Notice of Construction Application: New Project or Modification of Existing Permit

INSTRUCTIONS

This application applies statewide for facilities under the Department of Ecology's jurisdiction. Submit this form if you want approval to construct a new project or modify an existing permit. Submit the Application for a PSD Program Applicability Determination form (ECY 070-413) if you want Ecology to determine whether your project is subject to the PSD Program. The state rules exempt specific emission units, activities, and emission rates. You don't need a permit if your project fits in these categories. Refer to WAC 173-400-110(4) and (5) for more information.

Fill out the front and back of this form. Attach a check for the initial fee to this form. Mail the form and your Notice of Construction application to: **Department of Ecology**
Cashiering Unit
P.O. Box 47611
Olympia, WA 98504-7611

For Fiscal Office Use Only:
001-NSR-216-0299-000404

Check the box that applies to your application.

☒	$1,500: Basic project initial fee covers 16 hours of review. Ecology may determine your project is complex during completeness review of your application. If your project is complex, you must pay the additional $8,500 before we will continue working on your application.
☐	$10,000: Complex project initial fee covers 106 hours of review. Submit this fee if you know your project is complex based on emissions.

Check the box for the location of your proposal. For assistance, call the contact listed below:		
	Ecology Permitting Authority	**Contact**
☐ **CRO**	**Chelan, Douglas, Kittitas, Klickitat, or Okanogan County** Ecology Central Regional Office – Air Quality Program	Lynnette Haller (509) 457-7126 lynnette.haller@ecy.wa.gov
☐ **ERO**	**Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla or Whitman County** Ecology Eastern Regional Office – Air Quality Program	Greg Flibbert (509) 329-3452 greg.flibbert@ecy.wa.gov
☐ **NWRO**	**San Juan County** Ecology Northwest Regional Office – Air Quality Program	Nick Roach (425) 649-7082 nick.roach@ecy.wa.gov
☐ **IND**	**For actions taken at Kraft and Sulfite Paper Mills and Aluminum Smelters** Ecology Industrial Section – W2Resources Program Permit manager: ______________________	Garin Schrieve (360) 407-6916 garin.schrieve@ecy.wa.gov
☒ **NWP**	**For actions taken on the US Department of Energy Hanford Reservation** Ecology Nuclear Waste Program	Ron Skinnarland (509) 372-7924 ron.skinnarland@ecy.wa.gov

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Read each statement, then check the box next to it to acknowledge what you have read.

☒	The initial fee you submitted may not cover the cost of processing your application. Ecology will track the number of hours spent on your project. If the number of hours exceeds the number of hours included in your initial fee, Ecology will send you a bill for that extra time.
☒	Ecology will bill you $95 per hour for each hour worked beyond the initial hours. You must pay the bill before we will issue your permit.
☒	When you get a permit, you give permission for Ecology staff to enter the premises for inspection.

Applicant Information

The applicant is the business requesting services from Ecology and is responsible for paying the costs Ecology incurs.

Name of business __U.S. Department of Energy, Richland Operations Office (DOE-RL)___________

Physical location of project (city) ___Hanford Nuclear Reservation______________________________

Name of project ___200W Sewage Lagoon Treatment System (Project L-691)__________________

Project Manager Information

Ecology will send this person all official correspondence.

Name, Title______Dale E. Jackson, DOE-RL Air Programs Manager__________________________

Mailing address ____P. O. Box 550____

City, State, Zip____Richland, WA 99352____

Phone, Fax, E-mail___(509) 376-8086____dale.jackson@rl.doe.gov___________________________

Project Billing Contact Information

Ecology will send the Project Manager the bills if there are any.

☐ If the Project Billing Contact is different from the Project Manager, check this box and provide the required information.

Name, Title____

Mailing address ____

City, State, Zip____

Phone, Fax, E-mail____

Project Consultant Information

☒ If you hired a consultant to prepare the application (or materials), check this box and provide the required information.

Consultant Name, Title____Ryan Hanna, EIT____

Organization_________Trinity Consultants____

Mailing address _______20819 72nd Avenue South_____________________________________

City, State, Zip________Kent, WA 98032____

Phone, Fax, E-mail__***Do not contact consultant directly with any questions on this project***_____

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DEPARTMENT OF ECOLOGY State of Washington

I. SIGNATURE BLOCK

I certify, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate, and complete.

Printed Name RAY J. COREY Title AMSE

Signature [signature] Date 12/15/11

II. COMPANY INFORMATION

1. Legal Name of Company U.S. Department of Energy, Richland Operations Office (DOE-RL)	
2. Company Mailing Address (street, city, state, zip) P. O. Box 550, Richland, WA 99352	
3. Company Responsible Official & Title Dale E. Jackson, DOE-RL Air Programs Manager	
4. Company Phone Number (509) 376-8086	5.Company FAX Number N/A

III. FACILITY INFORMATION

1.Facility Name (if different from Legal Company Name above) 200W Area Sewage Lagoon Treatment System	
2. Facility Mailing Address (if different from Company Mailing Address above) Same	
3. Facility Site Legal Description Section 31, T 13N, Range 26EWM, Lat: 46 34' 12.12" N Long: 119 36' 34.86" W	
4. Facility Contact Person (if different from Company Responsible Official above) Thomas G. Beam	
5. Facility Phone Number (if different from Company Phone # above) (509) 376-4876	6. Facility FAX # (if different from Company FAX # above) N/A
7. General Proposal for Facility (see section on next page for specific description of proposal). Sewage treatment with evaporative lagoon detention to treat wastewater and waste solids	
8. Proposal Construction Starting Date ASAP	9.Proposal Construction Completion Date Scheduled for April 2012

DEPARTMENT OF ECOLOGY State of Washington

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IV. PROPOSAL INFORMATION

1. Complete Description of Specific Proposal (attach Drawings, Schematics, Prints or Block Diagrams):

Section 2 in the NOC air permit application describes the proposed facility and the proposed facility processes.

2. This Application is for (Check one):

- [x] New Construction
- [ ] Existing Equipment / Facility Operating without a Permit
- [ ] Change of Control Technology
- [ ] Modification to Facility
- [ ] New Permit Conditions
- [ ] Production Increase

3. Complete Description of Best Available control Technology (BACT) for Proposal (see attached Summary of BACT Process):
Attach Manufacturer's or Vendor's Information.

Section 4.2 in the NOC air permit application addresses BACT for the proposed project.

4. Maximum Potential Production Output per Year There is no specific production associated with the project.	5. Maximum Potential Production Output per Hour ~55,000 gpd of wastewater will be treated
6. Actual Production Output per Year N/A	7. Actual Production Output per Hour N/A

8. Operating Schedule	Hours Per Day	Days Per Week	Weeks per Year
	9	7	52

9. Percentage of Production	Jan-Feb-Mar	April-May-June	July-Aug-Sept	Oct-Nov-Dec
	25	25	25	25

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V. EMISSIONS ESTIMATIONS OF CRITERIA POLLUTANTS

1. Particulate Matter (PM) (Pounds or Tons per Year) Actual Emissions = N/A	Potential Emissions = Negligible
2. Nitrogen Oxides (NO_x) (Pounds or Tons per Year) Actual Emissions = N/A	Potential Emissions = 0
3. Carbon Monoxide (CO) (Pounds or tons per Year) Actual Emissions = N/A	Potential Emissions = 0
4. Sulfur Dioxide (SO2) (Pounds or Tons per Year) Actual Emissions = N/A	Potential Emissions = 0
5. Volatile Organic Compounds (VOCs) (Pounds or Tons per Year) Actual Emissions = N/A	Potential Emissions = 0.0014 tpy
6. Lead (Pb) (Pounds or Tons per Year) Actual Emissions = N/A	Potential Emissions = 0

VI. EMISSIONS ESTIMATIONS OF TOXIC AIR POLLUTANTS (consult Chapter 173-460 WAC)

Pollutant #1 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant Ammonia	Actual Emissions = N/A	Potential Emissions = 0.31 lb/hr
Pollutant #2 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant Bromodichloromethane	Actual Emissions = N/A	Potential Emissions = 1.03E-05 lb/hr
Pollutant #3 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant Chloroform	Actual Emissions = N/A	Potential Emissions = 1.08E-04 lb/hr
Pollutant #4 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant 1,4-dichlorobenzene	Actual Emissions = N/A	Potential Emissions = 2.02E-04 lb/hr
Pollutant #5 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant	Actual Emissions =	Potential Emissions =

VII. EMISSIONS ESTIMATIONS OF FUGITIVE AIR POLLUTANTS

Pollutant #1 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant N/A	Pounds per Hour =	Pounds per Year =
Pollutant #1 (List Pollutant Name, Pounds per Hour/Pounds per Year) Pollutant	Pounds per Hour =	Pounds per Year =

VIII. MODELING RESULTS

1. List Modeling Results of Criteria Air Pollutants (attach any Modeling Printouts) N/A
2. List Modeling Results of Toxic Air Pollutants (attach any Modeling Printouts) Appendix B in the NOC air permit application provides the results of WATER9 modeling.

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IX. EMISSIONS DATA AT DISCHARGE POINT

Stack Parameters	Other than Stack Parameters
1. List the Number of Stacks under this Proposal 0	1. List the Number of Discharge Points under this Proposal 11
2. List the Gas Velocity for each Stack N/A	2. List the Gas Velocity for each Discharge Point ~0 ft/s
3. List the Height for each Stack N/A	3. List the Height for each Discharge Point See page bottom
4. List the Inside Diameter or Dimensions for each Stack N/A	4. List the Inside Diameter or dimensions for each Discharge Point N/A
5. List the Gas Exit Temperature for each Stack N/A	5. List the Gas Exit Temperature for each Discharge Point Ambient
6. List the Building Height, Width, Length for each Stack N/A	6. List the Building Height, Width, Length for each Discharge Point N/A
7. List the Height of the Tallest Building On-site or in the Vicinity 27 ft	7. List the Height of the Tallest Building On-site or in the Vicinity 27 ft
8. List Whether the Facility is in an Urban or Rural Location Rural	8. List Whether the Facility is in an Urban or Rural Location Rural
9. List the Distance from each Stack to the Property Line N/A	9. List the Distance from each Discharge Point to the Property Line > 8 miles
10. Is this Stack Shared by more than One Source? N/A	10. Is this a Shared Discharge Point? No
11. List the Volumetric Flow Rate for each Stack N/A	11. List the Volumetric Flow Rate for each Discharge Point See Table A-2 in the WATER9 report for flow rates
12. How does each Stack Discharge, Vertically or Horizontally? N/A	12. How does each Discharge Point Vent, Vertically or Horizontally? N/A – these are area and volume sources

3.72 feet for the lime stabilization unit and polymer mixing unit; 0 feet (i.e., ground level) for all other sources

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X. FUEL DATA

	PRIMARY FUEL	SECONDARY FUEL
1. Type (Natural Gas, Oil, Coal, Hogged Fuel, etc.	N/A	N/A
2. Unit of Measure (Gallons, Cubic Feet, Tons, etc)		
3. Maximum Consumption Units per Hour		
4. Maximum Consumption Units per Year		
5. Actual Consumption Units per Hour		
6. Actual Consumption Units per Year		
7. BTU per Unit of Measure		
8. Percent Sulfur (if applicable)		
9. Percent Ash (if applicable)		

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XI. AIR POLLUTION CONTROL EQUIPMENT (ATTACH VENDOR'S INFO.)

BAGHOUSE	SCRUBBER	CYCLONE	E.S.P.	ADSORPTION
1. Type N/A	1. Type N/A	1. Type N/A	1. Type N/A	1. Type N/A
2. Efficiency _____	2. Efficiency _____	2. Efficiency _____	2. Efficiency _____	2. Efficiency _____
3. Bag height _____	3. Dimensions _____	3. Dimensions _____	3. Dimensions: Plate spacing, height, length (attach layout) _____	3. Gas Flow Rate (cfm) _____
4. Bag diameter _____	4. Gas Differential Pressure _____	4. Gas Differential Pressure _____	4. Fields _____	4. Bed Media _____
5. Number of bags _____	5. Type of scrubber liquid _____	5. Gas Flow Rate (cfm) _____	5. Configuration _____	5. Adsorption Isotherm (attach graph) _____
6. Filter Area (sq. feet) _____	6. Liquid Flow Rate _____	6. Other _____	6. Gas Velocity (fpm) _____	6. Surface Area (sq. feet) _____
7. Filter Media _____	7. Gas Flow Rate (cfm) _____		7. Gas Flow Rate (cfm) _____	7. Gas Velocity (fpm) _____
8. Gas Flow Rate (cfm) _____	8. Scrubber Packing Material _____		8. Residence Time _____	8. Gas Temperature (deg. F) _____
9. Air-to-Cloth Ratio _____			9. Gas Differential Pressure _____	9. Bed Volume (cubic feet) _____
10. Overall Dimensions _____			10. Precipitation Rate _____	10. Bed Dimensions _____
11. Cleaning Mechanism _____			11. Prim/Sec. Voltage _____	11. Capacity (hours) _____
12. Other _____			12. Prim/Sec. Current _____	12. Contaminant _____
13. Other _____			13. Corona Strength _____	13. Regeneration Time _____
14. Other _____			14. Gas Temperature (deg. F) _____	14. Regeneration Type _____

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XII. OTHER DATA

1. Site Plan and Equipment Layout for the site attached?	☒YES ☐NO
2. MSDS Sheets for Chemicals or Materials related to this proposal attached?	☐YES ☒NO
3. Vendor's and/or Manufacturer's information attached?	☐YES ☒NO
4. Modeling Information attached?	☒YES ☐NO
5. Fugitive Dust Control Plan attached?	☐YES ☒NO
6. All Enclosures for your Specific Proposal attached?	☒YES ☐NO
7. Name and Title of Person Filling out this Form Printed Name Thomas G .Beam Signature [signature] Date 12/8/2011	
8. Name and Title of Responsible Official Printed Name DALE JACKSON Signature [signature] Date 12/14/11	

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XIII. ADDITIONAL INFORMATION FOR SPECIFIC EQUIPMENT (Attach Vendor's Information)

BOILER	BURNER	ASPHALT PLANT	SAND / GRAVEL	PAINT BOOTH
1. Type and Number N/A 2. Size (BTU per hour input ____ 3. Size (steam pounds per hour) ____ 4. Efficiency ____ 5. NOx Rating (PPM@ 7% Oxygen) ____ 6. CO Rating (PPM @ 7% Oxygen) ____	1. Type and Number N/A 2. Size (BTU per hour input ____ 3. NOx Rating (PPPM@7% Oxygen) ____ 4. CO Rating (PPM @ 7% Oxygen) ____	1. Type (Drum, Batch) N/A 2. Size (tons per hour) ____ 3. VOC Emission Points (attach layout) ____ 4. VOC Controls ____ 5. Aggregate Piles (acres) ____ 6. Off Road Vehicle Use (miles per year) ____ 7. Power (Line, Genset, etc.) ____ 8. Number of Vehicles ____	1.Crusher Type (Prim., Sec., Tertiary) (attach layout) N/A 2. Size (tons per hour) ____ 3. Number of Screens ____ 4. Number of Conveyors ____ 5. Fog Spray Location (attach layout) ____ 6. Aggregate Piles (acres) ____ 7. Off Road Vehicle Use (miles per year) ____ 8. Number of Vehicles ____	1.Operation Type N/A 2. Application Method ____ 3. Filter Bank Area ____ 4. Filter Exhaust Flow ____ 5. Coating & Solvent Types & MSDS Sheets (attach details) ____ 6. Gun Cleaning Method ____ 7. Drying Method ____

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LANDFILL	ABRASIVE BLASTING	CONCRETE BATCH	OTHER	OTHER
1. Type N/A 2. Capacity (tons) ____ 3. Year started ____ 4. Year closed ____ 5. Area of Landfill (attach site plan) ____	1. Attach details of booth or hanger to be used N/A 2. Abrasive Materials to be used. Attach MSDS Sheet(s) ____ 3. Filter Bank Area ____ 4. Filter Exhaust Flow ____ 5. Approximate Number of Items to be Abrasively Blasted each Calendar Year. ____	1. Size (tons or cubic yards of product)) N/A 2. Cement Silo Controls (baghouse, etc.) ____ 3. Charging Station Controls (baghouse, enclosure, etc.) ____ 4. Conveyor Controls ____	N/A	N/A

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

APPENDIX B

WATER9 EMISSIONS SUMMARY REPORT

200 West Area Evaporative Sewer Lagoon
WATER9 Emissions Summary
Hanford Site

Prepared for:

Mission Support Alliance, LLC
2490 Garlick Boulevard
Richland, WA 99352

Freestone Environmental Services, Inc.
1100 Jadwin Ave. Suite 250
Richland, WA 99352

Prepared by:

Aaron M. Day, P.E. ▪ Principal Consultant
Michael T. Meister, CM ▪ Managing Consultant
Ryan Hanna, E.I.T. ▪ Consultant

Trinity Consultants
20819 72nd Avenue South
Suite 610
Kent, WA 98032
(253) 867-5600

December 2011

Trinity Consultants

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Acronym	Definition
AADF	Annual Average Discharge Flow
BOD	Biological Oxygen Demand (five-day at 20 degrees C)
CFC	Chlorofluorocarbon
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
Freestone	Freestone Environmental Services, Inc.
gpd	Gallons Per Day
HBFC	Hydrobromofluorocarbon
HCFC	Hydrochlorofluorocarbon
ISF	Intermittent Sand Filter
Jacobs	Jacobs Engineering Group, Inc.
LOSS	Large Onsite Lagoon System (3,500 – 14,500 gpd)
LTS	Lagoon Treatment System
MDL	Method Detection Limit
MSA	Mission Support Alliance, LLC
NAAQS	National Ambient Air Quality Standards
NOC	Notice of Construction
NSR	New Source Review
ODS	Ozone Depleting Substance
PQL	Practical Quantitation Limit
PTE	Potential To Emit
SQER	Small Quantity Emission Rate
TAP	Toxic Air Pollutant
TSP	Total Suspended Particulate
TSS	Total Suspended Solid
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WATER9	U.S. EPA WATER9 Model

1. INTRODUCTION

Mission Support Alliance, LLC (MSA) has proposed to install a wastewater treatment system, entitled 200 West Area Evaporative Sewer Lagoon, herein after referred to as the Lagoon Treatment System (LTS), to provide domestic waste treatment services for the 200 and 600 Areas of the Hanford Site, located in Hanford, Washington in Benton County. The area is currently in attainment for all National Ambient Air Quality Standards (NAAQS).

This report provides a detailed emissions characterization and analysis of the air quality regulatory issues pertinent to the LTS. Specifically, this report aims to determine whether or not a Notice of Construction (NOC) application must be submitted to Ecology prior to construction of the LTS. The following elements are included:

- *Section 1:* Introduction
- *Section 2:* Project Description
- *Section 3:* Emissions Data
- *Section 4:* Regulatory Applicability
- *Appendix A:* WATER9 Model Documentation
- *Appendix B:* Emissions Documentation
- *Appendix C:* Regulatory Compliance Summary

2. Project Description

The following sections provide a description of proposed LTS operations at the Hanford Site LTS. Detailed process description information is taken from the LTS engineering report for MSA Project L-691 prepared by Jacobs Engineering Group, Inc. (Jacobs).

2.1 Process Overview

Operations at the proposed LTS include primary treatment, in which wastewater influent is processed in an inlet chamber, grinder, grit separator, flume, and diversion box for storage in lagoons; and secondary treatment, in which wastewater is treated in aerated lagoons and settling lagoons, and diverted sludge solids are treated in a lime stabilization unit, polymer mixing unit, and bag dewatering system. Additional facilities of the LTS include two evaporative lagoons and other appurtenant structures necessary for the treatment and disposal of wastewater and waste solids within the plant site, including an intermittent sand filter, a dewatering sump pump, and effluent pump stations.

The LTS will receive two influent waste streams:

- A primary waste stream, consisting of raw wastewater hauled from holding tanks and flows from the sewer collection system at 200W; and
- A secondary waste stream, consisting of hauled septage from outside the LTS and sludge solids diverted from the LTS settling lagoons.

The primary treatment units receive the primary influent waste stream. The secondary treatment of wastewater includes biological treatment processes consisting of an aerated lagoon and a settling lagoon built as a dual train system to provide bypass and standby at 100% of capacity, at an annual average discharge flow (AADF) of 55,000 gallons per day (gpd). Settling basins allow for solids sedimentation, stabilization, and sludge storage within the basin itself.

The settling lagoons divert sludge solids to the lime stabilization unit, which then become part of the secondary waste stream, and wastewater effluent to the evaporative lagoons. The evaporative lagoons detain settling lagoon effluent with an impoundment and achieve zero discharge, except in emergencies. Lastly, intermittent sand filters (ISFs) enhance nitrification and remove biological oxygen demand (BOD) and total suspended solids (TSS) prior to discharge.

In the secondary waste stream, waste solids (both septage hauled by trucks and received from the onsite system and sludge solids separated from wastewater in the settling lagoons of the LTS) are treated or stabilized in the lime stabilization unit, mixed with polymers in the polymer mixing unit, dewatered, and finally disposed in accordance with applicable regulations. The lime stabilization system for septage and sludge operates on a batch mode at a design flow rate of 3,000 gallons per batch.

2.2 Detailed Process Description

2.2.1 Primary Treatment of the Primary Waste Stream

The primary treatment units receive wastewater both hauled from holding tanks and flows from the sewer collection system. Influent raw wastewater discharges into an inlet chamber connected to an unloading pad and passes through the grit chamber to remove inorganic solids such as sand, wood and other particles of 65 mesh size or greater. Next, a grinder installed in the flow channel cuts solids into sizes ¼ inch or less. A bypass channel removes manufactured inerts like plastics; ceramics with bar screens are also included for emergency use. Influent flow is measured in a Palmer-Bowles flume with automatic flow recorder and a totalizer for monitoring purposes. Influent is split in the diversion box between dual process trains consisting of lagoons for secondary treatment.

2.2.2 Secondary Treatment of the Primary Waste Stream

After passing the flume, the primary waste stream enters a parallel dual process train consisting of an aerated lagoon, settling lagoon, and evaporation lagoon in series.

2.2.2.1 Aerated Lagoon

The aerated lagoon facilitates bioconversion of influent biodegradable carbon to biomass and flocculation of biomass. In the aeration lagoon, solids are in complete suspension. The aerated lagoon is a complete mix system where the solids are kept in suspension with aeration through the detention time, until biological stabilization is nearly complete and flocculation of particles are ready to settle and separate the effluent from solids. The lagoon is a flow-though basin without the recycle of solids. The effluent will contain about one-third to one-half the concentration of the influent BOD. Power intensity necessary for oxygen requirements is compared with mixing requirements to ensure the process operates efficiently. Mechanical aerators provide most of the dissolve oxygen required for biomass and to mix lagoon contents. Turbulence levels are set high enough to ensure uniform dissolved oxygen and suspended solids concentrations throughout the basin. The aerators transfer oxygen at a high enough level to support intense mixing of the lagoon thereby reducing the tendency for sedimentation.

2.2.2.2 Settling Lagoon

The settling lagoon optimizes solids separation, solids stabilization, and sludge storage. The settling basin is also aerated to maintain an aerobic water column and aerobic layer at the top of sludge deposits on the floor of basin, which in turn minimizes the feedback of reduced compounds from the sludge to water column, eliminates odors, and reduces re-suspension of solids. In addition, aeration provides mixing to eliminate dead spaces in the lagoon, where algae can become established, and exhaust carbon dioxide depriving the carbon source for algae. Further, the supernatant from the lime stabilization tank will be recycled to raise the pH of the influent entering the settling lagoon. However, the intensity will be low enough to permit the influent waste solids (flocculated biomass from aerated lagoon) to settle as sludge.

The settling basin floor is sloped, forcing the sludge to accumulate at one end of the basin; here, it is pumped to the mixing tank at the lime stabilization system. Once diversion to the lime stabilization system begins, the sludge is considered secondary waste stream influent.

2.2.2.3 Evaporative Lagoon

Evaporative lagoons store effluents discharged from the settling lagoons. Floating aerators and solar powered pumps installed in the lagoons control algae and enhance evaporation loss of water to the atmosphere. Surface aerators and rechargeable solar pumps mix the contents of the lagoon to reduce carbon dioxide buildup in the water, thus ensuring carbon becomes a growth-limiting factor for algae in the daytime. The evaporative lagoons provide complete detention of effluents with an impoundment and achieve zero discharge of effluents, except in an emergency. A Water Balance Model for inflows, precipitation, and evaporation on a month-to-month basis to establish volumetric storage necessary during a design wet year (highest annual precipitation at a 10-year occurrence interval) was done incorporating local climatological data from the Site. The capacity of the evaporative lagoon as determined from the results of the water balance model is 30.3 million gallons. Due to the large size of the evaporative lagoons, the storage space for effluent may facilitate extended operation of the system, without needing a discharge for years to come.

The effluent pump station is capable of withdrawing water at various depths from the evaporative lagoons; the quality of the effluent will be in compliance with WAC-173-221-050 and will thus be suitable for direct discharge meeting the facility discharge standards for waste stabilization ponds. However, if further treatment is necessary to meet stabilization pond standards, the effluent will be routed through an intermittent sand filter (ISF) prior to discharge to ensure compliance with discharge standards.

2.2.2.4 Intermittent Sand Filter

ISFs will be designed to filter the effluent from evaporative lagoon prior to discharge. ISF units enhance nitrification as well as BOD and TSS removal depending on the physical and biological character of the biological mat that develops on the surface. Application of effluents will be limited to two doses per day to facilitate biological utilization of ammonia and BOD supplied from previous application, yet maintains the media moist enough to support a viable culture within the mat. Combined with ISFs, the effluent level of suspended solids from the evaporative lagoon will be significantly reduced to meet the discharge standards.

2.2.3 Secondary Treatment of the Secondary Waste Stream

In the secondary waste stream, septage hauled by trucks and received from the onsite system and sludge solids separated from wastewater in the settling lagoon of the LTS are processed in a two-step series: stabilization, and dewatering and drying. Lastly, resulting solid waste is disposed; liquid waste is pumped to the diversion box. Sludge solids from wastewater in the setline lagoon is removed once every two years from the lagoon and pumped by a floating dredge pump to the mixing tank for lime stabilization. Though the processing of sludge and stabilization of sludge achieves the same purpose as that of septage, the dose and time intervals for stabilization may vary.

2.2.3.1 Lime Stabilization

Lime stabilization using liquid lime stabilizes septage prior to dewatering and disposal. Lime addition to septage or sludge reduces pathogens, eliminates offensive odors, and inhibits or limits further degradation to facilitate storage of waste solids for later transportation. The unit utilizes a liquid feed system, inline grinder pump, sludge recirculation pump, and a mixing tank. Pumps, feed controls, and pH instruments are built into the system. Excess lime is added to maintain the pH above 12.5 (>12) for a duration of thirty minutes to ensure septage meets the requirements of WAC 173-308-270 prior to dewatering. Septage then passes to a polymer mixing and dosing system; supernatant returns to the settling lagoon and is recharacterized as part of the primary waste stream.

The stabilization process is a batch treatment process in which the contact tank for mixing liquid lime with sludge is based on the quantity of waste solids and the number of batches to be run in a day with a minimum of two hours detention time following stabilization. The gases (predominantly ammonia) evolved from the process may have to be treated before discharge to the atmosphere. Liquid lime stabilization of septage may require more lime per unit weight of sludge solids compared to sludge from the lagoons because of the range of TSS in the septage. Septage delivered by trucks is pumped from the trucks, passes through a grinder pump, and is received in a mixing tank. Liquid lime is mixed and agitated by recirculation pumps. Tanks fitted with membrane liners (to prevent corrosion damage) are sized to meet daily septage stabilization in a batch mode. After stabilization, lime-treated solids are left in the mixing tank for a day to allow gravity thickening.

2.2.3.2 Polymer Unit

The addition of polymers to condition the sludge or septage is required prior to dewatering with the geotextile bags. A liquid emulsion polymer injection system is designed with a storage tank, pumps, mixing unit, feed systems, mixing nozzles, and manual controls for calibration of dose and automatic controls for flushing and water flow running prior to polymer feed. The mixing heads for the polymer are selected to provide high kinetic energy at low pressures to ensure thorough mixing to invert the polymers.

After polymer mixing and dosing, the secondary waste stream passes to the bag dewatering system.

2.2.3.3 Bag Dewatering

Dewatering removes water from biosolids, making them easier and less expensive to transport, dry, compost, or incinerate. The dewatering system utilizes geotextile tubes filled with septage or sludge by pumping biosolids and effluent water permeating through the geotextile wall. The geotextile tubes are then collected and returned to the diversion box. Filling is repeated in the same bag until it is full of dewatered solids. Solids inside the bag consolidate by desiccation and allowing vapor and moisture escape. Here, volume reduction is achieved. After final filling, dewatered bags are allowed to dry in the open air, utilizing solar radiation with membrane covers to prevent entrainment of rainwater or snow. The dried solids are removed from the tube and disposed, while the geotextile bags are sent to landfill or buried with the solids.

3.1 EMISSIONS CHARACTERIZATION

The following sections characterize air emissions that are expected to result from the proposed LTS and describe the methodology used to estimate the speciation of influent wastewater to the LTS.

3.1.1 DEVELOPMENT OF INFLUENT SPECIATION AND INLET CONCENTRATIONS

To characterize air emissions from the LTS, a total of five grab samples from Large Onsite Sewer Systems (LOSSs) located at the Hanford Site were initially collected. All samples were tested for selected parameters by Edge Analytical Laboratories and Benton-Franklin County Health District, both of which are accredited by the Washington State Department of Ecology (Ecology). The influent wastewater that will be received by the LTS in the future will be diverted from inlet piping upstream of the existing septic tanks of the LOSSs. These wastewater grab samples and their constituent concentrations provide the most representative data available for the wastewater stream that will enter the completed LTS.

The data reports prepared by Edge Analytical Laboratories showed four compounds present above a non-detect threshold in at least one of the grab samples: ammonia, chloroform, bromodichloromethane, and 1,4-dichlorobenzene. These pollutants are regulated as toxic air pollutants (TAPs) under the air permitting rules in WAC 173-460 and as volatile organic compounds (VOCs), with the exception of ammonia. Table 3-1 below summarizes the data reports prepared by Edge Analytical Laboratories as they pertain to these four TAPs.

TABLE 3-1. SUMMARY OF TAP CONCENTRATIONS

	Hanford Site Sample Location					Concentration	
Pollutant	2607 E8A	2607 E1	2607 W16	2607-11	2607 E12	Average	Units
Ammonia	44.1	75	54.8	24	43	48.8	mg/l
Bromodichloromethane	--	--	--	0.7	--	0.54	µg/l
Chloroform	5	5	4	6.8	9.7	6.1	µg/l
1,4-dichlorobenzene	--	67.7	--	--	--	14.18	µg/l

The five Hanford Site grab sample locations and their corresponding TAP concentrations are listed in Table 3-1. Dashes imply a non-detect reading. The average concentration of each TAP for all five grab samples is provided.

Individual streams will mix with other contributor streams en route to the LTS. Using average pollutant concentrations to characterize the influent waste stream is a reasonable assumption given that each individual stream contributes equally or nearly equally to the total influent. For conservatism, the practical quantitation limit (PQL) or method detection limit (MDL), the lowest detection level that can be achieved within the specified limits of precision and accuracy during routine laboratory operating conditions, is used in place of non-detect readings. The PQL and

MDL for each pollutant in each grab sample are provided in the data reports in Appendix B of the L-691 engineering report prepared by Jacobs. Relevant data from the data reports are included in Appendix B of this report.

The U.S. EPA WATER9 model (WATER9) was used to estimate LTS emissions for ammonia, bromodichloromethane, chloroform, and 1,4-dichlorobenzene. WATER9 is a Windows-based computer program that consists of analytical expressions for estimating air emissions of individual waste constituents in wastewater collection, storage, treatment, and disposal facilities. The model accounts for biological activity that may be present in lagoons in wastewater treatment facilities.

3.1.2 Evaporative Lagoon Emissions

WATER9 utilizes and tracks influent waste streams as they progress through components of wastewater treatment facilities. The program does not have a specific unit type for evaporative lagoons and, consequently, cannot account for the evaporation of water at any point in the model. The following paragraphs detail the methodology used to characterize emissions from the evaporative lagoons.

The model endpoint was set as the entrance to the evaporative lagoons. This decision to end the model at this point is justified because components further downstream are used strictly for wastewater treatment prior to emergency discharge. LTS components used solely for emergency discharge were not included in the model as they are used only during upset conditions and do not function as part of normal LTS operations.

WATER9 gives influent and effluent pollutant concentrations for each component in the model; thus, influent pollutant concentrations to the evaporative lagoons are known. Influent pollutant concentrations to the evaporative lagoons are equivalent to effluent pollutant concentrations from piping directly upstream. Emission rates are calculated using a mass balance. It is conservatively assumed that the remaining pollutant concentrations of bromodichloromethane, chloroform, and 1,4-dichlorobenzene volatilize completely from the evaporative lagoons.

Computing potential ammonia emissions from the lagoon processes is dependent on ammonia that is available in the vapor phase and the degree of volatilization.

Supplementary data for the five influent grab samples shows values of 8.77 for pH (max) and 515 mg/l for alkalinity (max). Additionally, nitrogen levels in the grab samples are higher than typically found at the inlet to wastewater treatment plants. The absence of nitrites and nitrates (which result when ammonia is broken down in the wastewater) in the samples indicates a low age for the wastewater. As such, it is expected that the actual ammonia values will be lower than the sampled concentrations by the time the wastewater travels from the sampling locations to the inlet of the wastewater plant.[1]

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[1] Table 3 (*Physical and Chemical Characteristics of Untreated Domestic Septage*), HNF-50995, Revision 0, 200 West Area Evaporative Sewer Lagoon Engineering Report (L-691 engineering report prepared by Jacobs)

At a pH of 8.77, about 25 percent of ammonia can be considered to be in the vapor phase and the balance of nitrogen must be considered as ammonium (NH_4), which is in the aqueous phase.[2] The distribution of ammonia species (NH_3/NH_4) is a function of the pH of the sample.[3] Organic nitrogen is bound in proteins, amino acids, etc. in an aqueous solution. Organic nitrogen and ammonium are not subject to volatilization. Thus, only the fraction of ammonia in the vapor phase, 25 percent, should be considered for volatilization.

The degree of volatilization during aeration processes is dependent on competing mechanisms such as biological oxidation, cell synthesis, etc. Two main factors that affect the rate of transfer of ammonia gas from water to air are (1) the surface tension at the air water interface, and (2) the difference in concentration of ammonia in water and air. EPA provides a study of emission factors in a paper, "Review of Emission Factors and Methodologies to Estimate Ammonia from Animal Waste Handling." The study reports default volatilization rates ranging from 15-36 percent in different housing types.[4]

The lagoons in the LTS are designed to provide carbonaceous BOD removal and nitrification of ammonia nitrogen during the biological treatment. The design is based on the criteria for Dual Powered Multi Cell lagoons and intermittent sand filters to achieve nitrification.[5] Performance results based on operating lagoons utilizing the same criteria and the conversion of ammonia to nitrates indicate that the efficiency of ammonia to nitrate conversion should be in the range of 90-95 percent, indicating only 5-10 percent of ammonia is lost in volatilization.[6]

Allowing for differences in efficiency in operating ranges due to temperatures and other climate factors between plants, a 40 percent volatilization rate for ammonia is used in this report for computing a conservative estimate of ammonia emissions. In summary, approximately 25 percent of ammonia in the lagoons is in a form that should be considered for volatilization, and 40 percent of that amount is assumed to volatilize. This equates to 10 percent (i.e., 40 percent of the 25 percent considered for volatilization) of the total ammonia in the lagoons that is volatilized.

3.2 EMISSIONS SUMMARY

TAP emissions from WATER9 modeling emanating from the LTS are given below in Table 3-2. WATER9 input parameters are given in Table A-1 in Appendix A. Overall short-term (hourly) and long-term (annual) emissions from all emitting sources associated with the LTS are summarized in Table A-3 in Appendix A.

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[2] Metcalf &Eddy, 2003, Wastewater Engineering -Treatment and Reuse, 4th Edition. McGraw Hill Company.

[3] Ibid.

[4] EPA-600/R-02/017, 2002, Review of Emission Factors and Methodologies to Estimate Ammonia Emissions from Animal Waste Handling, NRMRL, Research Triangle Park, NC.

[5] Ibid.

[6] Ibid.

TABLE 3-2. MODELED TAP EMISSIONS

Compound	Emission Rate	
	(lb/hr)	(tpy)
Ammonia	0.310189	1.35863
Bromodichloromethane	0.000010	0.00005
Chloroform	0.000108	0.00047
1,4-dichlorobenzene	0.000202	0.00088

Table 3-3 converts modeled emissions in Table 3-2 using each TAP's respective averaging period to compare the modeled emissions to the *de minimis* emission rates and SQERs. All TAPs have emission rates below their respective SQER. Bromodichloromethane is the only TAP below its respective *de minimis* emission rate.

TABLE 3-3. COMPARISON OF MODELED EMISSIONS TO *DE MINIMIS* AND SQER

Compound	Modeled Emissions (lb/averaging period)	*De Minimis* (lb/averaging period)	SQER (lb/averaging period)	Averaging Period
Ammonia	7.4445	0.465	9.31	24-hr
Bromodichloromethane	0.0904	0.259	5.18	year
Chloroform	0.9491	0.417	8.35	year
1,4-dichlorobenzene	1.7682	0.872	17.4	year

The scope of this regulatory analysis consists of determining whether or not a NOC application must be submitted to Ecology prior to construction of the LTS.

The Hanford Site LTS is located in Benton County, Washington, which is an attainment area for all pollutants. The following section assesses NOC applicability for criteria pollutants under WAC 173-400-110 and for TAPs under WAC 173-460.

4.1 NOTICE OF CONSTRUCTION (NOC) APPLICABILITY

WAC 173-400-110 establishes new source review (NSR) requirements for new and stationary sources; *new source* is defined in WAC 173-400-030(53) as

> *(a) the construction or modification of a stationary source that increases the amount of any air contaminant emitted by such source or that results in the emission of any air contaminant not previously emitted; and (b) any other project that constitutes a new source under the Federal Clean Air Act.*

Included in the list of new sources in WAC 173-400-110 are *new or modified toxic air pollutant sources*, defined in WAC 173-460-020(6) as

> *the construction or modification of a stationary source that increases the amount of any toxic air pollutant emitted by such source or that results in the emission of any toxic air pollutant not previously emitted.*

The Hanford Site LTS meets the definition of a new toxic air pollutant source and, similarly, the definition of new source under WAC 173-400-110. In the state of Washington, all new or modified sources emitting toxic air pollutants (TAPs) are required to demonstrate compliance with the Washington TAP standards pursuant to WAC 173-460. Therefore, the source must either submit a NOC application for the project, or qualify for an exemption under the NOC rules.

Various compounds, including ammonia, chloroform, bromodichloromethane, and 1,4-dichlorobenzene, along with their corresponding *de minimis* emissions rates and small quantity emission rates (SQERs), are listed as TAPs in WAC 173-460-150. *De minimis emissions* is defined in WAC 173-460-020(4) as the

> *trivial level of emissions that do not pose a threat to human health or the environment.*

The *small quantity emission rate* is defined in WAC 173-460-020(7) as

> *a level of emissions below which dispersion modeling is not required to demonstrate compliance with acceptable source impact levels.*

Pursuant to WAC 173-460-040, a new source that is exempt from NSR under WAC 173-400-110(4) or (5) is also exempt from WAC 173-460. These exemptions are based on the source having a PTE under the *de minimis* emission rates listed in WAC 173-400-110(5). If no exemption can be claimed, and if the LTS will increase emissions of TAPs, then the LTS must meet all applicable requirements of WAC 173-460.

Per WAC 173-400-100(5)(i), new TAP sources with the potential to emit (PTE) below each of the levels listed in Table 110(5) are exempt from NSR; TAP sources with a PTE below the small quantity emission rate (SQER) are exempt from dispersion modeling. For TAPs, *de minimis* emission rates listed in WAC 173-460-150 are used for the Table 110(5) PTE levels. Applicable threshold levels are listed below in Table 4-1 for relevant criteria pollutants, total suspended particulates (TSPs), volatile organic compounds (VOCs), and ozone depleting substances (ODSs); and in Table 4-2 for TAPs.

4.2 NOC APPLICABILITY DETERMINATION

This section evaluates the emission potential of criteria pollutants, TAPs, and other pollutants regulated under WAC 173-400-100 at the LTS. LTS emission rates are compared to *de minimis* emission rates and SQER, and NSR and NOC applicability determinations are made.

TABLE 4-1. *DE MINIMIS* EMISSION RATES FOR OTHER POLLUTANTS

Common Name	*De Minimis* (tons per year)
Carbon Monoxide	5.0
Lead	0.005
Nitrogen Oxides	2.0
PM-10	0.75
PM-2.5	0.5
Total Suspended Particulates	1.25
Sulfur Dioxide	2.0
VOC, total	2.0
Ozone Depleting Substances, total	1.0

Combustion sources are not used for the direct treatment of waste at the LTS, nor does the LTS use any combustion sources in any other part of its operations. Therefore, carbon monoxide, nitrogen oxides, and sulfur dioxide emissions are not expected to be emitted from the LTS.

Furthermore, lead and ozone depleting substances such as chlorofluorocarbons (CFCs), hydrobromofluorocarbons (HBFCs), hydrochlorofluorocarbons (HCFCs), and methyl chloroform were not detected during initial waste stream sampling and are thus not expected to be present in the LTS during normal operating conditions.

Particulate matter from the LTS is expected to be negligible. Agitators in the aeration lagoons may facilitate particulate formation and release; however, these emissions are beyond the capability of

WATER9 to estimate and it is expected that any formation and release will be insignificant relative to the *de minimis* emission rate for particulate matter.

VOCs detected above non-detect thresholds in the existing LTS waste streams during initial sampling include bromodichloromethane, chloroform, and 1,4-dichlorobenzene. From Table 3-2, total emissions from these VOCs sum to 0.0014 tons per year, below the 2.0 ton per year *de minimis* emission rate for total VOCs. This summation is not meant to be inclusive of every VOC in waste streams at the LTS. It is expected that several other VOCs may be present during LTS operations; however, these VOCs are present at concentrations below detectable levels and their contribution to total VOC emissions is considered insignificant.

TABLE 4-2. APPLICABLE TAP *DE MINIMIS* EMISSION RATES AND SQERS

Common Name	Averaging Period	*De Minimis* (lb/averaging period)	SQER (lb/averaging period)
Ammonia	24-hr	0.465	9.31
Bromodichloromethane	year	0.259	5.18
Chloroform	year	0.417	8.35
1,4-dichlorobenzene	year	0.872	17.4

Ammonia, bromodichloromethane, chloroform, and 1,4-dichlorobenzene are regulated as TAPs in WAC 173-460 and were modeled using WATER9 to determine whether resulting emissions will be below their respective *de minimis* emission rates and SQERs in Table 4-2.

Modeled TAP emissions are characterized in detail in Section 3. In sum, only bromodichloromethane is below its respective *de minimis* emission rate. Therefore, the LTS is subject to NOC permitting for these TAPs and requires a NOC application to be submitted to Ecology.

Furthermore, pursuant to WAC 173-460-080(1) for first tier review, the NOC application must include an acceptable source impact level analysis for each TAP with an emissions increase greater than the *de minimis* levels specified in Table 4-2 (i.e., ammonia, chloroform, and 1,4-dichlorobenzene). The acceptable source impact analysis requirement of WAC 173-460-080(1) can be satisfied for each TAP by showing that the emission rate of that TAP is below the SQER. The WATER9 model results have done this for ammonia, chloroform, and 1,4-dichlorobenzene. For TAPs with emission rates above the SQER , dispersion modeling is required. No modeled TAPs were above their respective SQER. Table 4-3 on the following page summarizes regulatory requirements for each TAP.

TABLE 4-3. REGULATORY REQUIREMENTS FOR INDIVIDUAL TAPS

Toxic Air Pollutant	Regulatory Requirement
Ammonia	Emissions are greater than the *de minimis* emission rate, but below the SQER rate. The source impact analysis requirement is satisfied by the low emission rate.
Bromodichloromethane	Emissions are below the *de minimis* emission rate. No source impact analysis is required.
Chloroform	Emissions are greater than the *de minimis* emission rate, but below the SQER rate. The source impact analysis requirement is satisfied by the low emission rate.
1,4-dichlorobenzene	Emissions are greater than the *de minimis* emission rate, but below the SQER rate. The source impact analysis requirement is satisfied by the low emission rate.