



Environmental Review Form for Argonne National Laboratory

Form: ANL-985
Version: 5
Your Form ID: ANL-985-1600
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Date: 2/5/2021 10:56:08 AM
Created By: Campbell, Patty A.

Creator

Badge: 231600 Name: Campbell, Patty A.
Cost Center: 167 Division: EVS
Job Title: Consultant Employee Type: Non-Regular Full-Time Non-Exempt
Building: 362 Lab Extension: 2-5234

General Information

Project/Activity Title: 100 Gallon Fermenter Scale-Up Pilot
ASO NEPA Tracking No.: Type of Funding:
B & R Code: Identifying Number: BETO-DOE-EERE-L001-1505
SPP Proposal Number: CRADA Proposal Number:
Work Project Number: ANL Accounting Number: (Item 3a in Field Work Proposal)
Other (explain): BETO-DOE-EERE-L001-1505
List appropriate NEPA Owners:
Division: AMD NEPA Owner:

Financial Plans

To select a Financial Plan, click the magnifying glass icon to open a search window.

Cost Center: 114 Project: PRJ1001719 49963 Accl Anaerobic Dig Phase: PH01 General Task: PT1397: General Costs

Description of Proposed Action

A 100 gallon bioreactor system will be used for anaerobic digestion, which can be used to produce organic acids (e.g., acetic, butyric, lactic), and gases (e.g. mainly CO2 and trace levels of CH4, H2, and H2S) from waste streams (e.g. food waste, industrial, municipal wastewater). Work is being completed in the hi-bay of building 369. Purpose: The study is designed to scale up arrested methanogenesis anaerobic digestion for high-strength wastewater treatment and carboxylic acid production. Description of procedure: Cheese whey powder will be mixed with brewery wastewater and continuously fed into a bioreactor. The feedstock will be fermented under anaerobic conditions at 40-60 degrees C. Then effluent from this fermentation will follow instruction from Peter Lynch and a log will be kept of all discharges (amounts and concentrations). All waste will be pH neutral before discharge down a sanitary sink. Please see chemical table below of the major chemical parameters for this project (all Product values in table 2 below are average values): Reactants -Sodium Hydroxide 10M 6L/day -Hydrochloric Acid 3M 0-3.8 L/day -Glycerol 50% 8 L/month -Cheese Whey 1gCOD/g 6.3kg/day -Industrial and municipal wastewater 32 g COD/L 100 L/day Products -Carbon Dioxide 99% 1140 -1520 L/day -Total Organic Acids (Lactic acid+ volatile fatty acids) 37-151L/day -Lactic Acid 20g/L 37-151 L/day -Acetic Acid 5g/L 37-151 L/day -Butyric Acid 23g/L 37-151 L/day -COD 85g/L 37-151 L/day

Description of Affected Environment

Work is done indoors. Waste from experiment, especially concerning COD will be disposed via a sanitary drain located near building 369. CO2 is quantified and vented through the vent system of building 369. See details below.

Potential Environmental Effects

- Attach explanation for each "yes" response near bottom of form.
• See Instructions for Completing Environmental Review Form.

Table with 3 columns: Section A (Complete For All Projects), Yes, No, and Explanation.

1.	Project evaluated for Pollution Prevention and Waste Minimization opportunities and details provided under items 2, 4, 6, 7, 8, 16, and 20 below, as applicable	<input checked="" type="radio"/>	<input type="radio"/>	Review was complete and a log of discharge will be maintained
2.	Air Pollutant Emissions	<input checked="" type="radio"/>	<input type="radio"/>	1140 - 1520 L/day of Carbon Dioxide (99%) and other trace gases (1%) of methane (CH ₄), hydrogen(H ₂), and hydrogen sulfate (H ₂ S) will be vented through a venting port in building 369 discharging above the roof line. EOF staff attached a tube to a gas tipper to quantify the amount of gas released from the fermenter prior to exiting the building in the Vent Port of building 369.
3.	Noise	<input type="radio"/>	<input checked="" type="radio"/>	
4.	Chemical/Oil Storage/Use	<input checked="" type="radio"/>	<input type="radio"/>	Only the minimum amount of chemicals needed for the project will be used and stored in original containers. Secondary containment will be used for all materials during transport and storing. The following will be transported as follows: -NaOH (10 gallons of 10M) will be shipped from distributor to building 369 or transported from building 362 in a government vehicle in 4L plastic bottles (~1gallon), not to exceed 10 bottles, -HCl (0-1 gal 3M) will be transported from building 362 to building 369 in 5-gallon carboy or original glass container, -Cheese Whey (220lbs) will be transported to building 369 in a 5-gallon drum, -Industrial and municipal wastewater 5500 L (1,450 gal) total for the project will be transported to building 369 in 5-gallon carboys as needed; not to exceed 4-8/day. -2 gallons of 50% glycerol will be used in a chiller and discarded at the end of the project. Peristaltic pumps will be used to add the above to a feed tank that sits inside the berm. Potential spills from the facility will be contained by a berm designed to capture 11,356L (3,000gal). A 302L (80gal) harvest tank will be located outside of the berm containing fermenter effluent. The harvest tank is set on wheels for easy transport to the sanitary drain. This procedure will be walked through with water to find and address any friction in the path that could lead to spillage or injury.
5.	Pesticide Use	<input type="radio"/>	<input checked="" type="radio"/>	
6.	Toxic Substances Control Act (TSCA) Substances			
6a.	Polychlorinated Biphenyls (PCBs)	<input type="radio"/>	<input checked="" type="radio"/>	
6b.	Asbestos or Asbestos Containing Materials	<input type="radio"/>	<input checked="" type="radio"/>	
6c.	Other TSCA Regulated Substances	<input type="radio"/>	<input checked="" type="radio"/>	
6d.	Import or Export of Chemical Substances	<input type="radio"/>	<input checked="" type="radio"/>	
7.	Biohazards	<input type="radio"/>	<input checked="" type="radio"/>	
8.	Effluent/Wastewater (If yes, see question #12 and contact Peter Lynch (HSE) at 2-4582 or lynch@anl.gov)	<input checked="" type="radio"/>	<input type="radio"/>	Peter Lynch has reviewed the effluent and any discharge to the sanitary drain will be logged in a logbook kept in the hi-bay. The Harvest tank will be positioned outside a berm on wheels for easy transport to the sanitary drain. The contents will be logged with exact concentrations of each, but below is a daily estimate. Reactants -Sodium Hydroxide 10M 1.5 gal/day -Hydrochloric Acid 3M 0-1 gal/day -Cheese Whey 1 g COD/g 6.3kg/day -Industrial brewery wastewater 32 g COD/L 100L/day Products -Carbon Dioxide 99% 300-400 gal (see Air Pollutant emissions in question 2) -Total Organic Acids (Lactic acid+ volatile fatty acids) 45 g/L 10-40 gal -Lactic Acid 20g/L 10-40 gal -Acetic Acid 5g/L 10-40 gal -Butyric Acid 23g/L 10-40 gal -COD 85g/L 10-40 gal
9.	Waste Management			

9a.	Construction or Demolition Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9b.	Hazardous Waste	<input checked="" type="radio"/>	<input type="radio"/>	For the work conducted at Argonne National Laboratory, all RCRA hazardous waste will be accumulated (in a Satellite Accumulation Area) by personnel qualified by Argonne-specific training. Requisitions for transfer of accumulated hazardous waste to a central on-site facility will be completed by Argonne-certified personnel. The research personnel will conform to the requirements in LMS-PROC-103. All on-site handling, storage, and disposal will be performed in accordance with the RCRA Part 3 permit issued by the IEPA. The accumulated hazardous waste will be disposed in accordance with Argonne's Part B permit, and in accordance with the requirement in LMS-PROC-103.
9c.	Radioactive Mixed Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9d.	Radioactive Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9e.	Asbestos Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9f.	Biological Waste	<input checked="" type="radio"/>	<input type="radio"/>	This project was reviewed by the Biosafety Officer or IBC and was determined to be BSL-1 due to a mixed culture bacteria (BSL1) being used.
9g.	No Path to Disposal Waste	<input type="radio"/>	<input checked="" type="radio"/>	
9h.	Nano-material Waste	<input type="radio"/>	<input checked="" type="radio"/>	
10.	Radiation	<input type="radio"/>	<input checked="" type="radio"/>	
11.	Threatened Violation of ES&H Regulations or Permit Requirement	<input type="radio"/>	<input checked="" type="radio"/>	
12.	New or Modified Federal or State Permits	<input type="radio"/>	<input checked="" type="radio"/>	
13.	Siting, Construction, or Major Modification of Facility to Recover, Treat, Store, or Dispose of Waste	<input type="radio"/>	<input checked="" type="radio"/>	
14.	Public Controversy	<input type="radio"/>	<input checked="" type="radio"/>	
15.	Historic Structures and Objects	<input type="radio"/>	<input checked="" type="radio"/>	
16.	Disturbance of Pre-existing Contamination	<input type="radio"/>	<input checked="" type="radio"/>	
17.	Energy Efficiency, Resource Conserving, and Sustainable Design Features	<input type="radio"/>	<input checked="" type="radio"/>	
Section B (For Projects that Occur Outdoors)		Yes	No	
18.	Threatened or Endangered Species, Critical Habitats, and/or other Protected Species	<input type="radio"/>	<input checked="" type="radio"/>	
19.	Wetlands	<input type="radio"/>	<input checked="" type="radio"/>	
20.	Floodplain	<input type="radio"/>	<input checked="" type="radio"/>	

21.	Landscaping	<input type="radio"/>	<input checked="" type="radio"/>	
22.	Navigable Air Space	<input type="radio"/>	<input checked="" type="radio"/>	
23.	Clearing or Excavation	<input type="radio"/>	<input checked="" type="radio"/>	
24.	Archaeological Resources	<input type="radio"/>	<input checked="" type="radio"/>	
25.	Underground Injection	<input type="radio"/>	<input checked="" type="radio"/>	
26.	Underground Storage Tanks	<input type="radio"/>	<input checked="" type="radio"/>	
27.	Public Utilities or Services	<input type="radio"/>	<input checked="" type="radio"/>	
28.	Depletion of a Non-Renewable Resource	<input type="radio"/>	<input checked="" type="radio"/>	
Section C (For Projects Outside of ANL)		Yes	No	
29.	Prime, Unique, or Locally Important Farmland	<input type="radio"/>	<input checked="" type="radio"/>	
30.	Special Sources of Groundwater (such as sole source aquifer)	<input type="radio"/>	<input checked="" type="radio"/>	
31.	Coastal Zones	<input type="radio"/>	<input checked="" type="radio"/>	
32.	Areas with Special National Designations (such as National Forests, Parks, or Trails)	<input type="radio"/>	<input checked="" type="radio"/>	
33.	Action of a State Agency in a State with NEPA-type Law	<input type="radio"/>	<input checked="" type="radio"/>	
34.	Class I Air Quality Control Region	<input type="radio"/>	<input checked="" type="radio"/>	

Categorical Exclusion

ANL NEPA Reviewer Use Only

- My approval is the final approval necessary
 This form requires additional approval from DOE

To be Completed by DOE/ASO

Section D	Yes	No
Are there any extraordinary circumstances related to the proposal that may affect the significance of the environmental effects of the proposal?	<input type="radio"/>	<input checked="" type="radio"/>
Is the project connected to other actions with potentially significant impacts or related to other proposed action with cumulatively significant impacts?	<input type="radio"/>	<input checked="" type="radio"/>
If yes, is a categorical exclusion determination precluded by 40 CFR 1506.1 or 10 CFR 1021.211?	<input type="radio"/>	<input type="radio"/>
Can the project or activity be categorically excluded from preparation of an Environment Assessment or Environmental Impact Statement under Subpart D of the DOE NEPA Regulations?	<input checked="" type="radio"/>	<input type="radio"/>

If yes, indicate the class or classes of action from Appendix A or B of Subpart D under which the project may be excluded:

This project may be excluded under 10 CFR 1021, Subpart D, Appendix B Category: B 3.6 Small-scale research and development, laboratory operations, and pilot projects.

If no, indicate the NEPA recommendation and class(es) of action from Appendix C or D to Subpart D to Part 1021 of 10 CFR.

Attachments

File Description:

Comments

Trace levels of hydrogen and hydrogen sulfide will be generated from the fermenter and properly vented through a vent above the building roof line. The principal investigator will monitor if there is any potential for hydrogen sulfide presence at the ground level, and take appropriate precaution to avoid worker exposure if necessary.

Add Approver

Approver Name	Approver Badge	Reason	Delete
Urgun Demirtas, Meltem	59467	PI	
Wu, Haoran	297944	Worker	
Campbell, Patty A.	231600	Preparer	
McGhee, Ian Riley	272547	Safety Team	
Harris, Amy M.	49490	Safety Team	
Lynch, Peter L.	46304	Wastewater discharge	
Thompson, Lawrence S.	97495	Waste management	
Pfeiffer, Mark Albert	232188	quality	
Krumdick, Gregory K.	41078	Division Director	
Willig, Ryne T.	232518	Safety Team	

Notifications

The approval notification email will be copied to the people listed below.

Badge	Name	Division	Delete
59467	Urgun Demirtas, Meltem	AMD	
231600	Campbell, Patty A.	EVS	
272547	McGhee, Ian Riley	WSH	
49490	Harris, Amy M.	WSH	
46304	Lynch, Peter L.	QAS	
97495	Thompson, Lawrence S.	NWM	
232188	Pfeiffer, Mark Albert	QAS	
41078	Krumdick, Gregory K.	AMD	
232518	Willig, Ryne T.	WSH	
297944	Wu, Haoran	AMD	

ASO-CX Number

ASO-CX- 382

Comments:

Approval

Approval

<u>Approver</u>	<u>Action</u>	<u>Date Routed</u>	<u>Action Date</u>	<u>Approval Reason / Comments</u>	<u>Type</u>
Campbell, Patty A.	APPROVED	2021-03-02	2021-03-02 10:01:49.0	Creator :	PRIMARY
Campbell, Patty A.	APPROVED	2021-03-02	2021-03-02 10:01:49.0	Allows access to the form :	PRIMARY
Campbell, Patty A.	APPROVED	2021-03-02	2021-03-02 10:01:49.0	Allows access to the form :	PRIMARY
Campbell, Patty A.	APPROVED	2021-03-02	2021-03-02 10:01:49.0	Project Manager :	PRIMARY
Krumdick, Gregory K.	APPROVED	2021-03-02	2021-03-02 10:17:46.0	Division Director :	PRIMARY
Lynch, Peter L.	APPROVED	2021-03-02	2021-03-02 13:33:09.0	Wastewater discharge : Reviewed for waste water and hazardous waste only. Project should discuss potential air permitting (CO2 and does project meet definition of "bench scale") issues with air SME (M. Pfeiffer).pH for discharge between 6 and 9.	PRIMARY
Harris, Amy M.	APPROVED	2021-03-02	2021-03-02 10:40:58.0	Safety Team :	PRIMARY
McGhee, Ian Riley	APPROVED	2021-03-02	2021-03-02 11:49:53.0	Safety Team :	PRIMARY
Thompson, Lawrence S.	APPROVED	2021-03-02	2021-03-02 10:16:44.0	Waste management :	PRIMARY
Urgun Demirtas, Meltem	APPROVED	2021-03-02	2021-03-10 10:13:34.0	PI :	PRIMARY
Campbell, Patty A.	APPROVED	2021-03-02	2021-03-02 10:01:49.0	Preparer :	PRIMARY
Willig, Ryne T.	APPROVED	2021-03-02	2021-03-02 10:19:19.0	Safety Team :	PRIMARY
Wu, Haoran	APPROVED	2021-03-02	2021-03-02 14:37:29.0	Worker :	PRIMARY
Pfeiffer, Mark Albert	APPROVED	2021-03-02	2021-03-05 10:15:49.0	quality : No air permitting for emissions required as project is exempted as a research activity. Any change to the scope, or future planned work, should be communicated to Environmental Compliance.	PRIMARY
Harris, Amy M.	APPROVED	2021-03-02	2021-03-02 10:40:58.0	NEPA Owner Approval for Argonne Environmental Review :	PRIMARY
Ptak, Jill S.	APPROVED	2021-03-10	2021-03-22 14:32:02.0	ANL NEPA Reviewer :	PRIMARY
Hellman, Karen B.	APPROVED	2021-03-22	2021-03-30 10:55:06.0	ANL-985 Review and Approval :	PRIMARY
Dunn, Michael W.	APPROVED	2021-03-30	2021-04-02 12:59:51.0	ANL-985 ANL Deputy COO Review and Approval :	PRIMARY
Joshi, Kaushik N.	APPROVED	2021-04-02	2021-04-14 15:55:18.0	ANL-985 DOE-ASO Review and Approval : This DOE ERF Categorical Exclusion approval is tracked as ASO-CX-382.	PRIMARY
Siebach, Peter Rudolf	APPROVED	2021-04-14	2021-04-14	ANL-985 DOE NEPA Compliance	PRIMARY

