TECHNICAL EVALUATION
&
PRELIMINARY DETERMINATION

APPLICANT

Griffin Industries, LLC
1001 Orient Road
Tampa, Florida 33619-3321

Hampton Facility
Facility ID No. 0070004

PROJECT

Project No. 0070004-022-AC
Application for Air Construction Permit

COUNTY

Bradford, Florida

PERMITTING AUTHORITY

Florida Department of Environmental Protection
Northeast District Office
Waste and Air Resource Management
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

COMPLIANCE AUTHORITY

Florida Department of Environmental Protection
Northeast District Office
Compliance Assurance
8800 Baymeadows Way West, Suite 100
Jacksonville, Florida 32256

August 22, 2013

1. GENERAL PROJECT INFORMATION

Air Pollution Regulations

Projects at stationary sources with the potential to emit air pollution are subject to the applicable environmental laws specified in Section 403 of the Florida Statutes (F.S.). The statutes authorize the Department of Environmental Protection (Department) to establish regulations regarding air quality as part of the Florida Administrative Code (F.A.C.), which includes the following applicable chapters: 62-4 (Permits); 62-204 (Air Pollution Control – General Provisions); 62-210 (Stationary Sources – General Requirements); 62-212 (Stationary Sources – Preconstruction Review); 62-213 (Operation Permits for Major Sources of Air Pollution); 62-296 (Stationary Sources - Emission Standards); and 62-297 (Stationary Sources – Emissions Monitoring). Specifically, air construction permits are required pursuant to Rules 62-4, 62-210 and 62-212, F.A.C.

In addition, the U. S. Environmental Protection Agency (EPA) establishes air quality regulations in Title 40 of the Code of Federal Regulations (CFR). Part 60 specifies New Source Performance Standards (NSPS) for numerous industrial categories. Part 61 specifies National Emission Standards for Hazardous Air Pollutants (NESHAP) based on specific pollutants. Part 63 specifies NESHAP based on the Maximum Achievable Control Technology (MACT) for numerous industrial categories. The Department adopts these federal regulations on a quarterly basis in Rule 62-204.800, F.A.C.

Glossary of Common Terms

Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of this permit.

Facility Description and Location

The proposed work will be conducted at the existing Griffin Industries, Inc.'s Hampton Facility, which is a rendering facility (Standard Industrial Classification No. 2077). The facility is located in Bradford County at 11313 SE 52nd Ave, Starke, Florida. The UTM coordinates are Zone 17, 391.94 km East; 3306.05 km N.

The existing facility consists of three (3) boilers, a waste heat evaporator, a feather rendering system, and two animal/poultry rendering systems.

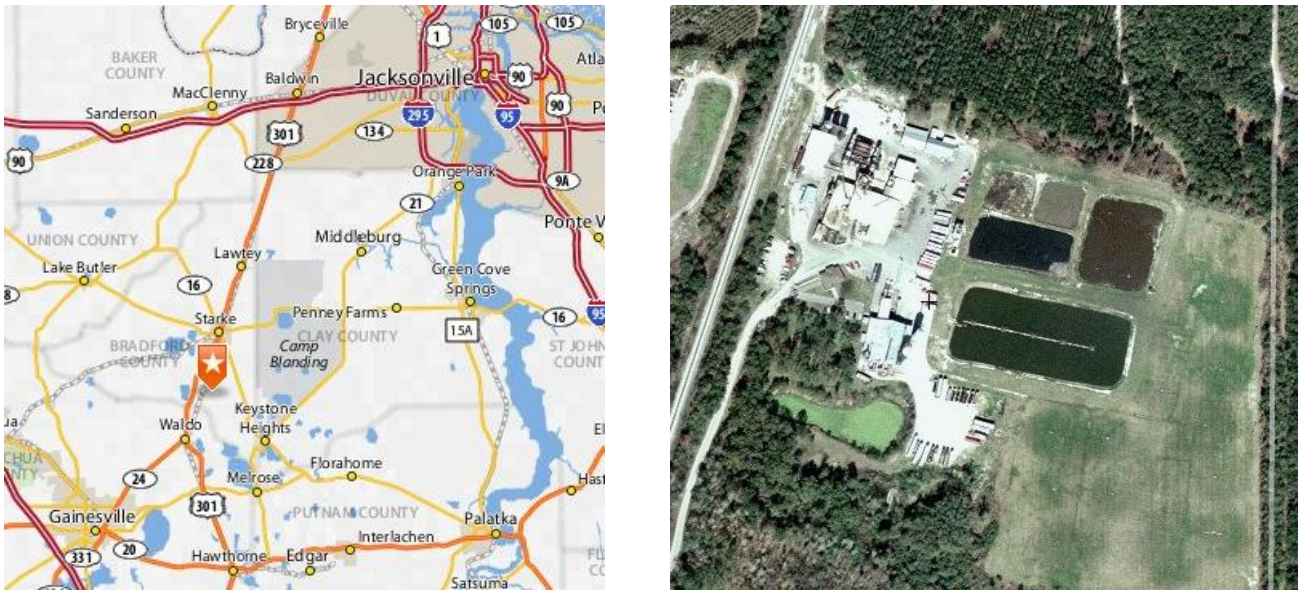


Figure No.1. Facility location in Bradford County (left) and satellite image (right).

Boilers

The two 800 horsepower (HP) boilers (EU 006 and EU 007) and one 750 HP boiler (EU 008) generate steam for process heat associated with the rendering and processing activities. Boilers No. 1 (EU 006) and No. 2 (EU 007) each have a maximum heat input rate of 33.5 million British thermal units per hour (MMBtu/hr). Boiler No. 3 (EU 008) has a maximum heat input rate of 32.7 MMBtu/hr. The boilers fire natural gas, No. 6 fuel oil, on-specification used oil, and processed grease.

Rendering Operation

The facility also includes waste heat evaporator, feather rendering system, and two animal rendering systems (EU 001 and EU 002). The waste heat evaporator utilizes heat extracted from the steam generated by the cookers to evaporate excess moisture from various liquid products. The continuous rendering system consists of a number of processes that grind, convey, cook, and remove fluids from red meat/poultry inedibles and poultry feathers. Emissions and odors from the red meat cooker, the poultry cooker, and the feather dryer in the rendering building are controlled by 10,000 cubic feet per minute (cfm) Venturi scrubber/packed tower system, and two 40,000 cfm building air scrubbers.

Facility Regulatory Categories

- The facility will become a major source of hazardous air pollutants (HAP) with the addition of the new proposed units.
- The facility has no units subject to the acid rain provisions of the Clean Air Act (CAA).
- The facility is a Title V major source of air pollution in accordance with Chapter 213, F.A.C.
- The facility is not a major stationary source in accordance with Rule 62-212.400(PSD), F.A.C.

Processing Schedule -- Original Application (0070004-015-AC)

September 28, 2009	Received pre-Application Case by Case MACT Applicability Summary.
November 9, 2009	Department's issued comments regarding the Case by Case MACT Applicability Summary.
December 16, 2009	Received additional information.
January 14, 2010	Received the application for the Air Construction Permit.
February 12, 2010	Requested additional information.
February 26, 2010	Received additional information.
March 28, 2010	Application Deemed Complete.

Processing Schedule -- New Application (0070004-022-AC)

June 5, 2013	Received the application for the Air Construction Permit
June 5, 2013	Application Deemed Complete

2. Proposed Project

Note: The applicant has claimed that certain information submitted constitutes "trade secret" and requested to be kept confidential per Section 403.111 of the Florida Statutes (F.S.). Therefore, only non-confidential information will be presented in this document.

Griffin is proposing the addition of a secondary protein nutrient (SPN) fines solvent extraction process at the Hampton facility to enable the facility to extract the remaining oil/fat from residual SPN fines (to separate oil/fat and fines solids into separate marketable materials) currently produced by the Hampton facility and other Griffin facilities.

The proposed SPN fines solvent extraction process fundamentally is similar to the vegetable oilseed extraction process that is currently widely used. The process consists of a closed loop system to recover and

recycle the solvent used in the extraction process to reduce air pollutants emissions and to minimize solvent costs. The solvent will be removed from the oil extracted from the SPN fines using a distillation process and condensers. The vapor stream from the process condensers and final condenser, which might include some non-condensable, will be vented to a mineral oil absorption system for final control and solvent recovery.

The applicant also proposes to install a new small boiler to provide steam for the proposed SPN solvent extraction process.

The proposed project will add two new regulated emissions units. Following is a listing of regulated emissions units for the facility.

This permit project reauthorizes the construction and initial operation of the subject emission units.

NEW BOILER

The boiler (Manufacturer: Hurst, Model: S400GO-250-200) is a fire tube boiler and has a maximum heat input rate of 9.9 MMBtu/hour. A fire-tube boiler is a type of boiler in which hot gases from a fire pass through one or more tubes running through a sealed container of water. The heat energy from the gases passes through the sides of the tubes by thermal conduction, heating the water and ultimately creating steam.

- The boiler will fire natural gas, No. 2 fuel oil, on-specification used oil, and processed grease.
- The boiler is intended solely to supply steam to the proposed oil extraction process.
- The boiler is not equipped with a pollution control system. CO, PM and VOC emissions can be minimized by efficient combustion of the fuels. SO_2 emissions will be controlled by using low sulfur content fuel oil.

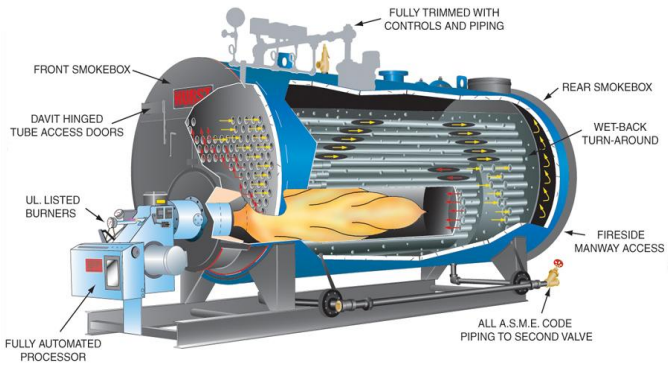


Figure No.2. View of the proposed model obtained from manufacturer website.

SECONDARY PROTEIN NUTRIENT (SPN) FINES SOLVENT EXTRACTION PROCESS

SPN FINES

The SPN fines are concentrated semi-solid matrix of solids and oil/fat that result from dewatering of wastewater emulsions. It has a soft dough or clay like consistency. The waste water emulsions can come from the Hampton facility, other Griffin's facilities, or from Griffin's customers. The collected waste water emulsions have high water content, and are processed in a two stage concentrator/evaporator and free-phase oil/fat removal process. The dewatering process will remove most of the water and result in SPN fines with very low water content. Based on the sampling data and the knowledge of the process, the applicant believes that the chemical and physical characteristic of the waste water emulsions and the SPN fines will be fairly consistent regardless whether the materials are generated on or off-site.

OIL EXTRACTION

The proposed process uses *n*-hexane to remove oil from the SPN fines and will utilize two (2) extraction steps. The first and predominant extraction step will use a closed immersion-type mixing extractor vessel and centrifuge for solids/miscella (oil and solvent liquids) separation, while the second and polishing extraction step will be completed by reslurrification of the centrifuged solids with solvent and a belt filter vacuum system for combination immersion/percolation extraction and solids/miscella separation. The vent system for the extraction process will be operated under a slight vacuum. Vapor collapse across condensers and vent fan will induce this negative pressure on the system in order to draw the exhaust from the vents through the condensers and mineral oil absorption system. The design of the seals for the system will be based on the appropriate OSHA and state-of-art solvent extraction process design constraints to ensure a safe working environment. The raw material feed, solvent feed, extraction, and oil/fats desolventization (miscella distillation) will be continuous operations.

DESOLVENTIZATION -- ORIGINAL PROPOSAL AND CONSTRUCTION

Two (2) specialty desolventizers will be installed in parallel and operated as a closed batch process to ensure maximum removal of solvent from the solids. In the flash or specialty desolventizing, SPN fines are "flash" desolventized in a vacuum with a small quantity of noncontact steam or in a pneumatic loop using superheated hexane. This step is followed by a final solvent stripping step using very small quantities of steam in a rotary or agitated vessel. The hexane vapor from the flash/vacuum desolventizer and the hexane and steam vapors from the stripper are directed to a condenser. Specialty or "flash" desolventizing utilizes different equipment and is less efficient than conventional desolventizing in both energy consumption and solvent removal. Given these factors, solvent emission factors are considerably higher for a specialty desolventizing process than for a similar-sized conventional desolventizing process.

DESOLVENTIZATION -- NEW PROPOSAL AND CONSTRUCTION

The original desoventization batch processors installed as part of the SPN Fines process proved to be inadequate in producing specification product. Adequate hexane removal on a consistent basis could not be achieved with the equipment installed. The permittee has proposed to replace the two (2) speciality batch desolventizers with a single, continuous flow, tray desolventizer to obtain a sellable meal product. This type of desolventizer technology is used in the vegetable oil extraction industry to effectively remove solvent from the oilseed meal materials. This type of desolventizer should provide adequate hexane removal results and result in overall lower hexane air emissions.

SOLVENT RECOVERY AND MINERAL OIL ABSORPTION

The solvent recovery system utilizes a miscella distillation condenser, a desolventizer heat recovery condenser, and a steam stripper condenser, which each feed tail gas vapors to the final condenser and mineral oil absorption system to remove additional solvent vapors from the extraction process vent gas. Indirect steam heating will be utilized for the solvent feed and oil/fat extraction process. Direct “live” steam will be utilized when stripping the oil/fat after miscellaneous distillation has occurred. The final condenser will lower the temperature of the vent gas to 100°F (below the solvent dew point), such that residual tail gas solvent will condense out of the vent gas and can be recovered and pumped back to the solvent separation work tank.

The mineral oil absorption system uses a counter-current flow of “lean” mineral oil and vent gas from the final condensers in an absorption column. The mineral oil absorbs approximately 99% of the remaining solvent that was not removed by the primary and final condensers. The vent gas leaving the absorption column is recycled back to the desolventizers for vent make-up and nitrogen recovery. Vent gases not recycled as vent make-up are released to the atmosphere through the mineral oil absorption system exhaust. The “rich” mineral oil that is laden with solvent is sent to the stripping column. With direct steam stripping, the solvent is driven out of the mineral oil. The reconditioned “lean” mineral oil is then re-circulated to be re-used. The stripped solvent

(and steam) vapor is routed back to the final condenser, to be condensed and re-used in the SPN fines solvent extraction process.

The design of the proposed system routes all vents through condensers and the mineral oil absorption system. During startup, the condensers and mineral oil absorption system will be fully operational at the time solvent extraction begins. During shutdown, the condensers and mineral oil absorption system will continue to operate even after solvent extraction is ceased, until it is safe to shutdown the equipment. This is standard operational practice of the vegetable oil solvent extraction industry.

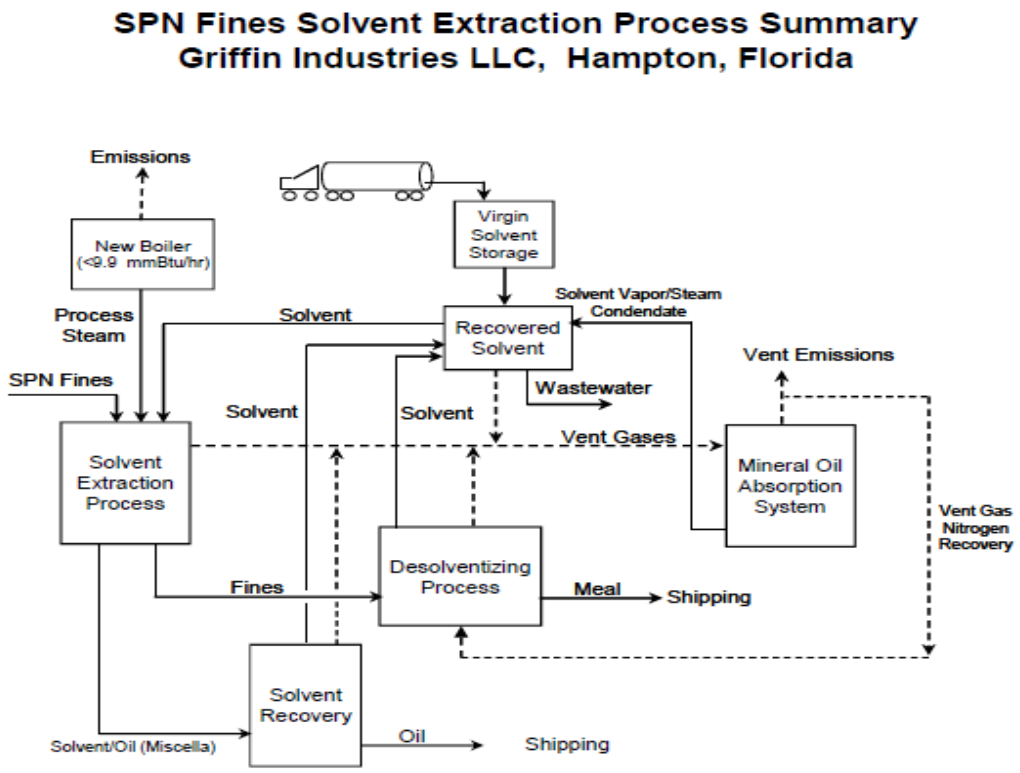


Figure No. 3. Process Flow Diagram for the Proposed Process (Updated for Project 0070004-022-AC).

2. APPLICATION REVIEW

A. SPN FINES SOLVENT EXTRACTION PROCESS (EU 016)

The facility will become a major source of Hazardous Air Pollutants (HAPs) as the result of the proposed SPN fines solvent extraction process. A major source is one with the potential to emit at least 10 tpy of any one HAP or 25tpy of any combined HAP. Because the solvent extraction process at the Hampton facility cannot be considered a vegetable oil production process as described by 40 CFR 63.2832 of MACT Subpart GGGG, a Case by Case MACT determination is required for the proposed project pursuant to Subpart B of 40 CFR 63.

Overview of Statutory Requirements

Section 112(g) of Clean Air Act requires States to establish Maximum Achievable Control Technology (MACT) limitations where EPA has failed to promulgate a relevant standard to ensure control of HAP emissions.

The Section 112(g) regulations consist of five (5) sections under 40 CFR Part 63, being §63.40 through §63.44. The regulation covers constructed ("new") and reconstructed major sources of HAPs. A major source emits or has the potential to emit 10 tons per year or more of any single HAP or 25 tons per year or more of any combination of HAPs.

In accordance with Rule 62-204.800 (11)(d) 2, F.A.C., 40 C.F.R. Part 63, Subpart B, Requirements for Control Technology Determinations for Major Sources in Accordance with Clean Air Act Sections, §§ 112(g) and 112(j); amended April 5, 2002, at 67 FR 16581; is adopted and incorporated by reference, subject to the following provisions:

a. The "effective date of Section 112(g)(2)(B)" as defined in 40 C.F.R. § 63.41 shall be July 1, 1997.
b. The "Notice of MACT Approval" as defined in 40 C.F.R. § 63.41 shall be the air construction permit.
c. The "permitting authority" as defined in 40 C.F.R. § 63.41 shall be the Department.
d. In lieu of the administrative procedures for review of the Notice of MACT Approval as set forth in 40 C.F.R. § 63.43(f)(1) through (5), the Department will follow the permit processing procedures of Rule 62-4.055, F.A.C.
e. In lieu of the opportunity for public comment on the Notice of MACT Approval as set forth in 40 C.F.R. § 63.43(h), the Department will provide opportunity for public comment on the Notice of MACT Approval pursuant to Rule 62-210.350, F.A.C.
f. The Notice of MACT Approval shall become effective upon issuance of the air construction permit by the Department.

Identifying HAPs Emissions

The applicant has conducted analysis on SPN fines and, the result shows that the concentration of organic chemicals in the SPN fines is below detection limit of the test method. The SPN fines contains small amount of metallic HAPs such as chromium, manganese, nickel, and etc (see table 1). However, the maximum operating temperature of the process is far below the boiling points of the metallic HAP compounds found, therefore it is not expected that these HAPs (non-hexane) will be released to the atmosphere from the process. As such, this project will mainly focus on reducing the HAP emissions from the use of the solvent in the oil extraction process.

Analysis	Level Found	Detection Limit
Chromium	28 ppm	2.0
Manganese	37.7 ppm	2.0
Nickel	16 ppm	2.0
Chloride	6087 mg/kg	500

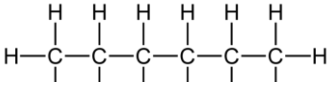
Table 1. Summary table of the sample analysis. Full result can be found in the application.

What Pollutant Emissions Will Be Reduced?

The emissions from solvent extraction for proposed oil extraction processes include *n*-hexane (a HAP) and volatile organic compounds (VOC). Currently, the commercial solvent for oil extraction is a hexane-based extraction solvent that consists primarily (on average 50-64 percent) of n-hexane, the only HAP. The remaining portion of the solvent consists of hexane isomers which are categorized as VOC. The floor determination includes requirements to specifically reduce emissions of n-hexane. The process of controlling n-hexane emissions also reduces emissions of VOC. The CAS for Hexane is 110-54-3, and the hazardous air pollutant code is H104.

Physical Properties

- The chemical formula for hexane is C_6H_{14}, and its molecular weight is 86.17 g/mol.
- Hexane is a colorless volatile liquid that is insoluble in water and highly flammable.
- The odor threshold for hexane is 130 parts per million (ppm), with a faint peculiar odor reported.
- The vapor pressure for hexane is 150 mm Hg at 25 °C.



The EPA does not consider n-hexane classifiable as a human carcinogen. However, short-term exposure to high levels of n-hexane is reported to cause reactions such as irritations, dizziness, headaches, and nausea. Long-term exposure can cause permanent nerve damage.

Potential HAPs Emissions Points

The emissions points that may potentially release HAP are identified below:

(1) Exhaust from the mineral oil absorber system;
(2) Exhaust from the meal dryer vent;
(3) Exhaust from the meal cooler vent;
(4) Residual losses from crude meal;
(5) Residual losses from crude oil;
(6) Evaporative losses from equipment leaks;
(7) Solvent storage tanks;
(8) Process wastewater collection; and
(9) Process startup/shutdowns.

For the purpose of this project, HAP (*n*-hexane) released can also be described as the solvent losses from the processes. The applicant estimates that majority of the solvent losses are from various equipment connections and parts, during startup and shutdown, and maintenance activities.

Small amount of solvent can be found in the wastewater stream, which includes stripped water from the wastewater economizer; in the oil product extracted from the SPN fines and in the meal itself. A small amount of solvent also lost during the truck unloading of solvent into the storage tank, from the daily transfer operations of solvent, from transfer equipment connections and solvent storage tanks.

The processes or equipments that are identified as HAP released points will be grouped into one emissions unit described as "Secondary Protein Nutrient (SPN) Fines Solvent Extraction Process", and are subject to MACT determination by the permitting authority. The processes or equipments are as stated below.

"Raw material preparation operations (drying), Solvent extractors, Desolventizers, Meal dryers, Meal coolers, Meal conveyor systems, Oil distillation units, Solvent evaporators and condensers, Solvent recovery system, Vessels storing solvent-laden materials, Residual meal storage/processing and storage vessels."

Major Principles of a Maximum Achievable Control Technology (MACT) Determination

(1) The MACT emission limitation or MACT requirements cannot be less stringent than the emission control which is achieved in practice by the best controlled similar source.
(2) Based on available information, the MACT emission limitation and control technology must achieve the maximum degree of reduction in emissions of HAP, taking into consideration the costs of achieving such emissions reductions and any non-air quality health and environmental impacts and energy requirements associated with the emissions reductions. (Note that while cost or other impacts can be considered in determining what sources are similar, cost or other impacts cannot be used to circumvent the requirement in (1) above that MACT be best control.)
(3) If the state agency determines under the criteria set forth in section 112(h)(2) of the Act that it is not feasible to prescribe or enforce an emission limitation, the MACT determination may be a specific design, equipment, work practice, or operational standard, or a combination of these.

(4) If EPA have either proposed a relevant emission standard under section 112(d) or section 112(h) or adopted a presumptive MACT determination for the source category that includes the constructed or reconstructed major source, then the state agency must consider these MACT requirements in developing the case-by-case determination.

Approach to MACT Floor Determination

It is not practical from regulatory and cost standpoint to quantify the losses of HAP from the individual emission points from the proposed unit, especially majority of the HAP losses are considered fugitive. It is believed that it is more meaningful to evaluate how well the solvent is being captured, controlled and recovered from the unit.

Therefore, the regulatory format for the proposed rule is selected as an emission limit expressed in terms of gallons of HAP lost per ton of SPN fines processed over a 12-month compliance period. This is taking into consideration of the practical enforceability of the proposed MACT emission limitation, since the total HAP emissions from the entire source can be determined using records of deliveries and inventories of solvent and SPN fines throughput rate.

As such, the floor determination restricts process-wide hexane emissions from each emissions point rather than requiring individual controls at each emission point. This gives the facility flexibility to meet emission limits in the most cost-effective way, either through controls on a single emission point, or a combination of emission points. This also encourages the facility to conserve resources and expects the facility will comply with the rule by maintaining or upgrading equipment to recover and recycle solvents. If needed, the facility may choose to implement a Leak Detection and Repair (LDAR) program to assist them complying with the emissions limit. However, the determination does not specifically requiring of the technique, and leaves it to be the responsibility of the owner or operator to identify and develop its own unique set of techniques to demonstrate compliance.

The proposed unit is a new source. Therefore, the MACT floor standards must be no less stringent than the emission control achieved in practice by the best controlled similar source.

Available Information

There is substantial information regarding the oil extraction and solvent recovery process based on Vegetable Oil MACT. However, the Department is unable to gather any information about the SPN fines being processed using the same process. As suggested by the applicant, the facility is the "first" attempting to use this process to extract oil from the SPN fines. After consulting with EPA Regional Offices and Headquarter, the Department finds that the proposed project appears to be a "new" attempt, and there is no information about emissions control that can be achieved in practice. Therefore, the floor determination is primarily relied on the design information from the application and the Vegetable Oil Production MACT.

Similar Source

According to 40 CFR 63.41, *Similar Source* means a stationary source or process that has comparable emissions and is structurally similar in design and capacity to a constructed or reconstructed major source such that the source could be controlled using the same control technology.

The proposed unit is considered similar to soybean oil solvent extraction process for the following reasons.

a. It has similar emissions type (*n*-hexane).

b. Emission units can be controlled with the same type of control technology (solvent recovery system and mineral oil scrubber).
c. Structurally similar in design.

Determining the MACT Floor

Section 112(d) of the CAA requires the regulatory agency to set emission standards for new sources based on the emissions control achieved in practice by the best controlled similar source.

For the purpose of this project, a hybrid approach is used for determining the floor.
1. The technology approach, which is based on the design data provided by the applicant. This is due to insufficient emissions data that are available for "what" can be best achieved in practice for extracting oil from SPN fines on a continuous basis.
2. Existing federal air toxic control regulations, which is NESHAP, Subpart GGGG - National Emission Standards for Hazardous Air Pollutants: Solvent Extraction for Vegetable Oil Production.

For NESHAP, Subpart GGGG, MACT Floor is based on a time series of SLF determined as a 12-month rolling average, calculated monthly. For new sources, the MACT floor was based on the performance level corresponding to the top ranking source.

The applicant proposes to establish the solvent loss factor of 1.5 gallon per ton of SPN fines processed, which is the same with the new source MACT floor solvent loss factor (SLF) for vegetable oil production (soybean specialty subcategory). The MACT floor for soybean specialty subcategory is based on the second best performing specialty facility because the best performing specialty facility has a proprietary process configuration which would not be duplicated by other facilities.

To determine the appropriate solvent loss factor for the proposed process, the Department evaluates these two main criteria:

1. Solvent/material ratio: The amount of solvent needed for each ton of material processed, comparing to similar oil seed production processes. In general, more solvent loss is expected when the ratio is higher.
2. Solvent capture/recovery performance: The effectiveness of the design system to capture/recover the solvent. For the purpose of this project, this is comparing to the performance of the solvent capture/recovery system of the specialty soybean oil production process (similar source).

Based on the design information provided, it appears that the design solvent/material ratio for the proposed process is significantly higher than the industrial average of 1:1 for soybean oil production process. The proposed process is deemed similar to the specialty soybean oil production process and consists of a mineral oil absorption system to recover the solvent. Theoretically, the design process has to be able to capture/recover the solvent better than the MACT floor for the specialty soy bean oil production process in order to achieve the same desire solvent loss factor since it is using more solvent per tons of material.
The solvent loss factor is determined based on 12 month rolling basis to accommodate short term variability of solvent loss potentially due to climatic patterns (i.e. warmer weather might increase fugitive emissions) and SPN fines characteristics (i.e. size, moisture, fat content and etc.), and to reflect long-term achievability of the standard.

Therefore, it is determined that the solvent loss factor of 1.5 gallons per ton of SPN fines processed is appropriate as the MACT floor for the proposed process.

Other More Stringent Control Option

Other emission control option more stringent than the MACT Floor include the installation of a fabric filter and catalytic incinerator (add on control) to the combined exhaust from the final condenser vent. A fabric filter is required to remove any particulate matter in the exhaust stream prior to entering the catalytic incinerator. Catalytic incineration is capable of efficiently controlling emission streams with high volumetric flow rates and low HAP concentrations.

According to EPA Vegetable Oil Production MACT floor determination, the cost effectiveness of the option above the MACT floor is approximately $13,800 per ton of HAP reduced, and the cost could be higher after considering site-specific conditions which may result in additional design, operating, and safety requirements that were not included their analysis model. This option will nearly doubles the reduction of HAP emissions achieved by the MACT floor. At present, solvent extraction for vegetable oil production processes have not installed such emission controls on meal dryer or cooler vents.

Therefore, it is deemed that this beyond the floor control option is not required.

Environmental, Energy, Cost and Economic Impacts

The Department does not expect any significant secondary air emission, wastewater, solid waste, or energy impacts resulting from the proposed rule. The emissions reduction techniques that will be used to comply with the NESHAP are pollution prevention technologies designed to recover and recycle solvent.

The Department also finds that it is infeasible to conduct the economy impact analysis for this project. Based on MACT floor scenario, it is unclear how the rule will impact the revenue, and the market condition of the products since the applicant is the "first" attempting to explore this venue. Therefore, it is unclear what the compliance cost for the facility is and how it impacts its ability to be profitable or upgrading the process to further reducing the HAP emissions if needed.

Discussions of Emissions

Table 2. Summary of potential emissions estimation from the solvent extraction process (EU016).

Source	n – Hexane (ton/year)	VOC (ton/year)
Solvent remain in oil product	2.67	4.17
Solvent remain in meal	7.64	11.93
Solvent in wastewater stream	0.03	0.05
Mineral oil absorption system	8.76	13.69
Storage Transfer losses	0.18	0.27
Miscellaneous fugitive from equipment leak	76.52	119.56
Total	95.79	149.67

The estimation is based on the process design assumptions.

- Estimated effectiveness of solvent recovery for the entire process of 99.7%.
- Maximum daily SPN fines throughput rate of 100 tons/day, monthly average.
- All the n-Hexane in the solvent loss release to the atmosphere.

References

- *Case by Case MACT analysis submitted January, 2010.*

- *National Emission Standards for Hazardous Air Pollutants: Solvent Extraction for Vegetable Oil Production; Proposed Rule*
- *Public Comments and EPA Responses to the Proposed NESHAP for Solvent Extraction for Vegetable Oil Production dated November 28, 2000.*
- *Final Report of Economic Impact Analysis for the Final Vegetable Oil Processing NESHAP*
- *Casimir C. Akoh, "Handbook of Functional Lipids", CRC Press, 2006.*
- *Peter J. Wan & Philip J. Wakelyn, "Technology and Solvents for Extracting Oilseeds & non-Petroleum Oils", AOCS Press, 1997.*
- *AP-42, Section 9.11.1 – Vegetable Oil Processing.*
- *EPA Guidelines for MACT Determinations under Section 112(j) Requirements*

Federal NSPS Provisions

The unit is not subject to any provision of NSPS.

State Unit Specific Requirements

The unit is not subject to any state unit specific requirements.

B. Steam Boiler No. 4 (EU017)

Fuels

The unit will use natural gas, No. 2 fuel oil, on-specification used oil and processed grease as fuels.

No. 2 fuel oil is normally referred to as distillate fuel oils or diesel fuel oils. It is a petroleum distillate which meets the specifications for No. 2 heating oil or fuel oil as defined in ASTM D 396 and/or the specifications for No. 2 diesel fuel as defined in ASTM Specification D 975. The sulfur content of the fuel is limited to 0.05 % by weight to reduce sulfur dioxide and particulate matter emissions from the unit.

Natural gas is a naturally occurring mixture of hydrocarbon and nonhydrocarbon gases found in geologic formations beneath the earth's surface, of which the principal constituent is methane. Natural gas is low in sulfur and generally considered cleaner fuel to burn.

Used oil is waste oil which includes but not limited to motor oils, gear oil, cutting oils, transmissions fluids, hydraulic fluids, dielectrict fluids and etc. According to Guidance DARM-PER-03 dated March 31, 2000, the burning of used oil containing PCB concentration less than 50 ppm for energy recovery is only allowed in industrial/electric utility boiler and industrial furnace. "On-specification" used oil containing PCB less than 2 ppm can be burned in any combustion device (industrial or non-industrial) if authorized by Department's permit. For regulatory purpose, used oil fuel is presumed to contain PCB above detection limit of 2 ppm. Used oil containing more than 50 ppm PCB is subject to Toxic Substance Control ACT (TSCA) regulations, 40 CFR 761. Same with the No.2 fuel oil, the sulfur content of the fuel is limited to 0.05 % by weight to reduce sulfur dioxide and particulate matter emissions from the unit.

Processed grease consists of recycled animal and vegetable oils used for cooking food for human consumption. The grease currently is also allowed to be burn in the existing boilers on site. Based on site specific data, it appears that the sulfur content of the grease is relatively low (Normally less than 0.1 % by weight). The heat value of the fuel is approximately 0.13 MMBtu/gal, relatively close to heat value of distillate fuel, which is approximately 0.14 MMBtu/gallon.

Discussion of Emissions

Table 3. Summary of potential emissions estimation from the new boiler (EU 017).

Pollutant	Emissions Rate (tons/year)
PM	9.2
PM_{10}	7.1
SO_2	22.0
VOC	0.23
NOx	6.2
CO	3.6
Pb	0.12

The estimation is based on the process design assumptions.

- Emissions are based on the maximum annual fuel usage.
- Maximum heat input rate of the boiler is 9.9 MMBtu/hour.
- Heating values for Natural Gas, No. 2 Fuel Oil are from AP 42, and the heating value of the used oil and processed grease are based on site data.

NSPS Provisions

Pursuant to 40 CFR 60.40c, the unit is not an affected source of 40 CFR Part 60, Subpart Dc—Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units since the maximum heat input rate of the unit is less than 10 MMBtu/hour.

NESHAP Provisions

The unit is subject to 40 CFR 63, Subpart DDDDD provisions of NESHAP.

State Specific Requirements

The natural gas, No. 2 fuel oil and on-specification used oil are considered "fossil fuel" in accordance with the definition in Rule62-210.200(141), F.A.C. Therefore, the unit is subject to Rule 62-296.406, F.A.C. - Fossil Fuel Steam Generators with Less Than 250 Million Btu per Hour Heat Input, New and Existing Emissions Units.

Rule 62-296.406, F.A.C. requires Best Available Control Technology (BACT) determination for Sulfur Dioxide and Particulate Matter emissions from the unit. For the purpose of this project, the BACT for No.2 fuel oil & used oil is to limit the sulfur content of the fuel to 0.05 % by weight. The compliance is determined by maintaining the fuel certification from the supplier.

The unit is also subject to visible emissions limitations of 20 percent opacity except for one two-minute period per hour during which opacity shall not exceed 40 percent. After the initial compliance test, the unit shall be tested each federal fiscal year to demonstrate compliance with the opacity limit.

C. Facility Wide Emissions

Table 4. Summary of Facility Wide Potential Emissions.

Pollutant	Emissions Unit (EU) Emissions Rate (tons/year)					
	001 – Animal/poultry rendering	002 - Animal/poultry rendering	006-008 No. 1, 2 & 3 steam boiler	017 – steam generating unit No.4	016 – SPN fines solvent extraction process	Total

PM	0.61	0.61	170	9.2	-	180.4
PM10	0.40	0.40	135	7.1	-	142.9
SO2	-	-	-	-	-	249
VOC	25.4	16.4	3.12	0.23	149.67	194.8
NOx	-	-	158	6.2	-	164.2
CO	-	-	35.9	3.6	-	39.5
n-Hexane	-	-	-	-	95.8	95.8
Pb	-	-	2.31	0.12	-	2.43

- The facility is subject to facility wide SO_2 emissions cap of 249 tons/12 consecutive months.
- EU 001 & 002 are unregulated units.
- The facility is a major source of HAP since the n-Hexane PTE > 10 tons/year.
- Other small traces of organic and metallic HAPs emissions from fuel combustions are not discussed in the table. The facility wide total HAPs emissions will be ~ 100 tons/year.

4. PRELIMINARY DETERMINATION

The Department makes a preliminary determination that the proposed project will comply with all applicable state and federal air pollution regulations as conditioned by the draft permit. This determination is based on a technical review of the complete application, reasonable assurances provided by the applicant, and the conditions specified in the draft permit. Jerry Woosley is the project specialist for this project. Additional details of this analysis may be obtained by contacting the project specialist at the Florida Department of Environmental Protection, Northeast District Office, Waste and Air Resource Management Program, 8800 Baymeadows Way West, Suite 100, Jacksonville, Florida 32256.

Permitting Note: MengChiu Lim was the project engineer responsible for reviewing the original application and drafting the original air construction permit (0070004-015-AC). This permit project (0070004-022-AC) is a minor update to the original document.