TECHNICAL REVIEW DOCUMENT
FOR
OPERATING PERMIT 95OPWE083
to be issued to:

Western Sugar Company - Greeley Facility
Weld County
Facility ID 1230002

Prepared on March 27, 1997 Revised on January 28, 1998
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Revised March 30, 1998, April 30, 1998 and June 26, 1998
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I. Purpose

This document will establish the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Colorado Title V Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, during Public Comment, and for other interested parties. Information in this report is primarily from the application received on December 7, 1995, and additional information received on November 4, 1997. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

On April 16, 1998 the Colorado Air Quality Control Commission directed the Division to implement new procedures regarding the use of short term emission and production/throughput limits on Construction permits. These procedures are being directly implemented in all operating permits that had not started their Public Comment period as of April 16, 1998. All short term emission and production/throughput limits that appeared in the construction permits associated with this facility that are not required by a specific State or Federal standard or by the above referenced Division procedures have been deleted and all annual emission and production/throughput limits converted to a rolling 12 month total. Note that, if applicable, appropriate modeling to demonstrate compliance with the National Ambient Air Quality Standards was conducted as part of the Construction Permit processing procedures. If required by this permit, portable monitoring results and/or EPA reference test method results will be multiplied by 8760 hours for comparison to annual emission limits unless there is a specific condition in the permit restricting hours of operation.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised Construction Permit.

II. Source Description

This facility manufactures sugar and sugar by-products from sugar beets classified under the primary

Standard Industrial Classification of 2063. The facility operates approximately 5 months per year beginning, typically, in mid-September. During this time, the plant is in operation for 24 hour/day, seven days per week until all harvested beets have been processed. This period of operation, averaging 140 days, is called a "campaign". The exception to this is the sugar storage bins and associated dust collectors which operate year round as sugar is shipped. Preventive maintenance and overhaul activities are performed during the off-campaign months. The facility is located on the eastern side of the city of Greeley. U.S. Highway 85 is located one block west of the factory and the Cache La Poudre River is immediately north. Wyoming is an affected state within 50 miles of the plant location. Rocky Mountain National Park is a Federal Class I designated area within 100 kilometers of the plant location. The area in which the plant operates, City of Greeley - Weld County, is designated as a Not Classified Carbon Monoxide (CO) Non-attainment Area.

The source is considered to be an existing major stationary source (Potential To Emit (PTE) > 100 Tons Per Year (TPY)) for purposes of the Major New Source Review (NSR). Construction of the facility and most subsequent modifications occurred prior to NSR promulgation. Additionally, no major modifications as defined under Colorado Regulation Number 3, Part A have occurred which would trigger major NSR review. The installation of the natural gas fired boilers which replaced the existing coal fired boilers does not constitute a major modification (see below). Facility wide emissions are as follows:

Pollutant	Potential To Emit (TPY)	1997 Actual Emissions (TPY)
NOx	143.4	77.7
CO	809.3	71.1
SO_2	8.2	0.2
VOC	47.2	0.5
PM	127.2	9.5
PM_{10}	118.6	9.3
HAPs	Insignificant	Insignificant

Potential emissions are based upon existing Colorado Construction Permit limitations and the operation of unpermitted equipment at 8760 hours/year without any controls. Actual emissions are based upon the last Air Pollution Emission Notices (APENs) received by the Division. This facility is required to provide an updated APEN in the event that emissions of any of the above air pollutants increase 5 tons per year or more (actual emissions)above the level reported on the last APEN submitted to the APCD. Under the guidelines of EPA's Whitepaper for streamlining the operating permit process, actual emissions for the last data year were not required during the application process. Therefore, the Division assumes that emissions from this facility have remained the same or decreased since the last APEN submittal based upon the compliance certification in the operating permit application.

III. Emission Sources

The following sources are specifically regulated under the terms and conditions of the proposed Operating Permit (Permit) for this site:

1. Emission Unit S001 - B&W Model FM-120#97C, SN: FM-2895, natural gas fired steam boiler design heat input rated at 215.9 MMBTU/hr and equipped with low-NOx burner.

a. Emission Permits- A construction permit application was filed for the boiler on July 24, 1996. Initial Approval construction permit 96WE674 was issued on March 10, 1997. The permit was later modified and reissued on June 3, 1998, due to problems with the CO emission limit.

The modification increased the facilities CO PTE from 418.8 TPY to 809.3 TPY. However, Western Sugar was able to produce portable monitoring data which demonstrated that the replaced coal-fired boiler's CO PTE was higher than originally believed. This allowed Western Sugar to net out the CO "increase" from the new boiler. Non-attainment NSR review was therefore not triggered .

b. Applicable Requirements- The following terms and conditions of 96WE674 have been incorporated into the Proposed Operating Permit as applicable requirements: 20% opacity; long term (tons/yr) limitations for air emissions; long term limitations for fuel consumption; Continuous Emission Monitor (CEM) requirements; provisions of New Source Performance Standard (NSPS) Db-Standards of Performance for Industrial/Commercial/Institutional Steam Generating Units.

The due date of the first semi-annual monitoring report required by this operating permit will be more than 180 days after the initial approval construction permits were issued and/or the equipment commenced operation. Therefore, the Division considers that the Responsible Official certification submitted with that report will serve as the self-certification for construction permits 96WE674 and the appropriate provisions of the construction permits have been directly incorporated into this operating permit.

Boilers are subject to the particulate standard for fuel burning equipment as stated in Colorado Regulation No. 1, Section III.A.1.b. The regulation requires that units meet a lbs/MMBTU particulate matter (PM) emission limit (PE) based on the following equation:

$PE=0.5(FI)^{-0.26}$ where FI = Fuel Input in Million Btu per Hour.

Because the facility is using EPA emission factors along with actual fuel usage, by calculation the standard will never be exceeded when burning natural gas. For example, when boiler S001 operates at its full capacity of 215.9 MMBTU/hr, the PE limit is 0.124 lbs/MMBTU. By comparison, actual emissions from burning natural gas are calculated to be only 0.003 lbs/MMBTU.

Steam generating units installed, modified, or reconstructed after June 19, 1984 with a heat input capacity of greater than 100 million Btu/hr are subject to NSPS subpart Db. Specific applicable requirements from this subpart include: NOx emissions not to exceed 0.20 lbs/MMBTU; installation, calibration, monitoring, and maintenance requirement for a CEM; submission or excess emission reports. A quality control plan is required to be developed covering calibration, monitoring, and testing activities. Because the applicable standards apply at all times, the facility will also be required to utilize the highest recorded NOx values (lbs/hr and lbs/MMBTU) during periods when the CEM is down. The CEM will also be required to measure CO and ensure that PSD is not

triggered.

Boilers are also subject to the 30% opacity standard applicable during the building of a new fire, cleaning of fire boxes, soot blowing, start-up, any process modification, or adjustment or occasional cleaning of control equipment (Colorado Regulation No. 1, Section II, A.4.).

c. Emission Factors- Emissions from the boilers are produced from the combustion of natural gas. The pollutants of concern are Nitrogen Oxide (NOx), SO_2, Carbon Monoxide (CO), Volatile Organic Compounds (VOC), Particulate Matter, and a subset of PM, Particulate Matter under 10 microns (PM_{10}). Small quantities of Hazardous Air Pollutants (HAPs) are also emitted due to incomplete combustion. The main pollutants of concern from natural gas combustion are NOx and CO.

Western Sugar will be using emission factors derived from testing on the new boiler. SO2, VOC, PM and PM10 emissions factors were originally from AP-42. During the Construction Permit mod, the source requested that these be increased to allow a "buffer" . The factors were back calculated from requested annual fuel use and emission limits. These derived factors were then used to determined short term emissions. These emission factors are:

Pollutants	Emission Factor (lbs/MMscf)
NOx	CEM Data
VOC	9.4
CO	CEM Data
SO_2	7.8
PM	15.7
PM_{10}	15.7

d. Monitoring - Conditions 1.1 to 1.10 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for this boiler.

The source will be required to monitor fuel use, hours of operation, and steam load (NSPS Db) on a daily basis. A rolling twelve month total of fuel consumption will also be kept. Non-CEM emissions will be calculated on a monthly basis using fuel consumption and the given emission factors listed above. A 12 month rolling total will be kept to verify compliance with long term limitations. The source shall update the rolling twelve month total of fuel consumption only for months in which any amount of fuel is consumed.

NOx and CO emissions will be calculated using the CEM. Compliance with the lbs/MMBTU will be based on a 30-day rolling average. At least 2 data points are required for each calculation. A minimum of one cycle of operation (sampling, analyzing, and recording) shall be performed for each successive 15-minute period. Relative accuracy evaluations shall be performed in accordance with Section 5 of Appendix F to 40 CFR Part 60. The CEMS must be audited once per quarter while the boiler is in operation. A Relative Accuracy Test Audit (RATA) shall be performed during at least one quarter each campaign while the boiler is in operation. During the other quarters that the boiler

is in operation, a Cylinder Gas Audit (CGA), Relative Accuracy Audit (RAA) , or other alternative audit procedure as approved by the Division shall be performed. Cylinder gas is a gas with specific known properties used to calibrate and test the accuracy of the CEM.

Due to the low particulate emissions from natural gas combustion, compliance with the 20% and 30% opacity standards shall be monitored by the burning of natural gas.

e. Compliance Status - Two incidences of opacity violations were found in a historical review of this facility. The 20% opacity standard was exceeded on 10/17/75 and 11/2/79. A Notice of Violation (NOV) was then issued for the 10/17/75 exceedance. Both exceedances involved the recently removed coal fired boilers and no other opacity problems were noted.

The source was not able to comply with the CO limitation originally proposed for the new gas boiler under 96WE674. As mentioned above, however, documentation was provided which demonstrated that the coal fired boiler had a much higher CO PTE than originally believed. The source was able to increase their CO limitation by using offsets from the removed coal boiler and thus not trigger a major modification (or NSR).

Based upon recent compliance testing and opacity observations, this facility is considered to be in compliance with all applicable requirements.

2. Emission Unit S002- Stearns/Rogers, Model: Peabody Type MV24, Order # 46441-1963, direct natural gas fired rotary drum dryer with a design rating of 33 MMBTU/hr.

Emission Unit S003 - Three Beet Pulp Pelletmills and Coolers.

The source has stated that this facility will only produce pressed pulp in the future and that these two units will be removed by the source prior to the 1998-1999 beet campaign. Therefore, they will not be included in the Operating Permit.

3. Emission Unit S004 - Sugar Granulator consisting of Steam Heated Rotary Dryer and Ambient Air Cooled Rotary Cooler.

As part of the crystallization and separation process, partially wet spun sugar from the white centrifuges moves by conveyor to one of two sugar granulators to be dried and cooled. The rotary dryer is steam heated and the sugar moves countercurrent to inlet air and steam. The hot sugar then drops to the sugar cooler which is essentially identical to the granulator except that the inlet air is not heated. The exhaust from the dryer enters a large area duct where water is sprayed across the top from multiple sprays. The exhaust from the cooler enters a baghouse dust collector. Water and sugar dust are returned to the process while entrained dust is emitted by a stack to atmosphere.

a. Emission Permits- The original granulator was installed in 1902. The current granulator was installed in the 1950's. The process was modified in 1995 to improve the baffles of the control

equipment and does not meet the regulatory definition of "modification". The control device on the cooler was updated in 1997 to a baghouse dust collector, this also does not meet the definition of "modification". Because this unit was constructed prior to February 1, 1972, it is considered grandfathered from construction permitting requirements. No modification or reconstruction has taken place to trigger additional requirements although routine maintenance, such as replacement of fans, ductwork, drums, structural supports, etc., has occurred over time as necessary.

b. Applicable Requirements Discussion- Because the emission unit is grandfathered, there are no specific Particulate Matter (both TSP and PM10) emission limitations. However, emissions of these pollutants must be calculated for fee and inventory purposes.

As with S002 and S003, the emission unit is subject to the particulate standard for manufacturing processes. The allowable Particulate Emissions (PE) rate using the manufacturing equation from S002 is calculated using the given maximum design process weight rate of 29.17 ton/hr. The PE is then calculated to be 29.10 lbs/hr. The units are also subject to the 20% opacity limitation.

c. Emission Factors- Specific emission factors for these activities are not available from published sources. The emission factors used in the operating permit were based on Western Sugar's best engineering judgement and include removal efficiency by the control device. It is assumed that PM is equal to PM10. The emission factors are listed below.

Emission Factors (Controlled), Lbs/Ton Sugar Throughput

Pollutant	**Dryer**	**Cooler**
PM	0.08	0.008
PM_{10}	0.08	0.008

d. Monitoring - Conditions 4.1 to 4.3 of the Operating Permit list the Monitoring and Recordkeeping provisions necessary to verify compliance with applicable requirements for the granulator dryer and cooler. The throughput tonnage of sugar will be measured and recorded on a monthly basis along with each granulator's operating hours. The dust box and baghouse shall be maintained and operated in accordance with good operating procedures and the manufacturer's specifications to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept.

This source has not historically had visible emissions other than steam. Compliance with the opacity standard will therefore be demonstrated by a monthly visual check (not EPA Method 9) of emissions. Should opacity, other than steam, be observed, then manufacturing process and control equipment will be checked for proper operation and corrected/adjusted if necessary. An additional visible check will be conducted after examining the process and control equipment. If visible emissions still persist, the source will be required to perform an EPA Method 9 observation. Should an EPA Method 9 observation result (6 minute average) show opacity above 10%, the source will be required to perform monthly EPA Method 9 observations for the next four (4) months. The source will continue these observations into the next campaign should the plant cease operating prior to the completion of this requirement. If no further instances of opacity above 10% are observed, then the

source may continue with the original monitoring scheme requiring monthly visual checks. As mentioned above, the control equipment must be operating during the manufacturing process.

e. Compliance - No compliance problems have been noted for this activity. The activity is currently considered in compliance with all applicable requirements.

5. Emission Unit S005 - Conveyor Transfer Points and Silo Filling.

Finished sugar is transferred to silos. The process is entirely indoors. An interior air handling system collects air-borne sugar and by way of a Wheelabrator 126-D, Sock Type Dust Collector allows the facility to recoup sugar which otherwise might go to atmosphere or be disposed of as waste.

The facility will be upgrading the control equipment for this emission point sometime in the near future. This will involve installing baghouses for dust collection from the bin vents. This modification will reduce potential emissions while meeting the most current National Fire Protection Association codes for the prevention of dust fires and explosions.

a. Emission Permits- The collection device was installed and began operation in 1966 with no further modifications or reconstructions. Because this unit was constructed prior to February 1, 1972, it is considered grandfathered from construction permitting requirements.

b. Applicable Requirements- The emissions associated with this activity are subject to the particulate standard for manufacturing processes. Because the process weight rate for sugar transferred is greater than 30 tons per hour, Regulation No. 1, Section III.C.1.b. applies where the following equation is used:

$$PE = 17.31(P)^{0.16}$$

Again, P is the process weight rate in tons per hour. For this activity, using the given maximum design process weight rate of 60 ton/hr the PE is then calculated to be 33.3 lbs/hr. The activities are also subject to the 20% opacity standard.

c. Emission Factors- Emission factors for transfer/conveying are based upon an equation from EPA Document AP-42, Compilation of Air Pollutant Emission Factors, 13.2.4.3 - Predictive Emission Factor Equations, 1/95.

$$EF = \frac{k\,(0.0032)\,(U/5)^{1.3}}{(M/2)^{1.4}}$$

Where k = Particle size multiplier (dimensionless)
U = Mean wind speed (miles per hour)
M = Material moisture content (%)

For these activities, k = 0.74 for PM and 0.35 for PM_{10}; U = 0.1 mph; M = 0.024%. Using these values, emission factors were calculated to be:

Pollutant	Emission Factor Lbs/Ton Sugar throughput
PM	0.00716
PM_{10}	0.00329

In calculating emissions, a minimum control efficiency of 50% is given to the dust sock based upon best engineering judgement. This control efficiency will probably increase once the upgraded dust collection equipment is installed and will be dependent on the actual equipment installed.

d. Monitoring -Conditions 5.1 to 5.3 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for the original "Wheelabrator" setup while 5.4 to 5.7 cover the upgraded control equipment.

The source will be required to track hours of operation on a monthly basis for use in calculating emissions for compliance, fee, and inventory purposes. The control device shall be maintained and operated in accordance with good operating procedures to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept. As with source S004, this emission unit has a history of no visible emissions. Compliance with the opacity requirement will be identical to that described for S004. It should be noted that Western Sugar is concerned about the feasibility of performing a Method 9 observation for this emission source. The exhaust point is between silos, the silos are white, the exhaust (sugar) is white, and the sun angle is poor. Despite this difficulty and comment, the opacity requirements were kept in the permit.

e. Compliance - No compliance problems have been noted for these activities. The activities are currently considered in compliance with all applicable requirements.

6. Emission Unit S006 - Slaking/Hydration of Calcium Oxide from Lime Kiln

Burned lime from the lime kiln goes to the lime slaker (as Calcium Oxide) where it is mixed with sweetwater (filtrate and wash water from the purification and filtration processes) and produces milk of lime. The milk of lime is used to precipitate or flock out non-sugars by gradually elevating the pH. Steam and dust from the lime slaker is sent to the slaker vent which is controlled by an in-house designed cyclone separator with water spray.

a. Emission Permits- The unit was installed and began operation in 1902 with the cyclone separator added in 1995. The addition of the cyclone does not meet the regulatory definition of a modification since emissions decreased. Because this unit was constructed prior to February 1, 1972, it is considered grandfathered from construction permitting requirements.

b. Applicable Requirements- As with S002, the emission unit is subject to the particulate standard for manufacturing processes, $PE = 3.59 (P)^{0.62}$. Using the maximum design rate, P, of 4.17 ton/hr results in a PE limitation of 8.7 lbs/hr. The slaker vent is also subject to the 20% opacity limitation.

c. Emission Factors - Specific emission factors for this activity are not available from published

sources. The emission factors used in the operating permit were based on emission stack testing at Western Sugar's Scottsbluff, Nebraska facility. PM_{10} emissions were tested and are assumed to be equal to PM. The uncontrolled emission factors are listed below.

Pollutant	Emission Factor Lbs/hr
PM	0.57
PM_{10}	0.57

The Scottsbluff emissions factors are on an uncontrolled basis. In calculating actual emissions for the Greeley facility, a minimum control efficiency of 50% may be allowed for the cyclone separator, based upon best engineering judgement. Even with the control efficiency included, emissions calculations are extremely conservative.

A decision was made by the Division on March 5, 1998 to convert the above emission factors to a lb/Ton of Calcium Oxide consumed using the maximum process rate of 4.17 ton/hr. With the emission factors in lb/hr and the emission limit in lb/hr, the source could never be out of compliance by calculation. Western Sugar will need to record the quantity of Calcium Oxide used if this is not already a value that is recorded. This change will not alter the calculated emissions for this point.

Emission Factor March 5, 1998

Pollutant	Emission Factor Lb/Ton Calcium Oxide
PM	0.068
PM_{10}	0.068

d. Monitoring -Conditions 6.1 to 6.3 of the Operating Permit list the Monitoring and Recording provisions necessary to verify compliance with applicable requirements for this activity.

The source will be required to track operating hours on an monthly basis for use in calculating emissions for fee and inventory purposes. Western Sugar shall be exercise good maintenance and operating practices to minimize emissions and ensure compliance with the particulate and opacity standards. Records of maintenance will be kept. As with source S004, this emission unit has a history of no visible emissions. Compliance with the opacity requirement will be identical to that described for S004.

e. Compliance - No compliance problems have been noted for this emission unit. This source is currently considered in compliance with all applicable requirements.

7. Emission Unit S007 - Fugitive Dust Emissions from Truck Traffic and Exposed Grounds

a. Emission Permits- The activities noted have been in operation prior to February 1, 1972 and are considered grandfathered from construction permitting requirements.

b. Applicable Requirements - During the campaign, traffic is approximately 330 trucks per week.

The majority of these trucks unload beets to a beet pile. Later they are put into another truck where they are dumped into a wet hopper. The facility also ships finished product (pulp, pellets and sugar) and has general miscellaneous traffic. Exposed areas such as the general plant grounds, mud ponds, and lime ponds are also sources of fugitive emissions.

Control measures and operating procedures shall be employed as necessary to minimize fugitive particulate emissions into the atmosphere (Colorado Regulation No. 1, Section III, Part D). This source is not currently required to submit a fugitive dust control plan. However, a control plan may be required should the Division determine that visible emissions are in excess of 20% opacity; or visible emissions are being transported off the property; of if the activities are operating to create a nuisance.

c. Emission Factors - Specific emission factors for these activities are available from AP-42, Section 11.2. Fugitive emissions from this facility are not used in determining PSD applicability. Additionally, Colorado does not charge annual emission fees for fugitive particulate emissions. Therefore, the source is not required to calculate fugitive emissions for purposes of this permit.

d. Monitoring - Control measures and operating procedures shall be employed as necessary to minimize fugitive particulate emissions into the atmosphere. These may include, but are not limited to, watering or chemical stabilization of unpaved roads; restricting the speed of vehicles; revegetation or reclamation; or the minimization of disturbed land.

e. Compliance - No compliance problems have been noted for these activities. The activities are currently considered in compliance with all applicable requirements.

IV. Insignificant Activities

A list of insignificant activities was provided with the application. These items were placed in an appendix in the proposed permit so that they would be of use during inspections. Of specific interest:

In-house laboratory equipment for quality control; Individual pieces of fuel burning equipment with a design rate of <5 MMBTU/hr; Chemical storage tanks or totes with a capacity of less than 500 gallons and daily throughput of less than 25 gallons; Lawnmower and snowblower; Chemical storage of process chemicals in closed totes with less than 5000 gallons total; Storage tanks and totes of lubricating oils with much less than 40,000 gallons; Underground storage tanks of diesel fuel, primarily used during beet trucking, with less than 300,000 gallon annual throughput; Individual small space heaters.

V. Alternative Operating Scenarios

The existing control device for S005 will be upgraded sometime during the issuance of this permit. The source will therefore operated under one set of conditions (5.1 - 5.3) before the change and another set of conditions (5.4 - 5.7) after the modification.

VI. Permit Shield

The following items were identified by the applicant as specifically non-applicable to their facility:

Colorado Regulation No. 6, Part B, III., Standards of Performance for New Stationary Sources, Standards of Performance for New Manufacturing Processes.

Units S002 - S006 are exempt from this regulation as they are manufacturing processes not constructed, reconstructed, or modified after the January 30, 1979 applicability date.

The facility requested that Colorado Regulation No. 1, Section III.D.1.d & d, be listed as a permit shield item. This citation covers the requirement of a facility to submit a fugitive dust control plan. While Western Sugar is not currently required to submit a control plan, the Division could require a plan as noted under S007.

VII. Accidental Release - 112(r)

A provision under Part 70 of the Clean Air Act (amended) is the Accidental Release provisions of section 112(r). Under this program, EPA established a list of substances which pose the greatest risk of death or serious injury to humans or extreme harm to the environment. Additionally, a list of flammable substances and high explosives were set forth. Each substance was given a threshold or deminimis level by considering their individual toxicity, reactivity, volatility, flammability, explosiveness, and dispersiveness. Facilities using any of these substances in greater-than-threshold quantities are required to prepare and implement a Risk Management/Prevention Plan for those substances.

This source has indicated that in its not subject to the provisions of 112(r).