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1.0 PURPOSE AND APPLICABILITY

The purpose of on-site troubleshooting and emergency maintenance is to assure quality data capture and minimize data loss by quickly identifying the probable source of a time-lapse video monitoring system malfunction and initializing appropriate equipment repairs or replacements. This technical instruction (TI) describes on-site troubleshooting and emergency maintenance procedures for an SVHS time-lapse video monitoring system at DNPP comprised of a Sony SSC-20 video camera, a Panasonic AG-6740 SVHS time-lapse VCR, and a Panasonic CT1384Y color monitor.

This TI serves as a guideline to facilitate the following unscheduled maintenance tasks:

- On-site troubleshooting procedures for the following components:
 - Sony SSC-S20 Camera
 - Panasonic AG-6740 SVHS time-lapse recorder
 - Panasonic CT1384Y color monitor
- Notification of the field specialist or data coordinator
- System diagnosis and resulting corrective action(s)
- Final system verification check

Site operators should be fully trained and supplied with a Time-Lapse Video Monitoring Field Procedures Notebook that contains detailed routine site operator maintenance and troubleshooting procedures for the specific camera monitoring system(s) located at the site. Additional manufacturer instruction booklets, a supply of Time-Lapse Video Monitoring Status/Assessment Sheets, and monitoring supplies are also provided.

Close personal communications should be maintained between Air Resource Specialists, Inc. (ARS) and site operators throughout all monitoring and unscheduled maintenance efforts. Operators are encouraged to call or notify ARS if they have any questions or problems. Many problems can be fully resolved over the telephone.

2.0 RESPONSIBILITIES

2.1 PROJECT MANAGER

The project manager shall coordinate with the site operator, his/her supervisor, field specialist, and data coordinator concerning the requirements and completion of specific troubleshooting procedures.

2.2 FIELD SPECIALIST

The field specialist shall:

- Coordinate with the project manager, site operator, his/her supervisor, and data coordinator concerning the requirements and completion of specific troubleshooting procedures.
- Train the site operator in all phases of specific troubleshooting procedures necessary for on-site resolution of instrument problems.
- Provide technical support to the site operator via telephone to identify and resolve instrument problems.
- Resolve problems reported by the site operator.
- Document all technical support provided to the site operator.

2.3 DATA COORDINATOR

The data coordinator shall:

- Coordinate with the project manager, site operator, his/her supervisor, and field specialist concerning the requirements and completion of specific troubleshooting procedures.
- Identify possible instrument malfunctions and contact the site operator to implement troubleshooting procedures.
- Verify that scheduled troubleshooting visits are performed and notify the site operator if he/she fails to make a scheduled visit.
- Provide technical support to the site operator via telephone to identify and resolve system problems. Document all technical support given to the site operator.
- Review documentation completed by the site operator for accuracy and completeness. File all documentation and correspondence.
- Coordinate the replacement and repair of all system components and support hardware.
- Enter all correspondence with site operators and the results of all performed procedures into the site-specific Quality Assurance Database.
- Document all capital instrumentation changes and maintain inventory records in the ARS Purchase Order/Inventory Database.

2.4 SITE OPERATOR

The site operator shall:

- Coordinate with the project manager, the site operator's supervisor, data coordinator, and field specialist concerning the requirements and completion of specific troubleshooting procedures.
- Perform procedures described in this TI.
- Thoroughly document all troubleshooting procedures on the Time-Lapse Video Monitoring Status/Assessment Sheet; mail the completed sheet to the data coordinator.
- Report any noted inconsistencies and troubleshooting efforts immediately to the data coordinator or field specialist.

3.0 REQUIRED EQUIPMENT AND MATERIALS

The time-lapse video monitoring system consists of a camera assembly and a video recording assembly. The components included in each assembly are:

Camera assembly components:

- Color video camera
- Environmental enclosure for the video camera with the following accessories:
 - heater
 - sun shroud
 - pole mount
 - pan/tilt mount

Video recording assembly components:

- Heated shelter
- Color review monitor
- SVHS time-lapse recorder
- UPS power supply
- Miscellaneous cables, connectors, etc.

3.1 SITE VISIT EQUIPMENT

Equipment and materials generally required to support a troubleshooting site visit or emergency maintenance include:

- Medium and small flat-blade screwdriver
- Small Phillips-head screwdriver
- Medium adjustable wrench
- Keys for enclosure, shelter, and padlocks
- Digital watch synchronized to National Bureau of Standards and Technology (NIST) Time (303/499-7111)
- Voltmeter
- 110 VAC wallplug circuit tester
- Time-Lapse Video Monitoring Field Procedures Notebook containing:
 - TI 4120-3650, *Routine Site Operator Maintenance Procedures for the SVHS Time-lapse Video Camera System at DNPP – Sony SSC-S20 Camera, Panasonic AG-6740 SVHS VCR, and Panasonic CT1384Y Monitor*
 - TI 4120-3750, *Troubleshooting and Emergency Maintenance Procedures for the SVHS Time-Lapse Video Camera System at DNPP - Sony SSC-S20 Camera, Panasonic AG-6740 SVHS VCR, and Panasonic CT1384Y Monitor*
 - Manufacturer's instruction booklets
 - Time-Lapse Video Monitoring Status/Assessment Sheets
 - Videotape cassette labels
- Pen or pencil
- Optical cleaning supplies
- Supplemental SVHS videotape cassettes
- Padded mailing envelopes

3.2 INVENTORY

It is imperative that any capital instrumentation changes made as a result of troubleshooting or emergency maintenance be thoroughly documented. Specific model and serial numbers of the exchanged enclosure, camera, recorder, and/or monitor should be documented for future reference by the data coordinator in the site-specific Quality Assurance Database and ARS Purchase Order/Inventory Database. Any on-site changes made should be documented by the site operator on a Time-Lapse Video Monitoring Status/Assessment Sheet. Capital equipment exchange procedures are discussed in Section 4.4.

4.0 METHODS

This section includes four (4) major subsections:

- 4.1 General Information
- 4.2 Troubleshooting and Emergency Maintenance Procedures
- 4.3 Final System Verification Check
- 4.4 Capital Equipment Exchange Procedures

Maintaining a video monitoring camera system includes prompt detection and emergency maintenance when the system fails to function properly. The troubleshooting and emergency maintenance process should progress as outlined below to ensure ongoing, consistent data collection.

- A system malfunction is detected by the site operator during routine maintenance of the system or by the data coordinator during review of videotapes.
- The site operator applies defined troubleshooting procedures to test the system and notifies ARS of his/her findings. The ARS data coordinator, in consultation with the site operator and ARS field specialists, diagnoses the problem and suggests specific actions. The operator initiates the corrective actions, tests the system, and again notifies the data coordinator of his/her findings.
- If the system appears to be operating normally following corrective actions, the operator returns it to service and visits the site periodically before the next regularly scheduled visit to verify system operation.
- When the site operator cannot identify or resolve a system-related problem or is not available to address the malfunction, the data coordinator ships a complete backup system or specific component to the site as quickly as possible, along with a Photographic Monitoring Network Quality Assurance Log (see Section 4.4). Site operators exchange the equipment, document the exchange on the log, and ship the malfunctioning component to ARS for evaluation and repair.
- The site operator documents all problems, troubleshooting, and corrective actions on the Time-Lapse Video Monitoring Status/Assessment Sheet. The documentation should include:

- Date of noted malfunction
 - Actual or estimated amount of data loss
 - Steps taken to test system components
 - Corrective actions taken
 - Current operational status
- All troubleshooting and emergency maintenance communications documentation will be retained in the site-specific Quality Assurance Database for future reference. The data coordinator will continue to monitor the videotapes for recurrences or resolution of the problem.

All procedures described in this TI refer to the Sony SSC-S20 camera with Panasonic AG-6740 SVHS VCR and Panasonic CT1384Y color monitor. Schematic diagrams of the monitoring system components are provided in TI 4120-3650, *Routine Site Operator Maintenance Procedures for the SVHS Time-Lapse Video Camera System at DNPP - Sony SSC-S20 Camera, Panasonic AG-6740 SVHS VCR, and Panasonic CT1384Y Monitor.*

4.1 GENERAL INFORMATION

Initial diagnoses of an equipment problem should follow this troubleshooting sequence:

- 1) Follow the troubleshooting procedures described in the following subsections.
- 2) Document troubleshooting results so the data coordinator or field specialist can review the problem accurately.
- 3) Refer to the Time-Lapse Video Monitoring Field Procedures Notebook when necessary.

Throughout the monitoring effort, ARS and site operators maintain close personal communications. Call ARS immediately if any inconsistencies are noted or if any questions arise. Many problems can be resolved through telephone consultation.

ARS may be reached at the following telephone numbers:

Telephone: 970/484-7941
Fax: 970/484-3423

If the person you need to speak with is not immediately available, ask to be directed to another or leave a message including your name, location, and a brief description of the problem(s) or need(s).

Data collection errors or discrepancies observed by the data coordinator during videotape review can also initiate required corrective action. All requested maintenance or troubleshooting procedures performed must be thoroughly documented by the site operator on the Time-Lapse Video Monitoring Status/Assessment Sheet and by the data coordinator in the site-specific Quality Assurance Database.

4.2 TROUBLESHOOTING AND EMERGENCY MAINTENANCE PROCEDURES

Standard settings for each component should be checked before troubleshooting procedures begin. Standard settings for the DNPP components are as follows:

- Sony high-resolution color CCD camera:
 - “MODE” selection switch should be set to **AUTO**.
- Panasonic AG-6740 time-lapse VCR:
 - “REC MODE” should be set to **INT** (internal timer).
 - “TIME MODE” should be set to **6H**.
 - Date and time should be correct.
- Panasonic CT1384Y color video monitor:
 - Press the **VIDEO SELECT** button. “VIDEO INPUT 1” should be the selected input.

If any component fails to operate properly, refer to the following discussion first. If a remedy cannot be found, or if the system components are not set correctly, consult the individual component manufacturer's manuals provided in the Time-Lapse Video Monitoring Field Procedures Notebook.

4.2.1 Video Monitor

If no picture appears or if the picture is distorted on the video monitor, it may be caused by cables, the monitor, VCR, or camera. The following troubleshooting procedures should be followed first to isolate the cause and potentially correct the problem:

POWER
CAUSES

GFI circuit breakers - Verify that the circuit breaker or GFI reset buttons for the outlet and UPS power supply have not been tripped.

Monitor – Verify that the monitor is plugged in and turned on.

CABLE
CAUSES

Check all power and signal cable connections to verify that all connectors are properly seated and that there are no severed or damaged cables or connections.

**MONITOR
CAUSES**

Power loss - Check the circuit breaker or GFI reset button for the outlet used. Check all power connections at the monitor, at the outlet in the bottom of the housing, and on the UPS. Check for power at the wall plug.

Video input loss - Check the VHS cable connections from the VCR to the monitor.

Incorrect channel selection - The monitor must be tuned to the correct input using the input selection button. The input channel where the video cables from the VCR are connected must match the channel input select button.

If no problems were identified with the monitor, an effective way to isolate the problem is to remove the "camera to VCR" cable from the back of the VCR. Connect the cable directly to the monitor. If a picture does not appear, the problem is likely camera related; proceed to Section 4.2.2 below. If a picture appears, the problem is likely with the VCR; proceed to Section 4.2.3.

4.2.2 Video Camera

NO PICTURE

Power loss – Check for power loss to the camera by inspecting the power connections at the camera within the environmental enclosure. When the camera is powered up, a red indicator light is visible on the front of the camera just below and to the left of the lens.

Cable connections – Check the signal cable connections inside and outside of the environmental enclosure, and verify the integrity of the cable.

No video signal – Check that the camera lens cap has been removed.

**BLACK AND
WHITE PICTURE**

Check all power and signal cable connections to verify that all connectors are properly seated and that there are no severed or damaged cables or connections.

**POOR
EXPOSURE**

Verify that the "MODE" selector switch on the camera is set to "AUTO".

**PICTURE OUT
OF FOCUS**

Telephone ARS for instructions.

4.2.3 Video Cassette Recorder

| | |
|-----------------------------------|---|
| VCR DOES NOT RECORD | <u>VCR tape</u> - Check that the read-only tab on the videotape cassette is intact. Also check that the videotape is rewound. <u>VCR</u> - Check that the VCR has not been placed in the pause mode. |
| RECORDING CANNOT BE STOPPED | If the "REC LOCK" switch is set to "1" or "2", set it to "OFF." |
| ERROR CODES | When error codes appear on the VCR display, refer to the manufacturer's manual in the Time-Lapse Video Monitoring Field Procedures Notebook . |
| DATE AND TIME NOT DISPLAYED | When the date and time do not appear on the monitor display, or if they are incorrect, reset them following the instructions on page 34 of the Panasonic AG-6740 operating instructions. |

4.2.4 Programmable VCR Video Function Check

If the steps defined above do not correct the problem and the problem has been isolated to the VCR, the programmable video functions may be incorrectly set. Correct VCR function settings are shown in Table 4-1. Procedures to navigate through the VCR menu screens are discussed below. If difficulty is encountered completing this process, refer to page 51 of the Panasonic AG-6740 time-lapse recorder manufacturer's manual. The operator should not attempt to change any other parameters in the VCR setup without direct instruction from the ARS data coordinator.

| | |
|---------------------------------------|---|
| NAVIGATING THE VCR MENU SCREENS | <p>The REV PLAY, PLAY, REW, and FF, REV ADV, and FWD ADV buttons on the front panel of the VCR serve a secondary programming purpose when in the VCR programming menu mode. There are six (6) menu screens with multiple options on each menu screen to choose from when in the programming mode. Use the gold labels under these buttons to navigate through the menus as follows:</p> <ul style="list-style-type: none">• Place the VCR in "program mode" by sliding the PROGRAM switch to MENU.• Page through the six menu screens using REV PLAY (-) or PLAY (+).• Scroll through items on a menu screen using REW (▼) or FF (►).• Set the value of an item on a screen using REV ADV (-) or FWD ADV (+). |
|---------------------------------------|---|

Table 4-1
Time-Lapse Monitoring System VCR Settings
for the DNPP Monitoring Site

| Menu Screen | Switch/Option | Correct Setting | | |
|----------------|---|-------------------|------|-----|
| 1 | (Display) | | | |
| | Mode | T/D | | |
| | Character | WHITE | | |
| | Position | L-BOTTOM | | |
| | Time Select | 24HOUR | | |
| | Data | ON | | |
| | Time Select | ON | | |
| | T-Mode | ON | | |
| | (Rec Indicated) | | | |
| | Not Rec | CAMERA | | |
| 2 | (VTR Mode Select 1) (High Density Rec) | | | |
| | Mode | ON | | |
| | (Rec T-Mode) | OFF | | |
| | (Tape in) | STOP | | |
| | (Tape end) | STOP | | |
| | Alarm in | STOP | | |
| | (Eject Operation) Mode | EJECT | | |
| 3 | (VTR Mode Select 2) Power Loss Memory ** * * * * * ** | | | |
| | (Video) | | | |
| | Mode | AUTO | | |
| | In | S-VIDEO | | |
| | S-VHS REC | ON | | |
| | (Time Adjusting) | | | |
| | Set Time Operation | 5:00 MASTER | | |
| 4 | (Alarm/Sensor Rec) | | | |
| | Mode | OFF | | |
| | Duration | 0.5MIN | | |
| | Buzzer | OFF | | |
| | Repeat in | OFF | | |
| | (Reset Pulse) | | | |
| | Input Level | HIGH | | |
| | (Camera SW) | | | |
| Timing Mode | 1FIELD TM2 | | | |
| 5 | (1-Shot REC) | | | |
| | Field | 1 | | |
| | Interval | 3MIN | | |
| | (Tape Remain) | | | |
| | Buzzer | OFF | | |
| | (Rec Review) | | | |
| | Auto Err Buzzer (Err Warn Buzzer) | OFF OFF OFF | | |
| 6 | (Internal Timer Rec) | Start | End | T-M |
| | Sun | OFF | | |
| | Mon | OFF | | |
| | Tue | OFF | | |
| | Wed | OFF | | |
| | Thu | OFF | | |
| | Fri | OFF | | |
| | Sat | OFF | | |
| DLY | (See Table 4-2) | | 480H | |
| Other | Program Switch | OFF | | |
| | Rec Lock | OFF | | |
| | Time Mode | 2H OR 6H | | |
| | Time/Counter | COUNT | | |

**VERIFY VCR
MENU SETTINGS**

Check each menu screen against the values in Table 4-1. The only parameter that can vary from the table is the Internal Timer Record settings for automatic recording times. These values are set seasonally to accommodate day-length. Make sure the Internal Timer Record start and stop times and T-M are set according to the times specified for the monitoring program.

**SETTING THE
DAILY START
AND STOP TIMES**

Using the navigation techniques described above, select the “Internal Timer Rec” menu. Scroll down to the DLY line and set the start and stop times as specified in Table 4-2.

Note: The VCR and all recording times are kept in standard time (i.e., DO NOT SET THE VCR TIME TO DAYLIGHT SAVING TIME).

Table 4-2

VCR Monthly Recording Start/Stop Timer Settings
Healy Clean Coal Project, Post-Construction Visibility Monitoring Program

| Healy, Yukon-Koyukuk County, Alaska (longitude W149.0° latitude N63.9°) | | | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Adjustment Date | 1-Jan | 1-Feb | 1-Mar | 1-Apr | 1-May | 1-Jun | 1-Jul | 1-Aug | 1-Sep | 1-Oct | 1-Nov | 1-Dec |
| Video Start* | 08:30 | 07:00 | 05:30 | 03:30 | 00:00 | 00:00 | 00:00 | 02:30 | 04:30 | 06:00 | 07:30 | 09:30 |
| Video Stop* | 18:00 | 19:00 | 20:30 | 22:30 | 00:00 | 00:00 | 00:00 | 00:00 | 21:00 | 19:00 | 17:30 | 16:00 |

* All times are in Standard Time. Do not set the VCR time to Daylight Saving Time.

Sunrise/Sunset Reference Table

| Date | 31-Jan | 28-Feb | 31-Mar | 30-Apr | 31-May | 22-Jun | 1-Jul | 1-Aug | 1-Sep | 1-Oct | 1-Nov | 22-Dec |
|----------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|--------|
| Standard/daylight | AST | AST | AST | ADT | ADT | ADT | ADT | ADT | ADT | ADT | AST | AST |
| Begin civil twilight | 08:40 | 07:18 | 05:29 | 04:27 | | | | 03:39 | 05:47 | 07:18 | 07:45 | 09:29 |
| Sunrise | 09:37 | 08:06 | 06:18 | 05:33 | 03:58 | 03:31 | 03:40 | 05:06 | 06:39 | 08:05 | 08:38 | 10:46 |
| Sun transit | 13:09 | 13:08 | 13:00 | 13:53 | 13:54 | 13:58 | 14:00 | 14:02 | 13:56 | 13:45 | 12:39 | 12:55 |
| Sunset | 16:43 | 18:12 | 19:44 | 22:15 | 23:51 | 00:25 | 00:18 | 22:56 | 21:10 | 19:25 | 16:40 | 15:03 |
| End civil twilight | 17:40 | 19:00 | 20:34 | 23:23 | | | | 00:20 | 22:02 | 20:12 | 17:33 | 16:20 |

Source:
U.S. Naval Observatory, Astronomical Applications Department
http://aa.usno.navy.mil/AA/data/docs/RS_OneDay.html

4.3 FINAL SYSTEM VERIFICATION CHECK

A thorough review of all system components and camera settings should be made following any component (or system) replacement or troubleshooting effort. Verify proper automatic operation by observing the system during a scheduled monitoring period. Refer to TI 4120-3650, *Routine Site Operator Maintenance Procedures for the SVHS Time-Lapse Video Camera System at DNPP - Sony SSC-S20 Camera, Panasonic AG-6740 SVHS VCR, and Panasonic CT1384Y Monitor*, for complete system verification procedures.

After any adjustment, repair, or replacement, verify system operation periodically before the scheduled site visit to ensure ongoing operation. The data coordinator will review all videotapes immediately upon receipt to ensure correct tape exposure and advancement.

4.4 CAPITAL EQUIPMENT EXCHANGE PROCEDURES

When the site operator cannot identify or resolve a system-related problem or is not available to address the malfunction, ARS will ship a backup system or system component to the site as quickly as possible. Site operators should exchange the equipment immediately upon receipt of the replacement, and ship the malfunctioning unit to ARS for evaluation and repair. ARS' shipping address is:

Air Resource Specialists, Inc.
Attn: Data Coordinator
1901 Sharp Point Drive Suite E
Fort Collins, CO 80525

Note that backup equipment and system components must be available to accommodate emergency system replacement with minimal data loss. Where no backup equipment is available, no data are collected until the system or system component can be repaired and returned to the site.

It is imperative that any capital instrumentation changes made as a result of troubleshooting or emergency maintenance be thoroughly documented. The data coordinator should document the specific model and serial numbers of the exchanged equipment in the site-specific Quality Assurance Database and ARS Purchase Order/Inventory Database for future reference. The site operator should document any on-site changes made on a Time-lapse Video Monitoring Status/Assessment Sheet or Photographic Monitoring Network Quality Assessment Log.

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| 4.4 Capital Equipment Exchange Procedures | 9 |

1.0 PURPOSE AND APPLICABILITY

The purpose of on-site troubleshooting and emergency maintenance is to assure quality data capture and minimize data loss by quickly identifying the probable source of a time-lapse video monitoring system malfunction and initializing appropriate equipment repairs or replacements. This technical instruction (TI) describes on-site troubleshooting and emergency maintenance procedures for an SVHS time-lapse video monitoring system at Garner Hill comprised of a. Sony SSC-S20 camera, Pelco PT1250 series pan/tilt, RWI 30CM microwave antenna, and Panasonic CT1384Y monitor.

This TI serves as a guideline to facilitate the following unscheduled maintenance tasks:

- On-site troubleshooting procedures for the following components:
 - Sony SSC-S20 camera
 - Pelco PT1250 series pan/tilt
 - RWI 30CM microwave antenna
 - Panasonic CT1384Y color monitor
- Notification of the field specialist or data coordinator
- System diagnosis and resulting corrective action(s)
- Final system verification check

Site operators should be fully trained and supplied with a Time-Lapse Video Monitoring Field Procedures Notebook that contains detailed routine site operator maintenance and troubleshooting procedures for the specific camera monitoring system(s) located at the site. Additional manufacturer instruction booklets, a supply of Time-Lapse Video Monitoring Status/Assessment Sheets, and monitoring supplies are also provided.

Close personal communications should be maintained between Air Resource Specialists, Inc. (ARS) and site operators throughout all monitoring and unscheduled maintenance efforts. Operators are encouraged to call or notify ARS if they have any questions or problems. Many problems can be fully resolved over the telephone.

2.0 RESPONSIBILITIES

2.1 PROJECT MANAGER

The project manager shall coordinate with the site operator, his/her supervisor, field specialist, and data coordinator concerning the requirements and completion of specific troubleshooting procedures.

2.2 FIELD SPECIALIST

The field specialist shall:

- Coordinate with the project manager, site operator, his/her supervisor, and data coordinator concerning the requirements and completion of specific troubleshooting procedures.
- Train the site operator in all phases of specific troubleshooting procedures necessary for on-site resolution of instrument problems.
- Provide technical support to the site operator via telephone to identify and resolve instrument problems.
- Resolve problems reported by the site operator.
- Document all technical support provided to the site operator.

2.3 DATA COORDINATOR

The data coordinator shall:

- Coordinate with the project manager, site operator, his/her supervisor, and field specialist concerning the requirements and completion of specific troubleshooting procedures.
- Identify possible instrument malfunctions and contact the site operator to implement troubleshooting procedures.
- Verify that scheduled troubleshooting visits are performed and notify the site operator if he/she fails to make a scheduled visit.
- Provide technical support to the site operator via telephone to identify and resolve system problems. Document all technical support given to the site operator.
- Review documentation completed by the site operator for accuracy and completeness. File all documentation and correspondence.
- Coordinate the replacement and repair of all system components and support hardware.
- Enter all correspondence with site operators and the results of all performed procedures into the site-specific Quality Assurance Database.
- Document all capital instrumentation changes and maintain inventory records in the ARS Purchase Order/Inventory Database.

2.4 SITE OPERATOR

The site operator shall:

- Coordinate with the project manager, the site operator's supervisor, data coordinator, and field specialist concerning the requirements and completion of specific troubleshooting procedures.
- Perform all procedures described in this TI.
- Thoroughly document all troubleshooting procedures on the Time-Lapse Video Monitoring Status/Assessment Sheet; mail the completed sheet to the data coordinator.
- Report any noted inconsistencies and troubleshooting efforts immediately to the data coordinator or field specialist.

3.0 REQUIRED EQUIPMENT AND MATERIALS

The time-lapse video monitoring microwave transmitter system consists of a camera assembly and a microwave transmission assembly. The components included in each assembly are:

Camera assembly components:

- Color video camera
- Microwave transmitter electronics and antenna
- Environmental enclosure for the video camera with the following accessories:
 - heater
 - heated window
 - sun shroud
 - pan/tilt mount
- Pan/tilt unit
- Rohn 45 tower

Microwave transmission assembly:

- Climate controlled shelter
- Microwave transmitter/receiver electronics and antenna

- Color review monitor
- UPS power supply
- Miscellaneous cables, connectors, etc.

3.1 SITE VISIT EQUIPMENT

Equipment and materials generally required to support a troubleshooting site visit or emergency maintenance include:

- Medium and small flat-blade screwdriver
- Small Phillips-head screwdriver
- Medium adjustable wrench
- Keys for enclosure and padlocks
- Climbing belt
- Digital watch synchronized to National Bureau of Standards and Technology (NIST) Time (303/499-7111)
- Voltmeter
- 110 VAC wallplug circuit tester
- Time-Lapse Video Monitoring Field Procedures Notebook containing:
 - TI 4120-3655, *Routine Site Operator Maintenance Procedures for SVHS Time-Lapse Video Camera System at Garner Hill – Sony SSC-S20 Camera, Pelco PT1250 Series Pan/Tilt, RWI 30CM Microwave Antenna, and Panasonic CT1384Y Monitor*
 - TI 4120-3755, *Troubleshooting and Emergency Maintenance Procedures for SVHS Time-Lapse Video Camera System at Garner Hill – Sony SSC-S20 Camera, Pelco PT1250 Series Pan/Tilt, RWI 30CM Microwave Antenna, and Panasonic CT1384Y Monitor*
 - Manufacturer's instruction booklets
 - Time-Lapse Video Monitoring Status/Assessment Sheets
- Pen or pencil
- Optical cleaning supplies

3.2 INVENTORY

It is imperative that any capital instrumentation changes made as a result of troubleshooting or emergency maintenance be thoroughly documented. Specific model and serial numbers of the exchanged enclosure, camera, an/or monitor should be documented for future reference by the data coordinator in the site-specific Quality Assurance Database and ARS Purchase Order/Inventory Database. Any on-site changes made should be documented by the site operator on a Time-Lapse Video Monitoring Status/Assessment Sheet. Capital equipment exchange procedures are discussed in Section 4.4.

4.0 METHODS

This section includes four (4) major subsections:

- 4.1 General Information
- 4.2 Troubleshooting and Emergency Maintenance Procedures
- 4.3 Final System Verification Check
- 4.4 Capital Equipment Exchange Procedures

Maintaining a video monitoring camera system includes prompt detection and emergency maintenance when the system fails to function properly. The troubleshooting and emergency maintenance process should progress as outlined below to ensure ongoing, consistent data collection.

- A system malfunction is detected by the site operator during routine maintenance of the system or by the data coordinator during review of videotapes.
- The site operator applies defined troubleshooting procedures to test the system and notifies ARS of his/her findings. The ARS data coordinator, in consultation with the site operator and ARS field specialists, diagnoses the problem and suggests specific actions. The operator initiates the corrective actions, tests the system, and again notifies the data coordinator of his/her findings.
- If the system appears to be operating normally following corrective actions, the operator returns it to service and visits the site periodically before the next regularly scheduled visit to verify system operation.
- When the site operator cannot identify or resolve a system-related problem or is not available to address the malfunction, the data coordinator ships a complete backup system or specific component to the site as quickly as possible, along with a Photographic Monitoring Network Quality Assurance Log (see Section 4.4). Site operators exchange the equipment, document the exchange on the log, and ship the malfunctioning component to ARS for evaluation and repair.
- The site operator documents all problems, troubleshooting, and corrective actions on the Time-Lapse Video Monitoring Status/Assessment Sheet. The documentation should include:

- Date of noted malfunction
 - Actual or estimated amount of data loss
 - Steps taken to test system components
 - Corrective actions taken
 - Current operational status
- All troubleshooting and emergency maintenance communications documentation will be retained in the site-specific Quality Assurance Database for future reference. The data coordinator will continue to monitor the videotapes for recurrences or resolution of the problem.

All procedures described in this TI refer to the Sony SSC-20 video camera, Pelco PT1250 pan/tilt head, RWI 30CM microwave transmitter, and a Panasonic CT1384Y color monitor. Schematic diagrams of the monitoring system components are provided in TI 4120-3655, *Routine Site Operator Maintenance Procedures for the SVHS Time-Lapse Video Camera System at Garner Hill - Sony SSC-20 Camera, Pelco PT1250 Series Pan/Tilt, RWI 30CM Microwave Antenna, and Panasonic CT1384Y Monitor.*

4.1 GENERAL INFORMATION

Initial diagnoses of an equipment problem should follow this troubleshooting sequence:

- 1) Follow the troubleshooting procedures described in the following subsections.
- 2) Document troubleshooting results so the data coordinator or field specialist can review the problem accurately.
- 3) Refer to the Time-Lapse Video Monitoring Field Procedures Notebook when necessary.

Throughout the monitoring effort, ARS and site operators maintain close personal communications. Call ARS immediately if any inconsistencies are noted or if any questions arise. Many problems can be resolved through telephone consultation.

ARS may be reached at the following telephone numbers:

Telephone: 970/484-7941
Fax: 970/484-3423

If the person you need to speak with is not immediately available, ask to be directed to another or leave a message including your name, location, and a brief description of the problem(s) or need(s).

Data collection errors or discrepancies observed by the data coordinator during videotape review can also initiate required corrective action. All requested maintenance or troubleshooting procedures performed must be thoroughly documented by the site operator on the Time-Lapse Video Monitoring Status/Assessment Sheet and by the data coordinator in the site-specific Quality Assurance Database.

4.2 TROUBLESHOOTING AND EMERGENCY MAINTENANCE PROCEDURES

Standard settings for each component should be checked before troubleshooting procedures begin. Standard settings for the Garner Hill components are as follows:

- Sony high-resolution color CCD camera:
 - “MODE” selection switch should be set to **AUTO**.
- Panasonic CT1384Y color video monitor:
 - Press the **VIDEO SELECT** button. “VIDEO INPUT 1” should be the selected input.

If any component fails to operate properly, refer to the following discussion first. If a remedy cannot be found, or if the system components are not set correctly, consult the individual component manufacturer's manuals located in the Time-Lapse Video Monitoring Field Procedures Notebook.

4.2.1 Video Monitor

If no picture appears or if the picture is distorted on the video monitor, it may be caused by cables, the monitor, camera, or microwave system. The following troubleshooting procedures should be followed first to isolate the cause and potentially correct the problem:

| | |
|----------------|--|
| POWER CAUSES | <u>GFI circuit breakers</u> - Verify that the circuit breaker or GFI reset buttons for the outlet and UPS power supply have not been tripped. <u>Monitor</u> – Verify that the monitor is plugged in and turned on. |
| CABLE CAUSES | Check all power and signal cable connections to verify that all connectors are properly seated and that there are no severed or damaged cables or connections. |
| MONITOR CAUSES | <u>Power loss</u> - Check the circuit breaker or GFI reset button for the outlet used. Check all power connections at the monitor, at the outlet in the bottom of the housing, and on the UPS. Check for power at the wall plug. <u>Video input loss</u> - Check the cable connections from the control panel to the monitor. |

Incorrect channel selection - The monitor must be tuned to the correct input using the input selection button. The input channel where the video cables from the control panel are connected must match the channel input select button.

4.2.2 Video Camera

NO PICTURE

Power loss – Check for power loss to the camera by inspecting the power connections at the camera within the environmental enclosure. When the camera is powered up, a red indicator light is visible on the front of the camera just below and to the left of the lens.

Cable connections – Check the signal cable connections inside and outside of the environmental enclosure, and verify the integrity of the cable.

No video signal – Check that the camera lens cap has been removed.

BLACK AND
WHITE PICTURE

Check all power and signal cable connections to verify that all connectors are properly seated and that there are no severed or damaged cables or connections.

POOR
EXPOSURE

Verify that the “MODE” selector switch on the camera is set to “AUTO”.

PICTURE OUT
OF FOCUS

Telephone ARS for instructions.

4.2.3 Microwave Transmitter

If a good picture can be seen in the video monitor but the picture cannot be seen at HCCP, the cause is probably in the microwave transmitter system. A certified technician has installed the microwave transmitter system and dish. Troubleshooting procedures cannot be performed by the site operator on this piece of equipment. After completing troubleshooting procedures on all of the other components, the site operator should contact ARS immediately if the microwave system is suspected to be malfunctioning.

If these troubleshooting steps do not resolve the problem, the VCR may not be functioning properly. Refer to TI 4120-3760, *Troubleshooting and Emergency Maintenance Procedures for SVHS Time-Lapse Video Camera System at HCCP – Panasonic AG-6740 SVHS VCR and Sony Monitor*.

4.3 FINAL SYSTEM VERIFICATION CHECK

A thorough review of all system components and camera settings should be made following any component (or system) replacement or troubleshooting effort. Verify proper automatic operation by observing the system during a scheduled monitoring period. Refer to TI 4120-3655, *Routine Site Operator Maintenance Procedures for the SVHS Time-Lapse Video Camera System at Garner Hill - Sony SSC-20 Camera, Pelco PT1250 Series Pan/Tilt, RWI 30CM Microwave Antenna, and Panasonic CT1384Y Monitor*, for complete system verification procedures.

After any adjustment, repair, or replacement, verify system operation periodically before the scheduled site visit to ensure ongoing operation. The data coordinator will review all videotapes immediately upon receipt to ensure correct tape exposure and advancement.

4.4 CAPITAL EQUIPMENT EXCHANGE PROCEDURES

When the site operator cannot identify or resolve a system-related problem or is not available to address the malfunction, ARS will ship a backup system or system component to the site as quickly as possible. Site operators should exchange the equipment immediately upon receipt of the replacement, and ship the malfunctioning unit to ARS for evaluation and repair. ARS' shipping address is:

Air Resource Specialists, Inc.
Attn: Data Coordinator
1901 Sharp Point Drive Suite E
Fort Collins, CO 80525

Note that backup equipment and system components must be available to accommodate emergency system replacement with minimal data loss. Where no backup equipment is available, no data are collected until the system or system component can be repaired and returned to the site.

It is imperative that any capital instrumentation changes made as a result of troubleshooting or emergency maintenance be thoroughly documented. The data coordinator should document the specific model and serial numbers of the exchanged equipment in the site-specific Quality Assurance Database and ARS Purchase Order/Inventory Database for future reference. The site operator should document any on-site changes made on a Time-lapse Video Monitoring Status/Assessment Sheet or Photographic Monitoring Network Quality Assessment Log.

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1.0 PURPOSE AND APPLICABILITY

The purpose of on-site troubleshooting and emergency maintenance is to assure quality data capture and minimize data loss by quickly identifying the probable source of a time-lapse video monitoring system malfunction and initializing appropriate equipment repairs or replacements. This technical instruction (TI) describes on-site troubleshooting and emergency maintenance procedures for an SVHS time-lapse video monitoring system at HCCP comprised of a Panasonic AG-6740 SVHS time-lapse VCR and a Sony color monitor.

This TI serves as a guideline to facilitate the following unscheduled maintenance tasks:

- On-site troubleshooting procedures for the following components:
 - Panasonic AG-6740 SVHS time-lapse recorder
 - Sony color monitor
- Notification of the field specialist or data coordinator
- System diagnosis and resulting corrective action(s)
- Final system verification check

Site operators should be fully trained and supplied with a Time-Lapse Video Monitoring Field Procedures Notebook that contains detailed routine site operator maintenance and troubleshooting procedures for the specific camera monitoring system(s) located at the site. Additional manufacturer instruction booklets, a supply of Time-Lapse Video Monitoring Status/Assessment Sheets, and monitoring supplies are also provided.

Close personal communications should be maintained between Air Resource Specialists, Inc. (ARS) and site operators throughout all monitoring and unscheduled maintenance efforts. Operators are encouraged to call or notify ARS if they have any questions or problems. Many problems can be fully resolved over the telephone.

2.0 RESPONSIBILITIES

2.1 PROJECT MANAGER

The project manager shall coordinate with the site operator, his/her supervisor, field specialist, and data coordinator concerning the requirements and completion of specific troubleshooting procedures.

2.2 FIELD SPECIALIST

The field specialist shall:

- Coordinate with the project manager, site operator, his/her supervisor, and data coordinator concerning the requirements and completion of specific troubleshooting procedures.
- Train the site operator in all phases of specific troubleshooting procedures necessary for on-site resolution of instrument problems.
- Provide technical support to the site operator via telephone to identify and resolve instrument problems.
- Resolve problems reported by the site operator.
- Document all technical support provided to the site operator.

2.3 DATA COORDINATOR

The data coordinator shall:

- Coordinate with the project manager, site operator, his/her supervisor, and field specialist concerning the requirements and completion of specific troubleshooting procedures.
- Identify possible instrument malfunctions and contact the site operator to implement troubleshooting procedures.
- Verify that scheduled troubleshooting visits are performed and notify the site operator if he/she fails to make a scheduled visit.
- Provide technical support to the site operator via telephone to identify and resolve system problems. Document all technical support given to the site operator.
- Review documentation completed by the site operator for accuracy and completeness. File all documentation and correspondence.
- Coordinate the replacement and repair of all system components and support hardware.
- Enter all correspondence with site operators and the results of all performed procedures into the site-specific Quality Assurance Database.
- Document all capital instrumentation changes and maintain inventory records in the ARS Purchase Order/Inventory Database.

2.4 SITE OPERATOR

The site operator shall:

- Coordinate with the project manager, the site operator's supervisor, data coordinator, and field specialist concerning the requirements and completion of specific troubleshooting procedures.
- Perform all procedures described in this TI.
- Thoroughly document all troubleshooting procedures on the Time-Lapse Video Monitoring Status/Assessment Sheet; mail the completed sheet to the data coordinator.
- Report any noted inconsistencies and troubleshooting efforts immediately to the data coordinator or field specialist.

3.0 REQUIRED EQUIPMENT AND MATERIALS

The time-lapse video monitoring system consists of a video recording assembly and a microwave receiver assembly. The transmitter assembly components are located at Garner Hill; refer to TI 4120-3655, *Routine Site Operator Maintenance Procedures for SVHS Time-Lapse Video Camera System at Garner Hill – Sony SSC-S20 Camera, Pelco PT1250 Series Pan/Tilt, RWI 30CM Microwave Antenna, and Panasonic CT1384Y Monitor*. The components included in each assembly are:

Video recording assembly components:

- Color review monitor
- SVHS time-lapse video recorder
- SVHS video recorder for real time recording of declared events
- SVHS review unit
- UPS power supply
- Video distribution amplifier
- Miscellaneous cables, connectors, etc.

Microwave receiver assembly:

- Microwave transmitter/receiver electronics and antenna

3.1 SITE VISIT EQUIPMENT

Equipment and materials generally required to support a troubleshooting site visit or emergency maintenance include:

- Medium and small flat-blade screwdriver
- Digital watch synchronized to National Institute of Standards and Technology (NIST) Time (303/499-7111)
- Voltmeter
- 110 VAC wallplug circuit tester
- Time-Lapse Video Monitoring Field Procedures Notebook containing:
 - TI 4120-3660, *Routine Site Operator Maintenance Procedures for SVHS Time-Lapse Video Camera System at HCCP – Panasonic AG-6740 SVHS VCR and Sony Monitor*
 - TI 4120-3760, *Troubleshooting and Emergency Maintenance Procedures for SVHS Time-Lapse Video Camera System at HCCP – Panasonic AG-6740 SVHS VCR and Sony Monitor*
 - Manufacturer's instruction booklets
 - Time-Lapse Video Monitoring Status/Assessment Sheets
 - Videotape cassette labels
- Pen or pencil
- Optical cleaning supplies
- Supplemental SVHS videotape cassettes
- Padded mailing envelopes

3.2 INVENTORY

It is imperative that any capital instrumentation changes made as a result of troubleshooting or emergency maintenance be thoroughly documented. Specific model and serial numbers of the exchanged recorder and/or monitor should be documented for future reference by the data coordinator in the site-specific Quality Assurance Database and ARS Purchase Order/Inventory Database. Any on-site changes made should be documented by the site operator on a Time-Lapse Video Monitoring Status/Assessment Sheet. Capital equipment exchange procedures are discussed in Section 4.4.

4.0 METHODS

This section includes four (4) major subsections:

- 4.1 General Information
- 4.2 Troubleshooting and Emergency Maintenance Procedures
- 4.3 Final System Verification Check
- 4.4 Capital Equipment Exchange Procedures

Maintaining a video monitoring camera system includes prompt detection and emergency maintenance when the system fails to function properly. The troubleshooting and emergency maintenance process should progress as outlined below to ensure ongoing, consistent data collection.

- A system malfunction is detected by the site operator during routine maintenance of the system or by the data coordinator during review of videotapes.
- The site operator applies defined troubleshooting procedures to test the system and notifies ARS of his/her findings. The ARS data coordinator, in consultation with the site operator and ARS field specialists, diagnoses the problem and suggests specific actions. The operator initiates the corrective actions, tests the system, and again notifies the data coordinator of his/her findings.
- If the system appears to be operating normally following corrective actions, the operator returns it to service and visits the site periodically before the next regularly scheduled visit to verify system operation.
- When the site operator cannot identify or resolve a system-related problem or is not available to address the malfunction, the data coordinator ships a complete backup system or specific component to the site as quickly as possible, along with a Photographic Monitoring Network Quality Assurance Log (see Section 4.4). Site operators exchange the equipment, document the exchange on the log, and ship the malfunctioning component to ARS for evaluation and repair.
- The site operator documents all problems, troubleshooting, and corrective actions on the Time-Lapse Video Monitoring Status/Assessment Sheet. The documentation should include:
 - Date of noted malfunction
 - Actual or estimated amount of data loss
 - Steps taken to test system components
 - Corrective actions taken
 - Current operational status

- All troubleshooting and emergency maintenance communications documentation will be retained in the site-specific Quality Assurance Database for future reference. The data coordinator will continue to monitor processed film for recurrences or resolution of the problem.

All procedures described in this TI refer to the Panasonic AG-6740 SVHS VCR and Sony color monitor. Schematic diagrams of the monitoring system components are provided in TI 4120-3660, *Routine Site Operator Maintenance Procedures for the SVHS Time-Lapse Video Camera System at HCCP - Panasonic AG-6740 SVHS VCR and Sony Monitor*.

4.1 GENERAL INFORMATION

Initial diagnoses of an equipment problem should follow this troubleshooting sequence:

- 1) Follow the troubleshooting procedures described in the following subsections.
- 2) Document troubleshooting results so the data coordinator or field specialist can review the problem accurately.
- 3) Refer to the Time-Lapse Video Monitoring Field Procedures Notebook when necessary.

Throughout the monitoring effort, ARS and site operators maintain close personal communications. Call ARS immediately if any inconsistencies are noted or if any questions arise. Many problems can be resolved through telephone consultation.

ARS may be reached at the following telephone numbers:

Telephone: 970/484-7941
Fax: 970/484-3423

If the person you need to speak with is not immediately available, ask to be directed to another or leave a message including your name, location, and a brief description of the problem(s) or need(s).

Data collection errors or discrepancies observed by the data coordinator during film review can also initiate required corrective action. All requested maintenance or troubleshooting procedures performed must be thoroughly documented by the site operator on the Time-Lapse Video Monitoring Status/Assessment Sheet and by the data coordinator in the site-specific Quality Assurance Database.

4.2 TROUBLESHOOTING AND EMERGENCY MAINTENANCE PROCEDURES

Standard settings for each component should be checked before troubleshooting procedures begin. Standard settings for the HCCP components are as follows:

- Panasonic AG-6740 time-lapse VCR:
 - “REC MODE” should be set to **INT** (internal timer).
 - “TIME MODE” should be set to **6H**.
- Sony color video monitor:
 - The **LINE A** button should be the selected input.

If any component fails to operate properly, refer to the following discussion first. If a remedy cannot be found, or if the system components are not set correctly, consult the individual component manufacturer's provided in the Time-Lapse Video Monitoring Field Procedures Notebook.

4.2.1 Video Monitor

If no picture appears or if the picture is distorted on the video monitor, it may be caused by cables, the monitor, VCR, or microwave system. The following troubleshooting procedures should be followed first to isolate the cause and potentially correct the problem:

| | |
|-------------------|---|
| POWER CAUSES | <u>GFI circuit breakers</u> - Verify that the circuit breaker or GFI reset buttons for the outlet and UPS power supply have not been tripped. <u>Monitor</u> – Verify that the monitor is plugged in and turned on. |
| CABLE CAUSES | Check all power and signal cable connections to verify that all connectors are properly seated and that there are no severed or damaged cables or connections. |
| MONITOR CAUSES | <u>Power loss</u> - Check the circuit breaker or GFI reset button for the outlet used. Check all power connections at the monitor, at the outlet in the bottom of the housing, and on the UPS. Check for power at the wall plug. <u>Video input loss</u> - Check the VHS cable connections from the VCR to the monitor. <u>Incorrect channel selection</u> - The monitor must be tuned to the correct input using the input selection button. The input channel where the video cables from the VCR are connected must match the channel input select button. |

If no problems were identified with the monitor, an effective way to isolate the problem is to remove the “microwave to VCR” cable from the back of the VCR. Connect the cable directly to the monitor. If a picture appears, the problem is likely with the VCR.

4.2.2 Video Cassette Recorder

| | |
|-----------------------------|---|
| VCR DOES NOT RECORD | <u>VCR tape</u> - Check that the read-only tab on the videotape cassette is intact. Also check that the videotape is rewound. <u>VCR</u> - Check that the VCR has not been placed in the pause mode. |
| RECORDING CANNOT BE STOPPED | If the "REC LOCK" switch is set to "1" or "2", set it to "OFF." |
| ERROR CODES | When error codes appear on the VCR display, refer to the manufacturer's manual in the Time-Lapse Video Monitoring Field Procedures Notebook. |
| DATE AND TIME NOT DISPLAYED | When the date and time do not appear on the monitor display, or if they are incorrect, reset them following the instructions on page 34 of the Panasonic AG-6740 operating instructions. |

4.2.3 Programmable VCR Video Function Check

If the steps defined above do not correct the problem and the problem has been isolated to the VCR, the programmable video functions may be incorrectly set. Correct VCR function settings are shown in Table 4-1. Procedures to navigate through the VCR menu screens are discussed below. If difficulty is encountered completing this process, refer to page 51 of the Panasonic AG-6740 time-lapse recorder manufacturer's manual. The operator should not attempt to change any other parameters in the VCR setup without direct instruction from the ARS data coordinator.

| | |
|---------------------------------|---|
| NAVIGATING THE VCR MENU SCREENS | <p>The REV PLAY, PLAY, REW, and FF, REV ADV, and FWD ADV buttons on the front panel of the VCR serve a secondary programming purpose when in the VCR programming menu mode. There are six (6) menu screens with multiple options on each menu screen to choose from when in the programming mode. Use the gold labels under these buttons to navigate through the menus as follows:</p> <ul style="list-style-type: none">• Place the VCR in "program mode" by sliding the PROGRAM switch to MENU.• Page through the six menu screens using REV PLAY (-) or PLAY (+).• Scroll through items on a menu screen using REW (▼) or FF (▶).• Set the value of an item on a screen using REV ADV (-) or FWD ADV (+). |
|---------------------------------|---|

Table 4-1
Time-Lapse Monitoring System VCR Settings
for the HCCP Monitoring Site

| Menu Screen | Switch/Option | Correct Setting | | |
|-------------------|--|-----------------|-----|------|
| 1 | (Display) | | | |
| | Mode | T/D | | |
| | Character | WHITE | | |
| | Position | L-BOTTOM | | |
| | Time Select | 24HOUR | | |
| | Data | ON | | |
| | Time Select | ON | | |
| | T-Mode | ON | | |
| | (Rec Indicated) | | | |
| | Not Rec | CAMERA | | |
| 2 | (VTR Mode Select 1) (High Density Rec) | | | |
| | Mode | ON | | |
| | (Rec T-Mode) | OFF | | |
| | (Tape in) | STOP | | |
| | (Tape end) | STOP | | |
| | Alarm in | STOP | | |
| | (Eject Operation) Mode | EJECT | | |
| 3 | (VTR Mode Select 2) Power Loss Memory ** * * * * * * * * * * | | | |
| | (Video) | | | |
| | Mode | AUTO | | |
| | In | LINE | | |
| | S-VHS REC | ON | | |
| | (Time Adjusting) | | | |
| | Set Time | 5:00 | | |
| | Operation | MASTER | | |
| 4 | (Alarm/Sensor Rec) | | | |
| | Mode | OFF | | |
| | Duration | 0.5MIN | | |
| | Buzzer | OFF | | |
| | Repeat in | OFF | | |
| | (Reset Pulse) | | | |
| | Input Level | HIGH | | |
| | (Camera SW) | | | |
| Timing | 1FIELD | | | |
| Mode | TM2 | | | |
| 5 | (1-Shot REC) | | | |
| | Field | 1 | | |
| | Interval | 3MIN | | |
| | (Tape Remain) | | | |
| | Buzzer | OFF | | |
| | (Rec Review) | | | |
| | Auto | OFF | | |
| | Err Buzzer | OFF | | |
| (Err Warn Buzzer) | OFF | | | |
| 6 | (Internal Timer Rec) | Start | End | T-M |
| | Sun | OFF | | |
| | Mon | OFF | | |
| | Tue | OFF | | |
| | Wed | OFF | | |
| | Thu | OFF | | |
| | Fri | OFF | | |
| | Sat | OFF | | |
| | DLY | (See Table 4-2) | | 480H |
| Other | Program Switch | OFF | | |
| | Rec Lock | OFF | | |
| | Time Mode | 2H OR 6H | | |
| | Time/Counter | COUNT | | |

**VERIFY VCR
MENU SETTINGS**

Check each menu screen against the values in Table 4-1. The only parameter that can vary from the table is the Internal Timer Record settings for automatic recording times. These values are set seasonally to accommodate day-length. Make sure the Internal Timer Record start and stop times and T-M are set according to the times specified for the monitoring program.

**SETTING THE
DAILY START
AND STOP TIMES**

Using the navigation techniques described above, select the “Internal Timer Rec” menu. Scroll down to the DLY line and set the start and stop times as specified in Table 4-2.

Note: The VCR and all recording times are kept in standard time (i.e., DO NOT SET THE VCR TIME TO DAYLIGHT SAVING TIME).

Table 4-2

VCR Monthly Recording Start/Stop Timer Settings
Healy Clean Coal Project, Post-Construction Visibility Monitoring Program

| Healy, Yukon-Koyukuk County, Alaska (longitude W149.0° latitude N63.9°) | | | | | | | | | | | | |
|---|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Adjustment Date | 1-Jan | 1-Feb | 1-Mar | 1-Apr | 1-May | 1-Jun | 1-Jul | 1-Aug | 1-Sep | 1-Oct | 1-Nov | 1-Dec |
| Video Start* | 08:30 | 07:00 | 05:30 | 03:30 | 00:00 | 00:00 | 00:00 | 02:30 | 04:30 | 06:00 | 07:30 | 09:30 |
| Video Stop* | 18:00 | 19:00 | 20:30 | 22:30 | 00:00 | 00:00 | 00:00 | 00:00 | 21:00 | 19:00 | 17:30 | 16:00 |

* All times are in Standard Time. Do not set the VCR time to Daylight Saving Time.

Sunrise/Sunset Reference Table

| Date | 31-Jan | 28-Feb | 31-Mar | 30-Apr | 31-May | 22-Jun | 1-Jul | 1-Aug | 1-Sep | 1-Oct | 1-Nov | 22-Dec |
|----------------------|--------|--------|--------|--------|--------|--------|-------|-------|-------|-------|-------|--------|
| Standard/daylight | AST | AST | AST | ADT | ADT | ADT | ADT | ADT | ADT | ADT | AST | AST |
| Begin civil twilight | 08:40 | 07:18 | 05:29 | 04:27 | | | | 03:39 | 05:47 | 07:18 | 07:45 | 09:29 |
| Sunrise | 09:37 | 08:06 | 06:18 | 05:33 | 03:58 | 03:31 | 03:40 | 05:06 | 06:39 | 08:05 | 08:38 | 10:46 |
| Sun transit | 13:09 | 13:08 | 13:00 | 13:53 | 13:54 | 13:58 | 14:00 | 14:02 | 13:56 | 13:45 | 12:39 | 12:55 |
| Sunset | 16:43 | 18:12 | 19:44 | 22:15 | 23:51 | 00:25 | 00:18 | 22:56 | 21:10 | 19:25 | 16:40 | 15:03 |
| End civil twilight | 17:40 | 19:00 | 20:34 | 23:23 | | | | 00:20 | 22:02 | 20:12 | 17:33 | 16:20 |

Source:
U.S. Naval Observatory, Astronomical Applications Department
http://aa.usno.navy.mil/AA/data/docs/RS_OneDay.html

If these troubleshooting steps do not resolve the problem, the microwave system or camera are not functioning properly. Refer to TI 4120-3755, *Troubleshooting and Emergency Maintenance Procedures for SVHS Time-Lapse Video Camera System at Garner Hill – Sony SSC-S20 Camera, Pelco PT1250 Series Pan/Tilt, RWI 30CM Microwave Antenna, and Panasonic CT1384Y Monitor.*

4.3 FINAL SYSTEM VERIFICATION CHECK

A thorough review of all system components and camera settings should be made following any component (or system) replacement or troubleshooting effort. Verify proper automatic operation by observing the system during a scheduled monitoring period. Refer to TI 4120-3660, *Routine Site Operator Maintenance Procedures for the SVHS Time-Lapse Video Camera System at HCCP – Panasonic AG-6740 SVHS VCR and Sony Monitor*, for complete system verification procedures.

After any adjustment, repair, or replacement, verify system operation periodically before the scheduled site visit to ensure ongoing operation. The data coordinator will review all videotapes immediately upon receipt to ensure correct tape exposure and advancement.

4.4 CAPITAL EQUIPMENT EXCHANGE PROCEDURES

When the site operator cannot identify or resolve a system-related problem or is not available to address the malfunction, ARS will ship a backup system or system component to the site as quickly as possible. Site operators should exchange the equipment immediately upon receipt of the replacement, and ship the malfunctioning unit to ARS for evaluation and repair. ARS' shipping address is:

Air Resource Specialists, Inc.
Attn: Data Coordinator
1901 Sharp Point Drive Suite E
Fort Collins, CO 80525

Note that backup equipment and system components must be available to accommodate emergency system replacement with minimal data loss. Where no backup equipment is available, no data are collected until the system or system component can be repaired and returned to the site.

It is imperative that any capital instrumentation changes made as a result of troubleshooting or emergency maintenance be thoroughly documented. The data coordinator should document the specific model and serial numbers of the exchanged equipment in the site-specific Quality Assurance Database and ARS Purchase Order/Inventory Database for future reference. The site operator should document any on-site changes made on a Time-lapse Video Monitoring Status/Assessment Sheet or Photographic Monitoring Network Quality Assessment Log.