluation Report*,¹⁰ prepared by the DOE Berkeley Site Office, Berkeley Lab was given an A- rating for its management of environmental measures. This was, in part, based on achieving the highest or "green" rating within DOE's eight EMS scorecard metrics for:

1. Environmental aspects
2. Sustainable practices (e.g., use of renewable energy, electronics stewardship, sustainable acquisition)
3. Objectives, targets, and programs
4. Environmental training
5. Operational controls
6. Contracts and concessionaire agreements
7. Evaluation of compliance with regulatory requirements
8. Management review

Moreover, the DOE EMS scorecard requested additional information to reflect the degree of integration between the EMS and Berkeley Lab's sustainable practices.

Also factoring into the A- rating was Berkeley Lab's successful accomplishment of such projects as:

- Reducing energy consumption by making improvements in computing centers
- Replacing heating/chilling equipment with more energy-efficient models

- Reducing greenhouse gases/fuel consumption by procuring environmentally friendly vehicles
- Reducing the hazardous chemical inventory and hazardous waste created as a result of a campaign to clean out unused chemicals from laboratories
- Substituting non-hazardous chemicals for hazardous chemicals
- Increasing site-wide awareness of sustainable practices that can reduce environmental impacts
- Encouraging the increased procurement of green products

The list of notable accomplishments tracked by the EMS program and reported to the DOE Berkeley Site Office for the performance evaluation report totaled more than two dozen projects or activities, categorized by acquisition, awareness, energy, greenhouse gases, pollution prevention, and transportation. The report also acknowledged that LBNL has maintained a good working relationship with external regulators and has kept the Berkeley Site Office informed of emerging issues.



House finches (*Carpodacus mexicanus*) perched near Building 71. Photograph by Kei Nakamura.

3. Environmental Program Summary

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3.1 INTRODUCTION

This chapter provides an overview of Berkeley Lab's environmental protection program and reviews the status of various compliance programs and activities for the reporting year.

3.1.1 Overview of Environmental Responsibilities

Berkeley Lab's EHSS Division is responsible for administering environmental protection and compliance programs at the site. Its organizational structure in 2012, with the focus on environmental responsibilities, is shown in [Figure 3-1](#).

Environmental protection programs are largely administered by two EHSS organizations:

- The **Environmental Services Group** oversees site-wide air and water quality compliance activities, provides technical assistance to LBNL staff, and manages environmental remediation activities, including groundwater sampling. Programs include environmental monitoring activities (summarized in [Chapter 4](#)) that provide information critical to demonstrating compliance and making programmatic decisions.
- The **Waste Management Group** manages hazardous, medical, radioactive, mixed (hazardous and radioactive), and universal waste generated at Berkeley Lab.

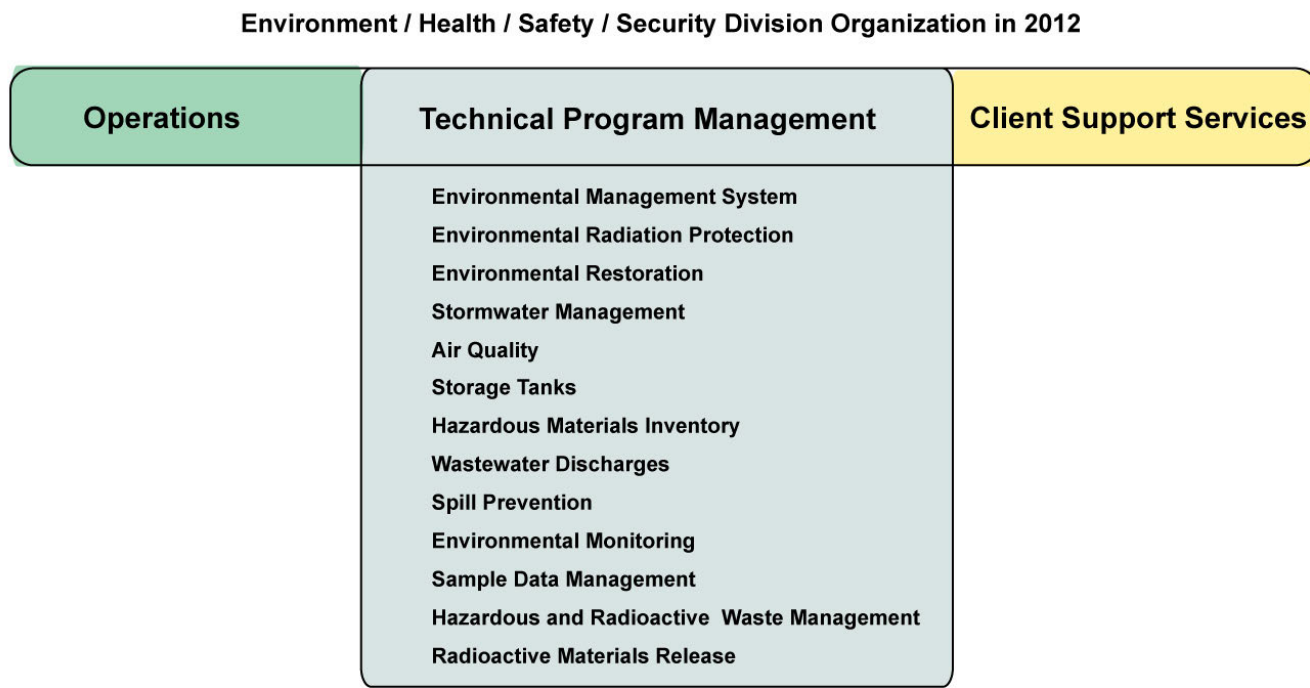


Figure 3-1 Environmental Programs Carried Out by the EHSS Environmental Services Group

3.2 PROGRAM SUMMARY

The following sections discuss environmental permits, audits, inspections, and DOE-reportable environmental incidents at Berkeley Lab for 2012.

3.2.1 Summary of Environmental Permits

Some Berkeley Lab activities require operating permits from environmental regulatory agencies. Table 3-1 summarizes, by area of environmental activity, the 51 active permits held by LBNL at the end of 2012.

3.2.2 Summary of Audits and Inspections

The regulatory agencies that enforce the environmental requirements at Berkeley Lab periodically conduct inspections. A summary of such inspections conducted in 2012 is shown in Table 3-2. Also listed are self-monitoring inspections conducted by Berkeley Lab that are required by EBMUD wastewater discharge permits because these activities expose LBNL to potential regulatory violations. A total of 13 inspections and one audit were conducted during 2012. Three violation notices, but no fines, resulted from these inspections. One of these violation notices is described in Section 3.2.3 since it resulted in a DOE-reportable incident. The audit resulted in one finding. All violations and the audit finding were resolved by the end of 2012.

Table 3-1 Environmental Permits Held at the End of 2012

Permit Type	Issuing Agency	Description	Number of Permits	See Section
Air quality	BAAQMD ^a	Various activities with emissions to atmosphere	30	3.3.1.2
Hazardous waste	DTSC ^b	Hazardous Waste Handling Facility operations, waste generation areas	1	3.3.6
	COB ^c	Hazardous waste SAA ^g and WAA ^h , FTU ⁱ (4)	1	3.3.9.3
Underground storage tanks	COB ^c	Underground storage tanks containing petroleum products	6	3.3.6.3
Wastewater	EBMUD ^d	Sitewide and operation-specific wastewater discharges to sanitary sewer	6	3.3.9.1
	CCCSD ^e	Wastewater discharges to sanitary sewer at JGI (Walnut Creek)	1	3.3.9.1
Stormwater	SWRCB ^f	Sitewide & construction stormwater discharges	6	3.3.9.2

^aBay Area Air Quality Management District

^bDepartment of Toxic Substances Control

^cCity of Berkeley

^dEast Bay Municipal Utility District

^eCentral Contra Costa Sanitary District

^fState Water Resources Control Board

^gSatellite Accumulation Areas

^hWaste Accumulation Areas

ⁱFixed Treatment Unit

Table 3-2 2012 Summary of Environmental Audits, Inspections, and Appraisals

Organization	Inspection Title	Start Date	Violations
CDFW ^a	Water/Mud Slurry Release into Strawberry Creek	Jan 11	0
CDPH ^b	Medical Waste Program	March 13	0
COB	Tiered permit units and hazardous waste generator areas	June 11	2
	Underground storage tanks	Nov 1	1
U.S. EPA ^c (with COB)	Hazardous materials/ hazardous waste	Sept 27	0
DOE	2012 External Validation Review of the LBNL Environmental Management System	June 11	1 ^d
EBMUD	Wastewater monitoring inspection at Hearst and Strawberry outfalls	Mar 13	0
	Wastewater monitoring inspection at B77 Fixed Treatment Unit	May 10	0
LBNL	EBMUD self-monitoring inspections at Hearst and Strawberry outfalls	Mar 13	0
	EBMUD self-monitoring inspections at B77 Fixed Treatment Unit	Nov 28	0
	EBMUD self-monitoring inspections at groundwater treatment units	Mar 1	0
		Dec 4	0
	Airborne radionuclide emissions quality assurance	Oct 16	0

^a California Department of Fish and Wildlife

^b California Department of Public Health

^c United States Environmental Protection Agency

^d Termed a "finding" for an audit of this type

3.2.3 Summary of DOE-Reportable Environmental Incidents

Four environmental incidents occurred during the year that resulted in submittal of reports under the DOE occurrence-reporting program used to track incidents across the DOE complex. A brief description of each incident follows:

1. On February 2, a blockage in the sewer pipe just northwest of Building 55 on Alvarez Road caused a minor sanitary sewer overflow with an estimated release of 50 to 75 gallons to the storm drain. The blockage was cleared within approximately one hour after discovery.
2. On November 1, during the annual testing of the underground storage tanks and fuel dispensing systems at Building 76, the mechanical line leak detectors on the gasoline and diesel product lines failed. The City of Berkeley cited LBNL for a minor violation and required it to repair or replace the mechanical line leak detectors within 30 days, and this was completed by November 19, 2012.
3. On November 29, a burst water tank fill pipe near Building 82 caused an estimated 6,300 gallons of municipal water to enter the storm drain. A report was received of turbid water in the creek below the LBNL site. The turbidity levels in the North Fork of Strawberry Creek were measured and found to be elevated by comparison to the levels in the South Fork of Strawberry, which may be due to re-mobilization of sediments present in the creek bed. This incident was reported to the California Emergency Management Agency (CalEMA), the City of Berkeley, and the San Francisco Bay Regional Water Quality Control Board (hereafter referred to as RWQCB).
4. Also on November 29, a sanitary sewer overflow occurred near the Building 70 loading dock as municipal water was being drained out of a 20,000-gallon Baker tank into the sanitary sewer at a flow rate higher than sewer capacity. The overflow was stopped within 20 minutes of discovery, and the flow was reduced to a rate that the sewer could accept. Because the overflow contained a small amount

of sewage, it was promptly reported to CalEMA, the City of Berkeley, and the RWQCB. Samples were collected and taken to an analytical laboratory to determine the levels of fecal coliform. The coliform levels in the creek were typical of levels found during and after rain events, which in this case had occurred on the previous day.

3.3 COMPLIANCE PROGRAMS

The following sections provide summaries of Berkeley Lab's primary environmental compliance programs.

3.3.1 Clean Air Act

The Clean Air Act¹ is the key statutory reference for federal, state, and local air pollution control programs. It classifies air pollutants into these main categories:

- Criteria air pollutants (e.g., carbon monoxide, nitrogen oxides, particulate matter)
- Hazardous air pollutants (e.g., radionuclides, air toxics)
- Ozone-depleting substances (e.g., chlorofluorocarbons or Freons)

The State of California's air pollution control program² gives it additional powers to regulate sources of air emissions.

Berkeley Lab divides its air quality protection and compliance activities into two categories: radiological (see Section 3.3.1.1) and non-radiological (see Section 3.3.1.2).

3.3.1.1 Radiological

Radionuclides released to the atmosphere from LBNL research activities must adhere to *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities* regulations,³ as well as sections of DOE Order 458.1, *Radiation Protection of the Public and the Environment*.⁴ U.S. EPA administers the National Emission Standards for Hazardous Air Pollutants (NESHAP)

regulations (under 40 CFR Part 61), which limit the dose to the public from LBNL's airborne radionuclide emissions to 0.10 mSv/yr (10 mrem/yr). Berkeley Lab documents its NESHAP review and compliance in its annual *Radionuclide Air Emission Report*.⁵

3.3.1.2 Non-radiological

At the end of 2012 Berkeley Lab held 30 operating permits issued by the BAAQMD, as listed in Table 3-3.⁶ Twenty-eight of these operating permits cover activities located at the main LBNL site, and the other two operating permits cover standby emergency generators at the DOE Joint Genome Institute (JGI) in Walnut Creek, California. The JGI facility is part of a collaborative effort involving research groups from Berkeley Lab, Lawrence Livermore National Laboratory, and Los Alamos National Laboratory. One existing portable standby emergency generator was retired and scrapped in 2012, and no replacement is planned. No other new emission sources were permitted during the year at the main Berkeley Lab site or the Walnut Creek site.

Operating permits are renewed annually, at which time the BAAQMD also requests information required by the state's *Air Toxics "Hot Spots" Information and Assessment Act of 1987*.⁷ While submitting annual update information for the BAAQMD operating permits, Berkeley Lab also submits its site-wide adhesive and sealant usage under the BAAQMD-approved alternative recordkeeping agreement for compliance with Regulation 8, Rule 51: *Adhesive and Sealant Products*. Activities covered by permits are subject to periodic inspection.

Recent California Air Resources Board regulations governing the use and release of the potent greenhouse gas sulfur hexafluoride (SF₆) took effect in 2012: beginning with calendar year 2013, California regulations will prohibit the use of SF₆ as a tracer gas except under specified exemptions, such as military operations. The new regulation targets SF₆ because its global warming potential is 23,900, which one of the highest global warming potential values for any substance currently identified. During 2012 LBNL requested – and was granted – an

Table 3-3 BAAQMD Permitted Air Emission Sources at the End of 2012

BAAQMD Category	Description (# of permitted sources)	Building	Abatement Type
Combustion equipment	Standby emergency generators (4)	64, 66, 67, 70	Catalytic converter
	Standby emergency generators (3)	48, 50A, 72	Diesel particulate filter
	Standby emergency generators (16)	Various ^a	None
	Standby emergency generators (2)	JGI	None
Gasoline dispensing	Fueling stations: unleaded and E85	76	Vapor recovery
Surface coating and painting	Paint spray booth (1)	77	Dry filter
Surface preparation and cleaning	Sandblast booth (1)	77	Baghouse
	Wipe-cleaning (1)	Sitewide	None
Miscellaneous	Soil-vapor extraction systems (1)	58	Activated carbon

^aIndividual generators located at Buildings 2, 37 (2), 50B, 55, 62, 64, 70A, 74, 75, 77, 84B, and 85, plus three portable units

exemption to the regulation for CY2013 for ongoing research at Berkeley Lab's Environmental Energy Technologies Division. Researchers in this division use SF₆ in very small quantities as a tracer gas for occupied building ventilation and air movement studies.

Federal mandates require that Berkeley Lab decrease the use of petroleum fuel, and to help attain this goal Berkeley Lab continues to operate its E85-fuel

dispensing facility at the Building 76 Motor Pool. (E85 fuel is a mixture of 85% ethanol and 15% unleaded gasoline.)

Berkeley Lab facilities do not emit GHG in quantities exceeding either U.S. EPA or California reporting levels. Beginning in FY2010, EO 13514 has required Berkeley Lab to report its annual GHG emissions to DOE.

3.3.2 Comprehensive Environmental Response, Compensation, and Liability Act

The *Comprehensive Environmental Response, Compensation, and Liability Act* of 1980 (CERCLA),⁸ also referred to as "Superfund," authorizes the U.S. EPA to manage the cleanup of abandoned or uncontrolled hazardous waste sites. According to CERCLA, the National Response Center must receive immediate notification of releases of hazardous substances in quantities that are equal to or greater than the reportable quantities of designated chemicals in the CERCLA regulation. In 2012, no releases occurred that were reportable under CERCLA, and Berkeley Lab conducted no remedial activities covered by CERCLA.

3.3.3 Emergency Planning and Community Right-to-Know Act

The *Emergency Planning and Community Right-to-Know Act* (EPCRA)⁹ was passed in 1986 as Title III of the *Superfund Amendments and Reauthorization Act* (SARA). The Act establishes requirements for emergency planning, notification, and reporting. In California, the requirements of SARA Title III are incorporated into the state's *Hazardous Materials Release Response Plans and Inventory Law*.¹⁰ Berkeley Lab activities addressing these requirements are summarized below in the next two sections.

3.3.3.1 Toxic Release Inventory

As a federal facility, LBNL is subject to Toxic Release Inventory (TRI) reporting requirements. The first step in this reporting consists of determining the amount of usage of TRI-listed chemicals. LBNL does not manufacture or process chemicals so those requirements of TRI reporting do not apply. If threshold usage quantities are exceeded, DOE submits U.S. EPA Form R for LBNL.

Table 3-4 Trends in Highest Quantities of Chemicals Subject to EPCRA Toxic Release Inventory Reporting

Substance	Quantity (in kilograms ^a)						
	2006	2007	2008	2009	2010	2011	2012
Chlorofluorocarbons	123	518	95	78	68	145	92
Methanol	165	63	69	82	67	40	47
Nitric acid	403	90	303	279	269	288	287
1,1,1-trichloroethane	<1	<1	<1	<1	<1	0	0

^a1 kilogram = 2.2 lb

Berkeley Lab determined that in 2012 no chemical usage exceeded the TRI criterion of 4,536 kilograms (kg) (10,000 pounds [lb]) for a listed substance and that DOE was therefore not required to submit a Form R on behalf of LBNL. Table 3-4 shows the highest usage quantities of the chemicals from LBNL's assessments over recent years.

3.3.3.2 Hazardous Materials Business Plans

The COB, Alameda County, and Contra Costa County are the local administering agencies for certain hazardous materials regulations that fall under state law. Each year, Berkeley Lab voluntarily submits *Hazardous Materials Business Plans* (HMBP)¹¹ to these local agencies, even though as a federal facility it is not subject to these regulations.

Table 3-5 Hazardous Materials Business Plans Submitted in 2012

Location	Agency	
LBNL Main Site	Berkeley	City of Berkeley
Joint Center for Artificial Photosynthesis	Berkeley	City of Berkeley
Berkeley West Biocenter	Berkeley	City of Berkeley
Joint BioEnergy Institute	Emeryville	Alameda County
Joint Genome Institute	Walnut Creek	Contra Costa County

LBNL's HMBP includes a list of all hazardous materials present in amounts exceeding the state's aggregate threshold quantities per building (i.e., 208 L [55 gal] for liquids, 227 kg [500 lb] for solids, and 5.7 cubic meters [m³] [200 cubic feet] for compressed gases). Also included is a site map and information regarding emergency plans, procedures, and training. In addition, the LBNL Main Site HMBP includes permit renewals for fixed treatment units (FTUs). In 2012, five HMBPs were submitted as detailed in Table 3-5.

3.3.4 Federal Insecticide, Fungicide, and Rodenticide Act

Passed by Congress in 1972, the *Federal Insecticide, Fungicide, and Rodenticide Act*¹² restricts the registration, sale, use, and disposal of pesticides. Pesticides, including insecticides and herbicides, are applied at the site by licensed contractors. LBNL chips and mulches green waste to minimize the use of herbicides and to reduce solid waste. The mulch generated is used on-site for weed screening and landscaping, and to control erosion. LBNL staff may occasionally apply very small amounts of herbicides (for example, Roundup) to weeds, such as poison oak, that are otherwise difficult to control.

3.3.5 Toxic Substances Control Act

The objective of the *Toxic Substances Control Act* (TSCA)¹³ is to minimize the exposure of humans and the environment to chemicals used in manufacturing, processing, commercial distribution, and disposal activities. TSCA establishes a protocol for evaluating chemicals before they are introduced into the marketplace, and controlling their use once they are approved for manufacturing. TSCA regulations are administered by the U.S. EPA.

Polychlorinated biphenyls (PCBs) are the principal substances at Berkeley Lab currently subject to the TSCA regulations. Since the TSCA program began, LBNL has removed all TSCA-regulated PCB transformers (PCB concentrations greater than 500 parts per million). The remaining equipment containing TSCA-regulated PCBs consists of four large low-voltage capacitors. These capacitors remain in use, containing an estimated 170 kg (375 lb) of regulated PCB dielectric

fluid. Because the small amount of PCBs is below reporting thresholds, the site is not required to prepare an annual PCB report for the U.S. EPA.

3.3.6 Resource Conservation and Recovery Act

The *Resource Conservation and Recovery Act* (RCRA)¹⁴ is an amendment to the earlier Solid Waste Disposal Act (SWDA) of 1965, and was enacted to create a management system that would regulate waste from “cradle to grave.” In 1984, the Hazardous and Solid Wastes Amendments were added to the SWDA to reduce or eliminate the generation and disposal of hazardous wastes, and between 1984 and 1988 RCRA was expanded further to regulate underground storage tanks (USTs) and leaking waste storage facilities. The primary goals of RCRA are to: protect the public from harm caused by waste disposal; encourage reuse, reduction, and recycling; and clean up spilled or improperly stored wastes. RCRA applies in three primary areas of Berkeley Lab operations:

1. Treatment and storage of hazardous waste (including the hazardous portion of mixed waste)
2. Cleanup of historical releases of chemicals to the environment
3. Operation of USTs

3.3.6.1 Hazardous Waste

In California, the DTSC administers the RCRA hazardous waste program. The California program incorporates the provisions of both the federal and state hazardous waste laws.¹⁵ The state program includes both permitting and enforcement elements.

The state’s permitting program for hazardous waste treatment and storage facilities consists of five tiers, shown in the following list in decreasing order of regulatory complexity:

1. Full permit
2. Standardized permit

3. Permit-by-rule
4. Conditional authorization
5. Conditional exemption

The state oversees the “full permit” and the “standardized permit” tiers; at Berkeley Lab, the other three tiers have been delegated to the COB for oversight under California’s Certified Unified Program Agency (CUPA) program.

Berkeley Lab’s Hazardous Waste Handling Facility (HWHF) operates under the “full permit” tier of the state’s program. The current permit for the HWHF¹⁶ became effective on July 31, 2007. The permit authorizes storage and treatment of certain hazardous and mixed wastes at the HWHF. Authorized treatment includes neutralization, consolidation, solidification, filtration, precipitation, phase separation, ultraviolet ozone and ultraviolet peroxide oxidation, reduction of Class 1 - 3 oxidizers, air or steam stripping, absorption, adsorption, ion exchange, metallic exchange, evaporation, distillation electrowinning, rinsing of empty containers, mixing of multicomponent resins, and desensitization. (Desensitization is the process of rendering a reactive chemical harmless by the addition of another chemical, water, or oil, or by not exposing it to light.)

Berkeley Lab has an additional hazardous waste permit to operate four FTUs,¹⁷ as these treatment units operate independently of the HWHF. The COB requests renewal of this permit each year, and the FTU permit was renewed in March 2012. The type, location, and wastewater volume treated for each unit are listed in [Table 3-6](#), as well as the permit tier under which each is authorized to operate as determined by regulations.

In 2011, Berkeley Lab installed a system to recycle treated wastewater from the Building 70A fixed treatment unit to the Building 70A cooling tower. In 2012, this system recycled 1,345,719 L (355,540 gal) of water to the cooling tower, and effectively fulfilled most cooling tower water needs for the year. By the end of 2012, the total volume of water that this system had recycled was over 860,000 gal (3,255,000 L).

Berkeley Lab's waste management program also sends hazardous, universal, mixed, medical, and radioactive waste generated at LBNL off-site for disposal. Disposal of medical waste is managed in accordance with the state's *Medical Waste Management Act*¹⁸ (see Section 3.3.7). Low-level radioactive waste is managed in accordance with DOE Orders. Mixed waste is managed in accordance with the *Mixed Waste Site Treatment Plan*¹⁹ and is subject to both California Environmental Protection Agency regulations and DOE Orders.

Waste management permits and regulations require Berkeley Lab to prepare several reports each year:

- *The Hazardous Waste Annual Facility Report*,²⁰ prepared for the DTSC, contains facility treatment and disposal information for all hazardous waste activities (including the hazardous waste portion of mixed waste) at the HWHF during the reporting year.

- In October 1995, DTSC approved LBNL's *Mixed Waste Site Treatment Plan*,²¹ which documents the procedures and conditions used by Berkeley Lab to manage its mixed-waste streams. LBNL prepares an annual report that quantifies the amount of mixed waste in storage at the end of the reporting period, as well as updates waste projections, milestone completions, and remaining milestones. This update is prepared in October for the previous fiscal year (October 1 to September 30). The site treatment plan also requires a mid-year report due April 30 to update any changes in milestones that have occurred since the annual report. A third report may be required if a newly generated waste (i.e., not covered in the annual or mid-year reports) has been in storage for more than a year. The report on milestones for this new waste is due by February 15.

3.3.6.2 Corrective Action Program

Berkeley Lab is currently in the final phase of the RCRA CAP, the Corrective Measures Implementation (CMI) phase. The purpose of the CMI phase is to design, construct, operate, maintain, and monitor the corrective measures (cleanup activities) recommended by LBNL in the *Corrective Measures Study Report*.²² These measures were approved by the DTSC²³ and are intended to reduce or eliminate the potentially adverse effects to human health or the

Table 3-6 Fixed Treatment Units

FTU	Building	Treatment Description	California's Tiered Permitting Program Permit Tier	Wastewater Volume Treated (Liters/Year)
004	70A/70F	Acid neutralization	Conditional authorization	2,876,535 (1,345,865 recycled)
005	2	Acid neutralization	Conditional authorization	352,195
006	77	Metals precipitation and acid neutralization	Permit-by-rule	88,270
007	67	Acid and alkaline neutralization	Permit-by-rule	87,875

environment caused by past releases of chemicals to soil and groundwater at Berkeley Lab.

The corrective measures required for eleven areas of groundwater contamination have been constructed and are operational. These consist of *in situ* soil flushing, groundwater capture and treatment, subsurface injection of Hydrogen Release Compound (HRC®), and monitored natural attenuation (MNA). The corrective measures are described below.

- *In situ* soil flushing consists of the extraction of contaminated groundwater from and the concurrent injection of the treated extracted groundwater into the subsurface.
- Groundwater capture involves extraction of groundwater in the downgradient portions of groundwater contaminant plumes to minimize further migration of the plumes. The extracted water from soil flushing and groundwater capture is treated on-site using granular activated carbon (GAC) treatment systems before being either reinjected for flushing or discharged to the sanitary sewer system.
- HRC is an environmentally safe polylactate ester formulate that is used to enhance the natural biodegradation of volatile organic compounds (VOCs). It is a form of enhanced bioremediation, and has been injected at regular intervals into some contaminant plume source areas.
- MNA refers to the reliance on natural attenuation processes within the context of a carefully controlled and monitored site cleanup approach to achieve site-specific remediation objectives.

A more detailed description of the specific corrective measures pertaining to each of the groundwater contaminant plumes is given in Section 4.5.

The corrective measures required for contaminated soil were completed in 2006 for all areas of soil contamination known at that time to require corrective action. Additional areas of soil contamination were identified during subsurface investigations conducted between September 2010 and February 2012 in

association with the Building 51 and Bevatron Demolition Project. During these investigations, VOC-contaminated soil and groundwater were located in two discrete areas: 1) under the former Building 51 Vacuum Pump Room area and 2) beneath the former location of Building 51A. On March 27, 2012, LBNL representatives met with the DTSC at their Berkeley office to provide a comprehensive presentation of the results of the investigations. Subsequently, the draft report on the investigations was submitted to the DTSC on April 27, with copies provided to the RWQCB and the COB. LBNL revised the draft report in accordance with comments provided by DTSC in July and submitted the final report to DTSC on August 6.²⁴

As part of the CMI phase, LBNL prepared a *Soil Management Plan*²⁵ and a *Groundwater Monitoring and Management Plan*.²⁶ These management plans describe the nature and extent of the contamination and the institutional controls required to reduce potential risk from exposure to the contaminants. The *Groundwater Monitoring and Management Plan* also provides the requirements for ongoing groundwater and surface water monitoring. These documents, as well as other RCRA CAP documents prepared by Berkeley Lab, are available to the public at www.lbl.gov/ehs/erp/html/documents.shtml and at the main branch of the Berkeley Public Library.

Berkeley Lab maintains a proactive approach in interacting with stakeholders in the RCRA CAP, including the DTSC, the COB, and the RWQCB.

3.3.6.3 Underground Storage Tanks

In the early 1980s, California addressed the problem of groundwater contamination from leaking USTs through a rigorous regulatory and remediation program.²⁷ The state program for USTs containing hazardous materials addresses permitting, construction, design, monitoring, record-keeping, inspection, accidental releases, financial responsibility, and tank closure, and it satisfies the provisions of the federal RCRA requirements.²⁸ The COB is the local administering agency for UST regulations that apply to Berkeley Lab.

Two Berkeley Lab employees have passed the State of California exam to become UST Designated Operators. They train other facility employees annually to conduct daily inspections of LBNL's UST systems, which are entered into a logbook. Designated Operators also ensure the quality of daily inspections by reviewing daily logs for completeness as well as completing a separate monthly inspection checklist.

At the end of 2012, six permitted USTs were in operation at Berkeley Lab, as listed in Table 3-7 and shown in Figure 3-2. The tanks contain either diesel fuel or unleaded gasoline. LBNL has removed and properly closed nine USTs since 1993.

During annual testing on November 1, 2012, leak-detection monitors were tested and recertified for all UST systems. On the same date, all product piping (pressure and suction) for the UST systems passed pressure testing. Every spill bucket at the fill port of each UST was tested for leaks and passed. During annual testing, the mechanical line leak detectors on the gasoline and the diesel product piping at Building 76 failed the leak test. The mechanical line leak detector for the gasoline product piping was repaired and the mechanical line

leak detector for the diesel product piping was replaced by the end of November.

The COB conducted its annual inspection of Berkeley Lab's USTs during the annual testing on November 1st, and cited Berkeley Lab with one minor violation for the two failed mechanical line leak detectors and required repair or replacement within 30 days.

3.3.7 Medical Waste

Although not regulated under RCRA, medical waste is included here as hazardous waste that is also administered under the Berkeley Lab Waste Management Program.

In California, the state's *Medical Waste Management Act*²⁹ contains requirements designed to ensure the proper storage, treatment, and disposal of medical waste. The state program is administered by the California Department of Public Health (CDPH). Medical waste includes biohazardous waste (e.g., blood and blood-contaminated materials) and "sharps" waste (e.g., needles) produced in the following activities:

- Research relevant to the diagnosis, treatment, or immunization of human beings or animals
- Diagnosis, treatment, or immunization of humans or animals
- Production of biological products used in medicine

LBNL generates medical waste and biohazardous waste at about 150 different locations distributed over 15 buildings, including three off-site buildings. Berkeley Lab does not treat any solid medical or biohazardous waste; it is treated at off-site vendor facilities using either incineration or steam sterilization.

Berkeley Lab produced 19,615 kg (43,271 lb) of solid medical and biohazardous waste in 2012, which is approximately the same amount as the previous year. Under the state's program, LBNL is considered a large-quantity generator because it generates more than 91 kg (200 lb) of medical waste each month.

Table 3-7 Underground Storage Tanks Requiring Operating Permits

Registration Tank ID Number	Building	Stored Material	Capacity in Liters (Gallons)		Construction	Year Installed
Fiberglass tanks, double-walled						
TK-3-2	2	Diesel	15,200	(4,000)	Fiberglass	1988
TK-4-2	2	Diesel	3,800	(1,000)	Fiberglass	1988
TK-1-85	85	Diesel	9,500	(2,500)	Fiberglass	1995
Steel tanks, double-walled, with fiberglass-reinforced plastic corrosion protection						
TK-1-55	55	Diesel	3,800	(1,000)	Glasteel	1986
TK-5-76	76	Unleaded gasoline	38,000	(10,000)	Glasteel	1990
TK-6-76	76	Diesel	38,000	(10,000)	Glasteel	1990

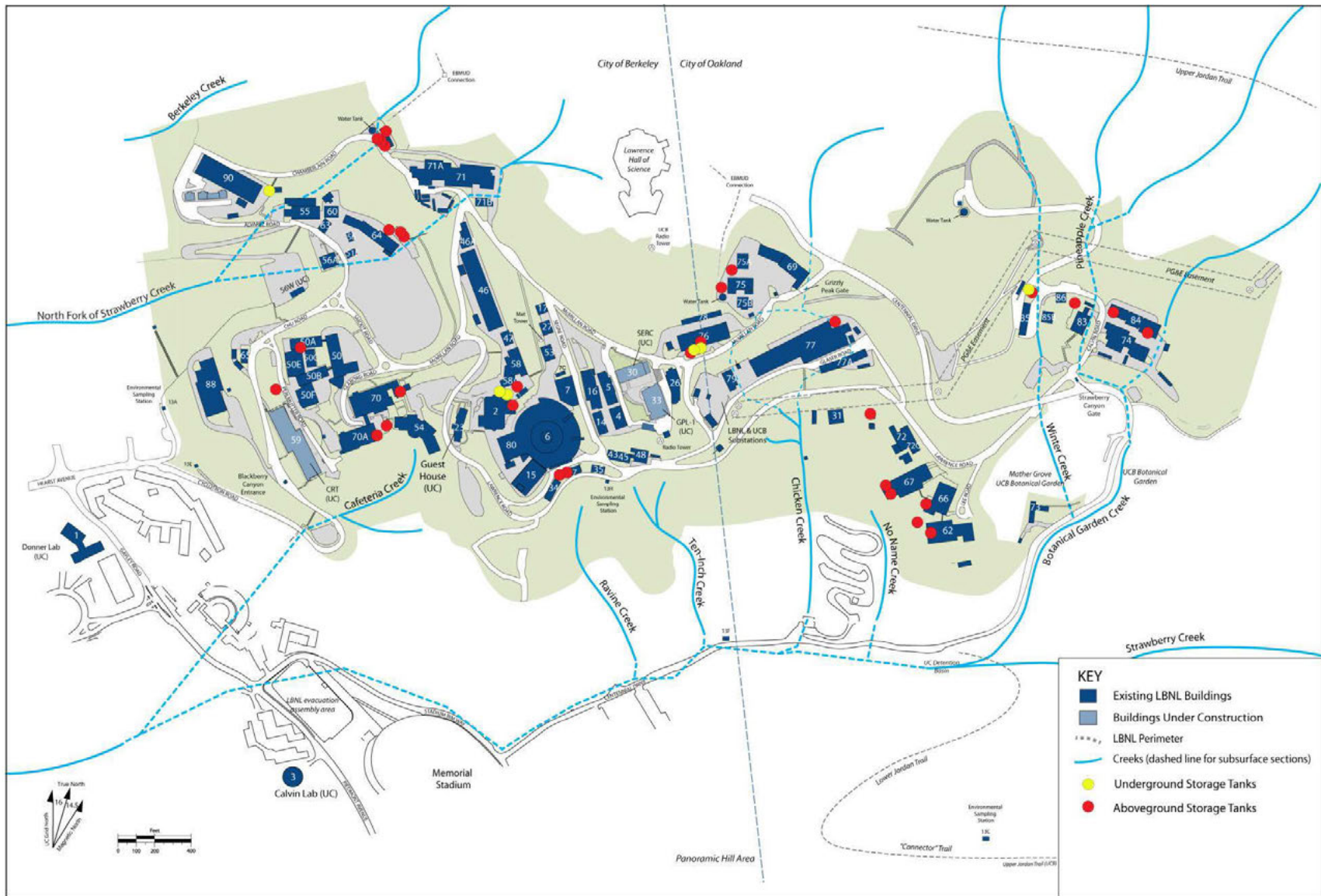


Figure 3-2 Storage Tank Locations (Above and Underground)

All large-quantity generators must register with the CDPH and are subject to periodic inspections. CDPH conducted an inspection of the Berkeley Lab program on March 13, 2012. No observations or violations were reported by the agency.

3.3.8 Hazardous Waste Source Reduction and Management Review Act

The California State Legislature passed the *Hazardous Waste Source Reduction and Management Review Act*³⁰ in 1989. With an emphasis on minimizing waste and preventing pollution, the Act has the following goals:

- Reduce hazardous waste at its source
- Encourage recycling wherever source reduction is infeasible or impractical
- Manage hazardous waste in an environmentally safe manner and minimize present and future threats to health and the environment if it is infeasible to reduce or recycle
- Document hazardous waste management information and make that information available to state and local governments

Every four years, Berkeley Lab prepares a two-part report in compliance with this Act: the *Source Reduction Evaluation Review Plan and Plan Summary*.³¹ The last report was compiled in 2011 and submitted to the DOE Livermore Site Office as part of the DOE-wide report.

3.3.9 Clean Water Act

The *Clean Water Act*³² regulates the discharge of pollutants from both point and nonpoint sources to the waters of the United States using various means, including development of pollutant discharge standards and limitations and also a permit and licensing system to enforce the standards. California is authorized by U.S. EPA to administer the principal components of the federal water quality management program.

In addition to the CWA, the *California Porter-Cologne Water Quality Control Act*³³ established a comprehensive statewide system for regulating water use. This 1969 act provides for a three-tiered system of regulatory oversight and enforcement: the State Water Resources Control Board (SWRCB), the nine RWQCBs, and local governments.

For the Berkeley Lab main site, the regional regulatory agency is the San Francisco Bay RWQCB. The local agencies are (1) the cities of Berkeley and Oakland for stormwater and (2) EBMUD for drinking water supply and wastewater discharges. For JGI, which is located in Walnut Creek, the Central Contra Costa Sanitary District (CCCSD) is responsible for regulatory oversight of both wastewater and stormwater discharges.

3.3.9.1 Wastewater

EBMUD is the local Publicly Owned Treatment Works that regulates all industrial and sanitary discharges to its treatment facilities. Berkeley Lab holds wastewater discharge permits³⁴ issued by EBMUD for the following activities at the main site:

- General sitewide wastewater discharge
- Fixed treatment unit discharge of rinse water from the metal finishing operations in Building 77
- Treatment system discharge of groundwater from hydraulics and groundwater monitoring wells
- Special permits for construction and demolition activities (four total, two of which are active)

In late 2011 and in 2012 Berkeley Lab submitted permit renewal applications to EBMUD for three permits, excluding the special permits mentioned in the preceding list. EBMUD approved the permit for the Building 77 treatment unit in April, and approved the other two permits in early 2013. The permits incorporate standard terms and conditions, individual discharge limits, and

provisions, as well as monitoring and reporting requirements. Berkeley Lab submits periodic self-monitoring reports under each permit. The number of reports and their timing depend on the individual permit. No wastewater discharge limits were exceeded in 2012 for these three permits. (For more information regarding the results of LBNL's annual wastewater self-monitoring program, see [Chapter 4](#)).

EBMUD inspects the site's sanitary sewer discharge activities without prior notice. Inspections include the collection and analysis of wastewater samples. The agency conducted inspections on two separate occasions in 2012, as listed in [Table 3-2](#). The routine sample collection results for all permits showed no violations.

The EBMUD wastewater discharge permit for Building 77 requires that the facility incorporate a *Toxic Organics Management Plan* and a *Slug Discharge Plan* into the facility's activity hazard document (AHD) for operations. The AHD outlines facility management practices designed to eliminate the accidental release of toxic organics or any other pollutant to the sanitary sewers or external environment by emphasizing secondary containment and other appropriate spill prevention practices. The AHD for the metal finishing area at Building 77 also includes emergency response procedures.

To meet the requirements of EBMUD's *Slug Discharge Plan*, Berkeley Lab maintains emergency response procedures for areas where spills are most likely to occur. Berkeley Lab has prepared operation-specific response procedures for the following activities: Building 77 metal finishing, Building 76 vehicle fueling, and Buildings 2, 67, and 70A research projects.

Berkeley Lab held four EBMUD special wastewater discharge permits in 2012, as follows:

- The permit for the Bevatron Demolition Project located at Building 51 allowed for the discharge of treated rainwater and dust suppression water into the sanitary sewer system. No discharges to the sanitary sewer occurred under this permit in 2012 and the permit was terminated on April 12, 2012.
- The permit for a fault line study conducted by the Earth Sciences Division near Building 85, under which no wastewater was discharged to the sanitary sewer in 2012.
- One permit each was issued for the construction projects for the Solar Energy Research Center (SERC) near Building 26 and the Computational Research and Theory (CRT) facility near Building 70A. Both of these permits allowed treated rainwater to be discharged to the sanitary sewer in order to keep the construction site dry. In 2012, 57,905 gal (219,170 L) were discharged to the sanitary sewer from the SERC construction area and 55,100 gal (208,554 L) were discharged to the sanitary sewer from the CRT construction area.

Berkeley Lab also holds a *Class III Industrial User Permit*³⁵ re-issued on January 1, 2012 by CCCSD for general wastewater discharged at the JGI in Walnut Creek. The permit contains requirements for inspecting and reporting on operations, but no monitoring requirements.

3.3.9.2 Stormwater

Berkeley Lab's stormwater releases are permitted under the California-wide *General Permit for Storm Water Associated with Industrial Activity* (or Industrial General Permit, IGP).³⁶ The IGP is issued by the SWRCB, but administered and enforced by the RWQCB. Under this permit, Berkeley Lab has implemented a *Storm Water Pollution Prevention Plan* (SWPPP)³⁷ and an *Alternative Storm Water Monitoring Program* (ASWMP).³⁸ The purpose of the SWPPP is to identify sources of pollution that could affect the quality of stormwater discharges, and to describe and ensure the implementation of practices to reduce pollutants in these discharges. The ASWMP describes the rationale for sampling, sampling locations, and analytical parameters (radiological and non-radiological). Together, these documents represent LBNL's plan and procedures for identifying, monitoring, and reducing pollutants in its stormwater discharges.

The IGP requires submittal of an annual report on stormwater activities by July 1 of each year. Berkeley Lab transmitted its annual report to the RWQCB in June.³⁹ No regulatory concerns were raised by the agency regarding the 2011-2012 annual report. According to the IGP, its water quality benchmarks are guideline values, not effluent permit limits; for a summary of sampling locations and stormwater monitoring results, see [Chapter 4](#).

Stormwater releases from construction activity disturbing one or more acres of soil are regulated under the California-wide *General Permit for Stormwater Discharges Associated with Construction and Land-Disturbance Activities* (or Construction General Permit, CGP).⁴⁰ During 2012 five construction projects at Berkeley Lab disturbed more than one acre of soil, requiring five stormwater construction permits as follows:

- *Building 51 and Bevatron Demolition Project*. The purpose of this project was to clear the site to make the area available for future construction. To accomplish this, the building, its contents, and the shallow foundation were removed, and the subsurface soil was characterized.

At the end of February 2012 when the project was completed, the Notice of Termination for coverage under the IGP was submitted to the RWQCB and subsequently approved.

- *Seismic Life Safety, Modernization, and Replacement of General Purpose Buildings, Phase II Project (a.k.a. Seismic Phase II project)*. This project aims to provide seismically safe facilities for scientific research and involves demolishing several older buildings (Buildings 25/25B, 55, and three trailers associated with Building 90) and replacing the Building 25/25B demolished space with a new facility that would be built to higher seismic safety standards. In addition, modernization of Building 74 and slope stabilization at Building 85 are part of the Seismic Phase II project.
- *Computational Research and Theory Facility*. The University of California is constructing this new facility near LBNL's main entry point, Blackberry Gate. CRT will provide approximately 300 office spaces and 28,000 square feet of computer floor space in 32,000 total square feet. About 20,000 square feet is slated for initial use, with an additional 12,000 square feet for growth to house current and forecasted National Energy Research Scientific Computing Center systems.
- *Solar Energy Research Center*. The University of California is constructing this new research center in the central portion of the LBNL hill site with an approximate footprint of 1.5 acres. The SERC project will consist of building an approximately 40,000-gross-square-foot research facility focused on developing fuels from sunlight. This project involves the reconfiguration of 200 linear feet of the service road to the west of the proposed project and the reconfiguration of existing parking areas.
- *FLEXILAB (Facility for Low-Energy eXperiments in buildings LABoratory)*. This project consists of a cluster of buildings where single component

or whole-building systems will be developed and tested, each approximately 600 to 1,200 square feet, with a total disturbed footprint of approximately 1.1 acres. The project includes demolition and removal activities, mass grading, subgrade preparation, utility work, concrete work, building construction, paving, striping, landscaping, and other incidental work.

3.3.9.3 Aboveground Storage Tanks

Aboveground storage tanks (ASTs) also fall under the authority of the CWA.⁴¹ The CWA and the state's *Aboveground Petroleum Storage Act*⁴² outline the regulatory requirements for ASTs. Under the authority of the CWA, a *Spill Prevention, Control, and Countermeasure (SPCC) Plan*⁴³ is required for petroleum-containing tanks, both aboveground and underground. Berkeley Lab maintains an SPCC Plan with the goal of preventing and, if needed, mitigating spills or leaks from petroleum-containing tanks. ASTs are provided with secondary containment or spill kits to capture any potential leaks. The locations of the 32 ASTs are shown in [Figure 3-2](#). In addition, at the JGI a 15,142 L (4,000 gal) AST supports two standby emergency generators. The JGI maintains a separate SPCC Plan⁴⁴ for this AST.

Non-petroleum (i.e., chemical or hazardous) ASTs consist of FTU tanks, storage drums at Waste Accumulation Areas (WAAs), and storage drums at product distribution areas. FTU operators inspect FTU tanks each operating day. EHSS staff inspects WAAs weekly.

The E85-fuel dispensing station tank (located at Building 76) supports approximately 70 alternative-fuel vehicles. The use of 85%-ethanol fuel is one of LBNL's strategies for reducing petroleum usage by its vehicle fleet.

3.3.10 National Environmental Policy Act and California Environmental Quality Act

The *National Environmental Policy Act of 1969* (NEPA)⁴⁵ and the *California Environmental Quality Act of 1970* (CEQA)⁴⁶ exist for the main purpose of ensuring that the environmental impacts of proposed actions are one of the considerations in the decision-making process before selecting among alternative approaches. At Berkeley Lab, LBNL staff provides information and technical support to enable DOE and UC to make this determination on proposed actions.

In 2012, several projects were categorically excluded from further NEPA and CEQA review, and numerous projects (mostly research activities and proposals) were found to be covered under existing categorical exclusions and exemptions. NEPA categorical exclusions are posted at <http://science.energy.gov/ssi/sc-categorical-exclusions-and-nepa-documents/bso/>.

3.3.11 Federal Endangered Species Act

The *Federal Endangered Species Act*⁴⁷ requires that activities taking place at Berkeley Lab on federally controlled property, or using federal permission or funding, undergo a screening process or the NEPA process to determine whether federally listed or proposed species may be present or affected by the action. No compliance activities were required in 2012.

In accordance with the 2006 *Long Range Development Plan Environmental Impact Report* mitigation measures, several project-specific bat and raptor surveys were carried out prior to tree removals or ground disturbance in 2012. Also, training was carried out for numerous project construction teams to identify (and avoid) the Alameda whipsnake, which is a protected species.

3.3.12 California Endangered Species Act

The *California Endangered Species Act*⁴⁸ requires that activities taking place at Berkeley Lab on UC Regents land, or using UC Regents or state permission or funding, undergo a screening process or the CEQA process to determine whether state-listed or proposed species may be present or affected by the action. No compliance activities were required in 2012. (See Section 3.3.11 above regarding bird, raptor, and Alameda whipsnake mitigation activities carried out in 2012.)

3.3.13 National Historic Preservation Act

The *National Historic Preservation Act*⁴⁹ provides for a National Register of Historic Places that lists buildings, structures, sites, objects, and districts possessing historic, architectural, engineering, archaeological, or cultural significance. In the past few years Berkeley Lab has inventoried most of its buildings using qualified historians in consultation with the State Historic Preservation Officer to determine whether the Berkeley Lab assets are eligible for listing on the National Register. Berkeley Lab is developing a Cultural Resources Management Program to further comply with the National Historical Preservation Act and DOE policy.

3.3.14 Migratory Bird Treaty Act

The *Migratory Bird Treaty Act*⁵⁰ implements various treaties and conventions between the United States, Canada, Japan, Mexico, and the former Soviet Union for the protection of migratory birds. The Act makes it unlawful to take, kill, or possess listed migratory birds. Pursuant to EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*,⁵¹ NEPA environmental analyses on Berkeley Lab projects must include an evaluation of effects on migratory birds. No compliance activities were required in 2012, with the exception of pre-construction bird surveys taken during breeding season.



Jim Chiu of LBNL's Environmental Services Group completes on-site environmental testing.

4. Environmental Monitoring

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4.1 INTRODUCTION

The Berkeley Lab environmental monitoring program assesses whether LBNL's emissions are impacting the health of the public or the environment. The program is important for environmental stewardship and for demonstrating compliance with requirements imposed by federal, state, and local agencies. The program also confirms adherence to DOE environmental protection policies and supports environmental management decisions.

This chapter presents summaries of the 2012 monitoring results for the following categories:

- Stack air
- Surface water and wastewater
- Groundwater
- Soil and sediment
- Vegetation and foodstuffs
- Penetrating radiation

A comprehensive *Environmental Monitoring Plan*¹ prepared by Berkeley Lab provides the basis and current scope for each of these monitoring programs. (The most recent periodic revision of the plan was completed in June 2013.)

All of the individual sample results are presented in Volume II of this *Site Environmental Report*. Additional details on groundwater investigations and results are included in Environmental Restoration Program (ERP) reports, which are available at the main Berkeley public library and at www.lbl.gov/ehs/erp.

4.2 AIR QUALITY

Berkeley Lab's air monitoring program is designed to measure the impacts from radiological air emissions. The program meets the U.S. EPA and DOE requirements, which are contained in the following references:

- 40 CFR Part 61, Subpart H (*National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities*)²
- DOE Order 458.1 (*Radiation Protection of the Public and the Environment*)³

This program consists of exhaust emissions monitoring, which measures contaminants in building exhaust systems (e.g., stacks).

4.2.1 Exhaust Emissions Monitoring Results

Berkeley Lab uses various radionuclides in its radiochemical and biomedical research programs. Charged particle accelerators also generate radioactive materials. These operations result in small amounts of airborne radionuclides, which are typically emitted through building exhaust systems.

Berkeley Lab must evaluate the potential for radionuclide emissions from laboratories where radionuclides are used. If the potential emissions exceed the U.S. EPA-approved threshold, LBNL must measure emissions by sampling or monitoring stacks through which emissions are released. *Sampling* means collecting radionuclides on a filter and analyzing the filters at an analytical laboratory; *monitoring* means continuously measuring radionuclides in real time.

LBNL measures stack emissions in accordance with an approach approved by U.S. EPA Region 9, and Table 4-1 identifies the categories and their respective measurement requirements associated with this approach. Berkeley Lab has no Category 1 or 2 sources; all LBNL sources have potential doses that are less than 0.001 mSv/yr (0.1 mrem/yr), so only Category 3 and 4 measurements are required. However, Berkeley Lab may monitor or sample some stacks more frequently than required by the U.S. EPA. Exercising this option, Berkeley Lab collected monthly samples from four stacks and performed real-time monitoring at four stacks (one of which was also sampled monthly) in addition to collecting samples quarterly from 12 stacks. Sampling and monitoring locations are shown in Figure 4-1.

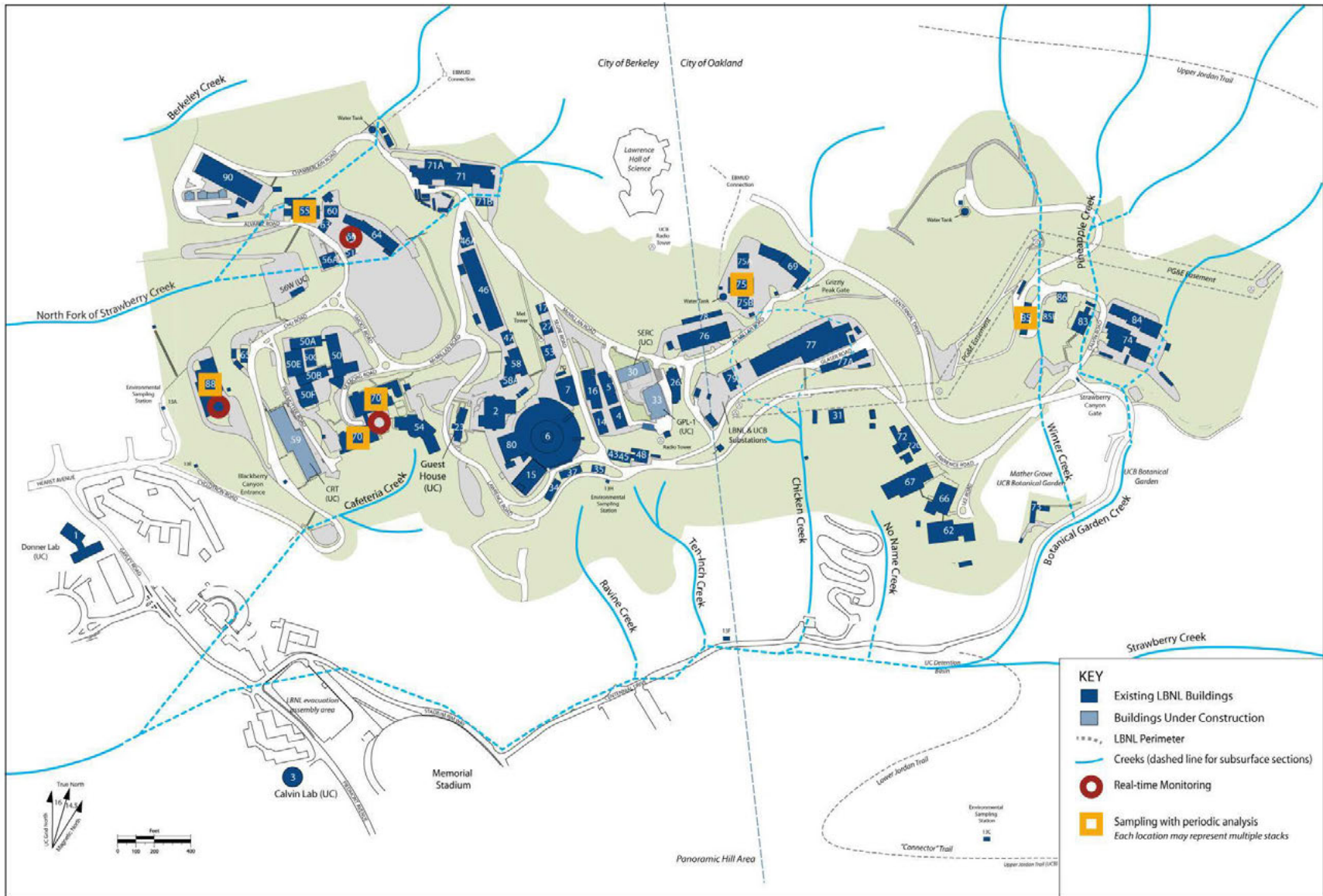


Figure 4-1 Building Exhaust Sampling and Monitoring Locations

Stack exhaust samples were analyzed for five radiological parameters: gross alpha, gross beta, carbon-14, iodine-125, and tritium. Real-time stack monitoring systems measured alpha emitters and positron emitters. In 2012, the positron emitter fluorine-18 (half-life of 1.8 hours) was the predominant radionuclide emitted and accounted for about 99% of the emitted activity. The Building 56 accelerator was the main source of fluorine-18 emissions (5.00×10^{10} becquerels [Bq] [1.35 curies (Ci)]). Additional details on stack emissions are available in LBNL's annual *Radionuclide Air Emission Report*,⁴ which is submitted to the U.S. EPA. For information on the projected dose from radionuclide emissions, see Chapter 5.

Table 4-1 U.S. EPA-Approved Radionuclide Emissions Measurement Approach

Category	Annual Effective Dose Equivalent (mSv/yr) ^a	Requirements
Noncompliant	AEDE ^b ≥ 0.1	Reduction or relocation of the source and reevaluation before authorization
1	$0.1 > \text{AEDE} \geq 0.01$	Continuous sampling with weekly collection and real-time monitoring for short-lived radionuclides
2	$0.01 > \text{AEDE} \geq 0.001$	Continuous sampling with monthly collection or real-time monitoring for short-lived radionuclides
3	$0.001 > \text{AEDE} \geq 0.0001$	Periodic sampling 25% of the year
4	$0.0001 > \text{AEDE}$	Potential dose evaluation before project starts and when project changes; no sampling or monitoring required

^a 1 mSv = 100 mrem

^b AEDE = annual effective dose equivalent

4.3 SURFACE WATER

This section summarizes the monitoring results for surface water. Surface water monitoring included creeks and stormwater.

4.3.1 Surface Water Program

Berkeley Lab lies within the Blackberry Canyon and Strawberry Canyon subwatersheds of the Strawberry Creek watershed. There are two main creeks in these watersheds, the South Fork of Strawberry Creek (in Strawberry Canyon) and the North Fork of Strawberry Creek (in Blackberry Canyon). Both creeks join below Berkeley Lab on the UC Berkeley campus.

Creeks are monitored for alpha and beta emitters and tritium, based on DOE Order 458.1,⁵ which prescribes monitoring requirements for radionuclides. Creek water is also monitored for non-radiological analytes in an ongoing effort to characterize and manage LBNL's overall impact on the environment. Stormwater monitoring is a requirement of the California-wide General Permit⁶ and includes monitoring for metals and other constituents.

Although LBNL surface waters are not used as a public drinking water supply, Berkeley Lab takes the conservative approach of evaluating creek water results against drinking water standards. The federal and state maximum contaminant levels for alpha and beta radioactivity in drinking water are 0.6 Bq/L (15 picocuries/liter [pCi/L]) and 1.9 Bq/L (50 pCi/L), respectively.^{7,8} The federal and state limit for tritium in drinking water is 740 Bq/L (20,000 pCi/L).^{9,10} LBNL also uses the water quality objectives stated in the *Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan)*¹¹ for comparison purposes.

4.3.1.1 Creeks Sampling Results

The flow in many of the creeks of the Strawberry Creek watershed varies in intensity throughout the year. To track any seasonal variation in water quality, a set of creek samples is collected semi-annually from the following creeks that flow through or originate within the Berkeley Lab site: North Fork Strawberry

Creek, Chicken Creek (two locations), Botanical Garden Creek, Cafeteria Creek, No-Name Creek, Ravine Creek, Ten-Inch Creek, Winter Creek (two locations). One creek that is not impacted by Berkeley Lab activities is also sampled: Wildcat Creek, located approximately 2.5 km (1.6 mi) north-northwest of the site in Tilden Regional Park. Figure 4-2 shows all creek sampling locations.

All samples were analyzed for metals and VOCs. No VOCs were detected except for the August sample from Ravine Creek, in which low concentrations of p-isopropyltoluene (3.5 µg/L) and toluene (3.2 µg/L) were detected. Since the flow in the creek in August was extremely low, a sample could not be collected from the flowing water. The sample was therefore collected from a pool of standing water adjacent to the roadway and is not considered representative of the quality of water flowing in the creek. No samples were collected from Ten-Inch Creek during either of the semi-annual sampling periods as creek flow typically only exists after extreme rainfall events.

Metals detected were aluminum, antimony, arsenic, barium, copper, iron, lead, magnesium, selenium, vanadium, and zinc. Their concentrations were within historical levels for LBNL, well below the water quality objectives listed in the *Basin Plan*,¹² and well below the drinking water standard.

Samples with a different set of parameters are also collected from a subset of the above-mentioned creeks. Two sets of samples were collected in 2012 from Chicken Creek, the North Fork of Strawberry Creek, and Wildcat Creek. All samples were analyzed for gross alpha, gross beta, gamma by spectroscopy, and tritium. To provide additional data about the identity of the alpha- and beta-emitting radionuclides measured, the samples were analyzed by gamma spectroscopy for actinium-228, cesium-137, lead-214, potassium-40, radium-226 (by two methods), and uranium-238. In addition, samples were analyzed for chemical oxygen demand (COD), pH, specific conductance, total suspended solids (TSS), and nitrate plus nitrite.

Radium-226, a naturally occurring radionuclide whose decay products emit both alpha and beta radiation, was the only detected radionuclide. It was measured at Chicken Creek at levels consistent with the gross alpha and gross beta measurements, which were less than the federal and state maximum contaminant levels.

Of the nineteen samples taken for tritium analysis, four samples from Chicken Creek, one at 7.6 Bq/L (210 pCi/L), one at 8.3 Bq/L (220 pCi/L), one at 10 Bq/L (270 pCi/L), and one at 7.3 Bq/L (200 pCi/L), were slightly above the minimum detectable activity (MDA), but significantly below federal and state limits for drinking water.

Results indicate that concentrations in all samples analyzed for COD, pH, specific conductance, TSS, and nitrate plus nitrite were within historical levels for the site.

4.3.1.2 Stormwater Sampling Results

Under the terms of California's IGP, sampling must take place during rain events at least twice each wet season (i.e., October 1 through May 30) under specific conditions. Berkeley Lab's ASWMP¹³ describes the rationale for sampling, sampling locations (see Figure 4-2), and analytical parameters for each specific industrial activity. The IGP also requires visual observation of the surface water runoff from one storm each month and visual observation of authorized and unauthorized non-stormwater discharges once each quarter.

The ASWMP was prepared to determine pollutant contributions from specific regulated industrial activities at LBNL, and is thus a reliable basis for evaluating the performance and effectiveness of the BMPs described in LBNL's SWPPP. The ASWMP is designed to focus on the specific areas of industrial activity that represent the only potential sources of pollutants regulated under the IGP.

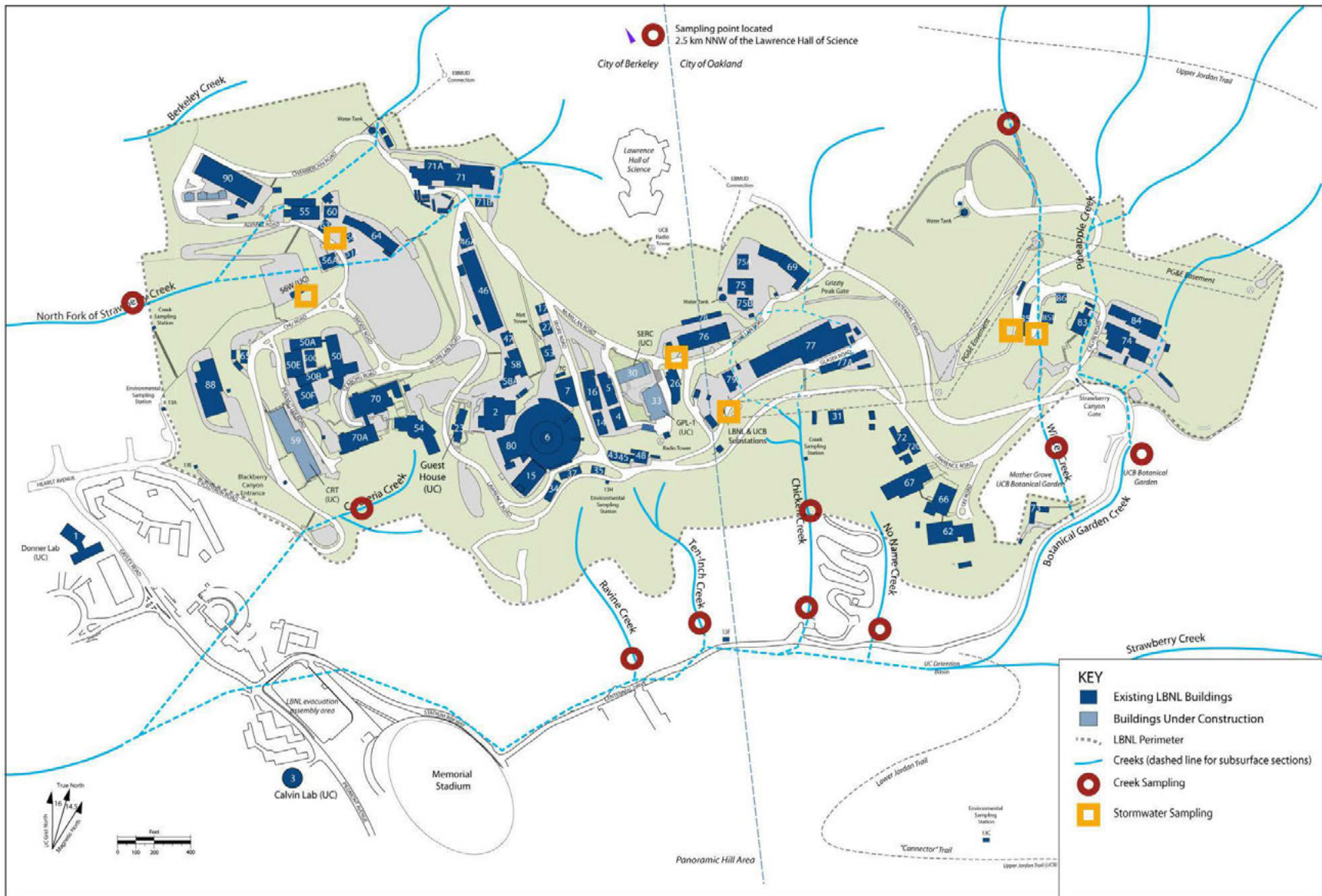


Figure 4-2 Creek and Stormwater Sampling Locations

Berkeley Lab is regulated by the IGP for industrial activities that fall under the following Standard Industrial Classification (SIC) Codes:

- 3499 - Fabricated Metal Products, Not Elsewhere Classified
- 4173 - Terminal and Service Facilities for Motor Vehicle Passenger Transportation
- 4953 - Hazardous Waste Treatment Storage or Disposal
- 5093 - Scrap Recycling Facility

Stormwater sampling in 2012 was performed at the following five areas with specific regulated industrial activities. Note that one area, the HWHF, has two sampling locations, and all are shown in [Figure 4-2](#).

- Blackberry Parking Lot, (previous bus parking and storage industrial area (MP 1))
- Building 76, Fuel Dispensing (MP 2)
- Buildings 77 & 79, Metal Fabrication, Storage, and Scrap Recycling (MP 3)
- Building 85, HWHF (MP 4, lower yard, and MP 5, upper yard)
- Building 64, Bus Parking Lot (MP 6)

The IGP requires the analysis of at least four parameters for stormwater samples at each monitoring location.

- TSS
- pH
- Specific conductivity
- Total oil and grease

Based on the SIC codes for specific industrial activities conducted at LBNL, additional sector-required analyses are specified in the IGP monitoring program, as shown in [Table 4-2](#). Note that MP 1 and MP 6 do not fall under a specific SIC code that requires sampling for additional

Table 4-2 Sector-Required Analyses from the General Permit

SIC Code	Sampling Location	Parameters ^a
3499	Fabricated Metal Products	MP 3 Aluminum, iron, nitrite and nitrate as nitrogen, zinc
4173	Terminal and Service Facilities for Motor Vehicle Passenger Transportation	MP 2 No additional parameters listed
4953	Hazardous Waste Treatment, Storage, or Disposal	MP 4 MP 5 Ammonia, arsenic, cadmium, COD, cyanide, lead, magnesium, mercury, selenium, silver
5093	Scrap Recycling Facility	MP 3 Aluminum, COD, copper, iron, lead, zinc

^aNote: TSS, pH, specific conductivity and total oil and grease are analyzed at all locations.

parameters; however, because they are areas of former transportation activities, it was deemed appropriate to include them in the ASWMP as areas to be sampled for the standard four parameters.

Sampling results for stormwater are compared to the Multi-Sector General Permit (MSGP) benchmark guidelines for industrial activities. It should be noted that the current IGP does not include benchmark values; however, the draft version of the future IGP does include very similar benchmark guidelines, hence the use of those particular benchmarks.

Oil and grease, cyanide, ammonia, and nitrate plus nitrite results were all below benchmark guidelines. The pH was within the acceptable range of 6 to 9 standard pH units at all the locations except at the metal fabrication and salvage yard (MP 3) during the November 8, 2012 storm event, when the pH was measured at 9.43 pH units. Additional stormwater sampling was performed at this location during a subsequent storm event on November 16, for which the pH was measured as 7.70 and 7.68 pH units, which is within acceptable range.

While the MSGP does not list a benchmark value for specific conductance, other sources set this value at less than 200 $\mu\text{mhos/cm}$; all stormwater samples collected in 2012 were below this guideline.

At the Blackberry Parking Lot the measured level of total suspended solids was 180 milligrams/L (mg/L), exceeding the MSGP benchmark. During this particular storm event, a storm drain inlet had become plugged, causing excessive surface water runoff from the hillside to flow onto the parking lot. While the asphalt berm surrounding the parking lot and the storm drain filter were functional, the additional erosion from the hillside was not retained by the BMPs. To prevent this occurrence in the future, the adjacent storm drain inlets will be cleaned more frequently.

Aluminum was below the MSGP benchmark at the metal fabrication and salvage yard (MP 3), but the duplicate sample was above that benchmark. Also for this site, COD and zinc were detected above MSGP benchmarks, despite the removal and/or covering of all galvanized fabricated materials present in the metal yard. Investigations to determine the source of the zinc indicated that it is largely in the dissolved phase, and that wear (small particles) from forklift truck tires used on the yard contain significant quantities of zinc. The surface cleaning frequency of the work areas will be increased to minimize the accumulation of zinc and materials that increase COD levels at the metal fabrication and salvage yard.

Copper was generally detected at the metal fabrication and salvage yard, measuring below the MSGP benchmark; however, during the November 8 storm event copper was measured above the MSGP benchmark. It was determined that the likely source was copper pipes that are used to funnel rain from the roof of neighboring buildings onto the yard. Iron was also detected in the MP 3 runoff below the MSGP benchmark; however, a duplicate sample was above the benchmark. While lead has been detected, all results have been below MSGP benchmark.

Ammonia, COD, cyanide, and magnesium were detected at the upper and lower yard of the HWHF (locations MP 4 and MP 5, respectively). While ammonia and COD are typically detected in the stormwater runoff at the HWHF, all results have been below MSGP benchmarks. Cyanide was detected during the March 13, 2012 sampling event at MP 4 above the MSGP benchmark, while the result at MP 5 was below the MSGP benchmark; a follow-up sampling event at the upper and lower yards did not detect cyanide in the stormwater runoff. Magnesium detected in stormwater has been traced to aerial deposition of soil particles on the concrete surface. The surrounding soils have been found to contain a significant amount of naturally occurring magnesium. Arsenic, cadmium, mercury, selenium, and silver were all below detection limits.

4.4 WASTEWATER

Berkeley Lab's sanitary sewer system (see [Figure 4-3](#)) is based on gravity flow. The point of water discharge is either Hearst or Strawberry Monitoring Station, and depends on which part of LBNL the water is coming from, as follows:

- Hearst Station, located at the head of Hearst Avenue below the western edge of Berkeley Lab, monitors discharges from LBNL's western and northern areas. The monitoring site is located at a point immediately before the connection of LBNL's sanitary sewer system with the COB's sewer main.
- Strawberry Station, located next to Centennial Drive in Strawberry Canyon, monitors discharges from LBNL's eastern and southern areas. Downstream from the monitoring station, the discharge system first ties into UC-owned piping and then into the COB system. Because of the network's design, the Strawberry Monitoring Station also receives effluent from several UC Berkeley campus facilities separate from the main UC Berkeley campus located above LBNL; namely, the Lawrence Hall of Science, Space Sciences Laboratory,

Mathematical Sciences Research Institute, Animal Research Facility, and Botanical Garden.

4.4.1 Wastewater Discharge Program

As discussed in Section 3.3.9.1 Berkeley Lab has wastewater discharge permits issued by EBMUD for general sitewide activities, metal finishing operations in Building 77, and treated groundwater operations at seven different locations, as well as several special permits for wastewater discharges associated with construction, demolition, or research activities. All permits have periodic monitoring and reporting requirements as specified by EBMUD. Self-monitoring of wastewater discharges occurs at the Hearst and Strawberry Monitoring Stations, the fixed treatment unit located at Building 77, and the various treated groundwater sites. In addition, EBMUD conducts unannounced monitoring of wastewater discharges. For the reporting year, all monitoring results were below discharge limits. No discharges to the sanitary sewer system from the Wildcat Canyon fault line study or the Bevatron Demolition project occurred during the year.

4.4.1.1 Hearst and Strawberry Sewer Outfalls

Non-radiological monitoring of sitewide samples collected at the Hearst and Strawberry monitoring stations includes analyses for pH, total identifiable chlorinated hydrocarbons, TSS, and COD, with additional analyses for metals. Total flow is also measured and recorded. In 2012, Berkeley Lab discharged approximately 67,400 m³ (17.8 million gal) through Hearst Sewer and 85,200 m³ (22.5 million gal) through Strawberry Sewer.

Radiological monitoring is required by DOE Order 458.1¹⁴ and guidance,¹⁵ and verifies compliance with radiological limits under the California Code of Regulations (CCR),¹⁶ cited in the EBMUD wastewater discharge permit.¹⁷ California regulations now incorporate by reference the applicable federal Nuclear Regulatory Commission regulations¹⁸ and associated discharge limits.

Analyses are performed by a state-certified external laboratory. Results are compared against the discharge limits for each parameter given in the permits. Self-monitoring reports are submitted to EBMUD in compliance with permit requirements, and Berkeley Lab annually submits a certification to EBMUD that its discharge is in compliance with the permit's radioactive limits.

4.4.1.2 Non-radiological Monitoring Results

Berkeley Lab collected one non-radiological sample set from both the Hearst and Strawberry outfalls as part of EBMUD-required self-monitoring performed during 2012. The EBMUD permit specifies the collection dates for this sampling. All results were well within discharge limits, as were all measurements made by EBMUD in its one independent sampling event.

All metals and chlorinated hydrocarbon results were below EBMUD permit limits or not detected. According to the permit, the pH level must be equal to or greater than 5.5; all results were well above this value. TSS and COD have no discharge limits and are measured to determine wastewater strength, which forms the basis for the costs charged by EBMUD to LBNL for wastewater treatment. See Volume II of the SER for all analytical results.

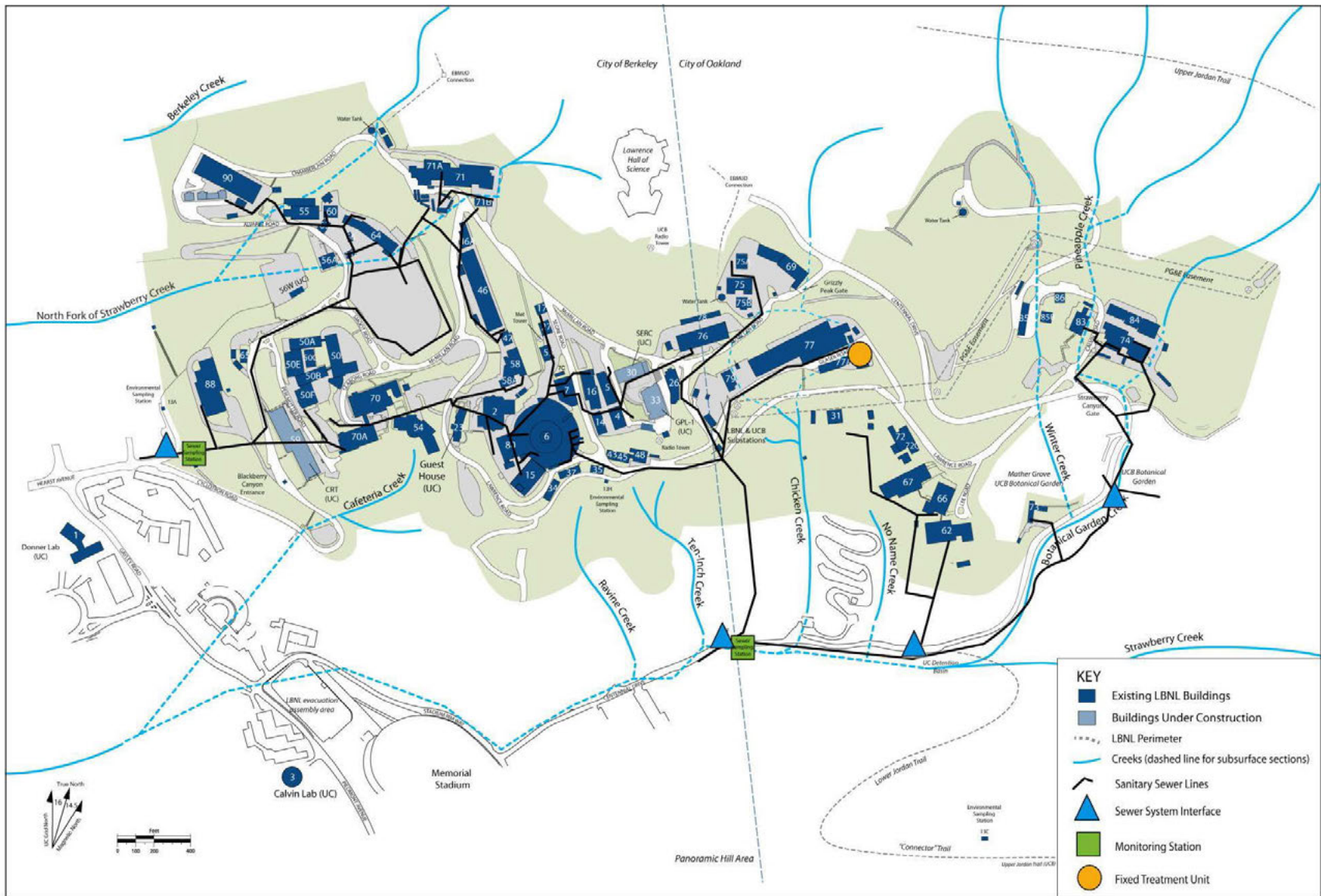


Figure 4-3 Sanitary Sewer System (Main Lines)

4.4.1.3 Radiological Monitoring Results

Composite samples are collected every four weeks from the Hearst and Strawberry sewer outfalls by sampling the wastewater every half hour using automatic equipment. The composite samples are submitted to a state-certified laboratory for analysis of gross alpha radiation, gross beta radiation, iodine-125, tritium, and carbon-14. Periodically, split samples are analyzed for quality control (QC) purposes.

The federal¹⁹ and state²⁰ regulatory limits for radioisotopes in wastewater are based on total amounts released per year. For tritium, this limit is 1.9×10^{11} Bq (5 Ci), and for carbon-14 the limit is 3.7×10^{10} Bq (1 Ci). The annual limit for all other radioisotopes is a combined 3.7×10^{10} Bq (1 Ci). All results for gross alpha, carbon-14, iodine-125, and tritium samples collected at both sampling locations were below the MDA.

Positive results for gross beta were found. The highest result was 0.81 Bq/L (22 pCi/L), which is below the federal and state requirements for drinking water and far below the EBMUD discharge limit for all radioisotopes.

Annual discharges are estimated by multiplying the activity found by the volume discharged during the monitoring period. All estimates are well below the EBMUD discharge limit. In the case of tritium, activities below the MDA were totaled to give an estimated annual discharge of zero Bq (zero Ci) or 0% of the discharge limit. Activities below the MDA were also totaled for carbon-14 to give an estimated annual discharge of 4.1×10^7 Bq (1.12×10^{-3} Ci) or 0.11% of the discharge limit. The estimated annual discharge for all other radioisotopes (gross alpha, gross beta, iodine-125) combined was 4.7×10^7 Bq (1.27×10^{-3} Ci) or 0.13% of the discharge limit.

4.4.1.4 Treated Hydrauger and Extraction Well Discharge

Since 1993, EBMUD has permitted Berkeley Lab to discharge treated groundwater to the sanitary sewer at seven locations. The EBMUD permit²¹ allows for discharge of treated groundwater from certain hydraugers (subsurface

drains) and extraction wells, and also from well sampling and development activities.

The treatment process consists of passing the contaminated groundwater through a two-stage carbon-drum adsorption system. Samples of the treated water are collected bi-monthly and analyzed for VOCs using U.S. EPA-approved methods to document that discharge limits have not been exceeded. All treated groundwater discharged under the permit is routed through the Hearst Sewer. Groundwater monitoring and treatment is discussed in Section 4.5.

4.4.1.5 Building 77 Ultra-High Vacuum Cleaning Facility Wastewater

The Ultra-High Vacuum Cleaning Facility (UHVCF) at Building 77 cleans various types of metal parts used in research and support activities at Berkeley Lab. Cleaning activities include passivating, acid and alkaline cleaning, and ultrasonic cleaning. Acid and alkaline rinse waters that contain metals from UHVCF operations are routed to a fixed treatment unit with a capacity of approximately 230 L/minute (L/min) (60 gal/min).

All sampling performed by Berkeley Lab (one self-monitoring event) and EBMUD (one sampling event) yielded results well within permitted limits.

LBNL submits a *Total Toxic Organics Compliance Report* twice per year which certifies that Building 77 is not discharging chlorinated hydrocarbons or other toxic organic compounds to the fixed treatment unit and to the sanitary sewer.

4.5 GROUNDWATER

This section reviews Berkeley Lab's groundwater monitoring program and provides a summary discussion of site groundwater contaminant plumes and the corrective measures applied to each of those plumes. More detailed information on the program is provided in the Environmental Restoration Program Semiannual Progress Reports, which contain all site groundwater monitoring data, site maps showing monitoring well locations and contaminant

concentrations, and graphs showing changes in contaminant concentrations over time. These reports are available for public view at www.lbl.gov/ehs/erp/html/documents.shtml and in hardcopy at the main branch of the Berkeley Public Library.

Berkeley Lab is currently in the CMI phase of the RCRA CAP. The objectives of groundwater monitoring during this phase are to: (1) evaluate the continued effectiveness of the corrective measures that have been implemented for cleanup of contaminated groundwater; (2) document that site groundwater plumes continue to be stable or attenuating and are not migrating offsite; and (3) monitor progress toward attaining the long-term goal of restoring all groundwater at the site to drinking water standards, if practicable. Although attaining drinking water standards is the long-term goal, it should be noted that groundwater at Berkeley Lab is not used for domestic, irrigation, or industrial purposes, and that drinking water is supplied by EBMUD.

4.5.1 Groundwater Monitoring Overview

The groundwater monitoring network at Berkeley Lab consists of more than 230 wells. The groundwater monitoring wells are sampled for VOCs, metals, and/or tritium in accordance with schedules approved by the DOE, DTSC, and RWQCB. Selected wells are also monitored for other potential contaminants.

The only metal detected in 2012 at a concentration above both the drinking water standard and the statistically estimated Berkeley Lab background level²² was arsenic in three wells. No plumes are associated with this metal, and it is likely to be naturally occurring. The elevated arsenic concentration is attributed to the relatively high natural concentration of this metal in certain sedimentary rock types at Berkeley Lab. In addition, molybdenum, which has no drinking water standard, was detected above the upper estimate of background in six wells. The 2012 results are consistent with previously detected metals concentrations in the groundwater.

Seventeen wells monitor for potential migration of contaminated groundwater beyond the developed areas of the site. One of these wells is located outside the site boundary (see Figure 4-4). No tritium was detected in any of these wells in 2012. The only VOC detected was trichloroethene (TCE), which was detected in one well at a concentration of 1.3 µg/L. When MWP-1 was resampled less than two weeks later, no VOCs were detected. The detected concentration is well below the drinking water standard of 5 µg/L. Sitewide results are discussed in detail in the following section.

4.5.2 Groundwater Contamination

VOC-Contaminated Groundwater: Based on groundwater monitoring results, six principal plumes of halogenated VOC-contaminated groundwater have been identified at Berkeley Lab: Old Town; Building 51/64; Building 51L; Building 71B; Building 69A; and Building 76. In addition, VOC-contaminated groundwater is present in five other localized areas (former Building 51A, former Building 51 Vacuum Pump Room, Building 64, Building 75/75A, and Building 77). The Building 51A and Building 51 Vacuum Pump Room contaminant areas were discovered in 2011 during the subsurface characterization investigations conducted for the recently completed Building 51 and Bevatron Demolition Project.

The Old Town VOC plume is a broad, multi-lobed plume that underlies much of the central portion of Berkeley Lab known as “Old Town.” The geometry and distribution of chemicals in the plume indicate that it consists of three coalescing lobes (Building 7, Building 25A, and Building 52 lobes) that were originally discrete plumes derived from distinct sources.

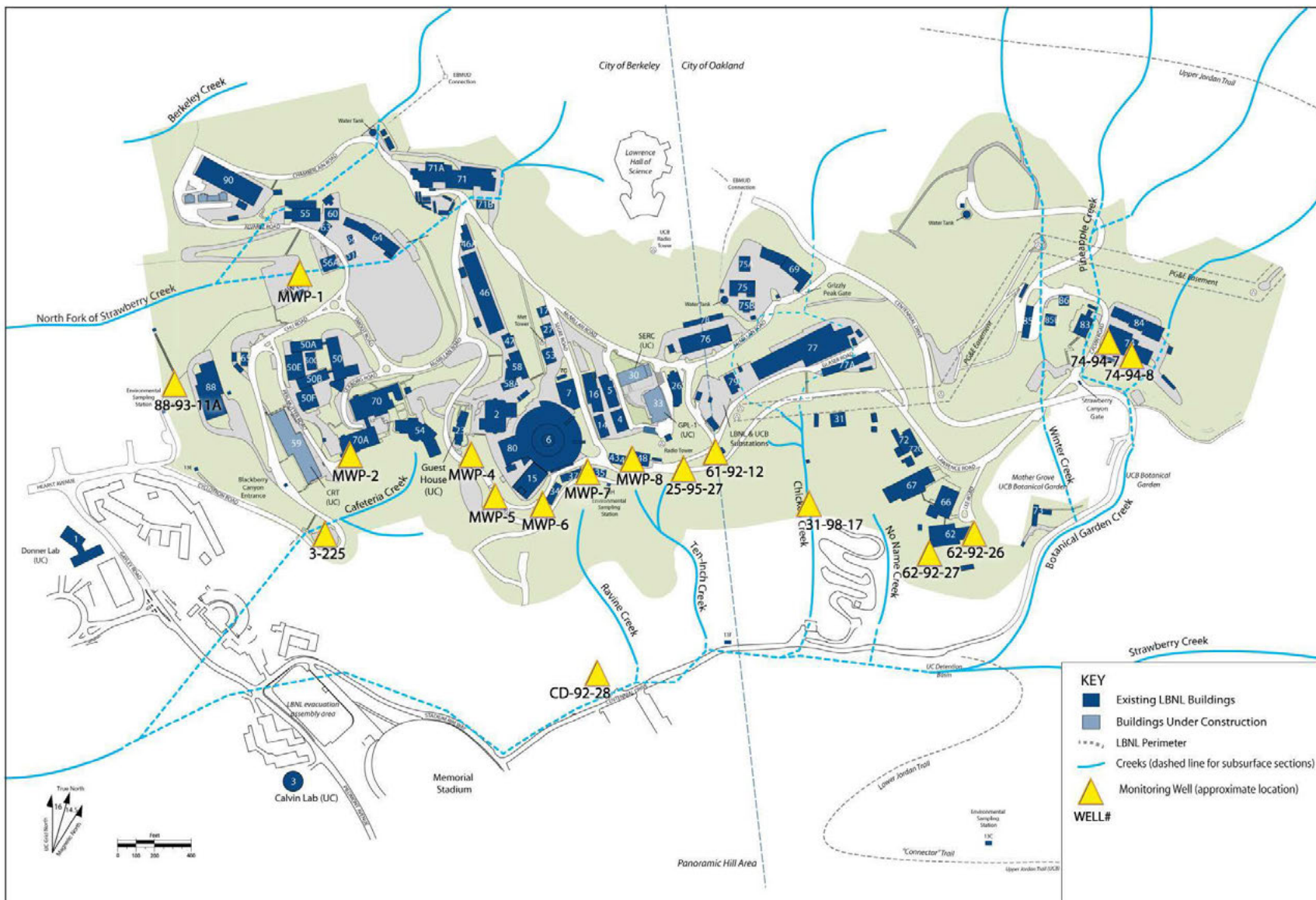


Figure 4-4 Monitoring Wells Nearest the Site Boundary

Concentrations of VOCs in most areas have shown significant declines primarily as a result of the corrective measures that have been implemented. However, except for the Building 77 area and the Building 52 lobe of the Old Town VOC plume, VOC concentrations remain above the drinking water standard.

Tritium-Contaminated Groundwater: A plume of tritium-contaminated groundwater extends southward from the Building 75 area. The magnitude and lateral extent of the tritium plume have been decreasing, with concentrations of tritium below the drinking water standard of 740 Bq/L (20,000 pCi/L)^{23, 24} in all wells since February 2005. Low concentrations of tritium (below the drinking water standard) have also been detected in groundwater samples collected in the Building 71B area and beneath the central area of the former Bevatron site.

Petroleum Hydrocarbon-Contaminated Groundwater: Two petroleum hydrocarbon plumes associated with former USTs are present at the site. One is located at Building 74 (Building 74 diesel plume), and the other near Building 6 (Building 7 diesel plume). While not considered a plume, petroleum hydrocarbons have also been detected in the groundwater at a former UST site south of Building 76.

The locations where the groundwater at Berkeley Lab is contaminated and the extent of groundwater with contaminant concentrations exceeding the drinking water standard in September 2012 are shown on Figure 4-5.

4.5.2.1 Old Town VOC Plume - Building 7 Lobe

The Building 7 lobe extends northwestward from the northwest corner of Building 7 to the parking area downslope from Building 58. The principal constituents of the Building 7 lobe are tetrachloroethylene (PCE) and carbon tetrachloride, and their associated degradation products (e.g., trichloroethylene (TCE); 1,1-dichloroethylene (DCE); cis-1,2-DCE; and vinyl chloride).

A number of interim corrective measures were instituted prior to 2007 for the Building 7 lobe, including excavation of contaminated soil from the source area, removal of a sump that was the source of the groundwater contamination, and

installation of several groundwater extraction trenches to control plume migration.

The final corrective measures for the Building 7 lobe consisted of excavation and off-site disposal of contaminated soil in the source area, *in situ* soil flushing and groundwater capture, and monitored natural attenuation (MNA). Excavation of the source area soil was completed in 2006. The *in situ* soil-flushing and groundwater capture system consists of three groundwater extraction trenches and numerous groundwater extraction and injection wells. This system is designed to flush contaminants from the subsurface and control the migration of contaminated groundwater.

The source removal, together with *in situ* soil flushing and groundwater capture, has significantly reduced VOC concentrations through much of the Building 7 lobe area, with the annual average concentration of total VOCs in representative wells declining from approximately 20,000 µg/L in 2002 to less than 700 µg/L. The maximum concentration of total VOCs detected in 2012 was 5,706 µg/L, which consisted primarily of PCE and TCE.

4.5.2.2 Old Town VOC Plume - Building 25A Lobe

The Building 25A lobe of the Old Town VOC plume encompasses two subplumes of groundwater contamination. The main Building 25A subplume extends from the western portion of Building 25A westward to the eastern edge of Building 6. The Building 25 subplume is located south of Building 25. The principal constituents of the Building 25A subplume are TCE and its degradation products (e.g., 1,1-DCE and cis-1,2-DCE). The principal constituents of the Building 25 subplume have been PCE and carbon tetrachloride.

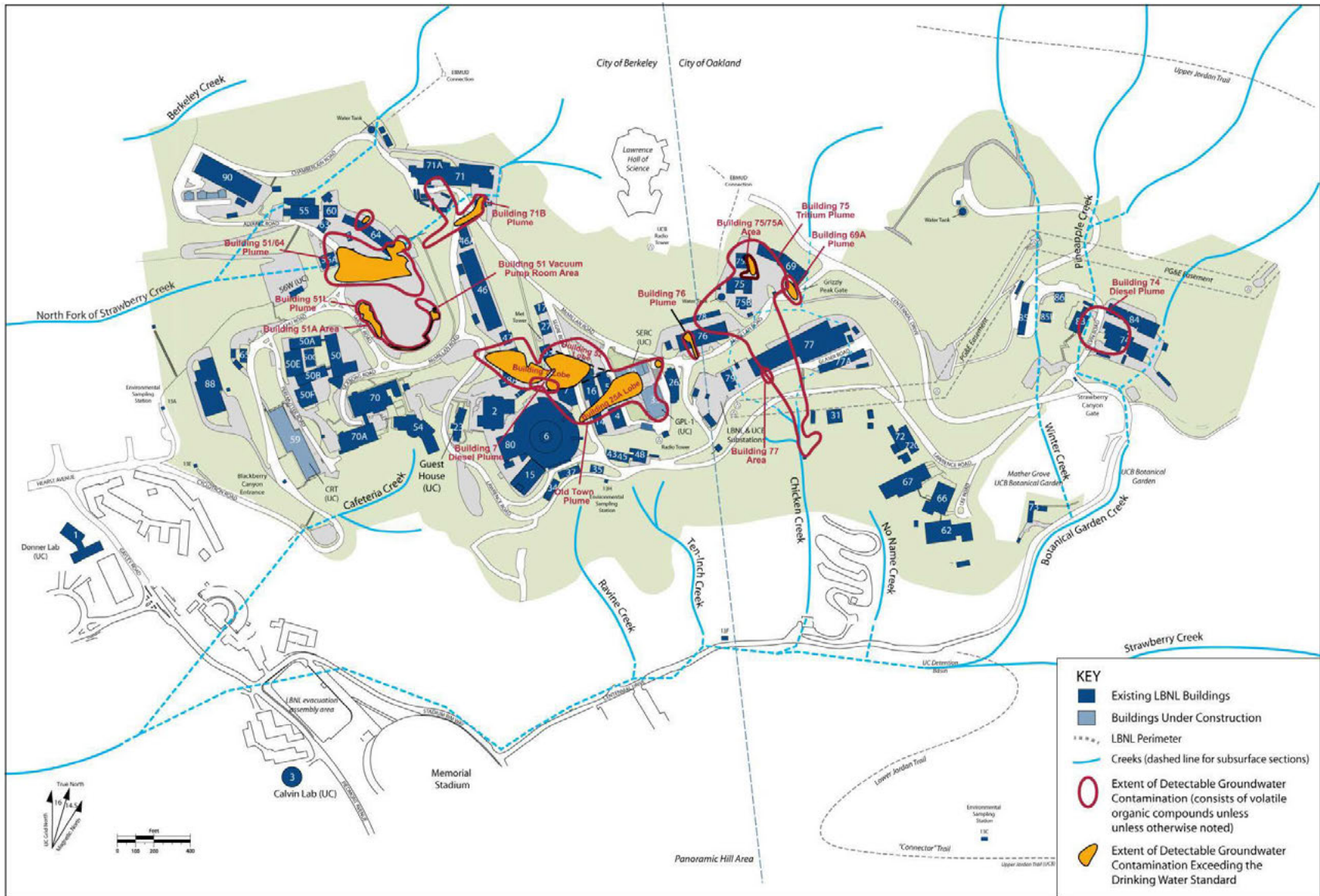


Figure 4-5 Locations of Groundwater Contamination (September 2012)

4.5.2.3 Old Town VOC Plume - Building 52 Lobe

The final corrective measure for the Building 25A lobe consists of *in situ* soil flushing. Since flushing was started in 2002, the annual average concentration of total VOCs detected in representative wells in the Building 25A subplume has declined from approximately 200 µg/L to less than 50 µg/L. The maximum concentration of total VOCs in the Building 25A subplume in 2012 was 143 µg/L, which consisted primarily of TCE.

Significant declines in the concentrations of VOCs have also been observed in the Building 25 subplume since the initiation of *in situ* soil flushing in the subplume source area in April 2006. Concentrations of VOCs in groundwater samples collected south of Building 25 have remained below the drinking water standard since the beginning of January 2010.

The Building 52 lobe of the Old Town VOC plume extends northwest from the area east of Building 52 to the east edge of Building 46, where the contaminated groundwater is captured by a subdrain that was installed in the 1950s as a landslide mitigation measure. The principal lobe constituents have been PCE and carbon tetrachloride, and their associated degradation products (e.g., TCE; 1,1-DCE; cis-1,2-DCE; and chloroform).

The final corrective measures for the Building 52 lobe consist of *in situ* soil flushing and the continued capture of groundwater at the Building 46 subdrain. Since flushing was started in 2003, the annual average concentration of total VOCs in representative Building 52 lobe wells has declined from more than 100 µg/L to less than 5 µg/L, with concentrations of individual VOCs declining to less than the drinking water standard throughout the lobe area. The maximum concentration of total VOCs detected in the Building 52 lobe in 2012 was 2.9 µg/L. Since flushing started, there has also been a significant reduction in the lateral extent of the plume, with VOCs declining to levels below the detection limit throughout most of the lobe area.

4.5.2.4 Building 51/64 VOC Plume

The Building 51/64 VOC plume extends south and west from the southeast corner of Building 64 beneath the former location of Building 51B. The principal plume constituents are 1,1-dichloroethane (DCA), TCE, and PCE and their associated degradation products (e.g., 1,1-DCE; cis-1,2-DCE; and vinyl chloride).

In 2000, contaminated soil was excavated from the source area of the plume as an interim corrective measure. The final corrective measures for the Building 51/64 VOC plume consist of *in situ* soil flushing, MNA, and the continued collection and treatment of water from the Building 51 subdrain system. In addition, HRC has been injected into the subsurface in the downgradient plume area to help accelerate the biodegradation of the contaminants. As a result of these interim and final corrective measures, the maximum concentration of total VOCs detected in groundwater in the source area has declined from more than 700,000 µg/L to approximately 1,200 µg/L. Since flushing was started in 2003, the annual average concentration of total VOCs detected in representative wells has declined from more than 4,000 µg/L to less than 70 µg/L.

4.5.2.5 Building 51L VOC Plume

The Building 51L VOC plume is located beneath the area where Building 51L was formerly located. The principal plume constituent is TCE and its associated degradation products (e.g., cis-1,2-DCE).

The final corrective measure for the Building 51L VOC plume was excavation and off-site disposal of contaminated source area soil. The corrective measure was completed at the end of 2006. Prior to completion of the corrective measure, halogenated VOCs were detected at concentrations above 1,000 µg/L in wells monitoring the plume. Groundwater extraction well EW51L-06-1 was installed in the backfilled corrective measure excavation. The maximum concentration of total VOCs detected in EW51L-06-1 in 2012 was 25 µg/L.

4.5.2.6 Building 71B VOC Plume

The Building 71B VOC plume extends southwest from Building 71B towards the Building 51/64 area. The principal plume constituents are TCE and PCE, and their associated degradation products (e.g., cis-1,2-DCE).

Between 2000 and 2004, highly contaminated soil was excavated from the plume source area as an interim corrective measure. The final corrective measures for the Building 71B VOC plume consist of *in situ* soil flushing with the injection of HRC, and continued collection and treatment of contaminated effluent from the hydraugers that drain groundwater from the slope west of Building 46A. As a result of these interim and final corrective measures, the maximum concentration of total VOCs detected in groundwater in the source area has declined from more than 6,000 µg/L to less than 50 µg/L. Since flushing was started in 2004, the annual average concentration of total VOCs in source area wells has declined from more than 300 µg/L to less than 25 µg/L.

4.5.2.7 Building 69A VOC Plume

The Building 69A VOC plume is located west of Building 69A. The principal plume constituents are cis-1,2-DCE and vinyl chloride.

The final corrective measure for the Building 69A VOC plume is MNA. In addition, HRC was injected into the subsurface in 2006 and 2007 to enhance the natural degradation processes. The annual average concentration of total VOCs in representative wells has declined from approximately 100 µg/L in 2001 to less than 10 µg/L. The maximum concentration of total VOCs detected in 2012 was 24 µg/L, which consisted primarily of cis-1,2-DCE.

4.5.2.8 Building 76 VOC Plume

The Building 76 VOC plume extends approximately 100 feet southwards from the motor-pool area on the south side of Building 76. The principal plume constituent is TCE and its degradation products (e.g., cis-1,2-DCE). The maximum concentration of total VOCs detected in groundwater samples

collected in 2012 was 13 µg/L. No corrective measures are required for the Building 76 plume.

4.5.2.9 Former Building 51 Vacuum Pump Room and Building 51A Areas

Two additional areas of VOC-contaminated groundwater were identified in 2011 as part of the environmental investigations conducted to assess potential contamination at the Building 51 and Bevatron Demolition Project site. VOCs (primarily TCE) were detected at a total concentration of 132,960 µg/L in a pre-development groundwater sample collected from a temporary groundwater sampling point installed in the former Vacuum Pump Room of Building 51. Groundwater samples collected within several feet of this location contained VOC concentrations orders of magnitude lower. VOCs (14,470 µg/L maximum total concentration) were also detected in grab groundwater samples collected from borings in the former Building 51A area. The contaminants in this area consisted primarily of TCE and carbon tetrachloride. These findings were reported to the DTSC.

Investigation of these two areas continued in 2012, with the results reported to the DTSC.²⁵ The maximum concentration of total VOCs detected in 2012 in the former Vacuum Pump Room area was 17,841 µg/L, which consisted primarily of TCE. The maximum concentration of total VOCs detected in 2012 in the former Building 51A area was 23,336 µg/L, which consisted primarily of TCE and carbon tetrachloride.

Currently, there is no significant risk to human health or the environment associated with VOC contamination in the former Vacuum Pump Room area. There is also no significant risk to human health associated with VOC contamination in the former Building 51A area. There is, however, an imminent threat to the environment from contaminated groundwater migrating into areas of clean groundwater and clean backfill material. In August, LBNL therefore submitted a workplan to DTSC to construct and operate an ICM to mitigate this

threat.²⁶ The DTSC approved the ICM in 2013, and has not yet required an evaluation of final corrective measures for either of these two areas.

4.5.2.10 Tritium-Contaminated Groundwater

The Building 75 tritium plume extends southwards from Building 75 toward Chicken Creek. The source of the plume was the former National Tritium Labeling Facility (NTLF) at Building 75, which ceased operation in December 2001. Since closure of the NTLF, concentrations of tritium have been declining in almost all wells monitoring the plume, with a concurrent reduction in the lateral extent of the plume. The maximum concentration of tritium detected in the groundwater in 2012 was 444 Bq/L (12,000 pCi/L), which is below the drinking water standard of 740 Bq/L (20,000 pCi/L).

Tritium has also been detected at concentrations well below the drinking water standard in two other localized areas, near Building 71B and beneath the central area of the former Bevatron site during building demolition. Tritium was not detected (less than 11.1 Bq/L [300 pCi/L]) in the Building 71B area groundwater in 2011 or 2012. In 2011 tritium was detected at a maximum concentration of 24.9 Bq/L (673 pCi/L) in groundwater samples collected beneath the central area of the former Bevatron site. Tritium was not detected in groundwater samples collected from wells downgradient and crossgradient from this area in 2011 or 2012, indicating that the extent of the contamination was limited. Therefore, no corrective measures are required for this plume.

4.5.2.11 Petroleum Hydrocarbon Plumes

Petroleum hydrocarbon-contaminated groundwater has been historically detected in three areas where USTs were formerly located: north of Building 6 (Building 7 diesel plume), near Building 74 (Building 74 diesel plume), and south of Building 76. In 2012, petroleum hydrocarbons were detected at a maximum concentration of 200 µg/L in three wells near Building 74 and at a concentration of 250 µg/L in one well south of Building 76. Petroleum hydrocarbons were not detected in the groundwater samples collected north of Building 6. No aromatic

VOCs, including BTEX components (i.e., benzene, toluene, ethylbenzene, xylenes), have been detected in the groundwater at any of these UST sites since 2003. No corrective measures are required at any of these former UST sites.

4.5.3 Treatment Systems

Berkeley Lab is using collection trenches, groundwater extraction wells, and subdrains to control the migration of groundwater plumes. Eleven GAC treatment systems were operated in 2012 to treat the extracted groundwater. The treated water is mainly re-injected into the subsurface for *in situ* soil-flushing purposes. Excess water is released to the sanitary sewer in accordance with Berkeley Lab's treated groundwater discharge permit from EBMUD.²⁷

The total volume of contaminated groundwater treated by these systems during the year was about 52,000 m³ (13.8 million gal). From 1991 through the end of 2012, more than 545,000 m³ (144 million gal) of contaminated groundwater have been extracted, treated, and mostly re-injected as clean water into the subsurface for *in situ* soil-flushing purposes.

4.6 SOIL AND SEDIMENT

This section summarizes the routine monitoring results for soil and sediment samples. Non-routine sampling conducted to investigate contamination at specific sites is reported in Environmental Restoration Program Semiannual Progress Reports, which are available for public view in hardcopy at the main branch of the Berkeley Public Library and on the web at www.lbl.gov/ehs/erp/html/documents.shtml.

4.6.1 Soil Sampling Results

Soil samples obtained from the top 2 to 5 cm (1 to 2 in) of surface soils were collected from three locations on the LBNL site and one off-site environmental monitoring station (see Figure 4-6). Samples were analyzed for gross alpha and

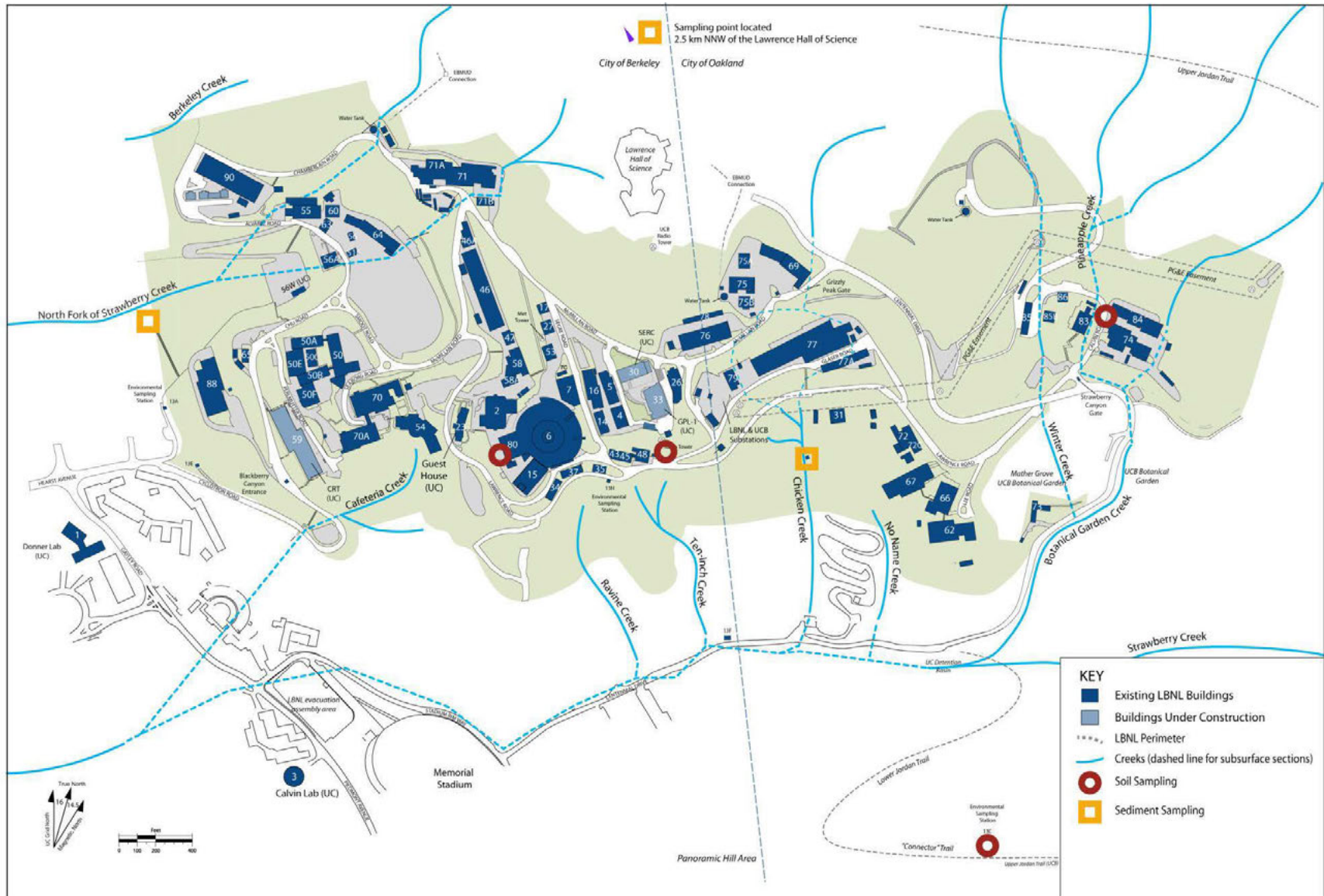


Figure 4-6 Soil and Sediment Sampling Sites

gross beta radiation, gamma emitters, tritium, moisture content, pH, and 15 individual metals.

For radioisotope analysis, the alpha, beta, and gamma emitter results were similar to background levels of naturally occurring radioisotopes commonly found in soils. Tritium measurements at each of the sampling locations were below detection limits.

For non-radioisotope analysis, measurements of pH and moisture content at each of the sampling locations were within the typical range for soils. For metals, the results were within established Berkeley Lab soil background levels²⁸ or levels commonly found in California soils.

4.6.2 Sediment Sampling Results

Sediment samples were collected in the creek beds of the North Fork of Strawberry Creek and Chicken Creek on the LBNL site and at one off-site location at Wildcat Creek in Tilden Regional Park in Berkeley (see Figure 4-6).

Due to limited sediment availability, several grab samples from the general sampling area of each location were composited and analyzed. Samples were analyzed for gross alpha, gross beta, and gamma emitters, tritium, 15 individual metals, pH, moisture content, and petroleum hydrocarbons (diesel and oil/grease).

For radioisotope analysis, the levels of alpha, beta, and gamma emitters were within background levels of naturally occurring radioisotopes commonly found in sediments. Tritium measurements at each of the sampling locations were below detection limits.

For non-radioisotope analysis, measurements of pH and moisture content at each of the sampling locations were within the typical range for soils. The metals results were within either the established Berkeley Lab soil background levels or levels commonly found in California soils.

For total petroleum hydrocarbons (diesel and oil/grease), all of the sample results for oil/grease were below detection limits. Diesel results at all of the sampling locations except Chicken Creek were below detection limits.

The Quality Assurance / Quality Control sample at Chicken Creek for TPH diesel had a result of 51 mg/kg, which is below the Environmental Screening Level for TPH (middle distillates) of 83 mg/kg established by the RWQCB. The primary sample result for TPH diesel was below detection limits.

4.7 VEGETATION AND FOODSTUFFS

Sampling and analysis of vegetation and foodstuffs can provide information regarding the presence, transport, and distribution of radioactive emissions in the environment. This information can be used to detect and evaluate changes in environmental radioactivity resulting from Berkeley Lab activities and to calculate potential human doses that would occur from consuming vegetation and foodstuffs.

Due to historical air emissions from the former NTLF Hillside Stack, vegetation near that site contains measurable concentrations of tritium. Tritium in vegetation occurs in two chemical forms – organically bound tritium and tissue-free water tritium. Berkeley Lab analyzes vegetation for both forms. Since the closure of the NTLF in December of 2001, tritium emissions from Berkeley Lab have decreased sharply and tritium concentrations in vegetation have decreased as well, albeit more slowly. To document changes in the concentrations of tritium in the local vegetation, Berkeley Lab routinely samples this vegetation at least every five years. In 2012, no samples were collected for this purpose.

Berkeley Lab also samples trees for tritium for landscape management, because only trees with tritium levels indistinguishable from background levels are removed from the LBNL site and released to the public. In 2012, several trees on the hillside near the former NTLF stack were cut and chipped to minimize wildland fire danger. Because these trees had probably absorbed tritium from

NITLF operations in past years, the chips were not removed from the Berkeley Lab site and instead were left on the hillside near the location of the former NITLF stack, consistent with Berkeley Lab policy on managing vegetation with detectable levels of tritium.

4.8 PENETRATING RADIATION MONITORING

Radiation-producing machines (e.g., accelerators, x-ray machines, irradiators) and various radionuclides are used at Berkeley Lab for high-energy particle studies and biomedical research. Accelerator and irradiator operations at the site are the primary contributors of penetrating radiation.

When operating, accelerators may produce both gamma radiation and neutrons. To detect gamma radiation and neutrons from accelerator operations, Berkeley Lab places radiation detection equipment at environmental monitoring stations near the site's primary research accelerators, which include the Advanced Light Source (Building 6), Biomedical Isotope Facility (Building 56), and 88-Inch Cyclotron (Building 88). The LOASIS Project (Building 71) is an experimental, laser-driven accelerator that does not produce measurable gamma or neutron radiation outside the building; nonetheless, penetrating radiation near this accelerator is passively monitored.

Berkeley Lab uses two methods to determine the environmental radiological impact from accelerator operations:

- Real-time monitors that continuously detect and record gamma radiation and neutron doses
- Passive detectors called “optically stimulated luminescence dosimeters,” which by laboratory analysis provide an average dose over time from gamma radiation

The locations of real-time monitors and dosimeters are shown in [Figure 4-7](#). Results of both measurement methods are given in terms of dose and are provided in [Section 5.2](#).

At LBNL, irradiators – which are sealed radioactive sources used to irradiate other material – predominantly produce only gamma radiation. The one exception is an irradiator that produces neutron radiation. This source is located in Building 75A and is operated by the EHSS Division's Radiation Protection Group to calibrate the dosimeters used by LBNL employees. There is no measurable dose to the public from this irradiator.

Berkeley Lab also uses other smaller, well-shielded gamma irradiators, as well as neutron generators, and x-ray machines. These smaller radiation-producing machines do not measurably increase the dose to the public.

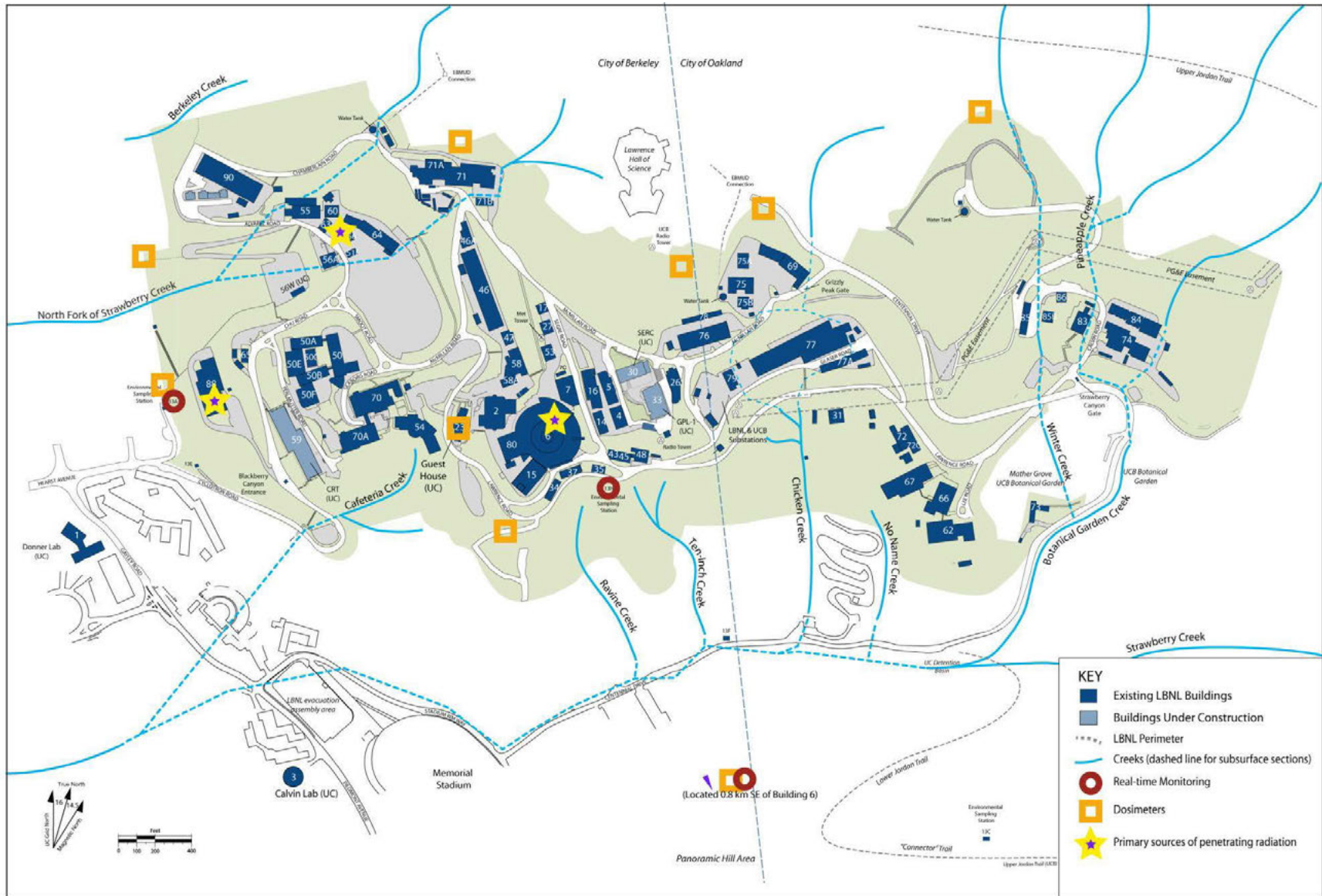


Figure 4-7 Environmental Penetrating Radiation Primary Sources and Monitoring Stations



John Jelinski of LBNL's Environmental Services Group collects vegetation samples.

5. Radiological Dose Assessment

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5.1 BACKGROUND

Earlier chapters refer to monitoring and sampling results in terms of concentrations of a substance. An exposure to concentrations of a radioactive substance over a period of time is referred to as “dose.” Because doses are calculated rather than measured, they represent potential or estimated, instead of actual, doses. This chapter presents the estimated dose results from Berkeley Lab’s penetrating radiation and airborne radionuclide monitoring programs. Doses to nearby individual members of the public are calculated, as well as population doses to people in the surrounding region extending 80 km (50 mi) from the site. Within this area, the daytime population is about 7,253,000.¹ The doses projected from each monitoring program are presented separately before they are cumulatively evaluated to summarize the overall impact of LBNL’s radiological activities on members of the public. Additionally, the radiological impact of Berkeley Lab’s operations on local animals and plants is discussed.

Radiation doses to the public and the environment from Berkeley Lab’s operations are very low, and health effects from very low doses are either too small to be observed or are nonexistent.² To ensure that radiological impacts to the environment and the public remain very low, Berkeley Lab manages its activities so that radioactive emissions and external exposures are as low as reasonably achievable (ALARA). LBNL’s Environmental ALARA Program ensures that a screening (qualitative) review is performed on activities that could result in a dose to the public or the environment.³ Potential doses from activities that may generate airborne radionuclides are estimated through the NESHAP⁴ process (discussed in Section 3.3.1.1 and Section 4.2.1). If the potential for a public dose is greater than 0.01 mSv (1 mrem) to an individual or 0.1 person-Sv (10 person-rem) to a population, an in-depth quantitative review is required. No quantitative reviews were required or performed in 2012.

5.2 DOSE FROM PENETRATING RADIATION

As discussed in Section 4.8, penetrating radiation from Berkeley Lab operations is measured by real-time monitors and passive dosimeters. Results of real-time penetrating radiation measurements indicate that the maximum dose from gamma and neutron radiation (which is from the 88-inch Cyclotron) to a person at the nearest residence (about 110 m [360 feet] away) was 1.3×10^{-3} mSv (1.3×10^{-1} mrem), and the population dose to people in the surrounding region that extends 80 km (50 mi) from the site was 1.4×10^{-3} person-Sv (1.4×10^{-1} person-rem).

Passive optically stimulated luminescence dosimeters measure gross gamma radiation dose (including background and air transport dose) and do not include neutron doses. As Figure 5-1 shows, in 2012 gross gamma radiation doses measured by passive dosimeters were less than the mean annual doses measured between 2001 and 2011 at all locations.

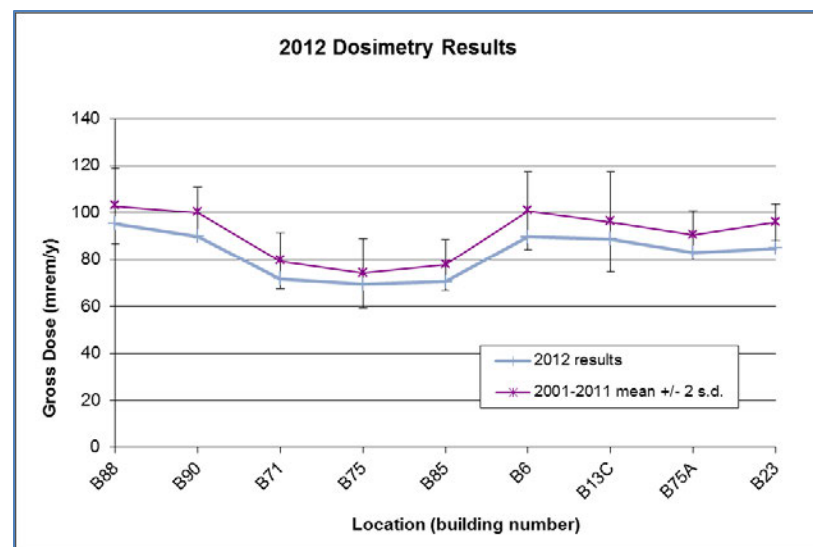


Figure 5-1 Gross Gamma Dosimetry Results

5.3 DOSE FROM DISPERSIBLE AIRBORNE RADIONUCLIDES

Dose due to dispersible contaminants represents the time-weighted exposure to a concentration of a substance, whether the contaminant is inhaled in air, ingested in drink or food, or absorbed through skin contact with soil or other environmental media. Very small quantities of dispersible radionuclides originate as emissions from building exhaust points generally located on rooftops, as discussed in Section 4.2.1. Once emitted, these small quantities of radionuclides may affect any of several environmental media: air, water, soil, plants, and animals. Each of these media represents a possible pathway of exposure affecting human dose.

Dose to an individual and the population is determined using computer dispersion models. The NESHAP regulation⁵ requires that any facility that releases airborne radionuclides assess the impact of such releases using a computer program approved by the U.S. EPA. Berkeley Lab satisfies this requirement with the use of the U.S. EPA-approved programs CAP88-PC and COMPLY.⁶ Details of dose calculations from dispersible airborne radionuclides are included in LBNL's annual NESHAP report.⁷

The maximally exposed individual to airborne emissions from the main LBNL site was determined to be a hypothetical person residing at the Lawrence Hall of Science as prescribed by the NESHAP regulation. (The maximum possible dose at this location is hypothetical because the exposure calculation assumes the person resides at the location the entire year.) For 2012, the calculated dose from airborne radionuclides was about 5.6×10^{-5} mSv (0.0056 mrem). This value is about 0.06% of the DOE and U.S. EPA annual limit for airborne radionuclides (0.10 mSv/yr [10 mrem/yr]).^{8,9}

As with penetrating radiation, the population dose from airborne radionuclides to the surrounding population is estimated for a region that extends from the site for 80 km (50 mi). The estimated population dose from all airborne emissions

from the LBNL main site for the year was 8.7×10^{-4} person-Sv (0.087 person-rem).

5.4 TOTAL DOSE TO THE PUBLIC

The total radiological impact to the public from penetrating radiation and airborne radionuclides is well below applicable standards and local background radiation levels. As presented in Figure 5-2, the maximum effective dose equivalent from penetrating radiation and airborne radionuclides from Berkeley Lab operations to an individual residing near LBNL in 2012 was about 1.4×10^{-3} mSv/yr (0.14 mrem/yr), primarily from gamma radiation from the LBNL accelerators. This value is approximately 0.05% of the average United States natural background radiation dose¹⁰ (3.1 mSv/yr [310 mrem/yr]) and about 0.1% of the DOE annual limit from all sources (1.0 mSv/yr [100 mrem/yr]).¹¹

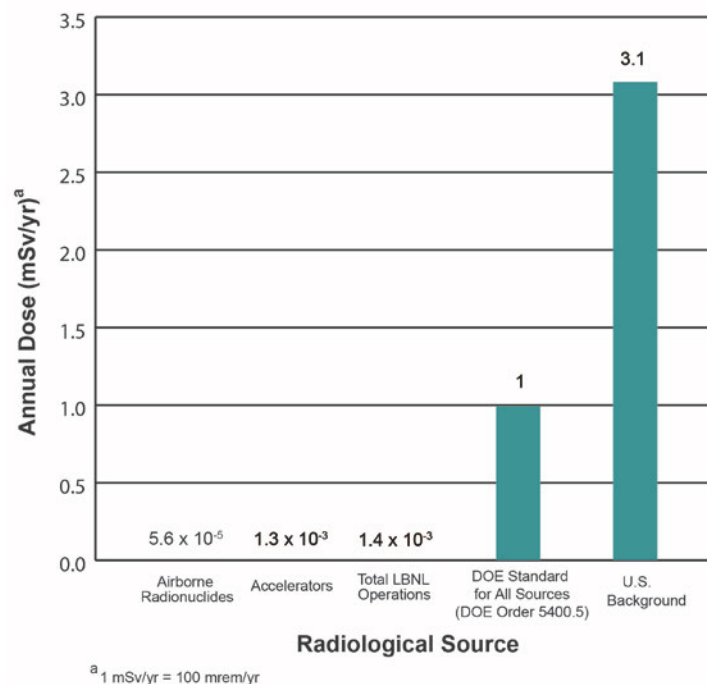


Figure 5-2 2012 Comparison of Radiological Dose Impacts

The total estimated dose to the population within 80 km (50 mi) of Berkeley Lab from penetrating radiation and airborne radionuclides emitted by LBNL operations was 2.3×10^{-3} person-Sv (0.23 person-rem) for the same period. From natural background airborne radionuclides alone, this same population receives an estimated dose of 12,000 person-Sv (1,200,000 person-rem) each year.¹² The dose to the population from Berkeley Lab is about 0.00002% of the background level, or about six million times less than background level.

5.5 DOSE TO ANIMALS AND PLANTS

Liquid discharges and airborne emissions may also affect animals and plants. DOE requires that aquatic animals and terrestrial plants be protected by limiting their radiation doses to 1 rad/day (0.01 gray per day [Gy/day]), and doses to riparian and terrestrial animals must be limited to less than 0.1 rad/day (0.001 Gy/day).^{13,14}

To determine dose to animals and plants, several sources of exposure were considered, including animal ingestion of vegetation, water, and soil; animal inhalation of dusty soil; plant uptake of water; and external exposure of animals and plants to radionuclides in water, soil, and sediment. Creek water, soil, and sediment samples were collected and analyzed for several radionuclides, including tritium and gamma-emitting radionuclides.

These radionuclides were measured at levels similar to natural background levels, or well below standards. Sample results are provided in Volume II and were evaluated using the DOE-endorsed computer model RESRAD-BIOTA. Both terrestrial and aquatic systems passed the “general screening process” (described in a DOE-approved technical standard),¹⁵ which demonstrates that doses calculated are less than biota dose limits. This confirms that Berkeley Lab is in compliance with DOE requirements to limit radiation doses to aquatic organisms and terrestrial plants to 1 rad/day (0.01 Gy/day) and to limit radiation doses to riparian and terrestrial animals to 0.1 rad/day (0.001 Gy/day).



Tom Donovan of LBNL's Environmental Services Group collects soil samples as part of the Environmental Monitoring Program.

6. Quality Assurance

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6.1 OVERVIEW

Berkeley Lab's Quality Assurance (QA) policy is documented in the *Operating and Quality Management Plan* (OQMP).¹ The OQMP consists of a set of operating principles used to support internal organizations in achieving consistent, safe, and high-quality performance in their work activities. OQMP principles are applied to individual programs through a graded approach, with consideration given to factors such as environmental, health, and safety consequences.

In addition to the OQMP, the monitoring and sampling activities and results presented in this report were conducted in accordance with Berkeley Lab's *Environmental Monitoring Plan*² and applicable DOE³ and U.S. EPA⁴ guidance. A Quality Assurance Project Plan is developed and implemented when special QA and QC requirements are necessary for environmental monitoring (such as for the NESHAP stack monitoring program).

The on-site and external analytical laboratories are all certified through California's Environmental Laboratory Accreditation Program (ELAP)⁵ by having demonstrated the capability to analyze samples for environmental monitoring using approved testing methods. Both types of laboratories must meet demanding QA and QC specifications and certifications⁶ that were established to define, monitor, and document laboratory performance. The QA and QC data provided by these laboratories are incorporated into Berkeley Lab's processes performed to assess data quality. In 2012, six external analytical laboratories were available for use.

Each set of data (batch) received from the analytical laboratory is systematically evaluated and compared to established data-quality objectives before the results can be authenticated and accepted into the environmental monitoring database. Categories of data quality objectives include accuracy, precision, representativeness, comparability, and completeness. When possible, quantitative criteria are used to define and assess data quality.

In addition to the ELAP certification, the DOE Consolidated Audit Program (DOECAP) annually audits external analytical laboratories supporting DOE facilities, including those working with Berkeley Lab. In general, DOECAP audits are two to three days in length, with five or more auditors participating in the audit. A member of DOE or a DOE contractor representative, trained as a Nuclear Quality Assurance lead auditor, heads the DOECAP audit team. Other team members come from across the DOE complex and add a wealth of experience. Typically, Berkeley Lab sends two representatives to participate in DOECAP audits of external analytical laboratories that provide services to LBNL. The team audits each of the following six areas that pertain to the services provided by the particular external analytical laboratory:

- QA management systems and general laboratory practices
- Organic analyses
- Inorganic and wet chemistry analyses
- Radiochemical analyses
- Laboratory information management systems and electronic deliverables
- Hazardous and radioactive materials management

The DOECAP laboratory audits also include a review of the external analytical laboratory's performance in proficiency testing required by the California ELAP. In 2012, none of the external laboratories had a major deficiency found during an audit. Any minor deficiencies identified in the audits were followed by corrective action plans and were tracked to closure.

In addition, external oversight of Berkeley Lab programs is performed through the DOE *Operational Awareness Program*.⁷ Operational awareness activities are ongoing and include field orientation, meetings, audits, workshops, document and information system reviews, and day-to-day communications. DOE criteria for performance evaluation include (1) federal, state, and local regulations with general applicability to DOE facilities and (2) applicable DOE requirements.

This program enables DOE to directly oversee Berkeley Lab programs and assess performance.

6.2 PROFILE OF ENVIRONMENTAL MONITORING SAMPLES AND RESULTS

Berkeley Lab's environmental monitoring program collected 1,850 individual samples to support air, sediment, soil, and water programs throughout the year; the samples generated 73,289 analytical results. The numbers are approximately 40% lower than the previous year due to the elimination of such programs as ambient air and rainwater, the use of fewer analytical laboratories, and the scaling back of other monitoring programs.

Samples collected by these programs were obtained from 354 different locations on or surrounding the Berkeley Lab site. Individual data results for all environmental monitoring programs are presented in Volume II. Detailed discussion of sampling conducted by the Environmental Restoration Program can be found at www.lbl.gov/ehs/erp/html/documents.shtml and at the main branch of the Berkeley Public Library.

6.3 SPLIT AND DUPLICATE RESULTS FROM ENVIRONMENTAL MONITORING

An essential activity undertaken to measure the quality of environmental monitoring results is the regular collection and analysis of split and duplicate samples collected in the field. In 2012, a total of 25 split and 100 duplicate samples from all programs were collected for either radiological or non-radiological (or both) analyses, leading to 140 and 2,887 analytical results, respectively. Additionally, 168 blank samples were submitted for QA purposes. Blank samples are useful because they can identify contamination obtained outside the sampling period.

Berkeley Lab uses the metrics of relative percent difference and relative error ratio to determine whether paired results (split-sample; duplicate-sample) are

within control limits. Relative percent difference is defined as the absolute value of the difference between two results divided by the mean of the two results. Relative error ratio is defined as the absolute value of the difference between two results divided by the sum of the analytical error of the two results. Relative percent difference is determined in all cases; relative error ratio is applicable only to radiological analyses where analytical error is determined.

When the primary sample and the split or duplicate sample results are below analytical detection limits, results from these tests are not meaningful. When QA pair results are outside of control limits, an investigation is performed to determine the cause of the discrepancy.

6.4 QUALITY CONTROL RESULTS FROM ANALYTICAL LABORATORIES

Analytical laboratories routinely perform QC tests to assess the quality and validity of their sample results. These tests are run with each batch of environmental samples submitted by Berkeley Lab. The same relative percent difference and relative error ratio metrics are used to evaluate these control sample results, with the relative error ratio test applicable only to radiological analyses.

Seven analytical laboratories (six external, one at LBNL) performed 1,718 radiological and non-radiological QC analyses to coincide with batches of samples submitted by Berkeley Lab. These QC analyses include various types of blank, replicate (also referred to as duplicate), matrix spike, and laboratory control samples. [Table 6-1](#) shows the breadth and diversity of this program.

Table 6-1 Summary of Quality Control Testing Performed by Analytical Laboratories in 2012

Program	Sample Batches	QC Analysis	Laboratories Involved	Radiological ^a	Non-radiological ^b
Stack air	36	121	3	X	
Stormwater and creeks	97	291	6	X	X
Wastewater	91	423	7	X	X
Groundwater	119	807	4	X	X
Sediment	14	45	5	X	X
Soil	11	31	5	X	X

^aAn "X" in this column indicates that the program tests for radiological substances.

^bAn "X" in this column indicates that the program tests for non-radiological substances.

In addition to the relative percent difference and relative error ratio tests, lower and upper control limits are established for each analyte and for each type of QC test. As with split and duplicate QA, when QC results are outside of established criteria, an investigation is performed to determine the cause of the discrepancy.

Acronyms and Abbreviations

AEDE	annual effective dose equivalent
AHD	Activity Hazard Document
AST	aboveground storage tank
ASWMP	Alternative Stormwater Monitoring Plan
BAAQMD	Bay Area Air Quality Management District
Basin Plan	Water Quality Control Plan for the San Francisco Bay Basin
Berkeley Lab	Lawrence Berkeley National Laboratory
BMP	Best Management Practice
Bq	becquerel
C	Celsius
CalEMA	California Emergency Management Agency
CAP	Corrective Action Program
CCCSD	Central Contra Costa Sanitary District
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDPH	California Department of Public Health
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CGP	Construction General Permit (for stormwater discharges associated with construction activity)
Gi	curie
cm	centimeter
CMI	Corrective Measures Implementation

COB	City of Berkeley	ft ³	cubic feet
COD	chemical oxygen demand	FTU	fixed treatment unit
CRT	Computational Research and Theory facility at Berkeley Lab	FY	fiscal year (October 1 – September 30)
CUPA	Certified Unified Program Agency	GAC	granular activated carbon
CWA	Clean Water Act	gal	gallon(s)
CY	calendar year (January 1–December 31)	GHG	greenhouse gas
DCA	dichloroethane	gsf	gross square feet
DCE	dichloroethylene	Gy	gray (measure of radiation in SI)
DOE	United States Department of Energy	HEMSF	High Energy Mission Specific Facilities
DOECAP	Department of Energy Consolidated Audit Program	HMBP	Hazardous Materials Business Plan
DPM	diesel particulate matter	hr	hour
DTSC	Department of Toxic Substances Control	HRC®	Hydrogen Release Compound
E85	85% ethanol fuel	HWHF	Hazardous Waste Handling Facility
EBMUD	East Bay Municipal Utility District	IGP	Industrial General Permit (for stormwater discharges associated with industrial activity)
EHSS	Environment / Health / Safety / Security Division at Berkeley Lab	in	inch
ELAP	Environmental Laboratory Accreditation Program	ISMS	Integrated Safety Management System
EMP	Environmental Management Program	ISO	International Organization for Standardization
EMS	Environmental Management System	JGI	Joint Genome Institute
EO	Executive Order	kg	kilogram
EPCRA	Emergency Planning and Community Right-to-Know Act	km	kilometer
ESG	Environmental Services Group	L	liter
ERP	Environmental Restoration Program	lb	pound
F	Fahrenheit	LBNL	Lawrence Berkeley National Laboratory
FLEXLAB	Facility for Low-Energy eXperiments in buildings LABORatory in the Environmental Energy Technologies Division at Berkeley Lab	LEED	Leadership in Energy and Environmental Design
		LOASIS	Laser Optics and Acceleration System Integrated Studies program in the Accelerator and Fusion Research Division at Berkeley Lab
ft	foot or feet	m	meter
		m ³	cubic meter

MDA	minimum detectable activity	Sv	sievert ($\text{mSv} = 1 \times 10^{-3} \text{ Sv}$)
μg	microgram	SWDA	Solid Waste Disposal Act
mg/kg	milligrams per kilogram	SWPPP	Storm Water Pollution Prevention Plan
mi	mile	SWRCB	State Water Resources Control Board
MNA	monitored natural attenuation	TCE	trichloroethylene
mrem	millirem	TPH	total petroleum hydrocarbons
MSGP	Multi-Sector General Permit	TRI	Toxic Release Inventory
mSv	millisievert	TSCA	Toxic Substances Control Act
NEPA	National Environmental Policy Act	TSS	total suspended solids
NESHAP	National Emission Standards for Hazardous Air Pollutants	UC	University of California
N'TLF	National Tritium Labeling Facility	UHVCF	Ultra-High Vacuum Cleaning Facility
OQMP	Operating and Quality Management Plan	U.S. EPA	United States Environmental Protection Agency
PCB	polychlorinated biphenyl	UST	underground storage tank
PCE	perchloroethylene (tetrachloroethylene)	VOC	volatile organic compound
pCi	picocurie (one trillionth of a curie)	WAA	Waste Accumulation Area
QA	quality assurance	yr	year
QC	quality control		
RCRA	Resource Conservation and Recovery Act		
rem	roentgen equivalent man ($\text{mrem} = 1 \times 10^{-3} \text{ rem}$)		
RWQCB	Regional Water Quality Control Board (for the San Francisco Bay Region)		
SAA	Satellite Accumulation Area		
SARA	Superfund Amendments and Reauthorization Act		
SERC	Solar Energy Research Center at Berkeley Lab		
SF_6	sulfur hexafluoride		
SI	Système Internationale or International System of Units (the metric system)		
SIC	Standard Industrial Classification		
SPCC	Spill Prevention, Control, and Countermeasure (Plan)		



In the summer and fall goats can be seen grazing on Berkeley Lab's hillsides. Their activity reduces fire hazards.
Photograph by Daniel Parks.

Glossary

accuracy

The degree of agreement between a measurement and the true value of the quantity measured.

Advanced Light Source

An accelerator that is a third-generation synchrotron light source, one of the world's brightest sources of ultraviolet and soft x-ray beams.

air particulates

Airborne particles that include dust, dirt, and other pollutants occurring as particles, as well as any pollutants associated with or carried on the dust or dirt.

alpha particle

A charged particle comprising two protons and two neutrons, which is emitted during decay of certain radioactive atoms. Alpha particles are stopped by several centimeters of air or a sheet of paper.

analyte

The subject of a sample analysis.

annual effective dose equivalent

The largest amount of ionizing radiation a person may receive in a given year. It combines both internal and external dose. The AEDE limit is prescribed for various organs as well as whole body and for various working conditions. The AEDE limit is 5000 mrem/yr or (50 mSv/yr).

background radiation

Ionizing radiation from sources other than LBNL. Background radiation may include cosmic radiation; external penetrating radiation from naturally occurring radioactivity in the earth (terrestrial radiation), air, and water; and

internal radiation from naturally occurring radioactive elements in the human body.

becquerel

The International System (SI) unit of radioactive decay equal to one disintegration per second.

beta particle

A charged particle identical to the electron that is emitted during decay of certain radioactive atoms. Most beta particles are stopped by less than 0.6 centimeter of aluminum.

contaminant

Any hazardous or radioactive material present in an environmental medium such as air, water, or vegetation. See also pollutant.

cosmic radiation

High-energy particulate and electromagnetic radiation that originates outside the earth's atmosphere. Cosmic radiation is part of natural background radiation.

curie

Unit of radioactive decay equal to 2.22×10^{12} disintegrations per minute (conventional units).

detection limit

The lowest concentration of an analyte that can reliably be distinguished from a zero concentration.¹

discharge

The release of a liquid or pollutant to the environment or to a system (usually of pipes) for disposal.

dose

The quantity of radiation energy absorbed by a human, animal, or vegetation. Dose to humans is also called effective dose equivalent (measured in the SI units of sieverts or conventional units of rem), which

takes into account the type of radiation and the parts of the body exposed. Dose to animals and vegetation is also called absorbed dose (measured in the SI units of grays or conventional units of rad), which is the energy deposited per unit of mass.

dose, population

The sum of the radiation doses to individuals of a population. It is expressed in units of person-sievert (SI unit) or person-rem (conventional unit). For example, if 1,000 people each received a radiation dose of one sievert, their population dose would be 1,000 person-sievert.

dosimeter

A portable detection device for measuring the total accumulated dose from ionizing radiation. See also optically stimulated luminescence dosimeter.

downgradient

In the direction of groundwater flow.

duplicate sample

A sample that is equivalent to a routine sample and is analyzed to evaluate sampling or analytical precision.

effective dose equivalent

Abbreviated EDE, it is the sum of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighting factor. This sum is a risk-equivalent value and can be used to estimate the health risk of the exposed individual. The tissue-specific weighting factor represents the fraction of the total health risk resulting from uniform whole-body irradiation that would be contributed by that particular tissue. The EDE includes the committed EDE from internal deposition of radionuclides and the EDE due to penetrating radiation from sources external to the body. EDE is expressed in units of sievert (SI unit) or rem (conventional unit). See dose.

effluent

A liquid waste discharged to the environment.

effluent monitoring

The collection and analysis of samples or measurements of liquid discharges for the purpose of characterizing and quantifying contaminants, assessing exposures of members of the public, and demonstrating compliance with applicable standards and permit requirements. Effluent is usually monitored at or near the point of discharge.

emission

A release of air to the environment that contains gaseous or particulate matter having one or more contaminants.

environmental monitoring

The collection and analysis of samples or direct measurements of environmental media for possible contaminants. Environmental monitoring consists of two major activities: effluent monitoring and environmental surveillance.

environmental surveillance

The collection and analysis of samples, or direct measurements, of air, water, soil, foodstuff, biota, and other media from LBNL facilities and their environs for possible contaminants with the purpose of determining compliance with applicable standards and permit requirements, assessing radiation exposures of members of the public, and assessing the effects, if any, on the local environment.

gamma radiation

Short-wavelength electromagnetic radiation of nuclear origin that has no mass or charge. Because of its short wavelength (high energy), gamma radiation can cause ionization. Other electromagnetic radiation, such as microwaves, visible light, and radio waves, has longer wavelengths (lower energy) and cannot cause ionization.

gray

The gray is the International System (SI) unit for absorbed dose. One gray is an absorbed radiation dose of one joule per kilogram.

greenhouse gas

Any of the atmospheric gases – such as carbon dioxide, water vapor, and methane – that contribute to the greenhouse effect. The greenhouse effect is the trapping and build-up of heat in the upper atmosphere by gases that absorb infrared radiation. These gases then reradiate some of this heat back towards the Earth's surface.

groundwater

Water below the land surface in a zone of saturation.

half-life, radioactive

The time required for the activity of a radioactive substance to decrease to half its value by inherent radioactive decay. After two half-lives, one-fourth of the original activity remains ($1/2 \times 1/2$); after three half-lives, one-eighth of the original activity remains ($1/2 \times 1/2 \times 1/2$); and so on.

hazardous waste

Waste exhibiting any of the following characteristics: ignitability, corrosivity, reactivity, or EP-toxicity (yielding toxic constituents in a leaching test). Because of its concentration, quantity, or physical or chemical characteristics, it may (1) cause or significantly contribute to an increase in mortality rates or cases of serious irreversible illness or (2) pose a substantial present or potential threat to human health or the environment when improperly treated, stored, transported, disposed of, or handled.

hydrauger

A subhorizontal drain used to extract groundwater for slope stability purposes.

low-level radioactive waste

Waste containing radioactivity that is not classified as high-level waste, transuranic (TRU) waste, spent nuclear fuel, by-product material (as defined in Section 11e(2) of the Atomic Energy Act of 1954, as amended), or naturally occurring radioactive material.

millirem

A common unit for reporting human radiation dose. One millirem is one thousandth (10^{-3}) of a rem. See rem.

mixed waste

Any radioactive waste that is also a U.S. EPA-regulated hazardous waste.

nuclide

A species of atom characterized by what constitutes the nucleus, which is specified by the number of protons, number of neutrons, and energy content; or, alternatively, by the atomic number, mass number, and atomic mass. To be regarded as a distinct nuclide, the atom must be able to exist for a measurable length of time.

optically stimulated luminescence dosimeter

A type of dosimeter. After being exposed to radiation, the material in the dosimeter luminesces on being stimulated by laser light. The amount of light that the material emits is proportional to the amount of radiation absorbed (dose). See also dosimeter.

organic compound

A chemical whose primary constituents are carbon and hydrogen.

person-rem

See dose, population.

person-sievert

See dose, population.

pH

A measure of hydrogen ion concentration in an aqueous solution. Acidic solutions have a pH less than 7; basic solutions have a pH greater than 7; and neutral solutions have a pH of 7.

plume

A volume of a substance that moves from its source to places farther away from the source. Plumes can be described by the volume of air or water they occupy and the direction they move. For example, a plume can be a column of smoke from a chimney or a substance moving with groundwater.²

pollutant

Any hazardous or radioactive material present in an environmental medium such as air, water, or vegetation. See also contaminant.

positron

A particle that is equal in mass to the electron but opposite in charge. A positively charged beta particle.³

precision

The degree of agreement between measurements of the same quantity.

priority pollutants

A set of organic and inorganic chemicals identified by U.S. EPA as indicators of environmental contamination.

rad

The conventional unit of absorbed dose from ionizing radiation, commonly used for dose to animals and vegetation. See also gray.

radiation protection standard

Limits on radiation exposure regarded as necessary for protection of public health. These standards are based on acceptable levels of risk to individuals.

radiation

Electromagnetic energy in the form of waves or particles.

radioactivity

The property or characteristic of a nucleus of an atom to spontaneously disintegrate, accompanied by the emission of energy in the form of radiation.

radiological

Arising from radiation or radioactive materials.

radionuclide

An unstable nuclide. See nuclide and radioactivity.

rem

Acronym for “roentgen equivalent man.” A unit of ionizing radiation, equal to the amount of radiation needed to produce the same biological effect to humans as one rad of high-voltage x-rays. It is the product of the absorbed dose, quality factor, distribution factor, and other necessary modifying factors. It describes the effectiveness of various types of radiation in producing biological effects.

remediation

The process of improving a contaminated area to an uncontaminated or safe condition.

sievert

The SI unit of effective dose equivalent in humans. It is the product of the absorbed dose, quality factor, distribution factor, and other necessary modifying factors. It describes the effectiveness of various types of radiation in producing biological effects. One sievert equals 100 rem.

source

Any operation or equipment that produces, discharges, and/or emits pollutants (e.g., pipe, ditch, well, or stack), or the location where a pollutant was released to the environment.

split sample

A single well-mixed sample that is divided into parts for analysis and comparison of results.

terrestrial

Pertaining to or deriving from the earth.

terrestrial radiation

Radiation emitted by naturally occurring radionuclides, such as potassium-40; the natural decay chains of uranium-235, uranium-238, thorium-232, or cosmic ray-induced radionuclides in the soil.

tritium

A radionuclide of hydrogen with a half-life of 12.3 years, which decays by emitting a low-energy beta particle.

universal waste

Hazardous wastes that are more common and pose a lower risk to people and the environment than other hazardous wastes. Some examples of universal waste are mercury thermostats, batteries, fluorescent lamps, cathode ray tubes, and consumer electronic devices.⁴

wind rose

Meteorological diagram that depicts the distribution of wind direction over a period of time.

Table G-1 Prefixes used with SI (Metric) Units

Prefix	Factor	Symbol
exa	1,000,000,000,000,000,000 = 10^{18}	E
peta	1,000,000,000,000,000 = 10^{15}	P
tera	1,000,000,000,000 = 10^{12}	T
giga	1,000,000,000 = 10^9	G
mega	1,000,000 = 10^6	M
kilo	1,000 = 10^3	k
hecto	100 = 10^2	h
deka	10 = 10^1	da ^a
deci	0.1 = 10^{-1}	d ^a
centi	.01 = 10^{-2}	c
milli	0.001 = 10^{-3}	m
micro	0.000001 = 10^{-6}	μ
nano	0.000000001 = 10^{-9}	n
pico	0.000000000001 = 10^{-12}	p
femto	0.000000000000001 = 10^{-15}	f
atto	0.000000000000000001 = 10^{-18}	a

^a Avoid where practical.

Table G-2 Conversion Factors for Selected SI (Metric) Units

To Convert SI Unit	To U.S. Conventional Unit	Multiply By
Area		
square centimeters	square inches	0.155
square meters	square feet	10.764
square kilometers	square miles	0.3861
hectares	acres	2.471
Concentration		
milligrams per kilogram	parts per million	1
milligrams per liter	parts per million	1
Length		
centimeters	inches	0.3937
meters	feet	3.281
kilometers	miles	0.6214
Mass		
grams	ounces	0.03527
kilograms	pounds	2.2046
kilograms	ton	0.00110
Pressure		
pascal	pounds per square foot	0.000145
Radiation		
becquerel	curie	2.7×10^{-11}
becquerel	picocurie	27.0
gray	rad	100
sievert	rem	100
coulomb per kilogram	roentgen	3,876
Temperature		
degrees Celsius	degrees Fahrenheit	1.8, then add 32
Velocity		
meters per second	miles per hour	2.237
Volume		
cubic meters	cubic feet	35.315
liters	gallons	0.2642



References

Preface

1. DOE, Order 231.1B, *Environment, Safety, and Health Reporting* (2011, as amended).

Executive Summary

1. See Preface, Note 1.
2. DOE, *Contract between the United States of America and the Regents of the University of California*, DE-AC02-05CH11231 (2005).
3. ISO 14001:2004(E), *Environmental Management Systems—Requirements with Guidance for Use* (November 2004).
www.iso.org/iso/catalogue_detail?csnumber=31807.
4. National Council on Radiation Protection and Measurements, *Ionizing Radiation Exposure of the Population of the United States*, NCRP Report No. 160 (2009).
5. DOE, Order 458.1, *Radiation Protection of the Public and the Environment* (2011).
6. U.S. EPA, *National Emission Standards for Emissions of Radionuclides Other Than Radon from Department of Energy Facilities*, Title 40 CFR Part 61, Subpart H (1989, as amended).

7. Mauro, J., and N.M. Briggs, *Assessment of Variations in Radiation Exposure in the United States*, U.S. Environmental Protection Agency (2005).

Chapter 1: Introduction

1. Association of Bay Area Governments-Metropolitan Transportation Commission's Web site, *Bay Area Census*, 2010 census data. www.bayareacensus.ca.gov/cities/cities.htm.
2. EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*, Federal Register, Vol. 72, No. 17, Friday, January 26, 2007, page 3919.
3. EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, Federal Register, Vol. 74, No. 194, Thursday, October 8, 2009, page 52117.
4. *Safe Drinking Water Act*, 42 United States Code (USC) §300f *et seq.* (1974, as amended).
5. DOE, Order 436.1, *Departmental Sustainability* (May 2, 2011).
6. LBNL, *Berkeley Lab Long Range Development Plan Final Environmental Impact Report* (July 6, 2007). www.lbl.gov/Community/pdf/env-rev-docs/LRDP-final/LBNL-2006-LRDP-Final-EIR.pdf.
2. See Chapter 1, Note 4.
3. See Chapter 1, Note 3.
4. DOE, Order 430.2B, *Departmental Energy, Renewable Energy, and Transportation Management* (February 27, 2008).
5. DOE, Order 450.1A, *Environmental Protection Program* (June 4, 2008).
6. See Chapter 1, Note 5.
7. LBNL, *Environmental Management System Plan*, LBNL-PUB-3180 (May 2012).
<https://commons.lbl.gov/display/SBL/Environmental+Management+System>.
8. DOE, *2012 Strategic Sustainability Performance Plan* (June 29, 2012).
9. LBNL, *FY2013 LBNL Site Sustainability Plan* (December 20, 2012).
10. LBNL DOE Site Office, *FY2012 Performance Evaluation Report, Lawrence Berkeley National Laboratory* (December 2012).

Chapter 2: Environmental Management System

1. ISO 14001:2004(E), *Environmental Management Systems—Requirements with Guidance for Use*, (November 2004).
www.iso.org/iso/catalogue_detail?csnumber=31807.

Chapter 3: Environmental Program Summary

1. *Clean Air Act*, 42 USC §7401 *et seq.* (1967, as amended).
2. *Air Resources*, California Health and Safety Code §39000 *et seq.* (1967, as amended).
3. See Executive Summary, Note 6.
4. See Executive Summary, Note 5.

5. LBNL, *Radionuclide Air Emission Report for 2012*, ESG (May 2013). www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
6. BAAQMD, *Permit to Operate for Lawrence Berkeley National Laboratory* (Plant No. 723 and GDF No. 6134) and *BAAQMD Permit to Operate for Joint Genome Institute in Walnut Creek*, (Plant No. 14549). www.lbl.gov/ehs/esg/Permit%20for%20Table/operatingpermitstable.shtml.
7. *Air Toxics "Hot Spots" Information and Assessment Act of 1987*, California Health and Safety Code §44300 *et seq.* (1987, as amended).
8. *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC §9601 *et seq.* (1980, as amended).
9. *Emergency Planning and Community Right-to-Know Act of 1986*, 42 USC §11001 *et seq.* (1986, as amended).
10. *Hazardous Materials Release Response Plans and Inventory Law*, California Health and Safety Code §25500 *et seq.* (1985, as amended).
11. LBNL, *Hazardous Materials Business Plans*, EHSS Division (March 2013). www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
12. *Federal Insecticide, Fungicide, and Rodenticide Act*, 7 USC §136 *et seq.* (1972, as amended).
13. *Toxic Substances Control Act*, 15 USC §2601 *et seq.* (1976, as amended).
14. *Resource Conservation and Recovery Act of 1976*, 42 USC §6901 *et seq.* (1976, as amended).
15. *Hazardous Waste Control Law*, California Health and Safety Code §25100 *et seq.* (1972, as amended).
16. California Environmental Protection Agency, *Hazardous Waste Facility Permit*, EPA ID No. CA 4890008986, DTSC (December 22, 2006).
17. City of Berkeley, Certified Unified Program Agency Consolidated Permit and Registration, No. 800488 (March 2011). www.lbl.gov/ehs/esg/Permit%20for%20Table/operatingpermitstable.shtml.
18. *Medical Waste Management Act*, California Health and Safety Code §117600–118360 (1991, as amended).
19. DOE, *Mixed Waste Site Treatment Plan for the Lawrence Berkeley National Laboratory* (October 1995).
20. LBNL, *Hazardous Waste Annual Facility Report for 2012*, Waste Management Group (February 2012).
21. See Note 20 above.
22. LBNL, *Corrective Measures Study Report*, Environmental Restoration Program (February 2005).
23. DTSC, *Notice of Final Decision for Corrective Measures Study Report and Remedy Selection for Lawrence Berkeley National Laboratory* (August 31, 2005).

- http://www.lbl.gov/ehs/erp/assets/pdfs/CMI%20Approval_Aug05.pdf.
24. LBNL, *Report of Environmental Investigations in the Former Building 51 Vacuum Pump Room and Former Building 51A Areas*, ERP (August 2012). <http://www.lbl.gov/ehs/erp/html/documents.shtml>.
 25. LBNL, *Soil Management Plan*, ERP (September 2006). <http://www.lbl.gov/ehs/erp/html/documents.shtml>.
 26. LBNL, *Groundwater Monitoring and Management Plan*, Environmental Restoration Program (September 2006). <http://www.lbl.gov/ehs/erp/html/documents.shtml>.
 27. *Underground Storage of Hazardous Substances*, California Health and Safety Code §25280 *et seq.* (1983, as amended).
 28. *Resource Conservation and Recovery Act of 1976*, Subchapter IX, Regulation of Underground Storage Tanks, 42 USC §6991 (1988, as amended).
 29. See Note 18 above.
 30. *Hazardous Waste Source Reduction and Management Review Act of 1989*, California Health and Safety Code §25244.12 *et seq.* (1989).
 31. LBNL, *Source Reduction Evaluation Review Plan and Plan Summary*, U.S. Department of Energy, Livermore Site Office (2011).
 32. *Clean Water Act*, 33 USC §1251 *et seq.* (1977, as amended).
 33. *California Porter-Cologne Water Quality Control Act*, California Water Code §13000 *et seq.* (1969, as amended).
 34. EBMUD, *Wastewater Discharge Permits* www.lbl.gov/ehs/esg/Permit%20for%20Table/operatingpermitstable.shtml.
 35. CCCSD, *Class III Industrial User Permit for Joint Genome Institute* (January 2006, reissued January 2012). www.lbl.gov/ehs/esg/Permit%20for%20Table/operatingpermitstable.shtml.
 36. California State Water Resources Control Board, *General Permit for Storm Water Discharges Associated With Industrial Activity (No. 2011002421)*, Water Quality Order 97-03-DWQ, NPDES General Permit No. CAS 000001 (1997). www.swrcb.ca.gov/water_issues/programs/stormwater/docs/induspmnt.pdf.
 37. LBNL, *Storm Water Pollution Prevention Plan*, ESG, (February 2013). www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
 38. LBNL, *Alternative Storm Water Monitoring Program*, ESG, (September 2009). www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
 39. LBNL, *Stormwater Annual Report 2012-2013*, ESG, (June 2013). www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
 40. California State Water Resources Control Board, *General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities*, Order No. 2009-0009-DWQ, NPDES No. CAS000002 (September 2, 2009). www.swrcb.ca.gov/water_issues/programs/stormwater/constpermits.shtml.

41. See Note 32 above.
42. *Aboveground Petroleum Storage Act*, California Health and Safety Code, §25270 et seq. (1989, as amended).
43. LBNL, *Spill Prevention, Control, and Countermeasure Plan*, ESG (December 2012).
www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
44. JGI, Production Sequencing Facility, *Spill Prevention, Control, and Countermeasure Plan*, LBNL ESG, (January 2009).
www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
45. *National Environmental Policy Act of 1969*, 42 USC §4321 et seq. (1970, as amended).
46. *California Environmental Quality Act of 1970*, Public Resources Code §21000 et seq. (1970, as amended).
47. *Federal Endangered Species Act of 1973*, 16 USC §1531 et seq. (1973, as amended).
48. *California Endangered Species Act*, Fish and Game Code §2050 et seq. (1985, as amended).
49. *National Historic Preservation Act of 1966*, 16 USC §470 et seq. (1966, as amended).
50. *Migratory Bird Treaty Act*, 16 USC §703 (Supp. I 1989) (1918, as amended).

51. EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, Federal Register, Vol. 66, No. 11, Wednesday, January 17, 2001, page 3853.

Chapter 4: Environmental Monitoring

1. LBNL, *Environmental Monitoring Plan*, ESG, (Updated June 2013).
www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
2. See Executive Summary, Note 6.
3. See Executive Summary, Note 5.
4. See Chapter 3, Note 6.
5. See Executive Summary, Note 5.
6. See Chapter 3, Note 36.
7. U.S. EPA, *National Primary Drinking Water Standards*, 40 CFR 141, Subpart B (1976, as amended).
8. California DPH, *Domestic Water Quality and Monitoring Regulations*, 22 CCR §64443 (1984, as amended).
9. See Note 7 above.
10. See Note 8 above.
11. California RWQCB, *San Francisco Bay Basin Plan*, Chapter 3 (January 2007).
www.waterboards.ca.gov/sanfranciscobay/basin_planning.shtml.
12. Ibid.

13. See Chapter 3, Note 38.
14. See Executive Summary, Note 5.
15. DOE, *Environmental Regulatory Guide for Radiological Effluent Monitoring and Environmental Surveillance*, DOE/EH-0173T (January 1991).
16. California DPH, *Standards for Protecting Against Radiation*, 17 CCR §30253 (1994, as amended).
17. See Chapter 3, Note 34.
18. U.S. Nuclear Regulatory Commission, *Standards for Protection Against Radiation*, 10 CFR 20, Subpart K (1994, as amended).
19. Ibid.
20. See Note 17 above.
21. See Chapter 3, Note 34.
22. LBNL, *Analysis of Background Distributions of Inorganic Elements in the Groundwater at Lawrence Berkeley National Laboratory*, ERP (July 2002).
23. See Note 7 above.
24. See Note 8 above.
25. LBNL, *Soil Management Plan*, ERP (September 2006).
<http://www.lbl.gov/ehs/erp/html/documents.shtml>.
26. LBNL, *Interim Corrective Measures Workplan to Control the Migration of Contaminated Groundwater at the Bevatron Demolition Site*, ERP (August 2012). <http://www.lbl.gov/ehs/erp/html/documents.shtml>.

27. See Chapter 3, Note 34.

28. LBNL, *Analysis of Background Distributions of Metals in the Soil at Lawrence Berkeley National Laboratory*, ERP (Revised April 2009).
<http://www.lbl.gov/ehs/erp/html/documents.shtml>.

Chapter 5: Radiological Dose Assessment

1. Bright, E.A., P.R. Coleman, A.N. Rose, and M.L. Urban, LandScan 2010, <http://www.ornl.gov/sci/landscan/> (accessed March 25, 2013).
2. Health Physics Society, Position Statement of the Health Physics Society, *Radiation Risk in Perspective*, (2010).
http://hps.org/documents/risk_ps010-2.pdf.
3. LBNL, *Environmental ALARA Program Plan*, Revision 6 (March 2013).
4. See Executive Summary, Note 6.
5. Ibid.
6. U.S. EPA, *National Emissions Standards for Hazardous Air Pollutants (Radionuclides), Availability of Updated Compliance Model*, Federal Register, Vol. 71, No. 34, p. 8854 (February 21, 2006).
7. LBNL, *Radionuclide Air Emission Annual Reports*, ESG,
www.lbl.gov/ehs/esg/Reports/tableforreports.shtml.
8. See Executive Summary, Note 5.
9. See Executive Summary, Note 6.

10. See Executive Summary, Note 4.
11. See Executive Summary, Note 5.
12. See Executive Summary, Note 7.
13. See Executive Summary, Note 5.
14. DOE, *A Graded Approach for Evaluating Radiation Dose to Aquatic and Terrestrial Biota*, DOE-STD-1153-2002 (July 2002).
15. Ibid.

Chapter 6: Quality Assurance

1. LBNL, *Operating and Quality Management Plan*, LBNL-PUB-3111, Revision 10 (October 2008).
www.lbl.gov/DIR/OIA/assets/docs/OCA/IA/OQMP%20Rev10-7.pdf.
2. See Chapter 4, Note 1.
3. See Chapter 4, Note 16.
4. See Executive Summary, Note 5.
5. California DPH, *Certification and Amendment Process*, 22 CCR §64803 (1994, as amended).
6. Lawrence Livermore National Laboratory/LBNL, *Quality Assurance and Quality Control Plan for Analytical Services* (February 2004).
7. DOE, *ES&H Operational Awareness Guide*, Berkeley Site Office (January 1998).

Glossary

1. Agency for Toxic Substances and Disease Registry, *ATSDR Glossary of Terms*, (June 21, 2004). www.atsdr.cdc.gov/glossary.html.
2. Ibid.
3. Shlein, Bernard, Lester A. Slaback, Jr., and Brian Kent Birdy, editors, *Handbook of Health Physics and Radiological Health* (Lippincott Williams and Wilkins, 1998).
4. DTSC, *Managing Universal Waste in California*, Fact Sheet, (June 2003).

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Volume II

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Monitoring Data

Volume II of the *Site Environmental Report for 2012* is provided by Lawrence Berkeley National Laboratory as a supplement to Volume I, which contains the body of the report. Volume II contains the environmental monitoring and sampling data used to generate summary results of routine and nonroutine sampling at the Laboratory (except for groundwater sampling data, which may be found in the reports referred to in Chapter 4 of Volume I).

The results from sample collections are more comprehensive in Volume II than in Volume I: for completeness, all results from sample collections that began or ended in calendar year (CY) 2012 are included in this volume. However, the samples representing CY 2012 data have not been used in the summary results that are reported in Volume I. (For example, although stack air samples collected on January 8, 2013, are presented in Volume II, they represent December 2012 data and are not included in Volume I.)

When appropriate, sampling results are reported in both conventional and International System (SI) units. For some results, the rounding procedure used in data reporting may result in apparent differences between the numbers reported in SI and conventional units. (For example, stack air tritium results reported as $< 1.5 \text{ Bq/m}^3$ are shown variously as < 39 and $< 41 \text{ pCi/m}^3$. Both of these results are rounded correctly to two significant digits.)

The list below links the Volume II data sections with corresponding summary results presented in Volume I:

Collection	Volume II section	Volume I Section
Stack Air	SA	4.2.1
Creeks	CR	4.3.1.1
Stormwater	SW	4.3.1.2
Sewer	SE	4.4.1.1–4.4.1.3, 4.4.1.5
Fixed Treatment Units	FT	4.4.1.4
Groundwater Treatment	GT	4.5.2
Soil	SO	4.6.1
Sediment	SD	4.6.2

The results listed in Volume II identify sampling locations with a station identifier code. The following table cross-references these codes with more meaningful descriptions.

Location code	Description of sampling location	Volume II section
55-128	Building 55, Room 128	Stack Air
55-128 Backup	Second inline sample at same location (results from 55-128 and 55-128 Backup added to represent total emissions from stack location)	Stack Air
55-128-COL	Duplicate sampler collocated with 55-128 stack air sampler	Stack Air
55-128-COL Backup	Second inline filter at 55-128-COL sampler (results from 55-128-COL and 55-128-COL Backup added to represent total emissions from collocated stack location)	Stack Air
70-147A	Building 70, Room 147A glovebox manifold	Stack Air
70A-1121A	Building 70A, northeast corner of roof	Stack Air
70A-1121B	Building 70A, northeast corner of roof	Stack Air
70A-1129H	Building 70A, Room 1129 hood	Stack Air
70A-1129P	Building 70A, Room 1129 pressurized glovebox manifold	Stack Air
70A-2211H	Building 70A-2211 fumehoods	Stack Air
70A-2217H	Building 70A-2217 gloveboxes and fumehoods	Stack Air
70A-2223	Building 70A, northeast corner of roof	Stack Air
70A-2229A	Building 70A-2229A fumehood	Stack Air
70A-2229B	Building 70A-2229B fumehood	Stack Air
75-127-H	Building 75, Room 127 hood	Stack Air
77 FTU	Building 77 fixed treatment unit	Fixed Treatment Units
85 Glovebox	Building 85 penthouse glovebox	Stack Air
85 Glovebox-COL	Duplicate sampler collocated with 85 Glovebox stack air sampler	Stack Air
85 Hood	Building 85 penthouse hood	Stack Air
85 Hood-COL	Duplicate sampler collocated with 85-Hood stack air sampler	Stack Air
B25A Treatment System	Groundwater treatment system regulated by EBMUD, located north of Building 5	Groundwater Treatment
B46 Treatment System	Groundwater treatment system regulated by EBMUD, located east of Building 46	Groundwater Treatment
B51 Fire Trail Treatment System	Groundwater treatment system regulated by EBMUD, located east of former Building 51 along fire trail	Groundwater Treatment

Location code	Description of sampling location	Volume II section
B51 Motor Room Basement Treatment System	Groundwater treatment system regulated by EBMUD, located south of Building 64	Groundwater Treatment
B51L Treatment System	Groundwater treatment system regulated by EBMUD, located west of former Building 51	Groundwater Treatment
B6 Treatment System	Groundwater treatment system regulated by EBMUD, located east of Building 6	Groundwater Treatment
B7 Coll Trench Treatment System	location PSP #5 in EBMUD report	Groundwater Treatment
B88 Cave 0	Building 88, Cave zero	Stack Air
B88-135H	Building 88, Room 135 hood	Stack Air
Building 69	North side of Building 69	Soil
Building 80	West side of Building 80	Soil
Building 85	Northeast of Building 85	Soil
Cafeteria Creek	Cafeteria Creek	Creeks
Chicken Creek	Chicken Creek	Creeks; Sediment
Chicken Creek—Downstream	Chicken Creek downstream of routine monitoring site	Creeks
Chicken Creek—Upstream	Chicken Creek upstream of routine monitoring site	Creeks
ENV-B13C	Background sampling shelter off Panoramic Way	Soil
Hearst Sewer	Hearst sewer station	Sewer
MP1	Sampling site at Blackberry Parking Lot	Stormwater
MP2	Sampling site at B76 Motorpool	Stormwater
MP3	Sampling site at B77 Metal Rack	Stormwater
MP4	Sampling site at B85 Lower Yard	Stormwater
MP5	Sampling site at B85 Upper Yard	Stormwater
MP6	Sampling site at B64 Bus Parking	Stormwater
N. Fork Strawberry Creek	North Fork of Strawberry Creek outlet near western boundary of site	Creeks; Sediment
N. Fork Strawberry Creek—Downstream	North Fork of Strawberry Creek downstream of routine monitoring site	Creeks
No Name Creek	No Name Creek	Creeks
Ravine Creek	Ravine Creek	Creeks
Strawberry Sewer	Strawberry sewer station	Sewer
Upper Botanical Garden Creek	At culvert south of UC Botanical Gardens where Botanical Garden Creek daylights	Creeks
Wildcat Creek	Offsite at the end of Brook Road inside Tilden Regional Park	Creeks; Sediment

Location code	Description of sampling location	Volume II section
Winter Creek	Offsite in the UC Botanical Garden's Redwood Grove Amphitheatre	Creeks
Winter Creek Influent	Creek sampling at northeast end of the LBNL boundary line next to B85 water tower	Creeks

Definitions of quality control (QC) types:

- **Equipment Blank/Field Blank:** blank sample of analyte-free water poured over or through decontaminated field sampling equipment.
- **Lot Blank:** blank filter from same lot as submitted samples.
- **Travel Blank:** blank sample prepared before field collections and carried by the sample technician during collection activities.
- **Trip Blank:** blank sample of analyte-free media collected in the same type of container that is required for the analytical test, taken from the laboratory to the sampling site and returned to the laboratory unopened for analysis.

The following units are used in Volume II:

Unit	Description	Pertains to:
%	Percent	Moisture content of sample
µg/L	Micrograms per liter	Concentration of analyte (nonradioactive) in liquid
µmhos/cm	Micromhos per centimeter	Specific conductance in liquid
Bq/g	Becquerels per gram	Activity of analyte (radioactive) in solid
Bq/L	Becquerels per liter	Activity of analyte (radioactive) in liquid
Bq/m ³	Becquerels per cubic meter	Activity of analyte (radioactive) in air
Bq/S	Becquerels per sample	Activity of analyte (radioactive) in blank samples
mg/L	Milligrams per liter	Concentration of analyte (nonradioactive) in liquid
mg/kg	Milligrams per kilogram	Concentration of analyte (nonradioactive) in solid
NTU	Nephelometric Turbidity Units	Turbidity Measurement
pCi/g	Picocuries per gram	Activity of analyte (radioactive) in solid
pCi/L	Picocuries per liter	Activity of analyte (radioactive) in liquid
pCi/m ³	Picocuries per cubic meter	Activity of analyte (radioactive) in air
pCi/S	Picocuries per sample	Activity of analyte (radioactive) in blank samples
S.U.	Standard units	pH measurement

Results Below the Detection Limit

Nonradiological results that cannot be quantified (because they are below the detection limit of the analysis) are reported as less than the reporting limit (for example, “< 10 µg/L”). Radiological results that cannot be quantified are generally reported as less than the minimum detectable activity (MDA) (for example, “< 0.15 Bq/L”). When the MDA is not available, the reporting limit is used. Reporting limits are typically constant between sample results for a particular analyte, but MDAs can vary between sample results for any one analyte.

Carbon-14		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
85 Glovebox	2/7/2012	< 1.4	Bq/m ³	< 38	pCi/m ³	Sample
	5/1/2012	< 2.3	Bq/m ³	< 62	pCi/m ³	Sample
	8/9/2012	< 2	Bq/m ³	< 53	pCi/m ³	Sample
	11/6/2012	< 2	Bq/m ³	< 53	pCi/m ³	Sample
85 Hood	2/7/2012	< 1.4	Bq/m ³	< 38	pCi/m ³	Sample
	5/1/2012	< 2.1	Bq/m ³	< 56	pCi/m ³	Sample
	8/9/2012	2.1	Bq/m ³	57	pCi/m ³	Sample
	11/6/2012	< 2	Bq/m ³	< 53	pCi/m ³	Sample
85 Hood-COL	2/7/2012	< 1	Bq/m ³	< 27	pCi/m ³	Dup
	5/1/2012	< 0.96	Bq/m ³	< 26	pCi/m ³	Dup
Travel Blank	2/7/2012	< 1.3	Bq/S	< 35	pCi/S	Blank
	2/7/2012	< 1.7	Bq/S	< 45	pCi/S	Blank
	5/1/2012	< 2.8	Bq/S	< 75	pCi/S	Blank
	5/1/2012	< 1.1	Bq/S	< 29	pCi/S	Blank
	8/9/2012	< 2.7	Bq/S	< 73	pCi/S	Blank
	11/6/2012	< 2.6	Bq/S	< 71	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Alpha		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
55-128	2/7/2012	0.000083	Bq/m ³	0.0022	pCi/m ³	Sample
	5/1/2012	< 0.000081	Bq/m ³	< 0.0022	pCi/m ³	Sample
	8/9/2012	< 0.000073	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000079	Bq/m ³	< 0.0021	pCi/m ³	Sample
55-128-COL	2/7/2012	0.000032	Bq/m ³	0.00085	pCi/m ³	Dup
	5/1/2012	0.00008	Bq/m ³	0.0022	pCi/m ³	Dup
	8/9/2012	0.000042	Bq/m ³	0.0011	pCi/m ³	Dup
	11/6/2012	0.000087	Bq/m ³	0.0024	pCi/m ³	Dup
70-147A	2/7/2012	0.00007	Bq/m ³	0.0019	pCi/m ³	Sample
	3/6/2012	< 0.000091	Bq/m ³	< 0.0025	pCi/m ³	Sample
	4/2/2012	< 0.000084	Bq/m ³	< 0.0023	pCi/m ³	Sample
	5/1/2012	< 0.000079	Bq/m ³	< 0.0021	pCi/m ³	Sample
	6/5/2012	< 0.000064	Bq/m ³	< 0.0017	pCi/m ³	Sample
	7/3/2012	< 0.000096	Bq/m ³	< 0.0026	pCi/m ³	Sample
	8/9/2012	< 0.000068	Bq/m ³	< 0.0018	pCi/m ³	Sample
	9/5/2012	< 0.0001	Bq/m ³	< 0.0027	pCi/m ³	Sample
	10/2/2012	< 0.00011	Bq/m ³	< 0.0031	pCi/m ³	Sample
	11/6/2012	< 0.000078	Bq/m ³	< 0.0021	pCi/m ³	Sample
	12/4/2012	< 0.0001	Bq/m ³	< 0.0027	pCi/m ³	Sample
	1/8/2013	< 0.000066	Bq/m ³	< 0.0018	pCi/m ³	Sample
	70A-1121A	2/7/2012	< 0.000058	Bq/m ³	< 0.0016	pCi/m ³
5/1/2012		< 0.00008	Bq/m ³	< 0.0022	pCi/m ³	Sample
8/9/2012		< 0.000072	Bq/m ³	< 0.002	pCi/m ³	Sample
11/6/2012		< 0.000079	Bq/m ³	< 0.0021	pCi/m ³	Sample
70A-1121B	2/7/2012	0.00006	Bq/m ³	0.0016	pCi/m ³	Sample
	5/1/2012	< 0.000081	Bq/m ³	< 0.0022	pCi/m ³	Sample
	8/9/2012	< 0.000073	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000077	Bq/m ³	< 0.0021	pCi/m ³	Sample
70A-1129H	2/7/2012	< 0.000056	Bq/m ³	< 0.0015	pCi/m ³	Sample
	3/6/2012	< 0.000094	Bq/m ³	< 0.0025	pCi/m ³	Sample
	4/2/2012	< 0.000083	Bq/m ³	< 0.0023	pCi/m ³	Sample
	5/1/2012	< 0.000077	Bq/m ³	< 0.0021	pCi/m ³	Sample
	6/5/2012	< 0.000065	Bq/m ³	< 0.0017	pCi/m ³	Sample
	7/3/2012	< 0.000094	Bq/m ³	< 0.0025	pCi/m ³	Sample
	8/9/2012	< 0.000066	Bq/m ³	< 0.0018	pCi/m ³	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Alpha		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
70A-1129H (cont.)	9/5/2012	< 0.000098	Bq/m ³	< 0.0026	pCi/m ³	Sample
	10/2/2012	< 0.00012	Bq/m ³	< 0.0032	pCi/m ³	Sample
	11/6/2012	< 0.000076	Bq/m ³	< 0.0021	pCi/m ³	Sample
	12/4/2012	< 0.000097	Bq/m ³	< 0.0026	pCi/m ³	Sample
	1/8/2013	< 0.000065	Bq/m ³	< 0.0018	pCi/m ³	Sample
70A-1129P	2/7/2012	< 0.000054	Bq/m ³	< 0.0014	pCi/m ³	Sample
	3/6/2012	< 0.000092	Bq/m ³	< 0.0025	pCi/m ³	Sample
	4/2/2012	< 0.000083	Bq/m ³	< 0.0022	pCi/m ³	Sample
	5/1/2012	< 0.000074	Bq/m ³	< 0.002	pCi/m ³	Sample
	6/5/2012	< 0.000061	Bq/m ³	< 0.0016	pCi/m ³	Sample
	7/3/2012	< 0.000092	Bq/m ³	< 0.0025	pCi/m ³	Sample
	8/9/2012	< 0.000065	Bq/m ³	< 0.0018	pCi/m ³	Sample
	9/5/2012	< 0.000097	Bq/m ³	< 0.0026	pCi/m ³	Sample
	10/2/2012	< 0.00011	Bq/m ³	< 0.0031	pCi/m ³	Sample
	11/6/2012	< 0.000078	Bq/m ³	< 0.0021	pCi/m ³	Sample
	12/4/2012	< 0.000098	Bq/m ³	< 0.0027	pCi/m ³	Sample
	1/8/2013	< 0.000069	Bq/m ³	< 0.0019	pCi/m ³	Sample
70A-2211H	2/7/2012	0.000078	Bq/m ³	0.0021	pCi/m ³	Sample
	5/1/2012	< 0.000079	Bq/m ³	< 0.0021	pCi/m ³	Sample
	8/9/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000078	Bq/m ³	< 0.0021	pCi/m ³	Sample
70A-2217H	2/7/2012	0.000059	Bq/m ³	0.0016	pCi/m ³	Sample
	5/1/2012	< 0.00008	Bq/m ³	< 0.0021	pCi/m ³	Sample
	8/9/2012	< 0.000077	Bq/m ³	< 0.0021	pCi/m ³	Sample
	11/6/2012	< 0.000083	Bq/m ³	< 0.0022	pCi/m ³	Sample
70A-2223	2/7/2012	< 0.000056	Bq/m ³	< 0.0015	pCi/m ³	Sample
	5/1/2012	< 0.000096	Bq/m ³	< 0.0026	pCi/m ³	Sample
	8/9/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample
70A-2229A	2/7/2012	< 0.000062	Bq/m ³	< 0.0017	pCi/m ³	Sample
	5/1/2012	< 0.000091	Bq/m ³	< 0.0024	pCi/m ³	Sample
	8/9/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000077	Bq/m ³	< 0.0021	pCi/m ³	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Alpha		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
70A-2229B	2/7/2012	< 0.000055	Bq/m ³	< 0.0015	pCi/m ³	Sample
	5/1/2012	< 0.000081	Bq/m ³	< 0.0022	pCi/m ³	Sample
	8/9/2012	< 0.000074	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000079	Bq/m ³	< 0.0021	pCi/m ³	Sample
75-127-H	2/7/2012	< 0.000054	Bq/m ³	< 0.0014	pCi/m ³	Sample
	3/6/2012	< 0.000092	Bq/m ³	< 0.0025	pCi/m ³	Sample
	4/2/2012	< 0.000084	Bq/m ³	< 0.0023	pCi/m ³	Sample
	5/1/2012	< 0.000073	Bq/m ³	< 0.002	pCi/m ³	Sample
	6/5/2012	< 0.000063	Bq/m ³	< 0.0017	pCi/m ³	Sample
	7/3/2012	< 0.000093	Bq/m ³	< 0.0025	pCi/m ³	Sample
	8/9/2012	< 0.000066	Bq/m ³	< 0.0018	pCi/m ³	Sample
	9/5/2012	< 0.000095	Bq/m ³	< 0.0026	pCi/m ³	Sample
	10/2/2012	< 0.00012	Bq/m ³	< 0.0032	pCi/m ³	Sample
	11/6/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample
	12/4/2012	< 0.000099	Bq/m ³	< 0.0027	pCi/m ³	Sample
	1/8/2013	< 0.000064	Bq/m ³	< 0.0017	pCi/m ³	Sample
85 Glovebox	2/7/2012	< 0.00006	Bq/m ³	< 0.0016	pCi/m ³	Sample
	5/1/2012	< 0.00008	Bq/m ³	< 0.0022	pCi/m ³	Sample
	8/9/2012	< 0.000073	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000077	Bq/m ³	< 0.0021	pCi/m ³	Sample
	12/4/2012	< 0.0001	Bq/m ³	< 0.0028	pCi/m ³	Sample
85 Glovebox-COL	2/7/2012	0.00003	Bq/m ³	0.00081	pCi/m ³	Dup
	5/1/2012	0.000084	Bq/m ³	0.0023	pCi/m ³	Dup
	8/9/2012	0.000063	Bq/m ³	0.0017	pCi/m ³	Dup
	11/6/2012	0.00013	Bq/m ³	0.0036	pCi/m ³	Dup
85 Hood	2/7/2012	< 0.000059	Bq/m ³	< 0.0016	pCi/m ³	Sample
	5/1/2012	< 0.000081	Bq/m ³	< 0.0022	pCi/m ³	Sample
	8/9/2012	< 0.000072	Bq/m ³	< 0.0019	pCi/m ³	Sample
	11/6/2012	< 0.000078	Bq/m ³	< 0.0021	pCi/m ³	Sample
	12/4/2012	< 0.0001	Bq/m ³	< 0.0028	pCi/m ³	Sample
B88 Cave 0	2/7/2012	0.000056	Bq/m ³	0.0015	pCi/m ³	Sample
	5/1/2012	< 0.000079	Bq/m ³	< 0.0021	pCi/m ³	Sample
	8/9/2012	< 0.000074	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Alpha		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
B88-135H	2/7/2012	< 0.000053	Bq/m ³	< 0.0014	pCi/m ³	Sample
	5/1/2012	< 0.000077	Bq/m ³	< 0.0021	pCi/m ³	Sample
	8/9/2012	< 0.000075	Bq/m ³	< 0.002	pCi/m ³	Sample
	11/6/2012	< 0.000076	Bq/m ³	< 0.002	pCi/m ³	Sample
Lot Blank	2/7/2012	< 0.033	Bq/S	< 0.89	pCi/S	Blank
	2/7/2012	0.02	Bq/S	0.54	pCi/S	Blank
	3/6/2012	< 0.046	Bq/S	< 1.2	pCi/S	Blank
	4/2/2012	< 0.039	Bq/S	< 1	pCi/S	Blank
	5/1/2012	< 0.039	Bq/S	< 1	pCi/S	Blank
	5/1/2012	0.035	Bq/S	0.94	pCi/S	Blank
	5/1/2012	< 0.048	Bq/S	< 1.3	pCi/S	Blank
	6/5/2012	< 0.038	Bq/S	< 1	pCi/S	Blank
	7/3/2012	< 0.047	Bq/S	< 1.3	pCi/S	Blank
	8/9/2012	0.044	Bq/S	1.2	pCi/S	Blank
	8/9/2012	< 0.051	Bq/S	< 1.4	pCi/S	Blank
	8/9/2012	< 0.045	Bq/S	< 1.2	pCi/S	Blank
	9/5/2012	< 0.047	Bq/S	< 1.3	pCi/S	Blank
	10/2/2012	< 0.055	Bq/S	< 1.5	pCi/S	Blank
	11/6/2012	< 0.049	Bq/S	< 1.3	pCi/S	Blank
	11/6/2012	< 0.047	Bq/S	< 1.3	pCi/S	Blank
	11/6/2012	0.031	Bq/S	0.83	pCi/S	Blank
	12/4/2012	< 0.049	Bq/S	< 1.3	pCi/S	Blank
12/4/2012	< 0.054	Bq/S	< 1.4	pCi/S	Blank	
1/8/2013	< 0.042	Bq/S	< 1.1	pCi/S	Blank	
Travel Blank	2/7/2012	< 0.034	Bq/S	< 0.92	pCi/S	Blank
	2/7/2012	< 0.015	Bq/S	< 0.4	pCi/S	Blank
	3/6/2012	< 0.046	Bq/S	< 1.2	pCi/S	Blank
	4/2/2012	< 0.039	Bq/S	< 1	pCi/S	Blank
	5/1/2012	< 0.045	Bq/S	< 1.2	pCi/S	Blank
	5/1/2012	< 0.037	Bq/S	< 1	pCi/S	Blank
	5/1/2012	0.033	Bq/S	0.88	pCi/S	Blank
	6/5/2012	< 0.04	Bq/S	< 1.1	pCi/S	Blank
	7/3/2012	< 0.048	Bq/S	< 1.3	pCi/S	Blank
	8/9/2012	0.028	Bq/S	0.75	pCi/S	Blank
	8/9/2012	< 0.05	Bq/S	< 1.3	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Alpha		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
Travel Blank (cont.)	8/9/2012	< 0.047	Bq/S	< 1.3	pCi/S	Blank
	9/5/2012	< 0.05	Bq/S	< 1.3	pCi/S	Blank
	10/2/2012	< 0.055	Bq/S	< 1.5	pCi/S	Blank
	11/6/2012	< 0.048	Bq/S	< 1.3	pCi/S	Blank
	11/6/2012	0.04	Bq/S	1.1	pCi/S	Blank
	11/6/2012	< 0.049	Bq/S	< 1.3	pCi/S	Blank
	12/4/2012	< 0.047	Bq/S	< 1.3	pCi/S	Blank
	12/4/2012	< 0.05	Bq/S	< 1.4	pCi/S	Blank
	1/8/2013	< 0.041	Bq/S	< 1.1	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Beta		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
55-128	2/7/2012	< 0.00013	Bq/m ³	< 0.0035	pCi/m ³	Sample
	5/1/2012	< 0.00012	Bq/m ³	< 0.0033	pCi/m ³	Sample
	8/9/2012	< 0.000093	Bq/m ³	< 0.0025	pCi/m ³	Sample
	11/6/2012	< 0.0001	Bq/m ³	< 0.0028	pCi/m ³	Sample
55-128-COL	2/7/2012	0.00013	Bq/m ³	0.0036	pCi/m ³	Dup
	5/1/2012	0.000094	Bq/m ³	0.0025	pCi/m ³	Dup
	8/9/2012	0.00012	Bq/m ³	0.0032	pCi/m ³	Dup
	11/6/2012	0.00021	Bq/m ³	0.0056	pCi/m ³	Dup
70-147A	2/7/2012	0.00062	Bq/m ³	0.017	pCi/m ³	Sample
	3/6/2012	< 0.00013	Bq/m ³	< 0.0036	pCi/m ³	Sample
	4/2/2012	0.00013	Bq/m ³	0.0034	pCi/m ³	Sample
	5/1/2012	0.00019	Bq/m ³	0.0052	pCi/m ³	Sample
	6/5/2012	0.00028	Bq/m ³	0.0076	pCi/m ³	Sample
	7/3/2012	< 0.00012	Bq/m ³	< 0.0031	pCi/m ³	Sample
	8/9/2012	0.0001	Bq/m ³	0.0027	pCi/m ³	Sample
	9/5/2012	0.00034	Bq/m ³	0.0091	pCi/m ³	Sample
	10/2/2012	0.00044	Bq/m ³	0.012	pCi/m ³	Sample
	11/6/2012	0.0002	Bq/m ³	0.0054	pCi/m ³	Sample
	12/4/2012	0.00046	Bq/m ³	0.012	pCi/m ³	Sample
	1/8/2013	0.00022	Bq/m ³	0.006	pCi/m ³	Sample
70A-1121A	2/7/2012	0.00019	Bq/m ³	0.0052	pCi/m ³	Sample
	5/1/2012	< 0.00013	Bq/m ³	< 0.0034	pCi/m ³	Sample
	8/9/2012	0.00013	Bq/m ³	0.0035	pCi/m ³	Sample
	11/6/2012	0.00033	Bq/m ³	0.0089	pCi/m ³	Sample
70A-1121B	2/7/2012	0.00036	Bq/m ³	0.0096	pCi/m ³	Sample
	5/1/2012	0.00016	Bq/m ³	0.0044	pCi/m ³	Sample
	8/9/2012	0.00011	Bq/m ³	0.003	pCi/m ³	Sample
	11/6/2012	0.00024	Bq/m ³	0.0065	pCi/m ³	Sample
70A-1129H	2/7/2012	0.00013	Bq/m ³	0.0035	pCi/m ³	Sample
	3/6/2012	< 0.00013	Bq/m ³	< 0.0036	pCi/m ³	Sample
	4/2/2012	< 0.00012	Bq/m ³	< 0.0033	pCi/m ³	Sample
	5/1/2012	< 0.0001	Bq/m ³	< 0.0027	pCi/m ³	Sample
	6/5/2012	0.00012	Bq/m ³	0.0033	pCi/m ³	Sample
	7/3/2012	< 0.00011	Bq/m ³	< 0.0031	pCi/m ³	Sample
	8/9/2012	< 0.000092	Bq/m ³	< 0.0025	pCi/m ³	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Beta		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
70A-1129H (cont.)	9/5/2012	< 0.00013	Bq/m ³	< 0.0035	pCi/m ³	Sample
	10/2/2012	0.00013	Bq/m ³	0.0036	pCi/m ³	Sample
	11/6/2012	< 0.00011	Bq/m ³	< 0.0028	pCi/m ³	Sample
	12/4/2012	0.00016	Bq/m ³	0.0044	pCi/m ³	Sample
	1/8/2013	< 0.00011	Bq/m ³	< 0.003	pCi/m ³	Sample
70A-1129P	2/7/2012	0.00015	Bq/m ³	0.004	pCi/m ³	Sample
	3/6/2012	< 0.00014	Bq/m ³	< 0.0038	pCi/m ³	Sample
	4/2/2012	< 0.00012	Bq/m ³	< 0.0034	pCi/m ³	Sample
	5/1/2012	< 0.0001	Bq/m ³	< 0.0028	pCi/m ³	Sample
	6/5/2012	< 0.00009	Bq/m ³	< 0.0024	pCi/m ³	Sample
	7/3/2012	< 0.00012	Bq/m ³	< 0.0031	pCi/m ³	Sample
	8/9/2012	< 0.00009	Bq/m ³	< 0.0024	pCi/m ³	Sample
	9/5/2012	< 0.00012	Bq/m ³	< 0.0033	pCi/m ³	Sample
	10/2/2012	0.00018	Bq/m ³	0.0047	pCi/m ³	Sample
	11/6/2012	0.00016	Bq/m ³	0.0043	pCi/m ³	Sample
	12/4/2012	0.00016	Bq/m ³	0.0042	pCi/m ³	Sample
	1/8/2013	0.00011	Bq/m ³	0.003	pCi/m ³	Sample
70A-2211H	2/7/2012	0.00037	Bq/m ³	0.01	pCi/m ³	Sample
	5/1/2012	0.00016	Bq/m ³	0.0044	pCi/m ³	Sample
	8/9/2012	0.00014	Bq/m ³	0.0039	pCi/m ³	Sample
	11/6/2012	< 0.00011	Bq/m ³	< 0.0029	pCi/m ³	Sample
70A-2217H	2/7/2012	0.00037	Bq/m ³	0.0099	pCi/m ³	Sample
	5/1/2012	0.00016	Bq/m ³	0.0044	pCi/m ³	Sample
	8/9/2012	< 0.000098	Bq/m ³	< 0.0026	pCi/m ³	Sample
	11/6/2012	0.0002	Bq/m ³	0.0054	pCi/m ³	Sample
70A-2223	2/7/2012	0.00034	Bq/m ³	0.0091	pCi/m ³	Sample
	5/1/2012	< 0.00015	Bq/m ³	< 0.004	pCi/m ³	Sample
	8/9/2012	< 0.000099	Bq/m ³	< 0.0027	pCi/m ³	Sample
	11/6/2012	0.00036	Bq/m ³	0.0098	pCi/m ³	Sample
70A-2229A	2/7/2012	0.00031	Bq/m ³	0.0085	pCi/m ³	Sample
	5/1/2012	< 0.00014	Bq/m ³	< 0.0038	pCi/m ³	Sample
	8/9/2012	0.00012	Bq/m ³	0.0032	pCi/m ³	Sample
	11/6/2012	0.00031	Bq/m ³	0.0084	pCi/m ³	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Beta		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
70A-2229B	2/7/2012	0.00031	Bq/m ³	0.0085	pCi/m ³	Sample
	5/1/2012	< 0.00012	Bq/m ³	< 0.0033	pCi/m ³	Sample
	8/9/2012	0.00012	Bq/m ³	0.0033	pCi/m ³	Sample
	11/6/2012	0.00032	Bq/m ³	0.0087	pCi/m ³	Sample
75-127-H	2/7/2012	< 0.00011	Bq/m ³	< 0.0029	pCi/m ³	Sample
	3/6/2012	< 0.00014	Bq/m ³	< 0.0037	pCi/m ³	Sample
	4/2/2012	< 0.00013	Bq/m ³	< 0.0035	pCi/m ³	Sample
	5/1/2012	< 0.00011	Bq/m ³	< 0.0029	pCi/m ³	Sample
	6/5/2012	< 0.00011	Bq/m ³	< 0.003	pCi/m ³	Sample
	7/3/2012	< 0.00011	Bq/m ³	< 0.003	pCi/m ³	Sample
	8/9/2012	< 0.000088	Bq/m ³	< 0.0024	pCi/m ³	Sample
	9/5/2012	< 0.00012	Bq/m ³	< 0.0033	pCi/m ³	Sample
	10/2/2012	< 0.00013	Bq/m ³	< 0.0035	pCi/m ³	Sample
	11/6/2012	< 0.000099	Bq/m ³	< 0.0027	pCi/m ³	Sample
	12/4/2012	< 0.00014	Bq/m ³	< 0.0037	pCi/m ³	Sample
	1/8/2013	< 0.00011	Bq/m ³	< 0.003	pCi/m ³	Sample
85 Glovebox	2/7/2012	< 0.00012	Bq/m ³	< 0.0032	pCi/m ³	Sample
	5/1/2012	< 0.00013	Bq/m ³	< 0.0034	pCi/m ³	Sample
	8/9/2012	< 0.000094	Bq/m ³	< 0.0025	pCi/m ³	Sample
	11/6/2012	< 0.00011	Bq/m ³	< 0.0029	pCi/m ³	Sample
	12/4/2012	< 0.00013	Bq/m ³	< 0.0036	pCi/m ³	Sample
85 Glovebox-COL	2/7/2012	0.000066	Bq/m ³	0.0018	pCi/m ³	Dup
	5/1/2012	< 0.000029	Bq/m ³	< 0.00078	pCi/m ³	Dup
	8/9/2012	0.000074	Bq/m ³	0.002	pCi/m ³	Dup
	11/6/2012	0.00017	Bq/m ³	0.0046	pCi/m ³	Dup
85 Hood	2/7/2012	< 0.00012	Bq/m ³	< 0.0032	pCi/m ³	Sample
	5/1/2012	< 0.00012	Bq/m ³	< 0.0033	pCi/m ³	Sample
	8/9/2012	< 0.000092	Bq/m ³	< 0.0025	pCi/m ³	Sample
	11/6/2012	< 0.0001	Bq/m ³	< 0.0028	pCi/m ³	Sample
	12/4/2012	< 0.00013	Bq/m ³	< 0.0035	pCi/m ³	Sample
B88 Cave 0	2/7/2012	0.00068	Bq/m ³	0.018	pCi/m ³	Sample
	5/1/2012	0.00018	Bq/m ³	0.005	pCi/m ³	Sample
	8/9/2012	0.00016	Bq/m ³	0.0044	pCi/m ³	Sample
	11/6/2012	0.00043	Bq/m ³	0.012	pCi/m ³	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Beta		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
B88-135H	2/7/2012	0.00022	Bq/m ³	0.0059	pCi/m ³	Sample
	5/1/2012	< 0.00012	Bq/m ³	< 0.0031	pCi/m ³	Sample
	8/9/2012	< 0.000098	Bq/m ³	< 0.0026	pCi/m ³	Sample
	11/6/2012	0.00021	Bq/m ³	0.0057	pCi/m ³	Sample
Lot Blank	2/7/2012	< 0.02	Bq/S	< 0.55	pCi/S	Blank
	2/7/2012	< 0.067	Bq/S	< 1.8	pCi/S	Blank
	3/6/2012	< 0.07	Bq/S	< 1.9	pCi/S	Blank
	4/2/2012	< 0.061	Bq/S	< 1.6	pCi/S	Blank
	5/1/2012	< 0.054	Bq/S	< 1.4	pCi/S	Blank
	5/1/2012	< 0.072	Bq/S	< 2	pCi/S	Blank
	5/1/2012	0.064	Bq/S	1.7	pCi/S	Blank
	6/5/2012	< 0.057	Bq/S	< 1.6	pCi/S	Blank
	7/3/2012	< 0.06	Bq/S	< 1.6	pCi/S	Blank
	8/9/2012	< 0.064	Bq/S	< 1.7	pCi/S	Blank
	8/9/2012	< 0.063	Bq/S	< 1.7	pCi/S	Blank
	8/9/2012	0.029	Bq/S	0.79	pCi/S	Blank
	9/5/2012	< 0.063	Bq/S	< 1.7	pCi/S	Blank
	10/2/2012	< 0.061	Bq/S	< 1.6	pCi/S	Blank
	11/6/2012	< 0.063	Bq/S	< 1.7	pCi/S	Blank
	11/6/2012	< 0.064	Bq/S	< 1.7	pCi/S	Blank
	11/6/2012	0.058	Bq/S	1.6	pCi/S	Blank
	12/4/2012	< 0.067	Bq/S	< 1.8	pCi/S	Blank
	12/4/2012	< 0.064	Bq/S	< 1.7	pCi/S	Blank
1/8/2013	< 0.067	Bq/S	< 1.8	pCi/S	Blank	
Travel Blank	2/7/2012	< 0.066	Bq/S	< 1.8	pCi/S	Blank
	2/7/2012	< 0.017	Bq/S	< 0.46	pCi/S	Blank
	3/6/2012	< 0.069	Bq/S	< 1.9	pCi/S	Blank
	4/2/2012	< 0.061	Bq/S	< 1.6	pCi/S	Blank
	5/1/2012	0.031	Bq/S	0.84	pCi/S	Blank
	5/1/2012	< 0.068	Bq/S	< 1.8	pCi/S	Blank
	5/1/2012	< 0.054	Bq/S	< 1.5	pCi/S	Blank
	6/5/2012	< 0.07	Bq/S	< 1.9	pCi/S	Blank
	7/3/2012	< 0.061	Bq/S	< 1.6	pCi/S	Blank
	8/9/2012	0.045	Bq/S	1.2	pCi/S	Blank
	8/9/2012	< 0.062	Bq/S	< 1.7	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Gross Beta		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
Travel Blank (cont.)	8/9/2012	< 0.066	Bq/S	< 1.8	pCi/S	Blank
	9/5/2012	< 0.063	Bq/S	< 1.7	pCi/S	Blank
	10/2/2012	< 0.059	Bq/S	< 1.6	pCi/S	Blank
	11/6/2012	0.058	Bq/S	1.6	pCi/S	Blank
	11/6/2012	< 0.063	Bq/S	< 1.7	pCi/S	Blank
	11/6/2012	< 0.065	Bq/S	< 1.8	pCi/S	Blank
	12/4/2012	< 0.065	Bq/S	< 1.8	pCi/S	Blank
	12/4/2012	< 0.066	Bq/S	< 1.8	pCi/S	Blank
	1/8/2013	< 0.068	Bq/S	< 1.8	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Iodine-125		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
55-128	2/7/2012	< 0.0002	Bq/m ³	< 0.0053	pCi/m ³	Sample
	5/1/2012	< 0.00021	Bq/m ³	< 0.0056	pCi/m ³	Sample
	8/9/2012	< 0.000087	Bq/m ³	< 0.0023	pCi/m ³	Sample
	11/6/2012	< 0.000026	Bq/m ³	< 0.00071	pCi/m ³	Sample
55-128 Backup	2/7/2012	< 0.00023	Bq/m ³	< 0.0062	pCi/m ³	Sample
	5/1/2012	< 0.00016	Bq/m ³	< 0.0044	pCi/m ³	Sample
	8/9/2012	< 0.00012	Bq/m ³	< 0.0031	pCi/m ³	Sample
	11/6/2012	< 0.000026	Bq/m ³	< 0.00071	pCi/m ³	Sample
55-128-COL	2/7/2012	< 0.00019	Bq/m ³	< 0.0052	pCi/m ³	Dup
	5/1/2012	< 0.00021	Bq/m ³	< 0.0056	pCi/m ³	Dup
	8/9/2012	< 0.00016	Bq/m ³	< 0.0044	pCi/m ³	Dup
	11/6/2012	< 0.00019	Bq/m ³	< 0.0052	pCi/m ³	Dup
55-128-COL Backup	2/7/2012	< 0.00024	Bq/m ³	< 0.0065	pCi/m ³	Dup
	5/1/2012	< 0.00023	Bq/m ³	< 0.0063	pCi/m ³	Dup
	8/9/2012	< 0.00016	Bq/m ³	< 0.0044	pCi/m ³	Dup
	11/6/2012	< 0.00019	Bq/m ³	< 0.0052	pCi/m ³	Dup
85 Glovebox	2/7/2012	< 0.00015	Bq/m ³	< 0.004	pCi/m ³	Sample
	5/1/2012	< 0.0002	Bq/m ³	< 0.0054	pCi/m ³	Sample
	8/9/2012	< 0.00012	Bq/m ³	< 0.0034	pCi/m ³	Sample
	11/6/2012	< 0.00002	Bq/m ³	< 0.00055	pCi/m ³	Sample
85 Hood	2/7/2012	< 0.00022	Bq/m ³	< 0.0058	pCi/m ³	Sample
	5/1/2012	< 0.00011	Bq/m ³	< 0.003	pCi/m ³	Sample
	8/9/2012	< 0.00013	Bq/m ³	< 0.0035	pCi/m ³	Sample
	11/6/2012	< 0.000027	Bq/m ³	< 0.00072	pCi/m ³	Sample
Travel Blank	2/7/2012	< 0.09	Bq/S	< 2.4	pCi/S	Blank
	2/7/2012	< 0.081	Bq/S	< 2.2	pCi/S	Blank
	5/1/2012	< 0.084	Bq/S	< 2.3	pCi/S	Blank
	5/1/2012	< 0.086	Bq/S	< 2.3	pCi/S	Blank
	8/9/2012	< 0.1	Bq/S	< 2.8	pCi/S	Blank
	8/9/2012	< 0.067	Bq/S	< 1.8	pCi/S	Blank
	11/6/2012	< 0.097	Bq/S	< 2.6	pCi/S	Blank
	11/6/2012	< 0.016	Bq/S	< 0.42	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Tritium		S.I.		Conventional		QC Type
Location*	Collection Date	Result [†]	Units	Result [†]	Units	
85 Glovebox	2/7/2012	< 0.12	Bq/m ³	< 3.3	pCi/m ³	Sample
	5/1/2012	< 0.15	Bq/m ³	< 4	pCi/m ³	Sample
	8/9/2012	< 0.1	Bq/m ³	< 2.8	pCi/m ³	Sample
	11/6/2012	< 0.1	Bq/m ³	< 2.8	pCi/m ³	Sample
85 Hood	2/7/2012	0.2	Bq/m ³	5.5	pCi/m ³	Sample
	5/1/2012	0.16	Bq/m ³	4.5	pCi/m ³	Sample
	8/9/2012	< 0.15	Bq/m ³	< 3.9	pCi/m ³	Sample
	11/6/2012	< 0.14	Bq/m ³	< 3.7	pCi/m ³	Sample
85 Hood-COL	2/7/2012	0.42	Bq/m ³	11	pCi/m ³	Dup
	5/1/2012	< 0.31	Bq/m ³	< 8.3	pCi/m ³	Dup
Travel Blank	2/7/2012	< 0.15	Bq/S	< 4	pCi/S	Blank
	2/7/2012	< 0.14	Bq/S	< 3.8	pCi/S	Blank
	5/1/2012	< 0.15	Bq/S	< 4	pCi/S	Blank
	5/1/2012	< 0.12	Bq/S	< 3.2	pCi/S	Blank
	8/9/2012	< 0.15	Bq/S	< 4	pCi/S	Blank
	11/6/2012	< 0.13	Bq/S	< 3.6	pCi/S	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Actinium 228	Chicken Creek	4/18/2012	< 0.68	Bq/L	< 18	pCi/L	Sample
		4/18/2012	< 1.8	Bq/L	< 47	pCi/L	Dup
		8/28/2012	< 3.7	Bq/L	< 99	pCi/L	Sample
		8/28/2012	< 0.7	Bq/L	< 19	pCi/L	Dup
	Equipment Blank	4/18/2012	< 0.61	Bq/L	< 16	pCi/L	Blank
		4/18/2012	< 1.9	Bq/L	< 51	pCi/L	Blank
		8/28/2012	< 3.6	Bq/L	< 98	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.71	Bq/L	< 19	pCi/L	Sample
		8/28/2012	< 0.96	Bq/L	< 26	pCi/L	Sample
	Wildcat Creek	4/18/2012	< 0.69	Bq/L	< 19	pCi/L	Sample
		8/28/2012	< 1.1	Bq/L	< 31	pCi/L	Sample
	Winter Creek	4/18/2012	< 0.69	Bq/L	< 19	pCi/L	Sample
		8/28/2012	< 1.2	Bq/L	< 31	pCi/L	Sample
	Winter Creek Influent	4/18/2012	< 0.68	Bq/L	< 18	pCi/L	Sample
Cesium 137	Chicken Creek	4/18/2012	< 0.18	Bq/L	< 4.8	pCi/L	Sample
		4/18/2012	< 0.33	Bq/L	< 9	pCi/L	Dup
		8/28/2012	< 0.42	Bq/L	< 11	pCi/L	Sample
		8/28/2012	< 0.17	Bq/L	< 4.7	pCi/L	Dup
	Equipment Blank	4/18/2012	< 0.39	Bq/L	< 11	pCi/L	Blank
		4/18/2012	< 0.15	Bq/L	< 4.1	pCi/L	Blank
		8/28/2012	< 0.81	Bq/L	< 22	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.19	Bq/L	< 5.2	pCi/L	Sample
		8/28/2012	< 0.4	Bq/L	< 11	pCi/L	Sample
	Wildcat Creek	4/18/2012	< 0.16	Bq/L	< 4.3	pCi/L	Sample
		8/28/2012	< 0.3	Bq/L	< 8.2	pCi/L	Sample
	Winter Creek	4/18/2012	< 0.15	Bq/L	< 4	pCi/L	Sample
		8/28/2012	< 0.31	Bq/L	< 8.4	pCi/L	Sample
	Winter Creek Influent	4/18/2012	< 0.13	Bq/L	< 3.5	pCi/L	Sample
Europium 152	Chicken Creek	4/18/2012	< 0.54	Bq/L	< 14	pCi/L	Sample
		4/18/2012	< 0.99	Bq/L	< 27	pCi/L	Dup
		8/28/2012	< 0.9	Bq/L	< 24	pCi/L	Sample
		8/28/2012	< 0.45	Bq/L	< 12	pCi/L	Dup
	Equipment Blank	4/18/2012	< 0.57	Bq/L	< 16	pCi/L	Blank
		8/28/2012	< 1.5	Bq/L	< 41	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.56	Bq/L	< 15	pCi/L	Sample
		8/28/2012	< 1.6	Bq/L	< 43	pCi/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Europium 152 (cont.)	Wildcat Creek	4/18/2012	< 0.45	Bq/L	< 12	pCi/L	Sample
		8/28/2012	< 0.51	Bq/L	< 14	pCi/L	Sample
	Winter Creek	4/18/2012	< 0.44	Bq/L	< 12	pCi/L	Sample
		8/28/2012	< 0.54	Bq/L	< 15	pCi/L	Sample
	Winter Creek Influent	4/18/2012	< 0.42	Bq/L	< 11	pCi/L	Sample
Gross alpha	Chicken Creek	4/18/2012	0.14	Bq/L	3.9	pCi/L	Sample
		4/18/2012	< 0.071	Bq/L	< 1.9	pCi/L	Dup
		8/28/2012	0.12	Bq/L	3.1	pCi/L	Sample
		8/28/2012	< 0.073	Bq/L	< 2	pCi/L	Dup
	Equipment Blank	4/18/2012	< 0.024	Bq/L	< 0.64	pCi/L	Blank
		4/18/2012	< 0.043	Bq/L	< 1.2	pCi/L	Blank
		8/28/2012	< 0.03	Bq/L	< 0.81	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.1	Bq/L	< 2.8	pCi/L	Sample
		8/28/2012	< 0.11	Bq/L	< 3	pCi/L	Sample
	Wildcat Creek	4/18/2012	< 0.064	Bq/L	< 1.7	pCi/L	Sample
		8/28/2012	< 0.086	Bq/L	< 2.3	pCi/L	Sample
	Winter Creek	4/18/2012	< 0.14	Bq/L	< 3.8	pCi/L	Sample
		8/28/2012	< 0.14	Bq/L	< 3.7	pCi/L	Sample
	Winter Creek Influent	4/18/2012	< 0.11	Bq/L	< 2.9	pCi/L	Sample
	Gross beta	Chicken Creek	4/18/2012	< 0.085	Bq/L	< 2.3	pCi/L
4/18/2012			0.064	Bq/L	1.7	pCi/L	Dup
8/28/2012			0.16	Bq/L	4.3	pCi/L	Sample
8/28/2012			0.14	Bq/L	3.7	pCi/L	Dup
Equipment Blank		4/18/2012	< 0.06	Bq/L	< 1.6	pCi/L	Blank
		4/18/2012	< 0.054	Bq/L	< 1.5	pCi/L	Blank
		8/28/2012	< 0.067	Bq/L	< 1.8	pCi/L	Blank
N. Fork Strawberry Creek		4/18/2012	< 0.069	Bq/L	< 1.9	pCi/L	Sample
		8/28/2012	< 0.076	Bq/L	< 2.1	pCi/L	Sample
Wildcat Creek		4/18/2012	< 0.067	Bq/L	< 1.8	pCi/L	Sample
		8/28/2012	< 0.074	Bq/L	< 2	pCi/L	Sample
Winter Creek		4/18/2012	< 0.09	Bq/L	< 2.4	pCi/L	Sample
		8/28/2012	< 0.073	Bq/L	< 2	pCi/L	Sample
Winter Creek Influent		4/18/2012	< 0.076	Bq/L	< 2	pCi/L	Sample
Lead 214		Chicken Creek	4/18/2012	< 0.4	Bq/L	< 11	pCi/L
	4/18/2012		< 0.62	Bq/L	< 17	pCi/L	Dup
	8/28/2012		< 0.99	Bq/L	< 27	pCi/L	Sample
	8/28/2012		< 0.45	Bq/L	< 12	pCi/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type	
Analyte	Location*		Result [†]	Units	Result [†]	Units		
Lead 214 (cont.)	Equipment Blank	4/18/2012	< 0.36	Bq/L	< 9.7	pCi/L	Blank	
		4/18/2012	< 0.97	Bq/L	< 26	pCi/L	Blank	
		8/28/2012	< 1.3	Bq/L	< 34	pCi/L	Blank	
	N. Fork Strawberry Creek	4/18/2012	< 0.42	Bq/L	< 11	pCi/L	Sample	
		8/28/2012	< 0.61	Bq/L	< 16	pCi/L	Sample	
	Wildcat Creek	4/18/2012	< 0.36	Bq/L	< 9.8	pCi/L	Sample	
		8/28/2012	< 0.91	Bq/L	< 25	pCi/L	Sample	
	Winter Creek	4/18/2012	< 0.35	Bq/L	< 9.5	pCi/L	Sample	
		8/28/2012	< 0.6	Bq/L	< 16	pCi/L	Sample	
	Winter Creek Influent	4/18/2012	< 0.32	Bq/L	< 8.7	pCi/L	Sample	
Potassium 40	Chicken Creek	4/18/2012	< 2.2	Bq/L	< 60	pCi/L	Sample	
		4/18/2012	< 4.8	Bq/L	< 130	pCi/L	Dup	
		8/28/2012	< 8.5	Bq/L	< 230	pCi/L	Sample	
		8/28/2012	< 2.5	Bq/L	< 67	pCi/L	Dup	
	Equipment Blank	4/18/2012	< 4.4	Bq/L	< 120	pCi/L	Blank	
		4/18/2012	< 2	Bq/L	< 55	pCi/L	Blank	
		8/28/2012	< 9	Bq/L	< 240	pCi/L	Blank	
	N. Fork Strawberry Creek	4/18/2012	< 1.9	Bq/L	< 52	pCi/L	Sample	
		8/28/2012	< 3.4	Bq/L	< 91	pCi/L	Sample	
	Wildcat Creek	4/18/2012	< 2.3	Bq/L	< 62	pCi/L	Sample	
		8/28/2012	< 3.6	Bq/L	< 98	pCi/L	Sample	
	Winter Creek	4/18/2012	< 1.7	Bq/L	< 46	pCi/L	Sample	
		8/28/2012	< 5.7	Bq/L	< 160	pCi/L	Sample	
	Winter Creek Influent	4/18/2012	< 1.3	Bq/L	< 36	pCi/L	Sample	
	Radium 226	Chicken Creek	4/18/2012	< 4.1	Bq/L	< 110	pCi/L	Sample
			4/18/2012	0.013	Bq/L	0.34	pCi/L	Sample
4/18/2012			< 0.0075	Bq/L	< 0.2	pCi/L	Sample	
4/18/2012			< 0.0075	Bq/L	< 0.2	pCi/L	Dup	
4/18/2012			< 0.57	Bq/L	< 15	pCi/L	Dup	
8/28/2012			< 0.86	Bq/L	< 23	pCi/L	Sample	
8/28/2012			0.0095	Bq/L	0.26	pCi/L	Sample	
8/28/2012			< 3.1	Bq/L	< 84	pCi/L	Dup	
8/28/2012			0.015	Bq/L	0.39	pCi/L	Dup	
Equipment Blank		4/18/2012	< 0.0059	Bq/L	< 0.16	pCi/L	Blank	
		4/18/2012	< 3.6	Bq/L	< 98	pCi/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Radium 226 (cont.)	Equipment Blank (cont.)	4/18/2012	< 0.0079	Bq/L	< 0.21	pCi/L	Blank
		4/18/2012	< 0.48	Bq/L	< 13	pCi/L	Blank
		8/28/2012	< 1.4	Bq/L	< 38	pCi/L	Blank
		8/28/2012	< 0.0024	Bq/L	< 0.066	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.0068	Bq/L	< 0.18	pCi/L	Sample
		4/18/2012	< 0.01	Bq/L	< 0.28	pCi/L	Sample
		4/18/2012	< 3.4	Bq/L	< 92	pCi/L	Sample
		8/28/2012	< 0.0064	Bq/L	< 0.17	pCi/L	Sample
		8/28/2012	< 2	Bq/L	< 55	pCi/L	Sample
	Wildcat Creek	4/18/2012	< 3.8	Bq/L	< 100	pCi/L	Sample
		4/18/2012	< 0.0066	Bq/L	< 0.18	pCi/L	Sample
		4/18/2012	< 0.0099	Bq/L	< 0.27	pCi/L	Sample
		8/28/2012	< 0.0067	Bq/L	< 0.18	pCi/L	Sample
		8/28/2012	< 0.58	Bq/L	< 16	pCi/L	Sample
	Winter Creek	4/18/2012	< 2.6	Bq/L	< 71	pCi/L	Sample
		4/18/2012	< 0.0063	Bq/L	< 0.17	pCi/L	Sample
		4/18/2012	< 0.0074	Bq/L	< 0.2	pCi/L	Sample
		8/28/2012	< 0.53	Bq/L	< 14	pCi/L	Sample
		8/28/2012	< 0.0078	Bq/L	< 0.21	pCi/L	Sample
	Winter Creek Influent	4/18/2012	< 0.0091	Bq/L	< 0.24	pCi/L	Sample
4/18/2012		< 0.0061	Bq/L	< 0.16	pCi/L	Sample	
4/18/2012		< 3.2	Bq/L	< 86	pCi/L	Sample	
Tritium	Chicken Creek	4/18/2012	8.3	Bq/L	220	pCi/L	Sample
		4/18/2012	7.6	Bq/L	210	pCi/L	Dup
		4/18/2012	10	Bq/L	270	pCi/L	Dup
		8/28/2012	< 6.3	Bq/L	< 170	pCi/L	Sample
		8/28/2012	7.3	Bq/L	200	pCi/L	Dup
	Chicken Creek Downstream	2/8/2012	< 7.4	Bq/L	< 200	pCi/L	Sample
		2/8/2012	< 9.3	Bq/L	< 250	pCi/L	Dup
	Chicken Creek Upstream	2/8/2012	< 7.4	Bq/L	< 200	pCi/L	Sample
	Equipment Blank	4/18/2012	< 6	Bq/L	< 160	pCi/L	Blank
		8/28/2012	< 6.3	Bq/L	< 170	pCi/L	Blank
	Field Blank	2/8/2012	< 7.4	Bq/L	< 200	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 6	Bq/L	< 160	pCi/L	Sample
		8/28/2012	< 6.2	Bq/L	< 170	pCi/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Tritium (cont.)	N. Fork Strawberry Creek Downstream	2/8/2012	< 7.4	Bq/L	< 200	pCi/L	Sample
	Wildcat Creek	4/18/2012	< 6.1	Bq/L	< 160	pCi/L	Sample
		8/28/2012	< 6.2	Bq/L	< 170	pCi/L	Sample
	Winter Creek	4/18/2012	< 6	Bq/L	< 160	pCi/L	Sample
		8/28/2012	< 6.2	Bq/L	< 170	pCi/L	Sample
Winter Creek Influent	4/18/2012	< 6	Bq/L	< 160	pCi/L	Sample	
Uranium 238	Chicken Creek	4/18/2012	< 9.3	Bq/L	< 250	pCi/L	Sample
		4/18/2012	< 44	Bq/L	< 1200	pCi/L	Dup
		8/28/2012	< 79	Bq/L	< 2100	pCi/L	Sample
		8/28/2012	< 6	Bq/L	< 160	pCi/L	Dup
	Equipment Blank	4/18/2012	< 51	Bq/L	< 1400	pCi/L	Blank
		4/18/2012	< 7.5	Bq/L	< 200	pCi/L	Blank
		8/28/2012	< 56	Bq/L	< 1500	pCi/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 7.8	Bq/L	< 210	pCi/L	Sample
		8/28/2012	< 18	Bq/L	< 470	pCi/L	Sample
	Wildcat Creek	4/18/2012	< 4.8	Bq/L	< 130	pCi/L	Sample
		8/28/2012	< 46	Bq/L	< 1200	pCi/L	Sample
	Winter Creek	4/18/2012	< 10	Bq/L	< 280	pCi/L	Sample
		8/28/2012	< 19	Bq/L	< 510	pCi/L	Sample
	Winter Creek Influent	4/18/2012	< 5.4	Bq/L	< 150	pCi/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
Chemical Oxygen Demand	Chicken Creek	4/18/2012	< 25	mg/L	Sample	
		4/18/2012	< 10	mg/L	Dup	
		8/28/2012	< 25	mg/L	Sample	
		8/28/2012	28	mg/L	Dup	
	N. Fork Strawberry Creek	4/18/2012	< 25	mg/L	Sample	
		8/28/2012	< 25	mg/L	Sample	
	Wildcat Creek	4/18/2012	< 25	mg/L	Sample	
		8/28/2012	< 25	mg/L	Sample	
	Winter Creek	4/18/2012	< 25	mg/L	Sample	
		8/28/2012	< 25	mg/L	Sample	
	Winter Creek Influent	4/18/2012	< 25	mg/L	Sample	
	pH	Chicken Creek	4/18/2012	8.2	S.U.	Sample
4/18/2012			8.2	S.U.	Dup	
8/28/2012			8.59	S.U.	Sample	
8/28/2012			8.66	S.U.	Dup	
N. Fork Strawberry Creek		4/18/2012	8.5	S.U.	Sample	
		8/28/2012	8.48	S.U.	Sample	
No Name Creek		8/28/2012	8.64	S.U.	Sample	
Ravine Creek		8/28/2012	7.86	S.U.	Sample	
Upper Botanical Garden Creek		8/28/2012	8.4	S.U.	Sample	
Wildcat Creek		4/18/2012	8.3	S.U.	Sample	
		8/28/2012	8.12	S.U.	Sample	
Winter Creek		4/18/2012	8.4	S.U.	Sample	
		8/28/2012	8.58	S.U.	Sample	
Winter Creek Influent		4/18/2012	7.8	S.U.	Sample	
Specific Conductance		Chicken Creek	4/18/2012	893	µmhos/cm	Sample
			4/18/2012	896	µmhos/cm	Dup
	8/28/2012		646	µmhos/cm	Sample	
	8/28/2012		616	µmhos/cm	Dup	
	N. Fork Strawberry Creek	4/18/2012	693	µmhos/cm	Sample	
		8/28/2012	611	µmhos/cm	Sample	
	No Name Creek	8/28/2012	869	µmhos/cm	Sample	
	Ravine Creek	8/28/2012	919	µmhos/cm	Sample	
	Upper Botanical Garden Creek	8/28/2012	1069	µmhos/cm	Sample	
	Wildcat Creek	4/18/2012	362	µmhos/cm	Sample	
		8/28/2012	465	µmhos/cm	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Specific Conductance (cont.)	Winter Creek	4/18/2012	832	µmhos/cm	Sample
		8/28/2012	748	µmhos/cm	Sample
	Winter Creek Influent	4/18/2012	706	µmhos/cm	Sample
Total suspended solids (TSS)	Chicken Creek	4/18/2012	4.7	mg/L	Sample
		4/18/2012	11	mg/L	Dup
		8/28/2012	15	mg/L	Sample
		8/28/2012	29	mg/L	Dup
	N. Fork Strawberry Creek	4/18/2012	< 1.1	mg/L	Sample
		8/28/2012	16	mg/L	Sample
	Wildcat Creek	4/18/2012	1.3	mg/L	Sample
		8/28/2012	1.8	mg/L	Sample
	Winter Creek	4/18/2012	< 1.1	mg/L	Sample
		8/28/2012	75	mg/L	Sample
	Winter Creek Influent	4/18/2012	3.3	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
Aluminum	Chicken Creek	4/18/2012	0.51	mg/L	Sample	
		4/18/2012	0.13	mg/L	Dup	
		8/28/2012	3.2	mg/L	Sample	
		8/28/2012	0.47	mg/L	Dup	
	Equipment Blank	4/18/2012	< 0.1	mg/L	Blank	
		4/18/2012	<0.05	mg/L	Blank	
		8/28/2012	< 0.05	mg/L	Blank	
	N. Fork Strawberry Creek	4/18/2012	<0.05	mg/L	Sample	
		8/28/2012	0.43	mg/L	Sample	
	Wildcat Creek	4/18/2012	1.4	mg/L	Sample	
		8/28/2012	0.25	mg/L	Sample	
	Winter Creek	4/18/2012	0.16	mg/L	Sample	
		8/28/2012	2.0	mg/L	Sample	
	Winter Creek Influent	4/18/2012	0.44	mg/L	Sample	
	Antimony (Filtered)	Cafeteria Creek	2/7/2012	0.0084	mg/L	Sample
		Chicken Creek	8/28/2012	< 0.002	mg/L	Sample
8/28/2012			< 0.002	mg/L	Dup	
Chicken Creek Downstream		2/8/2012	0.0033	mg/L	Sample	
		2/8/2012	0.003	mg/L	Dup	
Chicken Creek Upstream		2/8/2012	0.011	mg/L	Sample	
Equipment Blank		8/28/2012	< 0.002	mg/L	Blank	
Field Blank		2/8/2012	< 0.002	mg/L	Blank	
N. Fork Strawberry Creek		8/28/2012	< 0.002	mg/L	Sample	
N. Fork Strawberry Creek Downstream		2/8/2012	< 0.002	mg/L	Sample	
No Name Creek		2/8/2012	< 0.002	mg/L	Sample	
		8/28/2012	< 0.002	mg/L	Sample	
Ravine Creek		2/7/2012	0.018	mg/L	Sample	
		8/28/2012	< 0.002	mg/L	Sample	
Upper Botanical Garden Creek		2/8/2012	< 0.002	mg/L	Sample	
		8/28/2012	< 0.002	mg/L	Sample	
Wildcat Creek		8/28/2012	< 0.002	mg/L	Sample	
Winter Creek		2/8/2012	0.0023	mg/L	Sample	
		8/28/2012	< 0.002	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Arsenic (Filtered)	Cafeteria Creek	2/7/2012	0.0026	mg/L	Sample
	Chicken Creek	8/28/2012	0.004	mg/L	Sample
		8/28/2012	< 0.002	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	0.002	mg/L	Sample
		2/8/2012	< 0.002	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	0.0032	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.002	mg/L	Blank
	Field Blank	2/8/2012	< 0.002	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	0.0035	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	0.002	mg/L	Sample
	No Name Creek	2/8/2012	< 0.002	mg/L	Sample
		8/28/2012	0.0037	mg/L	Sample
	Ravine Creek	2/7/2012	0.002	mg/L	Sample
		8/28/2012	0.0072	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	0.0036	mg/L	Sample
		8/28/2012	0.0026	mg/L	Sample
	Wildcat Creek	8/28/2012	0.0036	mg/L	Sample
	Winter Creek	2/8/2012	< 0.002	mg/L	Sample
		8/28/2012	0.0027	mg/L	Sample
	Barium (Filtered)	Cafeteria Creek	2/7/2012	0.034	mg/L
Chicken Creek		8/28/2012	0.093	mg/L	Sample
		8/28/2012	0.081	mg/L	Dup
Chicken Creek Downstream		2/8/2012	0.083	mg/L	Sample
		2/8/2012	0.077	mg/L	Dup
Chicken Creek Upstream		2/8/2012	0.063	mg/L	Sample
Equipment Blank		8/28/2012	< 0.01	mg/L	Blank
Field Blank		2/8/2012	< 0.01	mg/L	Blank
N. Fork Strawberry Creek		8/28/2012	0.077	mg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	0.077	mg/L	Sample
No Name Creek		2/8/2012	0.056	mg/L	Sample
		8/28/2012	0.052	mg/L	Sample
Ravine Creek		2/7/2012	0.032	mg/L	Sample
		8/28/2012	0.11	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Barium (Filtered) (cont.)	Upper Botanical Garden Creek	2/8/2012	0.045	mg/L	Sample
		8/28/2012	0.051	mg/L	Sample
	Wildcat Creek	8/28/2012	0.023	mg/L	Sample
	Winter Creek	2/8/2012	0.07	mg/L	Sample
		8/28/2012	0.058	mg/L	Sample
Beryllium (Filtered)	Cafeteria Creek	2/7/2012	< 0.001	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
		2/8/2012	< 0.001	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.001	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.001	mg/L	Blank
	Field Blank	2/8/2012	< 0.001	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.001	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
	No Name Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.001	mg/L	Sample
	Winter Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
Cadmium (Filtered)	Cafeteria Creek	2/7/2012	< 0.001	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
		2/8/2012	< 0.001	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.001	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.001	mg/L	Blank
	Field Blank	2/8/2012	< 0.001	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.001	mg/L	Sample
N. Fork Strawberry Creek Downstream	2/8/2012	< 0.001	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Cadmium (Filtered) (cont.)	No Name Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.001	mg/L	Sample
	Winter Creek	2/8/2012	< 0.001	mg/L	Sample
8/28/2012		< 0.001	mg/L	Sample	
Chromium (Filtered)	Cafeteria Creek	2/7/2012	< 0.01	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.01	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.01	mg/L	Blank
	Field Blank	2/8/2012	< 0.01	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.01	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
	No Name Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.01	mg/L	Sample
Winter Creek	2/8/2012	< 0.01	mg/L	Sample	
	8/28/2012	< 0.01	mg/L	Sample	
Cobalt (Filtered)	Cafeteria Creek	2/7/2012	< 0.05	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.05	mg/L	Sample
		2/8/2012	< 0.05	mg/L	Dup
Chicken Creek Upstream	2/8/2012	< 0.05	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Cobalt (Filtered) (cont.)	Equipment Blank	8/28/2012	< 0.05	mg/L	Blank
	Field Blank	2/8/2012	< 0.05	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.05	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.05	mg/L	Sample
	No Name Creek	2/8/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.05	mg/L	Sample
	Winter Creek	2/8/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
Copper	Chicken Creek	4/18/2012	< 0.01	mg/L	Sample
		4/18/2012	< 0.005	mg/L	Dup
		8/28/2012	0.015	mg/L	Sample
		8/28/2012	0.014	mg/L	Dup
	Equipment Blank	4/18/2012	< 0.01	mg/L	Blank
		4/18/2012	< 0.005	mg/L	Blank
		8/28/2012	< 0.005	mg/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.01	mg/L	Sample
		8/28/2012	0.0063	mg/L	Sample
	Wildcat Creek	4/18/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.005	mg/L	Sample
	Winter Creek	4/18/2012	< 0.01	mg/L	Sample
		8/28/2012	0.0057	mg/L	Sample
Winter Creek Influent	4/18/2012	< 0.01	mg/L	Sample	
Copper (Filtered)	Cafeteria Creek	2/7/2012	< 0.01	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.01	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.01	mg/L	Blank
Field Blank	2/8/2012	< 0.01	mg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Copper (Filtered) (cont.)	N. Fork Strawberry Creek	8/28/2012	< 0.01	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Sample
	No Name Creek	8/28/2012	< 0.01	mg/L	Sample
		2/7/2012	< 0.01	mg/L	Sample
	Ravine Creek	8/28/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Sample
	Upper Botanical Garden Creek	8/28/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.01	mg/L	Sample
Winter Creek	2/8/2012	< 0.01	mg/L	Sample	
	8/28/2012	< 0.01	mg/L	Sample	
Iron	Chicken Creek	4/18/2012	0.5	mg/L	Sample
		4/18/2012	0.14	mg/L	Dup
		8/28/2012	3.1	mg/L	Sample
		8/28/2012	0.66	mg/L	Dup
	Equipment Blank	4/18/2012	<0.05	mg/L	Blank
		4/18/2012	< 0.1	mg/L	Blank
		8/28/2012	< 0.05	mg/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.05	mg/L	Sample
		8/28/2012	0.59	mg/L	Sample
	Wildcat Creek	4/18/2012	1.4	mg/L	Sample
		8/28/2012	0.33	mg/L	Sample
	Winter Creek	4/18/2012	0.17	mg/L	Sample
		8/28/2012	2.6	mg/L	Sample
Winter Creek Influent	4/18/2012	0.5	mg/L	Sample	
Lead	Chicken Creek	4/18/2012	< 0.001	mg/L	Sample
		4/18/2012	< 0.005	mg/L	Dup
		8/28/2012	0.0056	mg/L	Sample
		8/28/2012	0.0086	mg/L	Dup
	Equipment Blank	4/18/2012	< 0.001	mg/L	Blank
		4/18/2012	< 0.005	mg/L	Blank
		8/28/2012	< 0.005	mg/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.005	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Lead (cont.)	Wildcat Creek	4/18/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.005	mg/L	Sample
	Winter Creek	4/18/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.005	mg/L	Sample
	Winter Creek Influent	4/18/2012	< 0.001	mg/L	Sample
Lead (Filtered)	Cafeteria Creek	2/7/2012	< 0.001	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
		2/8/2012	< 0.001	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.001	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.001	mg/L	Blank
	Field Blank	2/8/2012	< 0.001	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.001	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
	No Name Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.001	mg/L	Sample
	Winter Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Magnesium	Chicken Creek	4/18/2012	45	mg/L
4/18/2012			35	mg/L	Dup
8/28/2012			32	mg/L	Sample
8/28/2012			31	mg/L	Dup
Equipment Blank		4/18/2012	< 0.5	mg/L	Blank
		4/18/2012	<0.05	mg/L	Blank
		8/28/2012	0.069	mg/L	Blank
N. Fork Strawberry Creek		4/18/2012	32	mg/L	Sample
		8/28/2012	27	mg/L	Sample
Wildcat Creek		4/18/2012	21	mg/L	Sample
		8/28/2012	22	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Magnesium (cont.)	Winter Creek	4/18/2012	45	mg/L	Sample
		8/28/2012	40	mg/L	Sample
	Winter Creek Influent	4/18/2012	33	mg/L	Sample
Mercury	Chicken Creek	4/18/2012	< 0.0002	mg/L	Sample
		4/18/2012	< 0.0002	mg/L	Dup
		8/28/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Dup
	Equipment Blank	4/18/2012	< 0.0002	mg/L	Blank
		4/18/2012	< 0.0002	mg/L	Blank
		8/28/2012	< 0.0002	mg/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Sample
	Wildcat Creek	4/18/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Sample
	Winter Creek	4/18/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Sample
	Winter Creek Influent	4/18/2012	< 0.0002	mg/L	Sample
	Mercury (Filtered)	Cafeteria Creek	2/7/2012	< 0.0002	mg/L
Chicken Creek		8/28/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Dup
Chicken Creek Downstream		2/8/2012	< 0.0002	mg/L	Sample
		2/8/2012	< 0.0002	mg/L	Dup
Chicken Creek Upstream		2/8/2012	< 0.0002	mg/L	Sample
Equipment Blank		8/28/2012	< 0.0002	mg/L	Blank
Field Blank		2/8/2012	< 0.0002	mg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 0.0002	mg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 0.0002	mg/L	Sample
No Name Creek		2/8/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Sample
Ravine Creek		2/7/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Sample
Upper Botanical Garden Creek		2/8/2012	< 0.0002	mg/L	Sample
		8/28/2012	< 0.0002	mg/L	Sample
Wildcat Creek		8/28/2012	< 0.0002	mg/L	Sample
Winter Creek	2/8/2012	< 0.0002	mg/L	Sample	
	8/28/2012	< 0.0002	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Molybdenum (Filtered)	Cafeteria Creek	2/7/2012	< 0.05	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.05	mg/L	Sample
		2/8/2012	< 0.05	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.05	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.05	mg/L	Blank
	Field Blank	2/8/2012	< 0.05	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.05	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.05	mg/L	Sample
	No Name Creek	2/8/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.05	mg/L	Sample
	Winter Creek	2/8/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Nickel (Filtered)	Cafeteria Creek	2/7/2012	< 0.01	mg/L
Chicken Creek		8/28/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Dup
Chicken Creek Downstream		2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Dup
Chicken Creek Upstream		2/8/2012	< 0.01	mg/L	Sample
Equipment Blank		8/28/2012	< 0.01	mg/L	Blank
Field Blank		2/8/2012	< 0.01	mg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 0.01	mg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 0.01	mg/L	Sample
No Name Creek		2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
Ravine Creek		2/7/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Nickel (Filtered) (cont.)	Upper Botanical Garden Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.01	mg/L	Sample
	Winter Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
Selenium (Filtered)	Cafeteria Creek	2/7/2012	< 0.002	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.002	mg/L	Sample
		8/28/2012	< 0.002	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.002	mg/L	Sample
		2/8/2012	< 0.002	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.002	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.002	mg/L	Blank
	Field Blank	2/8/2012	< 0.002	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.002	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.002	mg/L	Sample
		2/8/2012	< 0.002	mg/L	Sample
	No Name Creek	2/8/2012	< 0.002	mg/L	Sample
		8/28/2012	< 0.002	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.002	mg/L	Sample
		8/28/2012	0.0034	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.002	mg/L	Sample
		8/28/2012	< 0.002	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.002	mg/L	Sample
Winter Creek	2/8/2012	< 0.002	mg/L	Sample	
	8/28/2012	0.0022	mg/L	Sample	
Silver (Filtered)	Cafeteria Creek	2/7/2012	< 0.01	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.01	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.001	mg/L	Blank
	Field Blank	2/8/2012	< 0.01	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.01	mg/L	Sample
N. Fork Strawberry Creek Downstream	2/8/2012	< 0.01	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Silver (Filtered) (cont.)	No Name Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.01	mg/L	Sample
	Winter Creek	2/8/2012	< 0.01	mg/L	Sample
8/28/2012		< 0.01	mg/L	Sample	
Thallium (Filtered)	Cafeteria Creek	2/7/2012	< 0.001	mg/L	Sample
	Chicken Creek	8/28/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
		2/8/2012	< 0.001	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 0.001	mg/L	Sample
	Equipment Blank	8/28/2012	< 0.001	mg/L	Blank
	Field Blank	2/8/2012	< 0.001	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.001	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.001	mg/L	Sample
	No Name Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.001	mg/L	Sample
		8/28/2012	< 0.001	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.001	mg/L	Sample
	Winter Creek	2/8/2012	< 0.001	mg/L	Sample
8/28/2012		< 0.001	mg/L	Sample	
Vanadium (Filtered)	Cafeteria Creek	2/7/2012	< 0.01	mg/L	Sample
	Chicken Creek	8/28/2012	0.012	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Dup
Chicken Creek Upstream	2/8/2012	0.018	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Vanadium (Filtered) (cont.)	Equipment Blank	8/28/2012	< 0.01	mg/L	Blank
	Field Blank	2/8/2012	< 0.01	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.01	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
	No Name Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.01	mg/L	Sample
	Winter Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
Zinc	Chicken Creek	4/18/2012	< 0.05	mg/L	Sample
		4/18/2012	< 0.05	mg/L	Dup
		8/28/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Dup
	Equipment Blank	4/18/2012	< 0.05	mg/L	Blank
		4/18/2012	< 0.05	mg/L	Blank
		8/28/2012	< 0.05	mg/L	Blank
	N. Fork Strawberry Creek	4/18/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Wildcat Creek	4/18/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
	Winter Creek	4/18/2012	< 0.05	mg/L	Sample
		8/28/2012	< 0.05	mg/L	Sample
Winter Creek Influent	4/18/2012	< 0.05	mg/L	Sample	
Zinc (Filtered)	Cafeteria Creek	2/7/2012	0.013	mg/L	Sample
	Chicken Creek	8/28/2012	0.012	mg/L	Sample
		8/28/2012	< 0.02	mg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
		2/8/2012	< 0.01	mg/L	Dup
	Chicken Creek Upstream	2/8/2012	0.039	mg/L	Sample
Equipment Blank	8/28/2012	< 0.01	mg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Zinc (Filtered) (cont.)	Field Blank	2/8/2012	< 0.01	mg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 0.01	mg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 0.01	mg/L	Sample
	No Name Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Ravine Creek	2/7/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Upper Botanical Garden Creek	2/8/2012	0.023	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample
	Wildcat Creek	8/28/2012	< 0.01	mg/L	Sample
	Winter Creek	2/8/2012	< 0.01	mg/L	Sample
		8/28/2012	< 0.01	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Nutrients		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Nitrate plus Nitrite (as N)	Chicken Creek	4/18/2012	0.37	mg/L	Sample
		4/18/2012	0.36	mg/L	Dup
		8/28/2012	< 0.1	mg/L	Sample
		8/28/2012	< 0.1	mg/L	Dup
	Equipment Blank	4/18/2012	< 0.1	mg/L	Blank
		4/18/2012	< 0.1	mg/L	Blank
		8/28/2012	< 0.1	mg/L	Blank
	N. Fork Strawberry Creek	4/18/2012	0.76	mg/L	Sample
		8/28/2012	0.38	mg/L	Sample
	Wildcat Creek	4/18/2012	0.3	mg/L	Sample
		8/28/2012	0.18	mg/L	Sample
	Winter Creek	4/18/2012	2.2	mg/L	Sample
		8/28/2012	1.4	mg/L	Sample
	Winter Creek Influent	4/18/2012	< 0.1	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,1,2-Tetrachloroethane	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	1,1,1-Trichloroethane	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
Chicken Creek Upstream		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank	2/8/2012	< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,1-Trichloroethane (cont.)	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,1,2,2-Tetrachloroethane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,1,2-Trichloroethane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,2-Trichloroethane (cont.)	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,1-Dichloroethane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
Winter Creek	2/8/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	
1,1-Dichloroethene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1-Dichloroethene (cont.)	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,1-Dichloropropene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
1,2,3-Trichlorobenzene	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2,3-Trichlorobenzene (cont.)	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	1,2,3-Trichloropropane	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
Chicken Creek Upstream		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank
Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Wildcat Creek	8/28/2012	< 1	µg/L	Sample	
Winter Creek	2/8/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2,4-Trichlorobenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	1,2,4-Trimethylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
Chicken Creek Upstream		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank
Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Wildcat Creek		8/28/2012	< 1	µg/L	Sample
Winter Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dibromo-3-chloropropane	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 2	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	1,2-Dichlorobenzene	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
Chicken Creek Upstream		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank
Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichlorobenzene (cont.)	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,2-Dichloroethane	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
1,2-Dichloroethene (total)	Chicken Creek	8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Dup
1,2-Dichloropropane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichloropropane (cont.)	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,3,5-Trimethylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
1,3-Dichlorobenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,3-Dichlorobenzene (cont.)	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
1,3-Dichloropropane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
Winter Creek	2/8/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	
1,4-Dichlorobenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,4-Dichlorobenzene (cont.)	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
2,2-Dichloropropane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
Winter Creek	2/8/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	
2-Butanone	Chicken Creek	8/28/2012	< 10	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 10	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
2-Chlorotoluene	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample	
	Chicken Creek	8/28/2012	< 2	µg/L	Sample	
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample	
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample	
	Equipment Blank	8/28/2012	< 2	µg/L	Blank	
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample	
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample	
	No Name Creek		2/8/2012	< 2	µg/L	Sample
			8/28/2012	< 2	µg/L	Sample
	Ravine Creek		2/7/2012	< 2	µg/L	Sample
			8/28/2012	< 2	µg/L	Sample
	Trip Blank		2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek		2/8/2012	< 2	µg/L	Sample
			8/28/2012	< 2	µg/L	Sample
	Wildcat Creek		8/28/2012	< 2	µg/L	Sample
	Winter Creek		2/8/2012	< 2	µg/L	Sample
8/28/2012			< 2	µg/L	Sample	
2-Hexanone	Chicken Creek	8/28/2012	< 10	µg/L	Dup	
	Chicken Creek Downstream	2/8/2012	< 10	µg/L	Dup	
4-Chlorotoluene	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample	
	Chicken Creek	8/28/2012	< 2	µg/L	Sample	
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample	
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample	
	Equipment Blank	8/28/2012	< 2	µg/L	Blank	
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample	
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample	
	No Name Creek		2/8/2012	< 2	µg/L	Sample
			8/28/2012	< 2	µg/L	Sample
	Ravine Creek		2/7/2012	< 2	µg/L	Sample
			8/28/2012	< 2	µg/L	Sample
	Trip Blank		2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek		2/8/2012	< 2	µg/L	Sample
			8/28/2012	< 2	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
4-Chlorotoluene (cont.)	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
4-Methyl-2-pentanone	Chicken Creek	8/28/2012	< 10	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 10	µg/L	Dup
Acetone	Chicken Creek	8/28/2012	< 10	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 10	µg/L	Dup
Benzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
Bromobenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromobenzene (cont.)	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
Bromochloromethane	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
Winter Creek	2/8/2012	< 2	µg/L	Sample	
	8/28/2012	< 2	µg/L	Sample	
Bromodichloromethane	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromodichloromethane (cont.)	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Bromoform	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
Wildcat Creek	8/28/2012	< 2	µg/L	Sample	
Winter Creek	2/8/2012	< 2	µg/L	Sample	
	8/28/2012	< 2	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromomethane	Cafeteria Creek	2/7/2012	< 10	µg/L	Sample
	Chicken Creek	8/28/2012	< 10	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 10	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 10	µg/L	Sample
	Equipment Blank	8/28/2012	< 10	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 10	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 10	µg/L	Sample
	No Name Creek	2/8/2012	< 10	µg/L	Sample
		8/28/2012	< 10	µg/L	Sample
	Ravine Creek	2/7/2012	< 10	µg/L	Sample
		8/28/2012	< 10	µg/L	Sample
	Trip Blank	2/8/2012	< 10	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 10	µg/L	Sample
		8/28/2012	< 10	µg/L	Sample
	Wildcat Creek	8/28/2012	< 10	µg/L	Sample
Winter Creek	2/8/2012	< 10	µg/L	Sample	
	8/28/2012	< 10	µg/L	Sample	
Carbon disulfide	Chicken Creek	8/28/2012	< 5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 5	µg/L	Dup
Carbon tetrachloride	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek	2/7/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Carbon tetrachloride (cont.)	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Chlorobenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Chlorodifluoromethane	Cafeteria Creek	2/7/2012	< 30	µg/L	Sample
	Chicken Creek	8/28/2012	< 30	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 30	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 30	µg/L	Sample
	Equipment Blank	8/28/2012	< 30	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 30	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 30	µg/L	Sample
		2/8/2012	< 30	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chlorodifluoromethane (cont.)	Ravine Creek	2/7/2012	< 30	µg/L	Sample
		8/28/2012	< 30	µg/L	Sample
	Trip Blank	2/8/2012	< 30	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 30	µg/L	Sample
		8/28/2012	< 30	µg/L	Sample
	Wildcat Creek	8/28/2012	< 30	µg/L	Sample
	Winter Creek	2/8/2012	< 30	µg/L	Sample
		8/28/2012	< 30	µg/L	Sample
Chloroethane	Cafeteria Creek	2/7/2012	< 30	µg/L	Sample
	Chicken Creek	8/28/2012	< 30	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 30	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 30	µg/L	Sample
	Equipment Blank	8/28/2012	< 30	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 30	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 30	µg/L	Sample
	No Name Creek	2/8/2012	< 30	µg/L	Sample
		8/28/2012	< 30	µg/L	Sample
	Ravine Creek	2/7/2012	< 30	µg/L	Sample
		8/28/2012	< 30	µg/L	Sample
	Trip Blank	2/8/2012	< 30	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 30	µg/L	Sample
		8/28/2012	< 30	µg/L	Sample
	Wildcat Creek	8/28/2012	< 30	µg/L	Sample
	Winter Creek	2/8/2012	< 30	µg/L	Sample
8/28/2012		< 30	µg/L	Sample	
Chloroform	Cafeteria Creek	2/7/2012	< 3	µg/L	Sample
	Chicken Creek	8/28/2012	< 3	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 3	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 3	µg/L	Sample
Equipment Blank	8/28/2012	< 3	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chloroform (cont.)	N. Fork Strawberry Creek	8/28/2012	< 3	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	No Name Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Ravine Creek	2/7/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Trip Blank	2/8/2012	< 3	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Wildcat Creek	8/28/2012	< 3	µg/L	Sample
Winter Creek	2/8/2012	< 3	µg/L	Sample	
	8/28/2012	< 3	µg/L	Sample	
Chloromethane	Cafeteria Creek	2/7/2012	< 10	µg/L	Sample
	Chicken Creek	8/28/2012	< 10	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 10	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 10	µg/L	Sample
	Equipment Blank	8/28/2012	< 10	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 10	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 10	µg/L	Sample
	No Name Creek	2/8/2012	< 10	µg/L	Sample
		8/28/2012	< 10	µg/L	Sample
	Ravine Creek	2/7/2012	< 10	µg/L	Sample
		8/28/2012	< 10	µg/L	Sample
	Trip Blank	2/8/2012	< 10	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 10	µg/L	Sample
		8/28/2012	< 10	µg/L	Sample
	Wildcat Creek	8/28/2012	< 10	µg/L	Sample
Winter Creek	2/8/2012	< 10	µg/L	Sample	
	8/28/2012	< 10	µg/L	Sample	
cis-1,2-Dichloroethene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
cis-1,2-Dichloroethene (cont.)	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
cis-1,3-Dichloropropene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
Wildcat Creek	8/28/2012	< 1	µg/L	Sample	
Winter Creek	2/8/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Dibromochloromethane	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Dibromomethane	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
Chicken Creek Upstream		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank
Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Wildcat Creek		8/28/2012	< 1	µg/L	Sample
Winter Creek		2/8/2012	< 1	µg/L	Sample
	8/28/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Dichlorodifluoromethane	Cafeteria Creek	2/7/2012	< 3	µg/L	Sample
	Chicken Creek	8/28/2012	< 3	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 3	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 3	µg/L	Sample
	Equipment Blank	8/28/2012	< 3	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 3	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 3	µg/L	Sample
	No Name Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Ravine Creek	2/7/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Trip Blank	2/8/2012	< 3	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Wildcat Creek	8/28/2012	< 3	µg/L	Sample
	Winter Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Dichlorotrifluoroethane	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
Chicken Creek Upstream		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank
Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Wildcat Creek		8/28/2012	< 1	µg/L	Sample
Winter Creek		2/8/2012	< 1	µg/L	Sample
	8/28/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Ethanol	Chicken Creek	8/28/2012	< 2000	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2000	µg/L	Dup
Ethylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ethylene Dibromide	Cafeteria Creek	2/7/2012	< 2	µg/L
Chicken Creek		8/28/2012	< 2	µg/L	Sample
Chicken Creek Downstream		2/8/2012	< 2	µg/L	Sample
Chicken Creek Upstream		2/8/2012	< 2	µg/L	Sample
Equipment Blank		8/28/2012	< 2	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 2	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 2	µg/L	Sample
No Name Creek		2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
Ravine Creek		2/7/2012	< 2	µg/L	Sample
	8/28/2012	< 2	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Ethylene Dibromide (cont.)	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
8/28/2012		< 2	µg/L	Sample	
Freon 113	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 2	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 2	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Wildcat Creek	8/28/2012	< 1	µg/L	Sample	
Winter Creek	2/8/2012	< 1	µg/L	Sample	
	8/28/2012	< 1	µg/L	Sample	
Hexachlorobutadiene	Cafeteria Creek	2/7/2012	< 3	µg/L	Sample
	Chicken Creek	8/28/2012	< 3	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 3	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 3	µg/L	Sample
	Equipment Blank	8/28/2012	< 3	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 3	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 3	µg/L	Sample
No Name Creek	2/8/2012	< 3	µg/L	Sample	
	8/28/2012	< 3	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Hexachlorobutadiene (cont.)	Ravine Creek	2/7/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Trip Blank	2/8/2012	< 3	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
	Wildcat Creek	8/28/2012	< 3	µg/L	Sample
	Winter Creek	2/8/2012	< 3	µg/L	Sample
		8/28/2012	< 3	µg/L	Sample
Isopropylbenzene	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
Winter Creek	2/8/2012	< 2	µg/L	Sample	
	8/28/2012	< 2	µg/L	Sample	
Methylene chloride	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 10	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 10	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Methylene chloride (cont.)	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
Naphthalene	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
8/28/2012		< 2	µg/L	Sample	
n-Butylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
n-Butylbenzene (cont.)	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
n-Propylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
8/28/2012		< 1	µg/L	Sample	
p-Isopropyl toluene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
p-Isopropyl toluene (cont.)	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample	
	Equipment Blank	8/28/2012	< 1	µg/L	Blank	
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample	
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	
	No Name Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Ravine Creek		2/7/2012	< 1	µg/L	Sample
			8/28/2012	3.5	µg/L	Sample
	Trip Blank		2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Wildcat Creek		8/28/2012	< 1	µg/L	Sample
	Winter Creek		2/8/2012	< 1	µg/L	Sample
8/28/2012			< 1	µg/L	Sample	
sec-Butylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample	
	Chicken Creek	8/28/2012	< 1	µg/L	Sample	
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample	
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample	
	Equipment Blank	8/28/2012	< 1	µg/L	Blank	
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample	
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	
	No Name Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Ravine Creek		2/7/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Trip Blank		2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Wildcat Creek		8/28/2012	< 1	µg/L	Sample
	Winter Creek		2/8/2012	< 1	µg/L	Sample
8/28/2012			< 1	µg/L	Sample	
Styrene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample	
	Chicken Creek	8/28/2012	< 1	µg/L	Sample	
		8/28/2012	< 0.5	µg/L	Dup	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Styrene (cont.)	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	tert-Butylbenzene	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
Equipment Blank		8/28/2012	< 1	µg/L	Blank
N. Fork Strawberry Creek		8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream		2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 1	µg/L	Sample
No Name Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Ravine Creek		2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank
Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Wildcat Creek		8/28/2012	< 1	µg/L	Sample
Winter Creek		2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Tetrachloroethene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Toluene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
8/28/2012		3.2	µg/L	Sample	
Trip Blank	2/8/2012	< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Toluene (cont.)	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
Total xylene isomers	Cafeteria Creek	2/7/2012	< 2	µg/L	Sample
	Chicken Creek	8/28/2012	< 2	µg/L	Sample
		8/28/2012	< 1	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 1	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 2	µg/L	Sample
	Equipment Blank	8/28/2012	< 2	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 2	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 2	µg/L	Sample
		2/8/2012	< 2	µg/L	Sample
	No Name Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Ravine Creek	2/7/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Trip Blank	2/8/2012	< 2	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
	Wildcat Creek	8/28/2012	< 2	µg/L	Sample
	Winter Creek	2/8/2012	< 2	µg/L	Sample
		8/28/2012	< 2	µg/L	Sample
trans-1,2-Dichloroethene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
trans-1,2-Dichloroethene (cont.)	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
trans-1,3-Dichloropropene	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample
	Chicken Creek	8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample
	Equipment Blank	8/28/2012	< 1	µg/L	Blank
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample
	No Name Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Ravine Creek	2/7/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trip Blank	2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Trichloroethene	Cafeteria Creek	2/7/2012	< 1	µg/L
Chicken Creek		8/28/2012	< 1	µg/L	Sample
		8/28/2012	< 0.5	µg/L	Dup
Chicken Creek Downstream		2/8/2012	< 1	µg/L	Sample
		2/8/2012	< 0.5	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
Trichloroethene (cont.)	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample	
	Equipment Blank	8/28/2012	< 1	µg/L	Blank	
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample	
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	
	No Name Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Ravine Creek		2/7/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Trip Blank		2/8/2012	< 1	µg/L	Blank
	Upper Botanical Garden Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Wildcat Creek		8/28/2012	< 1	µg/L	Sample
	Winter Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
Trichlorofluoromethane	Chicken Creek	8/28/2012	< 1	µg/L	Dup	
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Dup	
Vinyl acetate	Chicken Creek	8/28/2012	< 20	µg/L	Dup	
	Chicken Creek Downstream	2/8/2012	< 20	µg/L	Dup	
Vinyl chloride	Cafeteria Creek	2/7/2012	< 1	µg/L	Sample	
	Chicken Creek	8/28/2012	< 1	µg/L	Sample	
		8/28/2012	< 0.5	µg/L	Dup	
	Chicken Creek Downstream	2/8/2012	< 1	µg/L	Sample	
		2/8/2012	< 0.5	µg/L	Dup	
	Chicken Creek Upstream	2/8/2012	< 1	µg/L	Sample	
	Equipment Blank	8/28/2012	< 1	µg/L	Blank	
	N. Fork Strawberry Creek	8/28/2012	< 1	µg/L	Sample	
	N. Fork Strawberry Creek Downstream	2/8/2012	< 1	µg/L	Sample	
	No Name Creek		2/8/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
	Ravine Creek		2/7/2012	< 1	µg/L	Sample
			8/28/2012	< 1	µg/L	Sample
Trip Blank		2/8/2012	< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Vinyl chloride (cont.)	Upper Botanical Garden Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample
	Wildcat Creek	8/28/2012	< 1	µg/L	Sample
	Winter Creek	2/8/2012	< 1	µg/L	Sample
		8/28/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
Chemical Oxygen Demand	MP3	2/7/2012	28	mg/L	Sample	
		2/7/2012	< 25	mg/L	Dup	
		3/13/2012	140	mg/L	Sample	
		11/8/2012	72	mg/L	Sample	
		11/8/2012	84	mg/L	Dup	
	MP4	2/7/2012	< 10	mg/L	Sample	
		3/13/2012	19	mg/L	Sample	
		11/8/2012	18	mg/L	Sample	
	MP5	2/7/2012	< 10	mg/L	Sample	
		3/13/2012	11	mg/L	Sample	
		11/8/2012	19	mg/L	Sample	
	Cyanide	MP4	2/7/2012	0.02	mg/L	Sample
			3/13/2012	0.08	mg/L	Sample
			11/8/2012	< 0.02	mg/L	Sample
		MP5	2/7/2012	< 0.01	mg/L	Sample
3/13/2012			0.03	mg/L	Sample	
11/8/2012			< 0.02	mg/L	Sample	
pH	MP1	2/7/2012	6.94	S.U.	Sample	
		3/13/2012	8.03	S.U.	Sample	
		11/8/2012	8.19	S.U.	Sample	
	MP2	2/7/2012	6.57	S.U.	Sample	
		3/13/2012	7.65	S.U.	Sample	
		11/8/2012	7.6	S.U.	Sample	
	MP3	2/7/2012	6.86	S.U.	Sample	
		2/7/2012	6.88	S.U.	Dup	
		3/13/2012	7.78	S.U.	Sample	
		11/8/2012	9.43	S.U.	Sample	
		11/8/2012	9.28	S.U.	Dup	
	MP4	2/7/2012	7.14	S.U.	Sample	
		3/13/2012	7.63	S.U.	Sample	
		11/8/2012	7.88	S.U.	Sample	
	MP5	2/7/2012	7.35	S.U.	Sample	
		3/13/2012	7.55	S.U.	Sample	
		11/8/2012	7.77	S.U.	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
pH (cont.)	MP6	2/7/2012	6.91	S.U.	Sample	
		3/13/2012	7.78	S.U.	Sample	
		11/8/2012	7.55	S.U.	Sample	
Specific Conductance	MP1	2/7/2012	23	µmhos/cm	Sample	
		3/13/2012	27	µmhos/cm	Sample	
		11/8/2012	110	µmhos/cm	Sample	
	MP2	2/7/2012	100	µmhos/cm	Sample	
		3/13/2012	62	µmhos/cm	Sample	
		11/8/2012	100	µmhos/cm	Sample	
	MP3	2/7/2012	49	µmhos/cm	Sample	
		2/7/2012	50	µmhos/cm	Dup	
		3/13/2012	26	µmhos/cm	Sample	
		11/8/2012	110	µmhos/cm	Sample	
		11/8/2012	100	µmhos/cm	Dup	
	MP4	2/7/2012	45	µmhos/cm	Sample	
		3/13/2012	76	µmhos/cm	Sample	
		11/8/2012	64	µmhos/cm	Sample	
	MP5	2/7/2012	11	µmhos/cm	Sample	
		3/13/2012	6.9	µmhos/cm	Sample	
		11/8/2012	30	µmhos/cm	Sample	
	MP6	2/7/2012	68	µmhos/cm	Sample	
		3/13/2012	39	µmhos/cm	Sample	
		11/8/2012	91	µmhos/cm	Sample	
	Total suspended solids (TSS)	MP1	2/7/2012	14	mg/L	Sample
			3/13/2012	62	mg/L	Sample
			11/8/2012	180	mg/L	Sample
		MP2	2/7/2012	12	mg/L	Sample
3/13/2012			57	mg/L	Sample	
11/8/2012			23	mg/L	Sample	
MP3		2/7/2012	6.0	mg/L	Sample	
		2/7/2012	4.2	mg/L	Dup	
		3/13/2012	90	mg/L	Sample	
		11/8/2012	30	mg/L	Sample	
		11/8/2012	66	mg/L	Dup	
MP4		2/7/2012	< 5	mg/L	Sample	
		3/13/2012	27	mg/L	Sample	
		11/8/2012	51	mg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Total suspended solids (TSS) (cont.)	MP5	2/7/2012	< 5	mg/L	Sample
		3/13/2012	4.0	mg/L	Sample
		11/8/2012	9.0	mg/L	Sample
	MP6	2/7/2012	19	mg/L	Sample
		3/13/2012	13	mg/L	Sample
		11/8/2012	38	mg/L	Sample
Turbidity	MP1	11/8/2012	184	NTU	Sample
	MP2	11/8/2012	29.4	NTU	Sample
	MP3	11/8/2012	41.8	NTU	Sample
		11/8/2012	58	NTU	Dup
	MP4	11/8/2012	60.2	NTU	Sample
	MP5	11/8/2012	18.1	NTU	Sample
	MP6	11/8/2012	40.9	NTU	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Aluminum	MP3	2/7/2012	0.14	mg/L	Sample
		2/7/2012	0.22	mg/L	Dup
		3/13/2012	0.5	mg/L	Sample
		11/8/2012	0.42	mg/L	Sample
		11/8/2012	2.3	mg/L	Dup
	Travel Blank	2/7/2012	< 0.05	mg/L	Blank
		2/7/2012	< 0.05	mg/L	Blank
		11/8/2012	< 0.05	mg/L	Blank
		11/8/2012	< 0.05	mg/L	Blank
	Arsenic	MP4	2/7/2012	< 0.05	mg/L
3/13/2012			< 0.05	mg/L	Sample
11/8/2012			< 0.05	mg/L	Sample
MP5		2/7/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Sample
		11/8/2012	< 0.05	mg/L	Sample
Cadmium	MP4	2/7/2012	< 0.01	mg/L	Sample
		3/13/2012	< 0.01	mg/L	Sample
		11/8/2012	< 0.01	mg/L	Sample
	MP5	2/7/2012	< 0.01	mg/L	Sample
		3/13/2012	< 0.01	mg/L	Sample
		11/8/2012	< 0.01	mg/L	Sample
Copper	MP3	2/7/2012	0.018	mg/L	Sample
		2/7/2012	0.024	mg/L	Dup
		3/13/2012	0.043	mg/L	Sample
		11/8/2012	0.1	mg/L	Sample
		11/8/2012	0.089	mg/L	Dup
	Travel Blank	2/7/2012	< 0.01	mg/L	Blank
		2/7/2012	< 0.005	mg/L	Blank
		11/8/2012	< 0.005	mg/L	Blank
		11/8/2012	< 0.005	mg/L	Blank
Iron	MP3	2/7/2012	0.23	mg/L	Sample
		2/7/2012	0.42	mg/L	Dup
		3/13/2012	0.85	mg/L	Sample
		11/8/2012	0.69	mg/L	Sample
		11/8/2012	4.5	mg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Iron (cont.)	Travel Blank	2/7/2012	< 0.05	mg/L	Blank
		2/7/2012	< 0.05	mg/L	Blank
		11/8/2012	< 0.05	mg/L	Blank
		11/8/2012	< 0.05	mg/L	Blank
Lead	MP3	2/7/2012	< 0.005	mg/L	Sample
		2/7/2012	0.0038	mg/L	Dup
		3/13/2012	0.024	mg/L	Sample
		11/8/2012	0.011	mg/L	Sample
		11/8/2012	0.062	mg/L	Dup
	MP4	2/7/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Sample
		11/8/2012	< 0.05	mg/L	Sample
	MP5	2/7/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Sample
		11/8/2012	< 0.05	mg/L	Sample
	Travel Blank	2/7/2012	< 0.005	mg/L	Blank
		2/7/2012	< 0.001	mg/L	Blank
		11/8/2012	< 0.005	mg/L	Blank
11/8/2012		< 0.005	mg/L	Blank	
Magnesium	MP4	2/7/2012	0.36	mg/L	Sample
		3/13/2012	1.1	mg/L	Sample
		11/8/2012	1.0	mg/L	Sample
	MP5	2/7/2012	0.14	mg/L	Sample
		3/13/2012	0.13	mg/L	Sample
		11/8/2012	0.45	mg/L	Sample
Mercury	MP4	2/7/2012	< 0.0002	mg/L	Sample
		3/13/2012	< 0.0002	mg/L	Sample
		11/8/2012	< 0.0002	mg/L	Sample
	MP5	2/7/2012	< 0.0002	mg/L	Sample
		3/13/2012	< 0.0002	mg/L	Sample
		11/8/2012	< 0.0002	mg/L	Sample
Selenium	MP4	2/7/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Sample
		11/8/2012	< 0.05	mg/L	Sample
	MP5	2/7/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Sample
		11/8/2012	< 0.05	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Silver	MP4	2/7/2012	< 0.01	mg/L	Sample
		3/13/2012	< 0.01	mg/L	Sample
		11/8/2012	< 0.01	mg/L	Sample
	MP5	2/7/2012	< 0.01	mg/L	Sample
		3/13/2012	< 0.01	mg/L	Sample
		11/8/2012	< 0.01	mg/L	Sample
Zinc	MP3	2/7/2012	0.13	mg/L	Sample
		2/7/2012	0.2	mg/L	Dup
		3/13/2012	0.4	mg/L	Sample
		11/8/2012	0.26	mg/L	Sample
		11/8/2012	0.53	mg/L	Dup
	Travel Blank	2/7/2012	< 0.05	mg/L	Blank
		2/7/2012	< 0.05	mg/L	Blank
		11/8/2012	< 0.05	mg/L	Blank
		11/8/2012	0.082	mg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Nutrients		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Ammonia Nitrogen (as N)	MP4	2/7/2012	0.27	mg/L	Sample
		3/13/2012	0.16	mg/L	Sample
		11/8/2012	0.36	mg/L	Sample
	MP5	2/7/2012	0.23	mg/L	Sample
		3/13/2012	0.13	mg/L	Sample
		11/8/2012	0.31	mg/L	Sample
Nitrate plus Nitrite (as N)	MP3	2/7/2012	0.21	mg/L	Sample
		2/7/2012	0.27	mg/L	Dup
		3/13/2012	0.11	mg/L	Sample
		11/8/2012	0.67	mg/L	Sample
		11/8/2012	0.78	mg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Petroleum Hydrocarbons		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Oil and Grease	MP1	2/7/2012	< 4.8	mg/L	Sample
		3/13/2012	< 4.8	mg/L	Sample
		11/8/2012	< 4.8	mg/L	Sample
	MP2	2/7/2012	< 4.8	mg/L	Sample
		3/13/2012	< 4.8	mg/L	Sample
		11/8/2012	< 4.8	mg/L	Sample
	MP3	2/7/2012	< 4.8	mg/L	Sample
		2/7/2012	< 5	mg/L	Dup
		3/13/2012	< 4.8	mg/L	Sample
		11/8/2012	< 4.8	mg/L	Sample
		11/8/2012	< 5	mg/L	Dup
	MP4	2/7/2012	< 4.7	mg/L	Sample
		3/13/2012	< 4.8	mg/L	Sample
		11/8/2012	< 4.8	mg/L	Sample
	MP5	2/7/2012	< 4.7	mg/L	Sample
		3/13/2012	< 4.8	mg/L	Sample
		11/8/2012	< 4.8	mg/L	Sample
	MP6	2/7/2012	< 4.7	mg/L	Sample
		3/13/2012	6.0	mg/L	Sample
		11/8/2012	< 4.8	mg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Carbon 14	Hearst Sewer	2/13/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
		2/13/2012	< 1.8	Bq/L	< 49	pCi/L	Split
		3/12/2012	< 2	Bq/L	< 54	pCi/L	Sample
		4/9/2012	< 2.4	Bq/L	< 65	pCi/L	Sample
		5/16/2012	< 2.8	Bq/L	< 77	pCi/L	Sample
		6/11/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
		7/9/2012	< 2.3	Bq/L	< 63	pCi/L	Sample
		8/13/2012	< 2.5	Bq/L	< 68	pCi/L	Sample
		9/17/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
		10/8/2012	< 1.9	Bq/L	< 51	pCi/L	Sample
		11/13/2012	< 2.5	Bq/L	< 68	pCi/L	Sample
		12/12/2012	< 2.3	Bq/L	< 63	pCi/L	Sample
		1/15/2013	< 1.4	Bq/L	< 37	pCi/L	Sample
	Strawberry Sewer	2/13/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
		3/12/2012	< 2	Bq/L	< 53	pCi/L	Sample
		4/9/2012	< 2.4	Bq/L	< 65	pCi/L	Sample
		5/16/2012	< 2.8	Bq/L	< 76	pCi/L	Sample
		6/11/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
		6/11/2012	< 1.7	Bq/L	< 45	pCi/L	Split
		7/9/2012	< 2.3	Bq/L	< 63	pCi/L	Sample
		8/13/2012	< 2.5	Bq/L	< 68	pCi/L	Sample
		9/17/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
		10/8/2012	< 1.9	Bq/L	< 51	pCi/L	Sample
		11/13/2012	< 2.5	Bq/L	< 68	pCi/L	Sample
		11/13/2012	< 2	Bq/L	< 53	pCi/L	Split
		12/12/2012	< 2.3	Bq/L	< 62	pCi/L	Sample
1/15/2013	< 1.4	Bq/L	< 37	pCi/L	Sample		
Travel Blank	2/13/2012	< 2.3	Bq/L	< 62	pCi/L	Blank	
	2/13/2012	< 1.8	Bq/L	< 50	pCi/L	Blank	
Gross alpha	Hearst Sewer	2/13/2012	< 0.073	Bq/L	< 2	pCi/L	Sample
		2/13/2012	< 0.058	Bq/L	< 1.6	pCi/L	Split
		3/12/2012	< 0.069	Bq/L	< 1.9	pCi/L	Sample
		4/9/2012	< 0.073	Bq/L	< 2	pCi/L	Sample
		5/16/2012	< 0.037	Bq/L	< 1	pCi/L	Sample
		6/11/2012	< 0.038	Bq/L	< 1	pCi/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Gross alpha (cont.)	Hearst Sewer (cont.)	7/9/2012	< 0.072	Bq/L	< 1.9	pCi/L	Sample
		8/13/2012	< 0.069	Bq/L	< 1.9	pCi/L	Sample
		9/17/2012	< 0.068	Bq/L	< 1.8	pCi/L	Sample
		10/8/2012	< 0.071	Bq/L	< 1.9	pCi/L	Sample
		11/13/2012	< 0.073	Bq/L	< 2	pCi/L	Sample
		12/12/2012	< 0.071	Bq/L	< 1.9	pCi/L	Sample
		1/15/2013	< 0.072	Bq/L	< 1.9	pCi/L	Sample
	Strawberry Sewer	2/13/2012	< 0.057	Bq/L	< 1.5	pCi/L	Sample
		3/12/2012	< 0.07	Bq/L	< 1.9	pCi/L	Sample
		4/9/2012	< 0.071	Bq/L	< 1.9	pCi/L	Sample
		5/16/2012	< 0.047	Bq/L	< 1.3	pCi/L	Sample
		6/11/2012	< 0.059	Bq/L	< 1.6	pCi/L	Sample
		6/11/2012	< 0.04	Bq/L	< 1.1	pCi/L	Split
		7/9/2012	< 0.069	Bq/L	< 1.9	pCi/L	Sample
		8/13/2012	< 0.069	Bq/L	< 1.9	pCi/L	Sample
		9/17/2012	< 0.072	Bq/L	< 1.9	pCi/L	Sample
		10/8/2012	< 0.078	Bq/L	< 2.1	pCi/L	Sample
		11/13/2012	< 0.066	Bq/L	< 1.8	pCi/L	Sample
		11/13/2012	< 0.043	Bq/L	< 1.2	pCi/L	Split
		12/12/2012	< 0.073	Bq/L	< 2	pCi/L	Sample
		1/15/2013	< 0.073	Bq/L	< 2	pCi/L	Sample
		Travel Blank	2/13/2012	< 0.041	Bq/L	< 1.1	pCi/L
	2/13/2012		< 0.041	Bq/L	< 1.1	pCi/L	Blank
Gross beta	Hearst Sewer	2/13/2012	0.4	Bq/L	11	pCi/L	Sample
		2/13/2012	0.43	Bq/L	12	pCi/L	Split
		3/12/2012	0.47	Bq/L	13	pCi/L	Sample
		4/9/2012	0.69	Bq/L	19	pCi/L	Sample
		5/16/2012	0.54	Bq/L	15	pCi/L	Sample
		6/11/2012	< 0.084	Bq/L	< 2.3	pCi/L	Sample
		7/9/2012	0.54	Bq/L	15	pCi/L	Sample
		8/13/2012	0.61	Bq/L	16	pCi/L	Sample
		9/17/2012	0.63	Bq/L	17	pCi/L	Sample
		10/8/2012	0.42	Bq/L	11	pCi/L	Sample
		11/13/2012	0.82	Bq/L	22	pCi/L	Sample
		12/12/2012	0.4	Bq/L	11	pCi/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Gross beta (cont.)	Hearst Sewer (cont.)	1/15/2013	0.35	Bq/L	9.5	pCi/L	Sample
		1/15/2013	0.4	Bq/L	11	pCi/L	Sample
	Strawberry Sewer	2/13/2012	0.15	Bq/L	4.1	pCi/L	Sample
		3/12/2012	0.49	Bq/L	13	pCi/L	Sample
		4/9/2012	0.39	Bq/L	11	pCi/L	Sample
		5/16/2012	0.39	Bq/L	10	pCi/L	Sample
		6/11/2012	< 0.088	Bq/L	< 2.4	pCi/L	Sample
		6/11/2012	0.33	Bq/L	8.8	pCi/L	Split
		7/9/2012	0.34	Bq/L	9.3	pCi/L	Sample
		8/13/2012	0.24	Bq/L	6.4	pCi/L	Sample
		9/17/2012	0.3	Bq/L	8	pCi/L	Sample
		10/8/2012	0.086	Bq/L	2.3	pCi/L	Sample
		11/13/2012	0.12	Bq/L	3.1	pCi/L	Sample
		11/13/2012	0.17	Bq/L	4.5	pCi/L	Split
		12/12/2012	0.2	Bq/L	5.3	pCi/L	Sample
		1/15/2013	0.26	Bq/L	7.1	pCi/L	Sample
		Travel Blank	2/13/2012	< 0.077	Bq/L	< 2.1	pCi/L
	2/13/2012		< 0.095	Bq/L	< 2.6	pCi/L	Blank
	I-125	Hearst Sewer	2/13/2012	< 0.93	Bq/L	< 25	pCi/L
2/13/2012			< 0.77	Bq/L	< 21	pCi/L	Split
3/12/2012			< 0.76	Bq/L	< 20	pCi/L	Sample
4/9/2012			< 0.87	Bq/L	< 24	pCi/L	Sample
5/16/2012			< 0.69	Bq/L	< 19	pCi/L	Sample
6/11/2012			< 0.49	Bq/L	< 13	pCi/L	Sample
7/9/2012			< 0.38	Bq/L	< 10	pCi/L	Sample
8/13/2012			< 0.39	Bq/L	< 10	pCi/L	Sample
9/17/2012			< 0.29	Bq/L	< 7.9	pCi/L	Sample
10/8/2012			< 0.85	Bq/L	< 23	pCi/L	Sample
11/13/2012			< 0.17	Bq/L	< 4.5	pCi/L	Sample
12/12/2012			< 0.36	Bq/L	< 9.8	pCi/L	Sample
1/15/2013			< 0.42	Bq/L	< 11	pCi/L	Sample
Strawberry Sewer		2/13/2012	< 0.76	Bq/L	< 20	pCi/L	Sample
		3/12/2012	< 0.49	Bq/L	< 13	pCi/L	Sample
		4/9/2012	< 0.67	Bq/L	< 18	pCi/L	Sample
		5/16/2012	< 0.47	Bq/L	< 13	pCi/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
I-125 (cont.)	Strawberry Sewer (cont.)	6/11/2012	< 0.31	Bq/L	< 8.4	pCi/L	Sample
		6/11/2012	< 0.26	Bq/L	< 6.9	pCi/L	Split
		7/9/2012	< 0.5	Bq/L	< 14	pCi/L	Sample
		8/13/2012	< 0.27	Bq/L	< 7.2	pCi/L	Sample
		9/17/2012	< 0.3	Bq/L	< 8.2	pCi/L	Sample
		10/8/2012	< 0.41	Bq/L	< 11	pCi/L	Sample
		11/13/2012	< 0.21	Bq/L	< 5.6	pCi/L	Sample
		11/13/2012	< 0.38	Bq/L	< 10	pCi/L	Split
		12/12/2012	< 0.19	Bq/L	< 5.1	pCi/L	Sample
		1/15/2013	< 0.25	Bq/L	< 6.7	pCi/L	Sample
	Travel Blank	2/13/2012	< 0.88	Bq/L	< 24	pCi/L	Blank
Tritium	Hearst Sewer	2/13/2012	< 6.5	Bq/L	< 180	pCi/L	Sample
		2/13/2012	< 9.3	Bq/L	< 250	pCi/L	Split
		3/12/2012	< 6.7	Bq/L	< 180	pCi/L	Sample
		4/9/2012	< 6.1	Bq/L	< 160	pCi/L	Sample
		5/16/2012	< 5.5	Bq/L	< 150	pCi/L	Sample
		6/11/2012	< 6.4	Bq/L	< 170	pCi/L	Sample
		7/9/2012	< 4.4	Bq/L	< 120	pCi/L	Sample
		8/13/2012	< 6	Bq/L	< 160	pCi/L	Sample
		9/17/2012	< 6.9	Bq/L	< 190	pCi/L	Sample
		10/8/2012	< 6	Bq/L	< 160	pCi/L	Sample
		11/13/2012	< 6.6	Bq/L	< 180	pCi/L	Sample
		12/12/2012	< 6.6	Bq/L	< 180	pCi/L	Sample
		1/15/2013	< 5.7	Bq/L	< 160	pCi/L	Sample
		Strawberry Sewer	2/13/2012	< 6.4	Bq/L	< 170	pCi/L
	3/12/2012		< 6.6	Bq/L	< 180	pCi/L	Sample
	4/9/2012		< 6.1	Bq/L	< 170	pCi/L	Sample
	5/16/2012		< 5.6	Bq/L	< 150	pCi/L	Sample
	6/11/2012		< 6.4	Bq/L	< 170	pCi/L	Sample
	6/11/2012		< 7.8	Bq/L	< 210	pCi/L	Split
	7/9/2012		< 4.4	Bq/L	< 120	pCi/L	Sample
	8/13/2012		< 6	Bq/L	< 160	pCi/L	Sample
	9/17/2012	< 7	Bq/L	< 190	pCi/L	Sample	
10/8/2012	< 6	Bq/L	< 160	pCi/L	Sample		
11/13/2012	< 6.6	Bq/L	< 180	pCi/L	Sample		

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Tritium (cont.)	Strawberry Sewer (cont.)	11/13/2012	< 8.5	Bq/L	< 230	pCi/L	Split
		12/12/2012	< 6.5	Bq/L	< 180	pCi/L	Sample
		1/15/2013	< 5.6	Bq/L	< 150	pCi/L	Sample
	Travel Blank	2/13/2012	< 6.5	Bq/L	< 180	pCi/L	Blank
		2/13/2012	< 9.3	Bq/L	< 250	pCi/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chemical Oxygen Demand (Filtered)	Hearst Sewer	3/13/2012	110	mg/L	Sample
	Strawberry Sewer	3/13/2012	100	mg/L	Sample
	Travel Blank	3/13/2012	< 25	mg/L	Blank
Chemical Oxygen Demand	Strawberry Sewer	3/13/2012	140	mg/L	Split
	Travel Blank	3/13/2012	< 10	mg/L	Blank
pH	Hearst Sewer	3/13/2012	8.6	S.U.	Sample
	Strawberry Sewer	3/13/2012	8.4	S.U.	Sample
Total suspended solids (TSS)	Hearst Sewer	3/13/2012	410	mg/L	Sample
	Strawberry Sewer	3/13/2012	330	mg/L	Sample
		3/13/2012	220	mg/L	Split
	Travel Blank	3/13/2012	< 1.5	mg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Cadmium	Hearst Sewer	3/13/2012	< 0.01	mg/L	Sample
	Strawberry Sewer	3/13/2012	< 0.01	mg/L	Sample
		3/13/2012	< 0.01	mg/L	Split
	Travel Blank	3/13/2012	< 0.01	mg/L	Blank
		3/13/2012	< 0.01	mg/L	Blank
Chromium	Hearst Sewer	3/13/2012	< 0.05	mg/L	Sample
	Strawberry Sewer	3/13/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Split
	Travel Blank	3/13/2012	< 0.05	mg/L	Blank
		3/13/2012	< 0.05	mg/L	Blank
Copper	Hearst Sewer	3/13/2012	0.094	mg/L	Sample
	Strawberry Sewer	3/13/2012	0.32	mg/L	Sample
		3/13/2012	0.09	mg/L	Split
	Travel Blank	3/13/2012	< 0.05	mg/L	Blank
		3/13/2012	< 0.05	mg/L	Blank
Lead	Hearst Sewer	3/13/2012	0.033	mg/L	Sample
	Strawberry Sewer	3/13/2012	0.01	mg/L	Sample
		3/13/2012	< 0.1	mg/L	Split
	Travel Blank	3/13/2012	< 0.01	mg/L	Blank
		3/13/2012	< 0.1	mg/L	Blank
Nickel	Hearst Sewer	3/13/2012	< 0.01	mg/L	Sample
	Strawberry Sewer	3/13/2012	0.047	mg/L	Sample
		3/13/2012	< 0.1	mg/L	Split
	Travel Blank	3/13/2012	< 0.1	mg/L	Blank
		3/13/2012	< 0.01	mg/L	Blank
Silver	Hearst Sewer	3/13/2012	< 0.05	mg/L	Sample
	Strawberry Sewer	3/13/2012	< 0.05	mg/L	Sample
		3/13/2012	< 0.05	mg/L	Split
	Travel Blank	3/13/2012	< 0.05	mg/L	Blank
		3/13/2012	< 0.05	mg/L	Blank
Zinc	Hearst Sewer	3/13/2012	0.31	mg/L	Sample
	Strawberry Sewer	3/13/2012	0.57	mg/L	Sample
		3/13/2012	0.4	mg/L	Split
	Travel Blank	3/13/2012	< 0.05	mg/L	Blank
		3/13/2012	< 0.05	mg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,1-Trichloroethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,1,2,2-Tetrachloroethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,1,2-Trichloroethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,1-Dichloroethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,1-Dichloroethene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,2-Dichlorobenzene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,2-Dichloroethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichloroethene (total)	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 2	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,2-Dichloropropane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,3-Dichlorobenzene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
1,4-Dichlorobenzene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
2-Butanone	Hearst Sewer	3/13/2012	< 20	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 20	µg/L	Sample
		3/13/2012	< 20	µg/L	Split
	Travel Blank	3/13/2012	< 20	µg/L	Blank
		3/13/2012	< 20	µg/L	Blank
2-Chloroethylvinylether	Hearst Sewer	3/13/2012	< 20	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 20	µg/L	Sample
		3/13/2012	< 20	µg/L	Split
	Travel Blank	3/13/2012	< 20	µg/L	Blank
		3/13/2012	< 20	µg/L	Blank
2-Hexanone	Hearst Sewer	3/13/2012	< 20	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 20	µg/L	Sample
		3/13/2012	< 20	µg/L	Split
	Travel Blank	3/13/2012	< 20	µg/L	Blank
		3/13/2012	< 20	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
4-Methyl-2-pentanone	Hearst Sewer	3/13/2012	< 20	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 20	µg/L	Sample
		3/13/2012	< 20	µg/L	Split
	Travel Blank	3/13/2012	< 20	µg/L	Blank
		3/13/2012	< 20	µg/L	Blank
Acetone	Hearst Sewer	3/13/2012	1100	µg/L	Sample
	Strawberry Sewer	3/13/2012	170	µg/L	Sample
		3/13/2012	140	µg/L	Split
	Travel Blank	3/13/2012	< 10	µg/L	Blank
		3/13/2012	< 10	µg/L	Blank
Benzene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Bromodichloromethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Bromoform	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Bromomethane	Hearst Sewer	3/13/2012	< 2	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 2	µg/L	Sample
		3/13/2012	< 2	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 2	µg/L	Blank
Carbon disulfide	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Carbon tetrachloride	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Chlorobenzene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Chloroethane	Hearst Sewer	3/13/2012	< 2	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 2	µg/L	Sample
		3/13/2012	< 2	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 2	µg/L	Blank
Chloroform	Hearst Sewer	3/13/2012	5.8	µg/L	Sample
	Strawberry Sewer	3/13/2012	4.2	µg/L	Sample
		3/13/2012	4.4	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Chloromethane	Hearst Sewer	3/13/2012	< 2	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 2	µg/L	Sample
		3/13/2012	< 2	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 2	µg/L	Blank
cis-1,2-Dichloroethene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
cis-1,3-Dichloropropene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Dibromochloromethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Dibromomethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Dichlorodifluoromethane	Hearst Sewer	3/13/2012	< 2	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 2	µg/L	Sample
		3/13/2012	< 2	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 2	µg/L	Blank
Ethylbenzene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Freon 113	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 2	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Methylene chloride	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 10	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 10	µg/L	Blank
Styrene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Tetrachloroethene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Toluene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Total xylene isomers	Hearst Sewer	3/13/2012	< 2	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 2	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 2	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
trans-1,2-Dichloroethene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
trans-1,3-Dichloropropene	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank
Trichloroethene	Hearst Sewer	3/13/2012	< 0.5	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 0.5	µg/L	Sample
		3/13/2012	< 0.5	µg/L	Split
	Travel Blank	3/13/2012	< 0.5	µg/L	Blank
		3/13/2012	< 0.5	µg/L	Blank
Trichlorofluoromethane	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Vinyl acetate	Hearst Sewer	3/13/2012	< 20	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 20	µg/L	Sample
		3/13/2012	< 10	µg/L	Split
	Travel Blank	3/13/2012	< 20	µg/L	Blank
		3/13/2012	< 10	µg/L	Blank
Vinyl chloride	Hearst Sewer	3/13/2012	< 1	µg/L	Sample
	Strawberry Sewer	3/13/2012	< 1	µg/L	Sample
		3/13/2012	< 1	µg/L	Split
	Travel Blank	3/13/2012	< 1	µg/L	Blank
		3/13/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Cadmium	77 FTU	11/29/2012	< 0.05	mg/L	Sample
		11/29/2012	< 0.01	mg/L	Split
	Travel Blank	11/29/2012	< 0.01	mg/L	Blank
		11/29/2012	< 0.01	mg/L	Split
Chromium	77 FTU	11/29/2012	< 0.25	mg/L	Sample
		11/29/2012	< 0.05	mg/L	Split
	Travel Blank	11/29/2012	< 0.05	mg/L	Blank
		11/29/2012	< 0.05	mg/L	Split
Copper	77 FTU	11/29/2012	0.49	mg/L	Sample
		11/29/2012	0.5	mg/L	Split
	Travel Blank	11/29/2012	< 0.05	mg/L	Blank
		11/29/2012	< 0.05	mg/L	Split
Lead	77 FTU	11/29/2012	< 0.5	mg/L	Sample
		11/29/2012	< 0.1	mg/L	Split
	Travel Blank	11/29/2012	< 0.1	mg/L	Blank
		11/29/2012	< 0.1	mg/L	Split
Nickel	77 FTU	11/29/2012	< 0.5	mg/L	Sample
		11/29/2012	0.1	mg/L	Split
	Travel Blank	11/29/2012	< 0.1	mg/L	Blank
		11/29/2012	< 0.1	mg/L	Split
Silver	77 FTU	11/29/2012	< 0.25	mg/L	Sample
		11/29/2012	< 0.05	mg/L	Split
	Travel Blank	11/29/2012	< 0.05	mg/L	Blank
		11/29/2012	< 0.05	mg/L	Split
Zinc	77 FTU	11/29/2012	< 0.25	mg/L	Sample
		11/29/2012	< 0.05	mg/L	Split
	Travel Blank	11/29/2012	< 0.05	mg/L	Blank
		11/29/2012	< 0.05	mg/L	Split

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
pH	77 FTU	11/28/2012	7.8	S.U.	Sample
		11/28/2012	7.8	S.U.	Split

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,1-Trichloroethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
12/4/2012		< 1	µg/L	Sample	
12/4/2012		< 1	µg/L	Dup	
Trip Blank	2/14/2012	< 1	µg/L	Blank	
	2/14/2012	< 1	µg/L	Blank	
	5/2/2012	< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,1-Trichloroethane (cont.)	Trip Blank (cont.)	5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
1,1,2,2-Tetrachloroethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
8/14/2012		< 1	µg/L	Sample	
8/14/2012		< 1	µg/L	Dup	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1,2,2-Tetrachloroethane (cont.)	B7 Coll Trench Treatment System (cont.)	12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
12/4/2012	< 1	µg/L	Blank		
1,1,2-Trichloroethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
B6 Treatment System	2/14/2012	< 1	µg/L	Sample	
	5/2/2012	< 1	µg/L	Sample	
	8/14/2012	< 1	µg/L	Sample	
	12/4/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
1,1,2-Trichloroethane (cont.)	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample	
		2/14/2012	< 1	µg/L	Dup	
		5/2/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Dup	
		8/14/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Dup	
		12/4/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Dup	
	Trip Blank	2/14/2012	< 1	µg/L	Blank	
		2/14/2012	< 1	µg/L	Blank	
		5/2/2012	< 1	µg/L	Blank	
		5/2/2012	< 1	µg/L	Blank	
		8/14/2012	< 1	µg/L	Blank	
		8/14/2012	< 1	µg/L	Blank	
		12/4/2012	< 1	µg/L	Blank	
		12/4/2012	< 1	µg/L	Blank	
	1,1-Dichloroethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
8/14/2012			< 1	µg/L	Sample	
12/4/2012			< 1	µg/L	Sample	
B46 Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51 Fire Trail Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51 Motor Room Basement Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51L Treatment System	2/14/2012	< 1	µg/L	Sample		
	5/2/2012	< 1	µg/L	Sample		
	8/14/2012	< 2.5	µg/L	Sample		
	12/4/2012	< 1	µg/L	Sample		

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1-Dichloroethane (cont.)	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
1,1-Dichloroethene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,1-Dichloroethene (cont.)	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
1,2-Dichlorobenzene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichlorobenzene (cont.)	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
1,2-Dichloroethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichloroethane (cont.)	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
1,2-Dichloroethene (total)	B25A Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichloroethene (total) (cont.)	B46 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51L Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 5	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B6 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 2	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 2	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 2	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 2	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 2	µg/L	Blank
		5/2/2012	< 2	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 2	µg/L	Blank	
12/4/2012		< 2	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichloropropane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
12/4/2012		< 1	µg/L	Sample	
12/4/2012		< 1	µg/L	Dup	
Trip Blank	2/14/2012	< 1	µg/L	Blank	
	2/14/2012	< 1	µg/L	Blank	
	5/2/2012	< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,2-Dichloropropane (cont.)	Trip Blank (cont.)	5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
1,3-Dichlorobenzene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,3-Dichlorobenzene (cont.)	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
1,4-Dichlorobenzene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
1,4-Dichlorobenzene (cont.)	B7 Coll Trench Treatment System (cont.)	8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
	2-Butanone	B25A Treatment System	2/14/2012	< 20	µg/L
5/2/2012			< 20	µg/L	Sample
8/14/2012			< 20	µg/L	Sample
12/4/2012			< 20	µg/L	Sample
B46 Treatment System		2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
B51 Fire Trail Treatment System		2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
B51 Motor Room Basement Treatment System		2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
B51L Treatment System		2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 50	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
B6 Treatment System	2/14/2012	< 20	µg/L	Sample	
	5/2/2012	< 20	µg/L	Sample	
	8/14/2012	< 20	µg/L	Sample	
	12/4/2012	< 20	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
2-Butanone (cont.)	B7 Coll Trench Treatment System	2/14/2012	< 20	µg/L	Sample	
		2/14/2012	< 20	µg/L	Dup	
		5/2/2012	< 20	µg/L	Sample	
		5/2/2012	< 20	µg/L	Dup	
		8/14/2012	< 20	µg/L	Sample	
		8/14/2012	< 20	µg/L	Dup	
		12/4/2012	< 20	µg/L	Sample	
		12/4/2012	< 20	µg/L	Dup	
	Trip Blank	2/14/2012	< 20	µg/L	Blank	
		2/14/2012	< 20	µg/L	Blank	
		5/2/2012	< 20	µg/L	Blank	
		5/2/2012	< 20	µg/L	Blank	
		8/14/2012	< 20	µg/L	Blank	
		8/14/2012	< 20	µg/L	Blank	
		12/4/2012	< 20	µg/L	Blank	
		12/4/2012	< 20	µg/L	Blank	
	2-Chloroethylvinylether	B25A Treatment System	2/14/2012	< 20	µg/L	Sample
			5/2/2012	< 20	µg/L	Sample
12/4/2012			< 1	µg/L	Sample	
B46 Treatment System		2/14/2012	< 20	µg/L	Sample	
		5/2/2012	< 20	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51 Fire Trail Treatment System		2/14/2012	< 20	µg/L	Sample	
		5/2/2012	< 20	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51 Motor Room Basement Treatment System		2/14/2012	< 20	µg/L	Sample	
		5/2/2012	< 20	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51L Treatment System		2/14/2012	< 20	µg/L	Sample	
		5/2/2012	< 20	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B6 Treatment System		2/14/2012	< 20	µg/L	Sample	
		5/2/2012	< 20	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B7 Coll Trench Treatment System	2/14/2012	< 20	µg/L	Sample		
	2/14/2012	< 20	µg/L	Dup		

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
2-Chloroethylvinylether (cont.)	B7 Coll Trench Treatment System (cont.)	5/2/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Dup
		8/14/2012	< 20	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 20	µg/L	Dup
	Trip Blank	2/14/2012	< 20	µg/L	Blank
		2/14/2012	< 20	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		8/14/2012	< 20	µg/L	Blank
		12/4/2012	<1	µg/L	Blank
		12/4/2012	< 20	µg/L	Blank
		12/4/2012	< 20	µg/L	Blank
2-Hexanone	B25A Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B46 Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B51L Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 50	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
B6 Treatment System	2/14/2012	< 20	µg/L	Sample	
	5/2/2012	< 20	µg/L	Sample	
	8/14/2012	< 20	µg/L	Sample	
	12/4/2012	< 20	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
2-Hexanone (cont.)	B7 Coll Trench Treatment System	2/14/2012	< 20	µg/L	Sample
		2/14/2012	< 20	µg/L	Dup
		5/2/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Dup
		8/14/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Dup
		12/4/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Dup
	Trip Blank	2/14/2012	< 20	µg/L	Blank
		2/14/2012	< 20	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		8/14/2012	< 20	µg/L	Blank
		8/14/2012	< 20	µg/L	Blank
		12/4/2012	< 20	µg/L	Blank
		12/4/2012	< 20	µg/L	Blank
4-Methyl-2-pentanone	B25A Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B46 Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
B51L Treatment System	2/14/2012	< 20	µg/L	Sample	
	5/2/2012	< 20	µg/L	Sample	
	8/14/2012	< 50	µg/L	Sample	
	12/4/2012	< 20	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
4-Methyl-2-pentanone (cont.)	B6 Treatment System	2/14/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 20	µg/L	Sample
		2/14/2012	< 20	µg/L	Dup
		5/2/2012	< 20	µg/L	Sample
		5/2/2012	< 20	µg/L	Dup
		8/14/2012	< 20	µg/L	Sample
		8/14/2012	< 20	µg/L	Dup
		12/4/2012	< 20	µg/L	Sample
		12/4/2012	< 20	µg/L	Dup
	Trip Blank	2/14/2012	< 20	µg/L	Blank
		2/14/2012	< 20	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		8/14/2012	< 20	µg/L	Blank
		8/14/2012	< 20	µg/L	Blank
		12/4/2012	< 20	µg/L	Blank
12/4/2012		< 20	µg/L	Blank	
Acetone	B25A Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B46 Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Acetone (cont.)	B51L Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 25	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B6 Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 10	µg/L	Sample
		2/14/2012	< 10	µg/L	Dup
		5/2/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Dup
		8/14/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Dup
		12/4/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Dup
	Trip Blank	2/14/2012	< 10	µg/L	Blank
		2/14/2012	< 10	µg/L	Blank
		5/2/2012	< 10	µg/L	Blank
		5/2/2012	< 10	µg/L	Blank
8/14/2012		< 10	µg/L	Blank	
8/14/2012		< 10	µg/L	Blank	
12/4/2012		< 10	µg/L	Blank	
12/4/2012		< 10	µg/L	Blank	
Benzene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Benzene (cont.)	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Bromodichloromethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromodichloromethane (cont.)	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
Bromoform	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromoform (cont.)	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromomethane	B25A Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B46 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51L Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 5	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B6 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 2	µg/L	Sample
		2/14/2012	< 2	µg/L	Dup
		5/2/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Dup
		8/14/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Dup
		12/4/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Dup
Trip Blank	2/14/2012	< 2	µg/L	Blank	
	2/14/2012	< 2	µg/L	Blank	
	5/2/2012	< 2	µg/L	Blank	
	5/2/2012	< 2	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Bromomethane (cont.)	Trip Blank (cont.)	8/14/2012	< 2	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
Carbon disulfide	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
8/14/2012		< 1	µg/L	Sample	
8/14/2012		< 1	µg/L	Dup	
12/4/2012		< 1	µg/L	Sample	
12/4/2012		< 1	µg/L	Dup	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Carbon disulfide (cont.)	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Carbon tetrachloride	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Carbon tetrachloride (cont.)	B7 Coll Trench Treatment System (cont.)	8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
	Chlorobenzene	B25A Treatment System	2/14/2012	< 1	µg/L
5/2/2012			< 1	µg/L	Sample
8/14/2012			< 1	µg/L	Sample
12/4/2012			< 1	µg/L	Sample
B46 Treatment System		2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
B51 Fire Trail Treatment System		2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
B51 Motor Room Basement Treatment System		2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
B51L Treatment System		2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
B6 Treatment System		2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chlorobenzene (cont.)	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Chloroethane	B25A Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B46 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
B51L Treatment System	2/14/2012	< 2	µg/L	Sample	
	5/2/2012	< 2	µg/L	Sample	
	8/14/2012	< 5	µg/L	Sample	
	12/4/2012	< 2	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chloroethane (cont.)	B6 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 2	µg/L	Sample
		2/14/2012	< 2	µg/L	Dup
		5/2/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Dup
		8/14/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Dup
		12/4/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Dup
	Trip Blank	2/14/2012	< 2	µg/L	Blank
		2/14/2012	< 2	µg/L	Blank
		5/2/2012	< 2	µg/L	Blank
		5/2/2012	< 2	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
12/4/2012		< 2	µg/L	Blank	
Chloroform	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chloroform (cont.)	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
Chloromethane	B25A Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B46 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Chloromethane (cont.)	B51 Motor Room Basement Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51L Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 5	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B6 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 2	µg/L	Sample
		2/14/2012	< 2	µg/L	Dup
		5/2/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Dup
		8/14/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Dup
		12/4/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Dup
	Trip Blank	2/14/2012	< 2	µg/L	Blank
		2/14/2012	< 2	µg/L	Blank
		5/2/2012	< 2	µg/L	Blank
		5/2/2012	< 2	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
cis-1,2-Dichloroethene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
cis-1,2-Dichloroethene (cont.)	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
cis-1,3-Dichloropropene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
cis-1,3-Dichloropropene (cont.)	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Dibromochloromethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
Trip Blank	2/14/2012	< 1	µg/L	Blank	
	2/14/2012	< 1	µg/L	Blank	
	5/2/2012	< 1	µg/L	Blank	
	5/2/2012	< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Dibromochloromethane (cont.)	Trip Blank (cont.)	8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Dibromomethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
8/14/2012		< 1	µg/L	Sample	
8/14/2012		< 1	µg/L	Dup	
12/4/2012		< 1	µg/L	Sample	
12/4/2012		< 1	µg/L	Dup	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Dibromomethane (cont.)	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Dichlorodifluoromethane	B25A Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B46 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51L Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 5	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B6 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
B7 Coll Trench Treatment System	2/14/2012	< 2	µg/L	Sample	
	2/14/2012	< 2	µg/L	Dup	
	5/2/2012	< 2	µg/L	Sample	
	5/2/2012	< 2	µg/L	Dup	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
Dichlorodifluoromethane (cont.)	B7 Coll Trench Treatment System (cont.)	8/14/2012	< 2	µg/L	Sample	
		8/14/2012	< 2	µg/L	Dup	
		12/4/2012	< 2	µg/L	Sample	
		12/4/2012	< 2	µg/L	Dup	
	Trip Blank	Trip Blank	2/14/2012	< 2	µg/L	Blank
			2/14/2012	< 2	µg/L	Blank
			5/2/2012	< 2	µg/L	Blank
			5/2/2012	< 2	µg/L	Blank
			8/14/2012	< 2	µg/L	Blank
			8/14/2012	< 2	µg/L	Blank
			12/4/2012	< 2	µg/L	Blank
			12/4/2012	< 2	µg/L	Blank
	Ethylbenzene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
5/2/2012			< 1	µg/L	Sample	
8/14/2012			< 1	µg/L	Sample	
12/4/2012			< 1	µg/L	Sample	
B46 Treatment System		B46 Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
			8/14/2012	< 1	µg/L	Sample
			12/4/2012	< 1	µg/L	Sample
B51 Fire Trail Treatment System		B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
			8/14/2012	< 1	µg/L	Sample
			12/4/2012	< 1	µg/L	Sample
B51 Motor Room Basement Treatment System		B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
			8/14/2012	< 1	µg/L	Sample
			12/4/2012	< 1	µg/L	Sample
B51L Treatment System		B51L Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
			8/14/2012	< 2.5	µg/L	Sample
			12/4/2012	< 1	µg/L	Sample
B6 Treatment System		B6 Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
			8/14/2012	< 1	µg/L	Sample
			12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Ethylbenzene (cont.)	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Freon 113	B25A Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B46 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
B51L Treatment System	2/14/2012	< 2	µg/L	Sample	
	5/2/2012	< 2	µg/L	Sample	
	8/14/2012	< 5	µg/L	Sample	
	12/4/2012	< 2	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Freon 113 (cont.)	B6 Treatment System	2/14/2012	< 2	µg/L	Sample
		5/2/2012	< 2	µg/L	Sample
		8/14/2012	< 2	µg/L	Sample
		12/4/2012	< 2	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 2	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 2	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 2	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 2	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 2	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 2	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
12/4/2012		< 1	µg/L	Blank	
Methylene chloride	B25A Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B46 Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Methylene chloride (cont.)	B51L Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 25	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B6 Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 10	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 10	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 10	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 10	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 10	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 10	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 10	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 10	µg/L	Blank	
Styrene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Styrene (cont.)	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Tetrachloroethene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Tetrachloroethene (cont.)	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
Toluene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Toluene (cont.)	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
8/14/2012		< 1	µg/L	Blank	
8/14/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Total xylene isomers	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 2	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 2	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 2	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 2	µg/L	Dup
Trip Blank	2/14/2012	< 1	µg/L	Blank	
	2/14/2012	< 2	µg/L	Blank	
	5/2/2012	< 1	µg/L	Blank	
	5/2/2012	< 2	µg/L	Blank	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Total xylene isomers (cont.)	Trip Blank (cont.)	8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 2	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 2	µg/L	Blank
trans-1,2-Dichloroethene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
8/14/2012		< 1	µg/L	Sample	
8/14/2012		< 1	µg/L	Dup	
12/4/2012		< 1	µg/L	Sample	
12/4/2012		< 1	µg/L	Dup	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
trans-1,2-Dichloroethene (cont.)	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
trans-1,3-Dichloropropene	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
trans-1,3-Dichloropropene (cont.)	B7 Coll Trench Treatment System (cont.)	8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
	Trichloroethene	B25A Treatment System	2/14/2012	< 0.5	µg/L
5/2/2012			< 0.5	µg/L	Sample
8/14/2012			< 0.5	µg/L	Sample
12/4/2012			< 0.5	µg/L	Sample
B46 Treatment System		2/14/2012	< 0.5	µg/L	Sample
		5/2/2012	< 0.5	µg/L	Sample
		8/14/2012	< 0.5	µg/L	Sample
		12/4/2012	< 0.5	µg/L	Sample
B51 Fire Trail Treatment System		2/14/2012	< 0.5	µg/L	Sample
		5/2/2012	< 0.5	µg/L	Sample
		8/14/2012	< 0.5	µg/L	Sample
		12/4/2012	< 0.5	µg/L	Sample
B51 Motor Room Basement Treatment System		2/14/2012	< 0.5	µg/L	Sample
		5/2/2012	< 0.5	µg/L	Sample
		8/14/2012	< 0.5	µg/L	Sample
		12/4/2012	< 0.5	µg/L	Sample
B51L Treatment System		2/14/2012	< 0.5	µg/L	Sample
		5/2/2012	< 0.5	µg/L	Sample
		8/14/2012	< 1.3	µg/L	Sample
		12/4/2012	< 0.5	µg/L	Sample
B6 Treatment System		2/14/2012	< 0.5	µg/L	Sample
		5/2/2012	< 0.5	µg/L	Sample
		8/14/2012	< 0.5	µg/L	Sample
		12/4/2012	< 0.5	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type	
Analyte	Location*					
Trichloroethene (cont.)	B7 Coll Trench Treatment System	2/14/2012	< 0.5	µg/L	Sample	
		2/14/2012	< 0.5	µg/L	Dup	
		5/2/2012	< 0.5	µg/L	Sample	
		5/2/2012	< 0.5	µg/L	Dup	
		8/14/2012	< 0.5	µg/L	Sample	
		8/14/2012	< 0.5	µg/L	Dup	
		12/4/2012	< 0.5	µg/L	Sample	
		12/4/2012	< 0.5	µg/L	Dup	
	Trip Blank	2/14/2012	< 0.5	µg/L	Blank	
		2/14/2012	< 0.5	µg/L	Blank	
		5/2/2012	< 0.5	µg/L	Blank	
		5/2/2012	< 0.5	µg/L	Blank	
		8/14/2012	< 0.5	µg/L	Blank	
		8/14/2012	< 0.5	µg/L	Blank	
		12/4/2012	< 0.5	µg/L	Blank	
		12/4/2012	< 0.5	µg/L	Blank	
	Trichlorofluoromethane	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
			5/2/2012	< 1	µg/L	Sample
8/14/2012			< 1	µg/L	Sample	
12/4/2012			< 1	µg/L	Sample	
B46 Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51 Fire Trail Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51 Motor Room Basement Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 1	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	
B51L Treatment System		2/14/2012	< 1	µg/L	Sample	
		5/2/2012	< 1	µg/L	Sample	
		8/14/2012	< 2.5	µg/L	Sample	
		12/4/2012	< 1	µg/L	Sample	

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Trichlorofluoromethane (cont.)	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
12/4/2012		< 1	µg/L	Blank	
12/4/2012		< 1	µg/L	Blank	
Vinyl acetate	B25A Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B46 Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B51 Motor Room Basement Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Vinyl acetate (cont.)	B51L Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 25	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B6 Treatment System	2/14/2012	< 10	µg/L	Sample
		5/2/2012	< 10	µg/L	Sample
		8/14/2012	< 10	µg/L	Sample
		12/4/2012	< 10	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 10	µg/L	Sample
		2/14/2012	< 20	µg/L	Dup
		5/2/2012	< 10	µg/L	Sample
		5/2/2012	< 20	µg/L	Dup
		8/14/2012	< 10	µg/L	Sample
		8/14/2012	< 20	µg/L	Dup
		12/4/2012	< 10	µg/L	Sample
		12/4/2012	< 20	µg/L	Dup
	Trip Blank	2/14/2012	< 20	µg/L	Blank
		2/14/2012	< 10	µg/L	Blank
		5/2/2012	< 20	µg/L	Blank
		5/2/2012	< 10	µg/L	Blank
8/14/2012		< 20	µg/L	Blank	
8/14/2012		< 10	µg/L	Blank	
12/4/2012		< 20	µg/L	Blank	
12/4/2012		< 10	µg/L	Blank	
Vinyl chloride	B25A Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B46 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51 Fire Trail Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Volatile Organic Compounds		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Vinyl chloride (cont.)	B51 Motor Room Basement Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B51L Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 2.5	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B6 Treatment System	2/14/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Sample
	B7 Coll Trench Treatment System	2/14/2012	< 1	µg/L	Sample
		2/14/2012	< 1	µg/L	Dup
		5/2/2012	< 1	µg/L	Sample
		5/2/2012	< 1	µg/L	Dup
		8/14/2012	< 1	µg/L	Sample
		8/14/2012	< 1	µg/L	Dup
		12/4/2012	< 1	µg/L	Sample
		12/4/2012	< 1	µg/L	Dup
	Trip Blank	2/14/2012	< 1	µg/L	Blank
		2/14/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		5/2/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		8/14/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank
		12/4/2012	< 1	µg/L	Blank

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Actinium 228	Building 69	10/17/2012	0.017	Bq/g	0.47	pCi/g	Sample
	Building 80	10/17/2012	0.033	Bq/g	0.88	pCi/g	Sample
	Building 85	10/17/2012	0.019	Bq/g	0.51	pCi/g	Sample
		10/17/2012	0.021	Bq/g	0.57	pCi/g	Split
	ENV-B13C	10/17/2012	0.036	Bq/g	0.98	pCi/g	Sample
Cesium 137	Building 69	10/17/2012	0.0013	Bq/g	0.034	pCi/g	Sample
	Building 80	10/17/2012	0.0017	Bq/g	0.046	pCi/g	Sample
	Building 85	10/17/2012	0.0013	Bq/g	0.035	pCi/g	Sample
		10/17/2012	< 0.0011	Bq/g	< 0.03	pCi/g	Split
	ENV-B13C	10/17/2012	0.0067	Bq/g	0.18	pCi/g	Sample
Europium 152	Building 69	10/17/2012	< 0.0013	Bq/g	< 0.035	pCi/g	Sample
	Building 80	10/17/2012	< 0.0016	Bq/g	< 0.044	pCi/g	Sample
	Building 85	10/17/2012	< 0.0014	Bq/g	< 0.038	pCi/g	Sample
		10/17/2012	< 0.0011	Bq/g	< 0.031	pCi/g	Split
	ENV-B13C	10/17/2012	< 0.0018	Bq/g	< 0.047	pCi/g	Sample
Gross alpha	Building 69	10/17/2012	0.48	Bq/g	13	pCi/g	Sample
	Building 80	10/17/2012	0.56	Bq/g	15	pCi/g	Sample
	Building 85	10/17/2012	0.22	Bq/g	5.8	pCi/g	Sample
		10/17/2012	0.059	Bq/g	1.6	pCi/g	Split
	ENV-B13C	10/17/2012	0.33	Bq/g	8.9	pCi/g	Sample
Gross beta	Building 69	10/17/2012	0.27	Bq/g	7.2	pCi/g	Sample
	Building 80	10/17/2012	0.99	Bq/g	27	pCi/g	Sample
	Building 85	10/17/2012	0.38	Bq/g	10	pCi/g	Sample
		10/17/2012	0.1	Bq/g	2.8	pCi/g	Split
	ENV-B13C	10/17/2012	1.0	Bq/g	28	pCi/g	Sample
Lead 214	Building 69	10/17/2012	0.017	Bq/g	0.46	pCi/g	Sample
	Building 80	10/17/2012	0.032	Bq/g	0.87	pCi/g	Sample
	Building 85	10/17/2012	0.025	Bq/g	0.69	pCi/g	Sample
		10/17/2012	0.017	Bq/g	0.45	pCi/g	Split
	ENV-B13C	10/17/2012	0.039	Bq/g	1.0	pCi/g	Sample
Potassium 40	Building 69	10/17/2012	0.27	Bq/g	7.3	pCi/g	Sample
	Building 80	10/17/2012	0.61	Bq/g	16	pCi/g	Sample
	Building 85	10/17/2012	0.37	Bq/g	9.9	pCi/g	Sample
		10/17/2012	0.35	Bq/g	9.5	pCi/g	Split
	ENV-B13C	10/17/2012	0.76	Bq/g	20	pCi/g	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Radium 226	Building 69	10/17/2012	0.013	Bq/g	0.35	pCi/g	Sample
	Building 80	10/17/2012	0.028	Bq/g	0.75	pCi/g	Sample
	Building 85	10/17/2012	0.019	Bq/g	0.52	pCi/g	Sample
		10/17/2012	0.015	Bq/g	0.4	pCi/g	Split
	ENV-B13C	10/17/2012	0.03	Bq/g	0.8	pCi/g	Sample
Tritium	Building 69	10/17/2012	< 0.00059	Bq/g	< 0.016	pCi/g	Sample
	Building 80	10/17/2012	< 0.00059	Bq/g	< 0.016	pCi/g	Sample
	Building 85	10/17/2012	< 0.00059	Bq/g	< 0.016	pCi/g	Sample
		10/17/2012	< 0.0024	Bq/g	< 0.064	pCi/g	Split
	ENV-B13C	10/17/2012	< 0.00059	Bq/g	< 0.016	pCi/g	Sample
Uranium 238	Building 69	10/17/2012	< 0.016	Bq/g	< 0.44	pCi/g	Sample
	Building 80	10/17/2012	0.035	Bq/g	0.95	pCi/g	Sample
	Building 85	10/17/2012	< 0.022	Bq/g	< 0.6	pCi/g	Sample
		10/17/2012	< 0.12	Bq/g	< 3.1	pCi/g	Split
	ENV-B13C	10/17/2012	0.05	Bq/g	1.3	pCi/g	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Moisture by weight	Building 69	10/17/2012	< 5.1	%	Sample
		10/17/2012	3.9	%	Sample
	Building 80	10/17/2012	2.8	%	Sample
		10/17/2012	< 3.5	%	Sample
	Building 85	10/17/2012	3.6	%	Sample
		10/17/2012	< 3.6	%	Sample
		10/17/2012	< 4	%	Split
	ENV-B13C	10/17/2012	4.7	%	Sample
		10/17/2012	< 5.1	%	Sample
pH	Building 69	10/17/2012	6.4	S.U.	Sample
	Building 80	10/17/2012	6.8	S.U.	Sample
	Building 85	10/17/2012	6.6	S.U.	Sample
		10/17/2012	6.8	S.U.	Split
	ENV-B13C	10/17/2012	5.8	S.U.	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Aluminum	Building 69	10/17/2012	22000	mg/kg	Sample
	Building 80	10/17/2012	17000	mg/kg	Sample
	Building 85	10/17/2012	22000	mg/kg	Sample
		10/17/2012	23000	mg/kg	Split
	ENV-B13C	10/17/2012	13000	mg/kg	Sample
Arsenic	Building 69	10/17/2012	< 5	mg/kg	Sample
	Building 80	10/17/2012	6.9	mg/kg	Sample
	Building 85	10/17/2012	< 5	mg/kg	Sample
		10/17/2012	< 5.1	mg/kg	Split
	ENV-B13C	10/17/2012	7.8	mg/kg	Sample
Barium	Building 69	10/17/2012	89	mg/kg	Sample
	Building 80	10/17/2012	220	mg/kg	Sample
	Building 85	10/17/2012	95	mg/kg	Sample
		10/17/2012	93	mg/kg	Split
	ENV-B13C	10/17/2012	130	mg/kg	Sample
Boron	Building 69	10/17/2012	< 10	mg/kg	Sample
	Building 80	10/17/2012	< 10	mg/kg	Sample
	Building 85	10/17/2012	< 10	mg/kg	Sample
		10/17/2012	15	mg/kg	Split
	ENV-B13C	10/17/2012	< 10	mg/kg	Sample
Chromium	Building 69	10/17/2012	64	mg/kg	Sample
	Building 80	10/17/2012	33	mg/kg	Sample
	Building 85	10/17/2012	66	mg/kg	Sample
		10/17/2012	64	mg/kg	Split
	ENV-B13C	10/17/2012	29	mg/kg	Sample
Cobalt	Building 69	10/17/2012	16	mg/kg	Sample
	Building 80	10/17/2012	12	mg/kg	Sample
	Building 85	10/17/2012	21	mg/kg	Sample
		10/17/2012	18	mg/kg	Split
	ENV-B13C	10/17/2012	< 10	mg/kg	Sample
Copper	Building 69	10/17/2012	19	mg/kg	Sample
	Building 80	10/17/2012	40	mg/kg	Sample
	Building 85	10/17/2012	32	mg/kg	Sample
		10/17/2012	37	mg/kg	Split
	ENV-B13C	10/17/2012	23	mg/kg	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Iron	Building 69	10/17/2012	27000	mg/kg	Sample
	Building 80	10/17/2012	23000	mg/kg	Sample
	Building 85	10/17/2012	29000	mg/kg	Sample
		10/17/2012	38000	mg/kg	Split
	ENV-B13C	10/17/2012	21000	mg/kg	Sample
Lead	Building 69	10/17/2012	< 10	mg/kg	Sample
	Building 80	10/17/2012	32	mg/kg	Sample
	Building 85	10/17/2012	< 10	mg/kg	Sample
		10/17/2012	< 10	mg/kg	Split
	ENV-B13C	10/17/2012	32	mg/kg	Sample
Magnesium	Building 69	10/17/2012	10000	mg/kg	Sample
	Building 80	10/17/2012	6400	mg/kg	Sample
	Building 85	10/17/2012	9000	mg/kg	Sample
		10/17/2012	11000	mg/kg	Split
	ENV-B13C	10/17/2012	3400	mg/kg	Sample
Manganese	Building 69	10/17/2012	580	mg/kg	Sample
	Building 80	10/17/2012	760	mg/kg	Sample
	Building 85	10/17/2012	790	mg/kg	Sample
		10/17/2012	890	mg/kg	Split
	ENV-B13C	10/17/2012	380	mg/kg	Sample
Mercury	Building 69	10/17/2012	< 0.2	mg/kg	Sample
	Building 80	10/17/2012	< 0.2	mg/kg	Sample
	Building 85	10/17/2012	0.28	mg/kg	Sample
		10/17/2012	0.3	mg/kg	Split
	ENV-B13C	10/17/2012	< 0.2	mg/kg	Sample
Nickel	Building 69	10/17/2012	43	mg/kg	Sample
	Building 80	10/17/2012	41	mg/kg	Sample
	Building 85	10/17/2012	53	mg/kg	Sample
		10/17/2012	51	mg/kg	Split
	ENV-B13C	10/17/2012	27	mg/kg	Sample
Vanadium	Building 69	10/17/2012	61	mg/kg	Sample
	Building 80	10/17/2012	37	mg/kg	Sample
	Building 85	10/17/2012	74	mg/kg	Sample
		10/17/2012	77	mg/kg	Split
	ENV-B13C	10/17/2012	37	mg/kg	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Zinc	Building 69	10/17/2012	47	mg/kg	Sample
	Building 80	10/17/2012	80	mg/kg	Sample
	Building 85	10/17/2012	46	mg/kg	Sample
		10/17/2012	49	mg/kg	Split
	ENV-B13C	10/17/2012	74	mg/kg	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Actinium 228	Chicken Creek	10/16/2012	0.028	Bq/g	0.76	pCi/g	Sample
		10/16/2012	0.023	Bq/g	0.63	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	0.015	Bq/g	0.41	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.02	Bq/g	0.55	pCi/g	Sample
Cesium 137	Chicken Creek	10/16/2012	0.0024	Bq/g	0.064	pCi/g	Sample
		10/16/2012	0.0016	Bq/g	0.043	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	0.0014	Bq/g	0.038	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.0017	Bq/g	0.047	pCi/g	Sample
Europium 152	Chicken Creek	10/16/2012	< 0.0012	Bq/g	< 0.033	pCi/g	Sample
		10/16/2012	< 0.00085	Bq/g	< 0.023	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	< 0.0014	Bq/g	< 0.037	pCi/g	Sample
	Wildcat Creek	10/16/2012	< 0.0013	Bq/g	< 0.036	pCi/g	Sample
Gross alpha	Chicken Creek	10/16/2012	0.32	Bq/g	8.5	pCi/g	Sample
		10/16/2012	0.12	Bq/g	3.3	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	0.29	Bq/g	7.9	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.3	Bq/g	8.2	pCi/g	Sample
Gross beta	Chicken Creek	10/16/2012	0.47	Bq/g	13	pCi/g	Sample
		10/16/2012	0.096	Bq/g	2.6	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	0.55	Bq/g	15	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.6	Bq/g	16	pCi/g	Sample
Lead 214	Chicken Creek	10/16/2012	0.029	Bq/g	0.79	pCi/g	Sample
		10/16/2012	0.018	Bq/g	0.48	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	0.016	Bq/g	0.44	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.023	Bq/g	0.61	pCi/g	Sample
Potassium 40	Chicken Creek	10/16/2012	0.51	Bq/g	14	pCi/g	Sample
		10/16/2012	0.44	Bq/g	12	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	0.22	Bq/g	5.9	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.38	Bq/g	10	pCi/g	Sample
Radium 226	Chicken Creek	10/16/2012	0.024	Bq/g	0.64	pCi/g	Sample
		10/16/2012	0.015	Bq/g	0.4	pCi/g	Split

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Radiological Activity		Collection Date	S.I.		Conventional		QC Type
Analyte	Location*		Result [†]	Units	Result [†]	Units	
Radium 226 (cont.)	N. Fork Strawberry Creek	10/16/2012	0.013	Bq/g	0.35	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.017	Bq/g	0.46	pCi/g	Sample
Tritium	Chicken Creek	10/16/2012	< 0.0014	Bq/g	< 0.038	pCi/g	Sample
		10/16/2012	< 0.0045	Bq/g	< 0.12	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	< 0.00089	Bq/g	< 0.024	pCi/g	Sample
	Wildcat Creek	10/16/2012	< 0.001	Bq/g	< 0.028	pCi/g	Sample
Uranium 238	Chicken Creek	10/16/2012	0.025	Bq/g	0.67	pCi/g	Sample
		10/16/2012	< 0.059	Bq/g	< 1.6	pCi/g	Split
	N. Fork Strawberry Creek	10/16/2012	< 0.019	Bq/g	< 0.53	pCi/g	Sample
	Wildcat Creek	10/16/2012	0.027	Bq/g	0.72	pCi/g	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

General Indicator Parameters		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Moisture by weight	Chicken Creek	10/16/2012	24	%	Sample
		10/16/2012	< 24	%	Sample
		10/16/2012	22	%	Split
	N. Fork Strawberry Creek	10/16/2012	41	%	Sample
		10/16/2012	< 26	%	Sample
	Wildcat Creek	10/16/2012	22	%	Sample
		10/16/2012	< 24	%	Sample
pH	Chicken Creek	10/16/2012	7.5	S.U.	Sample
		10/16/2012	7.3	S.U.	Split
	N. Fork Strawberry Creek	10/16/2012	7.7	S.U.	Sample
	Wildcat Creek	10/16/2012	7.7	S.U.	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Aluminum	Chicken Creek	10/16/2012	9200	mg/kg	Sample
		10/16/2012	16000	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	11000	mg/kg	Sample
	Wildcat Creek	10/16/2012	8700	mg/kg	Sample
Arsenic	Chicken Creek	10/16/2012	< 5	mg/kg	Sample
		10/16/2012	< 5.9	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	< 5	mg/kg	Sample
	Wildcat Creek	10/16/2012	5.6	mg/kg	Sample
Barium	Chicken Creek	10/16/2012	71	mg/kg	Sample
		10/16/2012	130	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	80	mg/kg	Sample
	Wildcat Creek	10/16/2012	80	mg/kg	Sample
Boron	Chicken Creek	10/16/2012	< 10	mg/kg	Sample
		10/16/2012	18	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	< 10	mg/kg	Sample
	Wildcat Creek	10/16/2012	< 10	mg/kg	Sample
Chromium	Chicken Creek	10/16/2012	34	mg/kg	Sample
		10/16/2012	59	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	28	mg/kg	Sample
	Wildcat Creek	10/16/2012	29	mg/kg	Sample
Cobalt	Chicken Creek	10/16/2012	< 10	mg/kg	Sample
		10/16/2012	17	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	< 10	mg/kg	Sample
	Wildcat Creek	10/16/2012	11	mg/kg	Sample
Copper	Chicken Creek	10/16/2012	18	mg/kg	Sample
		10/16/2012	62	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	25	mg/kg	Sample
	Wildcat Creek	10/16/2012	18	mg/kg	Sample
Iron	Chicken Creek	10/16/2012	16000	mg/kg	Sample
		10/16/2012	27000	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	20000	mg/kg	Sample
	Wildcat Creek	10/16/2012	19000	mg/kg	Sample
Lead	Chicken Creek	10/16/2012	13	mg/kg	Sample
		10/16/2012	14	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	15	mg/kg	Sample
	Wildcat Creek	10/16/2012	10	mg/kg	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Metals and Minerals		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Magnesium	Chicken Creek	10/16/2012	7200	mg/kg	Sample
		10/16/2012	11000	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	6100	mg/kg	Sample
	Wildcat Creek	10/16/2012	4800	mg/kg	Sample
Manganese	Chicken Creek	10/16/2012	390	mg/kg	Sample
		10/16/2012	840	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	510	mg/kg	Sample
	Wildcat Creek	10/16/2012	490	mg/kg	Sample
Mercury	Chicken Creek	10/16/2012	< 0.2	mg/kg	Sample
		10/16/2012	< 0.2	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	< 0.2	mg/kg	Sample
	Wildcat Creek	10/16/2012	< 0.2	mg/kg	Sample
Nickel	Chicken Creek	10/16/2012	37	mg/kg	Sample
		10/16/2012	100	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	23	mg/kg	Sample
	Wildcat Creek	10/16/2012	44	mg/kg	Sample
Vanadium	Chicken Creek	10/16/2012	30	mg/kg	Sample
		10/16/2012	51	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	53	mg/kg	Sample
	Wildcat Creek	10/16/2012	27	mg/kg	Sample
Zinc	Chicken Creek	10/16/2012	86	mg/kg	Sample
		10/16/2012	130	mg/kg	Split
	N. Fork Strawberry Creek	10/16/2012	140	mg/kg	Sample
	Wildcat Creek	10/16/2012	44	mg/kg	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

Petroleum Hydrocarbons		Collection Date	Result [†]	Units	QC Type
Analyte	Location*				
Diesel Range Organics (C12-C24)	Chicken Creek	10/16/2012	< 2	mg/kg	Sample
Diesel Fuel	Chicken Creek	10/16/2012	51	mg/kg	Split
Diesel Range Organics (C12-C24)	N. Fork Strawberry Creek	10/16/2012	< 3.9	mg/kg	Sample
	Wildcat Creek	10/16/2012	< 2	mg/kg	Sample
Oil and Grease	Chicken Creek	10/16/2012	68	mg/kg	Sample
	N. Fork Strawberry Creek	10/16/2012	< 50	mg/kg	Sample
	Wildcat Creek	10/16/2012	65	mg/kg	Sample

* See the table beginning on page A-2 for descriptions of sampling locations.

† See the discussion "Results Below the Detection Limit" on page A-5 for an explanation of the "<" flag.

