Notice to Construct Application for a Rendering Operation and Protein Grinding, Screening and Storage Operation

Darling Ingredients Inc.

2041 E. Marc Street
Tacoma, WA 98421

PSCAA AOP#: 10076

April 2023

Prepared by:

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1.0 INTRODUCTION

Darling Ingredients Inc. (Darling) is proposing to construct and operate a new meat rendering facility in Tacoma, Washington, to replace the existing rendering plant that was destroyed by a fire in September 2022. With the proposed construction, Darling will continue to be a critical service provider for the regional food processers, grocers, butchers, restaurants, and slaughter operations by providing an avenue for their byproducts to be managed in a more environmentally friendly manner compared to disposing them to the landfills. Darling is submitting this Notice to Construct (NOC) to the Puget Sound Clean Air Agency (PSCAA) for the installation of a rendering operation and a protein grinding, screening and storage operation.

This permit application summarizes the proposed request and presents the air quality evaluation for the proposed construction of a new rendering operation and a protein grinding, screening and storage operation.

1.1 Facility Information

Facility contact information is provided in Table 1-1.

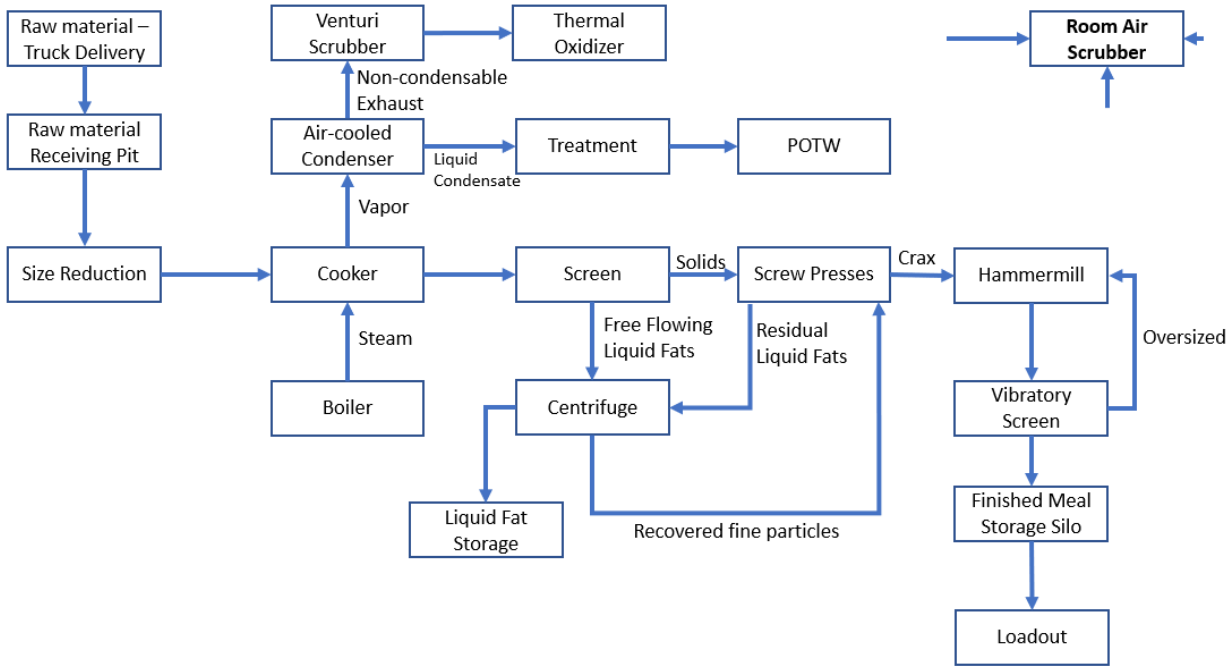
Table 1-1: Facility Information

Applicant's Name:	Darling Ingredients Inc.
Facility AOP#:	10076
Facility Location:	2041 E. Marc Street Tacoma, WA 98421
Mailing Address:	2041 E. Marc Street Tacoma, WA 98421

The proposed rendering operation will be located at the existing rendering plant that was destroyed by a fire in September 2022, as shown in Figure 1-1.

Figure 1-1: Facility Location and Surrounding Area

Figure 1-2: Rendering Operation Process Flow Diagram



1.2 Permit Application Preparer

This permit application was prepared by Carla Prasetyo Jo and Nick Gysel of Yorke Engineering, LLC. If there are technical questions regarding this application, please contact:

Table 1-2: Permit Application Preparers

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1.3 Proposed Actions

Darling is proposing to construct a new rendering operation and a protein grinding, screening and storage operation to replace the existing permitted rendering operation that was destroyed by a fire in September 2022.

1.4 Forms Included with This Application

A list of the application forms provided with this application is provided as Table 1-3. The application forms are included in Appendix A.

Table 1-3: PSCAA Forms Accompanying This Application

Unit	Form Name
Project	General Information – Form P
	SEPA Environmental Checklist
Rendering Operation	Other Emission Sources
	Thermal Oxidizer
Protein Grinding, Screening and Storage Operation	Other Emission Sources

2.0 PROCESS DESCRIPTION

2.1 Meat Rendering Operation

The new rendering operation is intended to service the critical needs of the regional food processers, grocers, butchers, restaurants, and slaughter operations by providing an avenue for their byproducts to be managed in a more environmentally friendly manner compared to disposing them to the landfills. The rendering operation starts with raw materials for the rendering process being delivered to the facility in trucks and unloaded to the raw material receiving pit. From the receiving pit, the raw materials are reduced in size to 1”-2” pieces and then pumped into the cooker (Supercookor 260U). The cooker uses steam heat from the permitted boiler (NOC 8629) to evaporate moisture and promote separation of the fat (liquid component) from the protein (solid component). The heated mixture from the cooker flows to the screen to separate free-flowing liquid fat from the solids.

The free-flowing liquid fats from the screen are routed to a centrifuge for recovery of fine particles from the liquids, and then pumped into liquid fat storage. The solids from the screen are conveyed and discharged into one of the two screw presses, where residual liquid fats are further removed from the solids. The residual liquid fats from the screw presses are routed to a centrifuge for recovery of fine particles. The recovered fine particles from the liquids are discharged into one of the two screw presses, along with the solids from the screen. The resulting pressed solids (crax) from the screw presses are then conveyed to the protein grinding system to be processed into finished protein meal.

The vapor from the cooking process is vented to an air-cooled condenser, where water is recovered as condensate. The liquid condensate is sent for treatment and discharged to the POTW. The non-condensable exhaust from the condensing system is ducted to the odor control system, which consists of a 15,000-cfm venturi scrubber and an 18 MMBtu thermal oxidizer (TO), which is equipped with heat recovery capability. This odor control system is designed for control of high intensity point sources from the rendering operation. In addition, the processing room and grinding room will be controlled by a 100,000-cfm room air scrubber, which is designed for control of fugitive emission odors in the room air.

2.2 Protein Grinding, Screening and Storage Operation

The Protein Grinding, Screening and Storage Operation receives crax from the meat rendering operation. The crax is ground by a hammermill and conveyed to a vibratory screen to produce the finished protein meal. The emissions from the protein grinding, screening and material handling operation are controlled by the room air scrubber to minimize particulate matter emissions. The finished protein meal is conveyed to the finished protein meal storage silo via two screw conveyors and a bucket elevator. The finished protein meal storage silo is equipped with bin vent filters serving as PM emission control from the loading of the storage silo. During the finished protein meal storage silo loadout process, the finished protein meal is transferred from the storage silo and loaded into trucks, containers, or supersacks within the meal loadout bay. The loading point is equipped with a chute to minimize PM emissions.

2.3 Operating Schedule

Darling proposes a maximum operating schedule of 24 hours per day, 7 days per week, and 365 days per year.

3.0 DATA AND EMISSION FACTORS

3.1 Rendering Operation Criteria Pollutant Emission Factors

The meat rendering operation involves the cooking of the raw material, which separates it into liquids and solids. The cooking process utilizes the steam from the boiler to render the raw material. The cooking process is expected to emit volatile organic compounds (VOCs), PM_{10}, and reduced sulfur compounds. The exhaust from the cooking process is vented to a venturi scrubber, followed by a TO. The reduced sulfur compounds are expected to completely oxidize to sulfur oxides (SO_X) by the TO.

The venturi scrubber and TO system are designed for a combined reduction of VOC emissions by 99%. PM_{10} emissions are expected from the droplets of fat released in the cooking process. In addition to rendering process emissions, the TO combusts natural gas fuel as supplemental fuel, which results in the emissions of nitrogen oxides (NO_X), SO_X, PM_{10}, carbon monoxide (CO), and VOC.

Darling proposes to estimate the potential to emit from the rendering operation using the emission factors for a rendering operation that are obtained from the recent San Joaquin Valley Air Pollution Control District (SJVAPCD) for a similar operation (Project #1172884, Facility C-9251).

The proposed criteria pollutant emission factors from the TO are summarized in Table 3-1.

Table 3-1: Criteria Pollutant Emission Factors – Rendering Operation – TO

Criteria Pollutant	Emission Factor	Reference
NO_x	0.0069 lb/ton of raw material	Proposed based on SJVAPCD Project #1172884, Facility C-9251
SO_X	0.0335 lb/ton of raw material	
PM_{10}	0.0033 lb/ton of raw material	
CO	0.0137 lb/ton of raw material	
VOC	0.0052 lb/ton of raw material	

In addition to the venturi scrubber and TO, the fugitive emissions from the cooker room, along with the emissions from the protein grinding, screening and material handling are vented to a room air scrubber. The room air scrubber is designed to primarily control fugitive odors, released as VOCs, and PM_{10}.

Darling proposes to estimate the potential to emit from the air room scrubber using the emission factors for a rendering operation that are obtained from the recent San Joaquin Valley Air Pollution Control District (SJVAPCD) for a similar operation (Project #1172884, Facility C-9251).

The proposed criteria pollutant emission factors from the room air scrubber are summarized in Table 3-2.

Table 3-2: Criteria Pollutant Emission Factors – Rendering Operation – Room Air Scrubber

Criteria Pollutant	Emission Factor	Reference
PM_{10}	0.001 gr/dscf	SJVAPCD Project #1172884, Facility C-9251
VOC	3.2 ppmv as CH4	
H_2S	0.75 ppmv	

3.2 Protein Grinding, Screening and Storage Operation Criteria Pollutant Emission Factors

The solids or crax processing is expected to result in PM_{10} emissions. The protein grinding, screening and material handling are vented to a room air scrubber with assumed 90% control efficiency (CE). Standard Environmental Protection Agency (EPA) AP-42 emission factors are used to estimate the PM emissions from the solids processing. Pursuant to EPA Air Pollution Control Technology Fact Sheet for cyclones, the PM10 CE range for a conventional single cyclone is 30-90%. The proposed criteria pollutant emission factors from the protein grinding, screening and material handling are summarized in Table 3-3.

Table 3-3: PM_{10} Emission Factors – Protein Grinding, Screening and Storage Operation

Activity[1]	PM_{10} Emission Factor	Reference
Conveyor to Grinding Process	0.00008 lb/ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed Mills – Uncontrolled Shipping adjusted by room air scrubber (90% control)
Grinding	0.0335 lb/ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed mills – Hammermill – controlled by Cyclone, assuming 50% of PM is PM_{10} and adjusted by room air scrubber (90% control)
Screening	0.0335 lb/ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed mills – Hammermill – controlled by Cyclone, assuming 50% of PM is PM_{10} and adjusted by room air scrubber (90% control)

[1] The emissions from transfer of materials from the conveyor to the grinding process, grinding, screening, transfer of materials at the rerun conveyors and transfer of materials from the storage silo conveyors are controlled by the room air scrubber, and are accounted for in the room air scrubber emissions.

Activity[1]	PM_{10} Emission Factor	Reference
Rerun Conveyors	0.00008 lb/ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed mills – Shipping – uncontrolled, adjusted by room air scrubber (90% control)
Storage Silo Conveyors	0.00008 lb/ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed mills – Shipping – uncontrolled, adjusted by room air scrubber (90% control)
Silo Loading	0.000008 lb /ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed Mills – Uncontrolled Shipping adjusted by bin vent (99% control)
Finished Meal Loadout	0.0008 lb /ton of solid	EPA AP-42, Table 9.9.1-2, Animal Feed Mills – Uncontrolled Shipping

3.3 Rendering Operation Toxic Air Pollutant Emission Factors

As mentioned in Section 3.1, the meat rendering operation is expected to result in reduced sulfur compound emissions in the form of hydrogen sulfide (H_2S), which is a Toxic Air Pollutant (TAP). However, the TO will effectively convert the H_2S to SO_X. The majority of TAP emissions are associated with the TO, which come from the combustion of natural gas. H_2S emissions are also expected to be emitted from the room air scrubber. The TAP emission factors for the TO natural gas combustion are obtained from "Natural Gas Fired External Combustion Equipment" in the May 2001 update of the Ventura County Air Pollution Control District (VCAPCD) AB 2588 Combustion Emission Factors for units between 10 and 100 MMBtu/hr.

The proposed TAP emissions from the rendering operation are summarized in Table 3-4.

Table 3-4: Toxic Air Pollutant Emission Factors – TO

TAP	Emission Factor	Reference
Acetaldehyde	3.10E-03 lb/MMSCF	"Natural Gas Fired External Combustion Equipment" in the May 2001 update of VCAPCD AB 2588 Combustion Emission Factors
Acrolein	2.70E-03 lb/MMSCF	
Benzene	5.80E-03 lb/MMSCF	
Ethyl Benzene	6.90E-03 lb/MMSCF	
Formaldehyde	1.23E-02 lb/MMSCF	
Hexane	4.60E-03 lb/MMSCF	
Naphthalene	3.00E-04 lb/MMSCF	
PAHs (excluding Naphthalene)	1.00E-04 lb/MMSCF	
Propylene	5.30E-01 lb/MMSCF	
Toluene	2.65E-02 lb/MMSCF	
Xylenes (mixed)	1.97E-02 lb/MMSCF	
H_2S	0.75 ppmv	SJVAPCD Project #1172884, Facility C-9251

3.4 Protein Grinding, Screening and Storage Operation Toxic Air Pollutant Emission Factors

Pursuant to the guidance on food-grade products and pre-cleaned material, the PM_{10} emissions from pre-cleaned grain products are considered non-hazardous. Material that is pre-cleaned is

assumed to have had all PM_{10} (dust/soil) removed, and therefore has eliminated the exposure to heavy metals. Since the crax and finished meal being processed have been pre-cleaned, the PM_{10} emissions from this process are considered non-hazardous and TAP emissions are not expected. Therefore, TAP emissions from protein grinding, screening and storage operation will not be addressed further in this application.

4.0 EMISSION CALCULATIONS

4.1 Criteria Pollutants

Emission calculation results are summarized in this section.

4.1.1 Rendering Operation Potential to Emit

Basis:

- Maximum daily throughput: 500 tons of raw material per day
- Maximum Room Air Scrubber exhaust flowrate; 100,000 cfm
- Maximum operating schedule: 24 hours per day and 365 days per year.

The potential to emit (PE) for the meat rendering operation are summarized in Tables 4-1 and 4-2.

Table 4-1: Criteria Pollutant PE - Rendering Operation - TO

Criteria Pollutant	Daily PE	Annual PE
NO_X	3.5 lbs/day	1,259 lbs/year
SO_X	16.8 lbs/day	6,114 lbs/year
PM_{10}	1.7 lbs/day	602 lbs/year
CO	6.9 lbs/day	2,500 lbs/year
VOC	2.6 lbs/day	949 lbs/year

Table 4-2: Criteria Pollutant PE - Rendering Operation – Room Air Scrubber

Criteria Pollutant	Daily PE	Annual PE
PM_{10}	20.6 lbs/day	7,509 lbs/year
VOC	19.4 lbs/day	7,091 lbs/year

4.1.2 Protein Grinding, Screening and Storage Operation Potential to Emit

Basis:

- Maximum daily throughput: 98 tons of finished meal per day

The PE for the protein grinding, screening and storage operation are summarized in Table 4-3.

Table 4-3: Criteria Pollutant PE - Protein Grinding, Screening and Storage Op.[2]

Criteria Pollutant	Daily PE (lb/day)	Annual PE (lb/year)
PM_{10}	0.1 lbs/day	29 lbs/year

4.2 Toxic Air Pollutants

Emission calculation results are summarized in this section.

4.2.1 Rendering Operation Potential to Emit

Basis:

- Maximum TO rating: 18 MMBtu/hr
- Maximum Room Air Scrubber exhaust flowrate; 100,000 cfm
- Maximum operating schedule: 24 hours per day and 365 days per year.

The TAP PE for the meat rendering operation are summarized in Tables 4-4 and 4-5.

Table 4-4: TAP PE - Rendering Operation – TO

TAP	Hourly PE	Annual PE
Acetaldehyde	5.58E-05 lbs/hour	4.89E-01 lbs/year
Acrolein	4.86E-05 lbs/hour	4.26E-01 lbs/year
Benzene	1.04E-04 lbs/hour	9.15E-01 lbs/year
Ethylbenzene	1.24E-04 lbs/hour	1.09E+00 lbs/year
Formaldehyde	2.21E-04 lbs/hour	1.94E+00 lbs/year
Hexane	8.28E-05 lbs/hour	7.25E-01 lbs/year
Naphthalene	5.40E-06 lbs/hour	4.73E-02 lbs/year
PAH's (excl. naphthalene)	1.80E-06 lbs/hour	1.58E-02 lbs/year
Propylene	9.54E-03 lbs/hour	8.36E+01 lbs/year
Toluene	4.77E-04 lbs/hour	4.18E+00 lbs/year
Xylenes (mixed)	3.55E-04 lbs/hour	3.11E+00 lbs/year

Table 4-5: TAP PE - Rendering Operation – Room Air Scrubber

TAP	Hourly PE	Annual PE
H_2S	0.4 lbs/hour	3,532 lbs/year

[2] The emissions from transfer of materials from the conveyor to the grinding process, grinding, screening, transfer of materials at the rerun conveyors and transfer of materials from the conveyor to the storage silo are controlled by the room air scrubbers and are accounted for in the room air scrubber emissions. The emissions below only account for the remaining emissions from the operation.

5.0 RULE COMPLIANCE EVALUATION

5.1 Puget Sound Clean Air Agency Regulations

5.1.1 Regulation 1 Article 2 – State Environmental Policy Act

Regulation 1, Article 2 specifies the State Environmental Policy Act (SEPA) procedures and policies of PSCAA. The SEPA review is to be conducted in accordance with Regulation I, Article 2. The SEPA review is undertaken to identify and help government decision-makers, applicants, and the public to understand how a project will affect the environment. A review under SEPA is required for projects that are not categorically exempt in WAC 197-11-800 through WAC 197-11-890. A new source review action which requires a NOC application submittal to the Agency is not categorically exempt. Therefore, the proposed operation is not exempt from SEPA. A SEPA Environmental Checklist Form has been completed and is included in Appendix A.

5.1.2 Regulation 1 Article 5 – Registration

Section 5.03 of Regulation 1 specifies the applicability of the PSCAA registration program. The proposed sources consist of sources with an afterburner and scrubbers, each with a rated capacity of greater than or equal to 200 cfm, serving as odor control equipment, as specified in Section 5.03(6). In addition, the proposed sources are part of a rendering plant, which is listed in Section 5.03(8). Therefore, the proposed sources are subject to the PSCAA registration program. This application package is submitted to obtain the registration for the proposed sources under the PSCAA registration program.

Section 5.05(a) of Regulation 1 requires owner or operator of any source subject to the registration requirements under Section 5.03 of Regulation 1 to make reports containing information as required by the PSCAA concerning location, size, and height of contaminant outlets, processes employed, nature and quantity of the air contaminant emission, and such other information as is relevant to air pollution and available or reasonably capable of being assembled. This application package submittal contains the information specified in Section 5.05(a) of Regulation 1.

Section 5.05(b) of Regulation 1 requires owner or operator of registered source to submit a report by a report by June 30th of each year provided that the previous year emissions from the registered source is at or exceeded the following threshold:

- 2.50 tons of any single HAP;
- 6.25 tons of total HAP;
- 25.0 tons of CO, NO_X, particulate matter, SO_X, or VOC; or
- 0.5 tons of lead.

The potential to emit for the proposed sources is estimated to be less that the emissions threshold listed in Section 5.05(b) of Regulation 1. Therefore, the facility is not expected to be required to submit a report pursuant to Section 5.05(b) of Regulation 1

Section 5.05(c) of Regulation 1 requires owner or operator of registered source to develop and implement an operation and maintenance plan to ensure continuous compliance with

Regulations I, II, and III. The facility will be operating in accordance with an operation and maintenance plan to ensure continuous compliance with Regulations I, II, and III.

Section 5.07 of Regulation 1 specifies the annual registration fees for sources subject to the PSCAA registration program. Darling proposes to fully pay the registration fees as required by the regulation within 45 days of the issuance date of the registration fees invoice.

5.1.3 Regulation 1 Article 6 – New Source Review

Section 6.03(a) of Regulation 1 requires a "Notice of Construction application" to be filed and an "Order of Approval" to be issued by the PSCAA prior to the construction of a new source, or the replacement or substantial alteration of control equipment installed on an existing source. Darling is submitting this NOC application package to meet the requirement specified in Section 6.03(a) of Regulation 1.

Section 6.04 specifies the NOC fees for the submittal of NOC application. Darling will be submitting a filling fee in the amount of $1,550, along with this NOC application package via credit card payment. Darling is requesting an invoice to be issued for any additional NOC fees associated with the review of the proposed sources and will fully pay the NOC fees within 45 days of the issuance date of the NOC fees invoice.

Section 6.09 requires a Notice of Completion to be submitted within 30 days of the completion of the installation or modification of a stationary source subject to the provisions of Article 6 of the NSR regulation. Each Notice of Completion is to be submitted on a form provided by the Agency with the date upon which operation of the stationary source has commenced or will commence specified. Darling proposes to submit the Notice of Completion as specified in this section.

Section 6.11 incorporates the provisions in the New Source Performance Standards (NSPS) from 40 CFR Part 60. The proposed rendering operation and protein grinding screening and storage operation is not subject to the current NSPS. Therefore, the provisions of this section are not applicable to the project being proposed.

5.1.4 Regulation 1 Article 7 – Operating Permits

Pursuant to Section 7.03, the provisions of Regulation 1, Article 7 apply to all Chapter 401 sources subject to the requirements of 173-401 Washington Administrative Code (WAC). Since the proposed operations are not considered as Chapter 401 sources, the proposed operations are not subject to the provisions of Regulation 1, Article 7.

5.1.5 Regulation 1 Article 9 – Emission Standards

Section 9.03 specifies the visual standard for emissions. This section prohibits any person from causing or allowing the emission of any air contaminant for a period or periods aggregating more than 3 minutes in any 1 hour, which is: (1) Darker in shade than that designated as No. 1 (20% density) on the Ringelmann Chart, as published by the United States Bureau of Mines; or (2) Of such opacity as to obscure an observer's view to a degree equal to or greater than does smoke described in Section 9.03(a)(1). (b) The density or opacity of an air contaminant shall be measured at the point of its emission, except when the point of emission cannot be readily observed, it may be measured at an observable point

of the plume nearest the point of emission. With proper maintenance and operation, the proposed operation is expected to meet the requirements in Section 9.03. Therefore, compliance with this section is expected.

Section 9.07 specifies the standard for sulfur dioxide emissions. This section prohibits any person from causing or allowing the emission of sulfur dioxide from any source in excess of 1,000 parts per million by volume on a dry basis, 1- hour average (corrected to 7% oxygen for fuel burning equipment and refuse burning equipment). With proper maintenance and operation, the proposed operation is expected to meet the requirements in Section 9.07. Therefore, compliance with this section is expected.

Section 9.08 specifies the standard for fuel oil. This section prohibits any person from causing or allowing the combustion of oil in fuel burning equipment or refuse burning equipment that exceeds any of the limits in subsection 9.08(a), unless that person has obtained an Order of Approval from the Agency in accordance with Article 6 of Regulation 1. The proposed equipment for this project does not include the combustion of oil. Therefore, the provisions of this section are not applicable to the project being proposed.

Section 9.09 specifies the standards for particulate matter emissions. The fuel burning equipment in the proposed operation is not using wood of solid fossil fuel. Therefore, the applicable standard in this section is 0.05 gr/dscf @ 7% O2. The fuel burning equipment in the proposed operation is expected to meet the standard in section 9.09. Therefore, compliance with this section is expected.

Section 9.10 specifies the requirements for hydrochloric acid emissions. The proposed operation is not expected to emit hydrochloric acid. Therefore, the requirement in this section is not applicable.

Section 9.11 specifies the requirements for emissions of air contaminant that are detrimental to person or property. This section prohibits any person from causing or allowing the emission of any air contaminant in sufficient quantities and of such characteristics and duration as is, or is likely to be, injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property. With respect to odor, subsection 9.11 (b) specified that the PSCAA may take enforcement action under this section if the Control Officer or a duly authorized representative has documented all of the following:

- The detection by the Control Officer or a duly authorized representative of an odor at a level 2 or greater, according to the following odor scale:
    - level 0 – no odor detected;
    - level 1 – odor barely detected;
    - level 2 – odor is distinct and definite, any unpleasant characteristics recognizable;
    - level 3 – odor is objectionable enough or strong enough to cause attempts at avoidance; and
    - level 4 – odor is so strong that a person does not want to remain present;

- An affidavit from a person making a complaint that demonstrates that they have experienced air contaminant emissions in sufficient quantities and of such characteristics and duration so as to unreasonably interfere with their enjoyment of life and property; and
- The source of the odor.

With proper maintenance and operation, the proposed operation is not expected to cause any emissions that are injurious to human health, plant or animal life, or property, or which unreasonably interferes with enjoyment of life and property. The proposed operation is equipped with a scrubber, TO and room air scrubber to control odor emissions. With proper maintenance and operation, the proposed operation is not expected to cause an odor at level 2 or greater as specified in subsection 9.11(b).

Section 9.20 specifies the requirements for equipment maintenance. This section prohibits any person from causing or allowing the operation of any features, machines or devices constituting parts of or called for by plans, specifications, or other information submitted pursuant to Article 6 of Regulation I unless such features, machines or devices are maintained in good working order. This section also prohibits any person from causing or allowing the operation of any of any equipment as defined in Section 1.07 or control equipment not subject to Section 9.20(a) unless the equipment or control equipment is maintained in good working order. Darling proposes to perform required maintenance and to properly operate the permitted equipment to keep the equipment in good working order.

5.1.6 Regulation 3 Article 2 – Review of Toxic Air Contaminant Sources

This regulation applies to all sources of toxic air contaminants, except otherwise exempted. Section 2.02 requires all source operation to comply with 40 CFR Part1 and Part 63.

Compliance with the applicable 40 CFR Part1 and Part 63 is demonstrated in Section 5.3 of this application.

Section 2.05 specifies the screening evaluation requirements for toxic air contaminant emissions from the source would result in the exceedance of an acceptable source impact levels (ASIL) contained in WAC 173-460-150.

Section 2.07 specifies the procedures that shall be used for quantifying emissions and analyzing impacts of toxic air contaminants in order to meet the requirements for new or modified toxic air contaminant sources and for existing toxic air contaminant sources. All TAP emissions from the proposed project are less than the SQER threshold limits in WAC 173-460-150, except for hydrogen sulfide. The emissions of hydrogen sulfide are subject to modeling to verify whether their emissions would exceed the ASIL values. Darling will be submitting a modeling results for the hydrogen sulfide emissions under a separate cover.

5.2 State Regulations

5.2.1 WAC Chapter 173-400 General Regulations for Air Pollution Resources

The purpose of this chapter is to establish technically feasible and reasonably attainable standards and to establish rules generally applicable to the control and/or prevention of the emission of air contaminants.

5.2.1.1 Best Avaiable Control Technology

New stationary sources of air pollution are required to use Best Available Control Technology (BACT) to control all pollutants not previously emitted, or those for which emissions would increase as a result of the new source or modification. BACT is defined in WAC 173-400-030 as, "an emission limitation based on the maximum degree of reduction for each air pollutant subject to regulation under Chapter 70.94 RCW emitted from or which results from any new or modified stationary source, which the permitting authority, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determines is achievable for such source or modification through application of production processes and available methods, systems, and techniques, including fuel cleaning, clean fuels, or treatment or innovative fuel combustion techniques for control of each pollutant."

An emissions standard or emissions limitation means "a requirement established under the Federal Clean Air Act or Chapter 70.94 RCW which limits the quantity, rate, or concentration of emissions of air contaminants on a continuous basis, including any requirement relating to the operation or maintenance of a source to assure continuous emission reduction and any design, equipment, work practice, or operational standard adopted under the Federal Clean Air Act or Chapter 70.94 RCW."

Rendering Operation

The proposed rendering operation involves the cooking of the raw material, and is expected to emit VOC, PM_{10}, and reduced sulfur compounds. The exhaust from the cooking process is vented to a venturi scrubber, followed by a TO. The reduced sulfur compounds are expected to completely oxidize to SO_X by the TO.

The recently issued VOC BACT determinations for rendering operation from SJVAPCD, South Coast Air Quality Management District (SCAQMD) and Texas Commission on Environment Quality (TCEQ) are summarized in Table 5-1.

Table 5-1: VOC BACT – Rendering Operation

Source	BACT Determination
SJVAPCD BACT Guideline 8.3.2	- The use of an odor scrubbing system utilizing a scrubbing medium of chlorine dioxide in water with a minimum overall control of 95% or better: or - The use of a thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1,400°F and minimum retention time of 1.0 second with a minimum overall control of 95%.
SCAQMD	Venting to an afterburner or boiler fire box (≥ 0.3 sec. Retention Time at ≥ 1200 °F)
TCEQ	Building under negative pressure and air streams routed to a condenser or venturi scrubber followed by two packed bed or two packed tower scrubbers. The scrubbers may use sodium hydroxide, chlorine dioxide, or sodium hypochlorite, maintain a pH of 11 and 10 ppm residual chlorine concentration, and maintain 30 room air changes per hour on the cooking room. Instead of the previous, the air stream may be routed to a

Source	BACT Determination
	condenser/venturi scrubber followed by the boiler firebox for incineration when the boiler is on high fire only.

Pursuant to SJVAPCD BACT Guideline 8.3.2 for animal matter rendering plants, the technologically feasible BACT determinations for PM_{10} are listed as follows:

1. The use of an odor scrubber with a particulate removal system that consists of a particulate scrubber, a shell and tube condenser, a Venturi scrubber, a cyclone, an air-cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%.
2. The use of a thermal oxidizer utilizing natural gas with a minimum chamber temperature of 1,400°F and minimum retention time of 1.0 second with a particulate removal system that consists of a particulate scrubber, a shell and tube condenser, a Venturi scrubber, a cyclone, an air-cooled condenser, and a contact condenser or a combination thereof with a minimum overall control of 95%.

Darling proposes to meet the VOC and PM_{10} BACT/RACT requirements for the meat rendering operation by controlling point emission sources with the venturi scrubber and TO system and controlling fugitive emissions with room air scrubber. The venturi scrubber and TO system are designed for a combined reduction of VOC emissions by 99%.

Pursuant to TCEQ Historical BACT requirements for rendering, the BACT determinations for odor are listed as follows:

1. Building under negative pressure and air streams routed to a condenser or venturi scrubber followed by two packed bed or two packed tower scrubbers. The scrubbers may use sodium hydroxide, chlorine dioxide, or sodium hypochlorite, maintain a pH of 11 and 10 ppm residual chlorine concentration, and maintain 30 room air changes per hour on the cooking room. Instead of the previous, the air stream may be routed to a condenser/venturi scrubber followed by the boiler firebox for incineration when the boiler is on high fire only.
2. Maintaining the temperature of vapors entering the scrubber to be 130F or less to maintain proper operation.

Darling proposes to meet the odor BACT/RACT requirements for the meat rendering operation by controlling point emission sources with the venturi scrubber and TO system and controlling fugitive emissions with room air scrubber. In addition, Darling will ensure that the temperature of the stream vented to the scrubber will allow for optimal and safe operation. In addition, an odor modeling analysis has been prepared for a similar operation under the permit application for NOC 11777 with the cooker as the primary potential source of odor, vented to an air-cooled condenser, wet venturi scrubber, and TO for odor control. The odor emissions from the room air scrubber are also accounted for in the odor modeling analysis. A copy of the odor modeling analysis report is included in Appendix B. The results of the air dispersion modeling for the odor emissions suggest that combined contribution of odor concentrations is well below the 1 OU/M^3 at the nearest residences, which assumes that the proposed odor control will control the odor emissions sufficiently.

Protein Grinding, Screening and Storage Operation

The proposed protein grinding, screening and storage operation involves the solids or crax processing, which will take place in the grinding room and results in PM_{10} emissions. The protein grinding, screening and material handling are vented to a room air scrubber, and the storage silo is equipped with bin vents.

The recently issued PM_{10} BACT determinations for meal grinding-rendering operation from SCAQMD and TCEQ are summarized in Table 5-2.

Table 5-2: PM_{10} BACT – Protein Grinding, Screening and Storage Operation

Source	BACT Determination
SCAQMD	Enclosed Grinding and Screening Operation with Mechanical Conveyors Transporting Meal
TCEQ	Meal Storage Silo equipped with a baghouse designed to meet an outlet grain loading of not more than 0.01 grains/dry standard cubic foot.

Darling proposes to meet the PM_{10} BACT/RACT requirements for the proposed protein grinding, screening and storage operation by enclosing the grinding and screening operation and venting the fugitive emissions to a room scrubber. In addition, the finished meal is stored in the storage silo that is equipped with bin vents that is expected to have a grain loading of 0.01 gr/dcf or less.

5.2.2 WAC Chapter 173-401 Operating Permit Regulation

The requirements in this chapter establish the elements of a comprehensive Washington state air operating permit program consistent with the requirements of Title V of the Federal Clean Air Act and includes the requirements for affected sources under the acid rain program. Since the Darling facility operation is not subject to Title V permitting or acid rain program, the requirements of this chapter are not applicable.

5.2.3 WAC Chapter 173-460 Controls for New Sources of Toxic Air Pollutants

The purpose of this chapter is to establish the systematic control of new sources emitting TAPs in order to prevent air pollution, reduce emissions to the extent reasonably possible, and maintain such levels of air quality as will protect human health and safety. WAC173-460-150 includes a list of TAP threshold limits for small quantity emission rates (SQERs), which is used to determine if the new source of TAPs needs to conduct modeling. All TAP emissions from the proposed project are less than the SQER threshold limits, except for hydrogen sulfide. Darling will be submitting a modeling results for the hydrogen sulfide emissions under a separate cover.

APPENDIX A – PSCAA APPLICATION FORMS

AGENCY USE ONLY	NOC#: 12348	REG#: 10076	Date Fee Pd:	Eng. Assigned:

PUGET SOUND
Clean Air Agency

1904 3rd Ave #105, Seattle, WA 98101
206-343-8800
pscleanair.gov

NOTICE OF CONSTRUCTION APPLICATION FOR ORDER OF APPROVAL

The following information must be submitted as part of this application packet before an Agency engineer is assigned to review your project.

SECTION 1. FACILITY INFORMATION

Business Name
Darling Ingredients Inc.

Equipment Installation Address	City	State	Zip
2041 E Marc Street	Tacoma	WA	98421

Is the business registered with the Agency at this equipment installation address?

☒ Yes. Current Registration or AOP No. 10076 ☐ No, not registered ☐ Unknown

Business Owner Name
Darling Ingredients Inc.

Business Mailing Address	City	State	Zip
2041 E Marc Street	Tacoma	WA	98421

Type of Business
Food Processing Byproduct Conversion Facility

Is the installation address located within the city limits?

☒ Yes ☐ No

NAICS Code	NAICS Description
311613	Rendering and Meat Byproducts

Contact Name (for this application)	Phone	Email

Description for Agency Website

Provide a 1-2 sentence simple description of this project. See examples www.pscleanair.gov/176
Darling is proposing to construct a new rendering operation and a protein grinding, screening and storage operation to replace the existing permitted rendering operation that was destroyed by a fire in September 2022.

SECTION 2: REQUIRED APPLICATION PACKET ATTACHMENTS

1) **Process flow diagram**
☒ YES, attached. ☐ NO, not attached. This application is incomplete

2) **Emission estimate**. Emission rate increases for all pollutants.
☒ YES, attached. ☐ NO, not attached. This application is incomplete.

3) **Environmental Checklist** (or a determination made by another Agency under the State Environmental Policy Act) www.pscleanair.gov/DocumentCenter/View/170
☒ YES, attached. ☐ NO, not attached. This application is incomplete.

NOTICE OF CONSTRUCTION APPLICATION FOR ORDER OF APPROVAL

SECTION 2: REQUIRED APPLICATION PACKET ATTACHMENTS (CONT)

4) Attach **equipment form**(s) applicable to your operation. Forms are available online at www.pscleanair.gov/179

☒ YES, attached. ☐ NO, not attached. This application is incomplete.

5) **Detailed Project Description**

The project description must include a detailed description of the project, a list of process and control equipment to be installed or modified, a description of how the proposed project will impact your existing operations (if applicable), and measures that will be taken to minimize air emissions.

Detailed description of the proposed project included in packet?

☒ YES, attached. ☐ NO, not attached. This application is incomplete.

6) **$1,550 filing fee** (nonrefundable)

☐ PAY BY CHECK – Attached and made payable to **Puget Sound Clean Air Agency**

☒ PAY BY CREDIT – Accounting technician will contact person identified below for payment information

Contact Name:	Contact Number:
Jon Elrod	(859) 344-2201

SECTION 3: PROCESS AND CONTROL EQUIPMENT (attach additional pages if necessary)

Process Equipment		Does this equipment have air pollution control equipment?	Air Pollution Control Equipment	
# of Units	Equipment Type & Design Capacity		# of Units	Equipment Type
1	Cooker - Rendering Ops	☒ Yes ☐ No	3	Venturi Scrubber, TO & Room Air Scrubber
2	Protein Grinding, Screening & Storage	☒ Yes ☐ No	1	Room Air Scrubber
		☐ Yes ☐ No		
		☐ Yes ☐ No		

SECTION 4: CERTIFICATION STATEMENT

I, the undersigned, certify that the information contained in this application and the accompanying forms, plans, specifications, and supplemental data described herein is, to the best of my knowledge, accurate and complete.

Jon Elrod — Signature

4/27/2023 — Date

Jon Elrod — Printed Name

VP of Environmental Affairs, North America — Title

SECTION 5: APPLICATION SUBMITTAL

☒ **EMAIL application and attachments to:** NOC@pscleanair.gov

-OR-

☐ **MAIL application, payment, and attachments to:**
Puget Sound Clean Air Agency
ATTN: NOC Application Submittal
1904 3rd Ave, Suite 105 - Seattle, WA 98101

pscleanair.org
Puget Sound Clean Air Agency

Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105 | Seattle, WA 98101-3317
Phone 206-343-8800 | 206-343-7522 Fax

ENVIRONMENTAL CHECKLIST

Because of the State Environmental Policy Act, the action for which you are filing a Notice of Construction and Application for Approval to this Agency requires the completion of an environmental checklist.

BUT: If you can answer "yes" to either of the following statements with respect to the action being proposed, the attached checklist need not be completed:

1. I have obtained a State, City, or County Permit and filled out an environmental checklist.

   ☐ **Yes** ☒ **No**

   If yes, complete the following:

   State, City or County Department: _____

   Date the checklist was completed: _____

   Attach a copy of the checklist

2. An environmental checklist or assessment has previously been filled out for another agency.

   ☐ **Yes** ☒ **No**

   If yes, complete the following:

   Agency: _____

   Date the checklist was completed: _____

   Attach a copy of the checklist

If your answers are NO to both of the above statements, you must complete the attached environmental checklist.

Prepared by:

Signature Jon Elrod

Name Jon Elrod

Position VP of Environmental Affairs, North America

Agency/Organization Darling Ingredients Inc.

Date Submitted 04/28/2023

ENVIRONMENTAL CHECKLIST

Date: 4/27/2023

Proponent: Puget Sound Clean Air Agency

Project, Brief Title: Darling Rendering Op. Replacement

Purpose of Checklist:

Governmental agencies use this checklist to help determine whether the environmental impacts of your proposal are significant. This information is also helpful to determine if available avoidance, minimization or compensatory mitigation measures will address the probable significant impacts or if an environmental impact statement will be prepared to further analyze the proposal.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Please answer each question accurately and carefully, to the best of your knowledge. You may need to consult with an agency specialist or private consultant for some questions. You may use "not applicable" or "does not apply" only when you can explain why it does not apply and not when the answer is unknown. You may also attach or incorporate by reference additional studies reports. Complete and accurate answers to these questions often avoid delays with the SEPA process as well as later in the decision-making process.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Instructions for Lead Agencies:

Please adjust the format of this template as needed. Additional information may be necessary to evaluate the existing environment, all interrelated aspects of the proposal and an analysis of adverse impacts. The checklist is considered the first but not necessarily the only source of information needed to make an adequate threshold determination. Once a threshold determination is made, the lead agency is responsible for the completeness and accuracy of the checklist and other supporting documents.

Use of Checklist for Nonproject Proposals:

For nonproject proposals (such as ordinances, regulations, plans and programs), complete the applicable parts of Sections A, B, and C plus section D: Supplemental Sheet for Nonproject Actions.

Please completely answer all questions that apply and note that the words "project," "applicant," and "property or site" should be read as "proposal," "proponent," and "affected geographic area," respectively. The lead agency may exclude (for non-projects) questions in Section B: Environmental Elements that do not contribute meaningfully to the analysis of the proposal.

ENVIRONMENTAL CHECKLIST

A. BACKGROUND

1. Name of proposed project, if applicable: Darling Rendering Op. Replacement			
2. Name of Applicant Darling Ingredients Inc.			
3. Applicant Address 2041 E Marc Street	City Tacoma	State WA	Zip 98421
Applicant Phone (859) 344-2201	Applicant Email jelrod@darlingii.com		
Contact Person Jon Elrod	Title VP of Environmental Affairs, North America		
Company/Firm Darling Ingredients Inc.			
4. Date Checklist Prepared 04/28/2023	5. Agency Requesting Checklist PSCAA		
6. Proposed timing or schedule (including phasing, if applicable). N/A			
7. Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? ☐ Yes ☒ No. If yes, explain.			
8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal. N/A			
9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? ☐ Yes ☒ No. If yes, explain.			
10. List any government approvals or permits that will be needed for your proposal, if known. NOC from PSCAA			

ENVIRONMENTAL CHECKLIST

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page.

Darling is proposing to construct a new rendering operation and a protein grinding, screening and storage operation to replace the existing permitted rendering operation that was destroyed by a fire in September 2022.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

2041 E Marc Street, Tacoma, WA 98421

B. ENVIRONMENTAL ELEMENTS

1. EARTH
a. General description of the site: ☒ flat ☐ rolling ☐ hilly ☐ steep slopes ☐ mountains ☐ other _____
b. What is the steepest slope on the site (approximate percent slope)? N/A
c. What general types of soils are found on the site (for example, clay, sand, gravel, peat, muck)? If you know the classification of agricultural soils, specify them, and note any agricultural land of long-term commercial significance and whether the proposal results in removing any of these soils. N/A
d. Are there surface indications or history of unstable soils in the immediate vicinity? ☐ Yes ☒ No. If yes, describe.
e. Describe the purpose, type, total area, and approximate quantities and total affected area of any filling, excavation, and grading proposed. Indicate source of fill. N/A
f. Could erosion occur as a result of clearing, construction, or use? ☐ Yes ☒ No. If yes, generally describe.
g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)? It will be built in an existing industrial plot. No changes in site surface.
h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any: N/A

ENVIRONMENTAL CHECKLIST

2. AIR

a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke, greenhouse gases) during construction, operation, and maintenance when the project is completed? If any, generally describe and give approximate quantities, if known.

The project is a replacement for an existing source. Please see application for details.

b. Are there any off-site sources of emissions or odor that may affect your proposal? ☐ Yes ☒ No.
If yes, generally describe.

c. Proposed measures to reduce or control emissions or other impacts to air, if any:

The rendering operation will be equipped with a venturi scrubber and thermal oxidizer for point sources, and a room air scrubber for fugitive emissions from within the building.

3. WATER

a. Surface

1. Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands) ? ☐ Yes ☒ No. If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

2. Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? ☐ Yes ☒ No. If yes, please describe and attach available plans.

3. Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

N/A

4. Will the proposal require surface water withdrawals or diversions? ☐ Yes ☒ No.
Give general description, purpose, and approximate quantities if known.

5. Does the proposal lie within a 100-year floodplain? ☐ Yes ☒ No. If yes, note location on the site plan.

6. Does the proposal involve any discharges of waste materials to surface waters? ☐ Yes ☒ No. If yes, describe the type of waste and anticipated volume of discharge.

b. Ground Water

1. Will groundwater be withdrawn from a well for drinking water or other purposes? ☐ Yes ☒ No. If yes, give a general description of the well, proposed uses and approximate quantities withdrawn from the well.

Will water be discharged to groundwater? ☐ Yes ☒ No. If yes, give general description, purpose, and approximate quantities, if known.

2. Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the systems, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

N/A

c. Water Runoff (including storm water)

1. Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? ☐ Yes ☒ No. If yes, describe.

2. Could waste material enter ground or surface waters? ☐ Yes ☒ No. If yes, generally describe.

3. Does the proposal alter or otherwise affect drainage patterns in the vicinity of the site? ☐ Yes ☒ No. If yes, describe.

d. Proposed measures to reduce or control surface, ground, and runoff water, and drainage pattern impacts, impacts, if any:

N/A

ENVIRONMENTAL CHECKLIST

4. PLANTS				
a. Check the types of vegetation found on the site:				
Deciduous Trees:	☐ Alder	☐ Maple	☐ Aspen	☐ other (specify):
Evergreen Trees:	☐ Fir	☐ Cedar	☐ Pine	☐ other (specify):
☐ Shrubs				
☐ Grass				
☐ Pasture				
☐ Crop or Grain				
☐ Orchards, Vineyards, or other permanent crops				
☐ Other types of Vegetation (specify):				
Wet Soil Plants:	☐ Cattail	☐ Buttercup	☐ other (specify):	
	☐ Bulrush	☐ Skunk Cabbage		
Water Plants:	☐ Water Lily	☐ Eelgrass	☐ Milfoil	☐ other (specify):
b. What kind and amount of vegetation will be removed or altered? N/A				
c. List threatened or endangered species known to be on or near the site. N/A				
d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any: N/A				
e. List all noxious weeds and invasive species known to be on or near the site. N/A				

ENVIRONMENTAL CHECKLIST

5. ANIMALS

a. Indicate birds and other animals that have been observed on or near the site or are known to be on or near the site.

Birds:	☐ Hawk	☐ Heron	☐ other (specify):
	☐ Eagle	☐ Songbirds	
Mammals:	☐ Deer	☐ Bear	☐ other (specify):
	☐ Elk	☐ Beaver	
Fish:	☐ Bass	☐ Salmon	☐ Trout
	☐ Hearing	☐ Shellfish	☐ other (specify):

b. List any threatened or endangered species known to be on or near the site.

N/A

c. Is the site part of a migration route? ☐ Yes ☒ No. If yes, explain.

d. Proposed measures to preserve or enhance wildlife, if any:

N/A

e. List any invasive animal species known to be on or near the site.

N/A

6. ENERGY AND NATURAL RESOURCES

a. What kinds of energy (electric, natural gas, oil, woodstove, solar) will be used to meet the completed project's energy needs? Describe whether it will be used for heating, manufacturing, etc.

The project is a replacement of an existing source. No additional energy is expected to be needed beyond the original source.

b. Would your project affect the potential use of solar energy by adjacent properties? ☐ Yes ☒ No. If yes, generally describe.

c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:

N/A

ENVIRONMENTAL CHECKLIST

7. ENVIRONMENTAL HEALTH
a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste that could occur as a result of this proposal? ☐ Yes ☒ No. If yes, describe:
2. Describe any known or possible contamination at the site from present or past uses. N/A
3. Describe existing hazardous chemicals/conditions that might affect project development and design. This includes underground hazardous liquid and gas transmission pipelines located within the project area and in the vicinity. N/A
4. Describe any toxic or hazardous chemicals that might be stored, used, or produced during the project's development or construction, or at any time during the operating life of the project. N/A
5. Describe special emergency services that might be required. N/A
6. Proposed measures to reduce or control environmental health hazards, if any: N/A
b. Noise
1. What types of noise exist in the area that may affect your project (for example, traffic, equipment, operation, other)? N/A
2. What types and levels of noise would be created by or associated with the project on a short-term or a long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site. N/A
3. Proposed measures to reduce or control noise impacts, if any: N/A

ENVIRONMENTAL CHECKLIST

8. LAND AND SHORELINE USE

a. What is the current use of the site and adjacent properties? Will the proposal affect current land uses on nearby or adjacent properties? ☐ Yes ☒ No. If yes, describe.

The current use is industrial, and will continue to be industrial.

b. Has the project site been used as working farmlands or working forest lands? ☐ Yes ☒ No. If yes, describe. How much agricultural or forest land of long-term commercial significance will be converted to other uses as a result of the proposal, if any? If resource lands have not been designated, how many acres in farmland or forest land tax status will be converted to nonfarm or nonforest use?

1. Will the proposal affect or be affected by surrounding working farm or forest land normal business operations, such as oversize equipment access, the application of pesticides, tilling, and harvesting? ☐ Yes ☒ No. If yes, how?

c. Describe any structures on the site.

Buildings housing an animal byproducts processing plant.

d. Will any structures be demolished? ☐ Yes ☐ No. If yes, what?

The structure was destroyed by a fire in September 2022.

e. What is the current zoning classification of the site?

Industrial

f. What is the current comprehensive plan designation of the site?

Industrial

g. If applicable, what is the current shoreline master program designation of the site?

N/A

h. Has any part of the site been classified as a critical area by the city or community? ☐ Yes ☒ No. If yes, specify.

i. Approximately how many people would reside or work in the completed project?

The same as existing operation.

j. Approximately how many people would the completed project displace?

None

k. Proposed measures to avoid or reduce displacement impacts, if any:

N/A

l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

N/A

m. Proposed measures to ensure the proposal is compatible with nearby agricultural and forest lands of long-term commercial significance, if any:

N/A

9. HOUSING

a. Approximately how many units would be provided, if any? Indicate whether high- middle- or low-income housing.

None

b. Approximately how many units, if any, would be eliminated? Indicate whether high- middle- or low-income housing.

None

c. Proposed measures to reduce or control housing impacts, if any:

None

10. AESTHETICS

a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

72' above grade, metal.

b. What views in the immediate vicinity would be altered or obstructed?

None

c. Proposed measures to reduce or control aesthetic impacts, if any:

N/A

ENVIRONMENTAL CHECKLIST

11. LIGHT AND GLARE
a. What type of light or glare will the proposal produce? What time of day would it mainly occur? N/A
b. Could light or glare from the finished project be a safety hazard or interfere with views? N/A
c. What existing off-site sources of light or glare may affect your proposal? N/A
d. Proposed measures to reduce or control light and glare impacts, if any: N/A

12. RECREATION
a. What designated and informal recreational opportunities are in the immediate vicinity? None
b. Would the proposed project displace any existing recreational uses? ☐ Yes ☒ No. If yes, describe.
c. Proposed measures to reduce or control impacts on recreation, including recreational opportunities to be provided by the project or applicant, if any: N/A

13. HISTORIC AND CULTURAL PRESERVATION
a. Are there any buildings, structures, or sites, located on or near the site that are over 45 years old listed in or eligible for listing in national, state, or local preservation registers located on or near the site? ☐ Yes ☒ No. If yes, specifically describe.
b. Are there any landmarks, features, or other evidence of Indian or historic use or occupation? This may include human burials or old cemeteries. Are there any material evidence, artifacts, or areas of cultural importance on or near the site? Please list any professional studies conducted at the site to identify such resources. No

c. Describe the methods used to assess the potential impacts to cultural and historic resources on or near the project site. Examples include consultation with tribes and the department of archeology and historic preservation, archaeological surveys, historic maps, GIS data, etc.

N/A

d. Proposed measures to avoid, minimize, or compensate for loss, changes to, and disturbance to resources. Please include plans for the above and any permits that may be required.

N/A

14. TRANSPORTATION

a. Identify public streets and highways serving the site or affected geographic area and describe proposed access to the existing street system. Show on-site plans, if any.

N/A

b. Is site or affected geographic area currently served by public transit? ☐ Yes ☒ No. If yes, generally describe. If not, what is the approximate distance to the nearest transit stop?

c. How many parking spaces would the completed project or non-project proposal have? How many would the project or proposal eliminate?

N/A

d. Will the proposal require any new or improvements to existing roads, streets, pedestrian, bicycle or state transportation facilities, not including driveways? ☐ Yes ☒ No. If yes, generally describe (indicate whether public or private).

e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? ☐ Yes ☒ No. If yes, generally describe.

f. How many vehicular trips per day would be generated by the completed project or proposal? If known, indicate when peak volumes would occur and what percentage of the volume would be trucks (such as commercial and nonpassenger vehicles). What data or transportation models were used to make these estimates?

The same as existing operation.

g. Will the proposal interfere with, affect or be affected by the movement of agricultural and forest products on roads or streets in the area? ☐ Yes ☒ No. If yes, generally describe.

h. Proposed measures to reduce or control transportation impacts, if any:

N/A

15. PUBLIC SERVICES

a. Would the project result in an increased need for public services (for example, fire protection, police protection, public transit, health care, schools, other)? ☐ Yes ☒ No. If yes, generally describe.

b. Proposed measures to reduce or control direct impacts on public services, if any:

N/A

16. UTILITIES

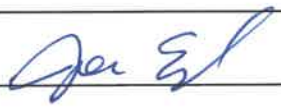
a. Indicate utilities currently available at the site:

☒ Electricity	☒ Natural gas	☒ Water	☐ Refuse Service
☒ Telephone	☒ Sanitary Sewer	☐ Septic System	☐ Other (specify):

b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity that might be needed.

N/A

C. SIGNATURE

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.	
Signature	
Name	Jon Elrod
Position	VP of Environmental Affairs, North America
Agency/Organization	Darling Ingredients Inc.
Date Submitted	04/28/2023

ENVIRONMENTAL CHECKLIST

D. SUPPLEMENTAL SHEET FOR NON-PROJECT ACTIONS

(Do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment in section B of this checklist.

When answering these questions, be aware of how the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; production, storage, or release of toxic or hazardous substance; or production of noise? N/A
Proposed measures to avoid or reduce such increases are:
2. How would the proposal be likely to affect plants, animals, fish, or marine life? N/A
Proposed measures to protect or conserve plants, animals, fish, or marine life are:
3. How would the proposal be likely to deplete energy or natural resources? N/A
Proposed measures to protect or conserve energy and natural resources are:
4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands? N/A
Proposed measures to protect such resources or to avoid or reduce impacts are:
5. How would the proposal be likely to affect land and shoreline use, including whether it would allow or encourage land or shoreline uses incompatible with existing plans? N/A

Proposed measures to avoid or reduce shoreline and land use impacts are:
6. How would the proposal be likely to increase demands on transportation or public services and utilities? N/A
Proposed measures to reduce or respond to such demand(s) are:
7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment. N/A

PUGET SOUND
Clean Air Agency

1904 3rd Ave #105, Seattle, WA 98101
206-343-8800
pscleanair.gov

NOC APPLICATION SUPPLEMENTAL FORM

Other Emission Sources (Not Otherwise Listed)

This application is for activities or equipment that is (check all that apply):

- ☒ New (including existing, unpermitted equipment)
- ☐ Physical or operational modification of existing equipment
- ☐ Relocation of existing equipment

Estimated date to begin construction: _____ Estimated date to startup: _____

Name of Emission Source: Rendering Operation - Cooker

Manufacturer: Dupps Model: Supercookor 260U

Description of Emission Source:
The rendering operation process raw materials using the cooker to evaporate moisture and promote separation of the fat (liquid component) from the protein (solid component). The heat used in the cooker is generated by an existing boiler. The resulting mixture from the cooker is further processed to separate free-flowing liquid fat from the solids.

Operating Data

Maximum Rated Capacity (specify units): 500 tons/day

Raw Materials and/or Fuel Required for Process: Food byproducts

Estimated Annual Usage of Each Raw Material and/or Fuel (specify units): 182,500 tons

Normal Operation _____ hours/day _____ days/week _____ weeks/yr

Maximum Operation 24 hours/day 7 days/week 52 weeks/yr

Form 50-184 | 03/20

Control Equipment

Are the emissions from the source controlled? ☒ Yes ☐ No If yes, provide the following:

Type of Control Device: 15,000 cfm venturi scrubber and 18 MMBtu/hr Thermal Oxidizer

Manufacturer: Process Combustion Corp Model: _____

Pollutant(s) Controlled: Odor and VOC Removal Efficiency (%): _____

Stack Parameters	Building Dimensions of Project Location
Stack diameter: 20.5 x 20.5 inches	Building Height (highest point of roof) 31.875 ft
Stack height above ground: 55 feet	Building Width 68 ft
Exhaust Flow Rate: 10000 acfm	Building Length 80 ft
Exhaust Temperature: 500 °F	

Required Attachments

1. Facility layout diagram showing location of the source (and its stack), associated buildings, and property lines.
2. Manufacturer specification sheet for each piece of equipment.
3. Agency specific control device form (if applicable), located at www.pscleanair.org/180/Source-Specific-Applications-for-Permits.
4. A copy of each applicable New Source Performance Standard (NSPS) with the applicable portions of each rule marked.
5. A copy of each applicable National Emissions Standard for Hazardous Air Pollutants (NESHAP) with the applicable portions of each rule marked.

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NOC APPLICATION SUPPLEMENTAL FORM

Thermal or Catalytic Oxidizer

This application is for activities or equipment that is (check all that apply):

- ☐ New (including existing, unpermitted equipment)
- ☐ Replacement of an existing oxidizer
- ☐ Substantial alteration of an existing oxidizer
- ☒ Relocation of an existing oxidizer

Specify the operation or process being controlled: Rendering Operation - Cooker

Hours of operation per day: Max - 24 hours Hours of operation per year: Max - 8,760 hours

Oxidizer Type

- ☐ catalytic oxidizer
- ☐ recuperative thermal oxidizer
- ☐ regenerative thermal oxidizer
- ☒ thermal (direct fired) oxidizer

Design and Technical Specifications

Make: Process Combustion Corp Model: Dual Fuel Johnson Burner Model Number: FD68

Inlet process flowrate: 15,000 acfm

Fan design flowrate: 10,000 acfm @ pressure drop of _____ inches water column

Blower hp: 7.5

Combustion retention time: >1 seconds

Burner fuel type: ☒ Natural Gas ☐ Fuel Oil ☐ Other: _____

Burner maximum fuel usage: 18,000,000 BTU/hr

Minimum operating temperature: 1200 °F

Number of burner nozzles: _____ Is burner low NOx design? ☐ Yes ☒ No

For Catalytic Oxidizers

Catalyst material: ☐ Precious metal ☐ Ceramic ☐ Base metal ☐ Other: _____

Volume of catalyst: _____ cubic feet per layer # of layer of beds: _____

Temperature rise across catalyst: _____ °F Expected catalyst lifetime: _____

Describe catalytic cleaning and replacement procedures and frequency:

For Regenerative Thermal Oxidizers

Number of chambers: _____ Chamber dimensions: _____

For Direct-Fired or Recuperative Thermal Oxidizers

Combustion chamber dimensions: 265" x 69"

Stack Parameters	Building Dimensions of Project Location
Exhaust stack parameters:	Building Height (highest point of roof) 31.875 ft
Stack diameter: 20.5 x 20.5 inches	Building Width 68 ft
Stack height above ground: 55 feet	Building Length 80 ft
Exhaust airflow: 10,000 scfm	Stack damper/rain guard:
Exhaust Temperature: 500 °F	☒ None ☐ Hexagonal ☐ Stack within stack
	☐ Butterfly ☐ Inverted Cone
	☐ Other (specify): _____

VOC Emissions

Maximum inlet VOC emissions: _____ ppm or lbs/hr

Maximum NOx emissions: _____ ppm or lb/hr

Maximum outlet VOC emissions: _____ ppm or lbs/hr

Maximum CO emissions: _____ ppm or lb/hr

Required Attachments
1. Brochure or technical fact sheet from manufacturer or supplier 2. Technical drawings of the oxidizer, including location of monitoring equipment 3. A list of instrumentation used to monitor temperature and flowrate. Specify if continuously monitored and recorded. 4. Description of any concentrators or particulate control devices associated with the oxidizer 5. If there are source test data available for this unit, include with application 6. Copy of the Operations and Maintenance Manual for control equipment, including provisions for shut down of inlet stream if oxidizer shuts down.

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NOC APPLICATION SUPPLEMENTAL FORM

Other Emission Sources (Not Otherwise Listed)

This application is for activities or equipment that is (check all that apply):

- ☒ New (including existing, unpermitted equipment)
- ☐ Physical or operational modification of existing equipment
- ☐ Relocation of existing equipment

Estimated date to begin construction: _____ Estimated date to startup: _____

Name of Emission Source: Protein Grinding, Screening and Storage Operation

Manufacturer: Custom Model: Custom

Description of Emission Source:

The protein grinding op receives crax from the meat rendering operation. The crax is ground by a hammermill and conveyed to a vibratory screen to produce the finished protein meal. The emissions from the operation are controlled by the room air scrubber to minimize particulate matter emissions. The finished protein meal is conveyed to the finished protein meal storage silo via two screw conveyors and a bucket elevator. The finished protein meal storage silo is equipped with bin vent filters serving as PM emission control from the loading of the storage silo. During the finished protein meal storage silo loadout process, the finished protein meal is transferred from the storage silo and loaded into trucks, containers, or supersacks within the meal loadout bay. The loading point is equipped with a chute to minimize PM emissions.

Operating Data

Maximum Rated Capacity (specify units): 98 tons/day

Raw Materials and/or Fuel Required for Process: finished meal

Estimated Annual Usage of Each Raw Material and/or Fuel (specify units): 35,770 tons of finished meal

Normal Operation _____ hours/day _____ days/week _____ weeks/yr

Maximum Operation 24 hours/day 7 days/week 52 weeks/yr

Control Equipment

Are the emissions from the source controlled? ☒ Yes ☐ No If yes, provide the following:

Type of Control Device: 100,000 cfm room air scrubber and silo bin vent

Manufacturer: _____ Model: _____

Pollutant(s) Controlled: Odor, PM and VOC Removal Efficiency (%): 99% for bin vent

Stack Parameters	Building Dimensions of Project Location
Stack diameter: 72 inches	Building Height (highest point of roof) 31.875 ft
Stack height above ground: 45 feet	Building Width 68 ft
Exhaust Flow Rate: 100,000 acfm	Building Length 80 ft
Exhaust Temperature: ambient °F	

Required Attachments

1. Facility layout diagram showing location of the source (and its stack), associated buildings, and property lines.
2. Manufacturer specification sheet for each piece of equipment.
3. Agency specific control device form (if applicable), located at www.pscleanair.org/180/Source-Specific-Applications-for-Permits.
4. A copy of each applicable New Source Performance Standard (NSPS) with the applicable portions of each rule marked.
5. A copy of each applicable National Emissions Standard for Hazardous Air Pollutants (NESHAP) with the applicable portions of each rule marked.

APPENDIX B – ODOR MODELING ANALYSIS REPORT

Yorke
ENGINEERING, LLC
www.YorkeEngr.com

June 30, 2021

Mr. Brian Renninger, P.E.
Engineer
Puget Sound Clean Air Agency
1904 Third Avenue, Suite 105
Seattle, WA 98101
Phone: (206) 689-4077
E-mail: BrianR@PSCleanAir.org

Subject: Odor Modeling Report, Darling Ingredients Inc. (NOC 11777)

Dear Mr. Renninger:

Per our approved odor modeling protocol, Yorke Engineering, LLC (Yorke), submits the following odor modeling report.

BACKGROUND

The Puget Sound Clean Air Agency (PSCAA) requested an odor modeling analyses be prepared in support of Notice of Construction (NOC) 11777 to assist the agency with determining best available control technology (BACT) requirements and demonstrate compliance with regulatory standards for potential odor impacts. The primary potential source of odor related to the NOC is the cooker, which exhausts to an air-cooled condenser prior to venting to a wet venturi scrubber and a thermal oxidizer for odor control.

In addition to the cooking process subject to the NOC, the PSCAA is also requesting Darling evaluate the odor profile from the fugitive odor in the main processing area ("room air"), which is vented to a packed bed wet scrubber with oxidizing chemistry.

AIR DISPERSION MODELING METHODOLOGY

As approved by the PSCAA air dispersion modeling was performed using the U.S. Environmental Protection Agency's (EPA's) AERMOD modeling system (computer software) to assess odor impacts based on post-project emissions. AERMOD is a steady-state plume dispersion model that incorporates air dispersion calculations based on planetary boundary layer turbulence structure and scaling concepts. AERMOD includes the treatment of both surface and elevated sources, as well as both simple and complex terrain. AERMOD uses algorithms to characterize the atmospheric processes that disperse pollutants emitted by a source. Based on emission rates, exhaust parameters, terrain characteristics, and meteorological inputs, AERMOD calculates pollutant concentrations at selected downwind receptor locations. The results are then used to determine compliance with National Ambient Air Quality Standards (NAAQS) and other regulatory requirements, such as New Source Review (NSR), air toxic regulations, and odor related impacts. AERMOD is recommended by both the U.S. EPA and the SCAQMD for air dispersion modeling projects.

AERMOD Version 19191, was used for this project implemented through the Lakes Environmental Software implementation/user interface, AERMOD View™ 9.9.5.

Air Dispersion Parameters

The air dispersion modeling parameters used for the odor modeling analysis are as follows:

Meteorological Data

AERMOD-specific meteorological (met) data for the Tacoma Tideflats station was used for the dispersion modeling. A 5-year data set from 2012 through 2016 was obtained from the PSCAA in a preprocessed format suitable for use in AERMOD.

AERMOD does not include an Ustar adjustment (ADJ_U*) option, therefore pre-processed MET data was assumed to be Ustar adjusted.

Urban and Rural Options

The facility is located in Tacoma near Commencement Bay. Due to the location of the facility near a waterway, the rural option was used in the analysis.

Modeling Options

Odor compounds disperse quickly with short timescales that are instantaneous in nature. Therefore, AERMOD was run with the lowest averaging period (1-hour). The modeling included the use of standard regulatory default options.

On-Site and Off-Site Buildings

All significant buildings were included in the dispersion model for the purpose of estimating building downwash. Onsite and off-site buildings were included in AERMOD that have a potential for downwash effects. Building downwash was assessed using building locations and dimensions using BPIPPRIME and included with the AERMOD project files.

Terrain Characteristics

The facility is generally flat surrounded by numerous hills. Therefore, digital terrain data was imported for all sources and receptors and actual elevations.

Receptors

The odor analysis modeling evaluated receptors within the modeling grid. Specifically, this analysis focused on the concentrations at potential habitable locations in neighboring communities

Source Characteristics

The odor analysis includes the thermal oxidizer that vents the cooker and packed bed wet scrubber that vents room air where processing equipment is operated at ambient air temperatures. Emissions from the cooker and supporting conversion steps vent to a 10,000 cubic feet per minute (cfm) shop-built venturi scrubber, and an 18 million British units per hour (MMBtu/hr) thermal oxidizer in series. The room air fugitives are controlled by a 65,000-cfm packed bed scrubber. The source characteristics used for the odor modeling analysis are provided in Table 2.

Table 1: Source Characteristics

Parameter	Cooker (Replacement)	Processing Area (Room Air)
Existing Release	Thermal oxidizer	Packed bed scrubber
Source Type	Point	Point
Release Height (ft)	24 ft	41.5 ft
Stack Diameter (ft)	1.93	4.26
Stack Dimensions	L=20.5" W=20.5"	L=41" W=41"
Stack Temperature (F)	275	80
Flow Rate (acfm)	10,000	65,000

ODOR COMPOUND IDENTIFICATION

Source Emissions Analysis

Emissions of odorous compounds were estimated based on concentrations measured from a study referenced by the PSCAA and shown in the protocol, on a pound per hour basis according to exhaust flowrates. The Study identified the primary contributors to odor intensity based on odor activity value (OAV) as methanethiol (MT), isopentanal, and to a lesser extent hydrogen sulfide (H2S). Therefore, in accordance with the agreed to protocol, odor impacts were evaluated based on these specific compounds as they are individually primary contributors to odor intensity and are also representative of the chemical families that contribute to potential odor impacts.

A control efficiency of 95% was applied to the thermal oxidizer, which is more conservative than the 99% presented in the NOC application. Also being conservative, no control efficiency was applied to the venturi scrubber operated at Darling, and also no additional reductions were applied for the air-cooled condenser, which removes the most odorous compounds emitted from the cooker. Similarly, emissions from the room air to the scrubber were estimated based on the measured concentrations reflecting the test conditions of the Study. Room air concentration were adjusted to account for fugitive emissions from equipment and applied to the volumetric flowrate of the wet scrubber operated at Darling.

The uncontrolled odor profile for the cooker and the room air fugitives was determined using the surrogate emission factor as described in Table 1 below and provided in Attachment 1.

Table 2: Malodorous Emission Rates

Compound	Type	Odor Quality	Emission Rate*		
			Cooker (lb/hour)	Room Air (lb/hour)	Total (lb/hour)
Methanethiol	Organosulfur	putrid smell	0.030	0.39	0.43
Isopentanal	Aldehyde compound	acrid, pungent	0.033	0.44	0.47
H_2S	Sulfur compounds	foul rotten eggs	0.029	0.38	0.41

*Cooker emissions based on measured concentrations of non-condensable gases (post-condenser) from the venturi scrubber with a 95% destruction efficiency due to the thermal oxidizer. Room air emissions is based on adjusted measured concentrations with no additional post-control destruction efficiency due to the wet scrubber.

Odor Relative Dilution Analysis

Because odor is subjective, the PSCAA may consider the reduction in perceived ambient impacts, as relevant, to determining the appropriate BACT for odor. Odor modeling uses an odor emission rate for estimating a relative dilution analysis. As an AERMOD input[1], an odor emission rate in Odor Units per second (OU/s) is calculated as follows:

$$E = V*DTT$$

Where:

E = Odor emission rate (OU/s)

V = Volumetric flow rate of the emission source (m^3/s)

DTT = Odor concentration in OU/m^3 (number of dilutions to odor threshold)

The methodology consists of modeling the odor emission rate to compare the output results in units of odor concentration (OU/m^3) less than an odor detection threshold of 1 OU/m^3. The DTT is the number of dilutions needed to reach a level where no odors are detectable. A DTT of 5 OU/m^3 is considered a typical level where odors are below detection for most people and will be used in this analysis. An odor modeling analysis was performed on the existing thermal oxidizer and packed bed wet scrubber stacks.

ODOR MODELING RESULTS

Odor Dilution Analysis

The results of the relative dilution analysis (Table 3) suggests that theoretically the scrubber has an elevated odor concentration compared to the thermal oxidizer, which is consistent with its higher odor emission rate. Isopleths for source group all are included in Attachment 1 of this report. The conservative assumptions on controls may have also contributed to the scrubber results. These Room Air scrubbers typically handle a very limited odor loading as they are intended to manage just fugitives in the processing space.

Table 1: Odor Unit Results at Nearest Resident

Compound	Concentration (OU/m^3)
Thermal Oxidizer	0.00276
Scrubber	0.01440
All	0.01716

Odor concentration is well below the odor detection threshold of 1 OU/m^3 at the nearest public residences.

Source Emissions Analysis

The individual chemical odor analysis was based on modeling emissions of methanethiol, isopentanal, and hydrogen sulfide as odorous compounds from the cooker and processing room. Concentrations at the nearest public receptors were compared to the published odor thresholds (Table 4). The modeled

[1] AERMOD includes Odor Units as an emission rate term to be modeled for estimating the number of dilutions to meet an odor threshold.

odor concentrations by pollutant are similar, with the room air scrubber contributing approximately 94% of the odor concentrations

Table 2: Odor Modeling Results by Pollutant at Nearest Residence

Substance	Venturi Scrubber/ Thermal Oxidizer	Room air scrubber	Venturi Scrubber/ Thermal Oxidizer	Room air scrubber	All	Odor Threshold Concentration
	Emission rate (g/s)		Max Concentration at Resident ($\mu g/m^3$)			$\mu g/m^3$
Methanethiol	0.004	0.050	0.34	4.86	5.19	2.10
Isopentanal	0.004	0.055	0.38	5.35	5.72	8.02
Hydrogen sulfide	0.004	0.048	0.33	4.68	5.00	6.55

Overall, only methanethiol was above the threshold, however emissions are unlikely to result in the concentration at the distance to the resident based on the conservative modeling assumptions and the fact that this is an odor detection threshold rather than an odor nuisance threshold. In practice it is not expected to cause an odor nuisance at that level.

Emissions from the room air to the scrubber were estimated based on the measured concentrations from the PSCAA identified study[2] (the Study). The Study observed that the removal efficiency of methanethiol was poor compared to hydrogen sulfide, aldehydes and ketones. In accordance with the Study, the incomplete degradation suggests that the conditions such as the lack of nutrients and acidic pH may not have been optimal. The conditions may help explain why the removal of methanethiol was low compared to other pollutants.

Relative Dilution Analysis

To provide a relative comparative analysis of how the thermal oxidizer compares to the scrubber in terms of dilution at distance, modeled results (concentration) were divided by the emissions estimates. The emissions by pollutant for the room air scrubber are approximately 13 times higher than the thermal oxidizer while the modeled odor concentrations are approximately 14 times higher with the scrubber (Table 5). For the modeled scenario, this suggests that the emissions are a more significant contributor to the odor concentrations that the release parameters. Isopleths for source group all by pollutant are included in Attachment 1 of this report.

It is important to note that the emission calculations used in this analysis were based on the measured concentrations from the Study. Therefore, the results in this study should be taken as a theoretical starting point in analyzing odor concentrations at the public receptors.

[2] Anet et al 2013.

Table 5: Source Ratios by Pollutant

Compound	Ratio (Scrubber/Thermal Oxidizer)		
	Emissions	Concentration	Concentration/Emissions
Methanethiol	13.00	14.29	1.10
Isopentanal	13.00	14.08	1.08
Hydrogen sulfide	13.00	14.18	1.09

CONCLUSION

The air dispersion modeling results of the relative dilution analysis suggest that the combined contribution of odor concentrations from both sources is well below the odor detection threshold of 1 OU/m^3 at the nearest residences.

The individual chemical odor analysis was based on modeling emissions of methanethiol, isopentanal, and hydrogen sulfide as odorous compounds from the cooker and processing room. The room air scrubber contributed approximately 94% of the odor concentrations by pollutant. Overall, only methanethiol was above the threshold, however it is not expected to cause an odor nuisance at that level. With the emission calculations based on the measured concentrations from the Study, the results of this analysis should be interpreted qualitatively as changes in emissions will have a direct impact on the resulting odor concentrations.

Although the odor modeling analysis was completed using the rural dispersion option, as suggested by the PSCAA, this appears to be conservative based on the location of the facility and population categories according to the Auer land use technique. To investigate the differences in odor concentrations between the rural and urban dispersion options, a subsequent methanethiol run was completed with the urban dispersion option. Results from this run suggest that the methanethiol concentrations are below the odor threshold at the residences.

Should you have any questions or concerns, please contact me at (949) 606-3687.

Sincerely,

Nicholas Gysel

Nick Gysel
Engineer, PhD
Yorke Engineering, LLC
NGysel@YorkeEngr.com

cc: Bill McMurtry, Darling Ingredients Inc.
Russel Kingsley, Yorke Engineering, LLC
Greg Wolffe, Yorke Engineering, LLC

Attachment 1 – Individual Odor Compound Assessment Isopleths

ATTACHMENT 1 – INDIVIDUAL ODOR COMPOUND ASSESSMENT ISOPLETHS

Isopentanal

Hydrogen Sulfide

Methanethiol