# ADOPT-A-MACT PROJECT:

## A Manual of Model Documents and Guidance to aid Compliance and Enforcement of the

## NUTRITIONAL YEAST MACT
## (40 CFR Part 63, Subpart CCCC)

**September 2003**

**Prepared by:**

**Kingsley Adeduro and Ed Snyder**

**Office of Radiation and Compliance Assurance**
**AIR Division**

**US EPA Region 9**

## INTRODUCTION

To fulfill our Adopt-A-MACT commitment to Headquarters and OECA, Region 9 chose the Nutritional Yeast MACT for our project to develop compliance tools. A goal in choosing this MACT was to meet our commitment, while "piggy backing" on our efforts in West Oakland to address air toxics and EJ issues associated with the Redstar/Lesaffre yeast manufacturing facility. We knew that this MACT only impacted a few facilities nationwide, but sought to use our work on this MACT as a component to our other work in West Oakland with Redstar. Subsequent to our starting work on the nutritional yeast MACT, the Redstar facility announced it was closing down.

The purpose of this checklist is to provide EPA inspectors with a tool to assist them in determining compliance with and enforcement of the Nutritional Yeast MACT, 40 CFR Part 63, Subpart CCCC. The checklist is designed to assist the inspector in planning for and conducting on site inspections at facilities engaged in the manufacturing of nutritional yeast.

A Health and Safety field report from the facility inspection is also included, highlighting areas that should be considered by inspectors conducting on site visits.

## BACKGROUND

Yeast has been part of human history for more than 5000 years, first used to leaven bread and produce alcoholic beverages. The biochemical process of fermentation was not understood until the invention of the microscope and the later work of Louis Pasteur, who identified it as a living organism. Isolation of yeast strains in pure culture form resulted in the commercial production of nutritional yeast at the beginning of the $20^{th}$ century.

The production of nutritional yeast begins with pure strains of *Saccharomyces cerevisiae* grown on mixtures of cane and beet molasses. After fermentation is completed, the yeast is harvested, washed, pasteurized, dried, and packaged.

The EPA identified the manufacturing of nutritional yeast as a major source of acetaldehyde, a recognized hazardous air pollutant (HAP) and volatile organic compound (VOC). Section 112(d) of the Clean Air Act (CAA) set emission standards, for HAPs, using the application of stringent air pollution controls known as maximum achievable control technology (MACT). It is expected that implementation of these standards will eliminate approximately 13% of acetaldehyde emissions nationwide, with this sector seeing acetaldehyde emissions go from 240 tons a year to 31 tons a year. The final rule allows flexibility for facilities to meet the air emission (MACT) standards using a variety of technologies. However, all the affected facilities have indicated that they plan to meet the final standards using pollution prevention techniques and process controls.

Acute (short term) and chronic (long term) inhalation exposure to acetaldehyde is associated with adverse health effects including irritation to the eyes, skin and respiratory tract. Acetaldehyde is a potential developmental toxin and a possible human carcinogen.

In the course of doing research and field work to understand the manufacturing of nutritional yeast, several trends were observed. The production of nutritional yeast has become international in scope, with a number of existing American facilities being taken over by European or Canadian multinational conglomerates. The manufacture of nutritional yeast is moving from local to regional facilities, with older, less efficient facilities being closed.

Some of the newer "state of the art" facilities in Europe and the United States can achieve emission reductions through operation and process design, that are lower than the MACT standards. The process for manufacturing nutritional yeast has become highly automated, using computer programs to control all aspects of production. It is through the use of automated process controls, combined with mechanical, biofilter and incineration techniques, that enable some facilities to claim zero emissions.

**Compliance Requirements:**

Facilities that come under the Standard Industrial Classification (SIC) code 2099 or the North American Industry Classification (NAICS) code 311999 are subject to these MACT requirements.

**Emission Limits:**

Owners and operators of affected sources must comply with 40 CFR Part 63, Subpart CCCC. For at least 98% of all batches in each 12-month period, the VOC concentration in the fermenter exhaust may not exceed the following(measured as propane and averaged over the duration of a batch):

- 100ppmv for the last stage (trade stage)
- 200ppmv for the second to last stage (first generation), and
- 300ppmv for the third to last stage (stock stage)

Facilities must continuously monitor VOC concentration in the fermenter exhaust during each batch period. As an alternative, facilities may continuously monitor "brew ethanol" during batches in lieu of fermenter exhaust performance testing. To comply under this option, facilities must conduct performance tests to correlate brew ethanol concentrations with fermenter exhaust concentrations (a "brew -to-exhaust" correlation). These tests must be repeated at least once a year. Compliance would then be based on brew methanol concentrations equivalent to the above standards.

**Notification:**

A notification of compliance status (NCS) must be submitted to EPA. Facilities required to conduct performance tests must submit their NCS no later than 60 days after conducting the performance test. All other facilities must submit their NCS no later than the first July 31 or January 31 following the first 12 months of compliance with the rule. Initial reporting is followed by semiannual compliance reporting on every July 31 and January 31. Monitoring and reporting records must be retained for 5 years (2 years onsite).

**Malfunction Plans:**

Facilities must also develop and implement written malfunction plans. Immediate reporting (within 2 days) is required if a malfunction occurs that is not consistent with the malfunction plan.

**Permits:**

Finally, affected yeast manufacturing facilities must obtain and/or revise Title V operating permits and met other requirements in the general NESHAP provisions.

For further information on this MACT, contact David W. Markwordt at (919)-541-0837 or markwordt.david@epa.gov. For Region 9, contact Kingsley Adeduro at (415)-947-4182 or adeduro.kingsley@epa.gov, or Ed Snyder at (415)-947-4186 or snyder.ed@epa.gov.

## Pollution Prevention

The American Yeast facility in Bakersfield, California, has an agreement to pipe the ethanol ( which makes up 80 to 90 per cent of the VOC emissions produced as a "waste" of the fermentation process), to a local water treatment plant to power a co-generation boiler used at the facility. This use of "waste" from the nutritional yeast production process serves as a good example of a pollution prevention opportunity.

A starting point for many companies interested in pollution prevention is the adoption of an Environmental Management Systems (EMS). The use of an EMS by many facilities has resulted in:

- Reduced raw material use and waste generation
- Reduced insurance premiums
- Enhanced public image and competitiveness by emphasizing Pollution Prevention (P2) and going beyond compliance
- Reduced environmental costs and an improved bottom line
- Improved relations with government agencies.

Assistance in setting up an EMS may be found at the Federal, state and local levels, as well as private sector and non profit groups.

## The benefits of adopting an Environmental Management Systems (EMS)

It is possible for sources that are subject to the Nutritional Yeast MACT to come into compliance with the standards and even go beyond compliance, while reducing costs and wastes and materials used in the process(s). This can be accomplished through the adoption and use of an EMS combined with the use of  pollution prevention (P2) techniques. An EMS follows a systematic approach of planning, implementing, evaluating and improving. The use of pollution prevention techniques does not depend on the use of an EMS, but those organizations who have adopted an EMS, have found that it helps promote the successful use of P2.

Protecting the environment by coming into compliance or, ideally, going beyond compliance can be very attractive to companies engaged in nutritional yeast production. An EMS can help reduce waste, costs, and inefficiencies. It promotes preservation of natural resources and can lessen the impact of industrial processes on the environment. An EMS can make greater use of materials already purchased and reduce purchasing costs. An EMS can aid an organization in having cleaner emissions and can also lessen the severity of spills, leaks, and other accidents. Overall an EMS can reduce costs for permitting, remediation, worker comp, insurance, and can also reduce the risk for potential law suit and fines.

Protecting the environment involves purchasing smaller amounts of materials or purchasing less toxic materials. These purchasing choices reduce OSHA reporting and record-keeping requirements and costs. These choices improve worker safety and morale, leading to more productive workers. Purchasing less hazardous materials reduces the need for and the costs associated with special equipment, special training, and specially designed storage areas. These purchasing practices also reduce the cost of disposal. Protecting the environment  by going beyond compliance helps keep regulators and inspectors out of the plant.

A major study by ICF Kaiser International "shows that when public companies improve their corporate environmental practices, they are able to increase shareholder wealth by up to 5 percent...The findings suggest that when environmental risks are reduced, the company becomes a more attractive investment to potential and current stockholders." Three factors contribute to this result: corporate environmental management, environmental performance, and environmental communications.

**Success Stories: Businesses Profiting from an EMS**

Many companies have profited from implementing an EMS. Here are descriptions of some brief success stories which provide insights into the process and benefits of implementing an EMS. To preserve confidentiality, some firms are referred to as “Company A” or similar.

- A manufacturer of office furniture eliminated the use of methyl chloroform from its cleaning and fastening processes and reduced the volume of VOC emissions by converting to a powder-based coating system. These pollution prevention alternatives saved the company more than $1.1 million per year, with a return on its $1 million investment in less than one year. Other bonuses included ease of compliance with increasingly stringent environmental regulations and the elimination of incineration fees for solid and liquid hazardous wastes.

- Leff-Marvins Cleaners, Inc. provides dry cleaning services. The company replaced its old equipment with new cold water chilled closed loop systems to recycle PERC (perchloroethylene). The new system also uses reusable nylon filters and increases efficiency, since garments do not have to be transferred between machines. The new equipment eliminated most VOC emissions (eliminating the need for permits) and also reduced purchase of PERC from 200 gallons per month to 40 gallons per month. In addition, the hazardous waste stream was reduced from over 1,900 gallons of spent PERC per year to just 35 gallons of still residues per month. The company realized a net savings of $1,400 per month with the new system.

- Company C considered trichloroethylene (TCE) emissions as constituting a significant environmental impact due to: hazardous waste disposal costs, TCE's impact on human health, and TCE's toxicity rating (commonly listed as a potential carcinogen). Since TCE emissions were identified as significant the company planned to minimize TCE use and set a specific target of completely eliminating TCE by the end of the fiscal year. The first step was identifying areas where the TCE was used. Suppliers marked metal parts using a grease coating to facilitate the stamping process. Company C used TCE in a vapor degreaser to clean these metal parts. The company convinced its suppliers to replace the grease coating with a water-based lubricant, thereby eliminating TCE use from the cleaning of about 80 percent of its parts. For the remaining 20 percent (parts that were cylindrical and required heavier oils in their production), the company incorporated a two-step aqueous cleaner to replace TCE. As a result, the degreasers were shut down. By eliminating TCE in the facility, Company C saves approximately $100,000 annually. More importantly, the company has reduced health risks by eliminating the use of a suspected carcinogen in the workplace.

- During its EMS identification process, Company D noticed that one of its large machines had a serious oil leak. The leak was quickly repaired with a $5 gasket. This easy, inexpensive action cut by half the amount of oil consumed by the company, creating significant cost savings. In addition, the local municipal authority reclassified the plant as no longer generating hazardous waste.

The use of an EMS is not without cost or commitment, and while results will not come over night, numerous companies have reported great success and returns for the effort. One company reported energy savings of 15%, water costs reduced by 55%, costs for waste disposal reduced by 50% and less chemical usage.

The current standard for Environmental Management Systems that is recognized world wide is ISO 14000/14001.

If you would like more information on EMS, look at www.trst.com/iso1-frame.htm and www.ifc.org/enviro/Publications/EMS/ems.htm.

For additional information on pollution prevention (P2) and Environmental Management Systems (EMSs), these Web sites offer a good starting point.

*Internet Resources:*

***EPA:***

*www.epa.gov/ (EPA's home page)*
*www.epa.gov/epahome/rules.html (Rules and regulations-Nutritional Yeast is at 40CFR Part 63, Subpart CCCC)*
*www.epa.gov/sbo (EPA's small business home page-assistance and links to other useful web sites)*
*www.epa.gov/oar/oaqps/ (Office of Air Quality Planning and Standards-site offering a great deal of information relating to air quality and technical assistance)*
*www.epa.gov/ttn/ (EPA's Technology Transfer Network (TTN) electronic bulletin board system provides a wide range of technical information about EPA's air toxics rules.)*
*www.epa.gov/ttn/sbap/access.html (Access to Small Business Assistance Program Publications)*
*www.epa.gov/oeca/oc (Compliance assistance home page)*
*www.epa.gov/epahome/clearing.html (Compliance assistance and sector links)*
*www.epa.gov/epahome/hotline.html (Telephone hotlines)*
*www.epa.gov/p2 (Pollutiom prevention information)*

*http://es.epa.gov (EnviorSense-common sense solutions to environmental problems.)*
*www.epa.gov/region09(Regional information-look for your Regional Web-site)*

# Health & Safety Field Report EPA Inspection American Yeast, Bakersfield, California

**Jeff Woodlee, CIH**

**September 18, 2003**

*The Health & Safety Office of EPA Region 9 provided assistance to EPA's Air Enforcement inspectors during inspection of American Yeast, Bakersfield, California. American Yeast produces bakers yeast by fermenting common yeast Saccharomyces Cerevisiae. Their production facility includes indoor and outside operations that include fermentation tanks, molasses tanks, mash tanks, aqueous ammonia system, miscellaneous feed systems, yeast processing, yeast storage, natural gas boiler and laboratory. During the process volatile organic compounds (VOCs) are produced. The San Joaquin Valley Air Pollution Control district restricts air contaminant releases. Acetaldehyde was identified as a regulated VOC that might cause significant exposure to inspectors. This field report evaluates exposure to acetaldehyde and identifies other chemical exposures that may be important in future evaluations.*

## Acetaldehyde

During production acetaldehyde concentration is second to ethanol. Other by products consist of organic acids, acetates and other alcohols. Approximately 80-90 percent of total VOC emissions is ethanol and the remaining 10-20 percent consist of other alcohols and acetaldehyde. Acetaldehyde is a hazardous air pollutant as defined under section 112 of the Clean Air Act.

Acetaldehyde is colorless, irritating, flammable, and highly reactive VOC. It can exist as liquid or vapor. At dilute concentrations, it has a pleasant fruity odor. At high concentrations, the odor becomes pungent and suffocating. Average low odor threshold for acetaldehyde is 67 ppb. Occupational exposure limits include ACGIH-TLV of 25 ppm as a ceiling limit and OSHA PEL of 200 ppm as an 8-hour time weighted average.

## Health Effects

Acetaldehyde is primarily an inhalation hazard. Direct dermal contact with the liquid can cause redness or burn. It is a confirmed animal carcinogen and NIOSH classified potential occupational carcinogen. At low concentrations it is primarily an irritant and will cause eye irritation when exposed to 50 ppm for 15 minutes. Concentrations over 200 ppm for prolonged periods of time may cause narcosis, CNS depression, conjunctivitis and injury to the corneal epithelium. The immediately dangerous to life and health (IDLH) level is 2000 ppm.

## Engineering Controls

When investigating yeast production facilities it is important to identify ventilation control and other engineer controls for VOC's. American Yeasts' major fermentation sources were found to be outdoors and the indoor controls for processing and drying were general ventilation both mechanical and leakage through large and small doorways. The outdoor fermentation was process controlled to minimize acetaldehyde formation.

## Exposure Assessment

S. cerevisieae is a commonly used industrial microorganism and is found in nature, being present on fruits and vegetables. There is extensive history of use and exposure. Humans come into contact with S. cervisiae on a daily basis through inhalation and ingestion. Review of the literature indicates that it is not considered pathogenic and worst case exposure estimates indicate low risk to workers from normal fermentation operations.

Of the associated VOC's released during fermentation, acetaldehyde is of primary concern due its relative abundance and toxicity.

On April 29$^{th}$ 2003 EPA Region 9 inspected American Yeast facilities in Bakersfield, California. Present for EPA were Ed Snyder, Kingsley Adeduro, John Brock and Jeff Woodlee. Personal exposures to acetaldehyde were determined in the breathing zone of three inspectors using NIOSH method 2538. Exposure to acetaldehyde was also monitored in real-time using length-of-stain volumetric detector tubes. General Area samples were taken indoors and outdoors with summa canisters and analyzed by GC-MS.

The real-time acetaldehyde measure was limited to a detection of 1 ppm. During the site visit acetaldehyde was not detected by this method.

The personal samples were collected on XAD sorbent tubes treated with 2-hydroxymethyl piperidine that provide a limit of detection of approximately 0.74 ppm. The average of personal exposures were below the methods reported lower limit, however trace levels were reported that averaged approximately 0.17 ppm. It is important to note that personal exposure levels are below the limit for the method and indicate a range of exposure from 0 ppb to a few hundred ppb as acetaldehyde. This range is further substantiated by semi-quantitative summa measurements that indicate low ppb levels.

GC-MS data of the summa samples indicated the presence of ethanol, acetaldehyde, ethyl acetate and other alcohols.

## Summary

Exposure assessment of EPA personnel during inspection of American Yeast determined the presence of acetaldehyde at low ppb levels. This is consistent with outdoor controlled process fermentation, the presence of adequate indoor general ventilation and use of closed indoor feed tanks.

The inspection illustrated a well run clean yeast production operation. It also revealed the presence of a 15,325 gallon aqueous ammonia tank. Exposure to ammonia should be considered and evaluated before and during future investigations.

Subpart CCCC - National Emission Standards for Hazardous Air Pollutants:

- Manufacturing of Nutritional Yeast

# Compliance checklists

# TABLE OF CONTENTS

SECTION 1

# FACILITY INFORMATION

| | |
|---|---|
| Facility's Name | |
| Facility's Address | |
| Mailing Address (if different) | |
| Facility's Owner | |
| Owner's Address | |
| Responsible Official, Name & Title | |
| Mailing Address | |
| Telephone | |
| Facility's Primary Activity | |
| S I C Code(s) | |
| Environmental Contact | |
| Contact's Telephone Number | |
| Owner's Registered Agent | |
| Registered Agent's Address | |

# SECTION 2 GENERAL QUESTIONS

| | Yes | No | NA | |
|---|---|---|---|---|
| 1.- | ☐ | ☐ | ☐ | Does Facility manufacture Nutritional Yeast? |
| 2.- | ☐ | ☐ | ☐ | Is Facility's location a major source of HAP emissions? |
| 3.- | ☐ | ☐ | ☐ | Is Facility a non-major (area) source but will later increase its potential to emit HAP to major source levels ? |
| 4.- | ☐ | ☐ | ☐ | When does Facility become a major source? |
| | | | | Date: |
| | | | | Amount of HAP |
| 5.- | ☐ | ☐ | ☐ | Does Facility produce Saccharomyces Cerevisiae? |
| | | | | Are all fermentation production lines exceeding 7000 gallons capacity (I.e. fermenters used in the last three fermentation states, including the final batch. Other terms for fermentation include "Stock first generation and trade" and CB4, CB5, and CB6 |
| | | | | Note: A fermentation production line doesnot include Flask, pure-culture,or yeasting-tank fermentations. It excludes all operations after the last dewatering operation such as filtration. |
| 6.- | ☐ | ☐ | ☐ | Is yeast produced at this Facility for the purpose of becoming a dough ingredient for bread, or for any other yeast-raised baked product, or for use as a nutritional food additive? |
| | | | | Note: 1. Specialty yeasts such as those for wine, champagne, whisky and beer are exempt. |
| | | | | 2. Torula yeast (candida utiles) using aerobic fermentation is also exempt. |
| 7.- | ☐ | ☐ | ☐ | Does Facility plan to be in compliance by monitoring BREW ETHANOL? |
| | | | | If YES: complete the Check List for Brew Ethanol |

| | Yes | No | NA | |
|---|---|---|---|---|
| | | | | |
| | | | | |
| **8.-** | ☐ | ☐ | ☐ | **Does Facility plan to be in compliance by monitoring FERMENTER EXHAUST?** |
| | | | | **If YES: complete the Check List for Fermenter Exhaust** |
| | | | | |

# Compliance Inspection Checklist for Brew Ethanol

| Yes | No | NA | | Cite |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility been in compliance with the applicable emission limitations for at least 98% of all batches (sum of batches from last, second-to-last and third-to-last stages) in each 12-month rolling calculation period (limitations are 100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for the third-to-last stage, measured as propane, and averaged over the duration of the batch)? | 63.2150(a) |
| ☐ | ☐ | ☐ | Has a written malfunction plan been developed and implemented? | 63.2150(c) |
| ☐ | ☐ | ☐ | Has initial compliance been demonstrated within 180 calendar days before May 21, 2004, as per 63.2161 and 63.2165? | 63.2160(b) |
| ☐ | ☐ | ☐ | Has the facility established a brew-to-exhaust correlation as per 63.2161? | 63.2161 |
| ☐ | ☐ | ☐ | Has a subsequent performance test been performed within one year of the last performance test? | 63.2162(b) |
| ☐ | ☐ | ☐ | Are CEMS installed, operated, and maintained according to manufacturer's specifications and the facility's malfunction plan? | 63.2164(a) |
| ☐ | ☐ | ☐ | Has each CEMS completed a minimum of one cycle of operation for each successive 30-minute period within each batch monitoring period? | 63.2164(b) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the CEMS data been reduced to arithmetic batch averages from two or more data points over each 1-hour period, except during periods when calibration, quality assurance, or maintenance activities are being performed? | 63.2164(c) |
| ☐ | ☐ | ☐ | Does the facility have valid CEMS data from at least 75 percent of the full hours over the entire batch monitoring period | 63.2164(d) |
| ☐ | ☐ | ☐ | Has the CEMS span been set to correspond not greater than 5 times the relevant emission limit, using the most recent performance test data (1.5 to 2.5 times the relevant emission limit being the range considered optimum by EPA)? | 63.2164(e) |
| ☐ | ☐ | ☐ | Have the results of each inspection, calibration, and validation check been recorded? | 63.2164(f) |
| ☐ | ☐ | ☐ | Has the GC (that is being used to calibrate the CEMS) been calibrated at least daily, utilizing standard solutions of ethanol in water (0.05%, 0.15% and 0.3 percent)? | 63.2164(g)(1) |
| ☐ | ☐ | ☐ | Does the facility use either a Porapak® Q, 80-100 mesh, 6' X 1/8", stainless steel packed column, or the DB Wax, 0.53mm X 30 m capillary column? | 63.2164(h)(1) |
| ☐ | ☐ | ☐ | If a CEMS ethanol value has differed by 20 percent or more from the corresponding GC ethanol value, did the facility determine the brew ethanol values through out the rest of the batch monitoring period by injecting brew samples into the GC not less frequently than every 30 minutes? | 63.2164(h)(2) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility performed a calibration of the CEMS at least four times per batch? | 63.2164(h)(3) |
| ☐ | ☐ | ☐ | Has a Notification of Compliance Status containing the results of the initial compliance demonstration been submitted according 63.2180? | 63.2166 |
| ☐ | ☐ | ☐ | Has the facility monitored continuously during each batch monitoring period (with the exception of monitor malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments)? | 63.2170(b) |
| ☐ | ☐ | ☐ | Has the facility used data recorded during monitoring malfunctions, associated repairs, and required quality assurance or quality control activities in data averages and calculations used to report emission or operating levels, or to fulfill a minimum data availability requirement? | 63.2170(c) |
| ☐ | ☐ | ☐ | Has the facility used data collected during all other periods (i.e., periods not involving monitoring malfunctions, associated repairs, and required quality assurance or quality control activities) in assessing the operation of the control system ? | 63.2170(c) |
| ☐ | ☐ | ☐ | Has the facility calculated the percentage of within-concentration batches for each monthly rolling 12-month period as required in 63.2171? | 63.2171(b) |
| ☐ | ☐ | ☐ | If the facility had periods of malfunction, did they operate in accordance with their malfunction plan? | 63.2171(b) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility submitted all of the notifications in 63.7(b) and (c), 63.8(e), (f)(4) and (6), and 63.9(b) through (h) that apply? | 63.2180(h) |
| ☐ | ☐ | ☐ | Did the facility submit a notification of the intent to conduct a performance test at least 60 days before the performance test is scheduled? | 63.2180(c) |
| ☐ | ☐ | ☐ | Did the facility submit a Notification of Compliance Status according to 63.9(h)(2)(ii) and according to paragraphs (e)(1) and (2) of 63.2180? | 63.2180(e) |
| ☐ | ☐ | ☐ | Has the facility submitted a Semi-Annual Compliance Report consistent with the requirements and timelines specified in Table 5 to Subpart CCCC and 63.2181? | 63.2181(a) |
| ☐ | ☐ | ☐ | If the facility had a malfunction during the reporting period that is not consistent with the malfunction plan, has the facility submitted an Immediate Malfunction Report consistent with the requirements and timelines specified in Table 5 to Subpart CCCC and 63.2181? | 63.2181(c) |
| ☐ | ☐ | ☐ | Does the facility keep records of submitted notifications and reports, records related to malfunction (as per 63.6(e)(3)(iii) through (v), records of performance tests and performance evaluations (as per 63.10(b)(2)(viii), and records of results of brew-to-ethanol exhaust correlation tests? | 63.2182(a) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | For each CEMS, does the facility maintain records as required by 63.10(b)(2)(vi), all required measurements needed to demonstrate compliance with a relevant standard, records described in (63.10(b)(2)(viii) through (xi) (the CEMS system must allow the amount of excess zero and high-level calibration drift measured at the interval checks to be quantified and recorded), all required CEMS measurements, identification of each batch during which the CEMS was inoperative (except for zero and high-level checks), identification of each batch during which the CEMS was out of control (as defined in 63.2163(k)), previous versions of the performance evaluation plan, request for alternatives to relative accuracy test for CEMS (as required by 63.8(f)(6)(i), and records of each batch for which the batch-average VOC concentration exceeded the applicable maximum VOC concentration in Table 1 to Subpart CCCC and whether the batch was in production during a period of malfunction or during another period? | 63.2182(b) |
| ☐ | ☐ | ☐ | Does the facility keep the records required in Table 4 to Subpart CCCC? | 63.2182(c) |
| ☐ | ☐ | ☐ | Has the facility kept records of unique batch identification number, fermentation stage for which the fermenter is being used, and unique CEMS equipment identification number? | 63.2182(d) |
| ☐ | ☐ | ☐ | Has the facility kept all required records in a form suitable and readily available for expeditious review (as per 63.10(b)(1)? | 63.2183(a) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility kept all required records for a period not less than five years following the date of the each occurrence, measurement, maintenance, corrective action, report, or record? | 63.2182(b) |
| ☐ | ☐ | ☐ | Has the facility kept all required records onsite for a period not less than two years following the date of the each occurrence, measurement, maintenance, corrective action, report, or record (the records can be kept offsite for the remaining three years)? | 63.2182(c) |

# Compliance Inspection Checklist for Fermenter Exhaust

| Yes | No | NA | | Cite |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility been in compliance with the applicable emission limitations for at least 98% of all batches (sum of batches from last, second-to-last and third-to-last stages) in each 12-month rolling calculation period (limitations are 100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for the third-to-last stage, measured as propane, and averaged over the duration of the batch)? | 63.2150(a) |
| ☐ | ☐ | ☐ | Has a written malfunction plan been developed and implemented? | 63.2150(c) |
| ☐ | ☐ | ☐ | Has initial compliance been demonstrated 12 months after May 21, 2004, as per 63.2161 and 63.2165? | 63.2160(b) |
| ☐ | ☐ | ☐ | Is each CEMS installed, operated, and maintained according to the applicable performance standard in Appendix B to 40 CFR Part 60? | 63.2163(a) |
| ☐ | ☐ | ☐ | Has the source conducted a Performance evaluation of each CEMS according to the requirements of 63.8, according to the applicable Performance Specification of 40 CFR Part 60, Appendix B, and 63.2163(b)(1) through (4)? | 63.2163(b) |
| ☐ | ☐ | ☐ | Has the CEMS been calibrated with propane? | 63.2163(c) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the CEMS span been set at not greater than 5 times the relevant emission limit, with 1.5 to 2.5 times the relevant emission limit being the range considered optimum by EPA? | 63.2163(d) |
| ☐ | ☐ | ☐ | Does the source monitor VOC concentration in fermenter exhaust at any point prior to dilution of the exhaust stream? | 63.2163(e) |
| ☐ | ☐ | ☐ | Has each CEMS completed a minimum of one cycle of operation for each successive 30-minute period within each batch monitoring period? | 63.2163(f) |
| ☐ | ☐ | ☐ | Has the CEMS data been reduced to arithmetic batch averages from two or more data points over each 1-hour period, except during periods when calibration, quality assurance, or maintenance activities are being performed? | 63.2163(g) |
| ☐ | ☐ | ☐ | Does the facility have valid CEMS data from at least 75 percent of the full hours over the entire batch monitoring period | 63.2163(h) |
| ☐ | ☐ | ☐ | Have the results of each inspection, calibration, and validation check been recorded? | 63.2163(i) |
| ☐ | ☐ | ☐ | Has the facility checked the zero and high-level calibration drifts for each CEMS in accordance with the applicable PS of 40 CFR Part 60, Appendix B? | |
| ☐ | ☐ | ☐ | Have the zero and high-level calibration drifts been adjusted, at a minimum, whenever the zero drift exceeds 2 times the limits of the applicable PS? | 63.2163(j) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Have calibration checks been performed at least once daily except as provided under 63.2163(j)(1) through (3)? | 63.2163(j) |
| ☐ | ☐ | ☐ | If the CEMS was out of control during this period, did the facility take corrective action according to paragraphs 63.2163(k)(1) through (3)? | 63.2163(k) |
| ☐ | ☐ | ☐ | Has a Notification of Compliance Status containing the results of the initial compliance demonstration been submitted according 63.2180? | 63.2165 |
| ☐ | ☐ | ☐ | Has the facility monitored continuously during each batch monitoring period (with the exception of monitor malfunctions, associated repairs, and required quality assurance or control activities (including, as applicable, calibration checks and required zero and span adjustments)? | 63.2170(b) |
| ☐ | ☐ | ☐ | Has the facility used data recorded during monitoring malfunctions, associated repairs, and required quality assurance or quality control activities in data averages and calculations used to report emission or operating levels, or to fulfill a minimum data availability requirement? | 63.2170(c) |
| ☐ | ☐ | ☐ | Has the facility used data collected during all other periods (i.e., periods not involving monitoring malfunctions, associated repairs, and required quality assurance or quality control activities) in assessing the operation of the control system ? | 63.2170(c) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility calculated the percentage of within-concentration batches for each monthly rolling 12-month period as required in 63.2171? | 63.2171(b) |
| ☐ | ☐ | ☐ | If the facility had periods of malfunction, did they operate in accordance with their malfunction plan? | 63.2171(b) |
| ☐ | ☐ | ☐ | Has the facility submitted all of the notifications in 63.7(b) and (c), 63.8(e), (f)(4) and (6), and 63.9(b) through (h) that apply? | 63.2180(h) |
| ☐ | ☐ | ☐ | Did the facility submit a notification of the intent to conduct a performance test at least 60 days before the performance test is scheduled? | 63.2180(d) |
| ☐ | ☐ | ☐ | Did the facility submit a Notification of Compliance Status according to 63.9(h)(2)(ii) and according to paragraphs (e)(1) and (2) of 63.2180? | 63.2180(e) |
| ☐ | ☐ | ☐ | Has the facility submitted a Semi-Annual Compliance Report consistent with the requirements and timelines specified in Table 5 to Subpart CCCC and 63.2181? | 63.2181(a) |
| ☐ | ☐ | ☐ | If the facility had a malfunction during the reporting period that is not consistent with the malfunction plan, has the facility submitted an Immediate Malfunction Report consistent with the requirements and timelines specified in Table 5 to Subpart CCCC and 63.2181? | 63.2181(c) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Does the facility keep records of submitted notifications and reports, records related to malfunction (as per 63.6(e)(3)(iii) through (v), and records of performance tests and performance evaluations (as per 63.10(b)(2)(viii)? | 63.2182(a) |
| ☐ | ☐ | ☐ | For each CEMS, does the facility maintain records as required by 63.10(b)(2)(vi), all required measurements needed to demonstrate compliance with a relevant standard, records described in (63.10(b)(2)(viii) through (xi) (the CEMS system must allow the amount of excess zero and high-level calibration drift measured at the interval checks to be quantified and recorded), all required CEMS measurements, identification of each batch during which the CEMS was inoperative (except for zero and high-level checks), identification of each batch during which the CEMS was out of control (as defined in 63.2163(k), previous versions of the performance evaluation plan, request for alternatives to relative accuracy test for CEMS (as required by 63.8(f)(6)(i), and records of each batch for which the batch-average VOC concentration exceeded the applicable maximum VOC concentration in Table 1 to Subpart CCCC and whether the batch was in production during a period of malfunction or during another period? | 63.2182(b) |
| ☐ | ☐ | ☐ | Does the facility keep the records required in Table 4 to Subpart CCCC? | 63.2182(c) |
| ☐ | ☐ | ☐ | Has the facility kept records of unique batch identification number, fermentation stage for which the fermenter is being used, and unique CEMS equipment identification number? | 63.2182(d) |

| Yes | No | NA | | |
|---|---|---|---|---|
| ☐ | ☐ | ☐ | Has the facility kept all required records in a form suitable and readily available for expeditious review (as per 63.10(b)(1)? | 63.2183(a) |
| ☐ | ☐ | ☐ | Has the facility kept all required records for a period not less than five years following the date of the each occurrence, measurement, maintenance, corrective action, report, or record? | 63.2182(b) |
| ☐ | ☐ | ☐ | Has the facility kept all required records onsite for a period not less than two years following the date of the each occurrence, measurement, maintenance, corrective action, report, or record (the records can be kept offsite for the remaining three years)? | 63.2182(c) |

# FEDERAL REGISTER TABLES

As stated in Sec. 63.2140, you must comply with the emission limitations in the following table:

## Table 1 to Subpart CCCC.--Emission Limitations

| For each fed-batch fermenter producing yeast in the following fermentation stage.... | You must meet the following emission limitation .... |
|---|---|
| **Last stage (Trade); or Second-to-last stage (First Generation); or Third-to-last stage (Stock).** | **a. For at least 98 percent of all batches (sum of batches from last, second-to-last, and third-to-last stages) in each 12-month calculation period described in Sec. 63.2171(b), the VOC concentration in the fermenter exhaust does not exceed the applicable maximum concentration (100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for third-to-last stage), measured as propane, and averaged over the duration of a batch.**<br><br>**b. The emission limitation does not apply during the production of specialty yeast.** |

**As stated in Sec. 63.2161, if you demonstrate compliance by monitoring brew ethanol, you must comply with the requirements for performance tests in the following table:**

# Table 2 to Subpart CCCC.

## Requirements for Performance Tests

[Brew Ethanol Monitoring Only]

| For each fed-batch fermenter for which compliance is determined by monitoring brew ethanol concentration and calculating VOC concentration in the fermenter exhaust according to the procedures in Sec. 63.2161, you must .. | Using . . . | According to the following requirements: |
|---|---|---|
| 1. Measure VOC as propane... | Method 25A*, or an alternative validated by EPA Method in the 301* and approved by the Administrator | You must measure the VOC concentration in the fermenter exhaust at any point prior to dilution of the exhaust stream |
| 2. Select the sampling port's location and the number of traverse points. | Method 1* | |
| 3. Measure volumetric flow rate | Method 2* | |
| 4. Perform gas analysis to determine the dry molecular weight of the stack gas. | Method 3* | |
| 5. Determine moisture content of the stack gas. | Method 4* | |

*EPA Test Methods found in appendix A of 40 CFR part 60.

As stated in sec. 63.2165 (if you monitor fermenter exhaust) and sec. 63.2166 (if you brew ethanol), you must comply with the requirements to demonstrate initial compliance with the applicable emission limitations in the following table:

# Table 3 to Subpart CCCC.

## --Initial Compliance With Emission Limitations

| For . . . | For the following emission limitation . . . | You have demonstrated initial compliance if . . . |
|---|---|---|
| 1. Each fed-batch fermenter producing yeast in a fermentation stage (last Trade), second-to-last (First Generation), or third-to-last (Stock) for which compliance is determined by monitoring VOC concentration in the fermenter exhaust | The VOC concentration in the fermenter exhaust, averaged over the duration of the batch, does not exceed the applicable maximum concentration (100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for thir-to-last stage), measured as propane .. | a. You reduce the CEMS data batch averages according to para. 63.2163(g)<br>b. The average VOC concentration in the fermenter exhaust for at least 98 percent of the batches (sum of batches from last, second-to-last, and third-to-last stages) during the initial compliance period described in para. 63.2160(a) does not exceed the applicable maximum concentration. |
| 2. Each fed-batch fermenter producing yeast in a fermentation stage (last Trade), second-to-last (First Generation), or third-to-last (Stock) for which compliance is determined by monitoring brew ethanol concentration and calculating VOC concentration in the fermenter exhaust according to the procedures in para. 63.2161. | The VOC concentration in the fermenter exhaust, averaged over the duration of the batch, does not exceed the applicable maximum concentration (100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for thir-to-last stage), measured as propane .. | a. The VOC fermenter exhaust concentration over the period of the Method 25A* performance test does not exceed the applicable maximum concentration.<br>b. You have a record of the brew-to-exhaust correlation during the Method 25A* performance test during which the VOC fermenter exhaust concentration did not exceed the applicable maximum concentration. |

* EPA Test Method in appendix A of 40 CFR part 60.

As stated in Sec. 63.2171, you must comply with the requirements to demonstrate continuous compliance with the applicable emission limitations in the following table:

# Table 4 to Subpart CCCC.

## -- Continuous Compliance with Emission Limitations

| For | For the following emission limitation . . . | You must demonstrate continuous compliance by . . . |
|---|---|---|
| 1. Each fed-batch fermenter producing yeast in a fermentation stage (last Trade), second-to-last (First Generation), or third-to-last (Stock) for which compliance is determined by monitoring VOC concentration in the fermenter exhaust | For at least 98 percent of all batches (sum of batches from last, second-to-last, and third-to-last stages) in each 12-month calculation period described in para. 63.2171(b), the VOC concentration in the fermenter exhaust, averaged over the duration of the batch, does not exceed the applicable maximum concentration (100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for third-to-last stage), measured as propane. | a. Collecting the monitoring data according to para. 63.2163(f).<br>b. Reducing the data according to para. 63.2163(g).<br>c. For at least 98 percent of the batches (sum of batches from last, second-to-last, and third-to-last stages) for each 12-month period ending within a seminannual reporting period described in para. 63.2181(b)(3), the batch average VOC concentration in the fermenter exhaust does not exceed the applicable maximum concentration. |
| 2. Each fed-batch fermenter producing yeast in a fermentation stage (last Trade), second-to-last (First Generation), or third-to-last (Stock) for which compliance is determined by monitoring brew ethanol concentration and calculating VOC concentration in the fermenter exhaust according to the procedures in para. 63.2161. | For at least 98 percent of all batches (sum of batches from last, second-to-last, and third-to-last stages) in each 12-month calculation period described in para. 63.2171(b), the VOC concentration in the fermenter exhaust, averaged over the duration of the batch, does not exceed the applicable maximum concentration (100 ppmv for last stage, 200 ppmv for second-to-last stage, or 300 ppmv for thir-to-last stage), measured as propane. | a. Collecting the monitoring data according to para. 63.2164(b).<br>b. Reducing the data according to para. 63.2164(c).<br>c. For at least 98 percent of the batches (sum of batches from last, second-to-last, and third-to-last stages) for each 12-month period ending within a seminannual reporting period described in para. 63.2181(b)(3), the batch average VOC concentration in the fermenter exhaust does not exceed the applicable maximum concentration. |

As stated in Sec. 63.2181, you must submit a compliance report that contains the information in Sec. 63.2181(c) as well as the information in the following table; you must also submit malfunction reports according to the requirements in the following table:

# Table 5 to Subpart CCCC.

## --Requirements for Reports

| You must submit a(n) | The report must contain . . . | You must submit the report . . . |
|---|---|---|
| 1. Compliance Report . . . | a. Your calculated percentage of within-concentration batches, as described in para 63.2171(b), for 12-month calculation periods ending on each calendar month that falls within the reported period. | Semiannually according to the requirements in para. 63.2181(b) |
| | b. If you had a malfunction during the reporting period and you took actions consistent with your malfunction plan, the compliance report must include the information in para. 63.10(d)(5)(i). | Semiannually according to the requirements in para. 63.2181(b) |
| 2. Immediate malfunction report if you had a malfunction during the reporting period that is not consistent with your malfunction plan | a. Actions taken for the event . . . | By fax or telephone within 2 working days after starting actions inconsistent with the plan |
| | b. The information in para. 6.10(d)(5)(ii) . . . | By letter within 7 working days after the end of the event unless you have made alternative arrangements with the permitting authority (para. 63.10(d)(5)(ii) |

**As stated in Sec. 63.2190, you must comply with the applicable General Provisions requirements according to the following table:**

# Table 6 to Subpart CCCC.

## Applicability of General Provisions to Subpart CCCC

| Citation | Subject | Applicable to Subpart CCCC? |
|---|---|---|
| Sect. 63.1 . . . . . | Applicability . . . . . | Yes. |
| Sect. 63.2 . . . . . | Definitions . . . . . . | Yes. |
| Sect. 63.3 . . . . . | Units and Abbreviations . . . . . | Yes. |
| Sect. 63.4 . . . . . | Prohibited Activities and Circumvention . . . . . | Yes. |
| Sect. 63.5 . . . . . | Construction and Reconstruction . . . . . | Yes. |
| Sect. 63.6 . . . . . | Compliance with Standards and Maintenance Requirements. | 1. For Para. 63.6(e) and (f), requirements for startup, shut-down, and malfunctions apply only to malfunctions.<br>2. Para. 63.6(h) does not apply.<br>3. Otherwise, all apply. |
| Sect. 63.7 . . . . . | Performance Testing Requirements . . . . . | 1. Para. 63.7(a)(1)-(2) and (e)(3) do not apply, instead specified in this subpart.<br>2. Otherwise, all apply. |
| Sect. 63.8 . . . . . | Monitoring Requirements . . . . . | 1. Para. 63.8(a)(2) is modified by Para 63.2163<br>2. Para. 63.8(a)(4) does not apply.<br>3. For Para. 63.8(c)(1), requirements for startup, shutdown, and malfunctions apply only to malfunctions, and no report pursuant to Para. 63.10(d)(5)(i) is required. |

| Citation | Subject | Applicable to Subpart CCCC? |
|---|---|---|
| | | 4. For Para. 63.8(d), requirements for startup, shutdown, and malfunctions apply only to malfunctions.<br>5. Para. 63.8(c)(4)(i), (c)(5), (e)(5)(ii), and (g)(5) do not apply.<br>6. Para. 63.8(c)(4)(ii), (c)(6)-(8), (e)(4), and (g)(1)-(4), do not apply, instead specified in this subpart.<br>7. Otherwise, all apply. |
| **Sect. 63.9 . . . . .** | **Notification Requirements . . . . .** | **1. Para. 63.9(b)(2) does not apply, because rule omits requirements for initial notification for sources that start up prior to May 21, 2001.<br>2. Para. 63.9(f) does not apply.<br>3. Otherwise, all apply.** |
| **Sect. 63.10 . . . . .** | **Recordkeeping and Reporting Requirements ..** | **1. For Para. 63.10(b)(2)(i)-(v), (c)(9)-(15), and (d)(5), requirements for startup, shutdown, and malfunctions apply only to malfunctions.<br>2. Para. 63.10(b)(2)(i), and (c)(1)-(6), do not apply, instead specified in this subpart.<br>3. Para. 63.10(c)(7)-(8), (d)(3), (e)(2)(ii)-(4), (e)(3)-(4) do not apply.<br>4. Otherwise, all apply.** |
| **Sect. 63.11 . . . . .** | **Flares . . . . .** | **No.** |
| **Sect. 63.12 . . . . .** | **Delegations . . . . . .** | **Yes.** |
| **Sect. 63.13 . . . . .** | **Addresses . . . . . . .** | **Yes.** |
| **Sect. 63.14 . . . . .** | **Incorporation by Reference . . . . . .** | **Yes.** |
| **Sect. 63.15 . . . . .** | **Availability of Information . . . . . .** | **Yes.** |