SAN JOAQUIN VALLEY UNIFIED AIR POLLUTION CONTROL DISTRICT

Initial Study/Environmental Checklist

A. PROJECT BACKGROUND INFORMATION

1. Project Title: Pacific Ethanol Facility

2. Lead Agency Name and Address

San Joaquin Valley Unified Air Pollution Control District (District)
1990 E. Gettysburg Ave.
Fresno, CA 93726

3. Contact Person:

CEQA: Mr. Hector R. Guerra
(559) 230-5800

Permits: Mr. Arnaud Marjollet
(559) 230-5800

4. Project Location:

South side of Avenue 12, approximately 0.57 miles west of the intersection with Road 32, unincorporated area of Madera County

5. Project Sponsor's Name and Address:

San Joaquin Valley Unified Air Pollution Control District
1990 E. Gettysburg Ave.
Fresno, CA 93726

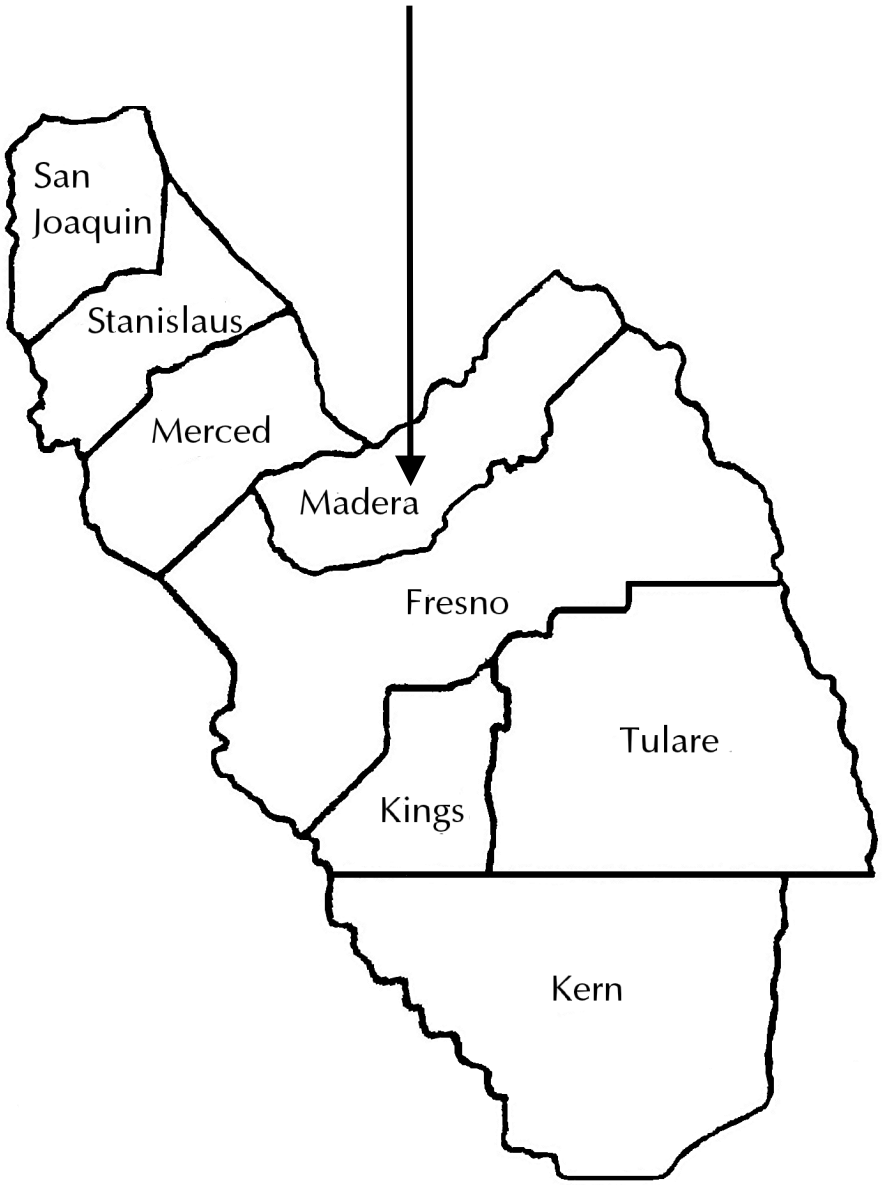
6. Description of Project:

Pacific Ethanol Inc. is a new facility applying for Authority to Construct (ATC) permits to build a new fuel-grade ethanol production facility located in Madera. Ethanol will be produced from the fermentation and distillation of corn. The maximum proposed capacity of the plant is 40 million gallons per year of undenaturated ethanol. The facility will process approximately 15.4 million bushels of corn per year, equivalent to 431,200 ton of corn per year.

The new ethanol production facility will be integrated with the existing grain process facility (ex-Coast Grain), therefore the SJVUAPCD will consider the entire facility (grain storage and process facility and ethanol production) as one single Stationary Source. Pacific Ethanol Inc. will use the existing equipment to store and supply grain to the ethanol production facility; and to process grain to cattle feed. This existing grain operation will be modified and operated to supply grain to the ethanol production operation. Therefore, for this project, the SJVUAPCD considers this grain process as a new operation.
A Project Description provided by the applicant is attached at the end of this Initial Study. A more comprehensive project/process description is also included at the end of this Initial Study. However, In order to protect the confidentiality of the particulars for this project, propriety information is not available for public review.

San Joaquin Valley Unified air Pollution Control District Boundaries

Project is located in Madera County



7. Other Agencies Whose Approvals Is Required and Permits Needed:

Regional Water Quality Control Board - Central Valley Region Issuance of Waste Discharge Requirements

8. Project Compatibility with Existing Zones and Plans:

Issuance of District Authorities to Construct (ATC) and Permits to Operate (PTO) will not affect any land use zones or plans.

General Plan/Zoning Designations:
General Plan Designation: HI (Heavy Industrial); Zoning: IH (Industrial, Urban or Rural, Heavy)

Assessors Parcel Number: 047-130-020

Adjacent Properties Zoning and Existing Land Use:
North Zoning: ARE-40 (agricultural, Rural, Exclusive-40 Acre) To the west of the BNSF tracks the property is designated in the General Plan for Community Commercial and Low Density Residential
North Current Uses: Agriculture row crops, vineyards
South Zoning: IH (Industrial, Urban or Rural, Heavy)
South Current Uses: Farmland and grazing
East Zoning: ARE-40 (Agricultural, Rural, Exclusive-40 Acre)
East Current Uses: Row crops and vineyards
West Zoning: IH (Industrial, Urban or Rural, Heavy)
West Current Uses: Farmland and grazing, a metal fabricating plant and an electric substation.

9. Name of Person Who Prepared Initial Study:

Hector R. Guerra
Senior Environmental Planner

B. ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a **"Potentially Significant Impact"** as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology /Soils
☐ Hazards & Hazardous Materials	☐ Hydrology / Water Quality	☐ Land Use / Planning
☐ Mineral Resources	☐ Noise	☐ Population / Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities / Service Systems	☐ Mandatory Findings of Significance	

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

X I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature Date

D. ENVIRONMENTAL IMPACT CHECKLIST

Explanations of all answers on the checklist are located in section E.

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?			.	**X**
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?				**X**
c) Substantially degrade the existing visual character or quality of the site and its surroundings?				**X**
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?				**X**
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				**X**
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				**X**
c) Involve other changes in the existing environment, which, due to their location				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
or nature, could result in conversion of Farmland, to non-agricultural use?				
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?				**X**
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				**X**
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?				**X**
d) Expose sensitive receptors to substantial pollutant concentrations?				**X**
e) Create objectionable odors affecting a substantial number of people?				**X**
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?				**X**
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
Game or US Fish and Wildlife Service?				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				**X**
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?				**X**
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				**X**
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				**X**
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in '15064.5?				**X**
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to '15064.5?				**X**
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				**X**
d) Disturb any human remains, including those interred outside of formal cemeteries?				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				**X**
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				**X**
ii) Strong seismic ground shaking?				**X**
iii) Seismic-related ground failure, including liquefaction?				**X**
iv) Landslides?				**X**
b) Result in substantial soil erosion or the loss of topsoil?				**X**
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?				**X**
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				**X**
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?				**X**
VII. HAZARDS AND HAZARDOUS MATERIALS -- Would the project:				
a) Create a significant hazard to the				

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
public or the environment through the routine transport, use, or disposal of hazardous materials?			**X**	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			**X**	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				**X**
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				**X**
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				**X**
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				**X**
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				**X**
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
intermixed with wildlands?				
VIII. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?				**X**
b) Substantially deplete groundwater supplies or interfere substantially with recharge such that there would be a net deficit in aquifer volume or lower the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing uses or planned uses for which permits have been granted)?				**X**
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site?				**X**
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?				**X**
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				**X**
f) Otherwise substantially degrade water quality?				**X**
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
hazard delineation map?				
h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?			**X**	
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				**X**
j) Inundation by seiche, tsunami, or mudflow?				**X**
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established community?				**X**
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				**X**
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				**X**
X. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				**X**
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				**X**
XI. NOISE B Would the project result in:				

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?				**X**
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				**X**
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?				**X**
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			**X**	
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				**X**
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				**X**
XII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				**X**
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				**X**
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?			**X**	
Police protection?				**X**
Schools?				**X**
Parks?				**X**
Other public facilities?				**X**
b) Cumulatively exceed official regional or local population projections?				**X**
c) Induce substantial growth in an area either directly or indirectly (e.g., through projects in an undeveloped area or extension of major infrastructure?				**X**
d) Displace existing housing, especially affordable housing?				**X**
XIV. RECREATION				
a) Would the project increase the use of existing neighborhood and regional				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?				**X**
XV. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?				**X**
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				**X**
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				**X**
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				**X**
e) Result in inadequate emergency access?				**X**
f) Result in inadequate parking capacity?				**X**
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS --Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?				**X**
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				**X**
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				**X**
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?				**X**
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				**X**
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?				**X**
g) Comply with federal, state, and local statutes and regulations related to solid waste?				**X**
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or				**X**

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporation	Less Than Significant Impact	No Impact
wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?				
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively Considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?				**X**
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?				**X**

E. ENVIRONMENTAL IMPACT CHECKLIST COMMENTS

I. Aesthetics

There will be no adverse aesthetic impact of the proposed project because the site is already developed to an industrial facility that has significant aesthetic impacts. The site currently includes eight concrete grain storage silos, approximately 200' in height and a large concrete processing building.

The proposed additional buildings will only range in height from 15' to 45' and will be constructed of materials consistent with those of similar industrial and agricultural structures in the area. The proposed storage tanks will be approximately 33' in height.

All of the new structures will be clustered near the existing concrete silos so they will not obstruct existing views of the Sierra or the agricultural open space to the east. In addition, the proposed project includes landscaping along Avenue 12 which will screen both the new facilities and the existing silos and building.

The project would not create aesthetically offensive sites visible to the public. No significant adverse aesthetic impacts are anticipated.

II. Agriculture Resources

None of the project site is or has been devoted to agricultural use so there will be no direct impact on agricultural resources by additional development of the site.

The site is zoned for heavy industrial uses and was historically used as a lumber mill. The site has never been enrolled in the Williamson Act. The site is partially developed with grain storage silos and a rail loop track

None of the planned activities in the proposed project are of a type that may have a negative impact on adjacent farmland. . Most activities will be conducted either in-vessel or in one of the buildings so there are minimal impacts off site. In addition, the BNSF railway property provides a buffer area between facility activities and adjacent agricultural lands.

The project will not lead to the conversion of prime or unique farmland to non-agricultural use. The project will not conflict with existing zoning for agricultural use, or Williamson Act contract.

III. Air Quality

Project stationary equipment will be equipped with Best Available Control Technology. Expected emissions are as follows (see Application for Authority to Construct for detailed emission calculations)

NOx	7.8 tons per year
VOC	14.1 tons per year
CO	37.9 tons per year

SOx	0.3 tons per year
PM10	9.3 tons year

Estimated emissions from mobile sources are as follows (see attachment for more details):

HC	0.11 tons per year
ROG	-0.48 tons per year
NOx	-17.31 tons per year
CO	-1.12 tons per year
SO_2	-0.21 tons per year
PM10	-0.84 tons per year

All on-site roads will be paved.

The project will not violate any air quality standard, result in a cumulatively considerable net increase in any criteria pollutant, expose sensitive receptors to substantial pollutants or create any objectionable odors. The project emissions will be under the District threshold, as described above, and is considered less than significant. A more comprehensive description of District imposed rule requirements to eliminate or substantially reduce potential pollutants is included at the end of this Initial Study.

IV. Biological Resources

A substantial portion of the site has already been developed with industrial uses and the new development is essentially more intense development of the area already dedicated to industrial use. Although the site is in an area of potential habitat for Kit Fox and kangaroo rats, due to the historic industrial uses of the site where development is proposed it does not have any habitat value.. The project will not have a substantial adverse effect on the habitat of sensitive species, riparian areas, federally protected wetlands, or interfere with any migratory fish or wildlife species with established migratory corridors. The project will not conflict with any local policies or ordinances protecting biological resources or conflict with any Habitat Conservation Plan.

V. Cultural Resources

There are no known cultural resources or features on the project site. The site is already established with structures. There is no possibility that this project could have any adverse effect on cultural resources including: historical resources, archaeological resources, paleontological resources, geologic features or the disturbance of any human remains. The proposed uses do not include any substantial excavation, however, in the unlikely event that any archeological or paleontological resources or buried human remains are uncovered at the project site, excavation activities will cease immediately. Any unearthed resources will not be disturbed and the proper authorities/agencies will be notified.

VI. Geology and Soils

There is an extremely low chance of geologic hazards due to the project location toward the center of the San Joaquin Valley floor. There are no known faults or unstable geologic features in the vicinity of the project site.

The project site is located approximately 48 miles west of the Great Valley Fault. The probabilistic ground motion value for the site is 13%g, with a 10% chance of exceedence in 50 years.

The land in the vicinity of the site is essentially flat and with well compacted natural sediment so landslides or collapse are unlikely. The site is adjacent to the BNSF railway line which has not experienced any soil problems for decades.

The primary soil types on the project site are San Joaquin Sandy Loam, with lesser quantities of San Joaquin Whitney Sandy Loam and Alamo Clay. Madera County has already approved the existing project for septic tanks for domestic sewage. Additional waste water disposal will be in a lined pond so soil permeability will not be an issue.

The project is not located in a known earthquake fault zone. It is not subject to landslides nor will it result in substantial soil erosion or loss of topsoil. The major structures for the project already exist and meet building code requirements. All other buildings will also meet all code requriements.

VII. Hazards and Hazardous Materials

The proposed project will utilize hazardous materials. Each material will be handled and contained with all required technology to minimize the chances of a release. Specific hazardous materials to be present in the proposed project and mitigation measures included in the project design are discussed in this section. The following potentially hazardous materials will be stored and utilized on the project site:

Material	Storage Method
Ethanol	Carbon steel storage tanks
Diesel Fuel	Above ground carbon steel storage tanks
Aqueous Ammonia	Stainless steel tank
Enzymes (alpha amylase, etc.)	Stainless steel tank
Sulfuric acid	Stainless steel tank
Urea	Stainless steel tank
Gasoline	Carbon steel tank

All tanks will be surrounded by spill containment structures and will be equipped with vapor control features. Employees will be trained in the proper use, handling, and storage of potentially hazardous materials.

The site is surrounded by land developed for various agricultural uses. A buffer area will be maintained between facility structures and open space.

The project is not within one quarter mile of an existing or proposed school. The project is not located on a site included on the list of hazardous materials sites.

Proper training, handling techniques, and buffers will be utilized to ensure that any potential hazards or hazardous materials spills are minimized to the extent practicable. The project is not located on a private airstrip and the existing buildings are in compliance with the applicable airport and land use plan. This project will not interfere with an adopted emergency response/evacuation plan.

VIII. Hydrology and Water Quality

There will be no substantial change to the site topography.

The site is within the 100-year flood zone: FEMA Zone AO, Average flood depth 1 foot, primarily from sheet flow generally from North East to South West. The northern boundary of the site along Avenue 12 will be bermed to prevent inundation of flood waters and the eastern boundary is protected by the raised bed of the BNSF railway. The Project proponent will file a Notice of Intent to comply with the General Stormwater Permits for Construction and Industrial Activities with the RWQCB, and the proponent will prepare a Storm Water Pollution Prevention Plan. As required, the project will indicate that all Storm Water will be retained on site rather than being discharged on neighboring lands.

All process water will be re-used. Blowdown water from the natural gas fired boilers and cooling towers will be discharged to a lined evaporation pond. The pond will be designed to meet Title 27 regulations. At least three ground water monitoring wells will be installed. Monitoring will occur quarterly. The Project proponent will obtain Waste Discharge Requirements from the Regional Water Quality Control Board (RWQCB).

IX. Land Use and Planning

The site is in area zoned for heavy industrial uses. Current surrounding land uses are primarily agricultural.

The Madera County Planning Department has found the proposed project to be consistent with the existing zoning and the applicable sections of the County General Plan.

The project will not conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect

X. Mineral Resources

There are no known mineral resources on the site or in the immediate vicinity of the site. No impact on mineral resources is anticipated.

XI. Noise

There will be a slight increase in area noise levels due to an increase of traffic generated by the facility. As noted in section XV Transportation/Traffic, below, approximately 122 additional vehicle trips will occur during a twenty-four (24) hour period. The facility will operate 24-hours per day, therefore, the traffic distribution will result in only approximately 5.0 additional vehicles per hour. Noise levels will remain below significant levels and no adverse impacts are anticipated

XII. Population and Housing

The facility will employ approximately 35 individuals, seventeen more than employed at the existing Coast Grain facility. New employees will be drawn from the existing local labor pool. No impact on local population or the need for housing is anticipated.

XIII. Public Services

The facility has the potential to increase the demand for local fire protection services. However, the facility will be designed to meet all local fire safety codes. The on-site well will be available to provide water should the need for fire fighting purposes occur. All fire safety measures will require approval by the California Department of Forestry which contracts with Madera County for fire protection in this area.

The facility is not expected to produce an increase in the demand for other public services.

XIV. Recreation

The project is an industrial facility and will not result in any increase in local population or the demand for recreation services.

XV. Transportation/Traffic

The daily traffic estimates for the project, compared to the average daily traffic for the existing Coast Grain facility are as follows:

Source of Traffic	Daily Vehicles	Daily Trips
Proposed Ethanol Facility	106	212
Existing Coast Grain	45	90
Net Increase in Local Traffic	61	122

The Madera County Planning Department has determined that a traffic study for the project is not required. No significant impact on local street segments or intersections is anticipated.

XVI. Utilities and Service Systems

The project will not exceed wastewater treatment requirements or require that new wastewater treatment facilities be built. Construction of new storm water drainage facilities will not be required. Sufficient water supplies are available to serve the project with existing resources. Waste disposal needs can be met for this project as required by the County of Madera.

Regarding energy needs the estimated utility usage of the facility is as follows:

Utility	Source	Usage	Approximate Requirement
Natural Gas	Pipeline	Steam boilers	2,100 cu.ft./day
Steam	On-site steam production facility	Mash cookers	76,200 lb/hr
Well water	On-site well	Boiler make-up (75%) and process needs (25%)	350 gallons per minute at peak 300 acre feet per year in total
Electricity	Local grid	Process equipment, lighting, office and test equipment	3,222 kW/day average 4,200 kW/day peak

"Will Serve" letters from the utilities have not yet been obtained. However, discussions with representatives of the utilities have indicated that adequate service for the project is available.

XVII. Mandatory Findings of Significance

This project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory.

This project does not have the potential to achieve short-term, to the disadvantage of long-term, environmental goals. Neither does this project have impacts, which are individually limited, but cumulatively considerable. This project will have no potential environmental effects that will cause substantial adverse effects on human beings, either directly or indirectly.

Based upon consideration of the information provided in the comments to the Environmental Checklist and other analyses performed for this project, it does not have the potential to degrade the quality of the environment or to interfere with either short-term or long-term environmental goals. There will not be any significant cumulative impacts. Finally, the project will not cause any direct or indirect substantial adverse effects on human beings.

The following is a summary description of the equipment, processes, and District Rules the project will entail as taken as excerpts from the Authorities To Construct for the project. As noted in the beginning of the Initial Study, propriety information is not available for public review in order to protect the confidentiality of the particulars for this project.

PROJECT DESCRIPTION:

Gasoline is a mixture of up to 50% paraffins (mostly branched), and up to 50% aromatics (benzene, xylenes, and heavier aromatics). Gasoline contains 100-1000 different chemical compounds. In most urban areas, air pollution exceeds the standards mandated by the Clean Air Act, and by law, refiners must add to gasoline oxygenating additives like MTBE (methyl tertiary-butyl ether) or ethanol. Oxygenates are oxygen-rich substances that should dissolve well in gasoline and make it burn better, thus reducing carbon monoxide and other emissions. A recent Californian law requires the phasing out of the use of MTBE as a gasoline oxygenating additive and requires ethanol to be used in its place, by January 2004.

Pacific Ethanol Inc. is a new facility applying for Authority to Construct (ATC) permits to build a new fuel-grade ethanol production facility located in Madera. Ethanol will be produced from the fermentation and distillation of corn. The maximum proposed capacity of the plant is 40 million gallons per year of undenaturated ethanol. The facility will process approximately 15.4 million bushels of corn per year, equivalent to 431,200 ton of corn per year.

As a part of this project, Pacific Ethanol Inc. has acquired an existing facility, Coast Grain that processes corn for cattle feed. Coast Grain was previously permitted under the facility number #C-3666. The new ethanol production facility will be integrated with the existing grain process facility (ex-Coast Grain) and, therefore, the District will consider the entire facility (grain storage and process facility and ethanol production) as one single Stationary Source.

Pacific Ethanol Inc. will use the existing equipment to store and supply grain to the ethanol production facility; and to process grain to cattle feed. This existing grain operation will be modified and operated for a different purpose compared to what it used to be, to supply grain to the ethanol production operation. Therefore, for this project, the District will consider this grain process as a new operation.

The feed mill operation consisting of grain storage and process operation will include the following units:

- one (1) railcar and truck grain receiving and storage operation (Authority To Construct (ATC) #C-4261-1-0, previously permitted under PTO #C-3666-2-0),
- one (1) grain flaking and cooling operation (ATC #C-4261-2-0, previously permitted under PTO #C-3666-4-1),
- one (1) grain grinding operation (ATC #C-4261-3-0, previously permitted under PTO #C-3666-8-0),
- one (1) flaked grain storage operation (ATC #C-4261-4-0, previously permitted under PTO #C-3666-5-0),
- one (1) grain truck loading operation (ATC #C-4261-5-0, previously permitted under PTO #C-3666-5-0),
- one (1) 19.8 MMbtu/hr Hurst natural gas-fired boiler (Authority To Construct (ATC) #C-4261-25-0, previously permitted under Permit To Operate (PTO) #C-3666-1-0), and

- one (1) 265 hp John Deere diesel-fired emergency Internal Combustion (IC) engine (ATC #C-4261-26-0, previously permitted under PTO #C-3666-7-0).

The ethanol production operation will include the following units:

- two (2) corn hammermills and conveyors (ATCs # C-4261-6-0 and –7-0),
- one (1) slurry tank served by a VOC distillation wet scrubber (ATC # C-4261-8-0),
- one (1) yeast tank served by a VOC distillation wet scrubber (ATC # C-4261-9-0),
- one (1) liquefaction tank served by a VOC distillation wet scrubber (ATC # C-4261-10-0),
- one (1) fermentation process consisting of four (4) fermentation tanks, all served by VOC fermentation wet scrubber vented to a CO_2 recovery plant (ATC # C-4261-11-0),
- one (1) beerwell tank served by a VOC fermentation wet scrubber vented to a CO_2 recovery plant (ATC # C-4261-12-0),
- one (1) distillation process consisting of a distillation column served by a VOC distillation wet scrubber (ATC # C-4261-13-0),
- one (1) process condensate tank served by a VOC distillation wet scrubber (ATC # C-4261-14-0),
- one (1) wet cake process consisting of stillage tanks, centrifuge, evaporator, syrup tank and conveyors, all served by a VOC distillation wet scrubber (ATC # C-4261-15-0),
- one (1) wet cake storage silo vented to the distillation wet scrubber (ATC # C-4261-16-0),
- one (1) wet cake truck loading system (ATC # C-4261-17-0),
- four (4) internal floating roof ethanol and gasoline storage tanks (ATCs # C-4261-18-0, -19-0, -20-0, and -21-0),
- one (1) denaturated ethanol truck loading rack controlled by a flare (ATC # C-4261-22-0),
- two (2) identical 75.6 MMBtu/hr natural gas-fired boilers with ultra low-NO_X burners (ATCs # C-4261-23-0 and -24-0), and
- four (4) cooling towers.

The four (4) water cooling towers are used to cool water used in the process as an indirect contact heating medium in condensers and heat exchangers. The water used in the condensers and heat exchangers is cooled in the induced draft direct contact cooling tower. The water is contacted with ambient air in the cooling towers to cool the water to the near ambient temperature. The water never contacts the process stream directly. The water circulating rate of each cooling tower is 3,575 gal/min. Pursuant to District Rule 2020, section 6.2, water cooling towers that have a circulation rate of less than 10,000 gallons per minute, and that are not used for cooling of process water, water from barometric jets, or water from barometric condensers are permit exempt. Therefore, the proposed four (4) cooling towers are permit exempt and no further discussion is required.

The facility has proposed to limit the facility process not to trigger public notification, offsets or major source requirements. Therefore, this evaluation is the first phase of the project. A second phase to remove the facility-wide limits will be processed after this evaluation is completed and ATCs issued and public notice will be required at that time.

APPLICABLE DISTRICT RULES AND CALIFORNIA HEALTH AND SAFETY CODES:

District Rule 2020	Exemptions (March 21, 2002)
District Rule 2201	New and Modified Stationary Source Review (December 19, 2002)
District Rule 2520	Federally Mandated Operating Permits (June 21, 2001)
District Rule 4001	New Sources Performance Standards (April 14, 1999)
District Rule 4101	Visible Emissions (November 15, 2001)

District Rule 4102	Nuisance (December 17, 1992)
District Rule 4103	Open Burning (June 21, 2001)
District Rule 4201	Particulate Matter Concentration (December 17, 1992)
District Rule 4202	Particulate Matter-Emission Rate (December 17, 1992)
District Rule 4301	Fuel burning equipment (December 17, 1992)
District Rule 4305	Boilers, Steam Generators and Process Heaters, Phase ll (August 21, 2003)
District Rule 4306	Boilers, Steam Generators and Process Heaters, Phase lll (September 18, 2003)
District Rule 4311	Flares (June 20, 2002)
District Rule 4451	Valves, Pressure Relief Valves, Flanges, Threaded Connections And Process Drains At Petroleum Refineries And Chemical Plants
District Rule 4452	Pump And Compressor Seals At Petroleum Refineries And Chemical Plants
District Rule 4621	Gasoline Transfer into Stationary Storage Containers, Delivery Vessels, and Bulk Plants
District Rule 4623	Storage of Organic Liquids
District Rule 4624	Organic Liquid Loading
District Rule 4661	Organic Solvents (December 20, 2001)
District Rule 4662	Organic Solvents Degreasing Operations (December 20, 2001)
District Rule 4663	Organic Solvents Cleaning, Storage and Disposal (December 20, 2001)
District Rule 4701	Stationary Internal Combustion Engines (November 12, 1998)
District Rule 4703	Stationary Gas Turbines (October 16, 1997)
District Rule 4801	Sulfur Compounds (December 17, 1992)
District Rule 8010	General Requirements (November 15, 2001)
District Rule 8021	Construction, Demolition, Excavation, Extraction, And Other Earthmoving Activities (November 15, 2001)
District Rule 8031	Bulk Materials (November 15, 2001)
District Rule 8041	Carryout And Trackout (November 15, 2001)
District Rule 8051	Open Areas (November 15, 2001)
District Rule 8061	Paved and Unpaved Roads (November 15, 2001)
District Rule 8071	Unpaved Vehicle/Equipment Traffic Areas (November 15, 2001)
CH&SC 41700	California Health and Safety Code
CH&SC 42301.6	California Health and Safety Code

PROCESS DESCRIPTION:

Feed Mill Operation

The feed mill operation is receiving raw materials (corn) and process them to make feed products.

Railcar and Truck Receiving and Storage Operation

Corn is received from railcars into a receiving pit, or from trucks into an enclosed receiving pit. The raw ingredients are moved by a common drag conveyor from the receiving pits to an elevator and then through a distributor, which directs the ingredients to storage bins and silos (all equipped with bin vent filters). Since the two receiving pits utilize a common drag conveyor, only one receiving pit can be used at a time. The drag conveyor, elevator and distributor is enclosed. The two receiving pits are vented to a common baghouse.

Grain Flaking and Cooling Operation

Screened corn or barley is mechanically conveyed to one of three flaking operations. The material is first conditioned in a steam chest, processed through a flaking roller, and then mechanically conveyed to a common grain cooler to remove moisture. The cooled grain is mechanically conveyed to an elevator, which feeds a distributor. The emissions from the cooler are vented to a three high efficiency compact separators. All of the material captured in the three compact separators are mechanically conveyed to the flaked grain leg. Flake grain is then stored in eight storage bins, all equipped with bin vent filters.

Grain Grinding Operation

Overs from the facility's different screening operations and off specification grains received as raw ingredients are fed into a surge bin. The material is then mechanically conveyed to a grinder (hammermill). All equipments, including conveyors, are fully sealed and enclosed and no visible emissions are emitted from this unit.

Grain Truck Loading Operation

Before truck loading, some of the products from the product storage conveyor are moved through a blending conveyor (screw) where molasses and fat are be added to the product as needed. Other finished product are loaded directly into trucks.

19.8 MMBtu/hr Hurst Natural Gas-Fired Boiler

The boiler is to be used to provide steam to soften the grain prior to entering the flaking/rolling process. It has a maximum heat input of 19.8 MMBtu/hr, which produces about 17,181 pounds of steam per hour. Emissions from the boiler is controlled by utilizing a low NO_X burner and flue gas recirculation (FGR) system and natural gas as a fuel.

Ethanol Production Operation

The basis for the production of ethanol is to convert starch to sugars and then convert the sugars to ethanol (i.e. grain alcohol).

Grain Hammermill Operation

Grain is removed from the grain storage building or the storage bins on demand. The grain (corn or milo) is then ground in the hammermills.

Fermentation Process

The fermentation process includes yeast preparation with one (1) yeast tank and one (1) liquefaction tank; one (1) slurry tank; four (4) fermentation tanks (fermenters).

The ground grain is mixed with water in the slurry tank, cooked, liquefacted with enzymes, and the resultant mash cooled. The mash is then mixed with yeast from the yeast tank and more enzymes

The four (4) fermentation tanks are operating in series as a continuous flow reactor. After approximately 48 hours of fermentation, the resultant liquid (beer) will contain 10% to 15% ethanol by weight.

After fermentation process in the fermentation tanks, the liquid (beer) and the fermented grain are stored in a beerwell tank. The capacity of the each fermentation tank is 420,000 gallon, and the beerwell tank has a capacity of 550,000 gallon.

Beerwell Tank

The beer is temporarily stored in the beerwell storage tank. From the beerwell storage tank, the beer is sent through a de-gas vessel to the distillation process.

Distillation Process

The beer will be distilled in a three-column distillation process that consists of the beer stripper, side stripper, and rectifier. The top product of the distillation process is 95% ethanol and 5% water (190-proof ethanol).. Using molecular sieve, the remaining 5% water will be removed from the 190-proof ethanol resulting in 100% ethanol (200-proof).

The bottom product from the distillation process is the whole stillage consisting of spent grain and water. The whole stillage is then processed through the wet cake process.

Wet Cake Process

The whole stillage is removed from the bottom of the beer stripper and conveyed to the centrifuge where the solids and the liquid are separated.

The organic matter in the water will be concentrated in an evaporator until syrup remains. This process is fully enclosed.

The wet cake is then discharged from the centrifuge, mixed with syrup and mechanically conveyed with an enclosed conveyor system to the storage silo.

Wet Cake Storage Silo

As material enters the storage silo the head space that is displaced by the wet cake will be pushed out a vent at the top of the silo. This vent will be piped directly to a process vent condenser. The water removed from the stream will be discharged directly into the process condensate tank via closed system. The vapor that passes through condenser will be routed into the distillation wet scrubber inlet duct where it will enter vent gas scrubber to control VOC emissions.

Wet cake will be removed from the silo through a bottom-feed conveyor. This conveyor will pull material from the bottom of the silo and carry up the loadout spout where it will be discharged into the back of a truck for shipment.

190-Proof Ethanol, 200-Proof Ethanol, Gasoline, and Denaturated Ethanol Storage Tanks

Off-spec material, 190-proof, and pure ethanol, 200-proof ethanol, are then stored in separate internal floating roof tanks. The product will then be combined with 5% natural gasoline (denaturant) and sold as denatured ethanol.

Denatured Ethanol Truck Loading Rack

Denatured ethanol is loaded in truck using a bottom loading rack type served by a flare to control VOC emissions from the truck during loading operation.

75.6 MMBtu/hr Natural Gas-Fired Boilers

The boilers are used mainly to provide steam to heat up the fermentation process and for the distillation process.

EMISSION CONTROL TECHNOLOGY EVALUATION:

Railcar and Truck Receiving and Storage Operation

Operation of railcar and truck receiving equipment will emit particulate matter with an aerodynamic diameter smaller than or equal to a nominal 10 microns (PM10). The two receiving pits and conveyors are vented to a common baghouse, and the storage silos are controlled with bin vent filters with 99% PM10 emissions control efficiency.

Baghouse evaluation:

The pulse jet cleaning mechanism uses a high pressure jet of air to remove the dust from the bags. The dust cake is removed from the bag by a blast of compressed air injected into the top of the bag tube. The air blast causes the bag to flex or expand as the shock wave travels down the bag tube. As the bag tube flexes, the dust cake fractures and deposited particulates are discharged from the bag. Pulse jet baghouses are generally designed with air-to-cloth ratio (filtering velocity) between 5 and 15 ft/min. The calculated air-to-cloth ratio for the proposed pulse jet baghouse is ft/min, which is within the typical range.

Thus, the proposed baghouse is designed for optimum performances, and is expected to achieve a control efficiency of at least 99% for PM10.

To ensure that the baghouse will be working properly, the following conditions will be listed on the permit:

- The baghouse shall be maintained and operated according to manufacturer's specifications. [District Rule 2201]

- {10} The baghouse shall be equipped with a pressure differential gauge to indicate the pressure drop across the bags. The gauge shall be maintained in good working condition at all times and shall be located in an easily accessible location. [District NSR Rule]

- The pressure differential gauge reading range shall be established per manufacturer's recommendation at the time of start-up inspection. District Rule 2201]

- {120} The baghouse cleaning frequency and duration shall be adjusted to optimize the control efficiency. [District NSR Rule]

- {73} Material removed from the dust collector(s) shall be disposed of in a manner preventing entrainment into the atmosphere. [District NSR Rule]

- {72} A spare set of bags shall be maintained on the premises at all times. [District NSR Rule]

Thus, the proposed baghouse will be considered as designed for optimum performances, and expected to achieve a control efficiency of at least 99% for PM10.

Grain Flaking and Cooling Operation

PM10 is the main criteria pollutant emitted by the grain flaking and cooling operation. Three (3) high efficiency compact separators are used to collect particulate matter from this operation's emissions.

The working principle of the compact separator is that of a double stage of centrifugal separator. In the first stage, the dust laden air is made to rotate in spiral-shaped housing, resulting in a high dust concentration of the air in the boundary area due to the action of the centrifugal forces.

This partial air stream with a high dust concentration is separated and fed tangentially to the second cyclone-type stage where the solids are separated. An immersion pipe in this stage is linked with the clean air connection through a return line crossing the spiral shaped housing. The cleaned main air stream of the first stage is delivered directly into the clean air connection. The separated solids are extracted through an airlock, air seal, which can be mounted to the outlet spout.

Per manufacturer, the expected efficiency of the separators for removal of PM is greater than 95%.

Grain Grinding Operation

Since all equipments, including conveyors, are fully sealed and enclosed and no visible emissions are emitted from this unit, no specific emissions control device is required.

To ensure that the system is fully enclosed and sealed, permit conditions will be listed as follows:

- Grain inlet conveyors to the grinder and grain discharge conveyors from the grinder shall be fully enclosed and sealed to the grinder. [District Rule 2201]

- There shall be no visible emissions from the conveyors at the grinding operation for a period or periods aggregating more than three minutes in any one hour. [District Rules 2201 and 4101]

Flaked Grain Storage Operation

Each storage bin is served by a bin vent filter with 99% PM_{10} emissions control efficiency.

Grain Truck Loading Operation

PM10 emissions from the truck loading operation are controlled by the use of a flexible loadout spout. In addition, before loading into trucks, the flaked grain is blended with molasses and fat. Therefore, the final product being "wet" and "sticky", very low PM10 emissions are expected from the truck loading operation.

Grain Hammermill Operations

Operation of hammermills will emit Particulate Matter with an aerodynamic diameter smaller than or equal to a nominal 10 microns (PM10).

Inlet Conveyors and Hammermills

The hammermills are vented to a high efficiency baghouse used to controlled PM10 emissions.

Grain inlet conveyors are fully enclosed and sealed to the hammermill controlled by a baghouse. Therefore, the District will also consider PM10 emissions from the conveyors controlled by a baghouse.

Baghouse evaluation

The pulse jet cleaning mechanism uses a high pressure jet of air to remove the dust from the bags. The dust cake is removed from the bag by a blast of compressed air injected into the top of the bag tube. The air blast causes the bag to flex or expand as the shock wave travels down the bag tube. As the bag tube flexes, the dust cake fractures and deposited particulates are discharged from the bag. Pulse jet baghouses are generally designed with air-to-cloth ratio (filtering velocity) between 5 and 15 ft/min. The calculated air-to-cloth ratio for the proposed pulse jet baghouse is ft/min, which is within the typical range.

Thus, the proposed baghouse is designed for optimum performances, and is expected to achieve a control efficiency of at least 99% for PM10.

To ensure that the baghouse will be working properly, the following conditions will be listed on the permit:

- Grain inlet conveyors to the hammermill shall be fully enclosed and sealed to the hammermill. [District Rule 2201]
- The baghouse shall be maintained and operated according to manufacturer's specifications. [District Rule 2201]
- {10} The baghouse shall be equipped with a pressure differential gauge to indicate the pressure drop across the bags. The gauge shall be maintained in good working condition at all times and shall be located in an easily accessible location. [District NSR Rule]
- The pressure differential gauge reading range shall be established per manufacturer's recommendation at the time of start-up inspection. [District Rule 2201]
- {120} The baghouse cleaning frequency and duration shall be adjusted to optimize the control efficiency. [District NSR Rule]
- {73} Material removed from the dust collector(s) shall be disposed of in a manner preventing entrainment into the atmosphere. [District NSR Rule]
- {72} A spare set of bags shall be maintained on the premises at all times. [District NSR Rule]

Thus, the proposed baghouse will be considered as designed for optimum performances, and expected to achieve a control efficiency of at least 99% for PM10.

Grain Discharge Conveyors

The ground corn from the hammermills will be dropped to a mechanical conveyor in a completely enclosed conveyance system. The end of the conveyor will be open to the inside of the covered slurry tank. Since the conveyor is fully enclosed and sealed to the slurry tank cover, there are no emissions from the system. Therefore, no emissions will be considered from the conveyors.

To ensure that the system is fully enclosed and sealed, permit conditions will be listed as follows:

- Grain discharge conveyors from the hammermill to the slurry tank shall be fully enclosed and sealed to the hammermill and the slurry tank cover. [District Rule 2201]

- There shall be no visible emissions from the conveyors at the hammermill operation for a period or periods aggregating more than three minutes in any one hour. [District Rules 2201 and 4101]

Fermentation Process and Beerwell Tank

The fermentation process and the storage of beer in the beerwell storage tank generate VOC and CO_2 when sugars are converted to ethanol. VOC emissions may be controlled in several different ways including wet scrubbing, thermal oxidation (stack-tip flare or enclosed oxidizer), carbon adsorption, VOC recovery/condensation. All of these control technologies are capable of reducing VOC emissions.

Thermal oxidation unit operation results in an increase in other pollutant emissions, including NO_X, CO, and PM_{10}. With a dilute VOC stream such as this, the VOC content will have little heat value and, therefore, will require significant amount of additional fuel firing to control the VOC emissions. Thermal oxidation and carbon absorption do not allow for easy recovery of the VOC emissions. In addition, these VOC emissions include ethanol and other valuable organic compounds, and it is important that VOC emissions are recycled to the process, resulting in higher yields and no additional emissions. Therefore, the applicant did not select thermal oxidation and carbon absorption process for VOC emissions control.

Condensation is a control technology that typically requires a large capital investment and significant energy for operation. The dilute VOC concentrations are likely to require multiple compression and cooling stages to obtain a control effectiveness comparable to wet scrubbing. Due to these reasons, the applicant did not select this type of control device.

Fermentation Wet Scrubber (CO_2 Scrubber)

Pacific Ethanol proposes to install a wet scrubber to control at least 95% of the VOC emissions in the exhaust from the fermentation process and the beerwell storage tank. A manufacturer guaranty of 95 % VOC control efficiency is attached as an appendix of the ATC. The fermentation wet scrubber is vented to a CO_2 recovery plant.

The flow rate for the fermentation scrubber is typically 30 gallons per minute. This scrubber is a "once-through" scrubbing unit and therefore, water loaded with VOC is not internally recycled into the scrubber but conveyed back to the slurry tank through the process condensate tank.

CO_2 Recovery Plant

The CO_2 discharged from the fermentation wet scrubber (CO_2 scrubber) enters the CO_2 recovery plant where the CO_2 is compressed and cooled in stages until the gas is cooled to about 50 degrees Fahrenheit and 300 pounds per square inch, absolute (psia). Water and condensed hydrocarbons will then be returned to the ethanol process condensate tank for recycling in the process flow. The cleaned gas is then scrubbed by a high pressure scrubber. The water effluent from this scrubber is transferred to the process condensate tank to be recycled in the process flow at the slurry tank.

The "wet" CO_2 after the scrubber is then dried in a dual vessel dryer (molecular sieve-type device) where the water will be dried to a minimum dew point of 76 degree Fahrenheit (10.5 ppm). The dryer will be designed for a 12-hour adsorption cycle.

The "dry" CO_2 will then be routed though a dual vessel carbon adsorption system to remove any traces of VOC that were not removed in the scrubber. The CO_2 stream will then be mixed with gases from the top of the stripper column and routed to the main CO_2 condenser where 97% or more of the vapor will be condensed into liquid CO_2. The liquid from the condenser will enter the top of the stripper column where any gases from the CO_2 are removed. Final liquid CO_2 product is obtained from the stripper column and sent to a subcooler where the liquid CO_2 is brought to storage conditions prior to entering storage.

Both of these units, dryer and carbon adsorption vessel, are dual vessel devices thus allowing the regeneration process to occur while the plant operates continuously. The non-condensable gases (such as oxygen and nitrogen, with traces of VOCs) that were removed from the CO_2 at the stripper column, are used to regenerate the section of the dryer and adsorption bed devices that are not currently in use.

Therefore, the source emissions at the CO_2 recovery plant are the non-condensable gases, VOCs and the materials captured in the dryer and carbon adsorption bed devices.

Based on the exhaust composition data available from similar ethanol plants, the engineering company (ERG) working for Pacific Ethanol assumed that virtually all of the organic material present in the exhaust in measurable quantities will be condensed from the exhaust and returned to the process. Assuming that 50% of the water in the CO_2 stream is condensed on the compression process, ERG estimated that the total VOC reduction expected from the operation of the CO_2 recovery plant is 97.7%.

Conservatively the District will only consider 95% VOC control efficiency at the CO_2 recovery plant.

The applicant proposed to consider that 500 hours per year will be used for maintenance and downtime of the CO_2 recovery plant. Therefore, the CO_2 recovery plant serving the fermentation wet scrubber will operate 8,260 hours per year, the 500 remaining hours will be considered for maintenance and downtime.

During the 500 hours for maintenance and downtime of the CO_2 recovery plant, the fermentation wet scrubber will be directly vented to the atmosphere with no additional emissions control device.

Distillation Process

The distillation process includes the distillation column with de-gas vessel, beer stripper, side stripper, rectifier; and a molecular sieve, and an evaporator. The distillation process units generate VOC emissions in the separation of ethanol from water and spent grain.

VOC emissions include ethanol and other valuable organic compounds, and it is important that the VOC emissions are recycled to the process, resulting in higher yields and no additional emissions.

To control the VOC emissions from the distillation process, Pacific Ethanol proposes to install a wet scrubber serving the distillation process with a 95% or higher VOC emissions control efficiency. A manufacturer guaranty of 95 % VOC control efficiency for the distillation wet scrubber is attached as an appendix of the ATC.

The flow rate for the distillation scrubber is typically 5 to 10 gallons per minute. This scrubber is a "once-through" scrubbing unit and therefore, water loaded with VOC is not internally recycled into the scrubber but conveyed back to the slurry tank through the process condensate tank.

Slurry Tank, Yeast Tank, Liquefaction Tank, Process Condensate Tank

To control VOC emissions from the slurry tank, the liquefaction tank, and the condensate water storage tank, Pacific Ethanol proposes to vent these tanks to the distillation wet scrubber serving the distillation process.

The process condensate tank will collect water from both scrubbers and condensates from the CO_2 recovery plant. This water, loaded with VOC, will be temporally stored in the process condensate water storage tank and will be recycled into the slurry tank as process water.

In addition, since the slurry tank and the liquefaction tank will be both vented to the distillation scrubber, and in order to prevent any fugitive VOC emissions, the yeast tank will also be connected to the distillation wet scrubber.

As discussed above, a manufacturer guaranty of 95 % VOC control efficiency is attached as an appendix of the ATC.

Wet Cake Process

The wet cake process includes a whole stillage tank, a centrifuge process, a thin stillage tank, an evaporator, and a syrup tank. Each unit at the wet cake process will emit VOCs. Pacific Ethanol proposes to control VOC emissions from the unit of the entire wet cake process with the distillation scrubber serving the distillation process. As discussed above, a manufacturer guaranty of 95 % VOC control efficiency is attached as an appendix of the ATC.

The wet cake transferred from the beer stripper, the whole stillage tank, the centrifuge process, the thin stillage tank, and the evaporator is conveyed with mechanical conveyors. To limit fugitive VOC emissions, each conveyor will be fully enclosed and sealed to the units at both end of the conveyor. Since each unit is connected to a VOC control device (scrubber), each unit

and each mechanical conveyor will be subject to a negative pressure, and no fugitive VOC emissions will be considered from the mechanical conveyors at the wet cake process.

To ensure that there will be no VOC fugitive emissions from the mechanical conveyors, the following conditions will be listed on the permit:

- Mechanical wet cake conveyors between each tank or each emissions unit at the wet cake process unit shall be fully enclosed and sealed at both ends to the tank or the emissions unit. [District Rule 2201]

- There shall be no fugitive emissions from the mechanical wet cake conveyors at the wet cake process unit. [District Rule 2201]

Wet Cake Storage Silo

As material enters the storage silo the head space that is displaced by the wet cake will be pushed out a vent at the top of the silo. This vent will be piped directly to a process vent condenser. The water removed from the stream will be discharged directly into the process condensate tank via closed system. The vapor that passes through condenser will be routed into the distillation wet scrubber inlet duct where it will enter vent gas scrubber to control VOC emissions.

The overall VOC control efficiency of the VOC emissions control system serving the storage silo will consist of efficiency of the condenser and the efficiency of the wet scrubber. Conservatively, the District will only consider the VOC control efficiency of the distillation wet scrubber.

As discussed above, a manufacturer guaranty of 95 % VOC control efficiency for the distillation wet scrubber, is attached as an appendix to the ATC.

Wet Cake Truck Loading System

All conveyors are enclosed. The truck loading system is equipped with a truck loadout.

Internal Floating Roof Ethanol Storage Tanks

The facility will have:
- one (1) 39,000 Gallon Internal Floating Roof 190-Proof Ethanol Storage Tank,
- one (1) 39,000 Gallon Internal Floating Roof 200-Proof Ethanol Storage Tank, and
- one (1) 350,000 Gallon Internal Floating Roof Denaturated Ethanol Storage Tank

The applicant proposed to equip each internal floating roof tank with Ultraflote Model Dual Ultraseal seal (double seal type, one above the other).

District Rule 4623, *Storage of Organic Liquids*, Section 5.4.2 indicates that, when installed and maintained to meet the gap criteria for primary and secondary seals set forth in Sections 5.3.2.1 through 5.3.2.3, the Ultraflote Model Dual Ultraseal has been found to be equivalent to seals meeting the criteria set forth in Section 5.3 (Specifications for External Floating Roof Tanks, also applicable to Internal Floating Roof Tanks). In particular, this seal type is considered as equivalent to a closure device equipped with a primary and a secondary seal, one above the other

The *Ultraflote*® Cover incorporates the latest technology to make the strongest lightweight non-contact Internal Floating Roof available in the industry. It is engineered to not only be extremely strong but also highly efficient and very flexible to move with product turbulence and upsets.

Ultraflote has over thirty (30) seal designs for any specific service requirement including single, double, triple, and quadruple wiper seals, foam log seals, and metal shoe seals. In addition, many different materials are available for compatibility with most petroleum and chemical applications.

Ultraflote Model Dual Ultraseal is a double wiper seal type, particularly adapted to the petroleum and organic storage liquid. The tank seal manufacturer indicated that VOC emissions control efficiency in excess of 95% and up to 99% and above is expected with the use of Ultraflote Model Dual Ultraseal.

To be more conservative, and since District Rule 4623 consider this seal type as equivalent to a closure device equipped with a primary and a secondary seal, one above the other, the District will consider 95% VOC emissions control efficiency.

20,000 Gal Internal Floating Roof Gasoline Storage Tank with Truck Unloading Rack

Tank

The facility will have one (1) 20,000 Gallon Internal Floating Roof Gasoline Storage Tank with a truck unloading rack.

The applicant proposed to equip the gasoline storage tank with an internal floating roof tank with Ultraflote Model Dual Ultraseal seal (double seal type, one above the other).

As discussed above, since District Rule 4623 consider this seal type as equivalent to a closure device equipped with a primary and a secondary seal, one above the other, the District will consider 95% VOC emissions control efficiency.

Truck Unloading Rack

In order to control VOC emissions during gasoline tank loading, the applicant proposed to install a phase I vapor recovery system in compliance with California Air Resources Board (CARB) Executive Order G-70-102-A.

Executive Order G-70-102-A indicates that the vapor recovery efficiency of a phase I system equipped with vapor recovery system in compliance with the requirements of this executive order is greater than 95%.

Conservatively, the District will consider that the VOC control efficiency of the tank loading system is 95%.

To ensure that the phase I system will be installed according to the standard and working properly, the following condition will be listed on the permit:

- The Phase I vapor recovery system and its components shall be operated and maintained in accordance with Executive Order G-70-102-A requirements. [District Rule 2201]

Denatured Ethanol Truck Loading Rack Served by a Flare

The denaturated ethanol and gasoline loading rack will generate VOC emissions when filling tanker trucks with ethanol. The loading rack will be a bottom loading rack type with dry break couplers and vapor collection system. VOCs emissions collected during truck loading process will be controlled using an enclosed flare with a designed control efficiency of at least 95%.

The flare capacity is calculated as follows.

The maximum capacity of the loading rack is 600 gal-denaturated ethanol/min.

Since the gas removed from the truck during loading operation might have low heat input, it is enriched with natural gas to ensure a proper and stable combustion at the flare. Based on applicant's proposal and experience, it is assumed that an additional 35% natural gas quantity will be added to the gas removed from the truck during loading operation.

Two 75.6 MMBtu/hr Superior Natural Gas-Fired Boilers

The boilers are equipped with ultra low-NO_X burners. Ultra Low-NO_X burners reduce NO_X by accomplishing the combustion process in stages. Staged combustion extends the combustion process, resulting in a cooler flame, which suppresses NO_X formation.

These boilers will not be equipped with back-up fuel option.

19.8 MMBtu/hr Hurst Natural Gas-Fired Boiler

The boiler is equipped with low-NO_X burners. Low-NO_X burners reduce NO_X by accomplishing the combustion process in stages. Staged combustion extends the combustion process, resulting in a cooler flame, which suppresses NO_X formation.

This boiler is not equipped with back-up fuel option.

265 hp John Deere Diesel-Fired Emergency IC Engine

The 265 hp John Deere Diesel-Fired Emergency IC Engine is equipped with:

- Turbocharger,
- Intercooler/aftercooler
- Low (0.05%) sulfur diesel

The emission control devices/technologies and their effect on diesel engine emissions detailed below are from *Non-catalytic NO_x Control of Stationary Diesel Engines*, by Don Koeberlein, CARB.

The turbocharger reduces the NO_x emission rate from the engine by approximately 10% by increasing the efficiency and promoting more complete burning of the fuel.

The intercooler/aftercooler functions in conjunction with the turbocharger to reduce the inlet air temperature. By reducing the inlet air temperature, the peak combustion temperature is lowered, which reduces the formation of thermal NO_x. NO_x emissions are reduced by approximately 15% with this control technology.

The use of low sulfur (0.05% by weight sulfur maximum) diesel fuel reduces SO_x emissions by approximately 90% from standard diesel fuel.

Facility wide Fugitive Emissions

The facility will have several valves, flanges, and other types of connectors that are in VOC service and may leak. The facility has proposed to implement an Inspection and Maintenance Program pursuant to District Rule 4451 and will use the 100 ppmv and 500 ppmv detection levels.

THROUGHTPUT CALCULATIONS

Assumptions:

- Maximum potential emissions are based on a 24 hours/day, 365 days/year
- PM is the only criteria pollutant emitted from the grain process at the feed mill operation (ATCs #C-4261-1-0, through –5-0) and from the hammermill at the ethanol operation (ATCs #C-4261-6-0 and –7-0)
- VOC is the only criteria pollutant emitted at the ethanol production and storage process (ATCs #C-4261-8-0 through –22-0)
- Each boiler may operate at maximum design burner rating of 66.0 MMBtu/hr
- Natural Gas Heating Value: 1,000 Btu/scf (AP 42 Section 1.4)
- EPA F-Factor for Natural Gas: 8,710 dscf/MMBtu at 68°F (40 CFR 60)
- Corrected EPA F-Factor for Natural Gas: 8,578 dscf/MMBtu at 60°F
- Grain conversion: 1 pound = 7,000 grains (AP-42-Appendix A-18)
- Grain conversion: 1 g = 15.43 grains (AP-42-Appendix A-18)
- EPA F-factor (adjusted to 60°F): 9,051 dscf/MMBtu
- Diesel Fuel heating value: 137,000 Btu/gal
- BHP to Btu/hr conversion: 2,542.5 Btu/hp·hr

Emission Factors:

Feed Mill Operation

For the feed mill operation, emissions factors are from the existing Permits To Operate.

PM is the only criteria pollutant emitted from the grain process at the feed mill operation(ATCs #C-4261-1-0, -2-0, -3-0, -4-0 and –5-0).

Railcar and Truck Grain Receiving and Storage Operation

Grain Receiving Process

PM_{10} emission factor is from AP-42, Table 9.9.1-2 (Animal feed mill, grain receiving).

With a 99% PM10 emissions control efficiency from the baghouse operation, the PM_{10} controlled emission factor for the receiving operation is calculated as follows:

EF_{PM10} = 0.0025 x (1 – 0.99) = 0.000025 lb-PM10/ton-grain received

Grain Conveyors

The District will consider fugitive PM10 emissions from the grain conveyed to the storage silos and PM10 emissions at the drop point from the conveyors into the silos. Therefore the overall PM10 emission factor from the conveyors is calculated as follows:

$EF_{PM10} = EF_{PM10\ fugitive} + EF_{PM10\ drop\ point\ into\ silos}$

Grain Conveyors, Fugitive Emissions

PM_{10} emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

With a 99% PM10 emissions control efficiency from the baghouse operation, the fugitive PM10 controlled emission factor for the conveyors is calculated as follows:

EF_{PM10} = 0.034 x (1 – 0.99) = 0.00034 lb-PM_{10}/ton-grain conveyed

Drop Point from Conveyors into Storage Silos

PM10 emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

With a 99% PM10 emissions control efficiency from the bin vent filters operation, the PM10 controlled emission factor for the drop point from the conveyors into the storage silos is calculated as follows:

EF_{PM10} = 0.034 x (1 – 0.99) = 0.00034 lb-PM10/ton-grain conveyed

Grain Conveyors Emission Factor

$EF_{PM10} = EF_{PM10\ fugitive} + EF_{PM10\ drop\ point\ into\ silos}$

EF_{PM10} = 0.00034 lb-PM_{10}/ton-grain conveyed + 0.00034 lb-PM_{10}/ton-grain conveyed

EF_{PM10} = 0.00068 lb-PM_{10}/ton-grain conveyed

Grain Flaking and Cooling Operation:

Grain Conveyors

The District will consider PM10 emissions at the drop point from the storage silos to the conveyors and fugitive PM10 emissions from the grain conveyed to the flaker. Therefore the overall PM10 emission factor from the conveyors is calculated as follows:

$EF_{PM10} = EF_{PM10\ drop\ point\ to\ conveyors} + EF_{PM10\ fugitive}$

Drop Point from Silos to Conveyors

PM10 emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM10 emissions control efficiency for PM10 emissions at the drop point, and the PM10 controlled emission factor for the drop point from silos to conveyors is calculated as follows:

$EF_{PM10\ drop\ point\ t\ to\ conveyors}$ = 0.034 x (1 – 0.99) = 0.00034 lb-PM_{10}/ton-grain conveyed

Grain Conveyors, Fugitive Emissions

PM_{10} emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM_{10} emissions control efficiency for fugitive PM10 emissions, and the fugitive PM10 controlled emission factor for the conveyors is calculated as follows:

$EF_{PM10\ Fugitive}$ = 0.034 x (1 – 0.99) = 0.00034 lb-PM_{10}/ton-grain conveyed

Grain Conveyors Emission Factor

EF_{PM10} = $EF_{PM10\ drop\ point\ to\ conveyors}$ + $EF_{PM10\ fugitive}$

EF_{PM10} = 0.00034 lb- PM10/ton-grain conveyed + 0.00034 lb- PM10/ton-grain conveyed

EF_{PM10} = 0.00068 lb- PM10/ton-grain conveyed

Grain Flaking and Cooling Process

The facility is using steam to soften the grain prior processing. Three (3) high efficiency compact separators with 95% or higher PM10 emission control efficiency, are used to collect particulate matter from this operation's emissions. Therefore, the PM emission factor listed in AP42 for grain flaker controlled by a cyclone (0.15 lb-PM/ton-grain processed) is too high and the District will consider the emission factor for grain cracker (0.024 lb-PM/ton-grain processed).

PM_{10} emission factor is from AP-42, Table 9.9.1-2 (Animal feed mill, grain cracker).

With a 50 % PM10/PM ratio, the PM10 controlled emission factor is calculated as follows:

EF_{PM10} = 0.024 x 0.5 = 0.012 lb- PM10/ton-grain flaked

Grain Grinding Operation:

The grinding operation consisting of a surge hopper, a hammermill, and conveyors, is fully sealed and enclosed and no emissions are expected. Therefore, PM10 emissions from this unit are assumed to be negligible:

Flaked Grain Storage Operation

Grain Conveyors

The District will consider PM10 emissions at the drop points (x2) from the flaker to the conveyors and from the conveyors into the storage bins, and fugitive PM10 emissions from the grain conveyed to the storage bins. Therefore the overall PM10 emission factor from the conveying and storage operation is calculated as follows:

$EF_{PM10} = EF_{PM10\ drop\ point\ t\ to\ conveyors} + EF_{PM10\ fugitive} + EF_{PM10\ drop\ point\ into\ storage\ bins}$

Drop Points from Flaker to Conveyors and from Conveyors into Bins

PM_{10} emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed and bin served by bin vent filters, the District will consider 99% PM_{10} emissions control efficiency for PM10 emissions at the drop points, and the PM10 controlled emission factor for each drop point is calculated as follows:

$EF_{PM10\ drop\ points} = 0.034 \times (1 - 0.99) = 0.00034$ lb- PM10/ton-grain conveyed

Grain Conveyors, Fugitive Emissions

PM_{10} emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM10 emissions control efficiency for fugitive PM10 emissions, and the fugitive PM10 controlled emission factor for the conveyors is calculated as follows:

$EF_{PM10\ Fugitive} = 0.034 \times (1 - 0.99) = 0.00034$ lb- PM10/ton-grain conveyed

Grain Conveyors Emission Factor

$EF_{PM10} = EF_{PM10\ drop\ point\ t\ to\ conveyors} + EF_{PM10\ fugitive} + EF_{PM10\ drop\ point\ into\ storage\ bins}$

$EF_{PM10} = (0.00034$ lb- PM10/ton-grain conveyed) x 3

$EF_{PM10} = 0.00102$ lb- PM10/ton-grain conveyed

Grain Truck Loading Operation

Grain Conveyors

The District will consider PM10 emissions at the drop point from the storage bins to the conveyors and fugitive PM10 emissions from the grain conveyed to the truck loading operation. Therefore the overall PM10 emission factor from the conveyors is calculated as follows:

$EF_{PM10} = EF_{PM10\ drop\ point\ t\ to\ conveyors} + EF_{PM10\ fugitive}$

Drop Point from Bins on Conveyors

PM10 emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM_{10} emissions control efficiency for PM10 emissions at the drop point, and the PM10 controlled emission factor for the conveyors is calculated as follows:

$EF_{PM10\ drop\ point\ on\ conveyors}$ = 0.034 x (1 – 0.99) = 0.00034 lb- PM10/ton-grain conveyed

Grain Conveyors, Fugitive Emissions

PM10 emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM10 emissions control efficiency for fugitive PM10 emissions, and the fugitive PM10 controlled emission factor for the conveyors is calculated as follows:

$EF_{PM10\ Fugitive}$ = 0.034 x (1 – 0.99) = 0.00034 lb- PM10/ton-grain conveyed

Grain Conveyors Emission Factor

$EF_{PM10} = EF_{PM10\ drop\ point\ to\ conveyors} + EF_{PM10\ fugitive}$

EF_{PM10} = 0.00034 lb- PM10/ton-grain conveyed + 0.00034 lb- PM10/ton-grain conveyed

EF_{PM10} = 0.00068 lb- PM10/ton-grain conveyed

Truck Loading Process

PM10 emission factor is from AP-42, Table 9.9.1-2 (Animal feed mill, feed shipping).

Since the truck loading operation is equipped with a spout as described in AP-42, no further adjustment is required, and the PM10 emission factor for the grain truck loading process is:

$EF_{PM10\ Truck\ loading}$ = 0.0008 lb-PM_{10}/ton-grain loaded

Grain Hammermill Operations

This unit consists of enclosed conveyors carrying grain from the storage silos to the hammermills.

Since the conveyors feeding the hammermills are part of the ethanol plant project, they will be included in permit units –6-0 and –7-0. Therefore, each permit unit, #C-4261-6-0 and –7-0, consists of three (3) emissions units:

- Inlet conveyors from the storage silos to the hammermill,
- Hammermill, and
- Discharge conveyors

PM is the only criteria pollutant emitted from the hammermill at the ethanol operation (ATCs #C-4261-6-0 and –7-0).

Grain Conveyors (Inlet and discharge)

The District will consider PM10 emissions at the drop point from the storage silos onto the conveyors, and fugitive PM10 emissions from the grain conveyed. Therefore the overall PM10 emission factor from the conveyors to the hammermills is calculated as follows:

$EF_{PM10} = EF_{PM10\ dropping\ point} + EF_{PM10\ fugitive}$

Drop Point from Silos to Conveyors and from Hammermill to Discharge Conveyor

PM_{10} emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM_{10} emissions control efficiency for PM10 emissions at the drop point, and the PM10 controlled emission factor for the conveyors is calculated as follows:

$EF_{PM10\ drop\ point\ to\ conveyors} = 0.034 \times (1 - 0.99) = 0.00034$ lb-PM_{10}/ton-grain conveyed

Inlet Grain Conveyors, Fugitive Emissions

PM_{10} emission factor is from AP-42, Table 9.9.1-1 (Headhouse for internal handling).

Since the conveyors are fully enclosed, the District will consider 99% PM10 emissions control efficiency for fugitive PM10 emissions, and the fugitive PM10 controlled emission factor for the conveyors is calculated as follows:

$EF_{PM10\ Fugitive} = 0.034 \times (1 - 0.99) = 0.00034$ lb- PM10/ton-grain conveyed

Grain Conveyors Emission Factor

$EF_{PM10} = EF_{PM10\ drop\ point\ t\ on\ conveyors} + EF_{PM10\ fugitive}$

$EF_{PM10} = 0.00034$ lb- PM10/ton-grain conveyed + 0.00034 lb- PM10/ton-grain conveyed

$EF_{PM10} = 0.00068$ lb- PM10/ton-grain conveyed

Grain Hammermill

Hammermills emissions are controlled by a baghouse.

PM10 emission factor for the grain milling operation controlled by a baghouse is from AP-42, Table 9.9.1-2. Considering 50 % PM10/PM ratio, the PM10 controlled emission factor is calculated as follows:

$EF_{PM10} = 0.012 \times 0.5 = 0.006$ lb- PM10/ton-grain processed

VOC Emissions from Ethanol Production and method used to measure VOC emissions:

Most of the ethanol production capacities in the US are located in the Midwest. An extensive research as been conducted to determine VOC emissions factors and test method for ethanol production.

This research included but was not limited to:

- San Joaquin Valley Air Pollution Control District,
- Web Site: Outlook for Biomass Ethanol Production and Demand,
- Web Sites: Ethanol Production Facilities,
- Phone conversations with Iowa Air Quality Bureau: Daniel Brady and Jenny Reinersten,
- Phone conversations with EPA Region V (Chicago): Eric Hardin.

It appears that VOC emissions from ethanol production plants vary significantly from 10 ton-VOC/year to up to 850 ton-VOC/year and above. This extraordinary range of VOC emissions is generally coming from:

- the type and size of operation: from 10 to 85 million gallon of ethanol per year, and above,
- the type of equipment involved in the process: it appears that wet cake dryers are responsible of the majority of VOC emissions at the ethanol production facilities,
- the type of control device: wet scrubber, thermal oxidizer,
- the type of test method used to measure VOC emissions: VOC emissions from the process can involve ethanol, methanol, acetic acid, formaldehyde, acetaldehyde, acrolein, 2-furfur-aldehyde.

As a result, and in order to better quantify VOC emissions from this type of process, EPA required to source test several ethanol plants located in the Midwest. This process is on going and results will not be available for several months.

VOCs from ethanol production process include but are not limited to:

- Ethanol,
- Methanol,
- Acetic Acid,
- Form-Aldehyde,
- Acet-Aldehyde,
- Acrolein,
- 2-Furfur-Aldehyde, and
- Lactic Acid.

Ethanol represents most of the VOC emitted from the fermentation process (80%) and up to 90 to 95% from the distillation process. The other VOC components are mainly emitted at the wet cake dryer.

Since the proposal does not include a dryer, other VOC components than ethanol will be very limited.

However, based on his experience, Daniel Brady, from Air Pollution Control District in Minnesota, indicated that the nature and type of VOC can significantly vary from one facility to another and from one process type to another. Therefore, it is highly recommended to run an initial source test at each scrubber to precisely identify the type of VOCs emitted.

After VOC identification, initial and periodic source testing shall be conducted to quantify VOC emissions from the different units at the facility.

Eric Hardin from EPA Region V in Chicago explained that there are 3 possible test methods to identify VOCs from fermentation and distillation process at an ethanol production facility: Method 18, Method 25, and Method 25A.

FERMENTATION PROCESS, BEERWELL TANK

Applicant's Proposal

The applicant has proposed to use a source testing conducted on December 19, 2002, at the Ace Ethanol Plant located in Stanley, Wisconsin. This facility is a 20 million gallon per year capacity ethanol production plant using a wet scrubber to control VOC emissions from the fermentation process consisting of fermentation tanks and beerwell tank. The proposed source test used method 25A to quantify VOC emissions as ethanol, from the scrubber serving the fermentation process.

The scrubber used at the Ace Ethanol Plant is a wet scrubber type, which is similar to the scrubber type proposed by the applicant to control emissions from the fermentation process at the Madera facility.

The fermentation process, and the type of scrubber used to control VOC emissions from the fermentation process at the ACE facility are identical to the process and control device proposed for the new Pacific Ethanol facility.

Therefore the District will consider the result of the source testing from the distillation wet scrubber at the ACE plant representative for VOC emissions determination from the fermentation wet scrubber at the Pacific Ethanol plant.

VOC Emission Factor for the Fermentation Process at Ace Ethanol Plant; See Appendix lll of the Authority to Construct for: Source Test Result, Fermentation Process with Scrubber, Ace Ethanol Plant, Stanley, Wisconsin

The VOC emission factor measured during source testing at the Ace Ethanol Plant is after control device (wet scrubber). To be conservative the District will consider the highest emission rate (Run 1) measured during a 3-run test:

$EF_{\text{Controlled VOC Fermentation}}$ (Ace) = 0.66 lb-Carbon/hr

$EF_{\text{Controlled VOC Fermentation}}$ (Ace) = 1.59 lb-VOC/hr (as ethanol)

The District will assume that ethanol is the primary component of VOC emitted at the fermentation wet scrubber. Therefore, as discussed above, using the scaling ratio (1.92) and the response ratio (80%), we can verify the conversion from lb-Carbon/hr to lb-VOC/hr (as ethanol) as follows:

0.66 lb-Carbon/hr x 1.92 / 0.80 = 1.5840 lb-VOC/hr (as ethanol)

The calculated 1.584 lb-VOC/hr (as ethanol) VOC emission factor is similar to 1.59 lb-VOC/hr (as ethanol) as the VOC emission factor presented in the source test result.

Therefore, the District agreed to use the proposed VOC emissions factor, after control device, for the fermentation process at Pacific Ethanol facility.

Proposed VOC Emission Factor for the Fermentation Process Exclusively Controlled by a Wet Scrubber (During Maintenance and Downtime of the CO_2 Recovery Plant):

During 500 hours per year for maintenance and downtime of the CO_2 recovery plant, the fermentation wet scrubber will be directly vented tot the atmosphere without any other VOC emissions control device.

As discussed above, the Ace Plant has an annual ethanol production capacity of 20 million gallon per year. Since Pacific Ethanol Plant maximum annual production capacity will be limited to 40 million gallons per year, the District will apply a coefficient of x2 to the Ace VOC emission factor.

In addition, to be conservative, applicant proposed to apply a 20% safety factor to the VOC emission factor. Therefore the proposed controlled VOC Potential to Emit (PE) and Emission Factor (EF) for the fermentation process served by a wet scrubber at the Pacific Ethanol facility are:

$PE_{\text{Controlled VOC Fermentation (Wet Scrubber)}}$ = (1.59 lb-VOC/hr (as ethanol) x 40.10^6 x 1.20) / (20.10^6)

$PE_{\text{Controlled VOC Fermentation (Wet Scrubber)}}$ = 3.82 lb-VOC/hr (as ethanol)

Equivalent to:

$EF_{\text{Controlled VOC Fermentation (Wet Scrubber)}}$ = (3.82 lb-VOC/hr x 8,760 hr/year) / (40.10^6 gal-ethanol/year)

$EF_{\text{Controlled VOC Fermentation (Wet Scrubber)}}$ = 0.8366 lb-VOC/10^3 gal-ethanol produced

Since the wet scrubber manufacturer has indicated that the VOC control efficiency for the wet scrubber serving the fermentation process is expected to exceed 95%:

$PE_{\text{Uncontrolled VOC Fermentation (Wet Scrubber)}}$ = 3.82 lb-VOC/hr (as ethanol) / (1 - 95%)

$PE_{\text{Uncontrolled VOC Fermentation (Wet Scrubber)}}$ = 76.4 lb-VOC/hr (as ethanol)

Equivalent to:

$EF_{\text{Uncontrolled VOC Fermentation (Wet Scrubber)}}$ = (3.82 lb-VOC/hr (as ethanol) x 8,760 hr/year) / [40.10^6 gal-ethanol/year x (1 - 95%)]

$EF_{\text{Uncontrolled VOC Fermentation (Wet Scrubber)}}$ = 16.73 lb-VOC/10^3 gal-ethanol produced

Proposed VOC Emission Factor for Fermentation Process Controlled by a Wet Scrubber Vented to a CO_2 Recovery Plant:

Pacific Ethanol proposed to vent the fermentation wet scrubber to a CO_2 recovery plant in operation at least 8,260 hours per year.

As discussed above in the emissions control technology evaluation section, the District will conservatively consider that the VOC control efficiency for fermentation process controlled by a wet scrubber vented to a co_2 recovery plant is 99.75%.

Therefore, the proposed controlled VOC emission factor for the fermentation process served by a wet scrubber vented to a CO_2 recovery plant at Pacific Ethanol facility is:

$EF_{\text{Controlled VOC Fermentation (Wet Scrubber + CO2 Recovery)}}$ = 0.8366 lb-VOC/10^3 gal-ethanol produced
x (1 – 99.75%)

$EF_{\text{Controlled VOC Fermentation (Wet Scrubber + CO2 Recovery)}}$ = 0.0021 lb-VOC/10^3 gal-ethanol produced

Slurry Tank, Yeast Tank, Liquefaction Tank, Distillation Process, Process Condensate Tank, Wet Cake Process

Applicant's Proposal

These six (6) units are served by a distillation wet scrubber.

The applicant has proposed to use a source testing conducted on December 19, 2002, at the Ace Ethanol Plant located in Stanley, Wisconsin. This facility is a 20 million gallon per year capacity ethanol production plant using a wet scrubber to control VOC emissions from the distillation process, the process tanks, and the wet cake process. The proposed source test used method 25A to quantify VOC emissions in lb-Carbon, from the scrubber serving emissions from the distillation process.

The scrubber used at the Ace Ethanol Plant is a wet scrubber type, which is similar to the scrubber type proposed by the applicant to control emissions from the distillation process at the Madera facility.

The distillation process, the wet cake process and the type of scrubber used to control VOC emissions from the distillation process at the ACE facility are identical to the process and control device proposed for the new Pacific Ethanol facility. Therefore, will consider the result of the source testing from the distillation wet scrubber at the ACE plant representative for VOC emissions determination from the distillation wet scrubber at the Pacific Ethanol plant.

VOC Emission Factor for the Distillation Process at Ace Ethanol Plant (See Appendix lll of the Authority to Construct for *Source Test Result, Distillation Process with Scrubber, Ace Ethanol Plant, Stanley, Wisconsin):*

The VOC emission factor measured during source testing at the Ace Ethanol Plant is after control device (wet scrubber). To be conservative the District will consider the highest emission rate (Run 2) measured during a 3-run test:

$EF_{\text{VOC Distillation (Controlled)}}$ (Ace) = 0.09 lb-Carbon/hr

The District will assume that ethanol is the primary component of VOC emitted at the distillation wet scrubber. Therefore as discussed above, using the scaling ratio (1.92) and the response

ratio (80%), we can convert the source testing from lb-Carbon/hr to lb-VOC/hr (as ethanol) as follows:

0.09 lb-Carbon/hr x 1.92 / 0.80 = 0. 22 lb-VOC/hr (as ethanol)

$EF_{VOC\ Distillation\ (Controlled)}$ (Ace) = 0.22 lb-VOC/hr (as ethanol)

The District agreed to use this VOC emissions factor, after control device, for the proposed distillation process and the slurry tank at Pacific Ethanol facility.

Proposed VOC Emission Factor for the Units Connected to the Distillation Wet Scrubber at Pacific Ethanol Plant:

As discussed above, the Ace Plant has an annual ethanol production capacity of 20 million gallon per year. Since Pacific Ethanol Plant maximum annual production capacity will be limited to 40 million gallons per year, the District will apply a coefficient of x2 to the Ace VOC emission factor.

In addition, to be conservative, applicant proposed to apply a 20% safety factor to the VOC emission factor. Therefore the proposed controlled VOC Potential to Emit (PE) and Emission Factor (EF) for the fermentation process at Pacific Ethanol Plant are:

$PE_{Controlled\ VOC\ Distillation}$ = (0.22 lb-VOC/hr (as ethanol) x 40.10^6 x 1.20) / (20.10^6)

$PE_{Controlled\ VOC\ Distillation}$ = 0.53 lb-VOC/hr (as ethanol)

Equivalent to:

$EF_{Controlled\ VOC\ Distillation}$ = (0.53 lb-VOC/hr x 8,760 hr/year) / (40.10^6 gal-ethanol/year)

$EF_{Controlled\ VOC\ Distillation}$ = 0.1161 lb-VOC/10^3 gal-ethanol produced

Since the wet scrubber manufacturer indicated that a VOC control efficiency of 95% for the proposed distillation wet scrubber is expected:

$PE_{Uncontrolled\ VOC\ Distillation}$ = 0.53 lb-VOC/hr (as ethanol) / (1 - 95%)

$PE_{Uncontrolled\ VOC\ Distillation}$ = 10.6 lb-VOC/hr (as ethanol)

Equivalent to:

$EF_{Uncontrolled\ VOC\ Distillation}$ = (0.53 lb-VOC/hr (as ethanol) x 8,760 hr/year)
/ [40.10^6 gal-ethanol/year x (1 - 95%)]

$EF_{Uncontrolled\ VOC\ Distillation}$ = 2.32 lb-VOC/10^3 gal-ethanol produced

Proposed VOC Emission Factor for the Mechanical Conveyors at the Wet Cake Process

Since all units are connected to a VOC control device (scrubber or boiler), each unit and each mechanical conveyor will be subject to a negative pressure, and therefore, no fugitive VOC emissions from the conveyors will be considered.

Wet Cake Storage Silo

Since the wet cake conveyors are fully enclosed, no fugitive emissions will be associated with the operation of the conveyors.

After the being processed, the wet cake is stored in a storage silo vented to the distillation wet scrubber.

As opposed to the Pacific Ethanol proposed process, most ethanol plants are equipped with a dryer or dryers to dry the wet spent grain that is a byproduct of the fermentation process, generating very large amounts of VOC and Hazardous Air Pollutants (HAPs).

Therefore, to validate the VOC emissions quantification presented below, it is necessary to compare both process and identify the source of VOC emissions.

Wet Cake Storage Process

According to a high performance liquid chromatograph (HPLC) test performed on the liquid portion of the sample the following compounds were present in the wet cake.

The result of the wet cake chemical analysis are presented as follows:

% Moisture: 69.4%
% Dry Solids: 30.6%

Wet Cake Drying Process versus Wet Cake Storage Process

Rotary drum dryers use hot air traveling co-currently with the grain material through a horizontal drum that rotates to mix the air and grain. The material and the hot gas enter the dryer at one end where the spent grain is approximately 165 degrees Fahrenheit and the hot gas is 700 degrees Fahrenheit. The hot dryer gas and spent grain are moved to the other end of the dryer as the drum rotates generating significant mixing between the spent grain and the hot dryer gas. At the end of the dryer the grain is removed from the bottom of the drum and the exhaust gas is vented from the middle or top of the drum. The exhaust passes through a series of cyclones removing most of the particulate emissions.

Ring dryers are modified flash dryers. Material is fed into a high speed venturi where the wet grain first contacts the hot gas. The dried material is collected at the bottom of the cyclones and sent to storage/shipping. The inlet dryer air temperature on ring dryers is as high as 1400 degrees Fahrenheit.

As discussed above, the dryer inlet temperatures range between 700 and 1400 degrees Fahrenheit. At these temperatures, the majority of organic material and water will be evaporated. Once in the gaseous form, the organic materials will rapidly oxidize. As these materials oxidize, several by-products of incomplete oxidation can be formed including acetaldehyde. These pollutants are emitted by the dryers in addition to ethanol and acetic acid; which exist in the wet cake in small amounts.

The table below provides an example of the exhaust composition of a rotary drum dryer used at ACE Ethanol plant drying the same wet cake for which the wet cake emission estimates for Pacific Ethanol have been made.

Conclusion

As shown above, some of the compounds emitted from the dryer do not exist in the wet cake. In addition, most of the compounds that do exist in the wet cake are solids or stable liquids at ambient temperatures. The wet cake compounds do not begin to oxidize or breakdown until the temperature of the wet cake is raised significantly.

In conclusion, the comparison of the tables presented above shows a great difference in term of VOC emissions per hour, 0.32 lb-VOC/hr for the wet cake storage process versus 102.81 lb-VOC/hr for the wet cake drying process, validating the assumption that the wet cake storage process will not emit as much VOC as the traditional drying process.

VOC Emissions Quantification

Succinnic Acid and Glycerol are not volatile at ambient temperatures. Only Acetic Acid Acetic Acid, Proprionic Acid, and Ethanol will be emitted from the wet cake storage process at ambient temperature.

Based on the table presented above, the total volatile VOC compounds, at ambient temperature, are:

Acetic Acid:	0.08%
Proprionic Acid:	0.13%
Ethanol:	0.0%
Total:	*0.21%*

The wet cake storage silo is vented to the distillation wet scrubber. ACE facility is using a dryer vented to a thermal oxidizer to process the wet cake. Therefore, since the wet cake process at the ACE facility differs from the wet cake process proposed at the Pacific Ethanol facility, the source testing result from the ACE facility can not be used and VOC emissions from the wet cake storage silo will have to be quantified using another method.

ERG, the environment engineering company working for Pacific Ethanol, quantified VOC emissions from the wet cake storage process using three different ways and proposed to use the most conservative method. The result of the proposed calculations are summarized as follows.

Estimation #1: Using Henry's Law Method at 77 °F (25 °C)

Based on detailed calculation presented in Appendix ll, *Wet Cake Storage Silo Emissions*, and using Henry's Law Method at 77 °F (25 °C), the total VOC emissions are:

$PE_{\text{Uncontrolled VOC Wet Cake Storage Silo}}$ = 7.09 lb-VOC/year

Estimation #2: Using the water vapor emissions at 165 °F (74 °C), and VOC concentration

As discussed above the total VOC Compounds, volatile at ambient temperature, is 0.21%.

Based on detailed calculation presented in Appendix II, *Wet Cake Storage Silo Emissions*, the water vapor emissions from the wet cake at 165 °F (74 °C) is:

$Mass_{Water\ Vapor}$ = 285,000 lb-water vapor/year

Therefore, using the water vapor emissions and the VOC concentration compound, volatile at ambient temperature, the total VOC emissions are:

$PE_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 285,000 lb-water vapor/year x 0.21%

$PE_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 598.5 lb-VOC/year

Estimation #3: Using Raoult's Law Method at 165 °F (74 °C)

Based on detailed calculation presented in Appendix II, *Wet Cake Storage Silo Emissions*, and using Raoult's Law Method at 165 °F (74 °C), the total VOC emissions are:

$PE_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 2,841 lb-VOC/year

Conclusion

To be conservative, the District will use the estimation #3, using Raoult's Law Method at 165 °F (74 °C). Therefore, VOC emissions from the wet cake storage silo are:

$PE_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 2,841 lb-VOC/year

$PE_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = (2,841 lb-VOC/year) / (8,760 hr/year)

$PE_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 0.32 lb-VOC/hr

Since the wet scrubber manufacturer indicated that a VOC control efficiency of 95% for the proposed distillation wet scrubber is expected, the controlled VOC emissions from the wet cake storage silo are:

$PE_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 2,841 lb-VOC/year x (1 – 0.95) = 142 lb-VOC/year

$PE_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 142 lb-VOC/year

$PE_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = (142 lb-VOC/year) / (8,760 hr/year)

$PE_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 0.016 lb-VOC/hr

To be even more conservative, the applicant proposed to double the quantified emissions from the wet cake storage silo. Therefore, the final proposed controlled VOC emissions from the wet cake storage silo are:

$PE_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 284 lb-VOC/year

Equivalent to:

$EF_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = (284 lb-VOC/year) / (40,000,000 gal-ethanol/year)

$EF_{Controlled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 0.0071 lb-VOC/10^3 gal-ethanol produced

And

$EF_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = (0.0071 lb-VOC/10^3 gal-ethanol produced) / (1 – 0.95)

$EF_{Uncontrolled\ VOC\ Wet\ Cake\ Storage\ Silo}$ = 0.1420 lb-VOC/10^3 gal-ethanol produced

CONTEMPORANEOUS INCREASE IN PERMITTED EMISSIONS (CIPE) AND TITLE L MODIFICATION

Section 3.39 of District Rule 2201 defines a Title I Modification as "the same as a Major Modification." District Policy APR 1125 defines a Major Modification as "*any physical change in or change in the method of operation of a major stationary source that would result in a significant net emissions increase of any pollutant subject to regulation under the Act*."

Calculating the CIPE is required for existing Major Sources to determine if the current project has emissions increases above Title I Modification thresholds or is required for existing non-Major Sources becoming Major Sources, to determine if the current project has emissions increases above Major Source thresholds.

As discussed in Section VII-G of the a ATC, this facility is not a Major Source and not becoming a Major Source as a result of this project, therefore CIPE calculations are not necessary.

For non-Major-Source, the Title I Modification thresholds are equivalent to the Major Source Thresholds. Therefore, since this facility is not becoming a Major Source, the project is not a Title I Modification (Major Modification), and no further discussion is required.