EAST BAY
MUNICIPAL UTILITY DISTRICT

December 30, 2020

Alicia Bihler
Environmental and Hazardous Materials Management Programs Manager
UC Berkeley Office of Environment, Health & Safety
317 University Hall, #1150
Berkeley, CA 94720

RE: Issuance of Wastewater Discharge Permit to Regents of the University of California, Berkeley by EBMUD, Permit no. 06600592.

Dear Ms. Bihler:

In response to input from the San Francisco Bay Regional Water Quality Control Board, EBMUD has modified the Wastewater Discharge Permit for Regents of the University of California, Berkeley (UC Berkeley). The permit now clarifies that the local limits for total identifiable chlorinated hydrocarbons, cyanide, oil and grease, pH, phenolic compounds, and temperature are instantaneous limits.

The enclosed Wastewater Discharge Permit No. 06600592 covers wastewater discharges from Regents of the UC Berkeley into the community sewer. All wastewater discharges from UC Berkeley, actions and reports, shall be in accordance with the terms and conditions of this permit.

Enclosed with this wastewater discharge permit is a copy of EBMUD's Standard Terms and Conditions. The current edition of the EBMUD's Wastewater Control Ordinance (Ordinance) is available at www.ebmud.com. As a permit holder you are legally responsible for complying with all requirements set forth in these documents.

If you have any questions regarding this permit, please contact Adam Kern of the Environmental Services Division at (510) 287-1622.

Sincerely,

Phoebe A. Grow, P.E.
Supervising Wastewater Control Representative

Enclosures:
- Wastewater Discharge Permit
- Standard Terms and Conditions
- Summary of Charges

EAST BAY MUNICIPAL UTILITY DISTRICT
WASTEWATER DISCHARGE PERMIT NO. 06600592

In accordance with the provisions of East Bay Municipal Utility District's (EBMUD) Wastewater Control Ordinance (Ordinance) No. 358-13:

Regents of the University of California, Berkeley
Main Campus

is hereby authorized to discharge wastewater from the above-identified facility to the community sewer in accordance with the effluent limitations and other conditions set forth herein. Compliance with this permit does not relieve the Regents of the University of California, Berkeley (herein referred to as UC Berkeley) of its obligations to comply with all applicable pretreatment regulations, standards, or requirements under local, state, and federal laws, including any such regulations, standards, requirements, or laws that come into effect during the term of this permit. Noncompliance with any term or condition of this permit shall constitute a violation of the Ordinance and this permit and could subject the UC Berkeley to enforcement action.

All reports and notifications required by this permit shall be made to:

East Bay Municipal Utility District
Wastewater Environmental Services Division
Attn: Adam Kern
375 11th Street, MS 702
Oakland, CA 94607-4240

Time-sensitive verbal notifications: shall be made to
(510) 287-1651 during business hours or
(866) 403-2683 during non-business hours.

Electronic submittals to adam.kern@ebmud.com (or alternatively cleanbay@ebmud.com) are acceptable to meet a deadline, but a hardcopy with wet signature for all reports shall be mailed to the address above.

This permit revises and replaces the existing permit. This permit will become effective upon date of signing and will expire at midnight on **December 30, 2025**. If UC Berkeley wishes to continue to discharge after the expiration date of this permit, an application must be filed for a renewal permit in accordance with the requirements of Title IV, Section 3(a) of the Ordinance, a minimum of 60 days before this permit expires.

Sincerely,

Eileen M. White

Eileen M. White, P.E.
Director of Wastewater

Issued this 30th day of December, 2020

I. GENERAL CONDITIONS

1. UC Berkeley shall comply with EBMUD Wastewater Control Ordinance, available at www.ebmud.com.
2. UC Berkeley shall comply with EBMUD Wastewater Discharge Standard Terms and Conditions (STC), most recent edition, available at www.ebmud.com.

II. DESCRIPTION OF MONITORING LOCATIONS

See Attachment A for wastewater monitoring locations for the UC Berkeley campus.

III. MONITORING FACILITIES

UC Berkeley shall maintain, at its own expense, monitoring facilities with safe access to allow the collection of samples from the permitted monitoring locations. UC Berkeley shall allow access for EBMUD employees to independently utilize these facilities to collect samples or take flow measurement readings.

IV. EFFLUENT LIMITATIONS

1. UC Berkeley shall not discharge any radioactive wastewater into the community sewer except when the person is authorized to use radioactive material by the Nuclear Regulatory Commission or other governmental agency empowered to regulate the use of radioactive materials and when the wastewater is discharged in compliance with Nuclear Regulatory Commission regulations and in compliance with all rules and regulations of State and local regulatory agencies.

2. UC Berkeley shall not discharge wastewater from any side sewer into the community sewer system if the strength of the wastewater exceeds the EBMUD Wastewater Control Ordinance local limits as listed below:

LOCAL EFFLUENT LIMITATIONS

Parameter	Daily Maximum (mg/L)
Arsenic	2
Cadmium	1
Chromium (total)	2
Copper	5
Iron	100
Lead	2
Mercury	0.05

Parameter	Daily Maximum (mg/L)
Nickel	5
Silver	1
Zinc	5
Parameter	**Instantaneous Maximum (mg/L, unless noted)**
Chlorinated Hydrocarbons (total identifiable)[1]	0.5
Cyanide	5
Oil and Grease	100
pH (in S.U.)[2]	not less than 5.5[3]
Phenolic compounds	100
Temperature[4]	150F

1. Total Identifiable Chlorinated Hydrocarbons (TICH) - The sum of the concentrations of all quantifiable values equal to or greater than the detection limit for all chlorinated hydrocarbons identified by EPA Method 624.
2. S.U. – Standard Units
3. pH is treated as instantaneous maximum limit. UC Berkeley shall not discharge wastewaters with pH greater than or equal to 12.5 s.u. (40 CFR 261.22(a)(1)).
4. 150F (65.5C), or any thermal discharge which as a result of temperature and/or volume causes the influent of the wastewater treatment plant to exceed 104F (40C).

V. REPORTING REQUIREMENTS

1. UC Berkeley shall submit annually to EBMUD by the end of July:

i. An updated Wastewater Toxics Management Plan or a self-certification that the plan on file is current and being implemented

ii. An updated Drain Disposal Restrictions for Chemicals or a self-certification that the plan on file is current and being implemented

iii. An updated Slug Control Plan or a self-certification that the plan on file is current and being implemented

2. UC Berkeley shall submit a report, including a copy of its most recent Annual Radiation Safety Performance Indicator Report for radioactive materials discharged to the community sewer. The report is due annually by the first day of November.

3. UC Berkeley shall immediately notify EBMUD Environmental Services Division at (510) 287-1651 during business hours or 866-403-2683 during non-business hours upon discovering any spill, accidental discharge, non-customary batch discharge or slug discharge to the community sewer. UC Berkeley shall submit to EBMUD within five days of the occurrence of a slug or spill a formal written notification describing:

i. name of the facility

ii. location of the facility

iii. name of the caller

iv. duration of discharge including beginning and end times and dates, or if continuing, the time compliance is expected to occur
v. location of the discharge
vi. estimated volume of discharge
vii. pollutants that may be present
viii. corrective actions to prevent reoccurrence
ix. whether discharge violates the terms and conditions of this permit

4. Self-Reporting Violations

a. UC Berkeley shall notify EBMUD via phone or email within 24 hours of becoming aware of any of the following violations:
i. discharges prohibited by EBMUD Wastewater Control Ordinance, except where authorized by this permit
ii. bypass of any part of a required pretreatment system

b. UC Berkeley shall submit a written report to EBMUD within five days of becoming aware of a violation. The report shall include the following information:
i. the date and time of the violations
ii. the cause of the violation
iii. a description of the violation, including what was discharged
iv. the volume of the discharge
v. the duration of the discharge violation including start and end times and dates
vi. analytical result, if available, with chain of custody and other pertinent documentation
vii. measures taken to correct the violation
viii. measures taken to prevent reoccurrence

5. Anticipated Noncompliance

UC Berkeley must give advance written notice to EBMUD of any planned changes in the permitted facility or activity that could result in noncompliance with permit requirements.

6. Notification of bypass

If a bypass occurs, UC Berkeley must notify EBMUD as follows:

a. Anticipated bypass. If UC Berkeley knows in advance of the need for a bypass, it must submit prior written notice, at least 10 days before the date of the bypass, to EBMUD.

b. **Unanticipated bypass.** UC Berkeley must notify EBMUD within 24 hours from the time it becomes aware of an unanticipated bypass and submit a written notice to the POTW within 5 days. This report must specify:
   i. a description of the bypass, and its cause, including its duration with exact dates and times
   ii. whether the bypass has been corrected and if the bypass has not been corrected, the anticipated time it is expected to terminate
   iii. the steps being taken or to be taken to reduce, eliminate, and prevent a reoccurrence of the bypass

7. Planned Changes

UC Berkeley must give notice to EBMUD 90 days before any facility expansion, production increase, or process modifications that result in new or substantially increased discharges or a change in the nature of the discharge.

VI. SLUG DISCHARGE CONTROL REQUIREMENTS

1. UC Berkeley is required to implement its slug discharge control plan. The slug discharge control plan shall include, at a minimum, the following:
   i. description of discharge practices, including non-routine batch discharges
   ii. description, including volume of stored chemicals
   iii. procedures for immediately notifying the District of slug discharges, including any discharge that would violate a prohibition under 40 CFR 403.5(b), with procedures for follow-up, written notification within 5 days
   iv. procedures to prevent adverse impact from accidental spills, including inspection and maintenance of storage areas, handling and transfer of materials, loading and unloading operations, control of plant site runoff, worker training, building of containment structures or equipment, measures for containing toxic organic pollutants, and measures and equipment for emergency response

VII. BEST MANAGEMENT PRACTICES

In addition to the local limits, UC Berkeley must implement the following best management practices to control its wastewater discharges into the community sewer:

1. For all photoprocessing/x-ray processing laboratories, UC Berkeley shall:
   i. Maintain a list of on-campus photoprocessing/x-ray processing laboratories
   ii. Post a conspicuous sign in each identified photoprocessing/x-ray laboratory, stating the discharge of photoprocessing waste to the community sewer is prohibited

iii. Train photoprocessing equipment operators in proper waste handling and disposal procedures

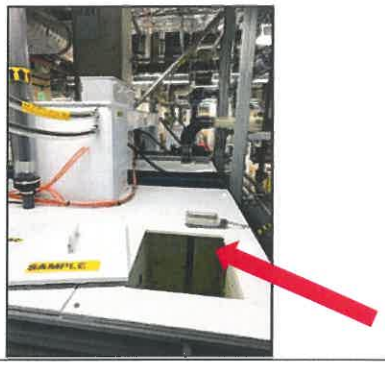
2. UC Berkeley shall manage all flooded elevator pit clean-up in accordance with UC Berkeley's standard operating procedure – Flood Water Discharges from Elevator Pits and Sumps, latest version.

Wastewater Monitoring Locations

Wastewater monitoring locations for main campus:

Side Sewer Number	UCB Manhole No.	Location
1	140	Sump pit at Li Ka Shing
1	55.2	Latimer Hall and Tan Hall
1	60	Lewis Hall, Hilderbrand Hall, and Gilman Hall
7	N/A	Innovative Genomics Institute Building @ loading dock vault

Wastewater monitoring location for Sutardja Dai Hall:

Monitoring Location ID	Description and Location
AWN Outflow	Samples from the acid waste neutralization (AWN) process waste stream will be collected from the outflow tank marked "sample". 

EBMUD

PERMIT FACT SHEET

I. INDUSTRIAL USER/ FACILITY INFORMATION

Facility Location
Regents of the University of California, Berkeley (UC Berkeley)
Berkeley, CA

Facility Contacts
Alicia Bihler, Interim Environmental Programs Manager
(510) 642-4848

Bernadette Rosero-Dugtong Santos, Environmental Protection Specialist at UC Berkeley
(510) 642-6568

Permit No. 06600592

UC Berkeley has designated the following individuals as authorized facility representative:

NAME	TITLE
Sally McGarrahan	Associate Vice Chancellor – Facilities Services

II. DESCRIPTION OF FACILITY OPERATIONS

UC Berkeley holds a mandatory wastewater discharge permit (Permit) because the facility is classified as a Significant Industrial User, designated as such by the District on the basis that it has a reasonable potential for adversely affecting the POTWs operation or for violating any pretreatment standard or requirement – Wastewater Control Ordinance Title I, Section 3(ss)(2)(C). UC Berkeley's pollutants of concern are chlorinated hydrocarbon compounds. The Permit includes an estimation of flow to the sanitary sewer as there are several significant facility operation diversions, including cooling/heating and irrigation usage.

The Marvell Nanofabrication Laboratory (NanoLab) located at Sutardja Dai Hall is engaged in the manipulation and fabrication of silicon-based semiconductor devices. Activities at the NanoLab include: polishing, oxidation, lithography, etching, doping (through steps such as chemical vapor deposition, molecular beam epitaxy, and ion implantation), and deposition of dielectric and/or polysilicon films.

The applicability statement in 40 CFR 469 Electrical and Electronic Components Point Source Category at 469.10 indicates coverage of regulations for semiconductor operation discharges: "The provisions of this subpart are applicable to discharges resulting from all process operations associated with semiconductor manufacture except sputtering, vapor deposition, and electroplating." Upon review EBMUD has determined that the NanoLab's operations are not subject to Pretreatment Standards for New Sources CFR Part 469.18, Subpart A for the following reasons:

- Novel devices produced by the NanoLab are not sold commercially.
- The NanoLab utilizes production methods, and materials are different from the processes that EPA evaluated to establish the basis for the categorical pretreatment standards outlined in 40 CFR 469.

- NanoLab operates as a stand-alone research and development facility serving the University.

III. WASTEWATER SOURCES AND CHARACTERISTICS

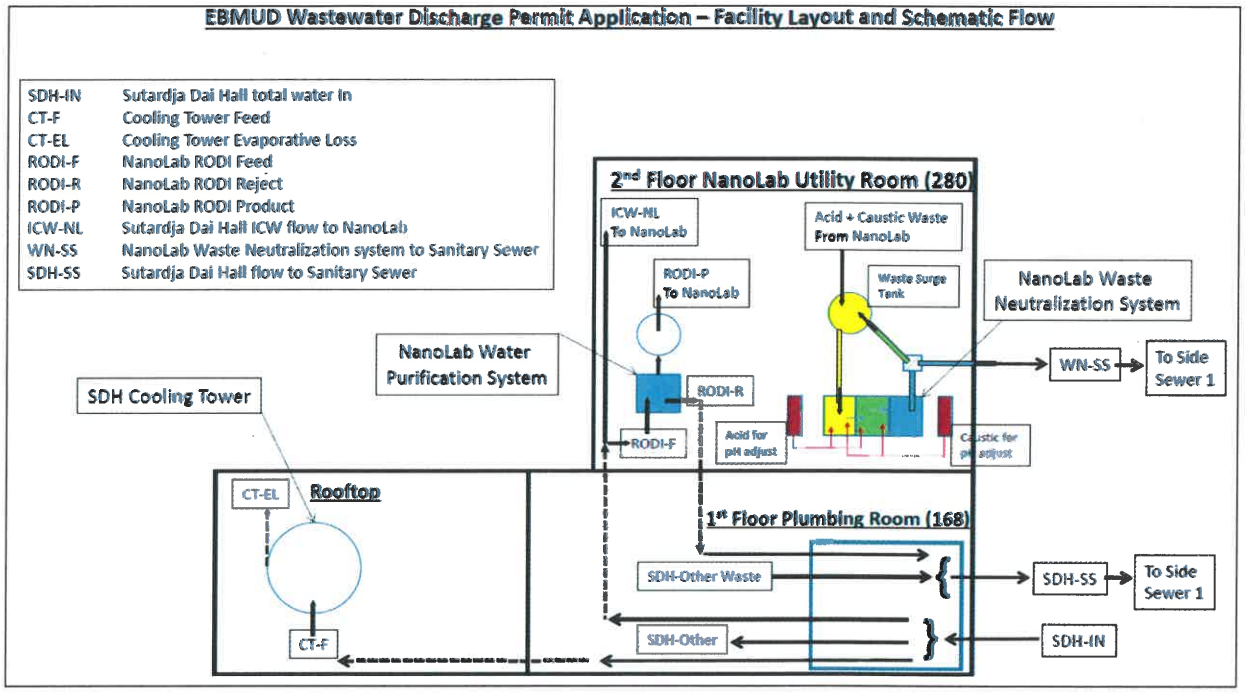
The business activity for the facility is listed as Educational Services – Colleges and University, SIC 8221, BCC 8200. The campus population for 2017 is included in the table below. UC Berkeley operates approximately 2,500 classroom and research laboratories that handle toxic chemicals and solvents and about 9 photo processing labs. According to UC Berkeley staff, the majority of the photo processing laboratories have converted to digital equipment.

Campus Population	2017
Undergraduate Students	30,574
Graduate Students	11,336
Campus Staff/Faculty	19,825
Total	61,735

Within the NanoLab there are five process stations containing heated acid baths. Each bath contains 5 to 7 gallons of acid, and following a period of time or number of uses, the bath is drained to the Acid Waste Neutralization (AWN) wastewater treatment system via a separate lab waste discharge line. Acid baths are drained on average 1 to 2 times per week. Wastewater discharge flows from the system to side sewer no. 1 are approximately 6,000 gallons per day; total wastewater from Sutardja Dai Hall to side sewer no. 1 is approximately 30,000 gallons per day.

IV. NANOLAB LAYOUT AND PROCESS DESCRIPTION

Sutardja Dai Hall's NanoLab operates 7 days a week (Monday through Sunday), 24 hours per day. The NanoLab occupies portions of two floors within Sutardja Dai Hall, is a Class 100/1000 clean room facility. Silicon wafers are cycled through several different steps and may be repeated at different points in the processing. Between steps, contaminants may be removed from wafers by spray or immersion in chemical solution baths such as acid, base or organic solvents. In final wafer preparation, wafers are typically rinsed in deionized water baths and dried using compressed air or nitrogen. Acid and/or caustic waste from the NanoLab is mixed with large quantities of industrial wastewater and reverse osmosis deionized purified wastewater. The waste stream is primarily water requiring pH review and adjustment prior to discharge.



V. FACILITY WASTE HANDLING

UC Berkeley submitted a summary table from its 2017 Hazardous Waste Report to the California Department of Toxic Substances Control. The summary includes the types of wastes and quantities off hauled and the disposal site EPA identification number. EH&S staff reported a total of 4,231 pounds of photo processing waste were off hauled. UC Berkeley reported that over 101 pounds of mercury waste, including 31 pounds of elemental mercury, were off hauled in 2017.

VI. PRETREATMENT AND FLOW MEASURING DEVICES

Wastewater from the NanoLab drains to a two-stage pH adjustment system manufactured by W2 Systems. The system is comprised of a 900 gallon surge tank, which feeds two sequential overflow rectangular adjustment tanks equipped for addition of 36 percent sulfuric acid (H2SO4) and/or 30 percent sodium hydroxide (NaOH) utilizing on/off chemical addition pump control. The table below lists the flow totalizer meter and flow sensor manufacturer and part information. The NanoLab commits to maintaining the flow meter and flow probe just as it maintains and regularly calibrates the more critical pH probes. (W2 Systems recommends in page 6 of the system manual that the pH probes be calibrated quarterly, but the NanoLab calibrates these sensors approximately monthly.) The NanoLab also commits to having a spare flow meter and flow probe on hand (just as we do with the pH sensors, pumps, and all other critical components of the system) to avoid any bypass events.

Part	Tag	Manufacturer	Part Number
Flow Meter and Totalizer	FICE	GF Signet – 8550 Panel Mount	3-8550-XP (panel)
Flow Sensor	FEE	GF Signet	2551 Magmeter

Acid Waste Neutralization (AWN) Treatment System

The campus has 14 domestic water meters on campus as shown in the table below.

Account Number	Meter Number	BCC Code	BCC Description
14861600001	99073750	8200	SCHOOLS
14864300001	99073747	8200	SCHOOLS
14864400001	70049092	8200	SCHOOLS
14864500001	98519174	8200	SCHOOLS
14864500001	98519175	8200	SCHOOLS
14864600001	70028201	8200	SCHOOLS
14864600001	70039422	8200	SCHOOLS
14864700001	70122149	8200	SCHOOLS
53636600001	31983602	8200	SCHOOLS
53636700001	31983609	8200	SCHOOLS
17957100001	60663078	8200	SCHOOLS
35506700001	16660760	6800	OFFICES
52781900001	31936081	8000	HEALTH SERVICES
52855300001	01340194	7020	BOARDING HOUSES

VII. EFFLUENT LIMITATIONS

The UC Berkeley campus must comply with EBMUD local limits.

REGULATED PARAMETER	(LOCAL LIMITS) INSTANTANEOUS MAXIMUM (mg/L, unless noted)	(LOCAL LIMITS) DAILY MAXIMUM (mg/L)
Arsenic	-	2
Cadmium	-	1
Chlorinated Hydrocarbons (total identifiable)[1]	0.5	-
Chromium	-	2
Copper	-	5
Cyanide	5	-
Iron	-	100
Lead	-	2
Mercury	-	0.05
Nickel	-	5
Oil and Grease	100	-
pH (in S.U.)[2]	not less than 5.5[3]	-
Phenolic compounds	100	-
Temperature[4]	150F	-
Total Toxic Organics (TTO)[5]	-	-
Zinc	-	5

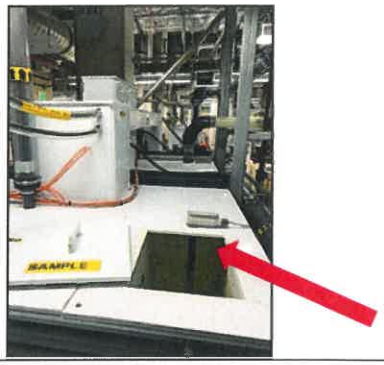
[1] *Total Identifiable Chlorinated Hydrocarbons (TICH) - The sum of the concentrations of all quantifiable values equal to or greater than the detection limit for all chlorinated hydrocarbons identified by EPA Method 624.*
[2] *S.U. – Standard Units*
[3] *pH is treated as instantaneous maximum limit. Sutardja Dai Hall shall discharge wastewaters with less than 12.5 pH (40 CFR 261.22).*
[4]. *150F (65.5C), or any thermal discharge which as a result of temperature and/or volume causes the influent of the wastewater treatment plant to exceed 104F (40C).*

VIII. MONITORING LOCATIONS AND POINT(S) OF COMPLIANCE

1. The discharge monitoring points for the campus are described as follows:

Side Sewer Number	UC Berkeley Manhole No.	Location
1	140	Sump pit at Li Ka Shing
1	55.2	Latimer Hall and Tan Hall
1	60	Lewis Hall, Hilderbrand Hall, and Gilman Hall
7	N/A	Innovative Genomics Institute Building at loading dock vault

2. Sutardja Dai Hall is authorized to discharge wastewater to the community sewer from the side sewer(s) described below.

Monitoring Location ID	Description and Location
AWN Outflow	Samples from the acid waste neutralization (AWN) process waste stream will be collected from the outflow tank marked "sample". 

IX. BEST MANAGEMENT PRACTICES/SPECIAL CONDITIONS

UC Berkeley must implement the following best management practices to control its wastewater discharges into the community sewer:

a. For all photo processing/x-ray processing laboratories, UC Berkeley shall:
   i. Maintain a list of on-campus photo processing/x-ray processing laboratories.
   ii. Post a conspicuous sign in each identified photo processing/x-ray laboratory, stating the discharge of photo processing waste to the community sewer is prohibited.
   iii. Train photo processing equipment operators in proper waste handling and disposal procedures.

b. UC Berkeley shall manage all flooded elevator pit clean-up in accordance with UC Berkeley's standard operating procedure – Flood Water Discharges from Elevator Pits and Sumps, latest version.

X. REPORTING REQUIREMENTS

1. UC Berkeley shall submit annually to EBMUD by the end of July:
   a. An updated Wastewater Toxics Management Plan or a self-certification that the plan on file is current and being implemented.
   b. An updated Drain Disposal Restrictions for Chemicals or a self-certification that the plan on file is current and being implemented.
   c. An updated Slug Control Plan or a self-certification that the plan on file is current and being implemented.

2. UC Berkeley shall submit a report, including a copy of its most recent Annual Radiation Safety Performance Indicator Report for radioactive materials discharged to the community sewer. The report is due annually by the first day of November.

XI. SLUG CONTROL AND SOLVENT MANAGEMENT PLAN EVALUATIONS

EBMUD has a copy of the campus-wide slug discharge control plan dated July 2020 on file and confirmed it contains all of the minimum federal requirements as listed 40 CFR 403.8(f)(2)(vi).

UC Berkeley's Guidelines for Drain Disposal Restrictions for Chemicals, University of California, Berkeley (Guidelines) was developed by EH&S staff. A copy of the July 2020 Guidelines are on file. The plan meets all required elements for the Solvent Management Plans required by UC Berkeley's wastewater discharge permit.

XII. ENFORCEMENT HISTORY

The table below includes UC Berkeley's violation history since 2000:

Date	TICH, mg/L	Side Sewer
11/08/2019	1.005988	4
11/12/2008	-	Non-reporting for potential Mercury/PCB slug discharge
10/01/2008	1.11	1
04/12/2000	1.956	1

Prepared by: Adam Kern — Date: 12/30/2020
Wastewater Control Representative

Reviewed by: Phoebe Grow — Date: 12/30/2020
Supervising Wastewater Control Representative