



**Air Quality Permitting
Technical Memorandum**

Permit to Construct No. 083-00085

**CITY OF TWIN FALLS
TWIN FALLS, IDAHO**

Prepared By:

**Kent Berry
Environmental Quality Management, Inc.**

Project No. P-000417

Date Prepared:

March 25, 2002

Permit Status:

FINAL

ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURE

acfd	actual cubic feet per day
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CO	carbon monoxide
DEQ	Department of Environmental Quality
HAPS	hazardous air pollutants
hr	hour
H ₂ S	hydrogen sulfide
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pound per hour
MACT	Maximum Available Control Technology
MMBtu/hr	million British thermal units per hour
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards For Hazardous Air Pollutants
NO _x	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM ₁₀	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
SIC	Standard Industrial Classification
SIP	State Implementation Plan
SO ₂	sulfur dioxide
TAPs	toxic air pollutants
THC	total hydrocarbons
T/yr	tons per year
µm/m ³	micrometers per cubic meter
VOC	volatile organic compound

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, *Rules for the Control of Air Pollution in Idaho* for issuing permits to construct (PTC).

PROJECT DESCRIPTION

The City of Twin Falls is requesting a PTC for a flare (installed in 1991 without a PTC) to combust the off-gases from anaerobic digesters at the Lamb-Weston Wastewater Pretreatment Plant. The off-gases consist primarily of methane, carbon dioxide, and water vapor, with small amounts of H₂S. The waste gas is directed to a flare for destruction of the methane and conversion of H₂S to SO₂.

SUMMARY OF EVENTS

December 12, 2000,	DEQ received a PTC application for the flare, along with a PTC exemption request for a bio-oxidation tank and biofilter bed at the Lamb-Weston Pretreatment Plant. An exemption letter for the latter equipment was issued on January 31, 2002.
November 29, 2001	DEQ determined that the PTC application for the flare was incomplete.
March 7, 2002	DEQ received supplemental information dated March 1, 2002.

DISCUSSION

1. Process Description

Wastewater is received through a 12-inch wastewater line that brings in water from the nearby Lamb-Weston potato processing facility. This is a dedicated line, so no other wastewater sources discharge water to this line. Following addition of chemicals, the wastewater goes to the anaerobic digesters (two).

The anaerobic digesters have an average residence time of five hours. The average quantity of waste gas produced in the digesters was 204,548 acfd, on a dry basis, based on the data collected from September 1999 to October 2000. The maximum flow rate recorded during this period was 395,610 acfd.

The waste gas consists primarily of methane, ranging from 80-89%, with an average content of 87% on a dry volume basis. The average H₂S concentration in the waste gas produced in the digesters was determined to be 0.536%. The maximum concentration measured during the latest 14-month operating period was 1.250%.

The waste gas is transferred to an elevated flare located on the northeastern side of the plant, adjacent to the sludge storage tank. The top of the flare is approximately 25 feet above grade. A pilot light on the flare is fired on propane, with an autoignition system that will relight the flare if a flame is not detected. The flare is designed to burn up to 13,500 standard cubic feet per hour of waste gas.

2. Equipment Listing

The flare is a Groth Corp. Model No. 8391; rated at 13 MMBtu/hr.

3. Emissions Estimates

The applicant calculated emissions for four scenarios: maximum gas flow, maximum H₂S concentration, maximum water flow, and average day. The emissions are summarized in the following table:

	SO ₂		THC		CO		NO _x	
	lb/hr ^a	T/yr ^b	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
Average Day	7.34	32.1	0.89	3.90	2.36	10.3	0.43	1.90
Maximum	18.5	81.2	1.65	7.20	4.3	19.1	0.80	3.50

^a pounds per hour
^b ton per year

4. Modeling

In their initial application, the applicant submitted SCREEN3 modeling results for SO₂, CO, NO_x, and H₂S (in case of a flame-out of the flare). The modeling accounted for downwash caused by nearby structures and assumed flat terrain, while mentioning severe elevation changes in nearby Rock Creek Canyon. It was assumed in the incompleteness letter requesting additional modeling that the nearby terrain was higher than the facility; however, the applicant has clarified that Rock Creek Canyon is approximately 40 feet below the facility.

The revised SCREEN3 modeling demonstrated that for the worst-case emissions/downwash scenario, only SO₂ exceeded the significant contribution concentrations at IDAPA 58.01.01.006.93. The worst-case scenario for SO₂ (maximum sulfur concentration and downwash from the bio-oxidation tank) plus background yielded the following: 3-hour max. - 350 µg/m³; 24-hour max. - 155 µg/m³; annual average - 31.1 µg/m³. Thus, the facility will not interfere with attainment or maintenance of any NAAQS.

For H₂S, the worst-case downwash condition produced the following maximum 24-hour concentrations: maximum emissions scenario - 2,098 µg/m³; average emissions scenario - 1,358 µg/m³. Since the acceptable ambient concentrations for H₂S is 700 µg/m³, a flare malfunction/ flame-out could have significant health consequences for a person located at the point of maximum concentration.

5. Facility Classification

The plant is not a major facility as defined in IDAPA 58.01.01.006.55 or 008.10. It is not a designated facility as defined in IDAPA 58.01.01.006.27. The Standard Industrial Classification code is 4952, Sewerage Systems. The AIRS facility classification is "B" because the actual and potential to emit is less than 100 T/yr. The project is not subject to PSD requirements since the potential to emit of the appropriate regulated pollutants does not exceed the corresponding 250 T/yr PSD major source threshold.

6. Area Classification

The City of Twin Falls pretreatment plant is located in Twin Falls County, in AQCR 63. This area is designated attainment or unclassified for all state and federal air quality standards.

7. Regulatory Review

IDAPA 58.01.01.201

Permit to Construct Required

The flare emits significant amounts of SO₂ and potentially H₂S. Thus, a PTC is required.

IDAPA 58.01.01.210

Demonstration of Preconstruction Compliance with Toxic Standards

Since H₂S is almost completely converted to SO₂ under normal operating conditions, compliance with the emissions screening levels or the acceptable ambient concentrations for TAPs in IDAPA 58.01.01.585 and 586 is only an issue under flare malfunction/flame-out situations. This warrants additional permit conditions to deal with such situations, as discussed below.

IDAPA 58.01.01.577

Ambient Air Quality Standards for Specific Air Pollutants

Compliance with the NAAQS was demonstrated as discussed in Sections 3 and 4 above.

IDAPA 58.01.01.775-776

Odors

Specific conditions for compliance were included in the permit (see Section 8).

40 CFR 52

Prevention of Significant Deterioration (PSD)

The facility is not a major PSD source and the changes are not by themselves major.

40 CFR 60

New Source Performance Standards (NSPS)

Not applicable.

40 CFR 61 & 63

National Emission Standards for Hazardous Air Pollutants (NESHAP)
& Maximum Available Control Technology (MACT)

Not applicable.

8. Permit Requirements

8.1 Emissions Limits

Annual emissions limits for SO₂ and CO have been set and compliance is determined monthly for the previous 12-month period based on monitoring of biogas flow and H₂S concentration. No emissions limit for H₂S has been set, since emissions are negligible under normal operation.

The flare is subject to the 20% opacity limit under IDAPA 58.01.01.625. No monitoring or recordkeeping requirement specific to this rule was required in the permit due to very low probability of a violation (most of the gases are methane).

Since the gases contain H₂S, which has a very low odor threshold, the permit contains specific provisions related to compliance with IDAPA 58.01.01.775-776, *Rules for Control of Odors* (see below).

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IDAPA 58.01.01.577 Ambient Air Quality Standards for Specific Air Pollutants

Compliance with the NAAQS was demonstrated as discussed in Sections 3 and 4 above.

IDAPA 58.01.01.775-776 Odors

Specific conditions for compliance were included in the permit (see Section 8).

40 CFR 52 Prevention of Significant Deterioration (PSD)

The facility is not a major PSD source and the changes are not by themselves major.

40 CFR 60 New Source Performance Standards (NSPS)

Not applicable.

40 CFR 61 & 63 National Emission Standards for Hazardous Air Pollutants & MACT

Not applicable.

8. Permit Requirements

8.1 Emission Limits

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Since the gases contain H₂S, which has a very low odor threshold, the permit contains specific provisions related to compliance with IDAPA 58.01.01.775-776, Rules for Control of Odors (see below).

8.2 Operating Requirements

Because of the high likelihood of odor complaints and possible H₂S health effects in the case of a flame-out of the flare, the permit requires the installation of an alarm system to notify the operating personnel of such an occurrence. Records of the time and duration of all flame-out periods must be kept. *maintained.*

Italics
a pilot flare and flare

The permittee shall maintain records of all odor complaints received. If the complaint has merit, the permittee shall take appropriate corrective action as expeditiously as practicable. The records shall, at a minimum, include the date that each complaint was received and a description of the following: the complaint, the permittee's assessment of the validity of the complaint, any corrective action taken, and the date the corrective action was taken.

8.3 Reporting Requirements

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The permittee shall notify the Twin Falls Regional Office within 1 hour of any flare flame out. The permittee shall also submit semi-annual reports to the Department by January 15 and July 15 of each year summarizing the occurrences of flare flame outs and odor complaints and corrective actions taken during the period.

9. Permit Coordination

There are no other current air permits for this facility. Lamb-Weston is considering using the digester off gases in their boilers; if so, they will need to apply for a PTC. The flare permit would remain in effect because there may be periods when the boilers are down and the gases must be flared.

8.2 Operating Requirements

Because of the high likelihood of odor complaints and possible H₂S health effects in the case of a flare flame-out, the permit requires the installation of a pilot flare and an alarm system to notify the operating personnel of such an occurrence. Records of the time and duration of all flame-out periods must be maintained.

The permittee shall maintain records of all odor complaints received. If the complaint has merit, the permittee shall take appropriate corrective action as expeditiously as practicable. The records shall, at a minimum, include the date each complaint was received and a description of the following: the complaint, the permittee's assessment of the validity of the complaint, any corrective action taken, and the date the corrective action was taken.

8.3 Reporting Requirements

The permittee shall notify the Twin Falls Regional Office within one hour of any flare flame-out. The permittee shall also submit semiannual reports to the DEQ by January 15 and July 15 of each year summarizing the occurrences of flare flame-outs, odor complaints, and corrective actions taken during the period.

9. Permit Coordination

There are no other current air permits for this source, the plant is not a Tier I source, and no Tier I operating permit is required.

10. AIRS Information

AIRS/AFS^a FACILITY-WIDE CLASSIFICATION^b DATA ENTRY FORM

AIR PROGRAM	SIP ^c	PSD ^d	NSPS ^e (Part 60)	NESHAP ^f (Part 61)	MACT ^g (Part 63)	TITLE V	AREA CLASSIFICATION A - Attainment U - Unclassifiable N - Nonattainment
POLLUTANT							
SO ₂ ^h	B						U
NO _x ⁱ	B						U
CO ^j	B						U
PM ₁₀ ^k	B						U
PT (Particulate) ^l	B						U
VOC ^m	B						U
THAP (Total HAPs) ⁿ							
			APPLICABLE SUBPART				

^a Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

^b AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

^c State Implementation Plan

^d Prevention of Significant Deterioration

^e New Source Performance Standards

^f National Emission Standards for Hazardous Air Pollutants

^g Maximum Achievable Control Technology

^h sulfur dioxide

ⁱ nitrogen oxides

^j carbon monoxide

^k particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

^l particulate matter

^m Volatile Organic Compounds

ⁿ Hazardous Air Pollutants

FEES

The Twin Falls wastewater pretreatment plant is not a major facility as defined in IDAPA 58.01.01.008.10. Therefore, registration fees are not applicable in accordance with IDAPA 58.01.01.527.

RECOMMENDATION

Based on review of application materials and all applicable state and federal rules and regulations, staff recommends the City of Twin Falls be issued PTC No. 083-00085. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

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cc: Steve VanZandt, Twin Falls Regional Office
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