



1901 Sharp Point Drive, Suite E  
Fort Collins, CO 80525  
Phone: 970-484-7941  
Fax: 970-484-3423

## QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTATION SERIES

## **TECHNICAL INSTRUCTION**

**NUMBER** **4420-5050**

**DATE** **SEPTEMBER 1998**

## AUTHORIZATIONS

TITLE	NAME	SIGNATURE
ORIGINATOR	Gloria S. Mercer	
PROJECT MANAGER	Lincoln E. Sherman	
PROGRAM MANAGER	David L. Dietrich	
QA MANAGER	Gloria S. Mercer	
OTHER		

## REVISION HISTORY

## TABLE OF CONTENTS

<u>Section</u>		<u>Page</u>
1.0	PURPOSE AND APPLICABILITY	1
2.0	RESPONSIBILITIES	1
2.1	Project Manager	1
2.2	Data Coordinator	1
2.3	Data Analyst	1
2.4	Project Scientist	2
3.0	REQUIRED EQUIPMENT AND MATERIALS	2
4.0	METHODS	2
4.1	Review for Observed Conditions	2
4.1.1	Stage-1 - Continuity Review and Problem Resolution	3
4.1.2	Stage-2 - Weather Condition, Anomaly, and Event Identification	3
4.2	Preparation of Discussions	5
4.2.1	Stage-3 - Evaluation of Observed Anomalies	5
4.2.2	Stage-3 - Evaluation of Observed Events	5

## LIST OF FIGURES

<u>Figure</u>		<u>Page</u>
4-1	Example Anomaly Summary	6
4-2	Example Event Summary	7

## LIST OF TABLES

<u>Table</u>		<u>Page</u>
4-1	Example Stage-2 Qualitative Review of Time-Lapse Video Images, Garner Hill and DNPP	4

## **1.0 PURPOSE AND APPLICABILITY**

This technical instruction (TI) describes the qualitative review procedures for time-lapse videotape for the Healy Clean Coal Project. This TI specifically describes qualitative videotape review procedures to:

- Document observed meteorological conditions.
- Identify observed events of interest to the monitoring program.
- Prepare comprehensive anomaly or event discussions.

## **2.0 RESPONSIBILITIES**

### **2.1 PROJECT MANAGER**

The project manager shall:

- Provide overall coordination of the qualitative videotape review process.
- Provide technical assistance if required, in the interpretation of time-lapse images during the videotape qualitative review process.
- Review all videotape documentation for completeness and accuracy.

### **2.2 DATA COORDINATOR**

The data coordinator shall:

- Perform Stage-1 videotape continuity review to verify proper camera and system component operation, exposure, alignment, and timing.
- Complete an Operational History Log for each videotape.

### **2.3 DATA ANALYST**

The data analyst shall:

- Perform Stage-2 qualitative videotape review to document weather conditions and events.
- Prepare qualitative review tables.
- Coordinate with the project scientist regarding review results.
- Oversee preparation and finalize qualitative review discussions.

## **2.4 PROJECT SCIENTIST**

The project scientist shall:

- Perform Stage-3 qualitative videotape review to evaluate observed anomalies and events.
- Coordinate with the data analyst regarding review results.
- Provide oversight of all qualitative review stages.
- Prepare initial qualitative review discussions.

## **3.0 REQUIRED EQUIPMENT AND MATERIALS**

Equipment and materials used to review time-lapse videotapes include:

- SVHS videotape cassettes from DNPP and Garner Hill.
- An SVHS video cassette player.
- A review monitor.
- Time-Lapse Video Monitoring Status/Assessment Sheets.
- Operational History Logs.
- Supplemental meteorological data, Bison Gulch monitoring data, information regarding plant operations, and any on-site observer comments.

## **4.0 METHODS**

This section presents the methods used to perform qualitative review of time-lapse videotapes for the Healy Clean Coal Project and to report the results of the review.

This section includes two (2) major subsections:

- 4.1 Review for Observed Conditions
- 4.2 Preparation of Discussions

### **4.1 REVIEW FOR OBSERVED CONDITIONS**

Qualitative review of time-lapse videotapes is generally performed in three stages as detailed in the following subsections. All videotape review is performed using a high-resolution color monitor and SVHS VCR.

#### **4.1.1 Stage-1 – Continuity Review and Problem Resolution**

The data coordinator performs Stage-1 videotape review. SVHS videotapes received from the field are first checked for proper labeling (identified by site, date and time the videotape began filming, and data and time the videotape ended filming). The videotapes are then reviewed to verify proper camera and system component operation, proper exposure and alignment, and correct operating period. If problems are noted, the data coordinator promptly contacts the site operator to initiate corrective actions. Videotape dates and times, and site operator comments noted on the status/assessment sheets are verified with the videotape images.

Videotapes are reviewed for continuity within two days of receipt at ARS and any required corrective actions are implemented immediately thereafter. Results of the continuity review are entered in site-specific Operational History Logs. For a detailed description of the Operational History Log and continuity review procedures, see TI 4305-4050, *Collection, Processing, and Handling of Time-Lapse Videotapes for the Healy Clean Coal Project*.

#### **4.1.2 Stage-2 – Weather Condition, Anomaly, and Event Identification**

After Stage-1 review, the data analyst performs Stage-2 review to document weather conditions and identify visual anomalies and events observed on the videotapes. An anomaly is defined as anything in the camera field of view, whether suspected to be human-caused or natural, that was visually unusual, interesting, or dynamic. Anomalies include unusual steam/ice plumes, smoke, fugitive dust, ground fogs, surface or elevated hazes, and other visual discontinuities. The view from DNPP will be the focus of anomaly identification. Anomalies noted in the Garner Hill view, however, will also be noted. Standard day-to-day occurrences such as short steam plumes emanating from the power plant stacks will not be considered anomalies. An event is a recorded period that identifies visibility impacts in DNPP that are believed to be attributable to the power plant.

Golden Valley Electric Association (GVEA) has developed a procedure to document events that are reported to plant operators. Plant operators use the “event” recording system in the HCCP control room. These videotapes are immediately sent to ARS for review and analysis.

The data analyst then prepares a summary table for each site and month. Table 4-1 is an example of this Stage-2 qualitative review summary table. Copies of the summary table and videotape for each site are forwarded to GVEA monthly for evaluation and review.

It is important to note that videotapes can only be used to document the presence of observed conditions. The cause of the condition generally must be obtained from supplemental data or from interpretation of other conditions observed in the vista. For example, though videotape can document that a visible plume emanated from a stack, the chemical constituents of the plume cannot be directly determined from the videotape.

Table 4-1

Example Stage-2 Qualitative Review of Time-Lapse Video Images  
Garner Hill and DNPP

Date and Time Period of Anomaly or Event	Weather Conditions	Anomaly Visible	Event Declared	In or Affecting Class I Area	Description
01/13/98 1400 – 1530	<p><i>Garner Hill view:</i> Cloudy with poor visibility.</p> <p><i>DNPP view:</i> Cloudy with strong up valley winds, turning partly cloudy with sunshine at midday. Poor visibility all day.</p>	Yes	No	No	<p><i>Garner Hill view:</i> Three white, steam plumes are visible all day. The plumes travel up valley in the morning, at a 45-degree angle, with a height to just below the background ridge. The longest plume, from HCCP, dissipates outside the camera's field of view, and extends above the background ridge by 1230. The plumes change direction several times in the afternoon. A dark, ground-based haze layer appears in the Healy area between 1130 and 1315.</p> <p><i>DNPP view:</i> Moody Gap appears dark and hazy between 1100 and 1300, then becomes obscured by haze and clouds. The gap is visible again and appears dark between 1400 and 1530. During this period, a dynamic, rolling feature appears low in the gap, and travels towards the Class I area, but does not reach it.</p>
01/15/98 1300 – 1500	<p><i>Garner Hill view:</i> Cloudy with poor visibility. Upper level clouds travel down valley in the afternoon.</p> <p><i>DNPP view:</i> Cloudy in the morning turning mostly sunny by noon, and partly cloudy in the afternoon. Slight winds travel down valley.</p>	Yes	No	No	<p><i>Garner Hill view:</i> At least three white plumes are visible and travel up valley all day, rising 45-degrees to the height of the background ridge. Between 1200 and 1330, visibility worsens as a white layer settles in the valley. By 1500, the plume from Unit #1 appears very short, while the larger two plumes (from HCCP and the roof vent), rise to an inversion layer above the background ridge and travels up valley.</p> <p><i>DNPP view:</i> A dark, yellow haze appears in Moody Gap between 1100 and 1130. Visibility is poor in the gap at 1300. At this time, a dark, elevated, dynamic feature appears on the left side of the gap, and becomes more prominent by 1430. It may enter the Class I area, but this is not clearly evident in the video.</p>

## **4.2 PREPARATION OF DISCUSSIONS**

### **4.2.1 Stage-3 - Evaluation of Observed Anomalies**

After Stage-2 review, an ARS project scientist further reviews the videotapes that contain the identified anomalies. The evaluation includes a description of the anomaly, related data, general weather conditions, a discussion of the dynamics of observed anomalies, and a conclusion. The conclusions state if the anomalies can be attributed to the power plant or other sources. These summaries are included in the quarterly data reports. An example Stage-3 anomaly summary is provided as Figure 4-1.

### **4.2.2 Stage-3 - Evaluation of Observed Events**

In addition to the events observed on the time-lapse videotapes, ARS will summarize any real-time event chosen and documented by the GVEA operator in response to an on-site observation or complaint. The format for the event summaries will be the same as the Stage-3 anomaly summary and will reference additional documentation as appropriate. These summaries, along with the images, verbal description by the GVEA operator, data from the post-construction monitoring instruments at the Bison Gulch Monitoring Station, Healy Power Plant stack emissions data, and other pertinent information will be compiled for each selected event and included in the quarterly data reports. . Figure 4-2 is an example Stage-3 event summary.

## ANOMALY SUMMARY

<b>Date and Time:</b>	April xx, 19xx 10a.m. to 2 p.m.
<b>View:</b>	Denali National Park (DNPP)
<b>Noted Anomaly:</b>	Blowing dust or fog. Video images depict whitish, ground-based features resembling blowing dust. The features are visible late in the morning and early afternoon.
<b>In Class I Area:</b>	No
<b>General Weather:</b>	Healy weather observations document good visibility with clear skies. Temperatures ranged from 24°F at 0545 and 0645 to 45°F at 1615. Light to moderate southeasterly winds occurred between 0545 and 0745. Strong southwesterly winds occurred at 0945, and turned to strong southeasterly at 1145, moderately southerly at 1615, and strong southeasterly from 1745 through the remainder of the day. Data from the ambient monitoring station are not available.
<b>Discussion:</b>	The Denali National Park view depicts cloudy skies and moderately windy conditions. Faint streaks resembling blowing dust or fog appear along the river valley.  The Garner Hill view depicts no plume from Unit No. 1. Faint streaks resembling blowing dust or fog appear near ground level near Unit No. 1 early in the morning and travel northward. The video depicts generally clear and windy conditions. Plant emission data show no inconsistencies or upsets.
<b>Conclusion:</b>	The ground-based features appearing in the Denali National Park and Garner Hill views are blowing dust or glacial till from the river banks. The appearance of the feature documented in the video and weather record supports this conclusion.

Figure 4-1. Example Anomaly Summary.

## EVENT SUMMARY

<b>Date and Time:</b>	January xx, 19xx 10a.m. to 2 p.m.
<b>View:</b>	Garner Hill
<b>Noted Event:</b>	Fog or plume. Video images depict whitish, ground-based and elevated layers resembling fog. The features are visible throughout the day.
<b>In Class I Area:</b>	No
<b>General Weather:</b>	Healy weather observations document fair visibility and generally clear skies. Temperatures ranged from -39°F at 0550 to -29°F at 1145. Calm conditions prevailed except for light northwesterly winds at 1345 and 1545. Visibility through the Nenana Valley was marginal for VFR (visual flight rules) aviation at 1345 and 1545. The ambient monitoring station at Bison Gulch registered calm or light northeasterly winds, and stable, very cold temperatures.
<b>Discussion:</b>	The Garner Hill view depicts the plume from HCCP as long, with high plume rise. The plume travels vertically, then creates an upvalley trail. The view depicts a thick, whitish layer traveling upvalley through the field of view. The view is initially obscured by fog. The HCCP operator tracked the plume upvalley with real-time video and observed the plume moving through Moody Gap at 1400. Stack emissions data showed all monitored parameters to be within emission limits. The Bison Gulch monitoring station indicated elevated atmospheric scattering throughout. The SO <sub>2</sub> monitor recorded background levels all day. Plots of the stack emission data and Bison Gulch are attached.
	The Denali National Park view clearly depicts a white layer extending through Moody Gap. The white layer does not appear to reach the Class I area boundary.
<b>Conclusion:</b>	The whitish, elevated layer appearing in the Garner Hill and DNPP views is a portion of the water plume from HCCP that has drifted upvalley. The extreme cold temperatures cause the plume to appear opaque, and the calm conditions allow the plume to travel a great distance before dispersing in the DNPP view. The plume is attributable to HCCP but does not reach the Class I area.

Figure 4-2. Example Event Summary.