



April 21, 2022

Brendan Mulholland
Environmental Water Quality Manager
Lawrence Berkeley National Laboratory
One Cyclotron Road
Berkeley, CA 94720

Re: Wastewater Groundwater Discharge Permit No. 50347891

Dear Mr. Mulholland:

Enclosed is the Groundwater Discharge Permit for Lawrence Berkeley National Laboratory, for your information and records. A copy of the *EBMUD Wastewater Control Ordinance* is available at www.ebmud.com. As a Permit holder, you are legally responsible for complying with all Permit conditions and requirements.

Lawrence Berkeley National Laboratory shall report to the Environmental Services Division any changes, permanent or temporary, to the premises or operations that significantly affect the quality or volume of the permitted discharge or deviate from the terms and conditions under which the Permit was granted.

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

Sincerely,

A handwritten signature in blue ink, appearing to read 'Phoebe Grow', is written over a horizontal line.

Phoebe Grow, P.E.
Supervising Wastewater Control Representative

Enclosures:
Groundwater Permit
Groundwater Permit Standard Terms and Conditions
Permit Fact Sheet
Summary of Charges

**East Bay Municipal Utility District
Groundwater Discharge Permit Number 50347891**

Discharger:	Lawrence Berkeley National Laboratory
Discharge Location:	One Cyclotron Road, Berkeley CA
Discharger Mailing Address:	One Cyclotron Road, MS 75B0101 Berkeley, CA 94720
Discharger Contacts:	Jim Buehler - (510) 486-7327, jrbuehler@lbl.gov Brendan Mulholland – (510) 486-5852, bjmulholland@lbl.gov

In accordance with the provisions of the East Bay Municipal Utility District's (EBMUD) Wastewater Control Ordinance (Ordinance) **Lawrence Berkeley National Laboratory** is hereby authorized to discharge groundwater from the above-identified facility to the community sewer in accordance with the effluent limitations, monitoring requirements and other conditions set forth herein. Compliance with this permit does not relieve **Lawrence Berkeley National Laboratory** 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.

All reports and notifications required by this permit shall be submitted in accordance with the Terms and Conditions below. Contact information for EBMUD is as follows:

East Bay Municipal Utility District
Wastewater Environmental Services Division
Attn: Adam Kern
375 11th Street, MS 702
Oakland, CA 94607-4240
(510) 287-1651
(866) 403-2683(Non-Business Hours)
cleanbay@ebmud.com

This permit will become effective on the date of signature below and will expire five years from the effective date shown below.

If **Lawrence Berkeley National Laboratory** 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, P.E.
Director of Wastewater

Effective Date: 4/20/22



GROUNDWATER DISCHARGE PERMIT

Terms and Conditions

PERMIT NUMBER: 50347891

GENERAL CONDITIONS

Lawrence Berkeley National Laboratory shall comply with the provisions of the following two documents:

- EBMUD Wastewater Control Ordinance (Wastewater Control Ordinance)
 - EBMUD Permit Standard Terms and Conditions, most recent edition
- II. Lawrence Berkeley National Laboratory shall discharge groundwater only from the locations described in the Permit Fact Sheet and shown on the maps in the *Groundwater Treatment System Descriptions* document submitted with the permit application.
- III. Lawrence Berkeley National Laboratory shall immediately cease discharge of treated groundwater if not in compliance with any of the terms and conditions of this permit or in compliance with requirements from the State of California, the Department of Energy, or other applicable regulatory agency regarding radioactivity.

COMPLIANCE REQUIREMENTS

- I. Lawrence Berkeley National Laboratory shall pretreat/manage, all groundwater prior to discharge to the community sewer. Pretreatment shall be sufficient to achieve compliance with the discharge limits established in this permit.
- II. Lawrence Berkeley National Laboratory shall not discharge groundwater to the community sewer at a flow rate greater than 100 gallons per minute.
- III. Lawrence Berkeley National Laboratory shall discharge all groundwater to the community sewer through a totalizing flow meter.
- IV. Lawrence Berkeley National Laboratory shall maintain a discharge logbook. Each entry shall include the date, time, source, and total volume of all groundwater discharged to the community sewer.



GROUNDWATER DISCHARGE PERMIT

Terms and Conditions

PERMIT NUMBER: 50347891

WASTEWATER DISCHARGE LIMITS

- I. Lawrence Berkeley National Laboratory shall not discharge groundwater to the community sewer if the strength of the wastewater exceeds EBMUD Wastewater Control Ordinance Discharge Limits as shown below.

Parameter	Daily Maximum (mg/L)
Arsenic	2
Cadmium	1
Chromium (total)	2
Copper	5
Iron	100
Lead	2
Mercury	0.05
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) - includes the following chlorinated hydrocarbons: Bromodichloromethane; Carbon tetrachloride; Chlorobenzene; Chloroethane; 2-Chloroethylvinyl ether; Chloroform; Chloromethane; Dibromochloromethane; 1,2-Dichlorobenzene; 1,3-Dichlorobenzene; 1,4-Dichlorobenzene; 1,1-Dichloroethane; 1,2-Dichloroethane; 1,1-Dichloroethene; trans-1,2 Dichloroethene; 1,2-Dichloropropane; cis-1,3-Dichloropropene; trans-1,3-Dichloropropene; Methylene chloride; 1,1,2,2-Tetrachloroethane; Tetrachloroethene; 1,1,1-Trichloroethane; 1,1,2-Trichloroethane; Trichloroethene; Trichlorofluoromethane; Vinyl chloride.

² S.U. – Standard Units

³ Lawrence Berkeley National Laboratory shall not discharge wastewater 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).



SELF-MONITORING AND REPORTING REQUIREMENTS

- I. Lawrence Berkeley National Laboratory shall submit technical reports as required below:

Date Due

Every June 1st

Every December 1st

Reporting Period

November 1st through April 30th

May 1st through October 31st

The technical reports shall contain the following information, at a minimum:

1. The self-monitoring report shall include: A signed analytical report, and the chain of custody documentation.
 2. Monthly readings from flow totalizers on the effluent side of each pretreatment system.
 3. Total volume of groundwater discharged to the sanitary sewer for the reporting period.
 4. Certification and signature prepared in accordance with Standard Terms and Condition (STC), "Signature Requirements".
- II. Lawrence National Berkeley Laboratory shall report to the EBMUD Environmental Services Division any changes, permanent or temporary, to the site, which change the quality or volume of the groundwater discharge or that deviate from the permit terms and conditions.
- III. Lawrence Berkeley National Laboratory shall submit all reports to EBMUD by email to adam.kern@ebmud.com.
- IV. Lawrence Berkeley National Laboratory shall monitor and obtain representative samples of the groundwater discharged from the pretreatment systems in accordance with STC.
- V. Self-monitoring reports shall contain all laboratory results and the corresponding chain of custody documentation, and signatory requirements.



GROUNDWATER DISCHARGE PERMIT

Terms and Conditions

PERMIT NUMBER: 50347891

VI. The sampling locations are identified as follow:

Discharge Source: Treatment System to SS#1	Process Sampling Point (PSP)	Sample Tap I.D.	Schematic Map*
B51 Fire Trail Treatment System	PSP#2	SP6	Figure D-5a, Schematic Diagram of Building 51 Fire Trail
B46 Treatment System	PSP#3	SP5	Figure D-4a, Schematic Diagram of Building 46
Building 51 Motor Generator Room Basement Treatment System	PSP#4	SP6	Figure D-6a, Schematic Diagram of Building 51 Motor Generator Room Basement
Building 7 Groundwater Treatment System	PSP#5	SP15	Figure D-2a, Schematic Diagram of Building 7
Building 6 Treatment System	PSP#6	SP6	Figure D-1a, Schematic Diagram of Building 6
Building 51L Treatment System	PSP#7	SP7	Figure D-7a, Schematic Diagram of Building 51L
Building 25A Treatment System	PSP#8	SP3	Figure D-3a, Schematic Diagram of Building 25A
Building 71B GAC Treatment System	PSP#9	SP6	Figure D-8a, Schematic Diagram of Building 71B
Building 53 Treatment System	PSP#10	SP4	Figure D-2a, Schematic Diagram of Building 53

**Maps referenced are those provided by Lawrence Berkeley National Laboratory in the Groundwater Treatment System Descriptions document submitted with the permit application.*

IV. Groundwater discharged to the sanitary sewer shall be sampled at the following locations at the indicated frequency, at a minimum, for the following parameters:

Parameter	Sample Type	Method	Location	Frequency
TICH	Grab	8260	PSP#2, PSP#3, PSP#4, PSP#5, PSP#6, PSP#7, PSP#8, PSP#9, PSP#10	2x/year

INSPECTIONS

EBMUD may conduct random, unannounced inspections to verify compliance with the terms and conditions of this permit. Lawrence Berkeley National Laboratory shall grant EBMUD personnel site access to conduct inspections and collect wastewater samples.



ENFORCEMENT AND PENALTIES

Failure to comply with the terms and conditions of this discharge permit may result in enforcement actions, including violation follow-up fees, civil enforcement penalties, and administrative fines of up to \$5,000 per day.

RATES AND CHARGES

This discharge permit may be amended to include changes to rates and charges that may be established by EBMUD during the term of this permit.

Permit Fact Sheet

Lawrence Berkeley National Laboratory (Groundwater) - Permit No. 50347891

Background

This groundwater permit is issued to Lawrence Berkeley National Laboratory's (LBNL) for the discharge of treated groundwater to the sanitary sewer system. LBNL has held this permit since December 31, 1998.

Site Contacts

The permit applicant is LBNL. Maria Nappi, 510-486-6571, Environmental Health & Safety Division Director, signed the permit application, and Brendan Mulholland, 510-486-5852, is the contact person for the permit. The emergency contact is LBNL Jim Buehler, 510-486-7327.

Pollutants of Concern

LBNL is located at 1 Cyclotron Road in Berkeley. The site was originally contaminated with chlorinated volatile organic compounds (VOCs) which includes: Chloroform, DCE (Dichloroethylene), TCE (Trichloroethylene), PCE (Perchloroethylene), and Freon-113 (Trichlorotrifluoroethane) due to previous activities. LBNL's goal is to treat the groundwater to non-detectable levels of volatile organics. EBMUD has a local limit of 0.5 mg/L Total Identifiable Chlorinated Hydrocarbons (TICH). TICH values were below the detection limit in all samples collected during the previous permit term.

Groundwater generated from well developments and monitoring well samples at the tritium stack may contain tritium (a radioactive isotope of hydrogen). LBNL is required to comply with Department of Energy and the State of California's requirements regarding radioactive discharges.

Process Description/Schematic Diagram

LBNL has nine pretreatment systems that treat groundwater prior to discharge. LBNL submitted a document titled Groundwater Treatment System Descriptions with the permit application. This document describes each pretreatment system, the location, the Process Sampling Point (PSP) location, and whether the effluent is used for soil flushing or discharged to the sanitary sewer. A summary of the nine treatment systems is provided below.

1.1 Building 6 Groundwater Treatment System

The Building 6 Groundwater Treatment System (GTS) is located on the east side of the Advanced Light Source. The GTS consists of a primary granulated activated carbon (GAC) canister and a secondary 5-gallon GAC drum in series, and treats contaminated groundwater extracted from well MW6-95-14 and electric manhole EMH133. After treatment the effluent is routed to a holding barrel and then injected into the well system in the upgradient core area of the Building 7 lobe for groundwater contamination for soil flushing purposes. The effluent could also be routed to the sanitary sewer if it is not needed for soil flushing. Sanitary sewer effluent sampling is taken from PSP #6.

1.2 Building 7 Groundwater Treatment System

The Building 7 GTS is located on a concrete pad at the former location of Building 7B. It consists of two primary GAC canisters and a single secondary canister. It treats contaminated groundwater pumped from a number of sources including extraction wells in the Building 7 groundwater collection trench, extraction wells in the Building 53/58 slope collection trench, extraction well EW58-02-1 in the Building 58 southeast trench, extraction wells in the Building 7 soil flushing system, and extraction wells EW7-06-1, EW58-07-1, and EW58-07-2. The water from twelve of the extraction wells is collected in a large metal tank located at the building 53/58 slope collection trench. A new temporary treatment system was installed as a contingency measure for rerouting of the treatment system at

Building 7. A booster pump routes this water to the Building 7 GTS. After treatment, the effluent is reinjected for soil flushing or discharge into the sanitary sewer. Sanitary sewer effluent sampling is taken from PSP #5.

1.3 Building 53 Ground Water Treatment System

The Building 53 GTS is located north of Building 53. The GTS consists of a primary GAC canister and 55-gallon GAC drum in series. The treatment system has been put in place as a contingency measure for eventual rerouting of the Building 7 treatment system. Sanitary sewer effluent sampling is taken from PSP #10.

1.4 Building 25A Groundwater Treatment System

The Building 25A GTS is located west of Building 44A. The GTS consists of a primary GAC canister and a secondary 55-gallon GAC drum in series. It treats contaminated groundwater from extraction well EW25A-02-1 and from groundwater monitoring well MW25A-98-3. After treatment, the effluent is recirculated into a shallow gravel-filled infiltration bed located between Buildings 25A and 44A, to flush the source area of the Building 25A lobe of groundwater contamination or discharge to the sanitary sewer. Sanitary sewer effluent sampling is taken from PSP #8.

1.5 Building 46 Groundwater Treatment System

The Building 46 GTS is located on the northeast side of Building 46. It treats the water pumped from a catch basin located in a subdrain south of the GTS. Water is pumped by one of two sump pumps within the catch basin through a strainer/sediment trap into either one of two treatment units (TU1 or TU2). TU1 is a backup system so TU2 typically treats the groundwater. After treatment, the water is routed to a 500-gallon holding tank if it is needed for in situ soil flushing, or discharged to the sanitary sewer. From the holding tank the water is pumped to a second holding tank east of Building 52. Water from the Building 53 Treatment System can also be pumped to this holding tank. The water can be pumped from this holding tank for well injection to treat the Building 52 lobe of groundwater contamination. It can also be routed to the Building 71B plume source area and injected into well MW71B-99-3R for soil flushing. Sanitary sewer effluent sampling is taken from PSP#3.

1.6 Building 51 Firetrail Groundwater Treatment System

The Building 51 Firetrail GTS is located upslope of Building 51, along the fire trail east of the building. The GTS consists of two GAC canisters in series and treats water from extraction wells EW58-98-1, EW58-98-2, and SB58-98-4. Water from the three wells is pumped through a totalizer and sediment trap to the treatment canisters. The GTS is also used to treat water from ERP well sampling and development and decontamination activities, and from contaminated hydrauger effluent. Contaminated water from field operations is placed in an intake pipe near Building 71H. The treated groundwater is transferred to a holding tank in Building 46 and used for in-situ soil flushing in the Building 52 lobe source area. Sanitary sewer effluent sampling is taken from PSP #2.

1.7 Building 51 Motor Generator Room Basement Groundwater Treatment System

The Building 51 Motor Generator Room basement GTS was moved from the Motor Generator Room basement in 2008 to a storage container located outside the northeast end of Building 51. The GTS consists of two GAC canisters in series and treats water from the Building 51 basement discharge sump, extraction wells EW51-07-1, EW51-07-2, and EW64-00-1 (which extracts groundwater from the backfilled Building 64 groundwater plume source area excavation). The treated water flows into a post treatment holding barrel before discharge to the sanitary sewer. Sanitary sewer effluent sampling is taken from PSP#4.

1.8 Building 51L Groundwater Treatment System

The building 51L GTS is located at the west side of Building 51A. The GTS consist of a primary GAC canister and a secondary 55-gallon GAC drum in series and treats the water pumped from the B51A sump and extraction wells EW51A-06-1, EW51L-06-1, EW51B-07-1, and EW51B-07-2. The treated water is re-injected inside Building 51A for in situ soil flushing or discharged into the sanitary sewer. Sanitary sewer effluent sampling is taken from PSP#7.

1.8 Building 71B Groundwater Activated Carbon Treatment System

The building 71B GAC Treatment System is located West of Building 71B. The treatment system consists of a primary 1,000lb GAC canister and a secondary 55-gallon GAC drum in series and treats the water pumped from the Building 71B sump and extraction wells SB71B-04-1, SB71B-04-2, SB71B-99-3R. The treated water is re-injected inside Building 71B for in situ soil flushing or discharged into the sanitary sewer. Sanitary sewer effluent sampling is taken from PSP#9.

Water Balance

LBNL discharges an average of 4,550 gallons/day to SS#1. The volume is based on their self-monitoring reports during the last permit term in 2016-2021.

Report Date	Wastewater Discharge in Gallons*
5/6/2016	1,298,341
11/28/2016	417,821
5/24/2017	2,785,330
11/14/2017	1,071,473
11/5/2018	1,107,997
11/22/2019	1,173,055
5/26/2020	1,030,132
11/11/2020	545,171
5/12/2021	534,277

*Discharge since last report date

5-year average =	1,660,600	gallons per year
	4,550	gallons per day
	136,488	gallons per month

Site Plan Map

A site map, *Figure 1-1, Locations of LBNL Treatment Systems*, dated 10/16 was submitted with the application.

Inspection Program (IP)

No District monitoring will be required for this permit.

Fees and Charges

Wastewater charges will be assessed upon receipt of LBNL's semi-annual discharge logs. The treatment rate uses BCC 4951, groundwater remediation.

Fiscal Year	2022 est.
Permit	\$3,010
Treatment	\$3,109
Total	\$6,119

1,660,600 gallons per year $\div$ 365 days per year = 4,550 gpd
4,550 gpd x 30 = 136,488 gallons per month
136,488 gallons per month $\div$ 748 gallons/Ccf = 182 Ccf/month
182 Ccf/month x 12 = 2,190 Ccf/year

\$1.42/Ccf x 2,190 Ccf/month = \$3,109 per year



SUMMARY OF CHARGES

Permit no. 50347891

FEES AND WASTEWATER CHARGES

The following fees and charges are due when billed by EBMUD:

Annual Permit Fee:

\$3,030.00

WASTEWATER DISPOSAL SERVICE CHARGE

Account Number	Meter Number	BCC Code	BCC Description	Percent Discharged	Fixed Volume Ccf/Month	Meter Rate \$/Ccf
54040200001	No meter	4951	Ground water Remediation	*	*	\$1.42

*Volume based discharge logs reported semi-annually. Treatment charges will be assessed upon receipt of the discharge logs.