

San Joaquin Valley Air Pollution Control District Authority to Construct Application Review Animal Rendering Operation

Facility Name: Darling International Inc. Date: 8/11/07
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Application #s: C-406-1-5, 2-4, and 4-5
Project #: C-1070484
Deemed Complete:

I. Proposal

Darling International Inc, hereafter referred to as Darling, is proposing to increase the amount of raw material it may process in permit units C-406-1 and -2 from 850,000 pounds per day to 1,510,560 pounds per day, facility-wide. Darling is not proposing any new equipment or additional modifications to its operating permit. Additionally, Darling is proposing to remove the raw material limiting condition from the meat and bone meal (MBM) storage permit listed under C-406-4, since raw material is not processed in this permit unit.

Permitting History

Darling International is a rendering facility that operates at 795 W. Belgravia in Fresno, CA. This site is very near several residential neighborhoods, located to the east-northeast, and to the south-southeast of the facility site. Fresno County APCD (prior to District unification) had received many odor complaints from the nearby residents stating that Darling (or its predecessors) were the cause of disagreeable odors. Upon District unification, these complaints continued. Fresno County APCD and District investigations revealed many different causes, but much of the odor complaints could be traced to either poor housekeeping or poorly maintained, old equipment that was reaching the end of its service life.

On November 5, 2003 (project C-1031912), the District received applications from Darling International to rebuild or replace much of its processing and odor abatement equipment. The following lists some of the work undertaken at this facility:

- Replace the existing concrete floor to include new scupper and sump collection system, eliminating the main sump outside

- Replace the existing wastewater pre-treatment system with a new system to include a roto strainer, mechanical skimmer, dissolved air flotation unit (DAF), air system, sludge tank, and associated plumbing, pumps, and control systems
- Upgrade packing, plumbing, and controls on the existing 75,000 cfm room air scrubber
- Upgrade packing, plumbing, and controls on the existing 100,000 cfm room air scrubber
- Upgrade the existing scrubber and thermal oxidizer ductwork
- Install a new 12,000 cfm venturi scrubber in the cooker exhaust prior to the thermal oxidizer
- Replace the existing 12,000 cfm thermal oxidizer fan with a new fan
- Replace the existing Dupps Hogger (a grinding unit) with one new Atlas-Stord Model TMA UNI 4 grinder
- Install a new 27,000 pound surge bin to stage ground raw materials
- Install 19 new material conveyors (inside the main production building) to replace and supplement existing conveyors
- Replace motor control center and other electrical upgrades
- Replace the existing Dupps press with a new Atlas-Stord Model AS-300 High Pressure press
- Replace the existing control room with a new control room
- Install a new fat tallow work tank with pumps to work with the new cooker
- Replace the existing 260 J Dupps Cooker with an Atlas-Stord Model TST-2264 Cooker
- Install a new Roto-Shear free fat drainer to the new cooker
- Replace chlorine gas in room air scrubbers with either Radox or chlorine dioxide (ability to use both, not simultaneously)
- Install closing devices on all entry/exit doors (per applicant)

As a part of the equipment upgrade, Darling requested an increase in raw material throughput to match the maximum rendering capacity of its new cooker. This request was withdrawn, however, when public opposition to the increase was voiced during several public hearings held by the City of Fresno. Neighborhood leaders voiced concerns regarding an increase in potential odors due to an increase in raw material processing. It was not known at the time if the new equipment and facility upgrades would mitigate all nuisance odors. As a result, the District issued ATC permits authorizing only equipment and facility upgrades, while the raw material throughput remained the same at 850,000 pounds per day.

As discussed in Section VIII, Compliance, Rule 4102 Nuisance, below, it appears that the facility upgrades have addressed the existing nuisance odors, and Darling is now re-applying for the raw material process rate increase to 1,510,560 pounds per day.

Permit Coordination

All outstanding ATCs related to facility upgrades and mitigation measures for nuisance odors have been implemented. Therefore no permit coordination is required.

II. Applicable Rules

Rule 2201 New and Modified Stationary Source Review Rule (9/21/06)

Rule 2520 Federally Mandated Operating Permits (6/21/01)
Rule 4001 New Source Performance Standards (4/14/99)
Rule 4002 National Emissions Standards for Hazardous Air Pollutants (5/20/04)
Rule 4101 Visible Emissions (11/15/01)
Rule 4102 Nuisance (12/17/92)
Rule 4104 Reduction of Animal Matter (12/17/92)
Rule 4201 Particulate Matter Concentration (12/17/92)
Rule 4301 Fuel Burning Equipment (12/17/92)
Rule 4801 Sulfur Compounds (12/17/92)
CH&SC 41700 Health Risk Assessment
CH&SC 42301.6 School Notice
California Environmental Quality Act (CEQA)

III. Project Location

The facility is located at 795 W. Belgravia in Fresno, CA. The equipment is not located within 1,000 feet of the outer boundary of a K-12 school. Therefore, the public notification requirement of California Health and Safety Code 42301.6 is not applicable to this project.

IV. Process Description

Darling International is an animal rendering facility. Animal raw material (raw material) are transported by truck from local slaughterhouses and other sources to the receiving area. The raw material is conveyed to grinders where it is ground and chopped into uniform size pieces. The material is then introduced into a cooker where the material is indirectly heated (heat is supplied by steam from permitted boilers). Vapors from the cooker are condensed in an air-cooled condenser. The condensate is sent to the municipal sewers.

Non-condensable vapors that escape the air-cooled condensing process are treated by a 12,000 cfm venturi scrubber. The venturi scrubber exhausts to a thermal oxidizer. Any remaining emissions will be incinerated before being vented to the atmosphere.

The resulting material from the cooker is crax, and once ground is called meat and bone meal (MBM). MBM is conveyed to storage silos where they are stored for loadout. Insignificant amounts of particulate matter are emitted from the loadout system (0.7 lb PM10/day, see C-1041037), but what emissions do exist are controlled by the 75,000 cfm room air scrubber. The loadout system is enclosed in the processing building which is kept under negative pressure, ensuring 100% capture efficiency.

V. Equipment Listing

C-406-1

Pre-project Equipment Description

ANIMAL RENDERING OPERATION INCLUDING A RAW MATERIAL RECEIVING OPERATION EQUIPPED WITH A RECEIVING AREA, SURGE BIN, PROCESSING EQUIPMENT, MEAL GRINDING AREA, AND WASTEWATER TREATMENT SYSTEM WITH TWO FLOW EQUALIZATION TANKS SERVED BY ONE 100,000 CFM PACKED-TOWER

WET SCRUBBER AND ONE 75,000 CFM PACKED-TOWER WET SCRUBBER (75,000 CFM PACKED-TOWER WET SCRUBBER SHARED WITH C-0406-4)

Modification

MODIFICATION OF ANIMAL RENDERING OPERATION INCLUDING A RAW MATERIAL RECEIVING OPERATION EQUIPPED WITH A RECEIVING AREA, SURGE BIN, PROCESSING EQUIPMENT, MEAL GRINDING AREA, AND WASTEWATER TREATMENT SYSTEM WITH TWO FLOW EQUALIZATION TANKS SERVED BY ONE 100,000 CFM PACKED-TOWER WET SCRUBBER AND ONE 75,000 CFM PACKED-TOWER WET SCRUBBER (75,000 CFM PACKED-TOWER WET SCRUBBER SHARED WITH C-0406-4): INCREASE RAW MATERIAL THROUGHPUT LIMIT TO 1,510,560 POUNDS PER DAY

Post-project Equipment Description

ANIMAL RENDERING OPERATION INCLUDING A RAW MATERIAL RECEIVING OPERATION EQUIPPED WITH A RECEIVING AREA, SURGE BIN, PROCESSING EQUIPMENT, MEAL GRINDING AREA, AND WASTEWATER TREATMENT SYSTEM WITH TWO FLOW EQUALIZATION TANKS SERVED BY ONE 100,000 CFM PACKED-TOWER WET SCRUBBER AND ONE 75,000 CFM PACKED-TOWER WET SCRUBBER (75,000 CFM PACKED-TOWER WET SCRUBBER SHARED WITH C-0406-4)

C-406-2

Pre-project Equipment Description

ANIMAL RENDERING OPERATION EQUIPPED WITH AN ATLAS-STORD TST-2264 COOKER, TALLOW WORK TANK, ROTO-SHEAR FAT DRAINER, PRESSES, SCREWS, CENTRIFUGE, AND CONDENSER SERVED BY A 12,000 CFM VENTURI SCRUBBER AND AN 18 MMBTU/HR NATURAL GAS-FIRED THERMAL OXIDIZER WITH AN ASSOCIATED 350 HP HEAT RECOVERY STEAM BOILER

Modification

MODIFICATION OF ANIMAL RENDERING OPERATION EQUIPPED WITH AN ATLAS-STORD TST-2264 COOKER, TALLOW WORK TANK, ROTO-SHEAR FAT DRAINER, PRESSES, SCREWS, CENTRIFUGE, AND CONDENSER SERVED BY A 12,000 CFM VENTURI SCRUBBER AND AN 18 MMBTU/HR NATURAL GAS-FIRED THERMAL OXIDIZER WITH AN ASSOCIATED 350 HP HEAT RECOVERY STEAM BOILER: INCREASE RAW MATERIAL THROUGHPUT LIMIT TO 1,510,560 POUNDS PER DAY

Post-project Equipment Description

ANIMAL RENDERING OPERATION EQUIPPED WITH AN ATLAS-STORD TST-2264 COOKER, TALLOW WORK TANK, ROTO-SHEAR FAT DRAINER, PRESSES, SCREWS, CENTRIFUGE, AND CONDENSER SERVED BY A 12,000 CFM VENTURI SCRUBBER AND AN 18 MMBTU/HR NATURAL GAS-FIRED THERMAL OXIDIZER WITH AN ASSOCIATED 350 HP HEAT RECOVERY STEAM BOILER

C-406-4

Pre-project Equipment Description

MEAL PRODUCT STORAGE AND LOADOUT OPERATION WITH A CRAX RECEIVING OPERATION AND FOUR ENCLOSED STORAGE LOADOUT BINS ALL SERVED BY A PACKED-TOWER SCRUBBER (SHARED WITH PERMIT C-406-1), EIGHT TALLOW AND YELLOW GREASE LOADOUT TANKS, AND TWO MEAT AND BONE MEAL STORAGE SILOS

Modification

MODIFICATION OF MEAL PRODUCT STORAGE AND LOADOUT OPERATION WITH A CRAX RECEIVING OPERATION AND FOUR ENCLOSED STORAGE LOADOUT BINS ALL SERVED BY A PACKED-TOWER SCRUBBER (SHARED WITH PERMIT C-406-1), EIGHT TALLOW AND YELLOW GREASE LOADOUT TANKS, AND TWO MEAT AND BONE MEAL STORAGE SILOS: REMOVE RAW MATERIAL THROUGHPUT LIMIT (ONLY APPLICABLE TO UNITS C-406-1 AND C-406-2)

Post-project Equipment Description

MEAL PRODUCT STORAGE AND LOADOUT OPERATION WITH A CRAX RECEIVING OPERATION AND FOUR ENCLOSED STORAGE LOADOUT BINS ALL SERVED BY A PACKED-TOWER SCRUBBER (SHARED WITH PERMIT C-406-1), EIGHT TALLOW AND YELLOW GREASE LOADOUT TANKS, AND TWO MEAT AND BONE MEAL STORAGE SILOS

VI. Emission Control Technology Evaluation

Emissions from the thermal oxidizer serving the cooking process are NO_x, SO_x, PM₁₀, CO, and VOC from the combustion of fuel. The use of natural gas as fuel will help to ensure that emissions from combustion are minimized, as natural gas is considered a clean fuel.

Odor emissions from the cooking process are treated by condensers that remove condensable emissions from the exhaust stream, and any noncondensable emissions are scrubbed before being incinerated in a thermal oxidizer. Per AP-42, Section 9.5.3, VOC emissions are primarily in the form of odors, which are extremely difficult to quantify. No particulate emissions are expected, since the material at this point is still very wet, and friable portions are not likely. AP-42 also lists emission factors for ammonia and hydrogen sulfide, but these only apply to direct-fired blood drying operations. Darling International does not process blood meal. Nuisance odors are discussed in further detail in Section VIII, Compliance.

No particulate matter is expected from raw material receiving and dumping, since raw material has a high moisture content.

Particulate matter is emitted from the silo loadout system, and these are collected and controlled by the room air scrubbers. See project C-1031912 for analysis of these emissions.

VII. General Calculations

A. Assumptions

- No increase in fuel usage for existing fuel-burning equipment (applicant proposed)
- No increase in criteria pollutant emissions from any permit unit (applicant proposed)
- Emissions from raw material receiving only include odors; no criteria pollutants are expected (applicant proposed)
- Facility operates 6 days per week, 24 hours/day (applicant)

B. Emission Factors

C-406-1 – Raw Material Receiving

There are no emission factors for the raw material receiving operation listed under C-406-1. Emissions from this operation are expected to only be nuisance odors.

C-406-2 – Cooking Operation

Emission factors for the thermal oxidizer serving the cooking process are taken from the current Permits to Operate (see Appendix A). These emission factors take into account controlled VOC emissions from the cooking and rendering process. The cooker is steam heated, and does not have criteria pollutants of its own.

Cooking Operation (thermal oxidizer exhaust)

NO_x – 2.52 lb/hr (please note that this value represents a combined NO_x emission rate from both the cooker and the thermal oxidizer due to natural gas combustion)
SO_x – 0.01 lb/hr
PM₁₀ – 0.04 lb/hr
CO – 0.63 lb/hr
VOC – 0.05 lb/hr

C-406-4 – MBM Storage and Loadout

Emission factor for the MBM storage silo is 0.0008 lb PM₁₀/ton MBM loaded, and is taken from project C-1041037.

C. Calculations

1. Pre-Project Potential to Emit (PE1)

C-406-1

The raw material receiving and handling area has a unique emissions profile. Criteria pollutant emissions at this point are assumed to be negligible as discussed below:

Criteria Pollutants

NO_x emissions are not likely, as NO_x formation depends upon high heat and the availability of oxygen. Although there is plentiful oxygen in the processing building, the raw material is not heated at this stage.

SO_x emissions are not likely, as SO_x also depends upon combustion processes in order to be emitted into the atmosphere. Again, no heating or cooking takes place at this stage of the process.

PM₁₀ emissions may be present, but since raw material is very wet at this point of the process, it is not likely that any material would become entrained due to handling or grinding.

CO emissions result only from the incomplete (less than stoichiometric) combustion of fuel. Since no fuel is being used at this point of the process, CO emissions are non-existent.

VOC emissions may result from the decomposition of the raw material as it is awaiting processing. However, the amount of these VOC emissions are generally believed to be more of a nuisance problem than contributing to an ozone problem. It is extremely difficult to quantify the VOC emissions from raw material decomposition. Different factors such as temperature, moisture content, humidity, age of the raw material, raw material type (whether it be a cow, sheep, or pig) all would have significant impact on decomposition. Therefore this evaluation will assume these emissions are negligible at this point in time, and concentrate more on odor reduction, as discussed in Section VIII, Compliance.

Nuisance Emissions

It is generally accepted that the raw material receiving and the initial processing area is the part of the process that is most likely to generate nuisance emissions. A very wide range of compounds are known to exist which would cause a 'disagreeable' olfactory response. Compounds such as skatole and the lighter mercaptans have been described by some people to be quite disagreeable. However, the concentration of these compounds, and the very identity of some of them is a very subjective matter. A compound at a certain level would be very disagreeable to one person, where another might not even notice it.

For this stage of the process, the focus will be methods of odor reduction as opposed to trying to quantify odorous emissions. Methods of odor reduction are discussed in detail in Section VIII, Compliance.

C-406-2

Emissions shown below are controlled emissions after the thermal oxidizer.

Daily Emissions

Pollutant	EF (lb/hr)	hr/day	lb/day
NOx	2.52	24	60.5
SOx	0.01	24	0.2
PM10	0.04	24	1.0
CO	0.63	24	15.1
VOC	0.05	24	1.2

Annual Emissions

Pollutant	EF (lb/hr)	hr/year	lb/year
NOx	2.52	7488	18,870
SOx	0.01	7488	75
PM10	0.04	7488	300
CO	0.63	7488	4717
VOC	0.05	7488	374

C-406-4

PE1 values are based on the throughputs (since they are not changing) from the PE2 calculation in project C-1031415. The silo system has three potential emission points:

- EP1 = transfer of meal through elevator from grinding room to storage silos
- EP2 = transfer of meal from storage silos to overhead bin
- EP3 = transfer of meal from overhead bin to delivery truck

Please note that the augers at this facility are open augers, but since all material movement occurs inside an enclosed building kept under negative pressure at all times, the augers will be considered enclosed, and not a source of emissions.

Permit #	throughput (ton/day)	EF (lb/ton)	VOC		PM10	
			PE1 (lb/day)	PE1 (lb/yr)	PE1 (lb/day)	PE1 (lb/yr)
C-406-4						
EP1	130*	0.0008	0	0	0.1	38.0
EP2	324	0.0008	0	0	0.3	94.6
EP3	324	0.0008	0	0	0.3	94.6
		Totals	0	0	0.7	227

*Max throughput based on maximum production rate assuming 30% by weight of raw material results in protein solids: 850,000 lb/day x 0.3 x 1/2000 = 127.5 ~130 ton/day.

The crax receiving operation is not expected to be a significant source of emissions. Crax is unground product that has completed the cooking process. The crax that is received from other Darling facilities is mixed with the crax that is produced at the

Fresno facility. Until this material is ground, it is not expected to create particulate emissions. As shown above, emissions are not assessed until the material is transferred from the grinding room to the storage silos.

2. Post Project Potential to Emit (PE2)

PE2 is the same as PE1 calculated above. The only increase proposed is in raw material, which does not have any significant levels of criteria pollutants associated with it. The applicant is not proposing any increases in fuel usage.

3. Pre-Project Stationary Source Potential to Emit (SSPE1)

Pursuant to Section 4.9 of District Rule 2201, the Pre-Project Stationary Source Potential to Emit (SSPE1) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

SSPE1 (lb/year)					
Permit Unit	NO _x	SO _x	PM ₁₀	CO	VOC
C-406-1-2	0	0	0	0	0
C-406-2-2	18,870	75	300	4,717	374
C-406-3-9	9,806	1,091	4,022	56,469	1,134
C-406-4-3	0	0	227	0	0
SSPE1	28,676	1,166	4,549	61,186	1,508

4. Post Project Stationary Source Potential to Emit (SSPE2)

Pursuant to Section 4.10 of District Rule 2201, the Post Project Stationary Source Potential to Emit (SSPE2) is the Potential to Emit (PE) from all units with valid Authorities to Construct (ATC) or Permits to Operate (PTO) at the Stationary Source and the quantity of emission reduction credits (ERC) which have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.

SSPE2 is the same as SSPE1 above, since the applicant is not proposing any changes that would affect criteria pollutant emissions.

5. Major Source Determination

Pursuant to Section 3.24 of District Rule 2201, a Major Source is a stationary source with post-project emissions or a Post Project Stationary Source Potential to Emit (SSPE2), equal to or exceeding one or more of the following threshold values. However, Section 3.24.2 states, "for the purposes of determining major source status, the SSPE2 shall not include the quantity of emission reduction credits (ERC) which

have been banked since September 19, 1991 for Actual Emissions Reductions that have occurred at the source, and which have not been used on-site.”

Major Source Determination (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
Pre-Project SSPE (SSPE1)	28,676	1,166	4,549	61,186	1,508
Post Project SSPE (SSPE2)	28,676	1,166	4,549	61,186	1,508
Major Source Threshold	50,000	140,000	140,000	200,000	50,000
Major Source	No	No	No	No	No

As seen in the table above, the facility is not an existing Major Source and also is not becoming a Major Source as a result of this project.

6. Baseline Emissions (BE)

BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE), calculated pursuant to Section 3.22

As shown in Section VII.C.5 above, the facility is not a Major Source for any criteria pollutant.

Therefore Baseline Emissions (BE) are equal to the Pre-Project Potential to Emit (PE1), which is calculated in Section VII.C.1 above.

7. Major Modification

Major Modification is defined in 40 CFR Part 51.165 as "*any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act.*"

As discussed in Section VII.C.5 above, the facility is not a Major Source for any criteria pollutant; therefore, the project does not constitute a Major Modification.

8. Federal Major Modification

As shown above, this project does not constitute a Major Modification. Therefore, in accordance with District Rule 2201, Section 3.17, this project does not constitute a Federal Major Modification and no further discussion is required.

9. Quarterly Net Emissions Change (QNEC)

The QNEC is calculated solely to establish emissions that are used to complete the District's PAS emissions profile screen. Since potential to emit is not changing for any emissions unit in this project, there is no QNEC and QNEC calculations are not required.

VIII. Compliance

Rule 2201 New and Modified Stationary Source Review Rule

A. Best Available Control Technology (BACT)

1. BACT Applicability

BACT requirements are triggered on a pollutant-by-pollutant basis and on an emissions unit-by-emissions unit basis for the following*:

- a. Any new emissions unit with a potential to emit exceeding two pounds per day,
- b. The relocation from one Stationary Source to another of an existing emissions unit with a potential to emit exceeding two pounds per day,
- c. Modifications to an existing emissions unit with a valid Permit to Operate resulting in an AIPE exceeding two pounds per day, and/or
- d. Any new or modified emissions unit, in a stationary source project, which results in a Major Modification.

*Except for CO emissions from a new or modified emissions unit at a Stationary Source with an SSPE2 of less than 200,000 pounds per year of CO.

a. New emissions units – PE > 2 lb/day

As discussed in Section I above, there are no new emissions units associated with this project; therefore BACT for new units with PE > 2 lb/day purposes is not triggered.

b. Relocation of emissions units – PE > 2 lb/day

As discussed in Section I above, there are no emissions units being relocated from one stationary source to another; therefore BACT is not triggered.

c. Modification of emissions units – AIPE > 2 lb/day

$$\text{AIPE} = \text{PE2} - \text{HAPE}$$

Where,

AIPE = Adjusted Increase in Permitted Emissions, (lb/day)

PE2 = Post-Project Potential to Emit, (lb/day)

HAPE = Historically Adjusted Potential to Emit, (lb/day)

$$\text{HAPE} = \text{PE1} \times (\text{EF2}/\text{EF1})$$

Where,

PE1 = The emissions unit's Potential to Emit prior to modification or relocation, (lb/day)

EF2 = The emissions unit's permitted emission factor for the pollutant after modification or relocation. If EF2 is greater than EF1 then EF2/EF1 shall be set to 1

EF1 = The emissions unit's permitted emission factor for the pollutant before the modification or relocation

$$AIPE = PE2 - (PE1 * (EF2 / EF1))$$

Since PE1 and PE2 are equal to each other, and EF2 and EF1 are also equal to each other, the AIPE calculation will result in zero. BACT is not required for AIPE greater than 2 lbs per day.

d. Major Modification

As discussed in Section VII.C.7 above, this project does not constitute a Major Modification; therefore BACT is not triggered.

B. Offsets

1. Offset Applicability

Pursuant to Section 4.5.3, offset requirements shall be triggered on a pollutant by pollutant basis and shall be required if the Post Project Stationary Source Potential to Emit (SSPE2) equals to or exceeds the offset threshold levels in Table 4-1 of Rule 2201.

The following table compares the post-project facility-wide annual emissions in order to determine if offsets will be required for this project.

Offset Determination (lb/year)					
	NO _x	SO _x	PM ₁₀	CO	VOC
Post Project SSPE (SSPE2)	28,676	1,166	4,549	61,186	1,508
Offset Threshold	20,000	54,750	29,200	200,000	20,000
Offsets triggered	Yes	No	No	No	No

2. Quantity of Offsets Required

As seen above, the SSPE2 is greater than the offset thresholds for NO_x only; therefore offset calculations will be required for this project.

Per Sections 4.7.1 and 4.7.3, the quantity of offsets in pounds per year for NO_x is calculated as follows for sources with an SSPE1 greater than the offset threshold levels before implementing the project being evaluated.

Offsets Required (lb/year) = $(\Sigma[PE2 - BE] + ICCE) \times DOR$, for all new or modified emissions units in the project,

Where,

PE2 = Post Project Potential to Emit, (lb/year)

BE = Baseline Emissions, (lb/year)

ICCE = Increase in Cargo Carrier Emissions, (lb/year)

DOR = Distance Offset Ratio, determined pursuant to Section 4.8

BE = Pre-project Potential to Emit for:

- Any unit located at a non-Major Source,
- Any Highly-Utilized Emissions Unit, located at a Major Source,
- Any Fully-Offset Emissions Unit, located at a Major Source, or
- Any Clean Emissions Unit, Located at a Major Source.

otherwise,

BE = Historic Actual Emissions (HAE)

It has already been established that BE is equal to PE1, which in turn is also equal to PE2. Since there are no increases in cargo carrier emissions, the amount of offsets required will be zero. No offsets are required for this project.

C. Public Notification

1. Applicability

Public noticing is required for:

- a. Any new Major Source, which is a new facility that is also a Major Source,
- b. Major Modifications,
- c. Any new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any one pollutant,
- d. Any project which results in the offset thresholds being surpassed, and/or
- e. Any project with an SSIPE of greater than 20,000 lb/year for any pollutant.

a. New Major Source

New Major Sources are new facilities, which are also Major Sources. Since this is not a new facility, public noticing is not required for this project for New Major Source purposes.

b. Major Modification

As demonstrated in VII.C.7, this project does not constitute a Major Modification; therefore, public noticing for Major Modification purposes is not required.

c. PE > 100 lb/day

Applications which include a new emissions unit with a Potential to Emit greater than 100 pounds during any one day for any pollutant will trigger public noticing requirements. There are no new emissions units associated with this project; therefore public noticing is not required for this project for Potential to Emit Purposes.

d. Offset Threshold

The following table compares the SSPE1 with the SSPE2 in order to determine if any offset thresholds have been surpassed with this project.

Offset Threshold				
Pollutant	SSPE1 (lb/year)	SSPE2 (lb/year)	Offset Threshold	Public Notice Required
NO _x	28,676	28,676	20,000 lb/year	No
SO _x	1,166	1,166	54,750 lb/year	No
PM ₁₀	4,549	4,549	29,200 lb/year	No
CO	61,186	61,186	200,000 lb/year	No
VOC	1,508	1,508	20,000 lb/year	No

As detailed above, there were no thresholds *surpassed* with this project; therefore public noticing is not required for offset purposes.

e. SSIPE > 20,000 lb/year

Public notification is required for any permitting action that results in a Stationary Source Increase in Permitted Emissions (SSIPE) of more than 20,000 lb/year of any affected pollutant. According to District policy, the SSIPE is calculated as the Post Project Stationary Source Potential to Emit (SSPE2) minus the Pre-Project Stationary Source Potential to Emit (SSPE1), i.e. $SSIPE = SSPE2 - SSPE1$. The values for SSPE2 and SSPE1 are calculated according to Rule 2201, Sections 4.9 and 4.10, respectively. The SSIPE is compared to the SSIPE Public Notice thresholds in the following table:

Stationary Source Increase in Permitted Emissions [SSIPE] – Public Notice					
Pollutant	SSPE2 (lb/year)	SSPE1 (lb/year)	SSIPE (lb/year)	SSIPE Public Notice Threshold	Public Notice Required
NO _x	28,676	28,676	0	20,000 lb/year	No
SO _x	1,166	1,166	0	20,000 lb/year	No
PM ₁₀	4,549	4,549	0	20,000 lb/year	No
CO	61,186	61,186	0	20,000 lb/year	No
VOC	1,508	1,508	0	20,000 lb/year	No

2. Public Notice Action

As discussed above, this project will not result in emissions, for any criteria pollutant, which would subject the project to any of the noticing requirements listed above. Therefore, public notice will not be required for this project for New Source Review purposes.

However, Darling's Fresno facility is located in an area of depressed economic growth, which is inhabited mainly by ethnic minorities. Although the proposed modifications are not anticipated to adversely affect air quality, Darling International is a high-profile facility situated near several neighborhoods that would be subject to Environmental Justice. In order to properly address Environmental Justice and the possible concern of the local residents, the District will require that this project be subject to a 30-day public notice in order to ensure the residents of this area are able to participate in the regulatory process.

Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies.

Fair treatment means that no group of people, including a racial, ethnic, or a socioeconomic group, should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies.

Meaningful involvement means that: (1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contribution can influence the regulatory agency's decision; (3) the concerns of all participants involved will be considered in the decision making process; and (4) the decision makers seek out and facilitate the involvement of those potentially affected.

It is the District's intent to further satisfy all four of the above criteria for meaningful involvement through a 30-day public noticing. Letters summarizing Darling's proposal and the District's findings will be mailed to the residents near this facility. The District will make available a copy of the application, engineering evaluation, draft ATCs, and all other pertinent information for the public's inspection. Only after all comments have been addressed by the District will the ATCs be issued.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The ERG was prepared to comply with this requirement and is an internal document used to comply with CEQA.

The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

The District will prepare a CEQA analysis and will make this document available for public inspection for 30 days, during which comments will be received and considered. This 30-day commenting period will be held simultaneously with the 30-day public noticing period for satisfaction of Environmental Justice requirements.

D. Daily Emission Limits (DELs)

Daily Emissions Limitations (DELs) and other enforceable conditions are required by Section 3.15 to restrict a unit's maximum daily emissions, to a level at or below the emissions associated with the maximum design capacity. Per Sections 3.15.1 and 3.15.2, the DEL must be contained in the latest ATC and contained in or enforced by the latest PTO and enforceable, in a practicable manner, on a daily basis. DELs are also required to enforce the applicability of BACT. The following DELs are existing with the exception of the raw material throughput, and will be carried over to the ATCs that result from this project.

C-406-1-2

- Total facility raw material process rate shall not exceed 1,510,560 pounds per day. [District Rules 2201 and 4102]

C-406-2-2

- Emissions from the thermal oxidizer shall not exceed any of the following emission limits: 2.52 lb NO_x/hr, 0.01 lb SO_x/hr, 0.04 lb PM₁₀/hr, 0.63 lb CO/hr, and 0.05 lb VOC/hr. [District Rule 2201]
- Total facility raw material process rate shall not exceed 1,510,560 pounds per day. [District Rules 2201 and 4102]

C-406-4-2

- Total meal materials loaded from the storage bins shall not exceed 648,000 pounds per day. [District Rule 2201]
- Emissions from MBM loading shall not exceed 0.7 lb-PM₁₀/day. [District Rule 2201]

E. Compliance Assurance

1. Source Testing

Pursuant to District Policy APR 1705, source testing is not required to demonstrate compliance with Rule 2201.

2. Monitoring

No monitoring is required to demonstrate compliance with Rule 2201.

Please note, however, that existing monitoring requirements of the oxidation-reduction potential (ORP) when using chlorine dioxide, and of pH when using Radox in the scrubbers on a continuous basis will be required to ensure compliance with Rule 4102. The operating temperature of the thermal oxidizer will also be monitored on a continuous basis. Additionally, monitoring of the performance of the odor scrubbers as well as the thermal oxidizer will be imposed to address several recent operational problems. See discussion in Rule 4102 compliance, below.

3. Recordkeeping

Recordkeeping is required to demonstrate compliance with the offset, public notification and daily emission limit requirements of Rule 2201. The following condition(s) will appear on the permit to operate:

C-406-1

Records of the daily raw material throughput, continuous ORP readings when using chlorine dioxide in the scrubber, continuous pH readings when using Radox in the scrubber, and time required to process each incoming load to ensure compliance with the 24 hour limitation shall be kept.

C-406-2

Records of the amount of fuel used shall be kept on a weekly basis.

C-406-4

Records of the daily raw material throughput and amount of MBM loaded shall be kept.

4. Reporting

No reporting is required to demonstrate compliance with Rule 2201.

Rule 2520 Federally Mandated Operating Permits

Since this facility's potential emissions do not exceed any major source thresholds of Rule 2201, this facility is not a major source, and Rule 2520 does not apply.

Rule 4001 New Source Performance Standards (NSPS)

This rule incorporates NSPS from Part 60, Chapter 1, Title 40, Code of Federal Regulations (CFR); and applies to all new sources of air pollution and modifications of existing sources of air pollution listed in 40 CFR Part 60. However, no subparts of 40 CFR Part 60 apply to animal rendering operations.

Rule 4002 National Emission Standards for Hazardous Air Pollutants (NESHAPs)

This rule incorporates NESHAPs from Part 61, Chapter I, Subchapter C, Title 40, CFR and the NESHAPs from Part 63, Chapter I, Subchapter C, Title 40, CFR; and applies to all sources of hazardous air pollution listed in 40 CFR Part 61 or 40 CFR Part 63. However, no subparts of 40 CFR Part 61 or 40 CFR Part 63 apply to animal rendering operations.

Rule 4101 Visible Emissions

Rule 4101 states that no person shall discharge air contaminant shall which is as dark as or darker than 20% opacity for greater than three minutes in any one hour.

Darling International is using natural gas to fuel its processes, and all exhaust is controlled by wet scrubbers before being emitted into the atmosphere. Further, a review of the facility's compliance history does not show any violations of this opacity standard.

Since Darling is not proposing to increase criteria pollutant emissions, continued compliance with this rule is expected.

Rule 4102 Nuisance

The emissions of most concern from animal rendering facilities are nuisance emissions in the form of objectionable odors. Since the raw material accepted at these types of facilities is in various stages of decay, the potential for odors is great, especially during the warmer summer months when the higher ambient temperature speeds decomposition. To add to the odors from decay, cooking of the raw material can present nuisance problems, since the cooker exhaust is ultimately emitted into the atmosphere.

Historical Nuisance Odor Complaints

The following table shows the number of nuisance odor complaints the District has received against this facility for the last five years:

Year	# of complaints
2003	6
2004	6
2005	10
2006	3
2007	2

The plant upgrades were implemented and completed in 2006, and the number of complaints against the facility were reduced in spite of the summer of 2006 being warmer than usual. Warmer weather will speed the decay process of raw material, and it would be expected that nuisance odors will also be increased during warmer weather. It is also noted that one of the three complaints against the facility during 2006 was because of a leaking raw material truck and not due to the actual rendering process itself.

Recent Odor Complaints

The two complaints lodged against Darling during June of 2007 related to equipment breakdowns that Darling has addressed and has implemented additional monitoring to ensure that the breakdowns will be minimized in the future. The District notes that the odor complaints are only related to equipment breakdowns, and were not received during periods of normal facility operations. Since breakdown conditions are not indicative of normal plant operations, the proposed increase in raw material handling is not expected to result in an increase in uncontrolled nuisance odors.

One nuisance odor complaint could be traced to the fuel/air mixing cone in the thermal oxidizer being corroded. This corrosion did not allow thorough mixing of the incoming process air, therefore some of it was released un-incinerated to atmosphere. The following condition will be added to ATC C-406-2 to ensure the thermal oxidizer is operating at its maximum control capability:

- *Permittee shall inspect the air/fuel mixing cone in the thermal oxidizer at least once quarterly to ensure that the integrity of the cone is not compromised, and to ensure that the thermal oxidizer is operating at optimum. Records of quarterly inspection shall be maintained. [District Rule 4102]*

The District believes that quarterly monitoring is sufficient to ensure reliable operation of the mixing cone since the cone does not have any moving parts or mechanical processes that are subject to deteriorate rapidly. Additionally, much of the thermal oxidizer is required to be taken apart in order to inspect the cone properly, and a shorter inspection interval would be onerous without markedly improving compliance assurance.

The second nuisance odor complaint could be linked to plugging of the packing material in the wet scrubbers. Bacterial buildup was greater than anticipated due to the different nature of the Radox chemistry currently being employed. Bacterial growth in the packing material hindered the ability of the scrubber to mitigate odors, thusly resulting in an increased nuisance odor situation. Darling has since cleaned the scrubber, and added detergent to the scrubber liquor in order to continuously clean the packing material. Darling is also monitoring the scrubber to ensure that it is operating properly. The following condition will appear on ATC C-406-1 to ensure the scrubbers are operating at maximum control capability:

- *The 75,000 cfm scrubber shall be monitored daily to ensure that the pressure drop does not fall below a minimum pressure of 3 inches of water column or exceed a maximum pressure of 6 inches of water column. [District Rule 4102]*

- *The 100,000 cfm scrubber shall be monitored daily to ensure that the pressure drop does not fall below a minimum pressure of 1 inch of water column or exceed a maximum pressure of 4 inches of water column. [District Rule 4102] N*

As discussed above, as long as the odor control equipment is operated according to manufacturer's recommendations and monitored and maintained properly, nuisance odors are expected to be abated, and Darling will not present a nuisance to the public.

Potential Odor Increase Due to Increase in Raw Material Processing

It is generally valid to assume that an increase in the amount of raw material present at a processing facility would relate to an increase in nuisance odors during material handling operations. However, the allowance of a *raw material processing* throughput increase at Darling's Fresno facility will actually help to alleviate nuisance odor emissions from this operation, as described below.

Darling's Fresno facility operates as a transfer station for its other facilities in San Francisco and Los Angeles. The slaughterhouses in this area are continuously generating raw material, and this is transported to the Fresno facility where it is unloaded and stockpiled for the rendering process under controlled conditions. The raw material that is already onsite is required to be stored under controlled conditions, and is not expected to present a nuisance odor problem. The raw material that cannot be processed in Fresno due to the raw material processing limitation on the current Permit to Operate, however, is then re-loaded onto trucks which are open and uncontrolled, and shipped back out to other rendering facilities that Darling operates. Reloading of raw material from controlled storage into uncontrolled trucks and transporting uncontrolled raw material offsite may contribute significantly to nuisance odors.

By raising the limit for the amount of raw material that can be processed by the Fresno facility, raw material does not have to be reloaded onto trucks and taken out of a controlled environment. The raw material that is already onsite may continue to remain onsite and be processed (under controlled conditions), therefore mitigating the potential for nuisance odor creation by the process of truck reloading (an uncontrolled process). Please see Appendix B for raw material shipping records, which shows that the proposed amount of raw material throughput increase proposed in this project is already currently being shipped to this facility.

Truck Traffic

There are two operating scenarios for truck traffic, both of which is realized at Darling's Fresno facility.

- 1) Loaded trucks arrive at the facility, the material is dumped, and the truck leaves the site empty. Should material not be able to be processed, the truck comes back and reloads the material, and then leaves. In this scenario, there will be a decrease in truck traffic when raw material processing is increased, since materials will not have to be reloaded, therefore sparing the extra truck trip.
- 2) Loaded trucks arrive at the facility, the material is dumped, and the truck stays onsite empty. Should material not be able to be processed, the truck reloads and leaves the facility

full again. In this scenario, truck traffic will remain the same even if raw material throughput is increased. The same amount of traffic is already onsite.

The worst-case scenario for truck traffic from the increase in raw material throughput is that truck traffic will remain the same. The District does not anticipate any increased impacts to air quality from truck traffic.

Risk Manage Review (RMR)

Section 4.0 prohibits discharge of air contaminants which could cause injury, detriment, nuisance or annoyance to the public. Public nuisance conditions are not expected as a result of these operations, provided the equipment is well maintained. Therefore, compliance with this rule is expected.

California Health & Safety Code 41700 (Health Risk Assessment)

District Policy APR 1905 – Risk Management Policy for Permitting New and Modified Sources specifies that for an increase in emissions associated with a proposed new source or modification, the District perform an analysis to determine the possible impact to the nearest resident or worksite.

As demonstrated above, there are no increases in emissions associated with this project, therefore a health risk assessment is not necessary and no further risk analysis is required.

Rule 4104 Reduction of Animal Matter

This rule applies to any source that reduces animal matter. This rule requires that any equipment used to reduce animal matter (such as cookers) be controlled by incinerating all effluent gases at a temperature of at least 1200 degrees F for at least 0.3 seconds. Darling currently operates a thermal oxidizer that meets these rule requirements, and will continue to do so with the proposed modifications. The rule also requires that equipment be installed so that proper operating temperatures, pressures, and other operating conditions may be monitored. Continued compliance with this rule is expected, and the following condition will be placed on the draft Authority to Construct (taken from the current PTO):

- *All non-condensable emissions and vapors shall be incinerated in the thermal oxidizer at a minimum temperature of 1200 degrees F and a minimum retention time of 0.5 seconds. Incineration temperature shall be monitored by a continuously recording temperature device. [District Rules 4104 and 4102]*
- *Thermocouple installed at the rear of the thermal oxidizer shall provide accurate temperature readings of flue gas. An audible alarm shall be installed to alert facility personnel to low temperature readings. [District Rules 4104 and 4102]*

Rule 4201 Particulate Matter Concentration

Section 3.1 prohibits discharge of dust, fumes, or total particulate matter into the atmosphere from any single source operation in excess of 0.1 grain per dry standard cubic foot.

The only sources of significant PM10 emissions is from the thermal oxidizer exhaust and the MBM loadout system. As discussed previously, the raw material unloading and handling area is not expected to emit particulate matter because of the wet characteristics of the raw material.

MBM Loadout

The MBM loadout system is controlled by the 75,000 cfm room air scrubber, as it is enclosed inside of the main processing building. Daily emissions of PM10 from the loadout system is calculated to be 0.7 lb PM10/day (see Section VII.C.2). The grain loading may be calculated thusly:

Assumptions: 7000 gr/lb
50% of total PM is PM10

$$0.7 \text{ lb PM10/day} \times 2 \text{ lb PM/lb PM10} \times 7000 \text{ gr/lb} = 9800 \text{ grain/day} \div 1440 \text{ min/day} = 6.8 \text{ gr/min}$$

$$6.8 \text{ gr/min} \div 75000 \text{ ft}^3/\text{min} = 9.07\text{E-}5 \text{ gr/dscf} \ll 0.1 \text{ gr/dscf}$$

Compliance with this rule is expected for the MBM loadout system.

Thermal Oxidizer

The thermal oxidizer emits 1.0 lb/day of PM10 as calculated in Section VII.C.2. The grain loading of the thermal oxidizer may be calculated:

Assumptions: thermal oxidizer is fired only on natural gas
thermal oxidizer rating is 18.0 MMBtu/hr
F-factor for natural gas is 8710 ft³/MMBtu
[O₂] of 3% in exhaust stream
7000 gr/lb
50% of total PM is PM10

Grain emission rate is calculated:

$$1.0 \text{ lb PM10/day} \times 2 \text{ lb PM/lb PM10} \times 7000 \text{ gr/lb} = 14000 \text{ grain/day} \div 1440 \text{ min/day} = 9.7 \text{ gr/min}$$

Exhaust flow is calculated:

$$18.0 \text{ MMBtu/hr} \times 8710 \text{ ft}^3/\text{MMBtu} \times (20.9 \div 20.9 - 3) = 183,056 \text{ dscf/hr} \div 60 \text{ min/hr} = 3051 \text{ dscfm}$$

Grain loading is thusly calculated:

$$9.7 \text{ gr/min} \div 3051 \text{ dscfm} = 3.2\text{E-}3 \text{ gr/dscf} \ll 0.1 \text{ gr/dscf}$$

Compliance with this rule is expected for the thermal oxidizer.

Rule 4301 Fuel Burning Equipment

This rule applies to equipment that burns fuel for use by indirect heat transfer. The raw material handling area and the MBM loadout system require no fuel usage. The thermal oxidizer that incinerates noncondensable emissions is considered a control device. It is therefore concluded that this rule does not apply to this project.

Rule 4801 Sulfur Compounds

District Rule 4801 prohibits the discharge into the atmosphere of any sulfur-bearing pollutant in excess of 2000 ppmv or 0.2%.

The only point of emission with sulfur-bearing compounds in this project is the thermal oxidizer's exhaust. Daily emissions of SO_x are 0.2 lb/day or 90.8 grams/day.

Using the molecular weight of SO₂ as 64 g/mol, we can calculate the number of moles of sulfur: $90.8 \text{ g} \div 64 \text{ g/mol} = 1.4 \text{ moles}$

Using the ideal gas equation, we can calculate the volume of SO₂ that is emitted:

$$PV = nRT, \text{ or } V = (nRT) \div P$$

Where: V = volume of SO₂

n = moles of SO₂

$$R = \text{constant of } \frac{10.73 \text{ psi} \cdot \text{ft}^3}{\text{lb} \cdot \text{mol} \cdot ^\circ\text{R}}$$

T = 520 degrees R

P = 14.7 psi

$$V = (1.4 (10.73) (520)) \div 14.7 = 531 \text{ ft}^3/\text{lb} \text{ or } 1.3 \text{ E-2 mol/ft}^3$$

Since 1 ft³ is equal to 28.3 liters, we can then find ppmv since ppmv = mg/L

$$1.3 \text{ E-2 mole SO}_2 \times (64 \text{ g/mol SO}_2) \times 1000 \text{ mg/g} = 845 \text{ mg SO}_2$$

$$845 \text{ mg} \div 28.3 \text{ liters} = 30 \text{ ppmv} \ll 2000 \text{ ppmv}$$

As shown above, compliance with this rule is expected.

California Health & Safety Code 42301.6 (School Notice)

The District has verified that this site is not located within 1,000 feet of a school. Therefore, pursuant to California Health and Safety Code 42301.6, a school notice is not required.

California Environmental Quality Act (CEQA)

The California Environmental Quality Act (CEQA) requires each public agency to adopt objectives, criteria, and specific procedures consistent with CEQA Statutes and the CEQA

Guidelines for administering its responsibilities under CEQA, including the orderly evaluation of projects and preparation of environmental documents. The San Joaquin Valley Unified Air Pollution Control District (District) adopted its *Environmental Review Guidelines* (ERG) in 2001. The ERG was prepared to comply with this requirement and is an internal document used to comply with CEQA.

The basic purposes of CEQA are to:

- Inform governmental decision-makers and the public about the potential, significant environmental effects of proposed activities.
- Identify the ways that environmental damage can be avoided or significantly reduced.
- Prevent significant, avoidable damage to the environment by requiring changes in projects through the use of alternatives or mitigation measures when the governmental agency finds the changes to be feasible.
- Disclose to the public the reasons why a governmental agency approved the project in the manner the agency chose if significant environmental effects are involved.

The District has determined that no other agency has discretionary approval over the project, therefore establishing the District as the Lead Agency for the project (CEQA Guidelines §15051(b)). An Initial Study was prepared, which identified impact on air quality as the project's only potential significant environmental effect. The District's engineering evaluation of the project (this document) determined that compliance with District rules and permit conditions would mitigate the project's potential impact to less than significant. Consistent with CEQA Guidelines §15070(b)(1), a proposed Mitigated Negative Declaration was prepared and released for public review.

IX. Recommendation

Compliance with all applicable rules and regulations is expected. Issue Authorities to Construct C-406-1-5, 2-4, and 4-5 subject to the permit conditions on the attached draft Authority to Construct in Appendix C.

X. Billing Information

Annual Permit Fees			
Permit Number	Fee Schedule	Fee Description	Annual Fee
C-406-1-5	3020-01-E	225 electrical HP	\$352
C-406-2-4	3020-02-H	18,000 kbtu/hr	\$882
C-406-4-5	3020-05-E	259,948 gallons	\$210

Appendices

- A: Current PTOs
- B: Raw Material Receipt Records
- C: Draft ATCs and Emissions Profiles

APPENDIX A

Current PTOs

APPENDIX B
Raw Material Receipt Records

APPENDIX C

Draft ATCs and Emissions Profiles