Division's Air Quality Exhibit 4

0011

Outgoing
C0250005
#3371
ok

From: Priscilla Burton
To: Black, Jon; OGMCOAL
CC: Dean, Dana; Haddock, Daron
Date: 10/13/2009 11:33 AM
Subject: Coal Hollow Mine C/0025/0005 Outgoing
Place: OGMCOAL
Attachments: fugitive dust plan_20091013104332.pdf

Hello Jon,

A fugitive dust control plan was required as part of the coal mining application on file with the Division of Oil Gas and Mining in accordance with Utah Coal Mining Rule R645-301-423 which states:

"For all SURFACE COAL MINING AND RECLAMATION ACTIVITIES with projected production rates exceeding 1,000,000 tons of coal per year, the application will contain an air pollution control plan which includes the following:
423.100 An air quality monitoring program to provide sufficient data to evaluate the effectiveness of the fugitive dust control practices proposed under R645-301-423.200 to comply with federal and Utah air quality standards; and
423.200 A plan for fugitive dust control practices as required under R645-301-244.100 and R645-301-244.300."

R645-301-244.100 reads, "All exposed surface areas will be protected and stabilized to effectively control erosion and air pollution attendant to erosion."

R645-301-244.300 pertains to repair of rills and gullies that prevent plant establishment and contribute to water erosion.

Attached is the fugitive dust control plan that was included in the Coal Hollow Mine application. Dave Strohm, JBR, was the consultant who put together this plan. As we discussed by phone, Method 9 is being proposed for monitoring of the fugitive dust control plan. Div. Oil Gas & Mining does not have the expertise to evaluate the use of method 9. Your comment that EPA Method 9 is occasionally used for fugitive dust control monitoring of sand and gravel operations has been helpful. I am hopeful that DOGM will coordinate the permitting and compliance of this control plan with DAQ in the future.

As we discussed the Coal Hollow Mine may expand into adjacent federal leases in the future. Dave Prey, UDAQ provided comment on the Air Resources analysis for the Draft BLM EIS for the adjacent federal leases. Andrea Stacey, Dave Sharrow, John Notar provided comment for the National Park Service. Ken Distler represented the EPA. Scott Archer represented BLM, Denver. Keith Rigtrup, BLM Cedar city (435-865-3063) is the lead for the BLM and he could let you know the status of the air analysis document and put you in contact with the commenters listed above.

Please call or email me if you have any questions on the coal hollow mining plan application.

Priscilla Burton, CPSSc
Division Oil Gas & Mining
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Price UT 84501
(435) 613-3733

ALTON COAL DEVELOPMENT, LLC

463 NORTH 100 WEST, SUITE 1
(435) 867-5331

Fugitive Dust Control Plan

For

Coal Hollow Project

Located In:

T39S, R5W, Sections 19, 20, 29 and 30, southeast of Alton in Kane County, UT

for questions regarding this plan contact

Chris McCourt

at

(435) 867-5331

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Attachment 2 Fugitive Dust Management, Acknowledgement and Certification

I. Introduction

Alton Coal Development, LLC (Alton) intends to excavate and process coal from its Coal Hollow Mine Site, located south-southeast of Alton, UT. A Notice of Intent has been filed with the Utah Department of Environmental Quality, Division of Air Quality (UDAQ). Typical operations will include excavation, hauling, sizing and stockpiling the coal. The intent of this Fugitive Dust Control Plan (FDCP) is to outline Alton's plan to control fugitive dust during coal mining operations.

II. Regulatory Applicability

Utah Administrative Code R645-301-423 requires that all surface coal mining and reclamation activities with projected production rates exceeding 1,000,000 tons of coal per year must provide an air pollution control plan. The Coal Hollow Mine projects a production rate of 2,000,000 tons of coal a year, therefore this code is applicable to the operation. Although the Coal Hollow Mine is not subject to the requirements of UAC R307-309, ***Non-attainment and Maintenance Areas for PM10: Fugitive Emissions and Fugitive Dust***, as it is not in a non-attainment area or maintenance area, the mine is subject to R307-205, ***Emission Standards: Fugitive Emissions and Fugitive Dust.*** The purpose of R307-205 is to establish minimum work practices and emission standards for sources of fugitive emissions and fugitive dust located in all areas of the state, except those listed in the state implementation plan or non-attainment areas (UAC R307-205-1). While R307-205 does not require the implementation of a FDCP, Alton has prepared this FDCP to ensure the requirements of R645-301-423, R645-301-244, R645-301-526.220 and R307-205 are met.

The UAC R307-309-2 defines material as "sand, gravel, soil, minerals, other matter that may create fugitive dust." For this FDCP, material is used and defined in the same way. The following activities of concern to the UDAQ and UDOGM, will take place:

YES	NO	ACTIVITY
✓	☐	Storage, hauling or handling operations of material
✓	☐	Clearing, ~~or~~ leveling and reclamation of land one-quarter acre or greater in size
✓	☐	Earthmoving, excavation, or movement of trucks or construction equipment over cleared land one-quarter acre size or greater
✓	☐	Haul road access and activity
☐	✓	Engaging in demolition activities including razing homes, buildings or other structures

Alton recognizes that in some cases, an approval order or temporary relocation permit will be required for the project, especially in cases of equipment use such as crushers or screens. This document in no way releases Alton from the requirements of air quality permits.

III. Source Information

The section supplies the site specific information regarding the project. Although not required by the UAC, the Utah Division of Air Quality (UDAQ) suggests the FDCP contain the following source specific information. Therefore, the information provided in this section is not to be used for determining compliance with any applicable permits, rather to give an overall understanding of the project for fugitive dust applications only.

SOURCE INFORMATION	
Name of Operation:	**Alton Coal Development, LLC – Coal Hollow Mine**
Address or Approximate Location:	**T39S, R95W, Sections 19, 20, 29 and 30, South-southeast of Alton in Kane County, UT**
Approximate Length of Project:	**5 years**
Description of Process or Activity:	**Preparing site for mining operations including installation of buildings, haul roads and sizing/stockpiling equipment. Conducting coal mining operations including clearing topsoil, overburden removal, excavation of coal, and sizing, sorting and stockpiling coal.**
Type of Material Processed or Disturbed:	**Topsoil and vegetation temporarily removed (will be replaced and re-vegetated).** **Vegetation, topsoil, overburden, coal**
Amount of Material Processed or Disturbed:	**Approximately 240 acres of land will be cleared of topsoil and overburden to allow for excavation of coal. Approximately 193 acres will be cleared of topsoil to allow placement of support buildings and sizing and stockpiling operations, as well as construction of haul roads, sediment ponds, spoil placement and subsoil/topsoil stockpiles**

In all cases, the responsible parties for fugitive dust control are the owner and/or operator.

Attachment 1 identifies the owner and operators of this project, and the contact information of the individuals responsible for implementation and maintenance of the FDCP.

In addition, all subcontractors who may be active on the project have will be required to enter into an agreement of shared responsibility regarding fugitive dust control. Attachment 2 provides the form which would identify subcontractors and the duration of subcontractor activity on the project. Also included in Attachment 2 is a signed acknowledgement that would be provided for each subcontracting company. Included in that acknowledgement is: awareness of the FDCP, intent to comply with the FDCP, obligation of reporting to the owner and/or operator any problems with fugitive dust control, and shared responsibility of any fines incurred from subcontractor negligence regarding fugitive dust control.

IV. Fugitive Dust Emission Activities

The section fulfills the requirements set for the UAC R307-309-6(1)(a)-(k), by further addressing the specific project activities generating fugitive dust.

ACTIVITY	YES	NO	ACTIVITY DETAILS
MATERIAL STORAGE	✓	☐	*List the type of material, how many storage piles and area used for storage piles.* **Initially, topsoil will be removed from the facility area and stockpiled. Also topsoil and subsoil from the initial coal pits will be salvaged and stored in the east of the mining area. As mining progresses, topsoil and overburden from one pit will be direct hauled to reclamation areas, when practical. Any topsoil piles that exist for at least 1 year will be stabilized by sloping to a 3:1, reseeding and mulching. Piles that exist for less than 1 year will be coated with a tackifier at the manufacturer's suggested rate for dust control applications.** **There is one coal stockpile planned that is expected to contain approximately 50,000 ton.**
MATERIAL HANDLING, TRANSFER, HAULING LOADING, OR DUMPING	✓	☐	*List the type of material that will be handled, transferred, loaded, hauled and/or dumped and the equipment that will be used for these activities.* **Topsoil will be handled with loaders, dozers, trucks and/or graders.** **Overburden will be handled with loaders, excavators and trucks.** **Coal will be handled with loaders, excavators, trucks, conveyors, screens, and crushers.**
HAUL ROADS, ROADWAYS, OR YARD AREAS	✓	☐	*List vehicles, equipment, and frequency of driving on the haul roads, roadways, or yard areas. List approximate lengths of road or areas these items will take up.* **There will be two sets of roads at the site, coal haul roads and overburden haul roads. The majority of the coal haul roads will be mostly long term and centrally located at the site. The maximum length will be approximately 7900'. 80 to 100 ton haul trucks will be the primary vehicles on these roads.**

			Overburden haul roads will be located near the pits and location and length will be constantly changing as mining progresses. 150 to 250 ton haul trucks will be the primary vehicles on the overburden haul roads. **All haul roads will have marked speed limit of 25 mph and either watering or chemical suppressant dust control.**
CLEARING, LEVELING, AND UNVEGETATED RECLAMATION AREAS	✓	☐	*List the acreage of land being cleared or leveled.* **Approximately 433 acres will be cleared for mining and sizing/stockpiling activities. This area will be reclaimed contemperaneously with mining operations inorder to restore the lands post mining land use in an efficient and timely manner.**
EARTH MOVING, EXCAVATION	✓	☐	*List the areas of earthmoving, excavation or trenching.* **The coal pit areas, storage piles, roads, ditches and sediment pond locations.**
CONSTRUCTION, DEMOLITION	✓	☐	*List the structures that will be demolished or constructed and the areas associated with those activities.* **Several temporary buildings will be constructed in the processing area, in the northern portion of the site. These buildings include the South Control Room, Wash Bay, Shop, Oil Storage, and Office.**
DRILLING, BLASTING, PUSHING OPERATIONS	✓	☐	*List frequency of drilling blasting and pushing operations, (hours per day, days per week, weeks per year).* **Operations will occur up to 24 hr/day, 6 days per week, 52 weeks per year**
MATERIAL PROCESSING**	✓	☐	*Will any material be made or altered during the project? For example, crushing, screening, concrete production? Explain any material processing activities that will take place.* **The sizing and sorting operation involves crushing/breaking, screening, conveying, and stockpiling. Material is extracted at the mine using**

			hydraulic excavators and delivered to the processing plant by haul trucks. The material is sized by a feeder breaker which is a round shaft with bits attached that spin across the coal to break the coal. One conveyor transfers the broken up coal to the roll crusher and from the roll crusher to the stacker belt and into the stockpile.
OTHER	✓	☐	Reclamation areas that have topsoil applied during a season not suitable for seeding will have tackifier applied for dust control measures. During the appropriate season for seeding, all newly reclaimed areas will then be seeded and mulched.

*Material processing may require an approval order or other air permit. If applicable, the appropriate permits are in Attachment 3.

V. Fugitive Dust Controls

There are various aspects of fugitive dust control that must be addressed

- Road Activity – Fugitive Dust Control
- Activity Specific On-Site Fugitive Dust Control
- Off-Site Fugitive Dust Control

i. Road Activity – Fugitive Dust Control

The following are requirements, specific to road use that must be implemented during all projects, as indicated by the UAC. The UAC specifically identify activities that require prompt mitigation for control of fugitive dust. Due to the nature of Alton's business, these activities will always apply to a project; therefore, these techniques will be implemented for duration the project.

UAC R307-309-7. Storage, Hauling, and Handling of Coal and Overburden.
Any person owing, operating or maintaining a new or existing material storage, handling, or hauling operation shall prevent, to the maximum extent possible, material from being deposited onto any paved road other than a designated deposit site. Any such person who deposits materials that may create fugitive dust on a public or private paved road shall clean the road promptly.

UAC R307-309-7. Construction and Demolition Activities.
Any person engaging in clearing or leveling of land with an area of one-quarter acre or more, earthmoving, excavating, construction, demolition, or moving trucks or construction equipment over cleared land or access haul roads, shall prevent, to the maximum extent possible, material from being deposited onto any paved road other than a designated deposit site. Any such person who deposits materials that may create fugitive dust on a public or private paved road shall clean the road promptly.

UAC R307-309-9. Roads.

(1) Any person responsible for construction or maintenance of any existing road or having right-of-way easement or possessing the right to use the same whose activities results in fugitive dust from the road shall minimize fugitive dust to the maximum extent possible. Any such person who deposits material that may create fugitive dust on a public or private paved road shall clean the road promptly.

(2) Unpaved Roads. Any person responsible for construction or maintenance of any new or existing paved road shall prevent, to the maximum extent possible, the deposit of material from the unpaved road onto any intersecting paved road during construction or maintenance. Any person who deposits material that may create fugitive dust on a public or private paved road shall clean the road promptly.

ii. Activity Specific On-Site Fugitive Dust Control

For each activity that was described in ***IV. Fugitive Dust Emission Activities***, a control strategy or strategies are listed. The strategies are listed in a staged approach, meaning that if the first approach of control, Stage 1, is not satisfactory, then the next approach of control, Stage 2 will be attempted. Stage 3 is the final stage. If Stage 3 is unsuccessful in mitigating fugitive dust, this plan requires ceasing operation to control fugitive dust.

It is the owner/operator's responsibility to ensure that each of these control strategies are implemented and maintained on-site and that all subcontractors are aware of their obligation regarding these control strategies. Additional space has intentionally been included to allow the site supervisor to include any additional control strategies at each stage.

ACTIVITY	CONTROL STRATEGY	
MATERIAL STORAGE	Stage 1:	Either seeding and mulch or tackifier application for topsoil and subsoil. Coal: Inherent moisture with water sprays as needed.
	Stage 2:	Toposoil/Subsoil: Increase rate of tackifier application until fugitive dust is controlled. Coal: Increase use of water sprays until fugitive dust is controlled.
	Stage 3:	Topsoil/Subsoil and Coal: Minimize or reduce operations.
MATERIAL HANDLING, TRANSFER, HAULING LOADING, OR DUMPING	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
	Stage 2:	Increase use of water sprays until fugitive dust is controlled.
	Stage 3:	Minimize or reduce operations.
HAUL ROADS, ROADWAYS, OR YARD AREAS	Stage 1:	Water sprays only on as-needed basis.
	Stage 2:	Increase use of water sprays until fugitive dust is controlled, apply magnesium chloride or gravel as needed.
	Stage 3:	Minimize or reduce travel on these areas.
CLEARING, LEVELING, AND UNVEGETATED RECLAMATION AREAS	Stage 1:	Inherent moisture with water sprays only on an as-needed basis. Reclamation areas that have been graded and topsoiled will either be seeded and mulched, if during the appropriate planting season, or tackifier will be applied to control fugitive dust and erosion until the proper planting season.
	Stage 2:	Increase use of water sprays until fugitive dust is controlled.
	Stage 3:	Minimize and reduce operations.

EARTH MOVING, EXCAVATION	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
	Stage 2:	Increase use of water sprays until fugitive dust is controlled.
	Stage 3:	Minimize or reduce operations.
CONSTRUCTION, DEMOLITION	Stage 1:	Water sprays only on an as-needed basis.
	Stage 2:	Increase use of water sprays until fugitive dust is controlled.
	Stage 3:	Minimize or reduce operations.
DRILLING, BLASTING, PUSHING OPERATIONS	Stage 1:	Perform activity when low or no wind exists, when practicable.
	Stage 2:	Use water sprays on the area where activity will occur.
	Stage 3:	Minimize or reduce operations.
MATERIAL PROCESSING** (includes crushing and screening type operations)	Stage 1:	Inherent moisture with water sprays only on an as-needed basis.
	Stage 2:	Increase use of water sprays until fugitive dust is controlled.
	Stage 3:	Minimize or reduce operations.

** If processing other than crushing or screening occurs, the fugitive dust controls for those operations are addressed in the "OTHER" category.

Alton will also implement an awareness level program to minimize fugitive dust due to mining activities and haul road traffic in the pit areas. The site supervisor, (or authorized representative) will periodically observe the dust throughout each shift to determine the level of control needed to minimize the dust.

The following levels of awareness and control will be used:

Level 0 – No dust present; current dust control measures are adequate.

Level 1 – Weather or production causing dust at 0-5% opacity at the permit boundary; increase dust control measures necessary. Watering frequency and application of magnesium chloride on the Out of Pit haul roads will be increased until Level 0 is reached.

Level 2 - Weather or production causing dust at 5-10% opacity at the permit boundary; increase dust control measures necessary. Watering frequency and application of magnesium chloride on the Out of Pit haul roads will be increased until Level 0 is reached. Production reduced until evident that these measures are controlling the dust.

Level 3 - Weather or production causing dust > 10% opacity at the permit boundary; increase dust control measures necessary. Production stopped until Level 2 is reached. Level 2 activities conducted until Level 0 is reached.

Watering records will be maintained to show the dust control measures taken. These records will be provided in the Annual Report made available to Utah Division of Oil, Gas and Mining and to the inspectors upon request.

Since this plan provides control strategies based on total project opacity impacts at the property boundary, monitoring at the property boundary will be sufficient to "judge the effectiveness of the fugitive dust control plan". In order to monitor opacity at the property boundary, Alton Coal will utilize standard method 9 methodologies for the highest density "aggregate" plume from all sources within the property thus capturing highest impact of both point and non-point sources. Attachment 3 contains a description of method 9 techniques.

iii. Activity Specific Off-Site Fugitive Dust Control

Alton will control off-site of fugitive dust, which includes track-out, with the following control strategies:

OFF-SITE ACTIVITY	CONTROL STRATEGY	
FUGITIVE DUST ESCAPING FROM TRUCK BEDS	Stage 1:	Inherent moisture in material.
	Stage 2:	Use a synthetic cover for haul trucks.
	Stage 3:	Minimize or reduce operations.
TRACK-OUT	Stage 1:	Course gravel will be placed at the entrances and exits of the construction area to public roads to prevent track-out.
	Stage 2:	Use of a grader to clean the road from track-out.
	Stage 3:	Minimize or reduce operations, or wash tires.

VI. Continuous Improvement

Alton will review this plan and activities associated with controlling the Coal Hollow site's fugitive dust at least ONCE A YEAR. Changes to the plan will occur at this time, or sooner, if necessary.

ATTACHMENT 1

Responsible Parties for Fugitive Dust Control

Responsible Parties for Fugitive Dust Control

OPERATOR:	Alton Coal Development, LLC
Contact Name:	Chris McCourt
Position:	Mine Manager
Phone Number:	435-867-5331
OWNER:	Alton Coal Development, LLC
Contact Name:	Robert C. Nead, Jr.
Position:	Managing Member
Phone Number:	(239) 825-2332

ATTACHMENT 2

Fugitive Dust Management, Acknowledgement and Certification

Fugitive Dust Management, Acknowledgement and Certification

Contractor:	
Contact Name:	
Position:	
Phone Number:	
Start Date on Project:	
Finish Date on Project:	

I certify that I have reviewed the Fugitive Dust Control Plan and understand the requirements of this Plan, required under the Utah Administrative Code R307-309, and will instruct all employees of the Contractor on site to follow guidelines set for in the plan to control fugitive dust. The Contractor is equally responsible for fugitive dust maintenance and any fugitive dust violations from the Utah Division of Air Quality that may be directly related to the Contractor or its employees. Any and all subsequent violations due to fugitive dust non-compliance that can be attributed to the Contractor may be monetarily assessed to the Contractor by the owner and/or operator receiving the fine. The Contractor will report any fugitive dust control non-compliance to the owner and/or operator listed in this document.

Contractor

_____
Company Name (Printed)

_____
Name (Printed)

_____ _____
Signature Date

Alton Coal Development, LLC

Chris McCourt
Name (Printed)

_____ _____
Signature Date

ATTACHMENT 3

Method 9 Opacity Methodology and Documentation

EMISSION MEASUREMENT TECHNICAL INFORMATION CENTER
NSPS TEST METHOD

Prepared by **Emission Measurement Branch**
Technical Support Division, OAQPS, EPA

EMTIC TM-009
October 25, 1990

Method 9 - Visual Determination of the Opacity of Emissions from Stationary Sources

INTRODUCTION

(a) Many stationary sources discharge visible emissions into the atmosphere; these emissions are usually in the shape of a plume. This method involves the determination of plume opacity by qualified observers. The methods includes procedures for the training and certification of observers and procedures to be used in the field for determination of plume opacity.

(b) The appearance of a plume as viewed by an observer depends upon a number of variables, some of which may be controllable in the field. Variables which can be controlled to an extent to which they no longer exert a significant influence upon plume appearance include: angle of the observer with respect to the plume; angle of the observer with respect to the sun; point of observation of attached and detached steam plume; and angle of the observer with respect to a plume emitted from a rectangular stack with a large length to width ratio. The method includes specific criteria applicable to these variables.

(c) Other variables which may not be controllable in the field are luminescence and color contrast between the plume and the background against which the plume is viewed. These variables exert an influence upon the appearance of a plume as viewed by an observer and can affect the ability of the observer to assign accurately opacity values to the observed plume. Studies of the theory of plume opacity and field studies have demonstrated that a plume is most visible and presents the greatest apparent opacity when viewed against a contrasting background. Accordingly, the opacity of a plume viewed under conditions where a contrasting background is present can be assigned with the greatest degree of accuracy. However, the potential for a positive error is also the greatest when a plume is viewed under such contrasting conditions. Under conditions presenting a less contrasting background, the apparent opacity of a plume is less and approaches zero as the color and luminescence contrast decrease toward zero. As a result, significant negative bias and negative errors can be made when a plume is viewed under less contrasting conditions. A negative bias decreases rather than increases the possibility that a plant operator will be incorrectly cited for a violation of opacity standards as a result of observer error.

(d) Studies have been undertaken to determine the magnitude of positive errors made by qualified observers while reading plumes under contrasting conditions and using the procedures set forth in this method. The results of these studies (field trials) which involve a total of 769 sets of 25 readings

each are as follows:

(1) For black plumes (133 sets at a smoke generator), 100 percent of the sets were read with a positive error of less than 7.5 percent opacity; 99 percent were read with a positive error of less than 5 percent opacity. (Note: For a set, positive error = average opacity determined by observers' 25 observations -average opacity determined from transmissometer's 25 recordings.)

(2) For white plumes (170 sets at a smoke generator, 168 sets at a coal-fired power plant, 298 sets at a sulfuric acid plant), 99 percent of the sets were read with a positive error of less than 7.5 percent opacity; 95 percent were read with a positive error of less than 5 percent opacity.

(e) The positive observational error associated with an average of twenty-five readings is therefore established. The accuracy of the method must be taken into account when determining possible violations of applicable opacity standards.

1. PRINCIPLE AND APPLICABILITY

1.1 Principle. The opacity of emissions from stationary sources is determined visually by a qualified observer.

1.2 Applicability. This method is applicable for the determination of the opacity of emissions from stationary sources pursuant to § 60.11(b) and for visually determining opacity of emissions.

2. PROCEDURES

The observer qualified in accordance with Section 3 of this method shall use the following procedures for visually determining the opacity of emissions.

2.1 Position. The qualified observer shall stand at a distance sufficient to provide a clear view of the emissions with the sun oriented in the 140° sector to his back. Consistent with maintaining the above requirement, the observer shall, as much as possible, make his observations from a position such that his line of vision is approximately perpendicular to the plume direction and, when observing opacity of emissions from rectangular outlets (e.g., roof monitors, open baghouses, noncircular stacks), approximately perpendicular to the longer axis of the outlet. The observer's line of sight should not include more than one plume at a time when multiple stacks are involved, and in any case the observer should make his observations with his line of sight perpendicular to the longer axis of such a set of multiple stacks (e.g., stub stacks on baghouses).

2.2 Field Records. The observer shall record the name of the plant, emission location, facility type, observer's name and affiliation, and the date on a field data sheet (Figure 9-1). The time, estimated distance to the emission location, approximate wind direction, estimated wind speed, description of the sky condition (presence and color of clouds), and plume background are recorded on a field data sheet at the time opacity readings are initiated and

Figure 9-1. Record of visual determination of opacity.

Company

Location

Test No.

Date

Type Facility

Control Device

Hours of Observation

Observer

Observer Certification Date Observer Affiliation

Point of Emissions Height of Discharge Point

CLOCK TIME	Initial			Final
OBSERVER LOCATION				
Distance to				
Direction from				
Height of				
BACKGROUND				
WEATHER CONDITIONS				
Wind Direction				
Wind Speed				
Ambient				
SKY CONDITIONS (clear, overcast, % clouds, etc.)				
PLUME DESCRIPTION				
Color				
Distance				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time	Opacity	
	Start - End	Sum	Average

Readings ranged from ___ to ___ % opacity.

The source was/was not in compliance with ___ at the time evaluation was made.

Figure 9-2. Observation record.

Page ___ of ___

Company _____ Observer _____

Location _____ Type facility _____

Test Number _____ Point of emissions _____

		Seconds				Steam plume (check if applicable)		Comments
Hr	Min	0	15	30	45	Attached	Detached	
	0							
	1							
	2							
	3							
	4							
	5							
	6							
	7							
	8							
	9							
	10							
	11							
	12							
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	14							
	15							
	16							
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	18							
	19							
	20							
	21							

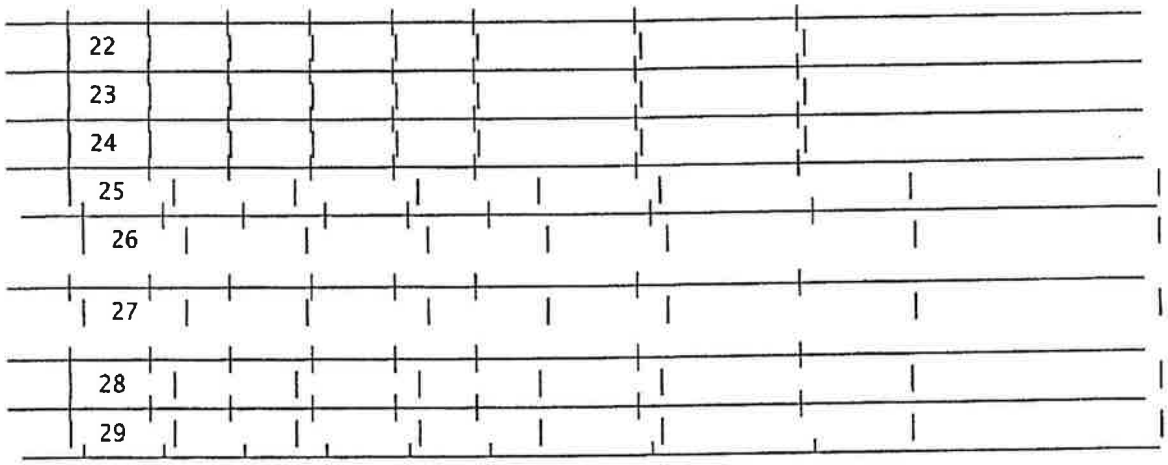
22
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Figure 9-2. Observation record (continued).

Page ___ of ___

Company _____ Observer _____

Location _____ Type facility _____

Test Number _____ Point of emissions _____

		Seconds				Steam plume (check if applicable)		Comments
Hr	Min	0	15	30	45	Attached	Detached	
	30							
	31							
	32							
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
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	47							
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2.3 Observations. Opacity observations shall be made at the point of greatest opacity in that portion of the plume where condensed water vapor is not present. The observer shall not look continuously at the plume but instead shall observe the plume momentarily at 15-second intervals.

2.3.1 Attached Steam Plumes. When condensed water vapor is present within the plume as it emerges from the emission outlet, opacity observations shall be made beyond the point in the plume at which condensed water vapor is no longer visible. The observer shall record the approximate distance from the emission outlet to the point in the plume at which the observations are made.

2.3.2 Detached Steam Plume. When water vapor in the plume condenses and becomes visible at a distinct distance from the emission outlet, the opacity of emissions should be evaluated at the emission outlet prior to the condensation of water vapor and the formation of the steam plume.

2.4 Recording Observations. Opacity observations shall be recorded to the nearest 5 percent at 15-second intervals on an observational record sheet. (See Figure 9-2 for an example.) A minimum of 24 observations shall be recorded. Each momentary observation recorded shall be deemed to represent the average opacity of emissions for a 15-second period.

2.5 Data Reduction. Opacity shall be determined as an average of 24 consecutive observations recorded at 15-second intervals. Divide the observations recorded on the record sheet into sets of 24 consecutive observations. A set is composed of any 24 consecutive observations. Sets need not be consecutive in time and in no case shall two sets overlap. For each set of 24 observations, calculate the average by summing the opacity of the 24 observations and dividing this sum by 24. If an applicable standard specifies an averaging time requiring more than 24 observations, calculate the average for all observations made during the specified time period. Record the average opacity on a record sheet. (See Figure 9-1 for an example.)

3. QUALIFICATION AND TESTING

3.1 Certification Requirements. To receive certification as a qualified observer, a candidate must be tested and demonstrate the ability to assign opacity readings in 5 percent increments to 25 different black plumes and 25 different white plumes, with an error not to exceed 15 percent opacity on any one reading and average error not to exceed 7.5 percent opacity in each category. Candidates shall be tested according to the procedures described in Section 3.2. Smoke generators used pursuant to Section 3.2 shall be equipped with a smoke meter which meets the requirements of Section 3.3. The certification shall be valid for a period of 6 months, at which time the qualification procedure must be repeated by any observer in order to retain certification.

3.2 Certification Procedure. The certification test consists of showing the candidate a complete run of 50 plumes--25 black plumes and 25 white plumes-generated by a smoke generator. Plumes within each set of 25 black and 25 white runs shall be presented in random order. The candidate assigns an opacity value to each plume and records his observation on a suitable form. At the completion of each run of 50 readings, the score of the candidate is determined. If a candidate fails to

qualify, the complete run of 50 readings must be repeated in any retest. The smoke test may be administered as part of a smoke school or training program and may be preceded by training or familiarization runs of the smoke generator during which candidates are shown black and white plumes of known opacity.

3.3 Smoke Generator Specifications. Any smoke generator used for the purposes of Section 3.2 shall be equipped with a smoke meter installed to measure opacity across the diameter of the smoke generator stack. The smoke meter output shall display in-stack opacity based upon a pathlength equal to the stack exit diameter, on a full 0 to 100 percent chart recorder scale. The smoke meter optical design and performance shall meet the specifications shown in Table 91. The smoke meter shall be calibrated as prescribed in Section 3.3.1 prior to the conduct of each smoke reading test. At the completion of each test, the zero and span drift shall be checked and if the drift exceeds ±1 percent opacity, the condition shall be corrected prior to conducting any subsequent test runs. The smoke meter shall be demonstrated, at the time of installation, to meet the specifications listed in Table 9-1. This demonstration shall be repeated following any subsequent repair or replacement of the photocell or associated electronic circuitry including the chart recorder or output meter, or every 6 months, whichever occurs first.

TABLE 9-1 - SMOKE METER DESIGN AND PERFORMANCE SPECIFICATIONS

Parameter	Specification
a. Light Source	Incandescent lamp operated at nominal rated voltage
b. Spectral reponse of photocell	Photopic (daylight spectral response of the human eye - Citation 3)
c. Angle of view	15° maximum total angle
d. Angle of projection	15° maximum total angle
e. Calibration error	±3% opacity, maximum
f. Zero and span drift	±1% opacity, 30 minutes
g. Response time	5 seconds

3.3.1 Calibration. The smoke meter is calibrated after allowing a minimum of 30 minutes warmup by alternately producing simulated opacity of 0 percent and 100 percent. When stable response at 0 percent or 100 percent is noted, the smoke meter is adjusted to produce an output of 0 percent or 100 percent, as appropriate. This calibration shall be repeated until stable 0 percent and 100 percent opacity values may be produced by alternately switching the power to the light source on and off while the smoke generator is not producing smoke.

3.3.2 Smoke Meter Evaluation. The smoke meter design and performance are to be evaluated as follows:

3.3.2.1 Light Source. Verify from manufacturer's data and from voltage measurements made at the lamp, as installed, that the lamp is operated within ±5 percent of the nominal rated voltage.

3.3.2.2 Spectral Response of Photocell. Verify from manufacturer's data that the photocell has a photopic response; i.e., the spectral sensitivity of the cell shall closely approximate the standard spectral-luminosity in (b) of Table 91.

3.3.2.3 Angle of View. Check construction geometry to ensure that the total angle of view of the smoke plume, as seen by the photocell, does not exceed 15°. The total angle of view may be calculated from: $\theta = 2 \tan^{-1} (d/2L)$, where θ = total angle of view; d = the sum of the photocell diameter + the diameter of the limiting aperture; and L = the distance from the photocell to the limiting aperture. The limiting aperture is the point in the path between the photocell and the smoke plume where the angle of view is most restricted. In smoke generator smoke meters this is normally an orifice plate.

3.3.2.4 Angle of Projection. Check construction geometry to ensure that the total angle of projection of the lamp on the smoke plume does not exceed 15°. The total angle of projection may be calculated from: $\theta = 2 \tan^{-1} (d/2L)$, where θ = total angle of projection; d = the sum of the length of the lamp filament + the diameter of the limiting aperture; and L = the distance from the lamp to the limiting aperture.

3.3.2.5 Calibration Error. Using neutral-density filters of known opacity, check the error between the actual response and the theoretical linear response of the smoke meter. This check is accomplished by first calibrating the smoke meter according to Section 3.3.1 and then inserting a series of three neutral-density filters of nominal opacity of 20, 50, and 75 percent in the smoke meter pathlength. Filters calibrated within 2 percent shall be used. Care should be taken when inserting the filters to prevent stray light from affecting the meter. Make a total of five nonconsecutive readings for each filter. The maximum error on any one reading shall be 3 percent opacity.

3.3.2.6 Zero and Span Drift. Determine the zero and span drift by calibrating and operating the smoke generator in a normal manner over a 1-hour period. The drift is measured by checking the zero and span at the end of this period.

3.3.2.7 Response Time. Determine the response time by producing the series of five simulated 0 percent and 100 percent opacity values and observing the time required to reach stable response. Opacity values of 0 percent and 100 percent may be simulated by alternately switching the power to the light source off and on while the smoke generator is not operating.

4. BIBLIOGRAPHY

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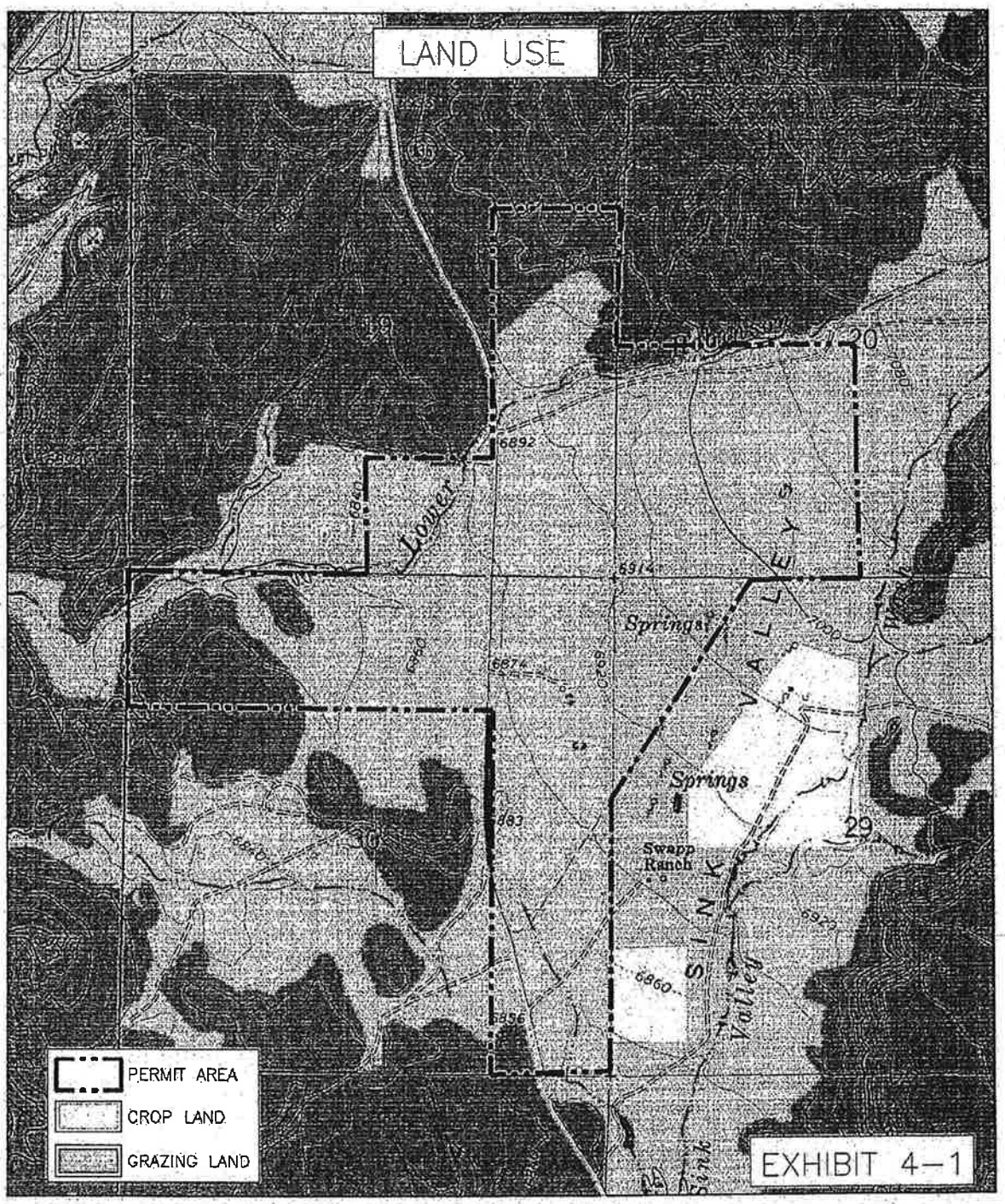

Acreage of crop land under production:
Sorensen: 90 acres (approximate)
Johnson: None currently
Dame: None currently
Pugh: None currently

0 0.5 1
1 mile

1,000 feet