RECEIVED
AUG 09 2016
AIR QUALITY
PROGRAM

July 29, 2016

Brenda Binegar, DENR
Foss Building
525 East Capitol Avenue
Pierre, SD 57501

Dear Ms. Binegar,

Enclosed please find a list of reasons why the Air Quality Construction Permit for Ring-Neck Energy and Feed, LLC, Onida, South Dakota should not be issued. We are also providing a copy of this letter to the same parties listed below.

If you have any questions please give us a call at (605)765-4891 or (605)222-8880. Thank-you.

Sincerely,

Clark and Lisa Guthmiller

Kathy Hyde

Kathy Hyde

Enclosures

Cc w/copy of Encl.: Steven R. Blair, Assistant Attorney General
Brian Gustafson, DENR Air Quality Program
Dennis Landguth, Hearing Chair
Charles McGuigan, Board Counsel
Peder A Larson
Craig Smith

We, the undersigned petitioners, ask the the Board of Minerals and Environment to consider the following issues that we have brought forward in contesting the issuance of the Air Quality Construction Permit for Ring-Neck Energy and Feed, LLC, Onida, South Dakota:

1. EPA's own "Environmental Laws Guide for Ethanol Plants" states, on Page1 that **"Selection of the plant location should focus on minimizing air quality impacts to downwind residents." (Attachment A)**

2. Proposed site location of the proposed subject plant is located in very close proximity and directly downwind of prevailing spring/summer/fall south-easterly winds.

   The proposed site is located on the south eastern side of numerous residential homes in and around the city of Onida as there are approximately 106 residential homes within one mile or less of the site. An aerial photo showing site location of the plant and the homes/residences within one mile is attached. **(Attachment B)**

   The data demonstrating the prevalence of south-easterly winds in the area, which is demonstrated to be the prevailing wind direction on 124 out of 365 days in 2015, which calculates to be 34% of the time. **(Attachment C)**

3. The ethanol plant located near Redfield, S D, produces approximately 213.6 tons of hazardous air pollutants per year based on the month of September, 2014, report filed with the SD Dept. of Environment and Natural Resources. This report shows 9 different categories of pollutants, all of which combine for a total of 213.6 tons of hazardous air pollutants were produced during the preceding 12 month period ending in Sept. of 2014 that month. During the 3 month quarter of this stated report, the amount of the 9 different pollutants calculated over a 12 month period is actually higher at 220.12 tons per year. **(Attachment D)**

4. The ethanol plant located near Redfield, SD produced 58 million gallons of ethanol for the entire yearly period of 2015. A document from the Redfield ethanol plant's website showing the gallons produced. **(Attachment E)**

   The proposed Ring Neck plant was earlier reported to be a 70 million gallon per year facility, but the Application for a Draft Air Quality permit shows Ring

Neck to operate a 100 million gallon per year ethanol plant. **(Attachment F)**

The difference in production between a 58 million gallon plant and a 70 million gallon plant would equate to an increase in production of 20.7%. (12 million gallons divided by 58 million gallons equals to 20.7%)

This increase of 20.7% would mean that the number of tons of hazardous air pollutants to be produced at the proposed Ring Neck location would equate to approximately 258 tons of hazardous air pollutants per year. (213.6 tons of pollutants at Redfield x 1.207 increase= 258 tons of pollutants at Ring Neck)

The difference in production between a 58 million gallon plant and a 100 million gallon plant would equate to an increase in production of 72.4%. (42 million gallons divided by 58 million gallons equals to 72.4) This increase of 72.4% would mean that the number of tons of hazardous air pollutants to be produced at the proposed Ring Neck location at this production level would equate to approximately 368 tons of hazardous air pollutants per year. (213.6 tons of pollutants at Redfield x 1.724 increase= 368 tons of pollutants at Ring Neck)

5. The site of the Redfield plant is located approximately 2.5 miles to the North and East of Redfield. There are only 3 residential homes located either downwind of the area's prevailing winter north/ westerly winds or the area's prevailing spring/ summer/ fall south-easterly winds. **(Attachment G)**

   Because there are so few residential homes located in either downwind directions of the Redfield plant and the 3 homes that are located within one mile of the plant are all located closer to one mile away from the plant than not, there would be much less significance to performing calculations of the percent of time that hazardous air pollutants would be falling on those areas.

   In comparison, at the proposed Ring Neck site, the wind direction data- as demonstrated in item #2 above- would be bringing hazardous air pollutants directly over the 106 homes within one mile or less of the site (including the homes of the petitioners) 34% in a year's time. This 34% of time taken times the total yearly amount of hazardous air pollutants projected to be produced at the proposed Ring Neck site would equate to 125.12 tons of hazardous air pollutants coming over the 106 homes (including petitioners homes) mentioned above every single year, figured at the 100 million gallon plant production level mentioned in #4 above. (34% times 368 tons of hazardous air

pollutants= 125.12 tons coming directly over residential homes). This appears to be a significant amount of hazardous air pollutants falling on residential homes at the proposed site due particularly to downwind location, which is not the case at the Redfield plant.

According to the American Academy of Pediatrics, children and infants are the most susceptible to many air pollutants. Children are at an increased risk for several reasons. Their lungs are still developing, they spend more time at high activity levels, their airways are more narrow than adults, they breath more rapidly and inhale more pollutants per pound of body weight, and they are more likely to have asthma and acute respiratory diseases. The Ethanol Plant is going to be built approximately ¼ to ¾ mile from the Onida fairgrounds, swimming pool, city park baseball field, and the Onida School. Therefore, the pollution caused by the Ethanol Plant will have a direct impact on the health and wellbeing of our children.

Along with the health and wellbeing, we also believe the air safety of our residents is at risk. The railroad runs along the edge of Onida. The town would have to be evacuated within a one-mile radius if a train carrying ethanol derailed and /or exploded. A very high percentage of Onida residents live within this radius. Not only could an explosion cause destruction of the environment and loss of human life, but toxic fumes could be released and hazardous chemicals could be spilled with the effects on soil, vegetation, and surface water.

6. In the "Statement of Basis" report used by SD DENR in making the determination for issuing the air quality permit, the ethanol production rate and emissions rate used to determine the emissions calculated in section 4.1.1 were gathered from what was called a "similar plant", which referred to permit #28.0503-57, which belongs to the Redfield Ethanol Plant. **(Attachment H)**

   In the "Statement of Basis" report mentioned above, the emissions data used to determine the emissions calculated in section 6.1.1 were also gathered from what was again called a "similar facility" which again referred to Permit #28.0503-57, which belongs to the Redfield Ethanol Plant. **(Attachment I)**

   As established in Item #5 above, the Redfield Ethanol Plant is completely unlike the site of the proposed Ring Neck Plant by not being located either adjacent to or having residential homes located downwind of the plant. Although it appears that the emissions data is being compared between the

Redfield Plant and the proposed Ring Neck site at the point of being released into the air, no data is produced or mentioned in regards to the associated fall out area of where the emissions will actually fall, and how the prevailing wind direction in relationship between the plants and surrounding residential homes, will affect how the emissions will actually be disbursed onto the surrounding fall out area.

7. In addition to no mention or data available on wind direction, fall our threshold calculations, or air dispersion modeling in sections 4.1.1 and 6.1.1 in the "Statement of Basis" report mentioned above, there was also no mention or data available on wind direction, fall out threshold calculations, or air dispersion modeling in any of the rest of this same "Statement of Basis" mentioned above. **(Attachment J)**

8. In the DENR's response to the public comments made regarding their issuance of the Draft Permit, the following statement was made: "Initially, when the ethanol industry expanded in South Dakota, modeling was conducted to determine what type of impact an ethanol plant may have on the National Ambient Air Quality Standards. Those ethanol plants were modeled at higher short-term emission rates than the emission rates proposed at Ring-Neck Energy and have demonstrated compliance with the National Ambient Air Quality Standards." **(Attachment K)**

   However, nowhere is there any mention made of the unique circumstances of the Ring Neck plant location selection along with the following issues:

   a. The extremely close proximity of the plant location to residential housing.
   b. The proximity of the plant location in terms of being directly up wind of prevailing spring-summer-fall, south-easterly winds to the residential housing mentioned above.
   c. The extremely small site area of approximately 40 acres of the proposed plant.

   All of these factors will contribute to an extremely concentrated plume of air pollutants that will be traveling overhead of the stated residential housing especially during times of south-easterly winds, which again is reporting to be approximately 34% of the time over the course of a year. The only way to obtain an accurate reading would be to complete air dispersion modeling of their specific plant location and close location affected by most by this pollution.

9. Pt. 51, App. W page 562 states the following: "Due to limitations in the spatial and temporal coverage of air quality measurements, monitoring data normally are not sufficient as the sole basis for demonstration the adequacy of emission limits for existing sources. Also, the impacts of new sources that do not yet exist can only be determined through modeling. Thus models, while uniquely filling one program need, have become a primary analytical tool in most air quality assessments. There is no one model capable of properly addressing all conceivable situations even within a broad category such as point sources. Meteorological phenomena associated with threats to air quality standards are rarely amenable to a single mathematical treatment; thus, case-by-case analysis and judgment are frequently required. The guidance provided here should be followed in air quality analyses relative to State Implementation Plans and in supporting analyses required by EPA. State and local agency air programs. EPA may approve the use of another technique that can be demonstrated to be more appropriate than those recommended in this guide. This is discussed at greater length in Section 3. In all cases, the model applied to a given situation should be the one that provides the most accurate representation of atmospheric transport, dispersion, and chemical transformations in the area of interest." **(Attachment L)**

10. 40 CFR, Ch. 1, pt. 51, App. W page 583 states the following: "The meteorological data used as input to a dispersion model should be selected on the basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions an the area of concern." **(Attachment M)**

11. 40 CFR, Ch. 1, pt. 51, App. W page 585 states the following: "Wind directions observed by the National Weather Service are reported to the nearest 10 degrees. A specific set of randomly generated numbers has been developed for use with the preferred EPA models and should be used with NWS data to ensure a lack of bias in wind direction assignments within the models." **(Attachment N)**

12. 40 CFR, Ch.1 (7-1-15 Edition), pt. 51, App. W, page 586 states the following: "Spatial or geographical representativeness is best achieved by collection of all of the needed model input data in close proximity to the actual site of the source(s). Site specific measured data are therefore preferred as model input, provided that appropriate instrumentation and quality assurance procedures

are followed and that the data collected are adequately representative (free from inappropriate local or microscale influences) and compatible with the input requirements of the model to be used. As a minimum, site specific measurements of ambient air temperature, transport wind speed and direction and the variables necessary to estimate atmospheric dispersion should be available in meteorological data sets to be used in Modeling. Care should be taken to ensure that meteorological instruments are located to provide representative characterization of pollutant transport between sources and receptors of interest." **(Attachment O)**

13. 40 CFR, Ch. 1, pt. 51, App. W, page 601 states the following: "meteorological data: The AERMET meteorological preprocessor requires input of surface characteristics, including surface roughness (zo), Bowen ratio, and albedo, as well as, hourly observations of wind speed between 7 zo and 100 m (reference wind speed measurement from which a vertical profile can be developed), wind direction, cloud cover, and temperature between zo and 100 m (reference temperature measurement from which a vertical profile can be developed)." **(Attachment P)**

14. EPA's Region Guide to Ethanol Plants, states the following: "Whether or not a facility needs to model will depend on the rate of emissions increase, facility history, plant location, type of source, and emission point configurations (e.g. stack heights). A construction permit cannot be issued if the plant will cause or significantly contribute to predicted violations of any ambient air quality standard." **(Attachment Q)**

Based on the facts mentioned above that a large concentration of residential homes, including, the homes of the petitioners, are located within one mile of the proposed Ring Neck site, and are also located directly downwind of the area's prevailing spring/summer/fall south-easterly winds as also established previously. We feel that Air Dispersion Modeling should be made to play a part in the decision making process for granting an air quality permit. We strongly feel that the potential health and welfare of the petitioners and all area residents will be affected by the hazardous air pollutants that will be emitted directly over residential homes a large amount of the time, and we beg that the Board of Minerals and Environment will require that Air Dispersion Modeling will be required to determine the exact levels of the projected hazardous air pollutant emissions that will be produced and emitted to the surrounding area. In summary, Federal Regulations 40 CFR Ch. 1, Part 51, App. W, 1.0 (b), (e), and 8.3 (a), and 8.3.3.2 (a) require the need for air dispersion modeling of new sources specifically in the area of interest,

particularly using meteorological data including site specific data including wind direction, that characterizes the transport and dispersion conditions in the area of concern. Site specific air dispersion modeling was not completed in this case, and needs to be completed to determine if NAAQS will be attained in the areas of concern. A construction permit should not be issued until this is done, and a determination made on whether NAAQS will be met in this particular case.

Attachment A

Environmental Laws Guide for Ethanol Plants (page 1)

Attachment A

CHAPTER 1 WHAT LAWS APPLY WHEN I'M BUILDING OR MODIFYING AN ETHANOL PLANT?

This chapter discusses environmental laws and regulations that might apply to construction at an ethanol plant. A general construction resource that you might find useful is: *Managing your Environmental Responsibilities: A Planning Guide for Construction and Development* (EPA/305-B-04-003). It is available at: http://www.epa.gov/compliance/resources/publications/assistance/sectors/constructmyer/myerguide.pdf

1.1 National Environmental Policy Act

If you're using federal money to construct an ethanol plant or any associated facility, such as an access road or water supply, then your plant is subject to the National Environmental Policy Act (NEPA). NEPA requires federal agencies to incorporate environmental considerations in their planning and decision-making and to prepare a detailed statement assessing the environmental impact of activities and alternatives that significantly affect the environment.

The NEPA assessment for ethanol plants should include all potential environmental and human health impacts. Resources such as wetlands, water quality, hazardous waste, and air quality are commonly analyzed. Ethanol plants should also consider potential impacts to road and railway capacity; water supply and local municipal water systems; and handling and deposition of byproducts (wet or dry cake) from the plant operation. Significant effects that are identified and determined to be unavoidable, may require mitigation to reduce or minimize the environmental or human health impacts.

Ethanol plants can have significant air emissions including volatile organic compounds, sulfur dioxide, nitrogen oxides, hazardous air pollutants and particulate matter. Selection of the plant location should focus on minimizing air quality impacts to downwind residents and consider other air emission sources in the area.

Attachment B

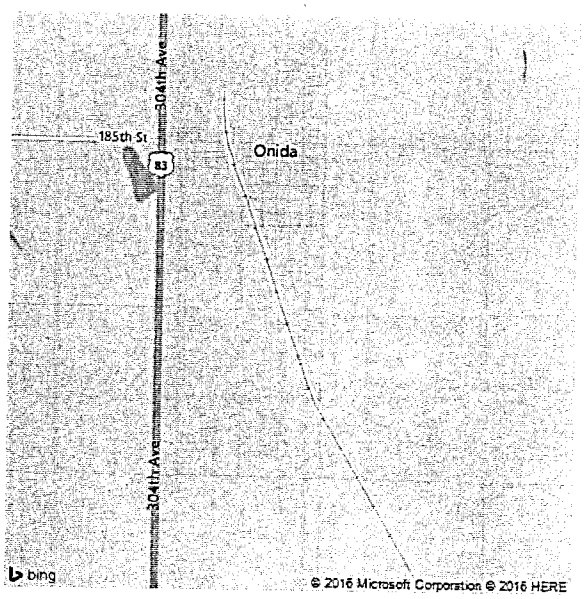
Aerial photo showing site location of the plant and the homes/residences within one mile of the plant.

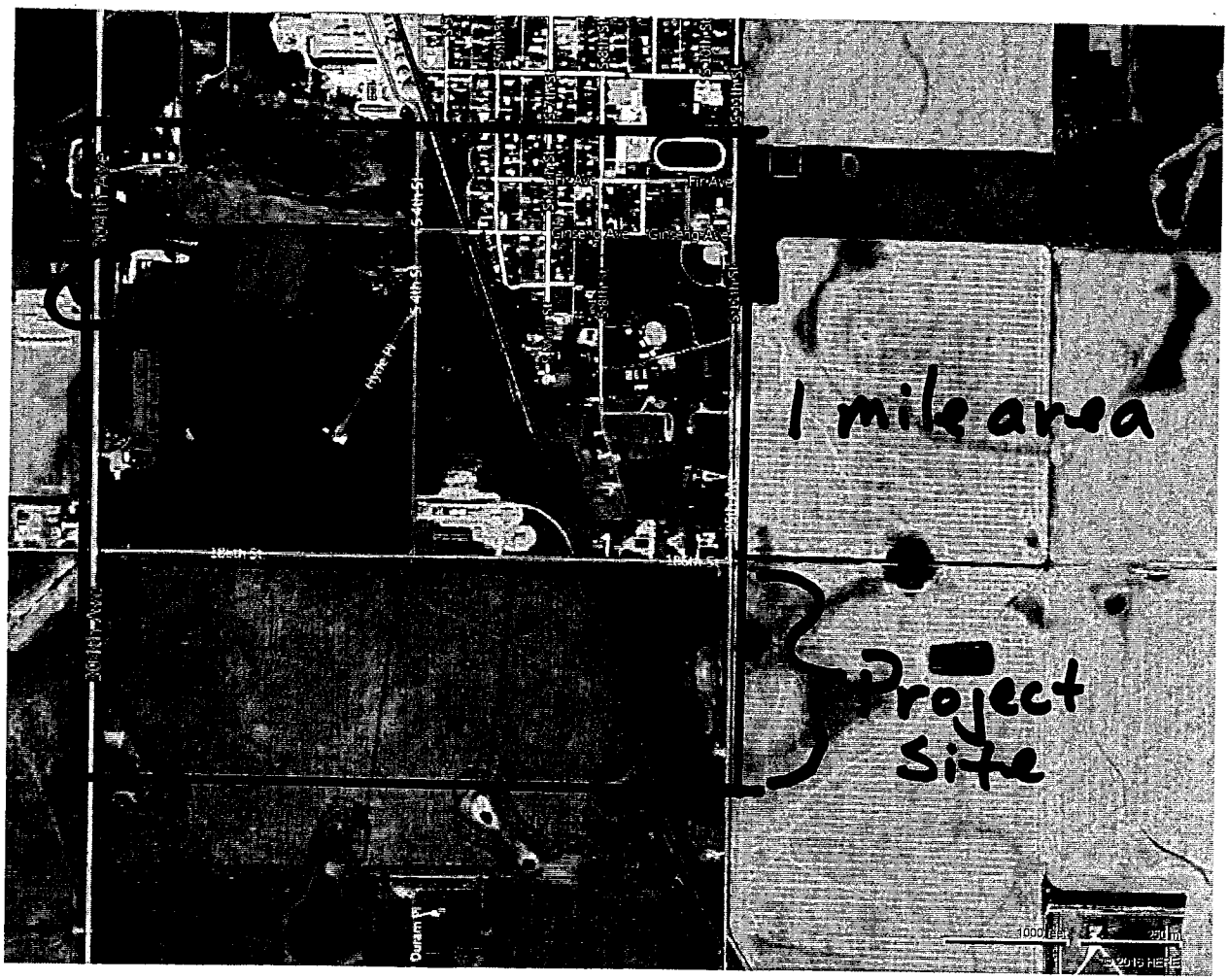
Attachment B - 4 pgs.

bing maps

Notes

106
~~104~~ Homes in Mile area - see attached subtotals





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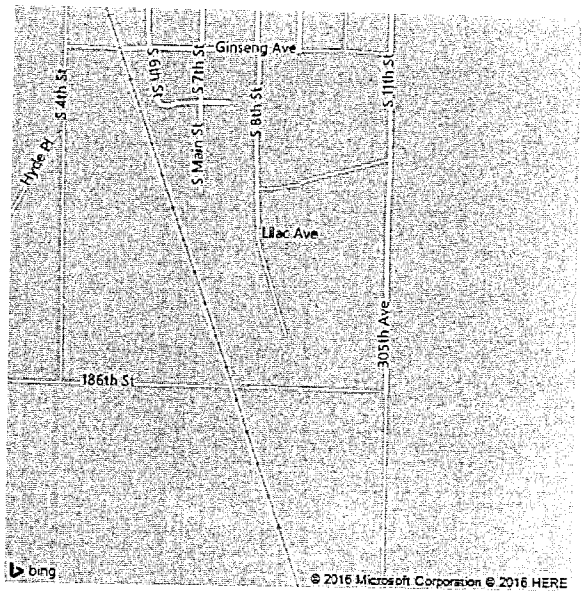
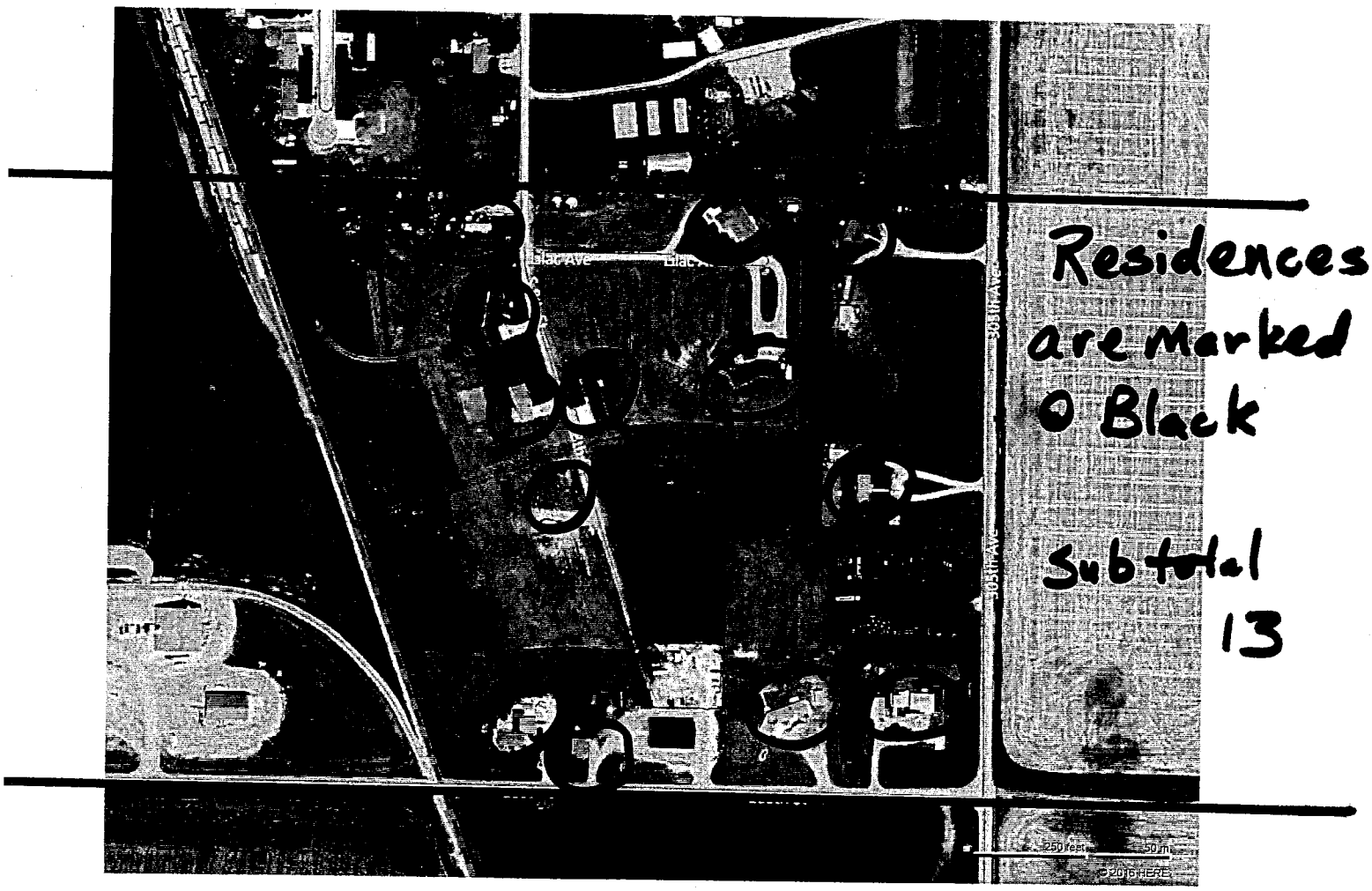
bing maps

Notes





Residences are Marked O Black

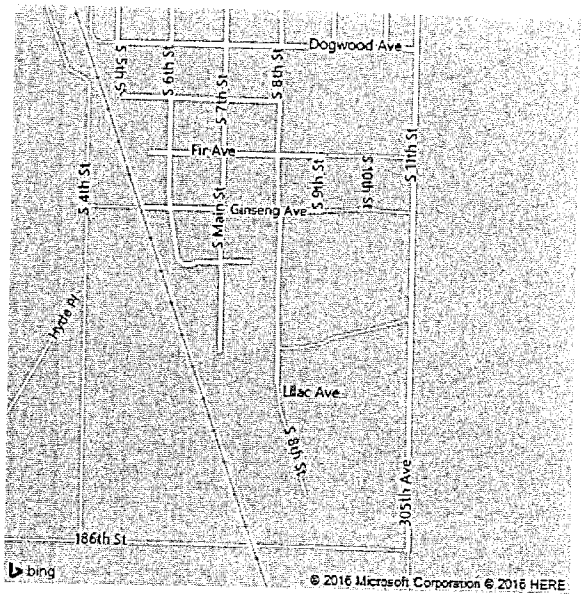
Subtotal 13

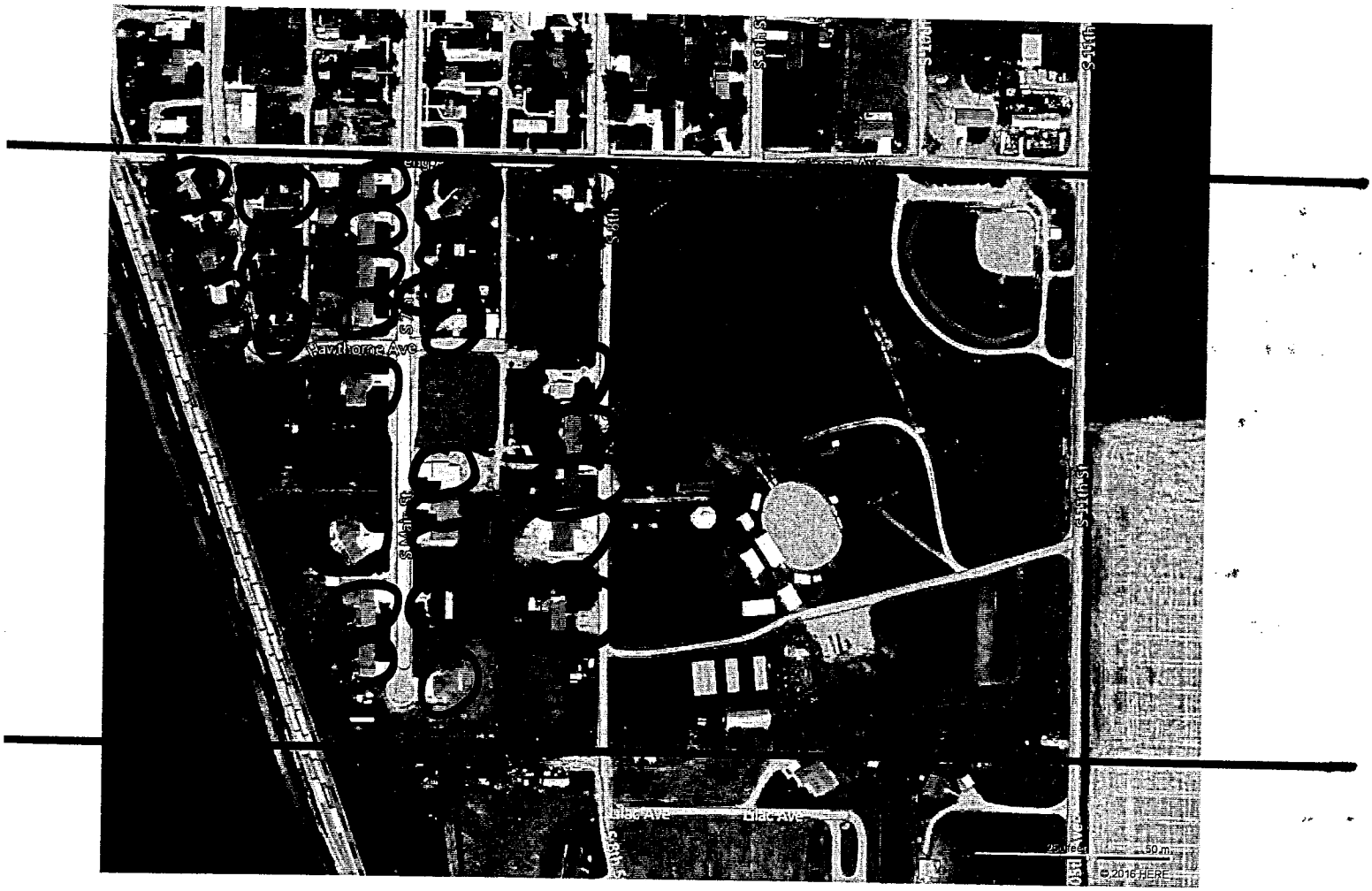
bing maps

Notes

Residences are marked ● Black

subtotal = 31



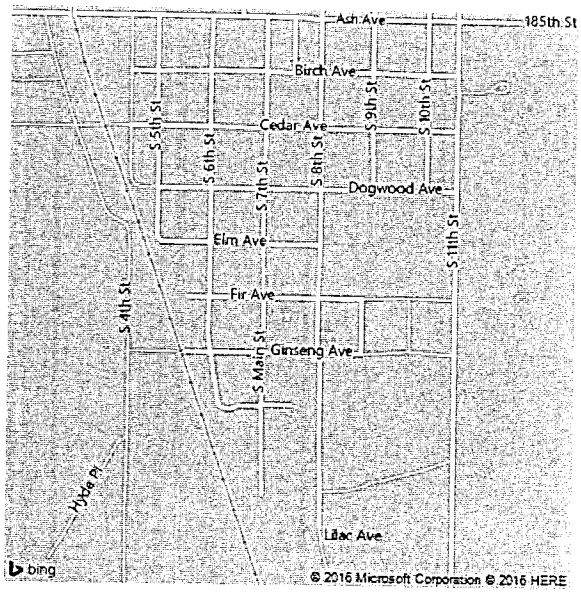


bing maps

Notes

Residences are marked @ Black

sub total = 60



8 apartments

Attachment C

Data demonstrating the prevalence of south-easterly winds in the area which is demonstrated to be the prevailing wind direction 34% of the time.

Attachment C - 2 pgs

Fort Pierre, SD

Pierre Regional

11:37 AM MDT on July 05, 2016 (GMT -0600)

Weather History for KPIR - January, 2015

From:

January

1

2015

To:

December

31

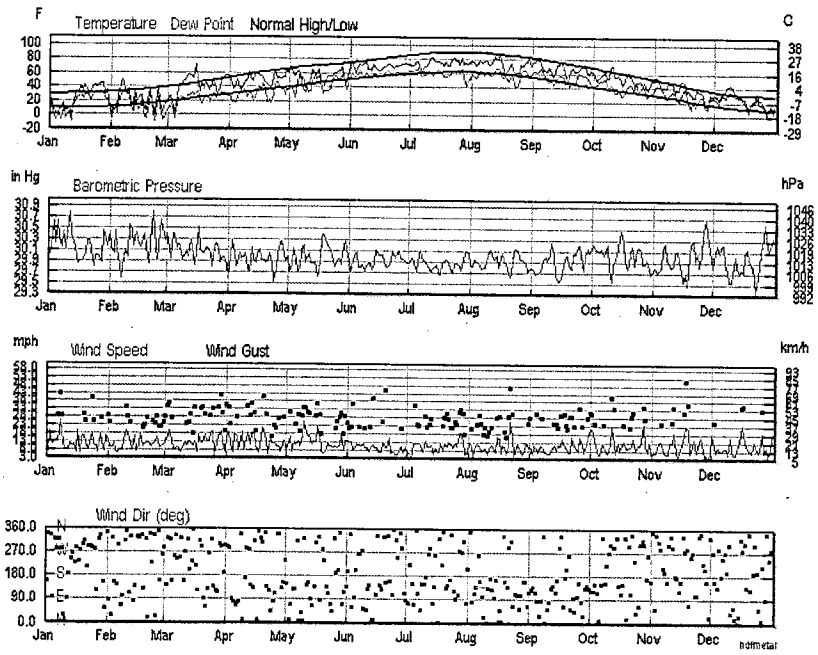
2015

Get History

Daily Weekly Monthly **Custom**

	Max	Avg	Min	Sum
Temperature				
Max Temperature	104 °F	62 °F	5 °F	
Mean Temperature	88 °F	49 °F	-3 °F	
Min Temperature	71 °F	36 °F	-11 °F	
Degree Days				
Heating Degree Days (base 65)	68	18	0	6566
Cooling Degree Days (base 65)	23	2	0	839
Growing Degree Days (base 50)	38	8	0	3028
Dew Point				
Dew Point	73 °F	37 °F	-16 °F	
Precipitation				
Precipitation	2.05 in	0.06 in	0.00 in	19.79 in
Snowdepth	9.0 in	0.9 in	0.0 in	-
Wind				
Wind	60 mph	11 mph	0 mph	
Gust Wind	80 mph	28 mph	16 mph	
Sea Level Pressure				
Sea Level Pressure	31.14 in	29.99 in	28.20 in	

Custom Weather History Graph



Search for Another Location

Airport or City:

KPIR

Submit

Trip Planner

Search our weather history database for the weather conditions in past years. The results will help you decide how hot, cold, wet, or windy it might be!

Date:

January

1

Submit

Weather History & Observations

2015	Temp. (°F)			Dew Point (°F)			Humidity (%)			Sea Level Press. (in)			Visibility (mi)			Wind (mph)			Precip. (in)	Events
Jan	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	high	sum	
	33	25	16	23	16	7	78	69	59	30.17	30.09	30.03	10	10	10	21	10	26	0.00	
	27	17	7	19	15	8	92	80	68	30.15	30.00	29.75	10	10	10	15	7	17	0.00	
	33	16	-2	27	3	-10	88	72	56	30.57	30.14	29.74	10	4	0	38	20	45	T	Snow
	7	0	-7	-2	-7	-13	79	71	63	30.74	30.62	30.49	10	9	1	17	11	21	0.01	Snow
	10	0	-11	5	-4	-16	88	78	68	30.72	30.22	29.91	10	6	0	24	12	27	0.08	Fog , Snow
	13	5	-3	6	1	-7	87	77	67	30.96	30.60	30.45	10	6	1	29	14	35	0.04	Snow
	21	7	-7	2	-8	-14	69	60	50	31.14	30.29	28.20	10	10	9	28	13	36	0.00	
	28	17	5	20	10	-5	74	53	43	30.56	30.15	29.83	10	4	1	44	26	56	T	Rain , Snow

Attachment D

Quarterly Excess Emissions Report-Covering July 1-September 30, 2014 of the Redfield Energy,LLC ethanol plant

Attachment D · 2 pgs

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OCT 30 2014
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PROGRAM

REDFIELD ENERGY, LLC
PO BOX 111 • 38650 171ST STREET • REDFIELD, SD 57469
PHONE: 605-302-0090 • FAX: 605-475-3004

October 28, 2014

Compliance Supervisor
South Dakota Department of Environment and Natural Resources
Air Quality Program
523 East Capitol, Joe Foss Building
Pierre, South Dakota 57501-3181

Subject: Quarterly Excess Emissions Report – Covering July 1 – September 30, 2014
Redfield Energy, LLC, Redfield, South Dakota
SDDENR Air Permit # 28.0503-57

Dear Compliance Supervisor:

Redfield Energy, LLC (RFE) submits this quarterly excess emissions report for the third quarter of 2014 (July 1 to September 30, 2014) for our facility located in Redfield, South Dakota.

If you have any questions or comments, please feel free to contact me at (605) 475-3120 or Billy VonSee of Merjent, our environmental consultant at (612) 746-1610.

Sincerely,

Redfield Energy, LLC

Certification:

"I certify that, based on information and belief formed after reasonable inquiry, the statements and information in this document and all attachments are true, accurate, and complete."

Simon Appel
Responsible Official

Director of Safety & Environmental Regulations
Title

Signature

10/28/14
Date

Enclosures: 2014 Quarter 3 Excess Emissions Report

cc: Billy VonSee, Merjent (signature pages only)

QUARTER 3 EMISSIONS CALCULATIONS

SUMMARY OF QUARTER 3 AIR EMISSIONS

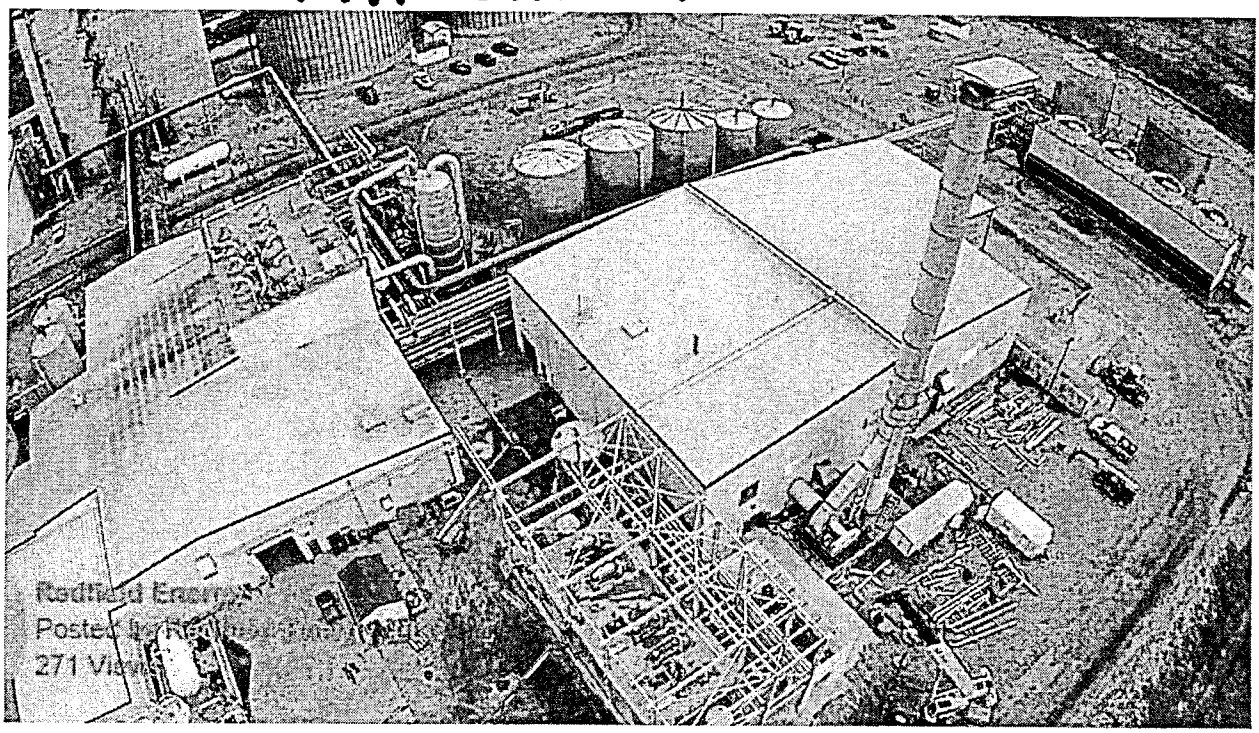
Pollutant	Units	Plant Emissions Monthly	Monthly	Monthly	12-Month	12-Month	12-Month	Li
TSP	tons	3.78	4.38	3.55	44.28	44.36	44.5	9
PM10	tons	1.47	1.63	1.34	17.11	17.23	17.07	9
PM2.5	tons	0.75	0.77	0.66	8.76	8.80	8.81	9
SO2	tons	3.61	3.65	3.06	41.77	41.91	41.94	9
NOx	tons	4.45	4.52	3.92	51.93	51.74	51.85	9
VOC	tons	3.75	3.49	3.06	43.43	43.71	43.75	9
Organic HAP	tons	0.55	0.58	0.47	6.15	6.16	6.16	23
Metal HAP	tons	0.00	0.00	0.00	0.00	0.00	0.00	23
Acetaldehyde	tons	0.38	0.41	0.33	4.21	4.21	4.21	9.
CO	tons	0.14	0.18	0.15	1.54	1.59	1.61	9

Item	Units	Monthly	Monthly	Monthly	12-Month	12-Month	12-Month	Li
Undenatured Ethanol	MMGal	4.46	5.08	4.16	55.55	57.74	57.58	6
Unit #9	hours	5.40	5.90	39.40	76.90	76.80	49.40	50
Unit #17	hours	0.00	0.40	0.00	7.90	8.30	8.30	30
TK001	MTVP (mmHg)	59.36	67.19	55.47				57
TK002	MTVP (mmHg)	59.36	67.19	55.47				57
TK003	MTVP (mmHg)	140.78	153.09	135.19				57
TK004	MTVP (mmHg)	45.26	52.81	69.50				57
TK005	MTVP (mmHg)	45.26	52.81	69.50				57
		Jul-14	Aug-14	Sep-14	Jul-14	Aug-14	Sep-14	

Attachment E

Document from the Redfield ethanol plant's website showing gallons produced

Attachment E



Calendar Year 2015 Stats

- Corn bushels – 20,601,895
- Corn oil pounds – 14,727.352
- Distillers grains tons – 219,376
- Ethanol gallons – 58,813,380

- Redfield Energy, LLC is a 55 million gallon per year ethanol production facility located two miles north of Redfield, SD. Redfield Energy is a South Dakota LLC comprised of 675 members who represent two unit classes. Class A equity unit holders are required to deliver corn on an annual fiscal year basis. Class B unit holders do not have a corn requirement.

- Redfield Energy, a dry mill plant, became operational in April 2007 and has the capacity to process approximately 20 million bushels of corn into ethanol per year. The plant produces approximately 230,000 tons of modified wet and dried distillers grain, which is sold to the local and west coast markets.

- Redfield Energy takes pride in providing economic impact to the agriculture industry, community, State, and its unit holders.

Attachment F

Draft Construction Permit

Attachment F

Under the South Dakota Air Pollution Control Regulations

Pursuant to Chapter 34A-1-21 of the South Dakota Codified Laws and the Air Pollution Control Regulations of the State of South Dakota and in reliance on statements made by the owner designated below, a permit to construct and operate is hereby issued by the Secretary of the Department of Environment and Natural Resources. This permit authorizes such owner to construct and operate the permitted unit(s) at the location designated below and under the listed conditions.

A. Owner

1. Company Name and Mailing Address

Ring-Neck Energy & Feed, LLC
PO Box 68
Onida, SD 57564

2. Actual Source Location if Different from Above

E ½ SE ¼ NE ¼, Section 14, Township 114 N, Range 77W
Onida, SD 57564

3. Permit Contact

Walter Wendland
(641) 420-5890

4. Facility Contact

Walter Wendland
(641) 420-5890

5. Responsible Official

Walter Wendland
(641) 420-5890

B. Permit Revisions

Not Applicable

C. Description of Construction Activity

Construct and operate a 100 million gallon per year ethanol production facility.

Attachment G

Redfield Ethanol plant aerial showing plant located 2.5 miles to the North and East of Redfield

Attachment G

bing maps

Notes

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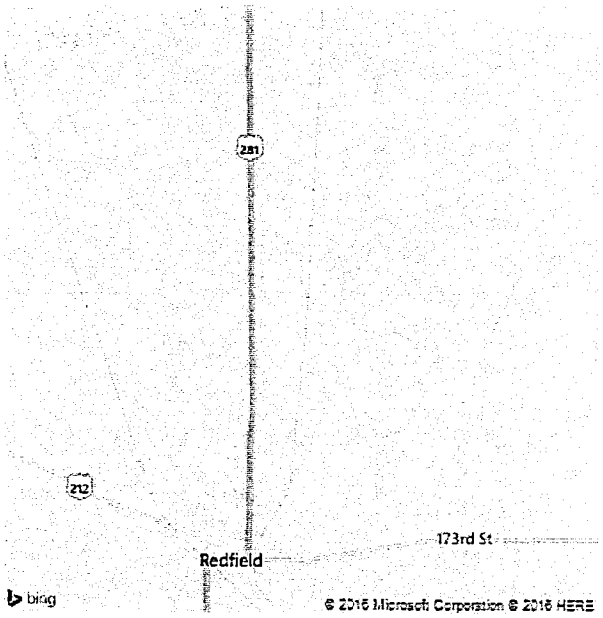
3 Homes nearly 1 mile to N W



Redfield Ethanol Plant Aerial

Attachment H

"Statement of Basis" report used in making the determination for issuing the air quality permit, the ethanol production rate and emissions rate of Redfield Ethanol Plant

Attachment H

4.1.1 *Uncontrolled Potential to Emit*

For the purposes of this review DENR will examine the fermentation unit. In previous reviews, DENR has established that the uncontrolled emission rate for volatile organic compounds from a fermentation system is very high. Additionally, DENR evaluates emissions on an every hour of every day (8,760 hours per year) basis for potential emissions. Table 4-1 includes the uncontrolled emission rate found in similar plant to that proposed by Ring-Neck Energy. The listed ethanol production rate for the existing ethanol plant will used to scale up to the proposed size of Ring-Neck Energy.

Table 4-1: Fermenter Uncontrolled Emissions

Facility	Undenatured Ethanol Production (Million gallons per year)	Uncontrolled Emissions (Pounds per hour)	Uncontrolled Emissions (Tons per year)
Exiting Facility[1]	60	565.3	2,476
Ring-Neck Energy	98.51	928.1	4,065

[1] – January 23, 2006, Statement of Basis Permit #28.0503-57

Based on uncontrolled potential emissions from just the fermentation system, Ring-Neck Energy would have emissions in excess of the major source threshold for volatile organic compounds. Ring Neck Energy has proposed the operation of control systems on the ethanol plant. Therefore, Ring Neck Energy may not be subject to major source requirements under the Prevention of Significant program if the operations of the control systems are made enforceable. To allow Ring-Neck Energy to forgo a Prevention of Significant review, DENR will establish short term emissions limits for the applicable criteria pollutants.

4.1.2 *Proposed Short Term Limits for Controlled Systems*

Equation 4-1 will be used to calculate potential emissions from units with applicable or proposed short term limits.

Equation 4-1 Potential Emissions

$$Potential\ Emissions\left(\frac{Tons}{Year}\right) = \frac{ShortTermLimit\left(\frac{Pounds}{Hour}\right) \times 8{,}760\left(\frac{hours}{Year}\right)}{2{,}000\left(\frac{Pounds}{Ton}\right)}$$

Table 4-2 contains the proposed short term limits for Ring-Neck Energy. See Table 4-9 for the results of inputting the short term limits into Equation 4-1.

Table 4-2: Short Term Limits (pounds per hour)

Unit	Description	TSP	PM_{10}	$PM_{2.5}$	NO_x	VOC	CO
#1	Grain Receiving	2.1	2.1	2.1			
#2	Grain Milling	1.2	1.2	1.2			
#3	Fermentation					13.0	
#4	Distillation/Dryers/RTO	6.0	6.0	6.0	15.4	12.2	8.7
#6	Boiler	1.7	1.7	1.7	21.0[1]	2.3	17.3

Attachment I

A copy of the section of the "Statement of Basis" report the emissions data used to determine emissions calculated for the Redfield Ethanol Plant.

Attachment I

conducted at similar facilities in the State of South Dakota. Table 6-1 contains emissions data for individual hazardous air pollutants at similar facility to those proposed by Ring-Neck Energy. It should be noted the representative facility is smaller than the proposed facility. Therefore, the emissions rates will be scaled up accordingly. The 98.51 million gallon undenatured ethanol production rate in the application will be used to scale up the controlled hazardous air pollutant emission rates.

Table 6-1: Emissions Data

Unit Type	Pollutant	Emission Rate (pounds per hour)	Permitted Production Rate	Proposed Production Rate	Adjusted Emission Rate (pounds per hour)
Wet Scrubber[1] (Unit #3)	Acetaldehyde	0.72	60 Million gallons of undenatured ethanol	98.51 Million gallons of undenatured ethanol	1.18
	Acrolein	0.09			0.15
	Formaldehyde	0.03			0.05
	Methonol	0.02			0.03
Regenerative Thermal Oxidizer[2] (Unit #4)	Acetaldehyde	0.02	Not Applicable[3]		0.02
	Acrolein	0.02			0.02
	Formaldehyde	0.02			0.02
	Methonol	0.19			0.19
Cooling Cyclone[4] (Unit #10)	Acetaldehyde	0.04	Not Applicable[3]		0.04
	Acrolein	0.03			0.03
	Formaldehyde	0.01			0.01
	Methonol	0.02			0.02

[1] – Test conducted December 8, 2011, Title V operating permit #28.0503-57, testing without water additive used as it is the worst case for hazardous air pollutants;

[2] - Test conducted December 8, 2011, Title V operating permit #28.0503-57;

[3] – The back half of the Ring Neck Energy's system (the drying unit and cooling cyclone) is designed to process approximately 50% of the ethanol production's distillers grain. Therefore, Ring Neck Energy's proposed equipment is similar in size to those tested at the other ethanol plant and no adjustment is required; and

[4] - Test conducted January 17, 2008, Title V operating permit #28.0503-57

Unit #6 will have potential hazardous air pollutant emissions from burning fuel. AP-42 provided emission factors for these pollutants. The amount of emissions from individual hazardous air pollutants from burning fuel is relatively small and does not typically include acetaldehyde, acrolein, or methanol. Formaldehyde may be emitted but in extremely small quantities. Therefore, potential emissions will be examined from a total hazardous air pollutant stand point. Table 6-2 contains the emission factors from both fuel options AP-42.

Table 6-2: AP-42 Emission Factors

Fuel Type	Citation	Emission Factor (Pounds per MMBtu)
Natural Gas	AP-42 Table 1.4-3	0.0019
Propane	No Data	Not Applicable

There is no hazardous air pollutant emission rate for propane listed in AP-42; therefore, the emission rate for natural gas will be used for propane. Equation 4-1 and Equation 4-4 will be used to calculate emissions. The results will be summarized in Table 6-6.

Attachment J

A copy of the entire "Statement of Basis" report

Attachment J - 23 pages

Table of Content

Table of Content

1.0 Background

On September 30, 2015, the South Dakota Department of Environment and Natural Resources (DENR) received a construction permit application for an ethanol plant, Ring-Neck Energy and Feed, LLC (Ring-Neck Energy). The proposed ethanol production facility will be located near Onida, South Dakota.

1.1 Proposed Facility

Table 1-1 summarizes Ring-Neck Energy's proposed equipment for the ethanol production facility.

Table 1-1 Description of Proposed Units, Operations, and Processes

Unit	Description	Maximum Operating Rate	Control Device
#1	Grain receiving, grain transfer, and storage bin loading. The grain is received in 2 truck receiving pits and 1 rail receiving pit and is transferred to grain storage.	20,000 bushels of grain per hour per conveyor and elevator	Baghouse
	Grain cleaning. Elevator legs transport the grain from the storage bins to a grain scalper and transport the cleaned grain to a surge bin.	20,000 bushels of grain hour	
#2	Grain milling. An elevator leg transports the grain from the surge bin to one of four hammer mills.	1,500 bushels of grain per hour per hammer mill	Baghouse
#3	Fermentation process. This process includes six fermenters and a beer well.	Each Fermenter is 1,050,000 gallons and the beer well is 1,370,000 gallons	Wet Scrubber
#4	Distillation process. This process includes a slurry tank, two liquefaction tanks, flash tank, cook tank, yeast tank, beer stripper, side stripper, rectifier column, molecular sieve, evaporator, and condenser.	100 million gallons of denatured ethanol per year	Regenerative Thermal Oxidizer
	Whole stillage and centrate stillage tank, four centrifuges, and syrup tank.	Each centrifuge can process 185 gallons per minute	
	Two distillers grain and solubles dryers. The dryers are fired with natural gas or propane.	45 Million British thermal units per hour for each dryer	
#4b	Regenerative Thermal Oxidizer. The system is fired with natural	18 Million British thermal units per hour	

Unit	Description	Maximum Operating Rate	Control Device
	gas.		
#5	A submerged truck and two rail loading racks.	600 gallons per minute for truck loading and 1,000 gallons per minute for railcar loading.	Flare
#5b	Flare. The flare is fired with natural gas.	12.4 million British thermal units per hour	
#6	Boiler. The boiler is fired with natural gas or propane.	210 Million British thermal units per hour	Not Applicable
#7	Dried distillers grain and soulubles storage, elevator and load out spout.	318 tons per hour	Baghouse
#9	Cooling Tower.	38,900 gallons per minute	Not Applicable
#10	Cooling Cyclone.	36.7 tons per hour	Baghouse
#11	Emergency Fire Pump.	300 horsepower	Not Applicable
#12	Storage Tank T61 equipped with an internal floating roof. This tank is used to store denatured ethanol.	1,500,000 gallons of denatured ethanol	Not Applicable
#13	Storage Tank T62 equipped with an internal floating roof. This tank is used to store denatured ethanol.	1,500,000 gallons of denatured ethanol	Not Applicable
#14	Storage Tank T63 equipped with an internal floating roof. This tank is used to store Denaturant.	200,000 gallons of denaturant	Not Applicable
#15	Storage Tank T64 equipped with an internal floating roof. This tank is used to store 200- proof ethanol.	200,000 gallons of 200 proof ethanol	Not Applicable
#16	Storage Tank T65 equipped with an internal floating roof. This tank is used to store 200- proof ethanol.	200,000 gallons of 200 proof ethanol	Not Applicable

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to the proposed facility. The following may be applicable.

2.1 Standards for Boilers

There are three New Source Performance Standards for fossil fuel-fired steam generators. The three standards are applicable to the following steam generators:

1. 40 CFR Part 60, Subpart D: applicable to a steam generator with a maximum operating rate of 250 million British thermal units per hour or more and commenced construction after August 17, 1971;
2. 40 CFR Part 60, Subpart Db: applicable to a steam generator with a maximum operating rate of 100 million British thermal units per hour or more and commenced construction after June 19, 1984; and
3. 40 CFR Part 60, Subpart Dc: applicable to a steam generator with a minimum design heat input capacity equal to or greater than 10 million Btus per hour but less than or equal to 100 million British thermal units per hour and commenced construction after June 9, 1989.

The proposed boiler at Ring-Neck Energy will have a maximum heating capacity of 210 million British thermal units per hour. The boiler is not subject to subject to Subpart D as the maximum heating capacity is less than 250 million British thermal units per hour. Additionally, Subpart Dc is not applicable because the heating input is more than 100 million British thermal units per hour.

Ring-Neck Energy's proposed boiler is rated at greater than 100 million British thermal units per hour and will commence construction after June 19, 1984. Therefore, the proposed boiler will be subject to Subpart Db. Ring-Neck Energy will be required to meet the requirements under the subpart for the natural gas fired boiler. It should be noted for the purposes of this subpart, propane is considered to be natural gas.

2.2 Standards for Storage Tanks

There are three New Source Performance Standards for storage vessels. The three standards are applicable to the following storage vessels:

1. 40 CFR Part 60, Subpart K: applicable to storage vessels for petroleum liquids capable of storing greater than 40,000 gallons and commenced construction after June 11, 1973 but prior to May 19, 1978;
2. 40 CFR Part 60, Subpart Ka: applicable to storage vessels for petroleum liquids capable of storing greater than 40,000 gallons and commenced construction after May 18, 1978 but prior to July 23, 1984; and
3. 40 CFR Part 60, Subpart Kb: applicable to storage vessels for volatile organic liquids capable of storing 75 cubic meters (approximately 19,813 gallons) or greater and commenced construction after July 23, 1984.

All of Ring-Neck Energy's proposed tanks will commence construction after July 23, 1984. Therefore, Subpart K and Ka are not applicable. Some of the proposed tanks will be greater than 75 cubic meters (19812.9 gallons) and are possibly applicable to Subpart Kb.

Subpart Kb applies to tanks greater than 151 cubic meters (39,890 gallons) storing liquids with a maximum true vapor pressure greater than 3.5 kilopascals (0.51 pounds per square inch) and to tanks with a storage capacity between 75 cubic meters to 151 cubic meters storing liquids with a maximum true vapor pressure greater than 15 kilopascals (2.18 pounds per square inch). Table

2.1 lists the proposed tanks, tank size, the maximum true vapor pressure of the liquids being stored in the tanks, and the applicability of Subpart Kb.

Table 2-1: Tank and Volatile Organic Liquid Specifications

Unit	Description	Capacity		Max True Vapor Pressure (kilopascal)	Subpart Kb Applicable
		Gallons	Cubic Meters		
#12	Storage Tank T61	1,500,000	5,678.1	11.03	Yes
#13	Storage Tank T62	1,500,000	5,678.1	41.78	Yes
#14	Storage Tank T63	200,000	757.1	41.85	Yes
#15	Storage Tank T64	200,000	757.1	6.62	Yes
#16	Storage Tank T65	200,000	757.1	6.62	Yes

All five proposed tanks will be subject to Subpart Kb.

2.3 Standards for Grain Elevators

The provisions under 40 CFR Part 60, Subpart DD is applicable to the following grain elevators:

1. The provisions of this subpart are applicable to any grain terminal elevator, which has a permanent grain storage capacity of 2,500,000 bushels. A grain terminal storage elevator means any grain elevator except those located at animal food manufacturers, pet food manufactures, cereal manufacturers, breweries, and livestock feedlots; or
2. The provisions of this subpart are applicable to any grain storage elevator, which has a permanent grain storage capacity of 1,000,000 bushels. A grain storage elevator means any grain elevator located at any wheat flour mill, wet corn mill, dry corn mill (human consumption), rice mill, or soybean oil extraction plant; and
3. Commences construction, modification, or reconstruction after August 3, 1978.

Ethanol plants are considered a grain terminal elevator. To be applicable to this subpart, Ring Neck Energy's permanent grain storage capacity has to be greater than or equal to 2,500,000 bushels. The permanent grain storage at Ring-Neck Energy's proposed facility is 2,261,000 bushels. Therefore, the proposed facility is not applicable to this subpart.

2.4 Standards for Synthetic Organic Chemical Manufacturing

There are two New Source Performance Standards for synthetic organic chemical manufacturing industries. The two standards are applicable to the following:

1. 40 CFR Part 60, Subpart VV is applicable to affected facilities in the synthetic organic chemical manufacturing industry, of which ethanol is included; and commence construction, reconstruction or modification after January 5, 1981, but before November 8, 2006 and the capacity of the plant is more than 1,000 megagrams per year of ethanol; and
2. 40 CFR Part 60, Subpart VVa is applicable to affected facilities in the synthetic organic chemical manufacturing industry that commence construction, reconstruction, or

modification after November 7, 2006 and the capacity of the plant is more than 1,000 megagrams per year of ethanol.

Ring-Neck Energy's proposed facility will produce ethanol, which is considered a synthetic organic chemical under both Subparts. The facility will be constructed after November 7, 2006. Therefore, the provisions of Subpart VVa are applicable to their proposed operations.

2.5 Standards for Stationary Compression Ignition Engines

The provisions under 40 CFR Part 60, Subpart IIII were promulgated July 11, 2006, and applicable to owners or operators of stationary compression ignition internal combustion engine that commenced construction after July 11, 2005 and the generator was manufactured after April 1, 2006.

Ring-Neck Energy's proposed facility will include a fire pump meeting the above conditions. Therefore, the provisions of Subpart III are applicable to the proposed fire pump.

2.6 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to Ring-Neck Energy.

3.0 New Source Review

In accordance with ARSD 74:36:10:01, the new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. This facility is located near Onida, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, Ring-Neck Energy is not subject to a new source review.

4.0 Prevention of Significant Deterioration

Any stationary source which emits or has the potential to emit 250 tons per year or more of any air pollutant is considered a major source and is subject to prevention of significant deterioration (PSD) requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). Any stationary source which emits or has the potential to emit 100 tons per year or more of any air pollutant and is one of the 28 named PSD source categories is subject to PSD requirements (ARSD 74:36:09 – 40 CFR. Part 52.21(b)(1)). The following is a list of regulated pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate matter with a diameter less than or equal to 10 microns (PM_{10});
3. Particulate matter with a diameter less than or equal to 2.5 microns ($PM_{2.5}$);
4. Sulfur dioxide (SO_2);
5. Nitrogen oxides (NO_x);

6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOC);
8. Lead;
9. Greenhouse gases (carbon dioxide, nitrous oxide, methane, etc.)
10. Fluorides;
11. Sulfuric acid mist;
12. Hydrogen sulfide;
13. Reduced sulfur compounds; and
14. Total reduced sulfur.

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the Federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases.

The Environmental Protection Agency (EPA) promulgated a final rule that states ethanol plants are not considered a chemical manufacturing plant. Therefore, Ring-Neck Energy is not classified as one of the 28 listed source categories for PSD regulations and the major source threshold is 250 tons per year, except for greenhouse gases.

On June 23, 2014, the Supreme Court of the United States issued a ruling that the EPA could not require facilities to obtain a PSD permit based solely on greenhouse gas emissions. The Supreme Court of the United States stated a facility must trigger one of the major source thresholds for another regulated pollutant before a greenhouse gas emission can be considered under the PSD permitting program.

4.1 Potential Emissions

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

ARSD 74:36:01:12 defines potential to emit as the maximum rated capacity of a source to emit a pollutant under its physical or operational design. Any physical or operational limitation on the capacity of a source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted stored or processed, shall be treated as part of its design if the limitation is federally enforceable.

To make a limitation federally enforceable, the limitation must be in a state or federal regulation, a state or federal permit, etc. To determine if additional limitation on the use of control systems or operational limits is necessary to allow Ring Neck Energy to forgo a PSD review, DENR reviewed Ring-Neck Energy's potential emissions prior to any additional limitations beyond the required federal standards in Chapter 2.0.

4.1.1 Uncontrolled Potential to Emit

For the purposes of this review DENR will examine the fermentation unit. In previous reviews, DENR has established that the uncontrolled emission rate for volatile organic compounds from a fermentation system is very high. Additionally, DENR evaluates emissions on an every hour of every day (8,760 hours per year) basis for potential emissions. Table 4-1 includes the uncontrolled emission rate found in similar plant to that proposed by Ring-Neck Energy. The listed ethanol production rate for the existing ethanol plant will used to scale up to the proposed size of Ring-Neck Energy.

Table 4-1: Fermenter Uncontrolled Emissions

Facility	Undenatured Ethanol Production (Million gallons per year)	Uncontrolled Emissions (Pounds per hour)	Uncontrolled Emissions (Tons per year)
Exiting Facility[1]	60	565.3	2,476
Ring-Neck Energy	98.51	928.1	4,065

[1] – January 23, 2006, Statement of Basis Permit #28.0503-57

Based on uncontrolled potential emissions from just the fermentation system, Ring-Neck Energy would have emissions in excess of the major source threshold for volatile organic compounds. Ring Neck Energy has proposed the operation of control systems on the ethanol plant. Therefore, Ring Neck Energy may not be subject to major source requirements under the Prevention of Significant program if the operations of the control systems are made enforceable. To allow Ring-Neck Energy to forgo a Prevention of Significant review, DENR will establish short term emissions limits for the applicable criteria pollutants.

4.1.2 Proposed Short Term Limits for Controlled Systems

Equation 4-1 will be used to calculate potential emissions from units with applicable or proposed short term limits.

Equation 4-1 Potential Emissions

$$Potential\ Emissions\left(\frac{Tons}{Year}\right) = \frac{ShortTermLimit\left(\frac{Pounds}{Hour}\right) \times 8{,}760\left(\frac{hours}{Year}\right)}{2{,}000\left(\frac{Pounds}{Ton}\right)}$$

Table 4-2 contains the proposed short term limits for Ring-Neck Energy. See Table 4-9 for the results of inputting the short term limits into Equation 4-1.

Table 4-2: Short Term Limits (pounds per hour)

Unit	Description	TSP	PM_{10}	$PM_{2.5}$	NO_x	VOC	CO
#1	Grain Receiving	2.1	2.1	2.1			
#2	Grain Milling	1.2	1.2	1.2			
#3	Fermentation					13.0	
#4	Distillation/Dryers/RTO	6.0	6.0	6.0	15.4	12.2	8.7
#6	Boiler	1.7	1.7	1.7	21.0[1]	2.3	17.3

#7	DDGS Loadout	0.2	0.2	0.2			
#10	Cooling Cyclone	0.2	0.2	0.2		3.3	

[1] – This unit is subject to a nitrogen oxide emissions limit in 40 CFR Subpart Db. The listed short term limit is the maximum emission rate under that subpart.

4.1.3 Potential Fire Pump Emissions

Ring-Neck Energy's proposed fire pump will emit criteria pollutants. The fire pump has been designated as emergency use. Emission Factors for reciprocating internal engines can be found in the EPA's AP-42 document. Table 4-3 contains the applicable emission factors.

Table 4-3: Emission Factors (pounds per horsepower-hour)

Reference	TSP[2]	PM_{10}	$PM_{2.5}$	NOx	SO_2	VOC	CO
AP-42 Table 3.3-1 (10/1996)	0.0022	0.0022	0.0022	0.031	0.0021	0.0025[1]	0.0067

[1]- Includes exhaust and crankcase emissions.

DENR estimates potential emissions for emergency use reciprocating internal combustion engines using a 500 hour per year basis. This is due to limitations set forth in federal standard (New Source Performance Standards Subpart IIII and Maximum Achievable Control Technology Subpart ZZZZ). Equation 4-2 will be used to calculate potential emissions. Potential emissions are shown in Table 4-9.

Equation 4-2 Fire Pump Potential Emissions

$$PotentialEmissions\left(\frac{Tons}{Year}\right) = \frac{EmissionFactor\left(\frac{Pounds}{Horsepower-Hour}\right) \times 300(Horsepower) \times 500\left(\frac{hours}{Year}\right)}{2{,}000\left(\frac{Pounds}{Ton}\right)}$$

4.1.4 Potential Cooling Tower Emissions

Ring-Neck Energy provided calculations for particulate emissions from the cooling tower. They cite 2.06 pounds per hour emission rate citing a manufacturer specification. DENR agrees with this calculation. Equation 4-1 will be used to calculate potential emissions from the cooling tower.

4.1.5 Potential Tank Emissions

Ring-Neck Energy has proposed construction of five large storage tanks. These tanks will have VOC emissions from their storage contents. DENR uses the Tanks 4.0.9d program to estimate potential emissions from tanks. The facility has requested 100 million gallons of denatured ethanol throughput and the regulation outside the air program allow for a denaturant rate up to 2.5 percent in the application. Emissions from tanks are much higher from gasoline storage tanks; therefore, the worst case of a 2.5 percent denaturant rate will be used. In the application, a gasoline with a Reid vapor pressure of 10 was listed as the denaturant; therefore, that type of gasoline is used in the calculations. Additionally, the tank dimensions used in the tanks program were taken from the application and Huron, South Dakota was designated as the closest major city. Table 4-4 contains the potential emissions of Units #12-#16 from conducting a Tanks

analysis.

Table 4-4: Tank Emissions

Unit	Description	Capacity (gallons)	Contents	Throughput (gallons per year)	VOC emissions (tons per year)
#12	Storage Tank T61	1,500,000	Denatured Ethanol	50,000,000	0.28
#13	Storage Tank T62	1,500,000	Denatured Ethanol	50,000,000	0.28
#14	Storage Tank T63	200,000	Denaturant	2,500,000	1.54
#15	Storage Tank T64	200,000	200 Proof Ethanol	47,500,000	0.26
#16	Storage Tank T65	200,000,	200 Proof Ethanol	47,500,000	0.26

4.1.6 Potential Loading Rack Emission

Ring-Neck Energy has potential emissions from the load out dentatured ethanol to trucks and railcars. These emissions are estimated using two separate scenarios. Those two scenarios are loading out all of the denatured ethanol by railcar without a control device and loading out all of the denatured ethanol by truck with the use of a flare as a control device. Emissions from the loadout of the ethanol can be calculated using AP-42 Chapter 5 Section 2. Equation 4-3 will be used to calculate emissions from the load out operations.

Equation 4-3 Load Loss Equation

$$Loadingloss\left(\frac{pounds}{1000\ gallons}\right) = \frac{S \times P \times M}{T}\left(1 - \frac{eff}{100}\right)$$

Where:

- S=Saturation Factor (AP-42 Table 5.2-1)
- P=Maximum True Vapor Pressure, psia, (DENR Tanks Calculation)
- M=Molecular Weight of Vapors, pound per pound-mole. (DENR Tanks Calculation)
- T=Temperature of liquid loaded, Degrees Rankine (Degrees Fahrenheit + 459.67), (DENR Tanks Calculation)
- Eff=Destruction efficiency of flare, %

Table 4-5 contains the variables above as well as the result of applying Equation 4-3.

Table 4-5: Loading Loss

Loadout Operation	Saturation Factor	Max Vapor Pressure (psia)	Molecular Weight (lbs/lbs-mole)	Temperature (°R)	Efficiency	Loading Loss (Pounds per 1000 gallons)
Truck	1.0	0.7351	48.8	504.9	98	0.0014
Rail	0.6	0.7351	48.8	504.9	0	0.0436

Due to the installation of the flare, the loading loss rate from railcar loading will be the worst case scenario for potential volatile organic compound emissions. Therefore, all 100 million gallons of potential through put will be assumed to be loaded out by rail for the purposes of this

review. This equates to 2.18 tons of volatile organic compound emissions per year.

Even though railcar loading is the worst case scenario for volatile organic compounds, the use of the flare would generate other criteria air pollutant emissions. These emissions should also be considered.

AP-42 provides a document on industrial flares. Although, emissions are based on a propylene fired flare. DENR does not agree the emissions would be equivalent to a natural gas fired flare. Therefore, emissions from the flare will be considered similar to burning natural gas from an external combustion source (Uncontrolled Boiler <100 million British Thermal units per hour). Table 4-6 contains the emissions factors.

Table 4-6: AP-42 Emission Factors (pounds per million British thermal units)

Reference	TSP	PM_{10}	$PM_{2.5}$	NOx	SO_2	VOC	CO
AP-42 Table 1.4-1 – 1.4-2 (10/1996)	0.007	0.007	0.007	0.098	0.0006	0.005	0.082

Equation 4-4 will be used to calculate potential emissions and results are shown in Table 4-9.

4.1.7 Other Potential Sulfur Dioxide Emission

Sulfur dioxide is not a product of ethanol production. The proposed ethanol plant will burn fuel to operate equipment, including the boiler, dryer, and regenerative thermal oxidizer that have the potential to emit sulfur dioxide. DENR will use EPA's AP-42 to estimate emissions from these units. Ring-Neck Energy has proposed using both propane and natural gas in some units; therefore, emissions factors for both fuels will be included.

The boiler, regenerative thermal oxidizer, and dryer are considered external combustion sources therefore AP-42 Chapter 1 will be used to estimate emissions. Table 4-4 contains the emission factors. The sulfur dioxide emissions for propane are dependent on sulfur content of the propane. DENR assumes sulfur content of propane is similar to natural gas. AP-42 lists the sulfur content for natural gas of 0.2 grains per 100 cubic feet. Therefore, sulfur dioxide for propane emissions will be estimated with this value. Table 4-7 contains the emission factors.

Table 4-7 AP-42 Sulfur Dioxide Emission Factors (pounds per Million Btu)

Fuel Type	Reference	SO_2
Propane	AP-42 Table 1.5-1 (07/2008)	0.0002
Natural Gas	AP-42 Table 1.4-2 (07/1998)	0.0006

Equation 4-4 will be used to calculate potential emissions. The results of applying the equation can be found in Table 4-9.

Equation 4-4 Potential Sulfur Dioxide Emissions

$$PotentialEmissions\left(\frac{Tons}{Year}\right) = \frac{EmissionFactor\left(\frac{Pounds}{Million\ Btu}\right) \times HeatInput\left(\frac{MillionBtus}{Hour}\right) \times 8{,}760\left(\frac{hours}{Year}\right)}{2{,}000\left(\frac{Pounds}{Ton}\right)}$$

4.1.8 Potential Fugitive Emission

As noted in 40 CFR Part 52 § 52.21(b)(1)(iii), fugitive emissions are not included in the potential to emit unless the facility is one of the 28 named sources or if the facility is one of the source categories was regulated as of August 7, 1980, under Section 111 (New Source Performance Standard – Chapter 2.0) and/or 112 (New Source Performance Standards for Hazardous Air Pollutants – Chapter 6.0). As noted above, Ring Neck Energy is not one of the 28 names sources. In addition, the only federal standards covering a source category that may have been regulated prior to August 7, 1980, that may be applicable to Ring Neck Energy are the New Source Performance Standards for Tanks (Subpart K and Ka) and Grain Elevators (Subpart DD). DENR has considered the regulated emissions (tanks, grain receiving, grain handling, etc.) from these Subparts in its calculations. Therefore, no additional fugitive emission calculations are necessary.

4.1.9 Facility Wide Potential Emissions

Table 4-9 contains the consolidated potential emissions from the above sections.

Table 4-9: Potential Emissions

Unit	Description	TSP	PM_{10}	$PM_{2.5}$	SO_2	NO_x	VOC	CO
#1	Grain Receiving	9.2	9.2	9.2				
#2	Grain Milling	5.3	5.3	5.3				
#3	Fermentation						59.9	
#4	Distillation/Dryers/RTO	26.3	26.3	26.3	0.28	67.5	53.4	38.1
#5	Truck Loading Rack and Flare	0.4	0.4	0.4	0.03	5.3	2.5	4.5
#6	Boiler	7.4	7.4	7.4	0.55	92.0	10.1	75.8
#7	DDGS Loadout	0.9	0.9	0.9				
#9	Cooling Tower	10.7	10.7	10.7				
#10	Cooling Cyclone	0.9	0.9	0.9			14.5	
#11	Fire Pump	0.17	0.17	0.17	0.16	2.33	0.19	0.50
#12	Denatured Ethanol Tank #1						0.28	
#13	Denatured Ethanol Tank #2						0.28	
#14	Denaturant Tanks						1.54	
#15	200 Proof Tank #1						0.26	
#16	200 Proof Tank #2						0.26	
	Total	**61**	**61**	**61**	**1**	**167**	**143**	**119**

The major source Prevention of Significant Detonation threshold is 250 tons per pollutant. Therefore, based on potential emissions Ring-Neck Energy will be considered a minor source and not subject to a Prevention of Significant Deterioration review. Due to short term limits being used to maintain minor source status, long term limits will be required to be placed in the permit to ensure continued minor source status for total suspended particulate, particulate matter with a diameter less than or equal to 10 microns, particulate matter with a diameter less than or equal to 2.5 microns, nitrogen oxides, volatile organic compounds and carbon monoxide. DENR limits facilities requesting these limits to 238 tons per year per pollutant. Sulfur dioxide has potential emissions less than 250 tons and is not subject to short term limits; therefore, no long term limit is required.

4.2 PSD Summary

Ring-Neck Energy's potential criteria pollutant emissions are less than 250 tons per year. Based on the US Supreme Court's decision and because Ring-Neck Energy is not applicable to the PSD program, a review for greenhouse gas emissions is not warranted or required.

5.0 National Emission Standards for Hazardous Air Pollutants (HAPs)

DENR reviewed 40 CFR Part 61 to determine the applicability to this facility to any of the subparts and determined none of the Subparts would be applicable.

6.0 Maximum Achievable Control Technology Standards

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

DENR uses stack test results to determine air emissions whenever stack test data is available from the source or a similar source. When stack test results are not available, DENR relies on manufacturing data, material balance, EPA's Compilation of Air Pollutant Emission Factors (AP-42, Fifth Edition, Volume 1) document, the applicant's application, or other methods to determine potential air emissions.

6.1 Potential Hazardous Air Pollutant Emission

There are three types of hazardous air pollutants, organic hazardous air pollutants, metal hazardous and non-organic hazardous air pollutants. Organic hazardous air pollutants are also accounted for in the volatile organic compound potential emissions. Ethanol plants are not sources of the other types except from fuel burning sources which may emit small amounts of metal hazardous air pollutants.

Ring-Neck Energy has requested limits to allow the facility to be considered an area source for hazardous air pollutants.

6.1.1 Potential Emissions from Units with Short Term Limits.

Ring-Neck Energy has accepted volatile organic compound limits on Units #3, #4, #6 and #10. These units may also have potential emissions of hazardous air pollutants.

Units #3, #4 and #10 are involved directly with ethanol or dried distillers grain production. The hazardous air pollutant emissions from these units are not readily available. These units are common at all ethanol plants and emissions can be estimated based on performance tests

conducted at similar facilities in the State of South Dakota. Table 6-1 contains emissions data for individual hazardous air pollutants at similar facility to those proposed by Ring-Neck Energy. It should be noted the representative facility is smaller than the proposed facility. Therefore, the emissions rates will be scaled up accordingly. The 98.51 million gallon undenatured ethanol production rate in the application will be used to scale up the controlled hazardous air pollutant emission rates.

Table 6-1: Emissions Data

Unit Type	Pollutant	Emission Rate (pounds per hour)	Permitted Production Rate	Proposed Production Rate	Adjusted Emission Rate (pounds per hour)
Wet Scrubber1 (Unit #3)	Acetaldehyde	0.72	60 Million gallons of undenatured ethanol	98.51 Million gallons of undenatured ethanol	1.18
	Acrolein	0.09			0.15
	Formaldehyde	0.03			0.05
	Methonol	0.02			0.03
Regenerative Thermal Oxidizer[2] (Unit #4)	Acetaldehyde	0.02	Not Applicable[3]		0.02
	Acrolein	0.02			0.02
	Formaldehyde	0.02			0.02
	Methonol	0.19			0.19
Cooling Cyclone[4] (Unit #10)	Acetaldehyde	0.04	Not Applicable[3]		0.04
	Acrolein	0.03			0.03
	Formaldehyde	0.01			0.01
	Methonol	0.02			0.02

[1] – Test conducted December 8, 2011, Title V operating permit #28.0503-57, testing without water additive used as it is the worst case for hazardous air pollutants;

[2] - Test conducted December 8, 2011, Title V operating permit #28.0503-57;

[3] – The back half of the Ring Neck Energy's system (the drying unit and cooling cyclone) is designed to process approximately 50% of the ethanol production's distillers grain. Therefore, Ring Neck Energy's proposed equipment is similar in size to those tested at the other ethanol plant and no adjustment is required; and

[4] - Test conducted January 17, 2008, Title V operating permit #28.0503-57

Unit #6 will have potential hazardous air pollutant emissions from burning fuel. AP-42 provided emission factors for these pollutants. The amount of emissions from individual hazardous air pollutants from burning fuel is relatively small and does not typically include acetaldehyde, acrolein, or methanol. Formaldehyde may be emitted but in extremely small quantities. Therefore, potential emissions will be examined from a total hazardous air pollutant stand point. Table 6-2 contains the emission factors from both fuel options AP-42.

Table 6-2: AP-42 Emission Factors

Fuel Type	Citation	Emission Factor (Pounds per MMBtu)
Natural Gas	AP-42 Table 1.4-3	0.0019
Propane	No Data	Not Applicable

There is no hazardous air pollutant emission rate for propane listed in AP-42; therefore, the emission rate for natural gas will be used for propane. Equation 4-1 and Equation 4-4 will be used to calculate emissions. The results will be summarized in Table 6-6.

6.1.2 Potential Emissions from Tanks and Denatured Ethanol Loadout

Potential emission of hazardous air pollutant emissions from tanks and loadout operations may come from the gasoline in the products. Ring-Neck Energy provided DENR with a Material Safety Data Sheet for natural gasoline. Table 6-3 provides a breakdown of the hazardous air pollutants contained within the natural gasoline used as denaturant.

Table 6-3: Hazardous Air Pollutant Content

Pollutant	% by Weight[1]
Benzene	5
Toluene	5
Ethylbenzne	5
O,M, and P Xylene	5
Hexanes	45
Total	**65**

[1]- Maximum possible.

The ethanol tanks containing only 200-proof ethanol do not have potential emissions of hazardous air pollutants. Units storing or loading out denaturant or denatured ethanol do have potential hazardous air pollutant emissions. DENR will estimate hazardous air pollutant potential emissions based on total volatile organic compound emission, denaturant content of fluid handled, and the hazardous air pollutant content of the denaturant. It should be noted that this calculation is very conservative as it assuming all hazardous air pollutants will volatilize in their maximum concentrations. Equation 6-1 will be used to calculate emissions and potential emissions are summarized in Table 6-4.

Equation 6-1 Hazardous Air Pollutant Potential Emissions from Tanks and Loadout

$$PotentialEmissions\left(\frac{tons}{Year}\right) = VOC\ Emissions\left(\frac{tons}{Year}\right) \times Denaturant\ (\%) \times HAP(\%)$$

Table 6-4: Hazardous Air Pollutant Potential Emissions from Tanks and Loadout

Unit	#5	#12	#13	#14
Description	**Loading Racks**	**Tank T61**	**Tank T62**	**Tank T63**
VOC Emission	2.18	0.28	0.28	1.54
Denaturant Content (%)	2.5	2.5	2.5	100
Benzene at 5% (tons per year)	0.002	0.0004	0.0004	0.08
Toluene at 5% (tons per year)	0.002	0.0004	0.0004	0.08
Ethylbenzene at 5% (tons per year)	0.002	0.0004	0.0004	0.08
Xylene at 5% (tons per year)	0.002	0.0004	0.0004	0.08
Hexane at 45% (tons per year)	0.025	0.003	0.003	0.69
Total Hazardous Air Pollutants (ton per year)	**0.035**	**0.005**	**0.005**	**1.001**

6.1.3 Fire Pump Hazardous Air Pollutant Emissions

The fire pump has potential hazardous air pollutant emissions from burning fuel. AP-42 provides emission factors for these emissions. Table 6-5 contains the emissions factors.

Table 6-5: Hazardous Air Pollutant Emission Factors (Pounds per Horsepower-Hour)

Unit	Citation	Emission Factor
Fire Pump	AP-42 Table 3.3-2	0.0000271

Equation 4-2 will be used to calculate potential emission of hazardous air pollutants and the results will be summarized in Table 6-6.

6.1.4 Summary of Hazardous Air Pollutant Emissions

Table 6-6 contains a summary of potential hazardous air pollutants for the facility. Acetaldehyde was included as a single hazardous air pollutant as it is the largest contributor.

Table 6-6: Summary of Hazardous Air Pollutant Emissions (tons per year)

Unit	Description	Acetaldehyde	Total HAP
#3	Fermentation	5.2	6.2
#4	Distillation/Dryers/RTO	0.1	2.0
#5	Loading Racks	0	0.0
#6	Boiler	0	1.7
#10	Cooling Cyclone	0.2	0.4
#12	Storage Tank T62	0	0.0
#13	Storage Tank T63	0	0.0
#14	Storage Tank T64	0	1.0
	Total	**6**	**11**

The major source threshold for hazardous air pollutant is 10 tons for a single pollutant and 25 tons for every pollutant. Therefore, based on the potential emission Ring-Neck Energy will be considered a minor source for hazardous air pollutants. Since uncontrolled emissions would be in excess of the hazardous air pollutant threshold for a major source, hazardous air pollutant emission limits of 9.5 tons and 23.8 tons for single and all hazardous air pollutants will be included in a permit to allow Ring Neck Energy to be considered an area source for hazardous air pollutants.

6.2 Non-Gasoline Organic Liquids Distribution

On November 10, 2003, EPA finalized Subpart EEEE under 40 CFR Part 63. This rule applies to the following chemical processing plants

1. Those facilities that produce chemicals classified using the 1987 Standard Industrial Classification Manual of a code indicated by 282, 283, 284, 285, 286, 287, 289, or 386; and
2. Are a major source of hazardous air pollutants.

Ring-Neck Energy's Standard Industrial Classification code is 2869, which falls underneath the code of 286. By including the emission limits on hazardous air pollutants of 9.5 tons and 23.8 tons for single and all hazardous air pollutants, respectively, Ring Neck Energy is considered an area source of hazardous air pollutants. Therefore, Ring Neck Energy is not applicable to this MACT standard.

6.3 Chemical Processing Plants

The maximum achievable control technology standard under 40 CFR Part 63, Subpart FFFF rule applies to the following chemical processing plants:

1. Those facilities that produce chemicals classified using the 1987 Standard Industrial Classification Manual of a code indicated by 282, 283, 284, 285, 286, 287, 289, or 386; and
2. Those facilities that are a major source of hazardous air pollutants. A major source of hazardous air pollutants has the potential to emit 10 tons of a single hazardous air pollutant and/or 25 tons of all hazardous air pollutants.

Ring-Neck Energy's Standard Industrial Classification code is 2869, which falls underneath the code of 286. By including the emission limits on hazardous air pollutants of 9.5 tons and 23.8 tons for single and all hazardous air pollutants, respectively, Ring Neck Energy is considered an area source of hazardous air pollutants. Therefore, Ring-Neck Energy is not applicable to this Subpart.

6.4 Stationary Reciprocating Internal Combustion Engines

The maximum achievable control technology under 40 CFR Part 63, Subpart ZZZZ establishes national emission and operating limitations for hazardous air pollutants emitted from stationary reciprocating internal combustion engines (RICE) located at major and area sources of hazardous air pollutant emissions. Therefore, Ring-Neck Energy is applicable to this subpart. The facility will be required to comply with 40 CFR Part 60, Subpart IIII which will satisfy the requirements under this subpart.

6.5 Industrial, Commercial, and Institutional Boilers and Process Heaters

The maximum achievable control technology under 40 CFR Part 63, Subpart DDDDD establishes national emission and operating limits for hazardous air pollutants emitted from industrial, commercial, and institutional boilers and process heaters located at a major source of hazardous air pollutant emissions. By including the emission limits on hazardous air pollutants of 9.5 tons and 23.8 tons for single and all hazardous air pollutants, respectively, Ring Neck Energy is considered an area source of hazardous air pollutants. Therefore, Ring-Neck Energy is not subject to this subpart.

6.6 Industrial, Commercial, and Institutional Boilers – Area Source

The maximum achievable control technology standard under 40 CFR Part 63, Subpart JJJJJJ applies to all new or existing industrial, commercial, and institutional boilers located at an area

source of hazardous air pollutants. In accordance with 40 CFR 63.11195 (e) a gas fired boiler is exempt from this subpart. A gas-fired boiler is defined as "...any boiler that burns gaseous fuels not combined with any solid fuels, burns liquid fuel only during periods of gas curtailment, gas supply emergencies, or periodic testing on liquid fuel." Gaseous fuels include natural gas and propane under the subpart. Therefore, Ring-Neck Energy is not subject to this subpart provided natural gas and propane are the only fuel burned in the boiler.

6.7 Gasoline Distribution

The maximum achievable control technology under 40 CFR Part 63, Subparts BBBBBB and CCCCCC apply only to bulk gasoline terminal, bulk gasoline pipeline breakout station, pipeline pumping station, or a plant gasoline distribution facility. Ring-Neck Energy does not propose to transport gasoline by pipeline, receive gasoline by pipeline, ship, or barge, ship gasoline, or dispense gasoline into motor vehicles. Therefore, these subparts are not applicable to Ring-Neck Energy.

6.8 Chemical Processing Plants – Area Source

The maximum achievable control technology under 40 CFR Part 63, Subpart VVVVVV applies to chemical manufacturing process units located at an area source of hazardous air pollutants. For Ring-Neck Energy to be applicable, Ring-Neck Energy would need to have one of the hazardous air pollutants present in a process fluid greater than 1.0 percent of those compounds listed as non-carcinogens or greater than 0.1 percent of those compounds that are considered carcinogens.

DENR's understanding, based on previous ethanol plant reviews, is that ethanol plants do not meet this definition. Therefore, Ring-Neck Energy is not applicable to this subpart.

6.9 Other MACT Standards

DENR reviewed the Maximum Achievable Control Technology Standards and determined that none are applicable to the proposed construction at Ring-Neck Energy.

7.0 State Requirements

7.1 Permit Type

In accordance with ARSD 74:36:09, a Prevention of Significant Deterioration permit is required for all sources meeting the definition of a major source. Ring-Neck Energy has accepted limitations to ensure emissions do not exceed the major source threshold for the Prevention of Significant Deterioration program. Therefore, a Prevention of Significant Deterioration Pre-Construction Permit is not required.

In accordance with ARSD 74:36:20, a construction permit is required for all new sources that are likely to emit air pollutants into the ambient air that do not meet the exemptions specified in

ARSD 74:36:20:02.01. Uncontrolled emissions from all above listed units would exceed the threshold for exemption. Therefore, a construction permit will be required to construct and operate Ring-Neck Energy's proposed facility.

7.2 State Restrictions on Visible Emissions

Visible emissions are applicable to any unit that discharges to the ambient air. In accordance with ARSD 74:36:12, a facility may not discharge into the ambient air emissions at greater than or equal to 20 percent opacity for all units.

7.3 State Emission Limits

In Accordance with ARSD 74:36:06, DENR has total suspended particulate and sulfur dioxide emission limits from process and fuel burning units.

7.3.1 State Particulate Emission Limits.

In accordance with ARSD 74:36:06:01, a unit that must comply with a total suspended particulate matter emission limit under the New Source Performance Standards, Maximum Achievable Control Technology Standards, the Acid Rain Program, or the Prevention of Significant Deterioration Program is exempt from having to meet the state's total suspended particulate matter emission limits.

In accordance with ARSD 74:36:06:02(1)(b), a fuel burning unit with a heat input equal to or greater than 10 million Btus per hour heat input may not exceed the particulate emissions rate determined by Equation 7-1.

Equation 7-1 – Particulate Emissions Limit for Fuel Burning Units

$E_{TSP} = 0.811 \times H^{-0.131}$

Where:

- E_{TSP} = emission rate, in pounds per million Btu heat input, and
- H = heat input, in million Btus per hour.

Using the maximum heat input value for the unit in Equation 7-1 results in a particulate matter emission limit listed in Table 7-1.

Equation 7-2, taken from ARSD 74:36:06:03(1)(b), is used to calculate the state limit of particulate emissions for each process unit with operating rates greater than 30 tons per hour. The state particulate emission limits are summarized in Table 7-1.

Equation 7-2 – State Particulate Emission Limit for Process Units > 30 tons per hour

$E_{TSP} = (55.0 \times P^{0.11}) - 40$

Where:

- E_{TSP} = Emission limit for total suspended particulate matter, in pounds per hour; and
- P = Design process rate, in tons per hour.

Table 7-1 – State Total Suspended Particulate Matter Emission Limit Comparison

Unit	Description	Short-term Limit TSP	State Emission Limit	Short-Term more Stringent
#1	Grain Receiving	2.1 pounds per hour	70.3 pounds per hour	Yes
#2	Grain Milling	1.2 pounds per hour	43.0 pounds per hour	Yes
#4	Distillation/Dryers /RTO	6.0 pounds per hour	0.47 pounds per MMBtu (29.7 pounds per hour)	Yes
#6	Boiler	1.7 pounds per hour	0.4 pounds per MMBtu (84.5 pounds per hour)	Yes
#7	DDGS Loadout	0.2 pounds per hour	63.7 pounds per hour	Yes
#10	Cooling Cyclone	0.2 pounds per hour	41.7 pounds per hour	Yes

Unit #9 is a cooling tower and particulate emissions are based on evaporative emissions. This unit does not have a process weight as defined in ARSD 74:36:01:13 and does not burn fuel. Therefore, Unit #9 is not subject to the South Dakota's particulate matter emission limits as it does not the definitions required to establish a state limit. Ring-Neck Energy has requested enforceable limits on particulate matter emissions to allow it to forgo a Prevention of Significant Deterioration review, these particulate matter emission limits are more stringent than South Dakota's state particulate matter emission limits as shown in Table 7-1. Therefore, South Dakota's particulate matter emission limits will not be included in the permit.

7.3.2 State Sulfur Dioxide Emission Limits

In accordance with ARSD 74:36:06:02(2) and ARSD 74:36:06:03(2), the permitted units may not emit sulfur dioxide emissions to the ambient air in an amount greater than three pounds of sulfur dioxide per million Btus of heat input.

Table 7-2 contains the proposed fuel burning units that are applicable along with their compliance status with the limit based on the potential emissions calculated in Chapter 4.

Table 7-2: State Sulfur Dioxide Limit

Unit	Description	Potential Emission Rate	Emission Limit	In Compliance
#10	Dryer/RTO	0.14 Pounds per MMBtus	3.0 pounds per MMBtus	Yes
#13	Boiler	0.14 pounds per MMBtus	3.0 pounds per MMBtus	Yes
#17	Fire Pump[1]	0.25 pounds per MMBtus	3.0 pounds per MMBtus	Yes

[1]-300 horsepower (output) = 2.1 MMBtus per hour (input) using AP-42 conversion of 7000 Btu per horsepower hour

7.4 Performance Tests

In accordance with ARSD 74:36:11:02, the Secretary may require a performance test if necessary to demonstrate compliance with the emission limits.

Ring-Neck Energy has accepted limitations to avoid being a major source for both the Prevention of Significant Deterioration and Maximum Achievable Control Technology Programs. In order to establish compliance with these limits, DENR will require performance testing. Table 7-3 contains the pollutants that will be required for each unit.

Table 7-3: Required Performance Testing

Unit	Description	Required Pollutants
#1	Grain Receiving	TSP, PM10, and PM2.5
#2	Grain Milling	TSP, PM10, and PM2.5
#3	Fermentation	VOC and HAPs
#4	Distillation/Dryers/RTO	TSP, PM10, PM2.5, NOx, VOC, HAPs, and CO
#6	Boiler	TSP, PM10, PM2.5 and CO
#7	DDGS Loadout	TSP, PM10, and PM2.5
#10	Cooling Cyclone	TSP, PM10, PM2.5, VOC, and HAPs

It should be noted that under NSPS Subpart Db, Ring-Neck Energy will be required to install a nitrogen oxides continuous emissions monitoring system or a predictive emissions monitoring system. This system will be used to demonstrate compliance with the short term limit for nitrogen oxides.

The EPA approved a methodology to determine compliance with volatile organic compound and hazardous air pollutant emission limits in a consent decree with other ethanol plants in South Dakota. DENR is recommending the following permit language be included in the construction regarding stack testing requirements for volatile organic compounds:

1. Required Test Methods. Conduct all volatile organic compound mass emission performance tests in accordance with 40 C.F. R. Part 51, Appendix M; Method 207 and 40 C. F. R. Part 60, Appendix A; Method 18 or other equivalent test method approved by the Secretary.
2. Treatment of 2,3-Butanediol. Due to difficulties associated with appropriate method detection limit, 2,3-Butanediol will be sampled through the chromatography column approximately 2.5 times faster than the maximum allowable sampling rate for the other volatile organic compounds or hazardous air pollutants in the sampling program (e.g. acetaldehyde, acrolein, and ethyl acetate). This requirement applies only if the Method 207 results indicate that 2,3-Butanediol should be sampled as part of the Method 18 testing.
3. Treatment of Non-Detects. When summing analytes per Method 18, non-detect data will be included in the total volatile organic compound and hazardous air pollutant mass as one half the compound method detection limit; except that, if all three performance test

Attachment K

Attachment K

DENR maintains ambient air monitors throughout South Dakota. Those monitors identify that South Dakota is meeting all of the National Ambient Air Quality Standards. The location and information on the monitoring data may be observed on DENR's webpage at http://denr.sd.gov/des/aq/monitoring/state-mo.aspx.

South Dakota has several ethanol plants in operation throughout South Dakota. Some of those ethanol plants are smaller, similar in size, and larger than Ring-Neck Energy. The air emissions generated from the existing ethanol plants has not caused or contributed to a monitored exceedance of the National Ambient Air Quality Standards.

Initially, when the ethanol industry expanded in South Dakota, modeling was conducted to determine what type of impact an ethanol plant may have on the National Ambient Air Quality Standards. Those ethanol plants were modeled at higher short-term emission rates than the emission rates proposed at Ring-Neck Energy and have demonstrated compliance with the National Ambient Air Quality Standards.

In addition to the modeling conducted for ethanol plants, modeling conducted for other facilities, whose emissions trigger a Prevention of Significant Deterioration preconstruction permit review, have demonstrated compliance with the National Ambient Air Quality Standards. Ring-Neck Energy's potential emissions considering the enforceable limits are less than the thresholds that trigger a Prevention of Significant Deterioration preconstruction permit review.

Considering this comparative analysis, Ring-Neck Energy should not prevent or interfere with South Dakota's attainment and maintenance of the National Ambient Air Quality Standards.

Comment: One of the commenters expressed concerns with the risk of railcar derailment.

Response: DENR does not have the authority to regulate where loaded railcars are stored, travel speeds through town, frequency of loaded railcars in town, or railroad track maintenance. Ring-Neck Energy has indicated that trains containing ethanol would be pulled south from the plant and not be pushed through town; however, some empty railcars would be staged on the north end of town. Therefore, only empty railcars would be pulled through town if additional railcar space is needed. Otherwise, railcars will be stored on Ring-Neck Energy's property.

Comment: One of the commenters expressed concerns with the use of a regenerative thermal oxidizer and that ethanol plants self-regulate and monitor their own air pollution.

Response: Ring-Neck Energy requested air emission and operational limits to allow the facility to forgo a Prevention of Significant Deterioration preconstruction permit. One of the enforceable conditions that Ring-Neck Energy has accepted is the use and operation of a thermal oxidizer. The proposed permit requires several performance tests,

Attachment L

Attachment L

agencies with air quality and land management responsibilities. The *Guideline* serves to identify, for all interested parties, those techniques and data bases EPA considers acceptable. The *Guideline* is not intended to be a compendium of modeling techniques. Rather, it should serve as a common measure of acceptable technical analysis when supported by sound scientific judgment.

b. Due to limitations in the spatial and temporal coverage of air quality measurements, monitoring data normally are not sufficient as the sole basis for demonstrating the adequacy of emission limits for existing sources. Also, the impacts of new sources that do not yet exist can only be determined through modeling. Thus, models, while uniquely filling one program need, have become a primary analytical tool in most air quality assessments. Air quality measurements can be used in a complementary manner to dispersion models, with due regard for the strengths and weaknesses of both analysis techniques. Measurements are particularly useful in assessing the accuracy of model estimates. The use of air quality measurements alone however could be preferable, as detailed in a later section of this document, when models are found to be unacceptable and monitoring data with sufficient spatial and temporal coverage are available.

c. It would be advantageous to categorize the various regulatory programs and to apply a designated model to each proposed source needing analysis under a given program. However, the diversity of the nation's topography and climate, and variations in source configurations and operating characteristics dictate against a strict modeling "cookbook". There is no one model capable of properly addressing all conceivable situations even within a broad category such as point sources. Meteorological phenomena associated with threats to air quality standards are rarely amenable to a single mathematical treatment; thus, case-by-case analysis and judgment are frequently required. As modeling efforts become more complex, it is increasingly important that they be directed by highly competent individuals with a broad range of experience and knowledge in air quality meteorology. Further, they should be coordinated closely with specialists in emissions characteristics, air monitoring and data processing. The judgment of experienced meteorologists and analysts is essential.

d. The model that most accurately estimates concentrations in the area of interest is always sought. However, it is clear from the needs expressed by the States and EPA Regional Offices, by many industries and trade associations, and also by the deliberations of Congress, that consistency in the selection and application of models and data bases should also be sought, even in case-by-case analyses. Consistency ensures that air quality control agencies and the general public have a common basis for estimating pollutant concentrations, assessing control strategies and specifying emission limits. Such consistency is not, however, promoted at the expense of model and data base accuracy. The *Guideline* provides a consistent basis for selection of the most accurate models and data bases for use in air quality assessments.

e. Recommendations are made in the *Guideline* concerning air quality models, data bases, requirements for concentration estimates, the use of measured data in lieu of model estimates, and model evaluation procedures. Models are identified for some specific applications. The guidance provided here should be followed in air quality analyses relative to State Implementation Plans and in supporting analyses required by EPA, State and local agency air programs. EPA may approve the use of another technique that can be demonstrated to be more appropriate than those recommended in this guide. This is discussed at greater length in Section 3. In all cases, the model applied to a given situation should be the one that provides the most accurate representation of atmospheric transport, dispersion, and chemical transformations in the area of interest. However, to ensure consistency, deviations from this guide should be carefully documented and fully supported.

f. From time to time situations arise requiring clarification of the intent of the guidance on a specific topic. Periodic workshops are held with the headquarters, Regional Office, State, and local agency modeling representatives to ensure consistency in modeling guidance and to promote the use of more accurate air quality models and data bases. The workshops serve to provide further explanations of *Guideline* requirements to the Regional Offices and workshop reports are issued with this clarifying information. In addition, findings from ongoing research programs, new model development, or results from model evaluations and applications are continuously evaluated. Based on this information changes in the guidance may be indicated.

g. All changes to the *Guideline* must follow rulemaking requirements since the *Guideline* is codified in Appendix W of Part 51. EPA will promulgate proposed and final rules in the FEDERAL REGISTER to amend this Appendix. Ample opportunity for public comment will be provided for each proposed change and public hearings scheduled if requested.

h. A wide range of topics on modeling and data bases are discussed in the *Guideline*. Section 2 gives an overview of models and their appropriate use. Section 3 provides specific guidance on the use of "preferred" air

Attachment M

Attachment M
(2 pages)

Background Sources

8.2.2 Recommendations (Isolated Single Source)

a. Two options (paragraph (b) or (c) of this section) are available to determine the background concentration near isolated sources.

b. Use air quality data collected in the vicinity of the source to determine the background concentration for the averaging times of concern. Determine the mean background concentration at each monitor by excluding values when the source in question is impacting the monitor. The mean annual background is the average of the annual concentrations so determined at each monitor. For shorter averaging periods, the meteorological conditions accompanying the concentrations of concern should be identified. Concentrations for meteorological conditions of concern, at monitors not impacted by the source in question, should be averaged for each separate averaging time to determine the average background value. Monitoring sites inside a 90° sector downwind of the source may be used to determine the area of impact. One hour concentrations may be added and averaged to determine longer averaging periods.

c. If there are no monitors located in the vicinity of the source, a "regional site" may be used to determine background. A "regional site" is one that is located away from the area of interest but is impacted by similar natural and distant man-made sources.

8.2.3 Recommendations (Multi-Source Areas)

a. In multi-source areas, two components of background should be determined: contributions from nearby sources and contributions from other sources.

b. *Nearby Sources:* All sources expected to cause a significant concentration gradient in the vicinity of the source or sources under consideration for emission limit(s) should be explicitly modeled. The number of such sources is expected to be small except in unusual situations. Owing to both the uniqueness of each modeling situation and the large number of variables involved in identifying nearby sources, no attempt is made here to comprehensively define this term. Rather, identification of nearby sources calls for the exercise of professional judgement by the appropriate reviewing authority (paragraph 3.0(b)). This guidance is not intended to alter the exercise of that judgement or to comprehensively define which sources are nearby sources.

c. For compliance with the short-term and annual ambient standards, the nearby sources as well as the primary source(s) should be evaluated using an appropriate Appendix A model with the emission input data shown in Table 8–1 or 8–2. When modeling a nearby source that does not have a permit and the emission limit contained in the SIP for a particular source category is greater than the emissions possible given the source's maximum physical capacity to emit, the "maximum allowable emission limit" for such a nearby source may be calculated as the emission rate representative of the nearby source's maximum physical capacity to emit, considering its design specifications and allowable fuels and process materials. However, the burden is on the permit applicant to sufficiently document what the maximum physical capacity to emit is for such a nearby source.

d. It is appropriate to model nearby sources only during those times when they, by their nature, operate at the same time as the primary source(s) being modeled. Where a primary source believes that a nearby source does not, by its nature, operate at the same time as the primary source being modeled, the burden is on the primary source to demonstrate to the satisfaction of the appropriate reviewing authority (paragraph 3.0(b)) that this is, in fact, the case. Whether or not the primary source has adequately demonstrated that fact is a matter of professional judgement left to the discretion of the appropriate reviewing authority. The following examples illustrate two cases in which a nearby source may be shown not to operate at the same time as the primary source(s) being modeled. Some sources are only used during certain seasons of the year. Those sources would not be modeled as nearby sources during times in which they do not operate. Similarly, emergency backup generators that never operate simultaneously with the sources that they back up would not be modeled as nearby sources. To reiterate, in these examples and other appropriate cases, the burden is on the primary source being modeled to make the appropriate demonstration to the satisfaction of the appropriate reviewing authority.

e. The impact of the nearby sources should be examined at locations where interactions between the plume of the point source under consideration and those of nearby sources (plus natural background) can occur. Significant locations include: (1) the area of maximum impact of the point source; (2) the area of maximum impact of nearby sources; and (3) the area where all sources combine to cause maximum impact. These locations may be identified through trial and error analyses.

f. *Other Sources:* That portion of the background attributable to all other sources (e.g., natural sources, minor sources and distant major sources) should be determined by the procedures found in subsection 89.2.2 or by application of a model using Table 8–1 or 8–2.

8.3 Meteorological Input Data

a. The meteorological data used as input to a dispersion model should be selected on the

basis of spatial and climatological (temporal) representativeness as well as the ability of the individual parameters selected to characterize the transport and dispersion conditions in the area of concern. The representativeness of the data is dependent on: (1) The proximity of the meteorological monitoring site to the area under consideration; (2) the complexity of the terrain; (3) the exposure of the meteorological monitoring site; and (4) the period of time during which data are collected. The spatial representativeness of the data can be adversely affected by large distances between the source and receptors of interest and the complex topographic characteristics of the area. Temporal representativeness is a function of the year-to-year variations in weather conditions. Where appropriate, data representativeness should be viewed in terms of the appropriateness of the data for constructing realistic boundary layer profiles and three dimensional meteorological fields, as described in paragraphs (c) and (d) below.

b. Model input data are normally obtained either from the National Weather Service or as part of a site specific measurement program. Local universities, Federal Aviation Administration (FAA), military stations, industry and pollution control agencies may also be sources of such data. Some recommendations for the use of each type of data are included in this subsection.

c. Regulatory application of AERMOD requires careful consideration of minimum data for input to AERMET. Data representativeness, in the case of AERMOD, means utilizing data of an appropriate type for constructing realistic boundary layer profiles. Of paramount importance is the requirement that all meteorological data used as input to AERMOD must be both laterally and vertically representative of the transport and dispersion within the analysis domain. Where surface conditions vary significantly over the analysis domain, the emphasis in assessing representativeness should be given to adequate characterization of transport and dispersion between the source(s) of concern and areas where maximum design concentrations are anticipated to occur. The representativeness of data that were collected off-site should be judged, in part, by comparing the surface characteristics in the vicinity of the meteorological monitoring site with the surface characteristics that generally describe the analysis domain. The surface characteristics input to AERMET should be based on the topographic conditions in the vicinity of the meteorological tower. Furthermore, since the spatial scope of each variable could be different, representativeness should be judged for each variable separately. For example, for a variable such as wind direction, the data may need to be collected very near plume height to be adequately representative, whereas, for a variable such as temperature, data from a station several kilometers away from the source may in some cases be considered to be adequately representative.

d. For long range transport modeling assessments (subsection 6.2.3) or for assessments where the transport winds are complex and the application involves a non-steady-state dispersion model (subsection 7.2.8), use of output from prognostic mesoscale meteorological models is encouraged.[84 85 86] Some diagnostic meteorological processors are designed to appropriately blend available NWS comparable meteorological observations, local site specific meteorological observations, and prognostic mesoscale meteorological data, using empirical relationships, to diagnostically adjust the wind field for mesoscale and local-scale effects. These diagnostic adjustments can sometimes be improved through the use of strategically placed site specific meteorological observations. The placement of these special meteorological observations (often more than one location is needed) involves expert judgement, and is specific to the terrain and land use of the modeling domain. Acceptance for use of output from prognostic mesoscale meteorological models is contingent on concurrence by the appropriate reviewing authorities (paragraph 3.0(b)) that the data are of acceptable quality, which can be demonstrated through statistical comparisons with observations of winds aloft and at the surface at several appropriate locations.

8.3.1 Length of Record of Meteorological Data

8.3.1.1 Discussion

a. The model user should acquire enough meteorological data to ensure that worst-case meteorological conditions are adequately represented in the model results. The trend toward statistically based standards suggests a need for all meteorological conditions to be adequately represented in the data set selected for model input. The number of years of record needed to obtain a stable distribution of conditions depends on the variable being measured and has been estimated by Landsberg and Jacobs[87] for various parameters. Although that study indicates in excess of 10 years may be required to achieve stability in the frequency distributions of some meteorological variables, such long periods are not reasonable for model input data. This is due in part to the fact that hourly data in model input format are frequently not available for such periods and that hourly calculations of concentration for long periods may be prohibitively expensive. Another study[88] compared various periods from a 17-year data set to determine the minimum number of years of data needed to approximate the concentrations modeled

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with a 17-year period of meteorological data from one station. This study indicated that the variability of model estimates due to the meteorological data input was adequately reduced if a 5-year period of record of meteorological input was used.

8.3.1.2 Recommendations

a. Five years of representative meteorological data should be used when estimating concentrations with an air quality model. Consecutive years from the most recent, readily available 5-year period are preferred. The meteorological data should be *adequately representative*, and may be site specific or from a nearby NWS station. Where professional judgment indicates NWS-collected ASOS (automated surface observing stations) data are inadequate {for cloud cover observations}, the most recent 5 years of NWS data that are observer-based may be considered for use.

b. The use of 5 years of NWS meteorological data or at least 1 year of site specific data is required. If one year or more (including partial years), up to five years, of site specific data is available, these data are preferred for use in air quality analyses. Such data should have been subjected to quality assurance procedures as described in subsection 8.3.3.2.

c. For permitted sources whose emission limitations are based on a specific year of meteorological data, that year should be added to any longer period being used (e.g., 5 years of NWS data) when modeling the facility at a later time.

d. For LRT situations (subsection 6.2.3) and for complex wind situations (paragraph 7.2.8(a)), if only NWS or comparable standard meteorological observations are employed, five years of meteorological data (within and near the modeling domain) should be used. Consecutive years from the most recent, readily available 5-year period are preferred. Less than five, but at least three, years of meteorological data (need not be consecutive) may be used if mesoscale meteorological fields are available, as discussed in paragraph 8.3(d). These mesoscale meteorological fields should be used in conjunction with available standard NWS or comparable meteorological observations within and near the modeling domain.

e. For solely LRT applications (subsection 6.2.3), if site specific meteorological data are available, these data may be helpful when used in conjunction with available standard NWS or comparable observations and mesoscale meteorological fields as described in paragraph 8.3.1.2(d).

f. For complex wind situations (paragraph 7.2.8(a)) where site specific meteorological data are being relied upon as the basis for characterizing the meteorological conditions, a data base of at least 1 full-year of meteorological data is required. If more data are available, they should be used. Site specific meteorological data may have to be collected at multiple locations. Such data should have been subjected to quality assurance procedures as described in paragraph 8.3.3.2(a), and should be reviewed for spatial and temporal representativeness.

8.3.2 National Weather Service Data

8.3.2.1 Discussion

a. The NWS meteorological data are routinely available and familiar to most model users. Although the NWS does not provide direct measurements of all the needed dispersion model input variables, methods have been developed and successfully used to translate the basic NWS data to the needed model input. Site specific measurements of model input parameters have been made for many modeling studies, and those methods and techniques are becoming more widely applied, especially in situations such as complex terrain applications, where available NWS data are not adequately representative. However, there are many model applications where NWS data are adequately representative, and the applications still rely heavily on the NWS data.

b. Many models use the standard hourly weather observations available from the National Climatic Data Center (NCDC). These observations are then preprocessed before they can be used in the models.

8.3.2.2 Recommendations

a. The preferred models listed in Appendix A all accept as input the NWS meteorological data preprocessed into model compatible form. If NWS data are judged to be adequately representative for a particular modeling application, they may be used. NCDC makes available surface[89 90] and upper air[91] meteorological data in CD-ROM format.

b. Although most NWS measurements are made at a standard height of 10 meters, the actual anemometer height should be used as input to the preferred model. Note that AERMOD at a minimum requires wind observations at a height above ground between seven times the local surface roughness height and 100 meters.

c. Wind directions observed by the National Weather Service are reported to the nearest 10 degrees. A specific set of randomly generated numbers has been developed for use with the preferred EPA models and should be used with NWS data to ensure a lack of bias in wind direction assignments within the models.

d. Data from universities, FAA, military stations, industry and pollution control agencies may be used if such data are equivalent in accuracy and detail to the NWS data, and they are judged to be adequately representative for the particular application.

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8.3.3 Site Specific Data

8.3.3.1 Discussion

a. Spatial or geographical representativeness is best achieved by collection of all of the needed model input data in close proximity to the actual site of the source(s). Site specific measured data are therefore preferred as model input, provided that appropriate instrumentation and quality assurance procedures are followed and that the data collected are adequately representative (free from inappropriate local or microscale influences) and compatible with the input requirements of the model to be used. It should be noted that, while site specific measurements are frequently made "on-property" (*i.e.*, on the source's premises), acquisition of adequately representative site specific data does not preclude collection of data from a location off property. Conversely, collection of meteorological data on a source's property does not of itself guarantee adequate representativeness. For help in determining representativeness of site specific measurements, technical guidance[92] is available. Site specific data should always be reviewed for representativeness and consistency by a qualified meteorologist.

8.3.3.2 Recommendations

a. EPA guidance[92] provides recommendations on the collection and use of site specific meteorological data. Recommendations on characteristics, siting, and exposure of meteorological instruments and on data recording, processing, completeness requirements, reporting, and archiving are also included. This publication should be used as a supplement to other limited guidance on these subjects.[83 93 94] Detailed information on quality assurance is also available.[95] As a minimum, site specific measurements of ambient air temperature, transport wind speed and direction, and the variables necessary to estimate atmospheric dispersion should be available in meteorological data sets to be used in modeling. Care should be taken to ensure that meteorological instruments are located to provide representative characterization of pollutant transport between sources and receptors of interest. The appropriate reviewing authority (paragraph 3.0(b)) is available to help determine the appropriateness of the measurement locations.

b. All site specific data should be reduced to hourly averages. Table 8–3 lists the wind related parameters and the averaging time requirements.

c. *Missing Data Substitution.* After valid data retrieval requirements have been met,[92] hours in the record having missing data should be treated according to an established data substitution protocol provided that data from an adequately representative alternative site are available. Such protocols are usually part of the approved monitoring program plan. Data substitution guidance is provided in Section 5.3 of reference 92. If no representative alternative data are available for substitution, the absent data should be coded as missing using missing data codes appropriate to the applicable meteorological pre-processor. Appropriate model options for treating missing data, if available in the model, should be employed.

d. *Solar Radiation Measurements.* Total solar radiation or net radiation should be measured with a reliable pyranometer or net radiometer, sited and operated in accordance with established site specific meteorological guidance.[92 95]

e. *Temperature Measurements.* Temperature measurements should be made at standard shelter height (2m) in accordance with established site specific meteorological guidance.[92]

f. *Temperature Difference Measurements.* Temperature difference (ΔT) measurements should be obtained using matched thermometers or a reliable thermocouple system to achieve adequate accuracy. Siting, probe placement, and operation of ΔT systems should be based on guidance found in Chapter 3 of reference 92, and such guidance should be followed when obtaining vertical temperature gradient data. AERMET employs the Bulk Richardson scheme which requires measurements of temperature difference. To ensure correct application and acceptance, AERMOD users should consult with the appropriate Reviewing Authority before using the Bulk Richardson scheme for their analysis.

g. *Winds Aloft.* For simulation of plume rise and dispersion of a plume emitted from a stack, characterization of the wind profile up through the layer in which the plume disperses is required. This is especially important in complex terrain and/or complex wind situations where wind measurements at heights up to hundreds of meters above stack base may be required in some circumstances. For tall stacks when site specific data are needed, these winds have been obtained traditionally using meteorological sensors mounted on tall towers. A feasible alternative to tall towers is the use of meteorological remote sensing instruments (e.g., acoustic sounders or radar wind profilers) to provide winds aloft, coupled with 10-meter towers to provide the near-surface winds. (For specific requirements for AERMOD and CTDMPLUS, *see* Appendix A.) Specifications for wind measuring instruments and systems are contained in reference 92.

h. *Turbulence.* There are several dispersion models that are capable of using direct measurements of turbulence (wind fluctuations) in the characterization of the vertical and lateral dispersion (e.g., CTDMPLUS, AERMOD, and CALPUFF). For specific requirements for CTDMPLUS, AERMOD, and

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Agency, Research Triangle Park, NC 27711; September 2004. (Available at *http://www.epa.gov/scram001/*)

Environmental Protection Agency, 2004. User's Guide for the AERMOD Meteorological Preprocessor (AERMET). Publication No. EPA–454/B–03–002. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711; November 2004. (Available at *http://www.epa.gov/scram001/*)

Environmental Protection Agency, 2004. User's Guide for the AERMOD Terrain Preprocessor (AERMAP). Publication No. EPA–454/B–03–003. U.S. Environmental Protection Agency, Research Triangle Park, NC 27711; October 2004. (Available at *http://www.epa.gov/scram001/*)

Schulman, L.L., D.G. Strimaitis and J.S. Scire, 2000. Development and evaluation of the PRIME plume rise and building downwash model. *Journal of the Air and Waste Management Association*, 50: 378–390.

Availability

The model codes and associated documentation are available on EPA's Internet SCRAM Web site (Section A.0).

Abstract

AERMOD is a steady-state plume dispersion model for assessment of pollutant concentrations from a variety of sources. AERMOD simulates transport and dispersion from multiple point, area, or volume sources based on an up-to-date characterization of the atmospheric boundary layer. Sources may be located in rural or urban areas, and receptors may be located in simple or complex terrain. AERMOD accounts for building wake effects (*i.e.*, plume downwash) based on the PRIME building downwash algorithms. The model employs hourly sequential preprocessed meteorological data to estimate concentrations for averaging times from one hour to one year (also multiple years). AERMOD is designed to operate in concert with two pre-processor codes: AERMET processes meteorological data for input to AERMOD, and AERMAP processes terrain elevation data and generates receptor information for input to AERMOD.

a. Recommendations for Regulatory Use

(1) AERMOD is appropriate for the following applications:

- Point, volume, and area sources;
- Surface, near-surface, and elevated releases;
- Rural or urban areas;
- Simple and complex terrain;
- Transport distances over which steady-state assumptions are appropriate, up to 50km;
- 1-hour to annual averaging times; and
- Continuous toxic air emissions.

(2) For regulatory applications of AERMOD, the regulatory default option should be set, i.e., the parameter DFAULT should be employed in the MODELOPT record in the COntrol Pathway. The DFAULT option requires the use of terrain elevation data, stack-tip downwash, sequential date checking, and does not permit the use of the model in the SCREEN mode. In the regulatory default mode, pollutant half life or decay options are not employed, except in the case of an urban source of sulfur dioxide where a four-hour half life is applied. Terrain elevation data from the U.S. Geological Survey 7.5-Minute Digital Elevation Model (*edcwww.cr.usgs.gov/doc/edchome/ndcdb/ndcdb.html*) or equivalent (approx. 30-meter resolution) should be used in all applications. In some cases, exceptions of the terrain data requirement may be made in consultation with the permit/SIP reviewing authority.

b. Input Requirements

(1) Source data: Required input includes source type, location, emission rate, stack height, stack inside diameter, stack gas exit velocity, stack gas temperature, area and volume source dimensions, and source elevation. Building dimensions and variable emission rates are optional.

(2) Meteorological data: The AERMET meteorological preprocessor requires input of surface characteristics, including surface roughness (zo), Bowen ratio, and albedo, as well as, hourly observations of wind speed between 7zo and 100m (reference wind speed measurement from which a vertical profile can be developed), wind direction, cloud cover, and temperature between zo and 100m (reference temperature measurement from which a vertical profile can be developed). Surface characteristics may be varied by wind sector and by season or month. A morning sounding (in National Weather Service format) from a representative upper air station, latitude, longitude, time zone, and wind speed threshold are also required in AERMET (instrument threshold is only required for site specific data). Additionally, measured profiles of wind, temperature, vertical and lateral turbulence may be required in certain applications (e.g., in complex terrain) to adequately represent the meteorology affecting plume transport and dispersion. Optionally, measurements of solar, or net radiation may be input to AERMET. Two files are produced by the AERMET meteorological preprocessor for input to the AERMOD dispersion model. The surface file contains observed and calculated surface variables, one record per hour. The profile file contains the observations made at each level of a meteorological tower (or remote sensor), or the one-level observations taken

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Offsets are emission reductions, generally obtained from existing sources in the vicinity of a proposed source that must offset the emissions increase from the new source or modification and provide a net air quality benefit. The obvious purpose for requiring offsetting emissions decreases is to allow an area to move toward attainment of the national ambient air quality standards while allowing some industrial growth.

Minor Construction Permits

Minor new source review is for pollutants from stationary sources that do not require prevention of significant deterioration or nonattainment new source review permits. The purpose of minor new source review permits is to prevent building sources that would interfere with attainment or maintenance of national ambient air quality standards or violate the control strategy in nonattainment areas. Minor new source review permits often contain permit conditions that will limit the source's emissions to avoid becoming subject to the prevention of significant deterioration or nonattainment new source review regulations. The permit conditions generally involve enforceable emission and/or operating limits that will ensure air quality protection. As a result, the permits usually contain recordkeeping, reporting, monitoring, and testing requirements to ensure compliance with the permit conditions.

A facility obtaining a minor new source review construction permit might, depending on the state's air permitting requirements, be required to conduct an air quality review using computer modeling to predict the effects that a facility might have on the ambient air. Whether or not a facility needs to model will depend on the rate of emissions increase, facility history, plant location, type of source, and emission point configurations (e.g. stack heights). A construction permit cannot be issued if the plant will cause or significantly contribute to predicted violations of any ambient air quality standard.

The public is given notice when a construction permit might be issued for all three types of construction permits (prevention of significant deterioration, nonattainment new source review, and minor new source review). Each state has different procedures for notification on minor new source review permits. Please check with the applicable state to verify the procedures.