

QUALITY ASSURANCE/QUALITY CONTROL DOCUMENTATION SERIES

TITLE SCENE MONITORING QUALITATIVE DATA REDUCTION

TYPE STANDARD OPERATING PROCEDURE

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REVISION HISTORY

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1.0 PURPOSE AND APPLICABILITY

This standard operating procedure (SOP) outlines the steps of scene monitoring qualitative data reduction. It serves as a guide to assure quality data from automatic camera and video monitoring stations.

Documenting visibility events and trends is an important aspect of evaluating existing or potential impairment in Class I and other visibility-sensitive areas. Photography is an efficient way to document these events and trends and is an effective method of communicating visibility relationships to decision-makers and to the public. Self-contained, battery-powered, automatic camera visibility monitoring systems or time-lapse video monitoring systems are easily installed and operated at any location. Camera-based monitoring, referred to as scene monitoring, is an effective, economical component of any visibility monitoring program.

Day-to-day variations in visual air quality captured on 35 mm color photographic slides, 8 mm color movie film, or SVHS videotape can be used to:

- Document how vistas appear under various visual air quality, meteorological, and seasonal conditions. Scene characteristics include observer visual range, scene contrast, color, texture, and clarity.
- Record the frequency that various visual air quality conditions occur (e.g., incidence of uniform haze, layered haze, or weather events).
- Provide a quality assurance reference for collocated measurements.
- Determine the visual sensitivity of individual areas or views to variations in ambient air quality.
- Identify areas of potential impairment.
- Estimate the optical properties of the atmosphere under certain conditions.
- Provide quality media for visually presenting program goals, objectives, and results to decision-makers and to the public.
- Provide support data for computer image modeling of potential impairment.
- Support color and human perception research.

Slides, movie film, and videotape, however, do not provide quantitative information about the cause of visibility impairment. Aerosol and optical properties of the atmosphere must be independently monitored where cause and affect relationships are required.

The following technical instructions (TIs) provide detailed information regarding scene qualitative data reduction:

- TI 4420-5000 *Qualitative Scene Coding and Data Reduction of 35 mm Color Slides*

- TI 4420-5010 *Qualitative 8 mm Time-Lapse Movie Film Review*
- TI 4420-5050 *Qualitative Time-Lapse Videotape Review for the Healy Clean Coal Project*

2.0 RESPONSIBILITIES

2.1 PROJECT MANAGER

The project manager shall:

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

2.2 DATA COORDINATOR

The data coordinator shall:

- Perform Stage-1 videotape continuity review.
- Complete an Operational History Log for each videotape.

2.3 DATA TECHNICIAN

The data technician shall:

- Perform 35mm slide coding.
- Create digital code files.

2.4 DATA ANALYST

The data analyst shall:

- Oversee film reduction.
- Review and verify 35 mm slide codes.
- Perform initial 8 mm film qualitative review.
- Perform Stage-2 qualitative videotape review.
- Prepare qualitative review tables.
- Coordinate with research/project scientist regarding review results.
- Oversee preparation and finalize qualitative review discussions.

2.5 RESEARCH/PROJECT SCIENTIST

The research/project scientist shall:

- Perform secondary 8 mm film qualitative review.
- Perform Stage-3 qualitative videotape review.
- Coordinate with the data analyst regarding review results.
- Oversee all qualitative review stages.
- Prepare initial qualitative review discussions.

3.0 REQUIRED EQUIPMENT AND MATERIALS

3.1 REQUIRED EQUIPMENT AND MATERIALS FOR 35 MM SLIDES

Equipment and materials used to code and validate 35 mm photographic slides include:

- Processed 35 mm slides.
- Slide Condition Code Sheets.
- A light table.
- A hand-held magnifying lens.
- An IBM PC-compatible 386/486 computer system with VGA monitor.
- A computer printer.
- ARS software; SS program, HAZE program.

3.2 REQUIRED EQUIPMENT AND MATERIALS FOR 8 MM TIME-LAPSE FILM

Equipment and materials used to review and validate 8 mm time-lapse movie film include:

- Processed 8 mm time-lapse movie film rolls.
- An 8 mm movie projector.
- Time-Lapse Camera Visibility Monitoring Status/Assessment Sheets.
- Master Logs.
- Supplemental meteorological data (if applicable).

3.3 REQUIRED EQUIPMENT AND MATERIALS FOR SVHS TIME-LAPSE VIDEOTAPE

Equipment and materials used to review and validate SVHS time-lapse videotape include:

- SVHS videotape cassettes.
- An SVHS video cassette player.
- A review monitor.
- Time-Lapse Video Monitoring Status/Assessment Sheets.
- Operational History Logs.
- Supplemental meteorological data, on-site observer comments, etc. (if applicable).

4.0 METHODS

This section includes the following three (3) subsections:

- 4.1 35 mm Slide Coding and Data Reduction
- 4.2 8 mm Time-Lapse Film Review
- 4.3 SVHS Time-Lapse Videotape Review

4.1 35 MM SLIDE CODING AND DATA REDUCTION

Not all 35 mm slides undergo the coding process. Slides are only coded if summaries of observed slide conditions are required by the contracting agency. Each photographic slide designated for coding is visually reviewed, chronologically numbered, and assigned a two-digit slide condition code. These qualitative slide condition codes are assigned by the data technician and are verified by the data analyst. The codes document the visual conditions present on each slide, and include observed hazes, plumes, weather conditions or unusable or missing observations.

Coding is normally performed at the end of a season on all slides collected during the season. Each valid slide is viewed on a light table with the naked eye and a hand-held magnifying lens. Codes are recorded directly on the slides and later entered into site-specific digital files. Digital files are used to prepare qualitative summaries of observed haze types and can be searched in a variety of ways to fulfill specific data reports. Slide coding and qualitative summary procedures are detailed in TI 4420-5000, *Qualitative Scene Coding and Data Reduction of 35 mm Color Slides*.

4.2 8 MM TIME-LAPSE FILM REVIEW

Qualitative film review only occurs when a summary of specific information captured on 8 mm time-lapse film is required. For example, this type of qualitative review could be required to support an EIS or other regulatory review process. Film undergoing qualitative film review is closely reviewed for general weather conditions and for the presence/absence of atmospheric anomalies. This review provides a preliminary indication of the types of visual effects observed within the individual vistas.

Original 8 mm film is reviewed primarily for anomaly identification and evaluation. Chronological review tables and comprehensive discussions of any observed anomalies are prepared. It is recommended that original 8 mm film be reviewed. Review of 8 mm film transferred to videotape is also possible, however, loss of image resolution and overall quality is likely to occur in any second-generation film or video product. Film review and procedures are detailed in TI 4420-5010, *Qualitative 8 mm Time-Lapse Movie Film Review*.

4.3 SVHS TIME-LAPSE VIDEOTAPE REVIEW

Qualitative review of time-lapse videotape is generally performed in three stages. Stage-1 is a continuity review and problem resolution; videotapes are reviewed to verify proper camera and system component operation, proper exposure and alignment, and correct operating period. Stage-2 review includes documenting weather conditions and identifying observed visual anomalies or events of interest to the monitoring program. Stage-3 review includes evaluation of these observed anomalies or events. Detailed descriptions of the anomaly are then prepared and include related data, general weather conditions, a discussion of the dynamics of observed anomalies, and a conclusion.

For a detailed description of videotape review procedures, see TI 4305-4050, *Collection, Processing, and Handling of Time-Lapse Videotapes for the Healy Clean Coal Project*.