



# FLORIDA DEPARTMENT OF Environmental Protection

Bob Martinez Center  
2600 Blair Stone Road  
Tallahassee, FL 32399-2400

**Ron DeSantis**  
Governor

**Jo a netto Nuñez**  
Lt. Governor

**Shawn Hamilton**  
Secretary

## PERMITTEE

Rayonier Performance Fibers, LLC  
P.O. Box 2002  
Fernandina Beach, Florida, 32035

Authorized Representative:  
Mr. Mark Homans, General Manager

Air Permit No. 0890004-070-AC  
Permit Expires: December 31, 2026  
Minor Air Construction Permit  
Fernandina Beach Dissolving Sulfite Pulp Plant  
Bioethanol Production Project

## PROJECT

This is the final air construction permit, which authorizes the construction of several emissions units to conduct the fermentation of spent sulfite liquor at the existing Rayonier Performance Fibers, LLC, Fernandina Beach Dissolving Sulfite Pulp Plant (RPF Plant). The new second-generation bioethanol production process will be capable of producing 7.5 million gallons of bioethanol per year. The proposed work will be conducted at the existing Fernandina Beach Dissolving Sulfite Pulp Plant, which is an acid sulfite-based pulp mill categorized under Standard Industrial Classification No. 2611. The existing facility is in Nassau County at 10 Gum Street in Fernandina Beach, Florida. The UTM coordinates are Zone 17, 454.7 kilometers (km) East, and 3392.2 km North.

This final permit is organized into the following sections: Section 1 (General Information); Section 2 (Administrative Requirements); Section 3 (Emissions Unit Specific Conditions); and Section 4 (Appendices). Because of the technical nature of the project, the permit contains numerous acronyms and abbreviations, which are defined in Appendix A of Section 4 of this permit.

## STATEMENT OF BASIS

This air pollution construction permit is issued under the provisions of: Chapter 403 of the Florida Statutes (F.S.) and Chapters 62-4, 62-204, 62-210, 62-212, 62-296 and 62-297 of the Florida Administrative Code (F.A.C.). The permittee is authorized to conduct the proposed work in accordance with the conditions of this permit. This project is subject to the general preconstruction review requirements in Rule 62-212.300, F.A.C. and is not subject to the preconstruction review requirements for major stationary sources in Rule 62-212.400, F.A.C. for the Prevention of Significant Deterioration (PSD) of Air Quality.

Upon issuance of this final permit, any party to this order has the right to seek judicial review of it under Section 120.68 of the Florida Statutes by filing a notice of appeal under Rule 9.110 of the Florida Rules of Appellate Procedure with the clerk of the Department of Environmental Protection in the Office of General Counsel (Mail Station #35, 3900 Commonwealth Boulevard, Tallahassee, Florida, 32399-3000) and by filing a copy of the notice of appeal accompanied by the applicable filing fees with the appropriate District Court of Appeal. The notice must be filed within 30 days after this order is filed with the clerk of the Department.

Executed in Tallahassee, Florida

**(Draft)**

David Lyle Read, P.E., Environmental Administrator  
Office of Permitting and Compliance  
Division of Air Resource Management

**CERTIFICATE OF SERVICE**

The undersigned duly designated deputy agency clerk hereby certifies that this Final Air Construction Permit package was sent by electronic mail, or a link to these documents made available electronically on a publicly accessible server, with received receipt requested before the close of business on the date indicated below to the following persons.

Mr. Mark Homans, Rayonier Performance Fibers, LLC: [mark.j.homans@ryam.com](mailto:mark.j.homans@ryam.com)  
Mr. David Rogers, Rayonier Performance Fibers, LLC: [david.rogers@ryam.com](mailto:david.rogers@ryam.com)  
Mr. Tom Faltemier, Rayonier Performance Fibers, LLC: [tom.faltemier@ryam.com](mailto:tom.faltemier@ryam.com)  
Mrs. Sheryl Watkins, P.E., ALL4 LLC: [swatkins@all4inc.com](mailto:swatkins@all4inc.com)  
Ms. Katie Miller, Northeast District Office: [Katie.Miller@FloridaDEP.gov](mailto:Katie.Miller@FloridaDEP.gov)  
DEP Northeast District Office Mailbox: [DEP\\_NED@dep.state.fl.us](mailto:DEP_NED@dep.state.fl.us)  
Mr. Ronald Ross, Commissioner, City of Fernandina Beach: [cross@fbfl.org](mailto:cross@fbfl.org)  
Mrs. Tiana Christner: [tainachristner@yahoo.com](mailto:tainachristner@yahoo.com)  
Mr. Len Kreger: [l.kreger@comcast.net](mailto:l.kreger@comcast.net)  
Mrs. Julia Ferreira, Sierra Club: [bordersofheaven@hotmail.com](mailto:bordersofheaven@hotmail.com)  
Ms. Elizabeth Walker, DEP OPC: [Elizabeth.Walker@FloridaDEP.gov](mailto:Elizabeth.Walker@FloridaDEP.gov)  
Ms. Amy Hilliard, DEP OPC: [Amy.Hilliard@FloridaDEP.gov](mailto:Amy.Hilliard@FloridaDEP.gov)

Clerk Stamp

**FILING AND ACKNOWLEDGMENT FILED**, on this date, pursuant to Section 120.52(7), Florida Statutes, with the designated agency clerk, receipt of which is hereby acknowledged.

**(Draft)**

## SECTION 1. GENERAL INFORMATION

### FACILITY DESCRIPTION

The applicant operates the existing Rayonier Performance Fibers, LLC, Fernandina Beach Dissolving Sulfite Pulp Plant (RPF Plant), which is located in Nassau County at 10 Gum Street in Fernandina Beach, Florida. The RPF Plant runs an acid sulfite-based pulp mill using ammonia as a base chemical for the manufacture of dissolving pulp. This plant produces approximately 10 different grades of pulp. The pulp produced at this plant is used in products such as plastics, photographic film, LCD screens, paints, cigarette filters, pharmaceuticals, food productions, cosmetics, and textiles.

The recovery boiler that supports the existing operations has a maximum throughput rate of 70,000 pounds (lb)/hour of oven-dry red liquor solids (RLS) and a nominal maximum heat input rate of 653.1 million British thermal units (MMBtu)/hour. The recovery boiler fires RLS and natural gas and provides steam for the evaporators. Its emissions are scrubbed for sulfur dioxide (SO<sub>2</sub>) recovery using an ammonia solution. The recovery boiler is equipped with a wet scrubber to control SO<sub>2</sub> emissions and mist eliminators to control emissions of PM. A continuous emission monitoring system (CEMS) is used to continuously monitor nitrogen oxide (NO<sub>x</sub>) and SO<sub>2</sub> emissions.

Steam and energy that are needed at the mill are supplied by No. 6 Power Boiler that has a maximum heat input rate of 660 MMBtu/hour. The power boiler fires biomass (green bark, chips, knots, fines, landscape waste, and shredded currency), tires, No. 2 fuel oil for startup, No. 6 fuel oil with a maximum sulfur content of 2.5% by weight, and small quantities of facility-generated on-specification used oil (to be blended with the No. 6 fuel oil). The boiler is equipped with a wet scrubber to control emissions of SO<sub>2</sub>; an electrostatic precipitator (ESP) to control emission of PM; the staged combustion and flue gas recirculation (FGR) and a selective non-catalytic reduction (SNCR) with an ammonia (NH<sub>3</sub>) injection system to control NO<sub>x</sub> emissions. The boiler is equipped with a NO<sub>x</sub>, CO and SO<sub>2</sub> CEMS to continuously monitor emissions. Visible emissions are continuously monitored by a continuous opacity monitoring system (COMS).

A lignosulfonate product manufacturing plant owned by LignoTech Florida (LignoTech Plant) is co-located with the RPF Plant. For PSD purposes, the RPF and LTF Plants are considered a single facility; however, the LignoTech Plant operates under a separate Title V Permit No. 0890444-006-AV. The LignoTech Plant can process up to 165,344 tons/year of red liquor on an oven dry basis from the RPF Plant to manufacture wet and dry lignosulfonate products. The products manufactured includes ammonium lignosulfonate, ion exchanged sodium lignosulfonate, and further processed ion exchanged sodium lignosulfonate.

The RPF Plant also includes miscellaneous unregulated/insignificant emissions units and/or activities.

The existing RPF Plant consists of the following emissions units (EU):

EU No.	Brief Description
<i>Regulated Emissions Units</i>	
005	Vent Gas Scrubber and Direct Contact Condenser
006	Sulfite Recovery Boiler
010	Biological Effluent Treatment System
011	Dissolving-Grade Bleaching System
021	Evaporator Vents Methanol Condenser
022	No. 6 Power Boiler
026	Emergency Diesel Engine (130 HP)
027	Emergency Diesel Engine (480 HP)
029	Emergency Diesel Fire Pump (237 HP)
<i>Unregulated Emissions Units and Activities</i> (see Appendix U, List of Unregulated Emissions Units and/or Activities)	

## SECTION 1. GENERAL INFORMATION

EU No.	Brief Description
007	Molten Sulfur Storage and Handling Facility
012	Miscellaneous Bleach Plant Emissions
014	Machine and Finishing Area
015	Environmental Control Emissions -Wastewater
016	Pulping Area
017	Screening Area
018	Utilities Area
019	Woodyard
020	Wastewater Solids Monofill
023	Chloride Dioxide Generator Plant No. 2
028	Cooling Tower

### PROPOSED PROJECT

Rayonier Performance Fibers, LLC is proposing the addition of a new second-generation bioethanol production process to the existing RPF Plant, capable of producing approximately 7.5 million gallons of bioethanol for sale per year. The proposed process will use spent sulfite liquor (SSL, also called red liquor) as the basis for ethanol fermentation and will consist of continuous fermenters, distillation and dehydration, and yeast recycling and conditioning systems. Volatile organic compounds (VOC) emissions from the new bioethanol production process are expected to be primarily ethanol and will be controlled by the fermentation vent scrubber using cold process water as the scrubbing solution. The project also entails the construction of the bioethanol in-process and storage tank units all equipped with internal floating roofs.

The project will affect the following EU:

EU No.	Emission Unit Description
006	Sulfite Recovery Boiler

The following new EUs will be added by this project:

EU No.	Emission Unit Description
030	Bioethanol Production Process
031	Bioethanol Product Storage Tank
032	Miscellaneous Process Tanks
033	Bioethanol Loadout

### FACILITY REGULATORY CLASSIFICATION

- The RPF Plant is a major source of hazardous air pollutants (HAP).
- The RPF Plant does not operate units subject to the acid rain provisions of the Clean Air Act (CAA).
- The RPF Plant is a Title V major source of air pollution in accordance with Chapter 62-213, F.A.C.
- The RPF Plant is a major stationary source in accordance with Rule 62-212.400, F.A.C. for the PSD of Air Quality.
- The RPF Plant operates units subject to the New Source Performance Standards (NSPS) of Title 40 Part 60 of the Code of Federal Regulations (40 CFR 60).
- The RPF Plant operates units subject to the National Emissions Standards of Hazardous Air Pollutants (NESHAP) of 40 CFR 63.

## SECTION 2. ADMINISTRATIVE REQUIREMENTS

---

1. Permitting Authority: The permitting authority for this project is the Office of Permitting and Compliance in the Division of Air Resource Management of the Department of Environmental Protection (Department). The Office of Permitting and Compliance mailing address is 2600 Blair Stone Road (MS #5505), Tallahassee, Florida 32399-2400.
2. Compliance Authority: All documents related to compliance activities such as reports, tests, and notifications shall be submitted to the DEP Northeast District at: 8800 Baymeadows Way West, Suite 100, Jacksonville, Florida 32256, 904-256-1700.
3. Appendices: The following Appendices are attached as a part of this permit: Appendix A (Citation Formats and Glossary of Common Terms); Appendix B (General Conditions); Appendix C (Common Conditions); Appendix D (Common Testing Requirements); Appendix E (NSPS 40 CFR 60 Subpart A); Appendix F (NSPS 40 CFR 60 Subpart Kb); and Appendix G (NSPS 40 CFR 60 Subpart VVa).
4. Applicable Regulations, Forms and Application Procedures: Unless otherwise specified in this permit, the construction and operation of the subject emissions units shall be in accordance with the capacities and specifications stated in the application. The facility is subject to all applicable provisions of: Chapter 403, F.S.; and Chapters 62-4, 62-204, 62-210, 62-212, 62-213, 62-296 and 62-297, F.A.C. Issuance of this permit does not relieve the permittee from compliance with any applicable federal, state, or local permitting or regulations.
5. New or Additional Conditions: For good cause shown and after notice and an administrative hearing, if requested, the Department may require the permittee to conform to new or additional conditions. The Department shall allow the permittee a reasonable time to conform to the new or additional conditions, and on application of the permittee, the Department may grant additional time. [Rule 62-4.080, F.A.C.]
6. Modifications: The permittee shall notify the Compliance Authority upon commencement of construction. No new emissions unit shall be constructed, and no existing emissions unit shall be modified without obtaining an air construction permit from the Department. Such permit shall be obtained prior to beginning construction or modification. [Rules 62-210.300(1) and 62-212.300(1)(a), F.A.C.]
7. Construction and Expiration: The expiration date shown on the first page of this permit provides time to complete the physical construction activities authorized by this permit, complete any necessary compliance testing, and obtain an operation permit. Notwithstanding this expiration date, all specific emissions limitations and operating requirements established by this permit shall remain in effect until the facility or emissions unit is permanently shut down. For good cause, the permittee may request that a permit be extended. Pursuant to Rule 62-4.080(3), F.A.C., such a request shall be submitted to the Permitting Authority in writing before the permit expires. [Rules 62-4.070(3) & (4), 62-4.080 & 62-210.300(1), F.A.C.]
8. Source Obligation:
  - a. At such time that a particular source or modification becomes a major stationary source or major modification (as these terms were defined at the time the source obtained the enforceable limitation) solely by virtue of a relaxation in any enforceable limitation which was established after August 7, 1980, on the capacity of the source or modification otherwise to emit a pollutant, such as a restriction on hours of operation, then the requirements of subsections 62-212.400(4) through (12), F.A.C., shall apply to the source or modification as though construction had not yet commenced on the source or modification.
  - b. At such time that a particular source or modification becomes a major stationary source or major modification (as these terms were defined at the time the source obtained the enforceable limitation) solely by exceeding its projected actual emissions, then the requirements of subsections 62-212.400(4) through (12), F.A.C., shall apply to the source or modification as though construction had not yet commenced on the source or modification.[Rule 62-212.400(12), F.A.C.]
9. Application for Title V Permit: This permit authorizes construction of the permitted emissions units and initial operation to determine compliance with Department rules. A Title V air operation permit is required

## SECTION 2. ADMINISTRATIVE REQUIREMENTS

---

for regular operation of the permitted emissions units. The permittee shall apply for a Title V air operation permit at least 90 days prior to expiration of this permit, but no later than 180 days after commencing operation. To apply for a Title V operation permit, the applicant shall submit the appropriate application form, compliance test results, and such additional information as the Department may by law require. The application shall be submitted to the appropriate Permitting Authority with copies to the Compliance Authority. [Rules 62-4.030, 62-4.050 and Chapter 62-213, F.A.C.]

10. **NSPS Subpart VVa Applicability:** New emissions units associated with the Bioethanol Production Project that can leak VOC are subject to NSPS Subpart VVa – Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry (SOCMI). Equipment such as pumps, compressors, pressure relief devices, sampling connection systems, open-ended valves, line valves and flanges or other connectors in VOC service and any devices or systems subject to NSPS, Subpart VVa, and the associated emissions units must be identified. Another requirement of Subpart VVa is the development of a Leak Detection and Repair (LDAR) program. Therefore, the permittee shall submit a list identifying the devices or systems and a final LDAR program plan to the Compliance Authority for approval no later than 90 days before the emissions units associated with the Bioethanol Production Project become operational. The affected emissions units associated with the Bioethanol Production Project shall demonstrate compliance with NSPS, Subpart VVa no later than 180 days after the initial startup. [NSPS Subpart VVa and Rule 62-4.070(3), F.A.C.]

*{Permitting Note: The Department is also tracking the status of proposed rule 40 CFR 60, Subpart VVb that would apply to sources constructed, reconstructed, or modified after April 25, 2023. The new rule would potentially include the same requirements as Subpart VVa, plus additional valve and connector monitoring requirements. If 40 CFR 60, Subpart VVb is finalized before the new emissions units associated with the Bioethanol Production Project become operational, the applicant shall provide the rule applicability analysis to Department in addition to the information required in Condition 10 above.}*



## SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

### A. EU 006 - Sulfite Recovery Boiler

This section of the permit addresses the following emissions unit.

EU No.	Emission Unit Description
006	Sulfite Recovery Boiler

The sulfite recovery boiler has a nominal maximum heat input rate of 653.1 MMBtu/hour from firing RLS to recover sulfur and produce steam. The maximum firing rate of 70,000 lb/hour of oven dry RLS to facilitate the recovery of the cooking liquor. The pulp production of 175,000 MT/year effectively limits the production of RLS that is burned in the recovery boiler. The recovery boiler fires RLS and natural gas. PM emissions are controlled by a high velocity mist eliminator. A multi-stage wet scrubber is used to control emissions of SO<sub>2</sub>. Non-condensable gases (NCG) from the Evaporator Vents Methanol Condenser (EU 021) are also vented to the wet scrubber. SO<sub>2</sub> and NO<sub>x</sub> emissions are continuously monitored by a CEMS. In addition, a continuous parameter monitoring system (CPMS) is used to demonstrate compliance with 40 CFR 63 Subpart MM for PM. The nominal exhaust stack parameters are: 7.33 feet in diameter; 250 feet in height; flow rate of 149,372 actual cubic feet per minute (acfm); and an exit temperature of 114 degrees Fahrenheit (°F). The recovery boiler was constructed in 1974.

*{Permitting Note: This emission unit is regulated under Rule 62-212.400, F.A.C., PSD; Rule 62-296.405, F.A.C., Fossil Fuel Steam Generators with More Than 250 MMBtu/Hour Heat Input; NESHAP Subpart A, General Provisions, and Subpart MM, NESHAP for Chemical Recovery Combustion Sources at Kraft, Soda, Sulfite, and Stand-Alone Semichemical Pulp Mills, of 40 CFR 63, adopted and incorporated in Rule 62-204.800(11)(b), F.A.C.; and NSPS Subpart A, General Provisions, and Subpart D, SOP for Fossil Fuel Fired Steam Generators, of 40 CFR 60, adopted and incorporated in Rule 62-204.800(8)(b), F.A.C.}*

#### PREVIOUS APPLICABLE REQUIREMENTS

1. Other Permits: The conditions of this permit supplement all previously issued air construction and operation permits for EU 006, and do not change the applicability of NESHAP and NSPS regulations for this unit. The permittee shall continue to comply with all emission limits and requirements stated in the current Title V air operation permit. [Rule 62-4.070, F.A.C.]

#### RECORDS AND REPORTS

2. Actual Emissions Reporting: This permit is based on an analysis that compared baseline actual emissions with projected actual emissions and avoided the requirements of subsection 62-212.400(4) through (12), F.A.C. Therefore, pursuant to Rule 62-212.300(1)(e), F.A.C., the permittee is subject to the following monitoring, reporting, and recordkeeping provisions.
  - a. The permittee shall monitor the emissions of any PSD pollutant that the Department identifies could increase as a result of the construction or modification and that is emitted by any emissions unit that could be affected; and, using the most reliable information available, calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of 5 years following resumption of regular operations after the change. Emissions of SO<sub>2</sub> from the Sulfite Recovery Boiler shall be computed in accordance with the provisions in Rule 62-210.370, F.A.C., which are provided in Appendix C of this permit.
  - b. The permittee shall report to the Department's permitting and compliance authority within 60 days after the end of each calendar year during the 5-year period setting out the unit's annual emissions during the calendar year that preceded submission of the report. The report shall contain the following:
    - (1) The name, address and telephone number of the owner or operator of the major stationary source;
    - (2) The annual emissions calculations pursuant to the provisions of 62-210.370, F.A.C., which are provided in Appendix C of this permit;
    - (3) If the emissions differ from the preconstruction projection, an explanation as to why there is a difference; and
    - (4) Any other information that the owner or operator wishes to include in the report.

### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

---

#### A. EU 006 - Sulfite Recovery Boiler

- c. The information required to be documented and maintained pursuant to subparagraphs 62-212.300(1)(e)1 and 2, F.A.C., shall be submitted to the Department, which shall make it available for review to the general public.
- d. The permittee shall compute and report annual emissions in accordance with Rule 62-210.370(2), F.A.C. as provided by Appendix C of this permit. For this project, the permittee shall use the following methods in reporting the actual annual SO<sub>2</sub> emissions for the Sulfite Recovery Boiler (EU 006):
  - (1) The permittee shall use data collected from the CEMS to determine and report the actual annual emissions of SO<sub>2</sub>.
  - (2) As defined in Rule 62-210.370(2), F.A.C., the permittee shall use a more accurate methodology if it becomes available.

[Rules 62-212.300(1)(e) and 62-210.370, F.A.C.; and Application 0890004-070-AC]

*{Permitting Note: Baseline actual emissions of SO<sub>2</sub> were determined to be 267.08 TPY.}*

DRAFT



## SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

### B. EU 030 - Bioethanol Production Plant

This section of the permit addresses the following emissions unit.

EU No.	Emission Unit Description
030	Bioethanol Production Process

For bioethanol production, the SSL (also called red liquor) will be taken from the optimum stage of the evaporator system (EU 021), where it is concentrated to approximately 20-30% total solids. Prior to fermentation, the SSL will be neutralized with ammonia in the existing pulp mill to reach the optimum pH for yeast cells to ferment.

This emissions unit will consist of the following major processes:

*Yeast Conditioning.* Yeast will be conditioned and acclimated to the fermentation process in the yeast conditioning tank. Weak caustic solution will be used to kill bacteria and weak yeast cells without harming the healthy yeast cells.

*Fermentation.* Fermentation will be on a continuous basis with an expected 48-hour cycle. There will be a total of three fermenters, each having controlled temperature and controlled additions of yeast to maintain optimum fermentation conditions. Used yeast will be recycled and may be made up with fresh yeast and nutrients. The product of fermentation, fermentation broth called "beer," will be pumped to a holding tank, designated as the beer well.

*Distillation and Dehydration (D&D).* From the beer well, the beer will be sent to the D&D process which will include the degassing column, the distillation "beer" column, the rectification column, and dehydrators. The alcohol stream will be concentrated in the rectifier column. Non-ethanol fermentation products (such as yeast, bacteria, non-fermentable solids, mineral salts) will be removed from the lower section of the rectifier column and sent to the clean-in-place (CIP) system for further treatment. Hydrated alcohol from the distillation process will undergo dehydration to produce ethanol at approximately 99.67% by weight purity. The process will be performed in a continuous operation where the hydrated alcohol is superheated by steam in a shell and tube heat exchanger to ensure that the ethanol stream is always in the vapor phase as it passes through molecular sieve beds. The ethanol product from the dehydration unit will be processed through one of two shift tanks, with on-specification ethanol being routed to the ethanol storage tank and off-specification ethanol being routed to the off-spec ethanol tank and back to rectifier column. The on-spec ethanol from the storage tank will be loaded to trucks or rail for shipping.

*Control Equipment.* VOC emissions from the yeast conditioning tank, continuous fermenters, beer well, degassing, beer column and dehydrators will be controlled by a vent scrubber. The vent scrubber will use cold water as the primary scrubbing solution to condense ethanol vapor. The liquor at the bottom of the scrubber that contains recovered ethanol from the scrubber will be sent back to the beer well by the vent scrubber pump. The design removal efficiency of the scrubber is approximately 96%.

#### EQUIPMENT

1. Bioethanol Production Process (EU 030). The permittee is authorized to construct the following major components used during the production of bioethanol and to control VOC emissions from the process:
  - a. *Pre-Fermentation and Fermentation:* a salt mix tank; yeast conditioning tank; yeast cream tote; three (3) continuous fermenters; a centrifuge; and a beer well tank.
  - b. *Distillation and Dehydration (D&D):* a beer distillation column; a degassing column; a rectification column; steam condensate return tank; dehydrators; CIP system tanks and spill collection system.
  - c. *Vent Scrubber:* one liquid scrubber to control VOC emissions from the yeast conditioning tank, continuous fermenters, beer well, degassing, beer column and dehydrators. The liquid scrubber shall have a design control efficiency of at least 96%. Emissions from the scrubber shall discharge through a stack with a design height of 28 ft (minimum), a design diameter of 1.2 ft (maximum) at a design exit temperature of 90 °F and a design flow rate of 2,000 acfm.

[Design; Application No. 0890004-070-AC]

## SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

### B. EU 030 - Bioethanol Production Plant

#### PERFORMANCE RESTRICTIONS

- Permitted Capacity: Bioethanol production shall not exceed 7.5 million gallons in any consecutive 12-month period. [Rule 62-210.200(PTE), F.A.C.; and Application No. 0890004-070-AC]
- Hours of Operation: The hours of operation are not limited (i.e., 8,760 hours/year). [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.]

#### EMISSIONS STANDARDS

- VOC Standard: This emissions unit shall not discharge VOC through the vent scrubber stack in excess of 6.60 pounds (lb) per hour. [Rules 62-4.070(3) and 62-210.200(PTE), F.A.C.; and Application No. 0890004-070-AC]

#### TESTING REQUIREMENTS

- Initial and Subsequent VOC Compliance Tests: The vent scrubber stack shall be tested to demonstrate initial compliance with the emissions standard for VOC in Specific Condition 4 of this subsection. The initial tests shall be conducted within 60 days after achieving permitted capacity, but not later than 180 days after initial operation of the unit. During scrubber VOC testing, the permittee shall establish minimum or maximum operating parameter limits for the water temperature and pressure drop across the scrubber. As an alternative to pressure drop, the water recirculation flow rate and fan amps shall be measured and recorded. VOC testing shall be performed using EPA Method 18, 25, 25A or 320. To assist in providing reasonable assurance, per Rule 62-4.070, F.A.C., the subsequent emissions tests for VOC shall be required no later than 18-months prior to Title V air operation permit renewal. The annual compliance tests shall not be required unless requested by the Department for good cause. [Rules 62-4.070, 62-210.200(PTE) and 62-297.310(8)(b)1, F.A.C.]

*{Permitting Note: Emissions testing shall be conducted within 90-100 percent of the emission unit's rated capacity when establishing the operating parameter limits or permittee shall limit future operation to 110 percent of the test run with the highest production rate.}*

- Test Requirements: The permittee shall notify the Compliance Authority in writing at least 15 days prior to any required tests. Tests shall be conducted in accordance with the applicable requirements specified in Appendix D (Common Testing Requirements) of this permit. [Rule 62-297.310(7)(a)9, F.A.C.]

*{Permitting Note: Air compliance test notifications can now be completed online in the Department's Business Portal. To access this online process, go to <http://www.fldepportal.com/go/home> and sign in (or register if you are a new user) from the link in the upper right corner of the page. On the Welcome page select the Submit option, then select Registration/Notification, and then click on Air Compliance Test Notifications. Once in the process, just carefully read the instructions on each screen (and under the Help tabs) to complete the notification.}*

- Test Methods: Required tests shall be performed in accordance with the following reference methods.

Method	Description of Method and Comments
1-4	Traverse Points, Velocity and Flow Rate, Gas Analysis and Moisture Content
18	Measurement of Gaseous Organic Compound Emissions by Gas Chromatography
25	Determination of Total Gaseous Nonmethane organic Emissions as Carbon
25A	Method for Determining Gaseous Organic Concentrations (Flame Ionization)
320	Measurement of Vapor Phase Organic and Inorganic Emissions by Extractive FTIR

The above methods are described in Appendix A of 40 CFR 60 and are adopted by reference in Rule 62-204.800, F.A.C. No other methods may be used unless prior written approval is received from the Department. [Rule 62-204.800, F.A.C.; and Appendix A of 40 CFR 60]

## SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

### B. EU 030 - Bioethanol Production Plant

#### MONITORING REQUIREMENTS

8. Vent Scrubber Operating Parameters: The permittee shall install, calibrate, operate, and maintain monitoring devices that continuously measure and record the total pressure drop across the scrubber. As an alternative to pressure drop, the water recirculation flow rate and the fan amps shall be measured and recorded. Accuracy of the monitoring devices shall be  $\pm 5\%$  over the operating range. The temperature of the scrubber's water shall be measured daily and recorded. During the initial compliance test required by Specific Condition 5, the permittee shall establish operating parameter limits for the scrubber water temperature and pressure drop (or scrubber water flow rate and fan amps). Continuous compliance with the VOC emissions standard will be demonstrated by monitoring and recording scrubber water temperature and pressure drop (or scrubber water flow rate and fan amps) on a 24-hour block average against the operating parameter limits set during the compliance test. Corrective action shall be implemented, with the exception of pressure drop during periods of startup and shutdown, when any 24-hour block average parameter value is more than 10% below or above the operating parameter limits established in the most recent compliance test. All records pertaining to the scrubber shall be provided to the Compliance Authority upon request. [Rule 62-4.070(3), F.A.C.; and Application No. 0890004-070-AC]

#### RECORDS AND REPORTS

9. Test Reports: The permittee shall prepare and submit reports for all required tests in accordance with the requirements specified in Appendix D (Common Testing Requirements) of this permit. The test reports shall include the vent scrubber's water temperature and pressure drop (or scrubber water flow rate and fan amps) during VOC testing. [Rule 62-297.310(10), F.A.C.]
10. Bioethanol Production Records: The permittee shall maintain records of the amount of bioethanol produced on a monthly and 12-month rolling total basis along with the SSL feed rate into the Bioethanol Production Process emissions unit. These records shall be submitted to the Compliance Authority on an annual basis and upon request. [Rule 62-4.070(3) & 62-210.200(PTE), F.A.C.]
11. Vent Scrubber Operational Data: The permittee shall maintain the following records:
- The 24-hour block average records of the monitored operating parameters required under Specific Condition 8;
  - Records of any occurrence when the 24-hour block average scrubber monitored readings are more than 10% outside of the established operating parameter ranges, including any corrective action taken to bring the unit into compliance with the established ranges.

All records pertaining to the scrubber shall be stored onsite in a form readily available for inspection by the Compliance Authority.

[Rule 62-4.070(3), F.A.C.; and Application No. 0890004-070-AC]

12. Actual Emissions Reporting: This permit is based on an analysis that compared potential emissions with PSD significant emissions rates and avoided the requirements of subsection 62-212.400(4) through (12), F.A.C. Therefore, pursuant to Rule 62-212.300(1)(e), F.A.C., the permittee is subject to the following monitoring, reporting, and recordkeeping provisions.
- The permittee shall monitor the emissions of any PSD pollutant that the Department identifies could increase as a result of the construction and that is emitted by any emissions unit that could be affected; and, using the most reliable information available, calculate and maintain a record of the annual emissions, in tons per year on a calendar year basis, for a period of 5 years following commencement of regular operations. Emissions shall be computed in accordance with the provisions in Rule 62-210.370, F.A.C., which are provided in Appendix C of this permit.
  - The permittee shall report to the Department's permitting and compliance authority within 60 days after the end of each calendar year during the 5-year period setting out the unit's annual emissions during the calendar year that preceded submission of the report. The report shall contain the following:

### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### B. EU 030 - Bioethanol Production Plant

- (1) The name, address and telephone number of the owner or operator of the major stationary source;
  - (2) The annual emissions calculations pursuant to the provisions of 62-210.370, F.A.C., which are provided in Appendix C of this permit;
  - (3) If the emissions differ from the preconstruction projection, an explanation as to why there is a difference; and
  - (4) Any other information that the owner or operator wishes to include in the report.
- c. The information required to be documented and maintained pursuant to subparagraphs 62-212.300(1)(e)1 and 2, F.A.C., shall be submitted to the Department, which shall make it available for review to the general public.
- d. The permittee shall compute and report annual emissions in accordance with Rule 62-210.370(2), F.A.C. as provided by Appendix C of this permit. For this project, the permittee shall use the following methods in reporting the actual annual VOC emissions for the Bioethanol Production Plant (EU 030):
- (1) Unless otherwise approved by the Department, the permittee shall use the same emissions factors for reporting the actual annual emissions of VOC as used in the application to establish potential emissions.
  - (2) As defined in Rule 62-210.370(2), F.A.C., the permittee shall use a more accurate methodology if it becomes available.

[Rules 62-212.300(1)(e) and 62-210.370, F.A.C.; and Application 0890004-070-AC]

*{Permitting Note: Potential emissions of VOC from the unit's vent scrubber stack were determined to be 28.9 tons per year.}*

### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### C. EUs 031, 032 - Bioethanol Product and Process Tanks, and EU 033 – Bioethanol Loadout

This section of the permit addresses the following emissions units.

EU No.	Emission Unit Description
031	Bioethanol Product Storage Tank
032	Miscellaneous Process Tanks
033	Bioethanol Loadout

The ethanol product from the dehydration unit will be processed through one of two shift tanks, with on-specification ethanol being routed to the ethanol storage tank and off-specification ethanol being routed to the off-spec ethanol tank and back to rectifier column. The on-spec ethanol from the storage tank will be loaded to trucks for shipping.

EU 031 will consist of one (1) volatile organic liquid (VOL) product storage tank for on-specification bioethanol with a design capacity of 171,320 gallons. The tank will be equipped with an internal floating roof to reduce VOC emissions.

EU 032 will consist of one (1) off-specification process tank (Off Spec Tank) with design capacity of 51,396 gallons and two (2) shift tanks (Shift Tanks 1 & 2) with design capacity of 24,182 gallons each. Each tank will be equipped with an internal floating roof to reduce VOC emissions.

EU 033 will consist of a loading track with a design loadout rate of 300 gallons of bioethanol per minute to transfer the product to tanker trucks or railcars.

#### EQUIPMENT

1. Bioethanol Product Storage Tank (EU 031): The permittee is authorized to construct one nominal 171,320 gallon bioethanol product storage tank equipped with an internal floating roof. [Design; Application No. 0890004-070-AC]
2. Miscellaneous Process Tanks (EU 032): The permittee is authorized to construct one (1) nominal 51,396 gallon off-specification bioethanol tank (Off Spec Tank) and two (2) nominal 24,182 gallon/each shift tanks (Shift Tanks 1 & 2). All tanks shall be equipped with an internal floating roof. [Design; Application No. 0890004-070-AC]
3. Bioethanol Loadout (EU 033): The permittee is authorized to construct a loading rack that is designed to transfer 300 gallons per minute (gpm) of bioethanol product to tanker trucks or railcars. [Design; Application No. 0890004-070-AC]

#### NSPS SUBPART Kb REQUIREMENTS

4. NSPS Subpart Kb Applicability:
  - a. *EU 031*. Bioethanol Product Storage Tank is subject to NSPS Subpart Kb which applies to any storage tank for which construction, reconstruction, or modification is commenced after July 23, 1984 with a capacity greater than or equal to 151 cubic meters (m<sup>3</sup>) or 39,990 gallons that is used to store a VOL with a maximum true vapor pressure greater than or equal to 3.5 kilopascals (kPa) or 0.51 pounds per square inch (psi). The tank will have a capacity greater than 39,990 gallons and will be designed to meet VOC standard with an internal floating roof per requirements under 40 CFR 60.112b(a)(1) or the alternative compliance requirements under 40 CFR 60.110b(e)(1).
  - b. *EU 032*. Off Spec Tank and Shift Tanks 1 & 2 are in-process tanks and do not qualify as storage vessels per definition in 40 CFR 60.111b; therefore, EU 032 tanks are not subject to NSPS Subpart Kb requirements.

[Rule 62-204.800(8)(b)18, F.A.C.; and Application No. 0890004-070-AC]

*{Permitting Note: The Department is also tracking the status of proposed rule 40 CFR 60, Subpart Kc that would apply to sources constructed, reconstructed, or modified after October 4, 2023. If 40 CFR 60, Subpart*



## SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

### C. EUs 031, 032 - Bioethanol Product and Process Tanks, and EU 033 – Bioethanol Loadout

*Kc is finalized before the new Bioethanol Product Storage Tank becomes operational, the permittee shall comply with the requirements of 40 CFR 60, Subpart Kc in place of 40 CFR 60, Subpart Kb.*

#### PERFORMANCE RESTRICTIONS

5. Permitted Capacity: Only bioethanol may be processed by these emissions units. Based on a consecutive 12-month period, material throughput shall not exceed 7.5 million gallons of bioethanol product. [Rule 62-210.200(PTE), F.A.C.; and Application No. 0890004-070-AC]
6. Hours of Operation: The hours of operation are not limited (8,760 hours per year). [Rule 62-210.200(PTE), F.A.C.; and Application No. 0890004-070-AC]

#### EMISSIONS STANDARDS

7. NSPS Subpart Kb VOC Standards (EU 031): The tanks with fixed roofs in combination with internal floating roofs must meet the following specifications:
  - a. The internal floating roof shall rest or float on the liquid surface (but not necessarily in complete contact with it) inside a storage vessel that has a fixed roof. The internal floating roof shall be floating on the liquid surface at all times, except during initial fill and during those intervals when the storage vessel is completely emptied or subsequently emptied and refilled. When the roof is resting on the leg supports, the process of filling, emptying, or refilling shall be continuous and shall be accomplished as rapidly as possible.
  - b. Each internal floating roof shall be equipped with one of the following closure devices between the wall of the storage vessel and the edge of the internal floating roof:
    - (1) A foam- or liquid-filled seal mounted in contact with the liquid (liquid-mounted seal). A liquid-mounted seal means a foam- or liquid-filled seal mounted in contact with the liquid between the wall of the storage vessel and the floating roof continuously around the circumference of the tank.
    - (2) Two seals mounted one above the other so that each forms a continuous closure that completely covers the space between the wall of the storage vessel and the edge of the internal floating roof. The lower seal may be vapor-mounted, but both must be continuous.
    - (3) A mechanical shoe seal. A mechanical shoe seal is a metal sheet held vertically against the wall of the storage vessel by springs or weighted levers and is connected by braces to the floating roof. A flexible coated fabric (envelope) spans the annular space between the metal sheet and the floating roof.
  - c. Each opening in a noncontact internal floating roof except for automatic bleeder vents (vacuum breaker vents) and the rim space vents is to provide a projection below the liquid surface.
  - d. Each opening in the internal floating roof except for leg sleeves, automatic bleeder vents, rim space vents, column wells, ladder wells, sample wells, and stub drains is to be equipped with a cover or lid which is to be maintained in a closed position at all times (i.e., no visible gap) except when the device is in actual use. The cover or lid shall be equipped with a gasket. Covers on each access hatch and automatic gauge float well shall be bolted except when they are in use.
  - e. Automatic bleeder vents shall be equipped with a gasket and are to be closed at all times when the roof is floating except when the roof is being floated off or is being landed on the roof leg supports.
  - f. Rim space vents shall be equipped with a gasket and are to be set to open only when the internal floating roof is not floating or at the manufacturer's recommended setting.
  - g. Each penetration of the internal floating roof for the purpose of sampling shall be a sample well. The sample well shall have a slit fabric cover that covers at least 90 percent of the opening.
  - h. Each penetration of the internal floating roof that allows for passage of a column supporting the fixed roof shall have a flexible fabric sleeve seal or a gasketed sliding cover.



### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### C. EUs 031, 032 - Bioethanol Product and Process Tanks, and EU 033 – Bioethanol Loadout

- i. Each penetration of the internal floating roof that allows for passage of a ladder shall have a gasketed sliding cover.

[Rule 62-204.800(8)(b)18, F.A.C.; 40 CFR 60.112b(a)(1)]

#### TESTING REQUIREMENTS

8. NSPS Subpart Kb Testing Procedures (EU 031): After installing the control equipment required to meet 40 CFR 60.112b(a)(1) (see Specific Condition 7 of this subsection), the permittee shall:
  - a. Visually inspect the internal floating roof, the primary seal, and the secondary seal (if one is in service), prior to filling the storage vessel with volatile organic liquids (VOL). If there are holes, tears, or other openings in the primary seal, the secondary seal, or the seal fabric or defects in the internal floating roof, or both, the permittee shall repair the items before filling the storage vessel.
  - b. For Vessels equipped with a liquid-mounted or mechanical shoe primary seal, visually inspect the internal floating roof and the primary seal or the secondary seal (if one is in service) through manholes and roof hatches on the fixed roof at least once every 12 months after initial fill. If the internal floating roof is not resting on the surface of the VOL inside the storage vessel, or there is liquid accumulated on the roof, or the seal is detached, or there are holes or tears in the seal fabric, the permittee shall repair the items or empty and remove the storage vessel from service within 45 days. If a failure that is detected during inspections required in this paragraph cannot be repaired within 45 days and if the vessel cannot be emptied within 45 days, a 30-day extension may be requested from the Department in the inspection report required in 40 CFR 60.115b(a)(3) (see Specific Condition 10.c. of this subsection). Such a request for an extension must document that alternate storage capacity is unavailable and specify a schedule of actions the company will take that will assure that the control equipment will be repaired, or the vessel will be emptied as soon as possible.
  - c. For vessels equipped with a double-seal system as specified in 40 CFR 60.112b(a)(1)(ii)(B):
    - (1) Visually inspect the vessel as specified in paragraph d of this condition at least every 5 years; or
    - (2) Visually inspect the vessel as specified in paragraph b of this condition.
  - d. Visually inspect the internal floating roof, the primary seal, the secondary seal (if one is in service), gaskets, slotted membranes, and sleeve seals (if any) each time the storage vessel is emptied and degassed. If the internal floating roof has defects, the primary seal has holes, tears, or other openings in the seal or the seal fabric, or the secondary seal has holes, tears, or other openings in the seal or the seal fabric, or the gaskets no longer close off the liquid surfaces from the atmosphere, or the slotted membrane has more than 10 percent open area, the permittee shall repair the items as necessary so that none of the conditions specified in this paragraph exist before refilling the storage vessel with VOL. In no event shall inspections conducted in accordance with this provision occur at intervals greater than 10 years in the case of vessels conducting the annual visual inspection as specified in paragraphs b and c.(2) of this condition and at intervals no greater than 5 years in the case of vessels specified in paragraph c.(1) of this condition.
  - e. Notify the Department in writing at least 30 days prior to the filling or refilling of each storage vessel for which an inspection is required by paragraphs a and d of this condition to afford the Department the opportunity to have an observer present. If the inspection required by paragraph d of this condition is not planned and the permittee could not have known about the inspection 30 days in advance or refilling the tank, the permittee shall notify the Department at least 7 days prior to the refilling of the storage vessel. Notification should be made by telephone immediately followed by written documentation demonstrating why the inspection was unplanned. Alternatively, this notification including the written documentation may be made in writing and sent by express mail so that it is received by the Department at least 7 days prior to the refilling.

[Rule 62-204.800(8)(b)18, F.A.C.; 40 CFR 60.113b(a)]

## SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

### C. EUs 031, 032 - Bioethanol Product and Process Tanks, and EU 033 – Bioethanol Loadout

#### RECORDS AND REPORTS

9. Bioethanol Throughput Records: The permittee shall maintain records sufficient to determine the bioethanol throughput for these units on a monthly and 12-month rolling total basis. The records shall be stored onsite in a form readily available for inspection by the Compliance Authority. [Rule 62-4.070(3) & 62-210.200(PTE), F.A.C.]
10. NSPS Subpart Kb Inspection Records and Reports (EU 031): After installing control equipment in accordance with 40 CFR 60.112b(a)(1) (see Specific Condition 7 of this subsection), the permittee shall meet the following requirements:
- Furnish the Department with a report that describes the control equipment and certifies that the control equipment meets the specifications of 40 CFR 60.112b(a)(1) (see Specific Condition 7 of this subsection) and 40 CFR 60.113b(a)(1) (see Specific Condition a. of this subsection). This report shall be an attachment to the notification required by 40 CFR 60.7(a)(3).
  - Keep a record of each inspection performed as required by 40 CFR 60.113b(a)(1), (a)(2), (a)(3), and (a)(4) (see Specific Condition 8 of this subsection, paragraphs a, b, c, and d). Each record shall identify the storage vessel on which the inspection was performed and shall contain the date the vessel was inspected and the observed condition of each component of the control equipment (seals, internal floating roof, and fittings).
  - If any of the conditions described in 40 CFR 60.113b(a)(2) (see Specific Condition b. of this subsection) are detected during the annual visual inspection required by 40 CFR 60.113b(a)(2), a report shall be furnished to the Department within 30 days of the inspection. Each report shall identify the storage vessel, the nature of the defects, and the date the storage vessel was emptied or the nature of and date the repair was made.
  - After each inspection required by 40 CFR 60.113b(a)(3) (see Specific Condition c. of this subsection) that finds holes or tears in the seal or seal fabric, or defects in the internal floating roof, or other control equipment defects listed in 40 CFR 60.113b(a)(3)(ii) (see Specific Condition (2) of this subsection), a report shall be furnished to the Department within 30 days of the inspection. The report shall identify the storage vessel and the reason it did not meet the specifications of 40 CFR 60.112b(a)(1) or 60.113b(a)(3) and list each repair made.

[Rule 62-204.800(8)(b)18, F.A.C.; 40 CFR 60.115b(a)]

11. NSPS Subpart Kb Recordkeeping Requirements (EU 031):
- The permittee shall keep copies of all records required by 40 CFR 60.116b, except for the record required by paragraph b of this condition, for at least 5 years. The record required by paragraph b of this condition shall be kept for the life of the source.
  - The owner or operator of each storage vessel as specified in 40 CFR 60.110b(a) shall keep readily accessible records showing the dimensions of the storage vessel and an analysis showing the capacity of the storage vessel.
  - Except as provided in 40 CFR 60.116b(f) and 60.116b(g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 m<sup>3</sup> storing a liquid with a maximum true vapor pressure greater than or equal to 3.5 kilopascals (kPa) or with a design capacity greater than or equal to 75 m<sup>3</sup> but less than 151 m<sup>3</sup> storing a liquid with a maximum true vapor pressure greater than or equal to 15.0 kPa shall maintain a record of the VOL stored, the period of storage, and the maximum true vapor pressure of that VOL during the respective storage period.
  - Except as provided in 40 CFR 60.116b(g), the owner or operator of each storage vessel either with a design capacity greater than or equal to 151 cubic meters (m<sup>3</sup>) storing a liquid with a maximum true vapor pressure that is normally less than 5.2 kPa or with a design capacity greater than or equal to 75 m<sup>3</sup> but less than 151 m<sup>3</sup> storing a liquid with a maximum true vapor pressure that is normally less than 27.6 kPa shall

### SECTION 3. EMISSIONS UNIT SPECIFIC CONDITIONS

#### C. EUs 031, 032 - Bioethanol Product and Process Tanks, and EU 033 – Bioethanol Loadout

notify the Department within 30 days when the maximum true vapor pressure of the liquid exceeds the respective maximum true vapor pressure values for each volume range.

- e. Available data on the storage temperature may be used to determine the maximum true vapor pressure as determined below.
- (1) For vessels operated above or below ambient temperatures, the maximum true vapor pressure is calculated based upon the highest expected calendar-month average of the storage temperature. For vessels operated at ambient temperatures, the maximum true vapor pressure is calculated based upon the maximum local monthly average ambient temperature as reported by the National Weather Service.
  - (2) For crude oil or refined petroleum products the vapor pressure may be obtained by the following:
    - (i.) Available data on the Reid vapor pressure and the maximum expected storage temperature based on the highest expected calendar-month average temperature of the stored product may be used to determine the maximum true vapor pressure from nomographs contained in API Bulletin 2517 (incorporated by reference – see 40 CFR 60.17), unless the Department specifically requests that the liquid be sampled, the actual storage temperature determined, and the Reid vapor pressure determined from the sample(s).
    - (ii.) The true vapor pressure of each type of crude oil with a Reid vapor pressure less than 13.8 kPa or with physical properties that preclude determination by the recommended method is to be determined from available data and recorded if the estimated maximum true vapor pressure is greater than 3.5 kPa.
  - (3) For other liquids, the vapor pressure:
    - (i.) May be obtained from standard reference texts, or
    - (ii.) Determined by ASTM D2879-83, 96, or 97 (incorporated by reference – see 40 CFR 60.17); or
    - (iii.) Measured by an appropriate method approved by the Administrator; or
    - (iv.) Calculated by an appropriate method approved by the Administrator.

[Rule 62-204.800(8)(b)18, F.A.C.; and 40 CFR 60.116b(a)-(d)]