Storm Water Pollution Prevention Plan (SWPPP)
Livermore Site
IGP Revision 5

July 2019

Craig Fish
Mohammad Abri
Storm Water Pollution Prevention Plan (SWPPP)
Livermore Site
IGP Revision 5

for
Lawrence Livermore National Laboratory - Livermore Site

Facility Address:
7000 East Avenue
Livermore, CA 94550

Waste Discharge Identification (WDID):
201I025682

Exceedance Response Action (ERA) Status:
Level 2 Magnesium

Legally Responsible Person (LRP):
Thomas Grim
The United States Department of Energy
National Nuclear Security Administration
Livermore Site Office
P.O. Box 808, L-293
Livermore, CA 94551
(925) 422-0704

SWPPP Prepared by:
Lawrence Livermore National Laboratory
Environmental Functional Area

C. Fish
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P.O. Box 808, L-627
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SWPPP Preparation Date
July 1, 2019
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

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Legally Responsible Person
Approval and Certification of the Storm Water Pollution Prevention Plan
Facility Name:  Lawrence Livermore National Laboratory – Livermore Site

Waste Discharge Identification (WDID):  2011025682

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

United States Department of Energy

Legally Responsible Entity

[Signature]

Signature of Duly Authorized Representative of Legally Responsible Entity

07/10/2019
Date

Thomas Rahm Grim

Name of Duly Authorized Representative of Legally Responsible Entity

(925)-422-0704
Telephone Number
### Amendment Log

**Facility Name:** Lawrence Livermore National Laboratory – Livermore Site  

**Waste Discharge Identification (WDID):** 2011025682

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<th>Prepared and Approved By</th>
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<td>Nov 16, 2016</td>
<td>P. 51 Sec. 3.2.3</td>
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<td>Added information on filter socks in Section 3.2.3 and Maps A.4 and A.5</td>
<td>CB Fish</td>
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<td>3-1</td>
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<td>p. 65</td>
<td>CB Fish</td>
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## Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

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<td>Table 1.1</td>
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<td>M. Abri</td>
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<td>5-2</td>
<td>June 5, 2019</td>
<td>Section 1.6</td>
<td>Updated document versions. Deleted “Part A and Part B” reference, documents are part of hazardous waste facility permit.</td>
<td>M. Abri</td>
<td></td>
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<td>5-3</td>
<td>June 5, 2019</td>
<td>P. 13 Section 2.2.3</td>
<td>Clarified types of industrial materials and provided a reference for more information.</td>
<td>M. Abri</td>
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<td>Clarified hazardous waste management unit descriptions.</td>
<td>M. Abri</td>
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<td>M. Abri</td>
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Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

Section 1   SWPPP Requirements

1.1    INTRODUCTION

Lawrence Livermore National Laboratory (LLNL) is a premier research laboratory that is part of the National Nuclear Security Administration (NNSA) within the U.S. Department of Energy (DOE). LLNL consists of two sites: the Livermore Site located in Livermore, California and the Experimental Test Site (Site 300) located near Tracy, California. This Storm Water Pollution Prevention Plan (SWPPP) addresses the Livermore Site. A separate SWPPP has been prepared for Site 300.

As a national security laboratory, LLNL is responsible for ensuring that the nation’s nuclear weapons remain safe, secure, and reliable. The Laboratory also meets other pressing national security needs, including countering the proliferation of weapons of mass destruction and strengthening homeland security, and conducts major research in atmospheric, earth, and energy sciences; bioscience and biotechnology; and engineering, basic science, and advanced technology.

The Livermore Site comprises approximately 821 acres and is located at 7000 East Avenue in Livermore, California. The property is owned by the DOE and is operated and managed by Lawrence Livermore National Security (LLNS) a Limited Liability Corporation (LLC). The facility location is shown on the vicinity Map A.1 in Appendix A.

On March 27, 1992, LLNL’s Livermore Site submitted a Notice of Intent (NOI) to the California State Water Resources Control Board (SWRCB) that LLNL would discharge storm water associated with industrial activity under the National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Industrial Activities (SWRCB, 1992). LLNL adopted and implemented the Storm Water Pollution Prevention Plan – Livermore Site (Eccher et al., 1994). On August 23, 1995, the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) adopted the site-specific Waste Discharge Requirements (WDRs) and an NPDES Permit – Order No. 95-174; NPDES No. CA0030023 for storm water discharges and specific non-storm water discharges at the LLNL Livermore Site (SFBRWQCB, 1995). In adopting these WDRs, the Regional Board rescinded LLNL’s coverage under the 1992 NPDES General Permit. On November 8, 2000 the SFBRWQCB Assistant Executive Officer declared that WDR 95-175 would continue, “in effect until the Board adopts a new permit for the discharges” (Moore, 2000). With the adoption of the new Industrial General Permit (IGP), the Livermore Site now complies with the provisions of the new IGP.

This SWPPP is designed to comply with California’s IGP for Storm Water Discharges Associated with Industrial Activities (General Permit) Order No. 2014-0057-DWQ (NPDES No. CAS000001; SWRCB, 2014) issued by the SWRCB. The previous Storm Water Monitoring Program at the Livermore Site focused on larger drainage areas within the Site, such that the storm water monitoring reflected the combined runoff from industrial and non-industrial areas. To better comply with the new IGP, this SWPPP focuses on the areas of industrial activity at the Livermore Site that are specifically regulated by the new IGP. These areas are identified in Section 2 of the SWPPP.
1.2 PERMIT REGISTRATION DOCUMENTS

Required Permit Registration Documents (PRDs) were submitted to the State Water Board in 2015 via the Storm Water Multi Application and Report Tracking System (SMARTS) by the Legally Responsible Person (LRP), or authorized personnel (i.e., Approved Signatory) under the direction of the LRP. The project-specific PRDs include:

- Notice of Intent (NOI);
- Signed Certification Statement (LRP Certification is provided electronically with SMARTS PRD submittal);
- Site Maps;
- A copy of this SWPPP; and
- Annual Fee.

The Site Maps can be found in Appendix A.

1.3 SWPPP AVAILABILITY AND IMPLEMENTATION

This SWPPP is available to Laboratory employees on the LLNL internal web site during all hours of operation (see Section 2.5 for the Operations Schedule), and will be made available on the SMARTS website in accordance with the IGP. The SWPPP was implemented on July 1, 2015.

1.4 POLLUTION PREVENTION TEAM

Facility staff that have been designated as Storm Water Pollution Prevention Team (SWPPT) members are listed in Table 1.1, along with their responsibilities and duties. Alternate team members are also provided and these personnel will perform SWPPP activities when regular members of the SWPPT are absent or unavailable. This table will be updated as needed when there are changes to staff and staff responsibilities. All team members will be trained to perform the duties assigned to them.
Table 1.1 – Storm Water Pollution Prevention Team

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
<th>Directorate</th>
<th>Responsibilities and Duties</th>
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<tr>
<td>Craig Fish</td>
<td>Environmental Analyst</td>
<td>EFA</td>
<td>Storm Water Compliance program lead, SWPPT Chair, BMP inspections and sampling (alternate), SWPPP revisions, data management (alternate), data entry (alternate), data reporting (alternate)</td>
</tr>
<tr>
<td>Kim Swanson</td>
<td>EFA Data Manager</td>
<td>EFA</td>
<td>Data management, quality control, data entry</td>
</tr>
<tr>
<td>Karl Brunckhorst</td>
<td>Environmental Monitoring Technician</td>
<td>EFA</td>
<td>BMP inspections and sampling</td>
</tr>
<tr>
<td>Crystal Rosene</td>
<td>Environmental Monitoring Technician</td>
<td>EFA</td>
<td>BMP inspections and sampling (alternate)</td>
</tr>
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<td>Yonas Bekele</td>
<td>Environmental Safety and Health (ES&amp;H) Team</td>
<td>ES&amp;H</td>
<td>Radioactive and Hazardous Waste Management (RHWM) Directorate environmental guidance representative</td>
</tr>
<tr>
<td>Neil Elam</td>
<td>RHWM Facility Point of Contact</td>
<td>RHWM</td>
<td>RHWM Storm Water Contact</td>
</tr>
<tr>
<td>Mark Accatino</td>
<td>RHWM Nuclear Facility Manager</td>
<td>Weapons and Complex Integration (WCI)</td>
<td>WCI Storm Water Contact</td>
</tr>
<tr>
<td>Chris Campbell</td>
<td>Monitoring Group Lead</td>
<td>EFA</td>
<td>Supervisor and guidance for field sampling procedures</td>
</tr>
<tr>
<td>Erica Hermsen</td>
<td>Environmental Analyst</td>
<td>EFA</td>
<td>Sanitary sewer and SPCC compliance lead</td>
</tr>
<tr>
<td>Caleb Murphy</td>
<td>Biologist</td>
<td>EFA</td>
<td>Biological inspections</td>
</tr>
<tr>
<td>Manny Rubio</td>
<td>Facility Manager</td>
<td>F&amp;I</td>
<td>Drainage Channels, Site BMP and Construction Soil Staging Lead</td>
</tr>
<tr>
<td>Dave Lavinsky</td>
<td>Facility Manager</td>
<td>F&amp;I</td>
<td>Drainage Channels (alternate), Site BMP Implementation (alternate), MUSD Staging Areas Lead</td>
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1.5 Duly Authorized Representatives

Duly Authorized Representatives who are responsible for SWPPP implementation and have authority to sign PRDs are listed below in Table 1.2.
### 1.6 PERMITS AND GOVERNING DOCUMENTS

In addition to the IGP, the following documents have been taken into account while preparing this SWPPP:

- Lawrence Livermore National Laboratory Livermore Site Spill Prevention, Control, and Countermeasure (SPCC) Plan (Mertesdorf/Hermsen, March 2019 or most recent version);
- Water Quality Control Plan (Basin Plan) for the San Francisco Bay Basin (SFRWQCB 2011);
- Lawrence Livermore National Laboratory Main Site Hazardous Materials Business Plan - 2019 Update (LLNL, 2019);
- Lawrence Livermore National Laboratory Hazardous Waste Facility Permit (DTSC, 2008);
- WDR No. 88-075 for discharges of treated groundwater from Treatment Facility A to recharge basin;
- NPDES General Permit No. CAS000002 for discharges of storm water associated with construction activities affecting 0.4 hectares (1 acre) or more (SWRCB 2009);
- Federal Facility Agreement (FFA) for groundwater investigation and remediation (treated groundwater discharge to surface water is authorized under the FFA under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); DOE, 1988).

### 1.7 SWPPP AMENDMENTS

This SWPPP will be amended or revised as needed. This is the third revision of the SWPPP for (IGP 2014-0057-DWQ). A list of amendments will be included in the Amendment Log. The Amendment Log will include the date of initial preparation and the date of each amendment. The SWPPP will be revised when:

- There is an IGP violation;
- There is a reduction or increase in the total industrial area exposed to storm water;
- Best Management Practices (BMPs) do not meet the objectives of reducing or eliminating pollutants in storm water discharges;
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

- There is a change in industrial operations which may affect the discharge of pollutants to surface waters, groundwater(s), or a municipal separate storm sewer system (MS4);
- There is a change to the parties responsible for implementing the SWPPP; or
- Otherwise deemed necessary by the Qualified Industrial Storm Water Practitioner (QISP).

The following items will be included in each amendment:
- Who requested the amendment;
- The location of proposed change;
- The reason for change;
- The original BMP(s) proposed, if any; and
- The new BMP(s) proposed.

The SWPPP text will be revised, replaced, and/or hand annotated as necessary to properly convey the amendment. SWPPP amendments must be certified and submitted by the LRP or their designated Duly Authorized Representative via SMARTS within 30 days whenever the SWPPP contains significant revisions. With the exception of significant revisions, SWPPP changes will be certified and uploaded to SMARTS once every three (3) months in the reporting year.

1.8 RETENTION OF RECORDS

Paper or electronic records of documents required by this SWPPP will be retained for a minimum of five (5) years from the date generated or date submitted, whichever is later. Section 3.1.7 further discusses records retention. Copies of the records will be available for review by the Water Board’s staff at the facility during scheduled facility operating hours. Upon written request by U.S. EPA or the local MS4, Dischargers will provide paper or electronic copies of requested records to the Water Boards, U.S. EPA, or local MS4 within ten (10) working days from receipt of the request.

1.9 EXCEEDANCE RESPONSE ACTIONS (ERAs)

A reporting year is defined as the period from July 1 to June 30 in the IGP. If the average of all analytical results from all samples taken at the Livermore Site during a reporting year for any given parameter exceeds an IGP annual numeric action level (NAL) or if an exceedance of an instantaneous NAL occurs in two or more analytical results from samples taken for any parameter within a reporting year (or are outside the instantaneous maximum NAL range for pH), the Discharger will enter Level 1 status on July 1 following the reporting year during which the exceedance(s) occurred. A Level 1 and/or Level 2 ERA Evaluation will be required by October 1 in the following year and a Level 1 and/or Level 2 ERA Report will be required no later than January 1 of the following year. A Discharger’s Level 1 status for any given parameter shall change to Level 2 status if sampling results indicate an NAL exceedance for that same
parameter while the Discharger is in Level 1. Level 2 status will commence on July 1 following the reporting year during which the NAL exceedance(s) occurred. A Level 2 ERA Action Plan and a Level 2 ERA Report will be required in accordance with the IGP. The results of either of the ERA reports may require that the SWPPP be amended.

1.10 TERMINATION AND CHANGES TO INDUSTRIAL GENERAL PERMIT COVERAGE

When any of the following conditions occur, termination of coverage under the IGP will be requested by certifying and submitting a Notice of Termination (NOT) via SMARTS:

- Operation of the facility has been transferred to another entity.
- The facility has ceased operations, completed closure activities, and removed all industrial related pollutant generating sources.
- The facility’s operations have changed and are no longer subject to the IGP.

The SWPPP and all of the provisions of the IGP will be complied with until a valid NOT is received and accepted by the Board.

If ownership changes, the new owner of the facility will be notified of the and regulatory requirements for permit coverage.
Section 2 Facility Information

2.1 FACILITY DESCRIPTION

LLNL is a national resource of scientific, technical, and engineering capability, with special focus on national security. LLNL undertakes multi-disciplinary fundamental and applied research and development (R&D) activities necessary to maintain a leading position in the diverse scientific and technical fields required for this mission. Current major programs include advanced defense technologies, energy, environment, biosciences, and basic science to meet important national needs. To support the R&D efforts at the Livermore Site, there are numerous offices, laboratories, support facilities (such as cafeterias, storage yards, small-scale fabrication facilities, a medical building, and fire station), roadways, parking areas, buffer zones, and landscaped areas. Approximately 698 acres (85% of the site) are impervious, including roadways, parking lots, sidewalks and pathways, and building footprints (see Map A.2 in Appendix A).

2.1.1 Facility Location and General Environs

The Livermore Site is located within the eastern boundary of the City of Livermore in the southeastern portion of the Livermore Valley, approximately 1-mile south of Interstate-580 and approximately 3 miles northeast of Lake Del Valle. The facility is located at 37° 41’ 22.66” N latitude and 121° 42’ 35.45” W longitude. A map showing the Site vicinity is provided as Map A.1 in Appendix A.

Mild, rainy winters and mild-to-hot, dry summers characterize the Livermore Valley climate. The mean annual temperature at the Livermore Site for the 17-year period from 1990 through 2006 was 15.1 °C (59.2 °F); temperatures typically range from –4 °C (25 °F) on the coldest winter mornings to 40 °C (104 °F) on the hottest summer afternoons (Bowen, 2007).

Both rainfall and wind exhibit a strong seasonal pattern. Nearly 80% of the rainfall typically occurs during November through March with very little or no rainfall during the summer months. The highest and lowest seasonal rainfalls on record are 77.6 and 13.7 centimeters (30.57 and 5.38 inches). Winds blow from the south-southwest through the west-southwest approximately 45% of the time and more frequently during the summer. During the winter, winds from the northeast are more common (Bowen, 2007).

2.1.2 Facility Industrial Operations

Appendix A of the IGP identifies a listing of facilities and activities that are subject to the IGP regulations. The primary criterion in the IGP used to determine whether a facility is engaged in industrial activity is the Standard Industrial Classification (SIC) code. The primary SIC code applicable to the Livermore Site is 8733, Non-commercial Research Organization and the majority of activities conducted at the Livermore Site are in support of various research projects and laboratory operations. SIC code 8733 is not one of the regulated categories included in the IGP. However, the Livermore Site operates under a Resource Conservation and Recovery Act (RCRA) permit (DTSC, 2008). The IGP indicates that activities related to hazardous waste treatment, storage, or disposal facilities operating under a RCRA permit are subject to the
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General Industrial Permit. Presently, treatment and storage of mixed and hazardous waste at the Livermore Site is conducted under the RCRA permit in the following two Waste Management Unit Areas (WMUAs) shown on Maps A.2 and A.3 in Appendix A (LLNL does not operate disposal units):

- Area 612/625 located in the southeastern portion of the Livermore Site; and
- The Decontamination and Waste Treatment Facility (DWTF) located in the northeastern corner of the Livermore Site.

Hazardous Waste Management Facility operations at LLNL are subject to federal, state, regional, and local environmental requirements. The Radioactive and Hazardous Waste Management (RHWM) Division of LLNL is responsible for work conducted within these facilities.

2.1.3 Operations Schedule

The normal business hours of the Livermore Site are Monday through Friday from 8:00 a.m. to 4:45 p.m. Variations in actual operating hours may occur as necessary. The Livermore Site is also closed in observance of the following holidays each year (variations may occur under special circumstances):

- New Year’s Holiday – January 1
- Martin Luther King Jr. Day - third Monday of January
- President’s Day - third Monday of February
- Spring Holiday – Monday after Easter
- Memorial Day – last Monday in May
- Independence Day – July 4
- Labor Day – first Monday in September
- Thanksgiving Holiday – fourth Thursday in November
- Friday after Thanksgiving Holiday
- Christmas Eve – December 24
- Christmas Day – December 25
- New Year’s Eve – December 31

If industrial activities are temporarily suspended for ten (10) or more consecutive calendar days during a reporting year, BMPs that are necessary to achieve compliance with this IGP during the temporary suspension of the industrial activity will be identified and incorporated into the SWPPP.

2.1.4 Geology and Groundwater

The Livermore Valley is an east-west-trending synclinal structure composed primarily of gently deformed alluvial deposits overlying complexly deformed Cenozoic and Mesozoic rocks. The California Coast Range in the Livermore region consists of north-to northwest- trending
mountain ranges and valleys bounded by faults. Most of the faults in the region are right-lateral strike-slip faults associated with the San Andreas Fault system. The Livermore Valley is bordered by the Calaveras Fault to the west, the Greenville Fault to the east, the Tassajara Hills and Mount Diablo to the north, and the Diablo Range to the south.

The oldest rock units exposed in the Livermore area consist of the highly deformed sedimentary, igneous, and metamorphic rocks of the Jurassic-Cretaceous Franciscan Assemblage. These rocks are structurally overlain by the Cretaceous Great Valley Sequence, consisting of alternating beds of sandstone, siltstone, and shale. Both of these units are intricately folded and faulted in the mountains surrounding the Livermore Valley. The Franciscan Assemblage and the Great Valley Sequence are overlain by more gently folded Tertiary sedimentary and igneous rocks.

In the Livermore Valley, valley fill deposits are composed of up to more than 4,000 feet of Late Tertiary to Holocene fluvial and lacustrine sediments (California Department of Water Resources [CDWR], 1966, included in CDWR, 1974). The oldest Livermore Valley fill deposit is the Plio-Pleistocene Livermore Formation, which has been divided into two members based on lithology and depositional environment. The lower member of the Livermore Formation consists of a poorly cemented pebble conglomerate, sandstone, and greenish-gray claystone of late Pliocene age (Dibblee, 1980). The upper member consists of light reddish-gray, cobble-pebble gravel with varying amounts of claystone of Pleistocene age (Dibblee, 1980).

Both members of the Livermore Formation outcrop in the hills south and east of the LLNL Livermore Site. Fine-grained, greenish to bluish-gray sediments correlating to the lower member of the Livermore Formation have been encountered in boreholes in the southern and eastern parts of the LLNL Livermore Site. Sediments corresponding to the upper member are present but have not been differentiated in these boreholes due to their similarity to the overlying Quaternary alluvium (Thorpe et al., 1990).

Four post-Livermore Formation alluvial units have been mapped near LLNL. These units consist primarily of interbedded and interlensed clays, silts, sands, and gravels. The Quaternary terrace deposits consist of silty clay and silty-to-clayey gravel of Franciscan origin. These deposits are locally overlain by younger valley fill and terrace deposits composed of reddish and yellow-brown silty gravels and sands capped by sandy-to-clayey silts. Borehole data indicate that the alluvial sediments near LLNL appear to dip 1.0 degrees to 1.5 degrees to the northwest, i.e., parallel to ground surface (Dresen and Hoffman, 1986). However, correlation of individual layers encountered at depth in this area is often a speculative task due to rapid lateral and vertical facies changes. This heterogeneity is the result of deposition by small, laterally shifting arroyos (Carpenter et al., 1984).

The Livermore Formation and overlying alluvial deposits contain the primary aquifers of the Livermore Valley groundwater basin. Natural recharge occurs primarily along the basin margins and arroyos during wet winters. In general, groundwater flows toward the central east–west axis of the valley and then westward through the central basin. Groundwater flow in the basin is primarily horizontal, although a significant vertical component probably exists along the basin margins under localized sources of recharge and near heavily used extraction or water production wells. Beneath the Livermore Site, the depth to the water table varies from about 30 to 130 feet below the ground surface. See Thorpe et al. (1990) for a detailed discussion of Livermore Site hydrogeology.
Watersheds and sub-watersheds of the San Francisco Bay region are defined in the San Francisco Bay Regional Water Quality Control Board Basin Plan (hereafter Basin Plan) (SFBRWQCB, 2011). The Basin Plan identifies that the Livermore Site is located in the South Bay Basin in the Arroyo Las Positas sub-watershed. Surface drainage in the watershed flows westward via intermittent streams (arroyos) that merge in the west end of the valley to form the southward-flowing Arroyo de la Laguna, which is a tributary to Alameda Creek. Storm water flows not percolating to groundwater flow out the southwestern corner of the valley and eventually enter San Francisco Bay by way of Alameda Creek. The Basin Plan identifies the existing beneficial uses for Arroyo Seco and Arroyo Las Positas as water contact recreation (REC1), noncontact water recreation (REC2), cold freshwater habitat (COLD), warm freshwater habitat (WARM), wildlife habitat (WILD), groundwater recharge (GWR), fish migration (MIGR), preservation of rare and endangered species (RARE), and fish spawning (SPWN).

2.1.5 CERCLA Remediation

Initial hazardous materials releases occurred at the Livermore Site in the mid- to late-1940s when the site was the Livermore Naval Air Station (Thorpe et al., 1990). There is also evidence that localized spills, unlined burial pits, and leaking tanks and impoundments contributed volatile organic compounds (VOCs), fuel hydrocarbons (FHCs), metals, and tritium to the groundwater and unsaturated sediments in the post-Navy era. By 1987, a plume of VOCs had migrated offsite about 2,200 feet west of the current LLNL property. These historical operations resulted in placement of the Livermore Site on the EPA National Priorities List in 1987 because of groundwater contamination by hazardous substances, as defined in Section 101(14) of CERCLA. In August 1987, the RWQCB adopted Site Cleanup Order No. 87-018 for various parts of the site. In June 1988, this order was superseded by Order No. 88-103 that considered the site as a whole and established a schedule for CERCLA investigations and remediation.

Twelve groundwater treatment systems are currently in operation at the Livermore Site and operate based on nature and extent of contamination, infrastructure, and topographic and hydrologic considerations. As a result of remedial actions, groundwater concentrations are currently below the Livermore Site cleanup standards for the following compounds:

- VOCs – trans-1,2-dichloroethylene (trans-1,2-DCE) and trichlorofluoromethane
- FHCs – ethyl benzene, toluene, and ethylene dibromide
- Metals – chromium

2.1.6 Description of Facility Storm Water Drainage

The Livermore Site discharges to two water bodies described below:

- Arroyo Seco, a redirected intermittent stream, traverses the southwest corner of the Livermore Site and carries drainage in a northwesterly direction offsite. The majority of the Arroyo Seco channel remains dry year-round except when rainfall creates drainage runoff. The last 20 feet of the channel onsite and at least a few hundred feet of the channel downstream of the Livermore Site flows year round due to treated groundwater discharge operated under CERCLA.
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- Arroyo Las Positas, an effluent-dominated stream modified into a storm water conveyance channel traverses the northern portion of the Livermore Site and carries drainage from the northwest corner in a northerly direction offsite. Just east of Building 591, Arroyo Las Positas receives treated water from the Livermore Site Ground Water Project as part of CERCLA activities, and water flows year-round in the lower two-thirds reach.

Arroyo Seco does not have adopted total maximum daily load (TMDLs) and is not listed for water quality impairment on the most recent 303(d) list (SWRCB 2010). Arroyo Las Positas is listed for water quality impairment on the most recent 303(d)-list (SWRCB 2014) for the following impairments:

- Diazinon
- Nutrient/Eutrophication Biological Indicators

Diazinon has an EPA-approved TMDL, whereas TMDLs are required for nutrient/eutrophication indicators. Diazinon is not used at the Livermore Site. A justification for omitting 303(d) storm water sampling is included in section 2.4.3.

The topographic surface at the Livermore Site is of low relief and slopes gently to the northwest. The elevation of the Livermore Site ranges from 172 to 206 feet above mean sea level (msl). On-site drainage for the Livermore Site is segregated, as described below:

- The southeast portion flows through both underground conduits and unlined open channels into siltation traps and then into a lined drainage retention basin referred to as Lake Haussmann. The water level of Lake Haussmann is controlled by a weir that also acts as an overflow mechanism during moderate rainfall periods, releasing water to an underground conduit that eventually discharges along the bank of Arroyo Las Positas.
- The westerly, central, and northerly portions flow through both underground conduits and unlined open channels into Arroyo Las Positas.
- A small southwest portion, beginning in the B-231 area, flows through both conduits and unlined open channels into Arroyo Seco.

The facility has numerous catch basins, drainage channels, subsurface storm drain lines as shown on facility drainage map in Map A.3 (Appendix A). The Site Maps show the area layout, including the general site topography, storm drainage systems, drainage inlets, drainage areas, and discharge locations. Many of the Livermore Site drainage ditches are unlined and infiltrate runoff, limiting the amount of storm water that could potentially enter Arroyo Las Positas and Arroyo Seco. The Livermore Site has no storm water effluent treatment system.

2.1.7 Storm Water Run-on from Off-site Areas

Off-site drainage runoff from mostly agricultural areas east and south of the Livermore Site splits at the intersection of Greenville Road and East Avenue, flowing northerly and westerly along the eastern and southern site boundaries, respectively. Drainage flowing northerly along Greenville Road enters Arroyo Las Positas at the eastern boundary of the Livermore Site. Drainage flowing
westerly along East Avenue enters Arroyo Seco at the southwestern boundary of the Livermore Site. Arroyo Seco also receives storm water drainage from Sandia National Laboratories/Livermore (SNL), located on LLNL’s southern boundary. Because Arroyo Seco and Arroyo Las Positas are located within the boundaries of the Livermore Site, flow from these off-site sources co-mingles with drainage from the Livermore Site. In addition, a portion of the agricultural runoff that crosses Greenville Road in the vicinity of East Gate Drive flows onsite to the sediment basin and on to Lake Haussmann.

2.2 DESCRIPTION OF INDUSTRIAL AREAS AT THE SITE AND ASSOCIATED INDUSTRIAL MATERIALS

Area 612 and the DWTF are RCRA Part B permitted facilities. Both facilities have Contingency Plans to respond to and mitigate spills.

2.2.1 Area 612

Area 612 is a fenced, secured, and controlled area. A detail map of Area 612 is shown in Map A.4 in Appendix A. Vehicular access to Area 612 is gained through one of four access gates shown on the Map in Appendix A. The footprint of Area 612 covers approximately 2.8 acres and the surface is covered by asphalt, concrete pads, and buildings or structures. Only authorized, appropriately-trained RHWM personnel or personnel accompanied by an authorized RHWM individual are allowed access to Area 612.

Area 612 slopes gently to the northwest. Storm water run-on from upgradient areas (located southeast of Area 612) is prevented by a perimeter berm surrounding the southeastern corner of Area 612. Storm water in the southern half of the yard flows across the asphalt-paved yard, some flowing to drainage ditches located on the western boundary and some flowing to the northern half of the facility. In the northern half of the facility, storm water flows split, with the eastern half heading towards a drainage swale out the northeastern corner of Area 612 and the western half entering a storm drain tied into the same drainage swale that collects flow from a minor portion of the southern half of Area 612. Storm water then flows through unlined drainage channels and culverts where it co-mingles with storm water flow from non-industrial areas of the Livermore Site and eventually discharges to Lake Haussmann.

Activities conducted within Area 612 are discussed in greater detail in Section 2.3.

2.2.2 Decontamination and Waste Treatment Facility

The DWTF is a fenced, secured, and controlled area. A detail map of the DWTF is shown in Map A.5 in Appendix A. Vehicular access to the DWTF is gained through one of four access gates shown on the Map in Appendix A. The footprint of the DWTF covers approximately 5.9 acres and the majority of the surface is covered by asphalt, concrete pads, and buildings or structures, except for an earthen, vegetated berm that runs along the northern boundary of the DWTF. Only authorized, appropriately-trained RHWM personnel or personnel accompanied by an authorized RHWM individual are allowed access to the DWTF.

Catch basins with grated inlets, underground corrugated metal pipe, and building downspouts are installed throughout the yard for storm water drainage. These drainage structures are sized using
the rational method to handle the peak flows from a 25-year storm event. Where practicable, the building downspouts are connected to the underground storm water drainage control system. The outlet to the storm water conveyance system is located in the northwest corner of the DWTF Complex on the bank of the Arroyo Las Positas channel.

Activities conducted within the DWTF are discussed in greater detail in Section 2.3.

2.2.3 Industrial Materials

Because LLNL is a research and development facility, waste generated and stored varies widely in chemical constituents. Hazardous waste handled at LLNL could exhibit ignitability, reactivity, corrosivity and toxicity characteristics. The RCRA Hazardous Waste Facility Permit issued by the Department of Toxic Substances Control (DTSC, 2008) identifies waste types, description and quantities for each hazardous waste management units.

Hazardous, radioactive, mixed, and nonhazardous wastes that are generated onsite or at Site 300 and are acceptable for storage are brought into Area 612 or the DWTF. Mixed wastes contain hazardous and radioactive constituents. Wastes are properly characterized before entering Area 612 or the DWTF. Because of the nature of activities at LLNL, the quantity of each type of waste treated, handled or stored within Area 612 or the DWTF may vary at any given time.

2.3 POTENTIAL INDUSTRIAL POLLUTANT SOURCES

2.3.1 Industrial Processes

The IGP requires a description of the industrial processes conducted at the Site, including “manufacturing, cleaning, maintenance, recycling, disposal, and any other activities related to the process.” The industrial processes as defined by the IGP conducted at the Livermore Site are limited to the permitted hazardous waste treatment and storage activities. Therefore, the sections that follow describe the hazardous waste treatment and storage processes, and the activities conducted that are related to these processes conducted within Area 612 and the DWTF.

2.3.1.1 Hazardous Waste Treatment

The RCRA permit for the Livermore Site provides a detailed description of the decision process used in determining whether wastes can be treated onsite or if they must be disposed offsite. If wastes are deemed appropriate for treatment, trained RHWM personnel select the applicable treatment process. The various hazardous waste treatment processes conducted at the Livermore Site are described briefly below. More detailed descriptions are provided in the RCRA permit. No treatment or process operation occurs outside of a designated treatment area located inside the indicated buildings. As a result, the majority of the equipment and materials used in the hazardous waste treatment processes are not exposed to storm water (except where noted below). However, to comply with the permit, a brief description of the treatment processes is provided.

The following waste treatment process is conducted inside Building 612:

- The **Size Reduction Unit (Building 612)** is used for the decontamination of equipment using abrasive slurry or high-pressure/high-temperature washing. Neutralization of liquids may occur here. The Size Reduction Unit also provides containment to prevent
the release of airborne particles and liquids when inspecting, assaying, and repackaging waste containers to comply with the certification requirements for off-site disposal facilities. The booth is also used to provide containment for decontaminating and dismantling of contaminated equipment.

The following waste treatment processes are conducted inside Building 695 within the liquid waste processing area (LWPA). The net operating capacity of secondary containment within the LWPA is 13,356 gallons.

- **DWTF Tank Farm (Building 695)** consists of nine, 5,000-gallon regulated hazardous waste tanks. The DWTF Tank Farm is used to store and treat batch volumes of waste waters. Chemical reagents can be added directly to the tanks to allow a variety of chemical treatment processes (i.e., neutralization, oxidation/reduction, precipitation, chlorination, cyanide destruction, degradation, detoxification, and liquid ion exchange). The chemical reagents used in the process are received in appropriate containers for the type of reagent and are kept inside clam-shell type plastic containers to provide secondary containment located outside of Building 695.

- **Waste Blending Station (Building 695)** is used to mix small batches of compatible wastes together to form a larger batch, mix chemical reagents into waste batches, perform chemical treatment, and strip organics from a wastewater. Waste blending is either conducted in a skid mounted mixing vessel or in a portable tank inside Building 695. After blending and/or chemical reagent additions, the waste is transferred to the tank farm, portable tank, waste container, or sanitary sewer depending on the waste characteristics via a pump and flexible hoses.

- **Filtration Module (Building 695)** is used to separate specific components from the waste stream. The principal component of the B695 Waste Water Filtration Unit is a rotating vacuum drum filter in a filter basin. Wastes are received in this unit from the DWTF Tank Farm or from a portable container in one of the B695 Storage Areas. The waste water feed is drawn through a filter drum by a vacuum pump, and solids contained in the waste water feed are deposited on the filter cake. The filtered waste water feed is separated from the air in the vacuum recovery reservoir, and the waste water feed is pumped back to the DWTF Tank Farm Unit by the precipitate transfer pump. The solids deposited on the filter cake are scraped off by a metal blade, which is a part of the unit, and discharged through a bottom chute into a 55-gal waste container. Auxiliary water is used to cool and lubricate the bearings on the filter basin agitator and the filtrate pump. All of this auxiliary water comes from the potable water supply. Spent auxiliary water is discharged by gravity piping into a sump located outside B695 and is subsequently pumped via sump pumps to two nonhazardous retention tanks, where it is held and analyzed prior to discharge to the sanitary sewer.

- **Centrifuge (Building 695)** is used to separate multiphasic wastes into different phases either to remove radioactive solid components, separate immiscible liquids, or pretreat the waste for subsequent treatment processes. Typically, either a storage tank or a portable tank is used as the source of the waste feed. All gaseous emissions emanating from the centrifuge are treated by the gas adsorption system prior to being directly vented to the building ventilation system.
Cold Vapor Evaporator (Building 695) is used to remove dissolved and suspended solids to allow sewer discharge of the resulting condensate. The DWTF tank farm is typically the source of the waste feed to the evaporator.

Solidification System (Building 695) is used to solidify free liquids and to immobilize toxic waste constituents. Solidification, also referred to as stabilization, is used to physically and chemically bind contaminants to produce a stable solid material. Both liquid and solid wastes are treated in the solidification system by mixing the wastes with a solidifying agent. Bulk solidifying agents are kept inside Building 695.

Shredder and Chopper (Building 695) are used to size reduce solid waste for subsequent treatment in the solidification system or the debris washer. The size-reduced materials may also be packaged for off-site shipment. The shredder/chopper and a hydraulic power unit (HPU) are installed in Rooms 1039 and 1040, respectively, of the LWPA in Building 695. A waste-receiving container is placed under the discharge portal. Debris exits the shredder/chopper as strips.

Debris Washer is located inside Room 1036 of Building 695. The debris is washed with high-pressure hot water that may contain dilute concentrations of surfactants, detergents, acids or bases. The debris is allowed to dry, and then dumped into a standard waste box and prepared for off-site disposal. The wastewater from the washing process is collected and managed as required by regulations. The process is intended to remove hazardous and/or radioactive contaminants in compliance with the land disposal restrictions (LDR) treatment standards for debris.

Bulking/Drum Rinsing Station (Building 695) is a skid-mounted unit that is used to rinse containers and drums to remove residual hazardous waste constituents. The Bulking/Drum Rinsing Station consists of an open pan connected to existing piping in the DWTF tank farm. Containers with liquid wastes are dumped into the pan using drum dumpers. Liquid wastes are then pumped from the pan to the DWTF tank farm. Smaller containers ranging from 5-gal carboys to l-qt containers are manually poured into the pan. The bulking station is also used for drum rinsing and equipment decontamination. Wastes generated from these operations are transferred directly to the DWTF Tank Farm for processing.

The following miscellaneous equipment is located in the reactive waste process area (RWPA) or Small Scale Treatment Laboratory inside of Building 695 to treat hazardous and mixed wastes:

Uranium Deactivation is located in the reactive materials cell (Room 1025) of the RWPA and is used to oxidize uranium chips and mill turnings to eliminate the pyrophoric properties of this material.

Pressure Reactor is used when precise temperature and pressure controls are required to safely control endothermic and exothermic waste treatment reactions. (The pressure reactor is operated in either the RWP area or in the SST Laboratory, Room 1023 and 1025, respectively.)
• **Water Reactor** is used to provide containment for treating water-reactive materials, such as sodium metal. (The water reactor is located in the inert atmosphere glove box or combination hazards glove box in the RWP Room 1023.)

• **Mercury Amalgamator** is used to treat mercury waste (such as elemental mercury contaminated with tritium) and a base metal to form an alloy. The treatment operations is conducted either in the RWP area (Rooms 1023 and 1025) or the SST Laboratory.

### 2.3.1.2 Permitted Hazardous Waste Storage

Hazardous wastes are stored in containers approved for the type of waste being stored. In general, the containers used at LLNL range in size from 1 mL to 5,000 gallons and include roll-off bins, cans, bags, vials, jars, bottles, drums, boxes, carboys, portable tanks, and tank trailers. Hazardous waste storage is permitted only in designated areas of Area 612 and the DWTF identified in the RCRA permit. For the purposes of this SWPPP, the storage areas are divided into three types: (1) indoor storage areas, meaning that the storage area is completely inside an enclosed, permanent building; (2) covered outdoor storage areas, meaning that the storage is not inside an enclosed building, but structures are present that provide cover and/or partial enclosure of the area; and (3) outdoor storage without cover (but may be constructed with secondary containment):

#### 1. Indoor Storage Areas

- **Building 612 Container Storage Unit (CSU)** is located entirely inside Building 612 and supports the lab packing of small quantities of nonradioactive waste chemicals, and the bulking of corrosive materials, and a mixed waste storage area. This storage area is constructed with a secondary containment capacity 1,012 gallons. Hazardous and mixed wastes stored in this building are stored on pallets.

- **Building 625 CSU** is located entirely inside Building 625 and is used to store transuranic (TRU) and mixed TRU wastes and wastes regulated under the **Toxic Substances Control Act** (TSCA), such as polychlorinated biphenyls and asbestos. An epoxy-coated concrete berm inside the building separates the radioactive wastes (east side) from the nonradioactive wastes (west side) and provides a secondary containment capacity of 14,023 gallons.

- **B693 CSU** is located entirely inside B693. The building interior is divided into four cells where wastes are segregated according to compatibility. The cells are separated by fire rated partitions. This unit stores solid, liquid, and gaseous wastes. The Building 693 CSU is used to store RCRA and DTSC regulated hazardous and mixed wastes as well as TSCA regulated waste and TRU waste. Other handling operations conducted in this unit include lab packing, over packing, bulking, sampling, and transferring. This storage area is constructed with a secondary containment capacity of 15,725 gallons.

- **B695 airlock** is located entirely inside B695 and is used for transferring and storing containers. This storage area is located within a zone of B695 that has been constructed with a total secondary containment capacity of 3,167 gallons.
Within the B695 reactive waste processing area (RWPA) are four reactive waste storage rooms entirely inside B695 used for segregated storage of reactive wastes (e.g., water-reactive materials), and the reactive materials cell. This storage area is constructed with a secondary containment capacity of 420 gallons.

The Building 696 Solid Waste Processing Area (SWPA) is located entirely inside B696 and may be used to store hazardous and mixed waste for up to 90 days in compliance with RCRA. This storage area is constructed with a secondary containment capacity of 13,958 gallons.

B696R CSU is located entirely inside B696. Building 696R is designed for the storage of solid TRU waste, solid and liquid low-level waste, mixed waste and combined waste (i.e., radioactive and California-regulated hazardous waste). Operations in the Building 696R segment include loading, unloading, staging, storage, over packing, sampling (except for TRU), and periodic visual inspections of waste containers. This storage area is constructed with a secondary containment capacity of 20,660 gallons.

B693 Annex–Container Storage Waste (CSU). The B693 Annex is an enclosed structure and was added to the north end of Building 693 during construction of the DWTF. The Annex was designed for waste storage as well as providing a pad for the Building 693 Freezer Storage Unit. This storage area is constructed with a secondary containment capacity of 22,126 gallons.

B693 Freezer Storage Unit. The freezer is located beneath a canopy-type roof of the B693 Annex. The freezer has a secondary containment capacity of 30 gallons.

2. Covered Outdoor Storage Areas

Area 612-1 CSU is located outside and consists of an asphalt surface, with a large portion under fabric structures (Tent 6197 and Tent 6198), primarily used to store drums, large boxes, and spent equipment (e.g., construction debris). The two tents erected at the Unit provide complete protection from direct or blown-on precipitation. Because only solid waste is stored in this unit, no secondary containment is required. However, all waste containers are kept closed and stored on pallets or skids to prevent contact with potential surface liquids. Waste containers are not stored outside of the tents. Run-on and run-off controls are provided by the tents, by the berms inside the tents, and by local drainage features. Run-on is prevented by berms on the south and east sides of the Unit and a grade that slopes away from the Unit on the north and west sides. The asphalt surface of the Unit is also sloped, directing surface liquids away from stored containers.

Area 612-2 CSU is a covered area used for storage of hazardous and mixed waste. The steel-frame, open-sided structure is covered by a corrugated metal roof and screens are attached on four sides. The storage area is surrounded by a chain link fence with wooden slats. Sloping concrete ramps allow vehicle access to the storage area. If liquid wastes are stored in the area, the wastes are stored in 55-gallon drums or smaller containers (generally 5 gallons or less) that are placed on secondary containment pallets. Liquid waste can also be stored in portable tanks, with capacities...
of 300, 600, 660, 750, and 1,100 gallons. These tanks are typically not placed on secondary containment pallets unless segregation of incompatible wastes is required. The perimeter berms (i.e., curbs) prevent storm water from entering the secondary containment system and prevent any accumulated liquids within the secondary containment system from escaping to the external environment. The drain line in the berm has a control valve which is kept shut. All waste containers are stored on pallets or skids to prevent contact with potential surface liquids. Containers that can deteriorate due to weathering are protected as necessary during inclement weather by relocating containers to dry locations or covering them with plastic tarps.

- Area 612-5 CSU is located outside and consists of an asphalt-surfaced storage area with a surface area of 8,300 square. A tent and a fenced area occupy 7,286 square feet of the 612-5 Unit. The tent has a 6-inch high asphalt berm located inside the tent along the east and south sides to prevent storm water run on. The remainder of the Unit is used as an open storage area on the asphalt pad. Only solid wastes are permitted to be stored in this Unit. This unit does not have secondary containment.

- Building 614 West Cells CSU is a partially-enclosed structure used for storage of hazardous wastes and compatible materials. The walls and roof slab are constructed of concrete. The roof overhangs the west side of the unit (to the concrete screens) by 6 feet and slopes from west to east. Two 6-inch thick, 12-inch wide, 13 feet 3-inch tall reinforced concrete screens have been constructed in front of the openings and doors at a distance of approximately 6 feet from the west wall. The overhanging roof forms a covered walkway between these screens and the Building 614 West Unit. This storage area is constructed with a secondary containment capacity of 176 gallons.

- Building 614 East Cells CSU is a three-sided, one-story, masonry structure used for storage of hazardous wastes and bulking and lab-packing small quantities of compatible materials. This storage area is constructed with a secondary containment capacity of 950 gallons.

3. Outdoor Storage Areas

- Area 612 Portable Tank Storage Unit is located outside and is used to store liquid wastes in portable tanks. The area consists of an uncovered 1,200-square-foot concrete pad surrounded on the north, east, and west sides by a concrete curb. This storage area is constructed with a secondary containment capacity of 4,114 gallons.

- Area 612 Tank Trailer Storage Unit is located outside and is designated for storage of hazardous or mixed liquid wastes in tank trailers or in portable tanks on flatbed trailers. The area has a total storage capacity of 5,000 gallons and the largest volume of any individual container that can be stored in the area is 5,000 gallons. The storage area is an uncovered recessed loading dock. The unit is 9 feet wide and 77.5 feet long and is recessed down to 4 feet below grade with a ramp on the east end for access. More than one tank trailer or flatbed trailer with portable tanks may be stored in the area as long as the wastes are compatible (i.e., will not create an additional hazard if mixed). This storage area is constructed with a secondary containment capacity of 8,320 gallons.
– B693 Roll Off Bin Storage Area is located outside and consists of a concrete pad on which up to two vendor supplied large metal bins (roll off bins) are stored while collecting RCRA hazardous and non-RCRA hazardous solid waste. Only solid wastes contained in the roll-off bins are permitted to be stored in this Unit. This unit does not have secondary containment.

– DWTF Portable Tank Storage Unit is located outside and consists of a coated, bermed, concrete pad designed to hold portable tanks of liquid waste. The liquid waste could be low-level, hazardous or mixed waste. These liquids primarily contain water. This storage area is constructed with a secondary containment capacity of 14,800 gallons.

2.3.1.3 Solid Waste Transfer and Handling

Waste transfer includes the movement of waste containers between locations and the moving of waste from one container into another. Waste may be transferred for the purpose of removing waste from a tank or container that is showing signs of deterioration or possible failure, or it may be conducted for the purposes of blending/bulking, treatment, sorting heterogeneous hazardous or mixed wastes prior to debris washing, or packaging (including lab packing) for off-site shipment. Within Area 612 and the DWTF, walkabouts (electric or push-type lifts) or hand carts are used to move individual waste drums within storage and process areas. Forklifts and pallet movers are used to move loads of containers on pallets or skids. Most of the portable tanks and solid waste boxes have skids that are designed to accommodate heavy lifting.

RHWM Division operators must be certified before operating heavy equipment. They are instructed to exercise caution when handling liquid waste and never to move double-stacked liquid containers. The operator ensures that lifting attachments are securely fastened to the lift truck to prevent dropping containers, and the operator observes the mast height to prevent collisions with overhead obstructions.

2.3.1.4 Liquid Waste Transfer and Handling

Liquid waste is pumped from various containers into RHWM-approved receiving vessels or commercial carriers. Transfer of waste occurs with containers either (1) located in a permitted CSU (discussed in Section 2.3.2) or (2) placed inside a portable berm. Pumping system components typically include flexible input and discharge hoses and a portable transfer pump. Locking couplings, cam lock fittings, or equivalent devices are used between hose connections and disconnect stations to prevent accidental detachment. When disconnecting a hose from a tanker truck located outside secondary containment, a container (such as a tray or bucket) is placed beneath specific points to contain leakage. Bonding and grounding are performed when flammable wastes are transferred. An anti-foam additive may be added to the receiving vessel if necessary to control foam build-up. Because receiving vessels in general do not have level alarms, RHWM personnel must be present to observe the transfer operation to ensure that no overflows or equipment leaks occur. Upon completion of the waste transfer, the flexible hoses may be manually elevated and walked to drain the liquids into a container.

Positive displacement, centrifugal, and other pumps are used to transfer liquids between containers or tanks or to remove accumulated liquids from secondary containment systems. The
pumps may be electric-, fuel-, or pneumatically-driven. Some portable pumps are installed on carts to prevent personnel injury from having to lift them. Fixed piping systems and flexible hoses are used within Building 695 to routinely transfer liquid wastes. All fixed piping is located within a secondary containment zone. Flexible hose used to transfer waste to a tank truck may be outside of a secondary containment zone; however, an operator is present at all times during the transfer operations to ensure that no leaks occur.

### 2.3.1.5 Decontamination of Hazardous Waste Containers and Equipment

Containers that previously held hazardous wastes are emptied and managed. These management practices include pouring and draining container contents, removing inner liners, rinsing containers, returning containers to the manufacturer for refill, shipping containers offsite for reclaiming or refurbishing, and de-pressuring gas cylinders and aerosol cans. Container rinsing is conducted in the **Bulking/Drum Rinsing Station (Building 695)** described in the previous section. Residues from the emptying processes are managed as hazardous waste, as required. Containers that previously held mixed wastes are also evaluated for the presence of radionuclides and are managed as radioactive waste, when appropriate.

Waste handling equipment (e.g., forklifts, dollies), floor surfaces, containers, tanks, treatment devices, and other ancillary equipment are decontaminated as required to maintain clean work areas, to optimize treatment performance, to prevent incompatible reactions, and to remove spilled materials. The decontamination technique selected is consummate with the size of the area and characteristics of the contamination. Techniques used by RHWM include wet wipe, detergent wash, caustic wash, acid wash, hydroblasting, and steam cleaning. Information from reference manuals may be used as a guide in selecting the appropriate decontamination method. Techniques that generate less liquid are used when possible to minimize generated waste. Wash water is collected in containers (e.g., carboys, drums, portable tanks) using a mop, wet-dry vacuum, or portable pump for appropriate disposition (e.g., on-site treatment, discharge to sanitary sewer, or off-site shipment). Typically, the rinsate is managed in the same manner as the previous contents of the tank(s). Adsorbents are used for small volumes and to remove residual liquids, when required. Solid waste decontamination residues are characterized and either packaged for off-site shipment or treated onsite.

### 2.3.1.6 Maintenance of Hazardous Waste Containers and Equipment

Containers that previously held hazardous wastes are managed in accordance with 22 CCR 66261.7. The emptied containers may be rinsed as required to conform with these management requirements. Drum rinsing is done onsite, as discussed above. Empty, open-head metal and plastic drums, which were previously used for storage and transport of hazardous materials, may be reused for storage and transport of hazardous waste if they meet the inspection requirements listed below. The container is checked for the following:

- Free of holes or perforations
- Free of flaking rust
- Undamaged seams and continuous welds
- Gasket is intact and is not deformed (or, the gasket is replaced)
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- Free of dents that might compromise its integrity
- Inner protective coating is not chipped, scratched, or peeling
- Closure points are in good condition
- Free of any other defects that might compromise its integrity

A preventative maintenance program is established to ensure that equipment parts subject to deterioration are replaced to minimize the potential for failures that may lead to leaks or other releases. These preventative maintenance items include, but are not limited to replacing valve packings, flange gaskets, and pump seals. Maintenance of process equipment is typically conducted in-placed, inside of the buildings.

Maintenance of motorized material handling equipment (such as forklifts) occurs at Building 6951, located northwest, adjacent to the DWTF yard.

Mobile fueling of diesel and gasoline-powered equipment and machinery occurs in the yard, as needed. Mobile fueling operations are conducted using either fueling trucks or small hand-held gasoline containers filled from a fueling station outside of the DWTF or Area 612 yards.

2.3.1.7 Disposal of Hazardous Waste and Treated Hazardous Waste Residuals

Following treatment, additional evaluation is conducted of the treated wastes residuals. Treated solid waste residuals may still be considered hazardous and packaged for off-site disposal; or they may be non-hazardous and either 1) reused or recycled or 2) packed for off-site disposal. For liquid wastes, treated waste water may be discharged to the sanitary sewer (if waste characterization indicates this is allowed), solidified, or packaged for off-site disposal (if the waste characterization is above the limits for discharge to the sanitary sewer).

Hazardous wastes that are transported offsite are appropriately manifested and transported by licensed hazardous waste transporters in accordance with Department of Transportation (DOT) requirements.

2.3.2 Material Handling and Storage Areas

2.3.2.1 Receipt of Hazardous Wastes

Hazardous, mixed, and nonhazardous wastes that are generated onsite or at Site 300 and are acceptable for storage or treatment are brought into the Area 612 Facility or the DWTF in appropriate waste-transport containers. The selection of the appropriate receiving facility for the waste is made prior to transfer of the waste from the generator and is based on the waste type or characteristic. Waste received from Site 300 is received with either a Bill of Lading (non-Resource Conservation and Recovery Act [RCRA]-regulated waste, i.e., rainwater, radioactive only, etc.) or a manifest (RCRA-regulated waste).

Upon arrival at the receiving area, the barcode on the waste container is scanned into RHWM's waste tracking database. The waste is then inspected, weighed, verified, and segregated into the appropriate CSU. When the container is relocated from the receiving area to the appropriate CSU, its most current location is scanned and the RHWM database is updated.
2.3.2.1.1 Area 612 Receiving Area

Hazardous wastes enter the Area 612 facility through the Area 612-4 Waste Accumulation Area (WAA) located at the southwestern end of the Area 612 Facility. The unit is a steel-frame structure with sheet metal interior and exterior walls and a diked, concrete floor slab covered by a corrugated metal roof. The interior of the unit is divided into five cells by curbs and is constructed with a secondary containment system. Temporary storage of hazardous wastes (less than 90 days) may also be conducted in the Area 612-4 WAA.

2.3.2.1.2 DWTF Receiving Area

The western yard area of the DWTF includes a covered truck bay located directly between the west end of Building 696S and the north end of Building 695. The truck bay is used to receive incoming vehicles delivering waste containers. The truck bay is a 12-in-thick concrete slab that has a polymeric coating and measures approximately 80 feet long by 50 feet wide. The pad is sloped towards a central trench with a secondary containment capacity for spills and rain water of approximately 24,900 gallons. The truck bay is covered with a roof that prevents direct precipitation, and run-on is prevented because the adjacent asphalt drive slopes away from the containment area. To the west of Building 696S is a truck scale and a ramped loading dock used for loading and unloading vendor supplies and some waste transport vehicles.

2.3.2.4 Outdoor Equipment and Materials Storage Areas (Other than Permitted Hazardous Waste Storage Areas)

The following non-regulated storage areas are located within the Area 612 Facility and DWTF:

- Chemical reagents used in the hazardous waste treatment processes conducted in Building 695 are stored outside in clam-shell type containers located adjacent to the western edge of the building.

- The majority of equipment used to transport hazardous wastes is stored inside the buildings. Larger empty tank trailers are kept stored at the DWTF either in the sloped concrete pad located to the west of Building 696S or parked immediately west of the DWTF portable tank storage pad. When a forklift is identified as requiring repair or maintenance, it may be stored adjacent to Trailer 6951 located northwest of the DWTF yard.

- Temporary (less than 90 days) storage of hazardous wastes is conducted within the Area 612-4 Receiving and Segregation Unit located at the southwestern end of the Area 612 Facility.

- Temporary storage is conducted in the 697 Waste Accumulation Area (WAA) located to the east of the DWTF.

- Storage of non-regulated (non-hazardous) wastes occurs in containers located on the eastern and western end of the DWTF yard. The containers are meant to be located outside and generally consist of cargo-type storage containers.
• Empty waste containers (such as drums and portable tanks) may be kept outside in various areas of the yard. Only empty containers are permitted outside of designated storage areas.

• The DWTF Underground Storage Tank (UST) is a normally empty UST connected by underground pipes to several DWTF facilities, including the Building 693 Annex. The purpose of the UST is to capture overflow water from sprinklers in case of a fire. The UST has a capacity of approximately 20,000 gallons.

2.3.3 Dust and Particulate Generating Activities

The solidification process of wastes has potential to generate dusts during the mixing process. These activities are conducted inside in an area equipped with a local hood and pre-filter to control dust emissions.

The B695 building ventilation system provides a positive airflow to the shredder/chopper unit to prevent the release of airborne particulates during size-reduction operations in the immediate working area. A high-efficiency particulate air (HEPA) filter is provided to capture airborne particulates that may be generated during size reduction operations. The filtered exhaust is vented directly into the Building 695 ventilation system which is also HEPA-filtered prior to being discharged to the atmosphere.

2.3.4 Significant Spills and Leaks

No significant spills or leaks of industrial materials impacting storm water have occurred within the industrial areas of the Site within the previous five-year period.

2.3.5 Identification of Non-Storm Water Discharges (NSWDS)

Non-storm water discharges (NSWDs) consist of discharges which do not originate from precipitation events. The IGP provides allowances for specified NSWDs provided they:

• Do not cause erosion;
• Do not carry other pollutants;
• Are not prohibited by the local MS4; and
• Do not require a separate NPDES Permit from the Regional Water Board.

NSWDs into storm drainage systems or waterways which are not authorized under the IGP and listed in the SWPPP or are not authorized under a separate NPDES permit are prohibited.

2.3.5.1 Authorized NSWDs

LLNL’s Livermore Site currently has non-storm water discharges regulated by CERCLA agreements and WDRs. The following discharge(s) to surface water are authorized by other regulatory authority:
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

- WDR No. 88-075 for discharges of treated groundwater from Treatment Facility A to recharge basin.¹
- NPDES General Permit No. 2009-0009-DWQ for discharges of storm water associated with construction activities affecting 0.4 hectares (1 acre) or more.
- Federal Facility Agreement (FFA) for groundwater investigation and remediation (treated groundwater discharge to surface water is authorized under the FFA under CERCLA).

Non-storm water discharges at the Livermore Site that are authorized under the IGP have been segregated into the categories identified in Section IV.A of the IGP and are discussed below:

1. Fire-hydrant and fire prevention or response system flushing. NSWDs at the Livermore Site under this category include:
   - Building fire sprinkler system tests
     - Inspector test valves
     - Main drain tests
     - Deluge valves
   - Fire hydrant testing
   - Annual in-service fire apparatus pump testing
   - Wet hose drills
   - Hose tests
   - Fire service pump tests

2. Potable water sources including potable water related to the operation, maintenance, or testing of potable water systems. NSWDs at the Livermore Site under this category include:
   - Emergency eye washes
   - Safety showers
   - Drinking water tanks
   - Mocho standpipes
   - Piping
   - System flushing
   - New water system pipe and broken line replacement

¹ Recharge basin referenced in WDR Order No. 88-075 is located south of East Avenue within Sandia National Laboratories/California boundaries. The discharge no longer occurs; however, LLNL has not terminated the permit.
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

- Back-flow prevention devices
- Temperature pressure relief valves
- Hose bibs and drinking fountains

3. Drinking fountain water and atmospheric condensate including refrigeration, air conditioning, and compressor condensate. NSWDs at the Livermore Site under this category include:
   - Air conditioners and humidifiers
   - Ice makers
   - Air compressors

4. Irrigation drainage and landscape watering, provided all pesticides, herbicides and fertilizers have been applied in accordance with the manufacturers label;

5. Uncontaminated natural springs, groundwater, foundation drainage, footing drainage
   - Uncontaminated groundwater discharges from sumps, foundation drains (e.g., B-194 and 583) or from groundwater well purging;

6. Incidental windblown mist from cooling towers that collects on rooftops or adjacent portions of the facility, but not intentional discharges from the cooling tower.

During 1992/1993, LLNL conducted an extensive investigation of building drain connections. Because many buildings at the site date back to the U.S. Navy’s use from 1942 to 1952, and numerous modifications have been made to buildings to meet LLNL’s changing research and development mission, a potential for inappropriate building drain connections existed. Investigative work completed in March 1993 under the Building Drain Investigation Project. Approximately 6,000 inappropriate drain connections were identified that resulted in non-storm water discharges to the storm water drainage system. Most of these discharges were low-flow discharges of condensate or potable water having little or no impact on receiving waters. The Building Drain Investigation Project used a combination of visual observations, dye testing, and other methods of tracing wastewater discharges to identify and verify building drain connections.

A tracking mechanism to track changes to buildings drains and the Building Drain Management Database were fully implemented by 1995. LLNL’s Maintenance and Utility Services Department’s Facility and Maintenance Management Division tracks changes to buildings.

Specific information on the building drain discharge locations is identified in the Building Drain Management Database and the storm water building assessment documentation, maintained by the Maintenance and Utility Services Department’s Facility and Maintenance Management Division.

The authorized NSWDs will be managed with the storm water and non-storm water BMPs described in Section 3 of this SWPPP. These BMPs are implemented to:

- Reduce or prevent the contact of authorized NSWDs with materials or equipment that are potential sources of industrial pollutants;
- Reduce, to the extent practicable, the flow or volume of authorized NSWDs;
• Ensure that authorized NSWDs do not contain quantities of pollutants that cause or contribute to an exceedance of a water quality standards; and

• Reduce or prevent discharges of pollutants in authorized NSWDs in a manner that reflects best industry practice considering technological availability and economic practicability and achievability.

Monthly visual observations will be conducted according to the IGP (Section XI.A.1) for sources to ensure adequate BMP implementation and effectiveness. Monthly visual observations include observations for evidence of unauthorized NSWDs within the industrial areas of the Livermore Site.

2.3.5.2 Discharges from the LLNL Drinking Water System

LLNL’s drinking water system infrastructure is aging. Some of it was built as far back as the 1940s. LLNL is replacing valves and distribution piping and has plans to continue as funds are available. Some portions of the system, specifically some of the landscaping irrigation infrastructure, have smart control systems that will close valves if significantly high flow occurs. Nevertheless, failures of the distribution system have and may continue to occur.

Any planned discharges for maintenance of water quality or discharges due to failure of LLNL’s aging drinking water infrastructure will be mitigated and/or minimized to the extent possible, by the following measures.

Planned Discharges will be:

• Kept as small as possible to achieve the desired goal
• Treated with Pollard Vita-D-Chlor tablets or other similar tablets, supplied by the Facilities and Infrastructure (F&I) Water Shop. The active ingredient of these tablets is ascorbic acid. These tablets decrease or eliminate the concentration of chlorine and chloramine. The San Francisco Public Utilities Commission (SF PUC) recommends the use of ascorbic acid or granular activated carbon to remove chloramine
• Directed through a diffuser to spread out the discharge to prevent erosion and to provide a convenient way of administering the dichlorination/dechloramination tablets
• Tested for chlorine (by F&I water shop personnel) during any planned release to verify that dichlorination efforts are successful

Unplanned Discharges will be:

• Valved off as soon as possible, keeping in mind the need for continuous fire suppression safety and continuity of critical research and support operations
• Treated with Pollard Vita-D-Chlor tablets or other similar tablets
• Tested for chlorine (by F&I water shop personnel) as possible during unplanned releases to verify that dichlorination efforts are successful
• Filtered by filter rolls to minimize the amount of turbidity that reaches receiving waters
2.3.5.3 Unauthorized NSWDs

Activities at this site that may result in unauthorized non-storm water discharges include:

- Discharges from backups and breaks in sanitary sewer lines
- Leaks from dumpsters
- Discharges to the storm water drainage system from building and grounds maintenance activities (such as, exterior building and window rinsing, pavement rinsing and other rinsewaters, storm drainage system maintenance, releases of pesticides and fertilizers due to improper application of these materials, and excavated soil from small-scale repairs or improvements disturbing less than 1 acre placed onto the ground)
- Releases of low-conductivity water tanks or deionized water

Steps will be taken, including the implementation of appropriate BMPs as defined in Section 3, to ensure that unauthorized NSWDS are eliminated or controlled and not discharged offsite through the storm water drainage system.

2.3.6 Erodible Surfaces

Erodible surfaces are not present within Area 612 or the DWTF. There may be occasions at either area where subsurface soils may be exposed, such as during a planned or emergency subsurface utility repair or small-scale renovations to the facility. There are currently no such activities planned for either Area 612 or the DWTF. However, erosion control measures for these potential activities are discussed in Section 3.0 in case of an unexpected soil-disturbing event that disturbs less than 1-acre of land.

2.4 POLLUTANT SOURCE ASSESSMENT

In accordance with the IGP, the following subsections present a pollutant source assessment for areas of industrial activity at the Livermore Site.

2.4.1 Description of Potential Pollutant Sources

Table 2.1 includes a list of the potential industrial pollutant source activities conducted at the Livermore Site identified in Section 2.3 and the associated industrial materials that are anticipated to be used, stored, or handled. The table identifies and summarizes activities identified in Section 2.3 that could potentially contribute pollutants to storm water runoff. The activities and associated pollutants provided in Table 2.1 that are identified as potentially contributing to storm water pollution are the basis for selecting the BMPs described in Section 3.

2.4.2 Drainage Areas with No Exposure to Industrial Activities and Materials

Based on the assessment conducted in Section 2.4.1, the majority of the Livermore Site is not subject to industrial activities. Activities conducted in the majority of the Livermore Site are associated with laboratory research projects and are not subject to coverage under the industrial permit. Industrial activities as defined in the IGP are limited to the Area 612 and DWTF facility boundaries identified on Maps A.2 and A.3 in Appendix A.
2.4.3 Justification for Omitting 303(d) Storm Water Sampling

The IGP, Appendix 3 lists Arroyo Las Positas as having a 303(d) Impairment. The impairment is for diazinon and nutrients, including the following: nitrate, nitrite, total nitrogen, dissolved oxygen, temperature, and total phosphorus. LLNL does not use diazinon, nor does it store waste at high temperatures. However, various wastes that are handled in our two IGP regulated areas, DWTF and 612/625, contain the listed nutrients. The wastes are strictly controlled. Nothing short of a regional catastrophe would cause a release of those wastes into Arroyo Las Positas.

The following factors prevent the impaired wastes and waste characteristics from being discharged:

1) All wastes are stored in securely closed containers that are designed to hold their contents even if they should fall over.
2) All wastes are stored indoors in rooms or on secondary containment designed to contain the wastes. (Note: occasionally wastes are staged outside for a limited time, usually only for a few hours, for shipment offsite)
3) Wastes are stored in locations protected from rain water.
4) Containers are initially inspected to verify they are in good operating condition upon receipt at LLNL. They are inspected again before use and are inspected at least weekly during use.
5) In the event of incidental spills during transfer of materials, there are trained employees and emergency response procedures in place that direct the containment and cleanup of the spilled material. In the event it is necessary, the Alameda County Fire Department is housed less than a mile away and can respond to larger incidents.
6) All hazardous waste storage areas have emergency and spill cleanup kits in case of a spill.
<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Material Location</th>
<th>Material Type</th>
<th>Material Quantity</th>
<th>Material Physical Characteristics</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>Potential for Pollutants to be Exposed to Storm Water</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hazardous Waste Treatment</strong></td>
<td>Inside Buildings (695 and 625)</td>
<td>Hazardous and mixed wastes</td>
<td>See table for annual allowable treatment quantities</td>
<td>Liquid and solid</td>
<td>Organics, pH, Metals, Cyanides, Sulfides, Peroxides, PCBs, Pesticides, Organic gases</td>
<td>• No Exposure – hazardous waste treatment activities are conducted inside permanent structures constructed with walls, a roof, and secondary containment. Reagents used in liquid waste treatment are stored outside of B695 and are discussed in section “Outdoor storage of liquids.”</td>
<td>• None</td>
</tr>
<tr>
<td><strong>Hazardous Waste Storage</strong></td>
<td>Building 612 Container Storage Unit (inside secondary containment capacity 1,012 gallons)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 292 cubic yards (58,976 gallons)</td>
<td>Liquid solid gas</td>
<td>Selected organics, pH, Metals, Cyanides, Sulfides, Peroxides, PCBs, Pesticides, Organic gases</td>
<td>• No Exposure – storage inside the building</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>Building 625 CSU (inside secondary containment capacity 14,023 gallons)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 210 cubic yards (42,416 gallons)</td>
<td>Liquid, solid, and gas</td>
<td>Selected organics, pH, Metals, Cyanides, Sulfides, Peroxides, PCBs, Pesticides, Organic gases</td>
<td>• No Exposure – storage inside building equipped with secondary containment</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>Building 693 CSU (inside)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 132,000 gallons</td>
<td>Liquid, solid, and gas</td>
<td>Selected organics, pH, Metals, Cyanides, Sulfides, Peroxides, PCBs, Pesticides, Organic gases</td>
<td>• No Exposure – storage inside building equipped with secondary containment</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>B695 Airlock</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 12,000 gallons</td>
<td>Liquid solid</td>
<td>• Selected organics • pH • Metals • Cyanides • Sulfides • Peroxides • PCBs Pesticides</td>
<td>• No Exposure – storage inside building</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>B695 Reactive Waste Storage Rooms (inside)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 12,400 gallons</td>
<td>Liquid solid gas</td>
<td>• Selected organics • pH • Metals • Cyanides • Sulfides • Peroxides • PCBs Pesticides</td>
<td>• No Exposure – storage inside building</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>B696 Container Storage Unit Group (inside secondary containment capacity 34,648 gallons)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 158,145 gallons</td>
<td>Liquid solid gas</td>
<td>• Selected organics • pH • Metals • Cyanides • Sulfides • Peroxides • PCBs Pesticides Organic gases</td>
<td>• No Exposure – storage inside building equipped with secondary containment</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>Building 693 Container Storage Annex (inside secondary containment capacity 22,126 gallons)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 22,880 gallons</td>
<td>Liquid, solid, and gas</td>
<td>• Selected organics • pH • Metals • Cyanides • Sulfides • Peroxides • PCBs Pesticides Organic gases</td>
<td>• No Exposure – storage inside building equipped with secondary containment</td>
<td>• None</td>
</tr>
<tr>
<td></td>
<td>Building 693 Freezer Storage (canopy-type roof secondary containment capacity 30 gallons)</td>
<td>Hazardous and mixed wastes</td>
<td>Maximum quantity storage - 1900 gallons</td>
<td>Liquid and solid</td>
<td>• pH • Selected organics • Cyanides • Sulfides Metals</td>
<td>• No Exposure – storage inside freezer under roof structure equipped with secondary containment</td>
<td>• None</td>
</tr>
</tbody>
</table>
### Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

#### Building 612 Lab
- **Packing/ Packaging Container Storage Unit** (inside secondary containment capacity 2,140 gallons)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 21 cubic yards (4,242 gallons)
- **Liquid and solid**
- Selected organics
  - pH
  - Metals
  - Cyanides
  - Sulfides
  - Peroxides
  - PCBs
  - Pesticides
  - Organic gases
- **No Exposure – storage is inside the building**
- **None**

#### Area 612-1 Container Storage Unit (outside/inside)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 1,422 cubic yards
- **Solid**
  - Selected organics
    - pH
    - Metals
    - Cyanides
  - Pesticides
  - PCBs
- **Run on/run off from storage areas**
- **Releases from punctured or damaged containers**
- **Spills**
- **Oxidation products from storage container surfaces;**
- **Leaching from materials stored outside**
- **Low – materials are inside tent structures with a perimeter berm on the upgradient side; Solids only; Inspected containers.**
- **None**

#### Area 612-2 Container Storage Unit (canopy-type roof with secondary containment capacity 2,410 gallons)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 10,560 gallons
- **Liquid and solid**
  - Selected organics
    - pH
    - Metals
    - Cyanides
    - Sulfides
    - Peroxides
    - PCBs
    - Pesticides
    - Organic gases
- **No Exposure – storage is on a concrete pad completely covered by a corrugated metal roof and constructed with secondary containment.**
- **None**

#### Area 612-5 Container Storage Unit (outside)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 955 cubic yards
- **Solid**
  - **pH**
  - Selected organics
    - Metals
    - Cyanides
  - Pesticides
  - PCBs
- **Run on/run off from storage areas**
- **Releases from punctured or damaged containers**
- **Spills**
- **Oxidation products from storage container surfaces;**
- **Leaching from materials stored outside**
- **Releases from leaking valves**
- **Low – materials are inside tent structures with a perimeter berm on the upgradient side; Solids only; Inspected containers.**
- **None**

#### Building 614 West Cells CSU (inside secondary containment capacity of 176 gallons)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 672 gallons
- **Liquid solid gas**
  - Selected organics
    - pH
    - Metals
    - Cyanides
    - Sulfides
    - Peroxides
    - PCBs
    - Pesticides
    - Organic gases
- **No Exposure – storage under roof structure equipped with secondary containment**
- **None**

#### Building 614 East Cells CSU (canopy-type roof secondary containment capacity 950 gallons)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 3,520 gallons
- **Liquid solid gas**
  - Selected organics
    - pH
    - Metals
    - Cyanides
    - Sulfides
    - Peroxides
    - PCBs
    - Pesticides
    - Organic gases
- **No Exposure – storage under roof structure equipped with secondary containment**
- **None**

#### Area 612 Portable Tank Storage Unit (outside secondary containment capacity 4,114 gallons)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 10,000 gallons
- **Liquid and solid**
  - Selected organics
    - pH
    - Metals
    - Cyanides
    - Sulfides
    - Peroxides
    - PCBs
- **No Exposure – storage unit has secondary containment**
- **None**

#### Area 612 Tank Trailer Storage Unit (outside unit equipped with secondary containment capacity of 8,320 gallons)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 5,000 gallons
- **Liquid and solid**
  - Selected organics
    - pH
    - Metals
    - Cyanides
    - Sulfides
    - Peroxides
    - PCBs
- **No Exposure – storage unit has secondary containment**
- **None**

#### Building 693 Roll-off Bins (outside)
- **Hazardous and mixed wastes**
- **Maximum quantity storage** - 80 cubic yards
- **Solid**
  - Selected organics
    - pH
    - Metals
    - PCBs
- **Run on/run off from storage areas**
- **Releases from punctured or damaged containers**
- **Spills**
- **Oxidation products from storage container surfaces**
- **Low – materials stored in lined roll-off bins**
<table>
<thead>
<tr>
<th>Hazardous and mixed wastes</th>
<th>Maximum quantity storage - 10,000 gallons</th>
<th>Liquid and solid</th>
<th>Hazardous waste management</th>
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<tr>
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<td>Division Yard</td>
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<td>Solid</td>
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<tr>
<td>Liquid Waste Transfer and Handling</td>
<td>Designated storage areas or inside buildings</td>
<td>Liquid wastes</td>
<td>Varies</td>
<td>Liquid</td>
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<tr>
<td>Equipment Decontamination</td>
<td>Inside Buildings (695 and 625) or outside with secondary containment</td>
<td>Rinse water potentially containing all hazardous waste codes, mixed wastes</td>
<td>Varies</td>
<td>Liquid</td>
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<tr>
<td>Equipment Maintenance and Repair</td>
<td>Dedicated equipment, such as forklifts and trucks, are stored at the northwestern corner of the DWTF yard. Forklifts requiring repair or maintenance are parked adjacent to the B6951 facility. Repairs/ maintenance activities are conducted adjacent to B6951.</td>
<td>Brake fluid</td>
<td>Fuel Oils: - Ultra low sulfur diesel fuel #2 – red - E85 ethanol - 87 unleaded 5.7% ethanol gasoline - Ethylene glycol/propylene glycol - Oil (motor, transmission, hydraulic) - Brake and transmission fluid</td>
<td>55 gallon drums</td>
</tr>
</tbody>
</table>

**Storm Water Pollution Prevention Plan (SWPPP) Livermore Site**
<table>
<thead>
<tr>
<th><strong>Receipt (Loading/Unloading) of Industrial Materials and Waste</strong></th>
<th><strong>Organic gases</strong></th>
<th><strong>Liquid and solid</strong></th>
<th><strong>Spills of materials during loading/unloading of waste containers</strong></th>
<th><strong>Low - waste materials are transported in appropriate, sealed containers</strong></th>
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<tbody>
<tr>
<td>Receiving area at Area 612 Facility; Track Bay of DWTF</td>
<td>• Hazardous and mixed wastes</td>
<td>Varies</td>
<td>Liquid and solid</td>
<td>-</td>
</tr>
</tbody>
</table>

| **Non-Regulated Outdoor Storage Areas** | **Organics** | **pH** | **Metals** | **Cyanides** | **Sulfides** | **Peroxides** | **PCBs** | **Pesticides** | **Organic gases** | **Spills** | **Run-on/run-off from storage area** | **Leaks from containers** | **Low - liquids are kept in clam-shell type storage units equipped with covers and secondary containment** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Reagents stored in covered bins located outside adjacent to the western edge of B695 | • sodium hydroxide at 50% by weight | 600 gallons (two tanks at 300 gallons each) | liquid | pH (acids and bases) | - | - | - | - | - | - | - | - | - | - |
| | • sulfuric acid at 93% by weight | 450 gallons | liquid | - | - | - | - | - | - | - | - | - | - | - | - |
| | • hydrogen peroxide at 30 to 50% by weight | 450 gallons | liquid | - | - | - | - | - | - | - | - | - | - | - | - |
| | • ferric sulfate (flocculant) at 50% by weight | 300 gallons | liquid | - | - | - | - | - | - | - | - | - | - | - | - |
| Northern boundary of DWTF and inside secondary containment structure west of B696 | • No material storage, only industrial equipment | Varies - typically 3-4 tank trailers | Solid | None | - | - | - | - | - | - | - | - | - | - |
| Temporary Outdoor Staging of Wastes in Division Yards | • Hazardous and mixed wastes | Varies | Solid and liquid | Selected organics | pH | Metals | Cyanides | Sulfides | Peroxides | PCBs | Pesticides | Organic gases | Runoff/run-on from temporary waste staging areas | Spills | Leaks from containers | - |
| Division Yards | • Non-regulated and non-hazardous wastes | Varies | Solid and liquid | Tritium Gross alpha beta | - | - | - | - | - | - | - | - | No Exposure - materials are kept inside appropriate waste containers that are meant for outdoor storage | - | - | - |
| Division Yards | • Empty storage containers | Varies | Solid | None | - | - | - | - | - | - | - | - | No Exposure - only empty, clean containers are permitted to be stored outside in the yard areas. Containers are intended for outdoor use. | - | - | - |
| Dust and Particulate Generating Activities | • Dust/particulates | Varies | Solid | TSS | - | - | - | - | - | - | - | - | No Exposure - activities conducted inside buildings equipped with ventilation controls to prevent particulate/dust emissions | - | - | - |

**Note:** The table above outlines the specific waste types and disposal procedures at the Livermore Site, including the types of materials handled, their disposal methods, and the associated environmental precautions and preventive measures.
Section 3  Best Management Practices

3.1  MINIMUM BMPS

The minimum BMPs that are required by the IGP and necessary to meet the facility conditions will be implemented. Most of the BMPs discussed in this chapter have already been implemented at LLNL as required by environment, safety, and health regulations; as prudent practices; or as required by coverage under the previous NPDES Permit. Sections 3.1.1 through 3.1.7 list the requirements for each of these minimum BMPs. The italicized text states the requirements as presented in the IGP. Following the italicized text is a description of the BMPs LLNL has already implemented or that will be implemented to comply with the minimum BMP requirements. Minimum BMPs will be implemented for targeted industrial activities, equipment, and materials.

As required by the IGP, a summary of all implemented BMPs is included in Section 3.3. The schedule for BMP implementation and the requirements for inspection and maintenance are contained in Section 4.

3.1.1  Good Housekeeping

The following good housekeeping measures will be implemented in accordance with the IGP (Section X.H.1.a):

- **Observe all outdoor areas associated with industrial activity including storm water discharge locations, drainage areas, conveyance systems, waste handling/disposal areas, and perimeter areas impacted by off-facility materials or storm water run-on to determine housekeeping needs.** Any identified debris, waste, spills, tracked materials, or leaked materials will be cleaned and disposed of properly.
  - Monthly inspections of Area 612 and the DWTF will be conducted by properly trained SWPPP inspectors as described in the Monitoring Implementation Plan (Section 5.0 of this SWPPP). Deficiencies found and corrective actions taken as a result of SWPPP inspections will be documented on the SWPPP inspection forms and in the Issues Tracking System (ITS).
  - RHWM conducts routine inspections (a minimum of once per week) of hazardous waste treatment and storage units to detect any safety or operating malfunctions, deterioration, spills, leaks, operator errors, and other deficiencies in accordance with the RCRA permit. During monthly inspections of the industrial areas, the trained SWPPP inspector will interview an available RHWM representative to determine that these inspections occurred and make note on the monthly observation form (Appendix B).

- **Minimize or prevent material tracking.**
  - Spilled or leaking materials are cleaned up promptly to prevent tracking of materials outside of the boundaries of Area 612 and the DWTF (see Section 3.1.3 for spill response procedures).
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– Maintenance and Utility Services Department will dry sweep paved areas within and around Area 612 and DWTF a minimum of twice a year.

• Minimize dust generated from industrial materials or activities.
  – Potential dust generating activities include solidification and drum crushing treatment activities. Both of these activities are conducted inside buildings.

• Ensure that all facility areas impacted by rinse/wash waters are cleaned as soon as possible.
  – Equipment rinsing/decontamination is done inside the buildings. If rinsing is necessary on outdoor equipment, it is done in an area with secondary containment and the rinsewater is characterized for disposal to the sanitary sewer or treatment.

• Cover all stored industrial materials that can be readily mobilized by contact with storm water.
  – Industrial materials are kept in appropriate containers and only in designated locations identified in Section 2.3.1.2 and shown on Maps A.4 and A.5 in Appendix A.
  – Containers that are typically stored outdoors are designed for outdoor use. These containers include, but are not necessarily limited to drums, tank trailers, portable tanks, carboys, and transportainers. Containers that can deteriorate due to weathering, such as cellulose drums or boxes, are protected as necessary during inclement weather by either relocating them to dry locations or covering them with plastic tarps.

• Contain all stored non-solid industrial materials or wastes (e.g., particulates, powders, shredded paper, etc.) that can be transported or dispersed by the wind or contact with storm water.
  – Industrial materials are protected from rainfall, run-on, runoff, and wind dispersal by storing the majority of materials indoors. In designated outdoor storage areas, liquid materials are stored in appropriate containers in designated storage areas equipped with secondary containment. Outdoor storage of other wastes is protected from dispersal by storing these materials in appropriate containers that are kept closed when not in use.
  – In areas without secondary containment, waste containers are either stored on pallets or skids or are otherwise designed to prevent contact with storm water.

• Prevent disposal of any rinse/wash waters or industrial materials into the storm water conveyance system.
  – Rinse/wash waters and liquids accumulated in secondary containment are characterized and discharged to the sanitary sewer (if characterization results allow) or is handled as hazardous waste (and treated and managed accordingly).
  – To prevent liquids from entering the storm water conveyance system, liquid wastes and liquid chemical reagents are stored in appropriate containers in
designated storage areas equipped with secondary containment. All material storage containers are routinely inspected by RHWM personnel for signs of deterioration a minimum of once per week.

- **Minimize storm water discharges from non-industrial areas (e.g., storm water flows from employee parking area) that contact industrial areas of the facility.**
  - At the Area 612 Facility, the grade of the facility is sloped to the northwest. Run-on is prevented by asphalt berms/curbing located along the southeastern boundary of the facility. At the DWTF, the facility is constructed to minimize run-on from the offices and parking areas located southeast of the DWTF.

- **Minimize authorized NSWDs from non-industrial areas (e.g., potable water, fire hydrant testing, etc.) that contact industrial areas of the facility.**
  - Authorized NSWDs that may occur within the boundaries of the Area 612 Facility or the DWTF include: eye wash and safety shower testing, AC condensate drains and fire response system testing. Testing (e.g., performance and verification) on the sprinkler system is performed quarterly.
  - Other authorized NSWDs that may occur in close proximity to Area 612 or the DWTF are conducted with precautions to not cause run-on to either Area 612 or the DWTF.

The specific housekeeping BMPs implemented at the Livermore Site as they relate to specific industrial activities are summarized in Section 3.3.

### 3.1.2 Preventative Maintenance

The following preventative maintenance measures will be implemented in accordance with the IGP (Section X.H.1.b):

- **Identify all equipment and systems used outdoors that may spill or leak pollutants.**
  - Equipment that is used outdoors that may spill or leak pollutants includes: forklifts and drum dollies used to transport hazardous wastes.

- **Observe the identified equipment and systems to detect leaks, or identify conditions that may result in the development of leaks.**
  - Tank systems and treatment equipment (including pipes, hoses, fittings, valves, etc.) are inspected for leaks or other damage. If a leak is discovered, corrective actions are initiated immediately, as outlined in the Contingency Plan that is part of the RCRA permit.

- **Establish an appropriate schedule for maintenance of identified equipment and systems.**
  - A preventative maintenance program is established to ensure that parts subject to deterioration are replaced to minimize the potential for failures that may lead to leaks or other releases. These preventative maintenance items include, but are not limited to replacing valve packings, flange gaskets, and pump seals.
Establish procedures for prompt maintenance and repair of equipment, and maintenance of systems when conditions exist that may result in the development of spills or leaks.

- Treatment process and material handling equipment found to be leaking or to be in an unsafe condition are not operated until the appropriate repairs are complete. Maintenance activities are documented and retained on file.

The specific preventative maintenance BMPs implemented at the Livermore Site as they relate to specific industrial activities are summarized in Section 3.3.

3.1.3 Spill and Leak Prevention and Response

The following spill and leak prevention and response measures will be implemented in accordance with the IGP (Section X.H.1.c):

- Establish procedures and/or controls to minimize spills and leaks. As described in Section 2.3.1, the majority of the industrial activities (hazardous waste treatment and storage) are conducted inside the buildings constructed with secondary containment. For outdoor activities and storage areas, the following procedures are conducted:

  - Area 612 and the DWTF storage and processing areas (indoors and outdoors) are inspected at least every week by RHWM Division personnel to ensure that waste containers are in good condition and no leaks are present in accordance with the RCRA permit.

  - Transfers of liquid waste will take place primarily in areas with secondary containment. If the transfer cannot take place in areas where secondary containment is available, the equipment will be inspected prior to use and personnel will remain in the area when the transfer is taking place.

  - Locking couplings, cam fittings or equivalent devices are used between hose connections and disconnect stations to prevent accidental detachment. Pans or other devices are placed under couplings to prevent releases should a leak occur.

  - Waste transfer operations are conducted by trained RHWM personnel who remain at the equipment during the transfer to (1) ensure no overflows or equipment leaks occur or (2) respond quickly if overflow or leaks do occur.

  - LLNL maintains a Spill Prevention, Control and Countermeasures (SPCC) Plan for the Livermore Site that outlines steps to prevent, control, and respond to potential spills from aboveground containers and equipment that contain 55 gallons or more of oil. The SPCC Plan establishes requirements to prevent the discharge of oil into navigable waters. The SPCC Plan is updated within six months of any technical change (changes in inventory or process). The Livermore Site SPCC Plan was most recently amended in March 2019.

  - Area 612 and the DWTF are managed by a Contingency Plan which describes the emergency release-response actions required of RHWM and other LLNL personnel to manage either leaks or releases of hazardous, toxic, or mixed materials and wastes.
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- RHWM personnel receive training in Waste Management Unit Inspection, Procedures, and Emergency Response.

- Develop and implement spill and leak response procedures to prevent industrial materials from discharging through the storm water conveyance system. Spilled or leaked industrial materials will be cleaned promptly and disposed of properly.
  - Spill response procedures are implemented as soon as a spill or leak is observed.
  - LLNL spill response policy is contained in DES-2689 Preventing Storm Water Pollution and Oil Spills. Small-scale spilled or leaked industrial materials will be cleaned promptly and disposed of properly. For large-scale incidents, LLNL contracts with Alameda County Fire Department to provide on-site hazardous materials response. Because they maintain a station onsite, they can respond quickly to an emergency involving outdoor storage of materials.

- Identify and describe all necessary and appropriate spill and leak response equipment, location(s) of spill and leak response equipment, and spill or leak response equipment maintenance procedures.
  - Spill kits are located throughout the Hazardous Waste Management Facilities. These kits contain the supplies necessary to manage small spills that may occur within the various storage and/or treatment areas. Maps A.4 and A.5 in Appendix A identify the specific locations and contents of each spill kit. In general, the contents include:
    - Dust/push brooms, dust pans, and plastic scoops;
    - Neutralization chemicals and other materials to respond to and clean up acid, caustic, and flammable liquid spills; and
    - Face shields, goggles, plastic booties, and rubber gloves.
  - Spill cleanup materials are maintained in Area 612 and the DWTF by RHWM. Spill kits are maintained with a tamper seal which allows a quick observation to identify whether or not the spill kit has been opened. Adequate supplies are restocked in the spill kits after any emergency use or in a timely manner upon observation of a broken seal. A new seal is placed on the spill kit after restocking the contents. Employees are instructed to make sure PPE in appropriate sizes is available in spill kits in their work areas.
  - The appropriate Waste Container Label for the cleanup materials shall be promptly filled out and attached to the closed container(s) of waste.

- Identify and train appropriate spill and leak response personnel.
  - The RHWM Training Program offers spill response training to RHWM personnel that are appointed to handle, transport, or contact hazardous materials. The RH5120 series courses are a required series of courses for RHWM personnel that train employees on inspection and emergency response procedures should a leak, spill or other emergency involving hazardous waste occur.
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

The specific spill and leak prevention and response BMPs implemented at the Livermore Site as they relate to specific industrial activities are summarized in Section 3.3.

3.1.4 Material Handling and Waste Management

The following material handling and waste management measures will be implemented in accordance with the IGP (Section X.H.1.d):

- **Prevent or minimize handling of industrial materials or wastes that can be readily mobilized by contact with storm water during a storm event.**
  - For activities that are conducted outside of areas with cover or secondary containment, activities are altered to prevent exposure of pollutants to storm water including performing the activity during dry periods.

- **Contain all stored non-solid industrial materials or wastes (e.g., particulates, powders, shredded paper, etc.) that can be transported or dispersed by the wind or contact with storm water during handling.**
  - Wastes are transported and stored in appropriate waste containers.
  - Waste containers are further protected from rainfall, run-on, run-off, and wind dispersal by storing the materials indoors or within designated storage locations identified in Section 2.3.1.2 and shown on Maps A.4 and A.5 in Appendix A.

- **Cover industrial waste disposal containers and industrial material storage containers that contain industrial materials when not in use.**
  - Containers are kept closed except when wastes are being added or removed (as in sampling, bulking, repackaging, or lab-packing operations). Bungs are tightened and rings are bolted; can lids are shut; valves on tank trailers and portable tanks are kept shut; and boxes are crimped, clamped, stapled, or nailed shut. Portable tank lids are screwed tight or clamped down. Also, quick disconnects on tank trailers and portable tanks are capped when not in use. The tanker lid/access ways are clamped shut. The lids to the process chemical storage area containers are kept closed when not in use.

- **Divert run-on and storm water generated from within the facility away from all stockpiled materials.**
  - Materials are generally not stockpiled within Area 612 or the DWTF. Hazardous wastes are kept in appropriate containers such as drums or roll-off bins. These containers are stored in the appropriate, designated locations identified in Section 2.3.1.2 and shown on Maps A.4 and A.5 in Appendix A.

- **Clean all spills of industrial materials or wastes that occur during handling in accordance with the spill response procedures (Section X.H.1.c).**
  - LLNL spill prevention and response procedures are discussed in Section 3.1.3.

- **Observe and clean as appropriate, any outdoor material or waste handling equipment or containers that can be contaminated by contact with industrial materials or wastes.**
Containers are managed as described in Section 2.3.1.6.

In addition to the minimum BMPs identified above, the following Material Handling and Waste Management BMPs have been implemented at the Livermore Site:

- RHWM Division operators must be certified before operating heavy equipment used to move or transport wastes.
- Forklift Operators follow all forklift operating procedures when moving waste.
- Hazardous wastes are tracked using an internal tracking barcode system.

The specific material handling and waste management BMPs implemented at the Livermore Site as they relate to specific industrial activities are summarized in Section 3.3.

### 3.1.5 Erosion and Sediment Controls

The following erosion and sediment control measures will be implemented in accordance with the IGP (Section X.H.1.e):

- **Implement effective wind erosion controls.**
  - The surfaces of Area 612 and the DWTF are covered with asphalt and concrete pads or buildings or stabilized with vegetation (in the case of the vegetated berm along the northern boundary of the DWTF).
  - If materials are stockpiled within the yards for any reason (such as a repair to a subsurface line), the exposed or stockpiled soil is covered or otherwise stabilized when not in use.

- **Provide effective stabilization for all disturbed soils and other erodible areas prior to a forecasted storm event.**
  - The surfaces of Area 612 and the DWTF are covered with asphalt and concrete pads or buildings, except for the earthen, vegetated berm along the northern boundary of the DWTF.
  - If materials were stockpiled within the yards for any reason (such as a repair to a subsurface line), the exposed or stockpiled soil is covered or otherwise stabilized when not in use.

- **Maintain effective perimeter controls and stabilize all site entrances and exits to sufficiently control discharges of erodible materials from discharging or being tracked off the site.**
  - The surfaces of Area 612 and the DWTF, including entrances and exits, have been stabilized by paving with asphalt.

- **Divert run-on and storm water generated from within the facility away from all erodible materials.**
  - The surfaces of Area 612 and the DWTF are covered with asphalt and concrete pads or buildings or stabilized with vegetation.
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- If sediment basins are implemented, ensure compliance with the design storm standards in Section X.H.6. of the IGP.
  - Sediment basins are not currently used at Area 612 or the DWTF. If new sediment basins are implemented, they will comply with the design storm standards set forth in the IGP and the SWPPP will be updated accordingly.

The erosion and sediment control BMPs implemented at the Livermore Site as they relate to specific industrial activities are summarized in Section 3.3. Recently installed sediment control measures are described in 3.2.3.

### 3.1.6 Employee Training Program

An employee training program will be implemented in accordance with the following requirements in the IGP (Section X.H.1.f):

- Ensure that all team members implementing the various compliance activities of this SWPPP are properly trained in topics including but not limited to: BMP implementation, BMP effectiveness evaluations, visual observations, and monitoring activities.
  - The employees identified in Table 1.1 as part of the SWPPT are required to take the on-line training course, *EP7034-W Storm Water Pollution Prevention Plan Overview*, which examines SWPPP content, scope, and responsibilities.

- Prepare or acquire appropriate training manuals or training materials.
  - The Safety Education and Training Section offers an on-line training course, *EP7034-W Storm Water Pollution Prevention Plan Overview*, which examines SWPPP content, scope, and responsibilities. The course content will be reviewed and updated, as appropriate, when significant revisions to the SWPPP occur.

- Identify which personnel need to be trained, their responsibilities, and the type of training they will receive.
  - Employees maintain an electronic Training Questionnaire, which drives what training they must complete. The personnel identified in Table 1.1 require SWPPP training. In addition, specific training courses for RHWM personnel are outlined in the RCRA permit. These required training courses are specific to job descriptions that handle, treat, and transport hazardous wastes.

- Provide a training schedule.
  - Employees receive initial training determined to be necessary for their job function upon being hired. Existing employees review their training questionnaire annually with their supervisor and take refresher courses as required.

- Maintain documentation of all completed training classes and the personnel that received training in the SWPPP.
  - The institutional training management system maintains records of all completed training, including SWPPP training, for all trained personnel in accordance with the requirements described in Section 3.1.7.
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

The Pollution Prevention Team will be trained in implementing the various compliance activities specified in this SWPPP, and documentation of training activities is retained. Records of the training will be kept as described in Section 3.1.7.

Task specific training for all employees engaged in activities that have the potential to cause storm water pollution will be conducted when new employees are hired and refresher training will be provided annually. The specific training that will be required as they relate to specific industrial activities is summarized in Section 3.3. Records of the training will be kept as described in Section 3.1.7.

3.1.7 Quality Assurance and Record Keeping

The following quality assurance and record keeping activities will be performed in accordance with the requirements in the IGP (Section X.H.1.g):

- **Develop and implement management procedures to ensure that appropriate staff implements all elements of the SWPPP, including the Monitoring Implementation Plan (SWPPP Section 5).**
  - Inspections are conducted by trained qualified inspectors. Inspections may be conducted by a team where the team members’ expertise together meets the requirements for a trained qualified inspector. Samples are collected by the appropriate team members identified in Table 1.1.

- **Develop a method of tracking and recording the implementation of BMPs identified in the SWPPP.**
  - The BMPs discussed in this chapter have been previously implemented at LLNL as required by environment, safety, and health regulations; as prudent practices; or as required by coverage under the previous NPDES Permit.
  - Inspections of the BMPs will be conducted in accordance with the IGP and described in the Monitoring Implementation Plan (Section 5.0).
  - If new BMPs are installed, the SWPPP will be updated accordingly.

- **Maintain the BMP implementation records, training records, and records related to any spills and clean-up related response activities for a minimum of five (5) years as required in the IGP (Section XXI.J.4).**
  - The results of the monthly and annual inspections are documented and kept on file by EFA for at least five years as required. Significant deficiencies are tracked with the Issues Tracking System maintained by Performance Analysis and Improvement. This system ensures follow-up to observations requiring a corrective action.
  - The institutional training management system (LTRAIN) maintains records of training for all personnel.
  - Spills and cleanup related response activities are maintained by RHWM personnel and are maintained for a minimum of five years in accordance with the IGP and the RCRA permit.
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Records of all storm water monitoring information and copies of all reports required are retained for at least five years from the date generated or date submitted, whichever is later. The records include:

- The date, place, and time of site inspections, sampling, visual observations, and/or measurements.
- The names of individuals who performed the site inspections, sampling, visual observations, and/or measurements.
- Date and time of analyses.
- Names of individuals performing the analyses.
- Results of analyses.

Additional records will be maintained for the following items:

- Employee Training Records;
- BMP Implementation Records;
- Spill and Clean-up Related Records;
- Level 1 ERA Reports;
- Level 2 ERA Action Plan;
- Level 2 ERA Technical Report; and
- Annual Reports.

3.2 ADVANCED BMPS

3.2.1 Exposure Minimization BMPS

As described in Section 2.3.1, hazardous waste treatment process equipment and most hazardous waste storage areas are located inside the permanent buildings and are not exposed to storm water. Some outdoor storage of hazardous waste materials is conducted in designated areas of the Area 612 Facility and the DWTF (identified in Section 2.3.1.2 and shown on Maps A.4 and A.5 in Appendix A). Where industrial materials are stored outdoors, materials are stored in appropriate containers meant to be kept outside. In addition, several outdoor storage areas are covered with shelters installed to prevent contact with storm water. The types of shelters used at the Livermore Site are described below. In addition, the locations where the shelters are installed are identified.

- Fabric tents are used in the Area 612 Facility to provide protection from rainfall. The tent frames are tubular aluminum and the tent fabric is polyvinyl chloride (PVC)-coated polyester and provide coverage on top and sides. These tents are used at the Area 612-1 CSU and Area 612-5 CSU.
- Roof and canopies provide cover over the top of outdoor storage areas. Corrugated metal roofs are used at the Area 612-2 CSU, Area 612-4 Receiving and Segregation Unit. The Building 614 East Cells CSU is constructed with a joist-type wood frame covered with
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

...exterior-grade plywood, felt paper, tar, and gravel. A concrete slab roof sits atop concrete walls to provide protection to the Area 614 West Cells CSU.

Exposure minimization BMPs are not installed in some outdoor storage areas, such as the Area 612 Portable Tank Storage Unit, Area 612 Tank Trailer Storage Unit, the B693 Roll-Off Bin Storage Area, and the DWTF Portable Storage Unit. For all of these units, wastes are stored in containers that are meant to be stored outside. In addition, the Area 612 Portable Tank Storage Unit, Area 612 Tank Trailer Storage Unit, and the DWTF Portable Storage Unit have been constructed with secondary containment, as described below.

3.2.2 Storm Water Containment and Discharge Reduction BMPs

Storm water containment and discharge reduction BMPs include BMPs that divert, reuse, contain, or reduce the volume of storm water runoff.

3.2.2.1 Secondary Containment Structures

Secondary containment structures are installed in outdoor storage areas where liquid wastes are stored. Although the primary purpose of the secondary containment structures is to capture liquids if they were to spill or leak from the storage containers, the secondary containment also collects rainwater in the case of outdoor storage areas that do not contain exposure minimization BMPs, as is the case with the Area 612 Portable Tank Storage Unit, Area 612 Tank Trailer Storage Unit, and the DWTF Portable Storage Unit. Secondary containment and exposure minimization BMPs are present together in the Area 612-2 CSU and the Area 614 East and West Cells CSUs.

Units with secondary containment are constructed so that the floor of the units slope to a sump or collection trench designed to contain the precipitation from a 24-hour, 25-year storm plus 10 percent of the aggregate liquid storage volume or the capacity of the largest container, whichever is greater. To ensure that this standard is maintained, liquid storage limits have been established for each containment zone. Accumulated liquids are removed from the secondary containment structures and characterized. The characterized liquids are either discharged to the sanitary sewer or identified as hazardous wastes and treated and handled accordingly.

3.2.2.2 Lake Haussmann

Lake Haussmann is an artificial water body that has a 37 acre-ft capacity. It is located in the central portion of the Livermore Site and receives storm water runoff from the southeast portion of the Livermore Site and treated groundwater from existing groundwater treatment systems, including storm water runoff from the Area 612 Facility. Discharge from Lake Haussmann flows north through a culvert into Arroyo Las Positas. The original basin was established in the 1970s in an effort for Plant Engineering to control storm water flow through the Lab. The basin lake was lined as part of Livermore Site remediation activities and to halt infiltration of water collected in that area as part of CERCLA. Lining was completed in March 1992. The lake supports multiple goals from a number of diverse LLNL programs and stakeholders. These include: (1) improved storm water quality, (2) flood control, (3) capacity to receive groundwater discharges, (4) reduced infiltration to groundwater, and (5) aesthetically pleasing conditions for the LLNL community.

During the dry season, treated groundwater is the only water source for this lake. Treated groundwater discharged from treatment facilities is directed into Lake Haussmann through hoses...
and existing drainage channels. This groundwater serves as a primary source of refill water to maintain the water level in the lake. Lake Haussmann also receives runoff from both the LLNL Livermore Site campus and an approximately 900-acre agricultural and ranching watershed. The level of the lake is controlled at a weir located at the lake’s outfall. This weir can be opened from the top or bottom. Historic water level management has hinged on maintaining flood control capacity. That approach resulted in periods of frequent and/or severe fluctuations in water level. Currently, the water level is maintained at a relatively constant level, and the rate of water flow from the lake’s outfall is relatively constant except following precipitation. The water level within the lake is dropped to the level of the lower weir each fall (between the last week in September and the last week in October) to allow for maintenance in the lake and Arroyo Las Positas. Also, if large rainfall events are forecast the lake level may be dropped approximately 12 inches to provide capacity for storm water flows.

3.2.3 Treatment Control BMPs

Treatment control BMPs include one or more mechanical, chemical, biologic, physical, or any other treatment process technology and is sized to meet the treatment control design storm standard.

Currently, there are sixteen catch basin locations (15 at the DWTF and 1 at Area 612) where catch basin inserts have been installed. The locations of the catch basin inserts are shown on Maps A.4 and A.5 in Appendix A. Each catch basin insert consists of a frame assembly sized specifically for the catch basin location, a filter liner, and filter-liner basket. The filter is constructed of 4-oz non-woven polypropylene rated for a flow of 140 gallons per minute per square foot. The catch basin inserts are installed beneath the catch basin cover to catch debris, trash, and sediment from storm water without interfering with lateral line flow.

Erosion control filtration socks have been installed at DWTF and the 612/625 yards. These socks are SiltSoxx from Filtrexx International. In addition to filtering particulate from runoff, it was originally hoped that the zeolite material in MetalLoxx socks would help capture soluble magnesium in the runoff. However, magnesium concentrations have only been decreased minimally and not below the NAL. Therefore LLNL has returned to the use of SiltSoxx. LLNL has studied the occurrence of particulate aluminum and iron as well as soluble magnesium in runoff at the Livermore Site. LLNL has completed a report that demonstrates that the source of these metals is aerial deposition on exposed asphalt in the TSDF yards, not industrial activities regulated under the IGP. LLNL has presented this information at the September 2017 CASQA Conference. The locations of the filter socks are shown on Maps A.4 and A.5 in Appendix A.

3.2.4 Other Advanced BMPs

There are no other advanced BMPs installed in the industrial areas at the Livermore Site. If other advanced BMPs are installed in the industrial areas, the SWPPP will be updated accordingly.

3.3 SUMMARY OF BEST MANAGEMENT PRACTICES

In accordance with the IGP, Table 3.1 summarizes the industrial activities, materials, pollutant sources, potential pollutants, and BMPs being implemented to prevent discharge of pollutants in storm water runoff. Implementation and maintenance of BMPs is described in Section 4.
Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hazardous Waste Storage</strong></td>
<td>• Selected organics&lt;br&gt;• pH&lt;br&gt;• Metals&lt;br&gt;• Cyanides&lt;br&gt;• Pesticides&lt;br&gt;• PCBs</td>
<td>• Releases from hazardous materials stored in unauthorized locations</td>
<td>• Store hazardous wastes only in permitted, designated locations (shown on Maps in Appendix A).&lt;br&gt;• Store liquid wastes in storage areas that have secondary containment.&lt;br&gt;• Permitted, designated outdoor hazardous waste storage areas are covered with roofs or tents to prevent precipitation from falling onto the storage areas, except the B693 roll-off bin storage area. However, the roll-off bins are meant to be stored outside, are lined, and lids are kept closed when wastes are not being added or removed.&lt;br&gt;• Permitted, designated outdoor hazardous waste storage areas are constructed with upgradient perimeter berms (asphalt or concrete curbs) or sloped/elevated pads to prevent storm water run on.&lt;br&gt;• For outdoor storage areas without secondary containment, store wastes on pallets or skids to prevent contact with potential surface liquids.&lt;br&gt;• Permitted, designated outdoor hazardous waste storage areas that are used to store liquid wastes are constructed with secondary containment and sloping access ramps to direct storm water run on away from wastes.&lt;br&gt;• Releases from punctured or damaged containers due to deterioration or incompatible material storage.&lt;br&gt;• Conduct routine inspections of containers by appropriately trained personnel (minimum of once per week).&lt;br&gt;• If defects are identified, make repair efforts no later than 24 hours after detection and the repair is made as soon as possible. If repair of a defect cannot be completed within 5 calendar days of first detection, then transfer wastes to a new container and take the defect container out of service until repairs are complete.&lt;br&gt;• Select appropriate containers for the wastes to be stored to ensure compatibility (decision made by appropriately-trained personnel).&lt;br&gt;• Incompatible wastes are stored appropriately.</td>
</tr>
</tbody>
</table>
### Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>• Spills from open containers</td>
<td>• Keep containers closed when not in use. Bungs should be tightened, rings bolted; can lids shut; valves on tank trailers and portable tanks kept shut; and boxes crimped, clamped, stabled or nailed shut.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Oxidation products from storage container surfaces</td>
<td>• Train personnel handling hazardous wastes in proper spill response awareness and techniques.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Leaching from materials stored outside</td>
<td>• Conduct routine inspections of containers by appropriately trained personnel (minimum of once per week) to ensure containers are in good condition.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Releases from leaking valves</td>
<td>• Store materials outside only in containers that are designated for outdoor use appropriate for the type of wastes they contain. Keep lids or other openings closed or covered when not in use.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Store and manage liquid wastes only in areas equipped with secondary containment. When liquid waste transfer must occur outside of secondary containment, use a portable berm to contain any spills or leaks.</td>
</tr>
</tbody>
</table>
Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
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<th>BMPs Implemented</th>
</tr>
</thead>
</table>
| Solid Waste Transfer and Handling | • Organics            | • Spills during loading and bulking solid wastes, such as crushed containers or contaminated equipment, into containers, end-dumps, roll-offs, or other cargo trucks. | • Clean up spills immediately. Keep spill control kits in accessible areas to ensure rapid response.  
• Maintain and implement the spill response plan for LLNL.  
• Do not perform activities during precipitation events.                                                                 |
|                                  | • pH                  |                                                                                             |                                                                                  |
|                                  | • Metals              |                                                                                             |                                                                                  |
|                                  | • Cyanides            |                                                                                             |                                                                                  |
|                                  | • Sulfides            |                                                                                             |                                                                                  |
|                                  |                       | • Spills during waste movement activities (from staging areas, treatment units, packaging or size reduction units, or storage units) due to:  
- inadequately secured containers  
- deteriorated containers  
- improper transfer methods. | • Train personnel in proper handling and storage techniques when moving and storing hazardous wastes.  
• Conduct routine inspections of hazardous waste containers.  
• Clean up spills immediately. Keep spill control kits in accessible areas to ensure rapid response. |
|                                  |                       | • Track out of contaminated materials.                                                        | • Keep yard areas clean.  
• Clean spills immediately.                                                                 |
### Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
</table>
| **Liquid Waste Transfer and Handling** | • Organics  
• pH  
• Metals  
• Cyanides  
• Sulfides  
• Peroxides  
• PCBs  
• Pesticides | • Spills during liquid transfer operations between containers | - Conduct liquid waste transfers with the relevant containers either (1) located in a permitted CSU equipped with secondary containment or (2) placed inside a portable berm.  
- Use locking couplings, cam lock fittings or equivalent devices between hose connections and disconnect stations to prevent accidental detachment.  
- Place pans under couplings to prevent releases should a leak occur or when disconnecting couplings.  
- Conduct all transfer operations with RHWM personnel present to observe operations to (1) ensure no overflows or equipment leaks occur or (2) respond quickly if overflow or leaks do occur.  
• Upon completion of waste transfer activities, manually elevate hoses and walk the hose to drain into a container. |
|                              |                                                            | • Spills during waste movement activities (from staging areas, treatment units, packaging or size reduction units, or storage units) due to:  
  - inadequately secured containers  
  - deteriorated containers  
  - improper transfer methods | • Train personnel in proper handling and storage techniques when moving and storing hazardous wastes.  
• Conduct routine inspections of hazardous waste containers.  
• Clean up spills immediately. Keep spill control kits in accessible areas to ensure rapid response. |
### Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Equipment Maintenance and Repair</strong></td>
<td>• pH (battery acid)</td>
<td>• Run-on/run-off from maintenance areas.</td>
<td>• Perform equipment and vehicle maintenance at the DWTF in the designated area at B6951.</td>
</tr>
<tr>
<td></td>
<td>• Oil and grease</td>
<td></td>
<td>• Store idle equipment under cover when awaiting repair.</td>
</tr>
<tr>
<td></td>
<td>• Metals (copper, lead, nickel, zinc)</td>
<td>• Drips from leaking vehicles or equipment stored outside designated areas</td>
<td>• Prevent excessive buildup of oil and grease on equipment.</td>
</tr>
<tr>
<td></td>
<td>• Solvents</td>
<td></td>
<td>• Use drip pans or containers under stationary or idle equipment that might leak.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Inspect vehicles and equipment for leaks on a routine basis.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spills, leaks, or releases from maintenance or repair activities conducted outside of designated areas.</td>
<td>• Perform equipment and vehicle maintenance at the DWTF in the designated area at B6951.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• If maintenance or repair must be conducted outside of a designated area (emergency repair), prohibit pouring materials down drains, discharging to the storm water drainage system, or hosing down work areas (use dry sweeping). Clean up work area immediately after repairs are complete.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Train employees that may repair equipment on proper procedures to prevent contaminants from entering the storm water system.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Releases from improper disposal of vehicle maintenance materials</td>
<td>• Collect and properly manage (dispose or recycle) used grease, oil, oil filters, antifreeze, cleaning solutions, batteries, and hydraulic fluids.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Spilled lubricants, coolants, and fuels</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Train personnel handling materials in proper spill response awareness and techniques.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Clean up spills immediately. Keep spill control kits in accessible areas to ensure rapid response.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Maintain and implement the spill response plan for LLNL.</td>
<td></td>
</tr>
</tbody>
</table>
# Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

## Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disposal of Hazardous Waste and Treated Hazardous Waste Residuals</td>
<td>• Selected organics&lt;br&gt;• pH&lt;br&gt;• Metals&lt;br&gt;• Cyanides&lt;br&gt;• Sulfides&lt;br&gt;• Peroxides&lt;br&gt;• PCBs&lt;br&gt;• Pesticides&lt;br&gt;• Treated liquid wastes (low levels of contaminants)</td>
<td>• Improper disposal of hazardous wastes.&lt;br&gt;• Discharges from inappropriate disposal to the storm water drainage system</td>
<td>• Track and properly manifest all hazardous wastes.&lt;br&gt;• Treated liquid wastes are discharged to the sanitary sewer system (if appropriate) or disposed off-site.</td>
</tr>
<tr>
<td>Receipt (Loading/Unloading) of Industrial Materials and Waste</td>
<td>• Selected organics&lt;br&gt;• pH&lt;br&gt;• Metals&lt;br&gt;• Cyanides&lt;br&gt;• Sulfides&lt;br&gt;• Peroxides&lt;br&gt;• PCBs&lt;br&gt;• Pesticides&lt;br&gt;• Organic gases</td>
<td>• Spills of materials during loading/unloading of waste containers</td>
<td>• Conduct loading/unloading in designated areas of the Area 612 and DWTF yards.</td>
</tr>
<tr>
<td>Outdoor Storage of Liquid Reagents Used in the Waste Treatment Processes</td>
<td>• pH (acids and bases)&lt;br&gt;• Spills&lt;br&gt;• Run-on/run-off from storage area&lt;br&gt;• Leaks from containers</td>
<td>• Uncontrolled spills&lt;br&gt;• Store reagent containers inside the clam-shell storage bins equipped with secondary containment&lt;br&gt;• Store materials in appropriate containers compatible with the material characteristics.</td>
<td>• Train personnel handling materials in proper spill response awareness and techniques.&lt;br&gt;• Clean up spills immediately. Keep spill control kits in accessible areas to ensure rapid response.&lt;br&gt;• Maintain and implement the spill response plan for LLNL.</td>
</tr>
</tbody>
</table>
## Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temporary Outdoor Staging of Wastes Prior to Off-Site Shipment</td>
<td>• Selected organics&lt;br&gt;• pH&lt;br&gt;• Metals&lt;br&gt;• Cyanides&lt;br&gt;• Sulfides&lt;br&gt;• Peroxides&lt;br&gt;• PCBs&lt;br&gt;• Pesticides&lt;br&gt;• Organic gases</td>
<td>• Runoff/run-on from temporary waste staging areas</td>
<td>• Keep wastes in appropriate, sealed containers designated for outdoor use.&lt;br&gt;• Temporarily stage wastes for no more than 72 hours.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Spills</td>
<td>• Train personnel handling materials in proper spill response awareness and techniques.&lt;br&gt;• Clean up spills immediately. Keep spill control kits in accessible areas to ensure rapid response.&lt;br&gt;• Maintain and implement the spill response plan for LLNL.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Leaks from containers</td>
<td>• Conduct routine inspections of containers by appropriately trained personnel.</td>
</tr>
<tr>
<td>Non-Storm Water Discharge: Discharges from backups and breaks in sanitary sewer lines</td>
<td>• Sewage</td>
<td>• Discharges from backups and breaks in sanitary sewer lines</td>
<td>• Block storm drains.&lt;br&gt;• Contain, collect, and return released material to the sanitary sewer.</td>
</tr>
<tr>
<td>Non-Storm Water Discharge: Discharges planned and unplanned city water discharges</td>
<td>• Chlorine and chloramine, possible TSS</td>
<td>• Release of chlorinated and chloraminated drinking water&lt;br&gt;• Erosion from large water release</td>
<td>• Minimize the volume of discharges&lt;br&gt;• Treat with ascorbic acid, e.g., Pollard Vita-D-Chlor&lt;br&gt;• Test chlorine concentration periodically during discharge to ensure dichlorination is effective&lt;br&gt;Direct water through a diffuser</td>
</tr>
</tbody>
</table>
### Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
</table>
| **Non-Storm Water Discharge**: Leaks from dumpsters | • Debris  
• Municipal Trash | • Leaks from dumpsters/ Leaching from wastes stored in uncovered bins or dumpsters | • Keep containers closed except when wastes are being added or removed. |
## Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
</table>
| **Non-Storm Water Discharge: Building and Grounds Maintenance** | • TSS  
• Debris | • Erosion during small, temporary earth-disturbing activities | • Use erosion control techniques when bare ground is temporarily exposed such as hay rolls. |
| | | • Storm drainage system maintenance | • Manually remove or vacuum debris to the extent feasible.  
• When underground conduits are cleaned, install a plug downstream and use fresh water to flush sections of pipe. Vacuum water from pipe and manage for proper disposal.  
• When cleaning above-ground swales and culverts, minimize water use and use filter barriers downstream to capture any debris mobilized. |
| | | • Tracking dirt to pavement during small, temporary earth-disturbing activities | • Clean wheels or tracks of equipment before driving on paved surfaces. |
| | | • Runoff from soil and non-hazardous debris storage areas where soils can wash into nearby storm drainage channels during the rainy season | • Cover or stabilize materials that are exposed to weather using temporary tarps or other stabilizers. |
| | | • Sediment releases because of improperly installed, inadequate, or unmaintained erosion control measures | • Routinely inspect and maintain erosion control measures until the work is complete and the site restored. |
| | | • Sediment releases from failure to stabilize site and associated disturbed areas after project completion | • Properly stabilize exposed soils by hydroseeding or planting landscape vegetation upon completion of the work. |
| **Pesticides**  
**Fertilizers** | • Pesticides  
• Fertilizers | • Improper disposal of pesticides | • Dispose of wastes properly. |
| | | • Releases (spills or leaks) during the application process of the pesticides or fertilizers | • Properly train employees on the use of pesticide and fertilizer application equipment |
### Table 3.1 – Summary of BMPs Implemented at the Livermore Site

<table>
<thead>
<tr>
<th>Industrial Activity</th>
<th>Associated Pollutants</th>
<th>Storm Water Exposure Pathway</th>
<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-Storm Water Discharge:</strong> Building and Grounds Maintenance (cont.)</td>
<td></td>
<td>• Run-off from excessive use of fertilizers or application of fertilizers or pesticides during the rainy season</td>
<td>• Avoid using pesticides and fertilizers within 25-feet of a storm drain or arroyo or when rain is predicted.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Tracking of pesticides or fertilizers from maintenance equipment</td>
<td>• Clean wheels or tracks of equipment.</td>
</tr>
<tr>
<td></td>
<td>• TSS</td>
<td>• Runoff from building exterior washing/cleaning</td>
<td>• Minimize use of water. • Direct rinsewater to landscaped areas to allow infiltration.</td>
</tr>
<tr>
<td></td>
<td>• Metals</td>
<td>• Discharges from floor and pavement washing</td>
<td>• Use dry sweeping methods for pavement cleaning whenever possible. • If water must be used, minimize use of water and use only potable water. • Do not use soaps, detergents, or other cleaning chemicals.</td>
</tr>
<tr>
<td></td>
<td>• Debris</td>
<td>• Plant cuttings washing into the storm drainage system</td>
<td>• Collect plant cuttings and handle appropriately.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Releases from inappropriate disposal of wastewaters from equipment washing</td>
<td>• Direct equipment wash water towards landscaped areas or otherwise contain wash water.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Run-off from newly coated surfaces during the rainy season that can be washed off before setting</td>
<td>• Do not coat surfaces before a forecasted precipitation event.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Releases from equipment storage, materials storage, or operations located too close to storm drains</td>
<td>• Conduct activities away from storm drains when possible. If activities must be conducted near storm drains, protect storm drain inlets.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Improper storage of construction materials</td>
<td>• Properly store construction materials in designated locations when not in use. Storage containers may be sheds/indoor storage areas, temporary containers mobilized to the project site, or inside vehicles depending on the materials, project location, and project duration.</td>
</tr>
</tbody>
</table>
Table 3.1 – Summary of BMPs Implemented at the Livermore Site

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<thead>
<tr>
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<th>BMPs Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Storm Water Discharge:</td>
<td>• None (except if in contact with industrial materials)</td>
<td>• Releases from DI water and LCW tanks</td>
<td>• Direct small releases towards unpaved areas to allow for infiltration. Contain larger releases (greater than 10,000 gallons) and handle appropriately (discharge to sanitary sewer or conduct treatment, as appropriate).</td>
</tr>
<tr>
<td>Low conductivity water</td>
<td></td>
<td>• Releases during maintenance of DI water and LCW lines</td>
<td></td>
</tr>
<tr>
<td>and Deionized water</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 4  BMP Implementation

4.1  BMP IMPLEMENTATION SCHEDULE

All planned BMPs at the Livermore Site have already been implemented. The SWPPP training course content was updated to reflect the changes to the storm water monitoring program as a result of the new Industrial Permit (2015). Catch basin inserts and silt rolls have been deployed at DWTF and Area 612. In addition, the Area 612 and DWTF yard areas will continue to be swept a minimum of twice per year.

4.2  BMP INSPECTION AND MAINTENANCE

The IGP requires, at a minimum, monthly observations of BMPs. BMPs will be inspected as part of the monthly observations of Area 612 and the DWTF described in the Monitoring Implementation Plan (Section 5). Inspections will be completed on the Monthly Visual Observation and BMP Inspection Form. A blank copy of this form is provided in Appendix B. In addition to the monthly inspections, RHWM personnel are required to inspect the hazardous waste storage areas and storage containers a minimum of once per week in accordance with the RCRA permit.

The catch basin inserts will be maintained regularly to ensure proper and effective functionality. Large trash and other debris observed in the catch basin inserts will be removed when it is observed during monthly inspections. Approximately three times per year, the catch basin inserts will be visually inspected. The frequency of the catch basin insert cleaning will vary depending on visual observations. The filter material will be replaced when tears or holes develop in the material.

If other issues are observed during the inspections, corrective actions will be implemented within 72 hours of identified deficiencies and associated amendments to the SWPPP will be prepared and documented. If corrective actions cannot be completed within 72 hours, the deficiency will be added to the Issues Tracking System (ITS).
Section 5 Monitoring Implementation Plan

5.1 PURPOSE

This Monitoring Implementation Plan (MIP) includes the following items in accordance with the IGP:

1. Identification of the team members assigned to conduct the required monitoring.

2. A description of the following:
   a. Sample locations.
   c. Visual observation response procedures related to monthly visual observations and sampling event visual observations.

3. Justification for the following:
   a. Alternative sample locations.
   b. Qualified combined samples.

4. Procedures for field instrument calibration instructions, including calibration intervals specified by the manufacturer.

5. Example chain of custody form used when handling and shipping water samples to the lab.

5.2 TEAM MEMBERS

Monthly visual observations of Area 612 and the DWTF will be conducted by qualified personnel identified in Table 1.1. Monthly visual observation procedures are discussed in Section 5.4.

Storm water samples will be collected by qualified personnel identified in Table 1.1. Sampling personnel must complete all training required by the applicable sections of eIWS 11040 Water, Air, Monitoring, and Analysis Group Sampling Activities before they can be added to the list of qualified personnel and authorized to perform these activities unsupervised. Non-qualified personnel may accompany qualified personnel for training or assessment purposes, but must be under the direct supervision of qualified personnel. ES&H Document 2.2, LLNL Institution-Wide Work Planning and Control Process will be followed prior to initiating work.

5.3 MONTHLY VISUAL OBSERVATION PROCEDURES

At least once per calendar month, visual observations of Area 612 and the DWTF will be conducted. Inspections will include the outside areas of Area 612 and the DWTF for evidence of unauthorized NSWDs, authorized NSWDs, outdoor industrial equipment and storage areas, outdoor industrial activity areas, and BMPs. The monthly visual observations will be conducted on days without precipitation during daylight hours of Livermore Site operations (see Section 2.2). The monthly visual observations will be recorded on a Monthly Visual Observation and BMP Inspection Form provided in Appendix B. Copies of the Monthly Visual Observation and BMP Inspection Form will be included in the next section of this document.
and BMP Inspection Forms will be maintained for a period of 5 years. If a monthly visual inspection is not completed for any reason, the reason will be documented on the Monthly Visual Observation Form. An explanation for the uncompleted monthly visual observation will also be provided in the Annual Report in accordance with the IGP.

5.4 STORM WATER SAMPLING

The following subsections describe when storm water sampling should be conducted and the procedures followed during a qualifying storm event (QSE). The sampling locations are shown on Maps A.4 and A.5 in Appendix A. To the extent possible, storm water samples will be collected and analyzed from two (2) QSEs within the first half of each reporting year (July 1 to December 31), and two (2) QSEs within the second half of each reporting year (January 1 to June 30). Collecting storm water samples or conducting visual observations is not required during dangerous weather conditions such as flooding and electrical storms or outside of scheduled site business hours. In the event that a sample location is not visually observed or sampled during the sampling event, the sample location and reasoning for not obtaining observations or a sample will be recorded. An explanation will also be provided in the Annual Report in accordance with the IGP.

5.4.1 Qualifying Storm Events

A QSE is defined as any precipitation event that produces a discharge for at least one drainage area and is preceded by 48 hours with no discharge from any drainage area. Weather and precipitation forecasts will be tracked to identify potential QSEs. When targeting a QSE for storm water sampling, the appropriate team member will consult the National Oceanographic and Atmospheric Administration (NOAA) weekly for weather forecasts. If weekly forecasts indicate potential for significant precipitation, the weather forecast will be closely monitored during the 48 hours preceding the event.

5.4.2 Sampling Locations

Because storm water from non-industrial portions of the Livermore Site enters the same storm water conveyance system, industrial storm water compliance sampling locations were selected for Area 612 and the DWTF to collect storm water runoff that best represents runoff from the industrial areas before the runoff co-mingles with storm water entering the conveyance systems from the non-industrial portions of the Livermore Site. The sampling locations are identified below and shown on Maps A.4 and A.5 for Area 612 and the DWTF, respectively.

- 625NE – sheet flow sampling location at the northeastern corner of Area 612 to represent storm water flow from the northeastern portion of the yard at Area 612.
- 625NW – catch basin sampling location at the northwestern corner of Area 612 to represent storm water flow from the southern central and northwestern portion of the yard at Area 612.
- DWTF-6951 – sheet flow sampling location adjacent to Building 6951 in the vicinity of where maintenance of the DWTF equipment occurs.
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

- DWTF-W – sheet flow sampling location on the western boundary of the DWTF. Storm water runoff is from the non-hazardous storage area and the outdoor process chemical storage area.
- DWTF-C – catch basin sampling location in the central portion of the DWTF. Storm water is collected in the catch basins throughout the eastern portion of the DWTF yard and runs through this central catch basin location before proceeding through the storm drains to co-mingle with storm water collected from outside of the DWTF.

Whenever changes in facility operations might affect the appropriateness of sampling locations, the sampling locations will be revised accordingly. All such revisions will be implemented as soon as feasible and the SWPPP amended.

5.4.3 Sampling Event Visual Observations

Sampling event visual observations will be conducted at the same time sampling occurs at the sample locations. At each location where a sample is obtained, observations of the following will be recorded on a Sampling Event Form:

- Floating and suspended materials;
- Oil and grease;
- Discoloration;
- Turbidity;
- Odors; and
- Trash.

When pollutants are observed in the discharged storm water, follow-up observations of the drainage area will be conducted to identify the probable source of the pollutants.

Correction of deficiencies identified by the observations, including required repairs or maintenance of BMPs, will be initiated and completed as soon as possible. Response actions will include the following:

- Report observations to the Pollution Prevention Team Leader or designated individual;
- Identify and implement appropriate response actions;
- Determine if SWPPP update is needed;
- Verify completion of response actions; and
- Document response actions.

If identified deficiencies require design changes, including additional BMPs, the implementation of changes will be completed as soon as possible, and the SWPPP will be amended to reflect the changes.

BMP deficiencies identified in site observation reports and correction of deficiencies will be tracked on the Monthly Visual Inspection and BMP Inspection Form.
Results of visual monitoring must be summarized and reported in the Annual Report.

### 5.4.4 Sampling Preparation

An adequate stock of monitoring supplies and equipment for sampling will be available onsite prior to a sampling event. Monitoring supplies and equipment will be stored in a cool temperature environment that will not come into contact with rain or direct sunlight. Sampling personnel will be available to collect samples in accordance with the sampling schedule. Supplies maintained at the facility will include, but are not limited to: clean powder-free nitrile gloves; sample collection equipment; coolers; appropriate number and volume of sample containers; identification labels; re-sealable storage bags; paper towels; personal rain gear; ice; and *Field Tracking Forms (FTFs)* and Chain of Custody (CoC) forms. In accordance with the permit, a copy of an example CoC is provided in Appendix C.

### 5.4.5 Analytical Constituents

*Table 5.1* identifies the constituents identified and rationale for sampling and analysis at each sample location.

<table>
<thead>
<tr>
<th>DMA</th>
<th>Constituent</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area 625 NW</td>
<td>pH, Total oil and grease, TSS</td>
<td>Minimum IGP required constituents</td>
</tr>
<tr>
<td></td>
<td>NH₃ as N, Mg, COD, As, CN, Pb, Hg, Se, Ag,</td>
<td>Additional analytical parameters identified in the IGP associated with Hazardous Waste Facilities (SIC Code 4953)</td>
</tr>
<tr>
<td></td>
<td>Tritium, GAB</td>
<td>Additional analytical parameters identified as applicable to the Livermore Site.</td>
</tr>
<tr>
<td>Area 625 NE</td>
<td>pH, Total oil and grease, TSS</td>
<td>Minimum IGP required constituents</td>
</tr>
<tr>
<td></td>
<td>NH₃ as N, Mg, COD, As, CN, Pb, Hg, Se, Ag,</td>
<td>Additional analytical parameters identified in the IGP associated with Hazardous Waste Facilities (SIC Code 4953)</td>
</tr>
<tr>
<td></td>
<td>Tritium, GAB</td>
<td>Additional analytical parameters identified as applicable to the Livermore Site.</td>
</tr>
<tr>
<td>DWTF-6951</td>
<td>pH, Total oil and grease, TSS</td>
<td>Minimum IGP required constituents</td>
</tr>
<tr>
<td></td>
<td>NH₃ as N, Mg, COD, As, CN, Pb, Hg, Se, Ag,</td>
<td>Additional analytical parameters identified in the IGP associated with Hazardous Waste Facilities (SIC Code 4953)</td>
</tr>
<tr>
<td></td>
<td>Cu, Zn, Gasoline, Diesel</td>
<td>Additional analytical parameters associated with mobile fueling and forklift maintenance operations conducted at B6951.</td>
</tr>
<tr>
<td></td>
<td>Tritium, GAB</td>
<td>Additional analytical parameters identified as applicable to the Livermore Site.</td>
</tr>
</tbody>
</table>
### Table 5.1 Analytical Constituents (cont.)

<table>
<thead>
<tr>
<th>DMA</th>
<th>Constituent</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWTF-W</td>
<td>pH, Total oil and grease, TSS</td>
<td>Minimum IGP required constituents</td>
</tr>
<tr>
<td></td>
<td>NH₃ as N, Mg, COD, As, CN, Pb, Hg, Se, Ag,</td>
<td>Additional analytical parameters identified in the IGP associated with Hazardous Waste Facilities (SIC Code 4953)</td>
</tr>
<tr>
<td></td>
<td>Tritium, GAB</td>
<td>Additional analytical parameters identified as applicable to the Livermore Site.</td>
</tr>
<tr>
<td>DWTF-C</td>
<td>pH, Total oil and grease, TSS</td>
<td>Minimum IGP required constituents</td>
</tr>
<tr>
<td></td>
<td>NH₃ as N, Mg, COD, As, CN, Pb, Hg, Se, Ag,</td>
<td>Additional analytical parameters identified in the IGP associated with Hazardous Waste Facilities (SIC Code 4953)</td>
</tr>
<tr>
<td></td>
<td>Tritium, GAB</td>
<td>Additional analytical parameters identified as applicable to the Livermore Site.</td>
</tr>
</tbody>
</table>

Notes:
- Ag = silver
- Pb = lead
- As = arsenic
- Se = selenium
- CN = cyanide
- TSS = total suspended solids
- COD = chemical oxygen demand
- Mg = magnesium
- Zn = zinc
- Cu = copper
- NH₃ as N = ammonia as nitrogen

### 5.4.6 Sample Collection

Samples of discharge will be collected at the designated sampling locations shown on Maps A.4 and A.5 in Appendix A. Samples from each discharge location will be collected within four (4) hours of:

- The start of the discharge; or
- The start of facility operations if the QSE occurs within the previous 12 hour period.

Sample collection is required during scheduled facility operating hours and when sampling conditions are safe.

Disposable gloves will be worn when collecting samples and will be changed between sampling locations. The LLNL storm water sample team is provided and typically uses dedicated stainless steel pitchers and tigon tubing for each sample location. However, if non-disposable sampling equipment is shared between sample locations (e.g., a bucket or tubing), it will be decontaminated between sample locations using a trisodium phosphate water wash and a final distilled water rinse (wash water will be discharged to the sanitary sewer). Samples will not be collected from ponded, sluggish or standing water. Sampling personnel will not stand upstream of the sampling point within the flow path. Samples will be placed in laboratory-provided sample containers, in accordance with the IGP.
For grab samples, the sample will be collected by partially submerging the sample bottle directly into the water provided the sample bottle does not contain a preservative. For sample containers that contain preservatives, the bottle will be filled using a dip sampling method, where a clean second container, usually a stainless steel bucket, is used to fill the sample bottles.

For samples collected using a peristaltic pump, a weighted pickup tube attached to silicone tubing is lowered into the flowing stream. The pump is turned on and water from the tubing is used to fill the sample containers.

Sheet flow samples are collected from impermeable surfaces such as asphalt or concrete. If necessary, in order to collect a representative sample and/or to provide enough volume to collect a sample, the flow is channeled using plastic sheeting. Aliquots are collected in a stainless steel dip sampler or in rare, extremely low flow cases when a sample could not otherwise be obtained, a sterile plastic bag, except for O&G or other TPH constituent. The aliquots are then transferred to the proper sample containers.

Grab samples will be collected and measured in the field for pH using a portable pH meter. The field meter will be calibrated not more than twelve hours prior to conducting monitoring activities following the appropriate manufacturer’s instruction manuals for calibration procedures. The pH measurement will be performed as soon as practicable, but no later than 15 minutes after sample collection.

After the samples have been collected, the sample bottles will be dried. The sampler will verify that sample labels are attached to the bottles and the information is complete and accurate. Field parameters will be recorded on the FTF. Samples from different discharge locations will not be combined or composited prior to shipment to the analytical laboratory.

5.4.7 Sample Handling

Field pH measurements must be conducted within 15 minutes of sample collection. Samples for laboratory analysis should be placed in an ice chest with sufficient ice or ice packs to cool to approximately 4°C. The samples should be packaged in each ice chest to avoid breakage of sample containers. A CoC will be completed and accompany the samples to the laboratory.

Most samples are submitted to Alpha Analytical of Pleasanton, California, a California certified laboratory, for analysis in accordance with the methods summarized in Table 5.2. Samples for gas analysis are sent to BC Laboratories, a California certified laboratory. Samples for gross alpha, gross beta and tritium analyses are sent to GEL Laboratories, also a California certified laboratory.

<table>
<thead>
<tr>
<th>Constituent</th>
<th>Analytical Method</th>
<th>Sample Volume and Preservation</th>
<th>Reporting Limit</th>
<th>Numeric Action Levels</th>
<th>Maximum Holding Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH</td>
<td>Field Meter</td>
<td>NA</td>
<td>NA</td>
<td>Instantaneous maximum: less than 6.0 or greater than 9.0</td>
<td>15 minutes</td>
</tr>
</tbody>
</table>

Table 5.2 Sample Analysis Methods for Water Quality Samples
# Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Description</th>
<th>Instantaneous Maximum</th>
<th>Preservation Method</th>
<th>Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSS</td>
<td>SM 2540-D</td>
<td>1L poly</td>
<td>100 mg/L (instantaneous maximum 400 mg/L)</td>
<td>7 days</td>
<td></td>
</tr>
<tr>
<td>Oil and Grease total</td>
<td>EPA 1664A</td>
<td>2 × 1L BRA Glass (preservation H₂SO₄)</td>
<td>15 mg/L (instantaneous maximum 25 mg/L)</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td>NH₃ as N</td>
<td>SM 4500-NH3</td>
<td>500 mL poly (preservation H₂SO₄)</td>
<td>2.14 mg/L</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td>Mg</td>
<td>EPA 200.7</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.064 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>COD</td>
<td>SM 5220C</td>
<td>500 mL poly (preservation H₂SO₄)</td>
<td>120 mg/L</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td>CN</td>
<td>SM 4500-CN C, D or E</td>
<td>250mL brown poly (preservation NaOH)</td>
<td>0.022 mg/L</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td>As</td>
<td>EPA 200.8</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.15 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>Pb</td>
<td>EPA 200.8</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.262 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>Se</td>
<td>EPA 200.8</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.005 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>Ag</td>
<td>EPA 200.8</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.0183 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>Cu</td>
<td>EPA 200.8</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.0332 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>Zn</td>
<td>EPA 200.8</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.26 mg/L</td>
<td>180 days</td>
<td></td>
</tr>
<tr>
<td>Hg</td>
<td>EPA 245.1</td>
<td>500 mL poly (preservation HNO₃)</td>
<td>0.0014 mg/L</td>
<td>28 days</td>
<td></td>
</tr>
<tr>
<td>Tritium</td>
<td>E906</td>
<td>250 mL amber glass</td>
<td>100 pCi/L</td>
<td>6 months</td>
<td></td>
</tr>
<tr>
<td>GAB</td>
<td>E900</td>
<td>1L poly (post acidify with HNO₃)</td>
<td>2 pCi/L</td>
<td>5 days non-preserved</td>
<td></td>
</tr>
<tr>
<td>Gasoline</td>
<td>EM8015:GAS</td>
<td>2 × 40 mL glass vials</td>
<td>50 µg/L</td>
<td>14 days</td>
<td></td>
</tr>
<tr>
<td>Diesel</td>
<td>EM8015:DIESEL</td>
<td>2 × 1L amber glass</td>
<td>50 µg/L or Best Achievable</td>
<td>14 days</td>
<td></td>
</tr>
</tbody>
</table>
Table 5.2 Sample Analysis Methods for Water Quality Samples (cont.)

<table>
<thead>
<tr>
<th>Notes:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Samples analyzed for multiple constituents using the same analytical method may be collected in the same bottle and submitted to the laboratory for analysis.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Analystic Method</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ag = silver</td>
<td>pCi/L = Pico Curies per liter</td>
</tr>
<tr>
<td>H2SO4 = sulfuric acid</td>
<td>Pb = lead</td>
</tr>
<tr>
<td>HNO3 = nitric acid</td>
<td>Se = selenium</td>
</tr>
<tr>
<td>L = liter</td>
<td>Pb = lead</td>
</tr>
<tr>
<td>Mg = magnesium</td>
<td>TSS = total suspended solids</td>
</tr>
<tr>
<td>COD = chemical oxygen demand</td>
<td>µg/L = micrograms per liter</td>
</tr>
<tr>
<td>Cu = copper</td>
<td>Zn = zinc</td>
</tr>
<tr>
<td>mL = milliliter</td>
<td>NA = not applicable</td>
</tr>
<tr>
<td>NH3 as N = ammonia as nitrogen</td>
<td></td>
</tr>
<tr>
<td>Hg = mercury</td>
<td></td>
</tr>
</tbody>
</table>

5.4.8 Data Evaluation and Reporting

The designated members of the Pollution Prevention Team will complete an evaluation of the water quality sample analytical results. The sampling results will be compared to the NALs identified in the Industrial Permit for the relevant parameters. The applicable NALs are also summarized in Table 5.2.

All sampling and analytical results for all individual samples will be submitted via SMARTS within 30 days of obtaining all results for each sampling event.

The method detection limit will be provided when an analytical result from samples taken is reported by the laboratory as a “non-detect” or less than the method detection limit. A value of zero will not be reported.

Analytical results that are reported by the laboratory as below the minimum level (often referred to as the reporting limit) but above the method detection limit will be provided.

Reported analytical results will be averaged automatically by SMARTS at the end of the reporting year. For any calculations required by the IGP, a value of zero shall be used for sampling analytical results that are reported by the laboratory as “non-detect” or less than the Method Detection Limit (MDL).

5.5 QUALITY ASSURANCE AND QUALITY CONTROL

After results are received from the analytical laboratory, the discharger will verify the data to ensure that it is complete, accurate, and the appropriate QA/QC requirements were met. Data must be verified as soon as the data reports are received. Data verification will include:

- Check the CoC and laboratory reports.
- Check laboratory reports to make sure hold times were met and that the reporting levels meet or are lower than the reporting levels agreed to in the contract.
- Check data for outlier values and follow up with the laboratory.
- Check laboratory QA/QC results.
• Check the data set for outlier values and accordingly, confirm results and re-analyze samples where appropriate.

Field data including pH measurements and visual observations must be verified as soon as the Monthly Visual Observation Forms or Sampling Event Forms are received, typically at the end of the monitoring event. Field data verification will include:

• Check logs to make sure all required measurements were completed and appropriately documented;
• Check reported values that appear out of the typical range or inconsistent;
• Verify equipment calibrations;
• Review observations noted on the logs; and
• Review notations of any errors and actions taken to correct the equipment or recording errors.

5.6 ANNUAL COMPREHENSIVE FACILITY COMPLIANCE EVALUATION

An annual evaluation will be conducted at the Livermore Site for each reporting year (July 1 through June 30) in accordance with the IGP (Section XV). Annual Evaluations will be conducted at least eight (8) months and not more than sixteen (16) months after the previous Annual Evaluation. The planned window for conducting the Annual Evaluation is between February and April of each year. The SWPPP will be revised, as appropriate based on the results of the Annual Evaluation, and the revisions will be implemented within 90 days of the Annual Evaluation. At a minimum, the annual evaluations will consist of:

• A review of all sampling, visual observation, and inspection records conducted during the previous reporting year;
• An inspection of all areas of industrial activity and associated potential pollutant sources for evidence of, or the potential for, pollutants entering the storm water conveyance system;
• An inspection of all drainage areas previously identified as having no exposure to industrial activities and materials;
• An inspection of equipment needed to implement the BMPs;
• An inspection of any BMPs;
• A review and effectiveness assessment of all BMPs for each area of industrial activity and associated potential pollutant sources to determine if the BMPs are properly designed, implemented, and effective in reducing and preventing pollutants in industrial storm water discharges and authorized NSWDs; and
• An assessment of any other factors needed to comply with the IGP.

5.7 ANNUAL REPORT

The Annual Report will be prepared, certified, and electronically submitted no later than July 15 following each reporting year using the standardized format and checklists in SMARTS. Included in the Annual Report will be a compliance checklist that indicates whether the
Livermore Site has complied with and addressed applicable requirements of the IGP, an explanation of any non-compliance of requirements with the reporting year as indicated in the Compliance checklist, identification (including page numbers and sections) of revisions made to the SWPPP during the reporting year, and the date(s) of the Annual Evaluation. Annual reports will be submitted in SMARTS and in accordance with information required by the on-line forms.
Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

Section 6  Certification and Signature

Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

IGP Revision 5

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

Frances Alston, Ph.D.
Associate Director
Environment, Safety & Health

Date
7/3/19
Section 7  References


Lawrence Livermore National Laboratory, Emergency Plan, Lawrence Livermore National Laboratory, Livermore, CA, January 2014 (LLNL-MI-649154).


Storm Water Pollution Prevention Plan (SWPPP) Livermore Site

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Appendix A

Site Maps
Appendix B

Copies of Blank Inspection Forms
### Monthly Visual Observation and BMP Inspection Log

**Part I. General Information**

<table>
<thead>
<tr>
<th>Date and Time of Inspection:</th>
<th>Report Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location:</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Inspector Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inspector Name:</td>
</tr>
<tr>
<td>Inspector Title:</td>
</tr>
<tr>
<td>Signature:</td>
</tr>
<tr>
<td>Date:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weather</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weather Conditions 48 Hours Prior to Visual Inspection:</td>
</tr>
<tr>
<td>Weather Conditions at Time of Visual Inspection:</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NSWD Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were any authorized non-storm water discharges observed? Yes □ No □</td>
</tr>
<tr>
<td>Were any <strong>unauthorized</strong> non-storm water discharges observed? Yes □ No □</td>
</tr>
</tbody>
</table>

If yes to either, identify source and corrective actions taken (if any):

<table>
<thead>
<tr>
<th>Outdoor Industrial Equipment and Storage Area Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>DWTF: Were any deficiencies or any other potential source of industrial pollutants observed? Yes □ No □</td>
</tr>
<tr>
<td>Area 612: Were any deficiencies or any other potential source of industrial pollutants observed? Yes □ No □</td>
</tr>
</tbody>
</table>

If yes to any, describe:

**Exception Documentation (explanation required if inspection could not be conducted).**
### Monthly Visual Observation and BMP Inspection Log

#### Part II. BMP Observations. (Describe deficiencies in Part III)

<table>
<thead>
<tr>
<th>BMP</th>
<th>Inspection Criteria</th>
<th>Area 612</th>
<th>Area 612 Observation Notes</th>
<th>DWTF</th>
<th>DWTF Observation Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Good Housekeeping</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keep yard areas clean.</td>
<td>Was yard area observed in well maintained order?</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clean up spills immediately.</td>
<td>Was evidence of an outdoor spill (past or present) observed anywhere at the facility?</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conduct routine inspections of hazardous waste containers.</td>
<td>Did hazardous waste containers being stored outdoors appear in good condition?</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Store hazardous wastes only in permitted, designated locations (shown on Maps in Appendix A).</td>
<td>Were hazardous wastes observed outside of designated outdoor storage locations?</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Store liquid wastes in storage areas that have secondary containment.</td>
<td>Was liquid waste storage observed outside of areas with secondary containment?</td>
<td>☐ Yes ☐ No</td>
<td>☐ Yes ☐ No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Containers stored outdoors are designed for outdoor use.</td>
<td>Were containers observed stored outside appropriate for outdoor use?</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perform equipment and vehicle maintenance at the DWTF in the designated area at B6951.</td>
<td>Were equipment maintenance activities observed outside of the B6951 Area?</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Store idle equipment under cover when awaiting repair.</td>
<td>Was idle equipment awaiting repair observed outside of the B6951 Area?</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td>☐ Yes ☐ No ☐ NA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Part II. BMP Observations. (Describe deficiencies in Part III)

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Clean up emergency repair areas immediately after work is complete.</td>
<td>Was evidence of emergency repair activities observed in the yards?</td>
<td>□ Yes  □ No</td>
<td></td>
<td>□ Yes  □ No</td>
<td></td>
</tr>
<tr>
<td>Keep storm drains and storm water conveyance lines clean.</td>
<td>Were catch basins, drainage swales, and other components of the storm water drainage system for the facilities clear and free of debris?</td>
<td>□ Yes  □ No</td>
<td></td>
<td>□ Yes  □ No</td>
<td></td>
</tr>
</tbody>
</table>

#### Preventative Maintenance

| | | | | | |
|---|---|---|---|---|
| Inspect vehicles and equipment for leaks on a routine basis. | Did vehicles and other outdoor equipment appear in good condition? | □ Yes  □ No  □ NA | | □ Yes  □ No  □ NA |
| Prevent excessive buildup of grease on equipment | Was evidence of grease observed on outdoor equipment? | □ Yes  □ No  □ NA | | □ Yes  □ No  □ NA |

#### Spill and Leak Prevention and Response

| | | | | | |
|---|---|---|---|---|
| Equip hazardous materials storage areas with spill kits containing dry absorbent materials to contain, collect, and store spilled materials. | Were spill kits observed at the facilities? | □ Yes  □ No  □ NA | | □ Yes  □ No  □ NA |
| Maintain and implement the spill response plan for LLNL. | Is a copy of the spill response plan readily available at the facilities? | □ Yes  □ No  □ NA | | □ Yes  □ No  □ NA |
| Conduct liquid waste transfers with the relevant containers either 1) located in a permitted containers storage unit | Were liquid waste transfers conducted in appropriate locations? (If liquid waste transfer operations | □ Yes  □ No  □ NA | | □ Yes  □ No  □ NA |
## Monthly Visual Observation and BMP Inspection Log

### Part II. BMP Observations. (Describe deficiencies in Part III)

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<tr>
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<tbody>
<tr>
<td></td>
<td>equipped with secondary containment or 2) placed inside a portable berm.</td>
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<td></td>
<td>Were not conducted at the time of inspection, select NA)</td>
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<tr>
<td></td>
<td>Use locking couplings, cam lock fittings or equivalent devices between hose connections and disconnect stations to prevent accidental detachment.</td>
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<tr>
<td></td>
<td>Were cam locks or other locking devices observed between outdoor hose connections? (If liquid waste transfer operations were not conducted at the time of inspection, select NA)</td>
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<tr>
<td></td>
<td>Yes ☐</td>
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<tr>
<td></td>
<td>No ☐</td>
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<td></td>
<td>NA ☐</td>
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<td></td>
<td>Place pans under couplings to prevent releases should a leak occur or when disconnecting couplings.</td>
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<td></td>
<td>Were pans observed under outdoor couplings or other hose connections?</td>
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<td></td>
<td>Yes ☐</td>
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<td></td>
<td>No ☐</td>
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<td></td>
<td>NA ☐</td>
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<tr>
<td></td>
<td>Conduct all transfer operations with RHWM personnel present to observe operations to 1) ensure no overflows or equipment leaks occur or 2) respond quickly if overflow or leaks do occur.</td>
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</tr>
<tr>
<td></td>
<td>Were RHWM personnel present during outdoor liquid waste transfer operations? (If liquid waste transfer operations were not conducted at the time of inspection, select NA)</td>
<td></td>
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<tr>
<td></td>
<td>Yes ☐</td>
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<tr>
<td></td>
<td>No ☐</td>
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<tr>
<td></td>
<td>NA ☐</td>
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<tr>
<td></td>
<td>Upon completion of waste transfer activities, manually elevate hoses and walk the hose to drain into a container.</td>
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<tr>
<td></td>
<td>Were hoses walked back to drain contents into an appropriate container? (If liquid waste transfer operations were not conducted at the time of inspection, select NA)</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Yes ☐</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>No ☐</td>
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<tr>
<td></td>
<td>NA ☐</td>
<td></td>
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### Monthly Visual Observation and BMP Inspection Log

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<tbody>
<tr>
<td>Use drip pans or containers under stationary or idle equipment that may leak.</td>
<td>Were drip pans observed under leaking stationary or idle equipment?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td>☐ Yes</td>
<td>☐ No</td>
</tr>
<tr>
<td>Do not pour any materials into storm water drainage system.</td>
<td>Was evidence of materials other than storm water (or authorized NSWDs) observed in the storm water drainage system?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td>☐ Yes</td>
<td>☐ No</td>
</tr>
</tbody>
</table>

#### Materials Handling and Waste Management

| Keep containers closed when not in use. Bungs should be tightened, rings bolted; can lids shut; valves on tank trailers and portable tanks kept shut; and boxes crimped, clamped, stabled or nailed shut. | Were containers being stored outdoors observed closed when not in use? | ☐ Yes    | ☐ No                      | ☐ Yes| ☐ No                   |
| Store reagent containers inside the clam-shell storage bins equipped with secondary containment. | Were the reagents stored outside located inside the clam-shell storage bins? | ☐ Yes    | ☐ No                      | ☐ Yes| ☐ No                   |
| For activities that are conducted outside of areas with cover or secondary containment, alter activities to prevent exposure of pollutants to storm water. | Were outdoor activities altered during precipitation events to prevent exposure of pollutants to storm water? | ☐ Yes    | ☐ No                      | ☐ Yes| ☐ No                   |
### Monthly Visual Observation and BMP Inspection Log

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<tbody>
<tr>
<td>Keep wastes in appropriate containers for the types of wastes being stored (e.g., liquid wastes in leak-proof containers)</td>
<td>Did containers appear to be appropriate for the wastes they contained (i.e., was there evidence of leaking, staining, corroding, bulging)?</td>
<td></td>
<td>☐ Yes</td>
<td></td>
<td>☐ Yes</td>
</tr>
<tr>
<td>Store incompatible wastes appropriately.</td>
<td>Were incompatible wastes stored outdoors properly segregated?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td></td>
<td>☐ No</td>
</tr>
<tr>
<td>Collect and properly manage used grease, oil, oil filters, antifreeze, cleaning solutions, batteries, and hydraulic fluids.</td>
<td>Were used grease, oil, oil filters, antifreeze, cleaning solutions, batteries, or hydraulic fluids placed in appropriate disposal containers?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td></td>
<td>☐ No</td>
</tr>
<tr>
<td>Temporarily stage wastes for no more than 72 hours</td>
<td>Were wastes staged temporarily for more than 72 hours?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td></td>
<td>☐ No</td>
</tr>
<tr>
<td>Erosion and Sediment Controls</td>
<td></td>
<td></td>
<td>☐ Yes</td>
<td></td>
<td>☐ Yes</td>
</tr>
<tr>
<td>Expose Minimization BMPs</td>
<td></td>
<td></td>
<td>☐ No</td>
<td></td>
<td>☐ No</td>
</tr>
<tr>
<td>Cover/Roof structures</td>
<td>Were tents and roofs observed in good condition?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td></td>
<td>☐ No</td>
</tr>
<tr>
<td>Asphalt/Concrete curbs</td>
<td>Were curbs (where present) observed in good condition?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td></td>
<td>☐ No</td>
</tr>
</tbody>
</table>
### Part II. BMP Observations. (Describe deficiencies in Part III)

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</thead>
<tbody>
<tr>
<td>Storm Water Containment and Discharge Reduction BMPs</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Secondary Containment</td>
<td>Were liquids observed in secondary containment structures at a volume that could present a risk of release?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td>☐ NA</td>
<td>☐ Yes</td>
</tr>
<tr>
<td>Treatment Control BMPs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catch Basin Inserts</td>
<td>Were catch basin inserts intact and free of trash and debris?</td>
<td>☐ Yes</td>
<td>☐ No</td>
<td>☐ Yes</td>
<td>☐ No</td>
</tr>
</tbody>
</table>

### Part III. Descriptions of BMP Deficiencies

<table>
<thead>
<tr>
<th>Deficiency</th>
<th>Repairs Implemented: \nNote - Repairs must be completed as soon as possible.</th>
<th>Corrective Action Implemented</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
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<tr>
<td>2.</td>
<td></td>
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<tr>
<td>3.</td>
<td></td>
<td></td>
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<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Part IV. Additional Corrective Actions Required

Identify additional corrective actions not included with BMP Deficiencies (Part III) above. Identify BMPs that need more frequent inspection. Note if SWPPP change is required.

<table>
<thead>
<tr>
<th>Required Actions</th>
<th>Implementation Date</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>
## Sampling Event Visual Observation Log

| Sampling Location Observed: |  |
| Date and Time of Inspection: |  |
| Inspector Information |  |
| Inspector Name: | Inspector Title: |
| Signature: | Date: |
| Sampling Event Observations |  |
| Observations: If yes identify location and observe drainage area to identify probable cause |  |
| Odors | Yes □ No □ |
| Floating material | Yes □ No □ |
| Suspended Material | Yes □ No □ |
| Sheen | Yes □ No □ |
| Discolorations | Yes □ No □ |
| Turbidity | Yes □ No □ |
| NSWD Observations |  |
| Were any authorized non-stormwater discharges observed? | Yes □ No □ |
| Were any unauthorized non-stormwater discharges observed? | Yes □ No □ |
| If yes to either, identify source |  |
| Exception Documentation (explanation required if inspection could not be conducted). |  |
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Appendix C

Example Chain of Custody Form
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### Chain of Custody

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Sample Description</th>
<th>Source</th>
<th>Event</th>
<th>Test</th>
<th>Analysis</th>
<th>Analysis Method</th>
<th>Lab Instructions</th>
</tr>
</thead>
</table>

**Explainations**

1. **Explainations:**
   - **Sample ID:** Unique identifier for each sample.
   - **Sample Description:** Detailed description of the sample.
   - **Source:** Origin of the sample.
   - **Event:** Event or action associated with the sample.
   - **Test:** Type of test performed on the sample.
   - **Analysis:** Analysis details.
   - **Analysis Method:** Methodology used for analysis.
   - **Lab Instructions:** Instructions for the laboratory.

**Retained Signature**

<table>
<thead>
<tr>
<th>Signature</th>
<th>Company</th>
<th>Date</th>
<th>Time</th>
<th>Received Signature</th>
<th>Company</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>LUSCPA</td>
<td>12/5/2005</td>
<td>2</td>
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</tbody>
</table>

**Tracked Fields:**

- **Signature Order:** 1: Sampler, 2: Collector, 3: Lab, 4: Analyst, 5: DAFT.