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## **1.0 PURPOSE AND APPLICABILITY**

The purpose of routine site operator maintenance is to assure quality data capture and minimize data loss by performing and documenting scheduled operational checks and preventive maintenance of the time-lapse video monitoring system. This technical instruction (TI) describes the steps of a routine site visit, scheduled maintenance, and on-site data control for the Garner Hill SVHS time-lapse video monitoring microwave transmitter system comprised of a Sony SSC-20 video camera, Pelco PT1250 pan/tilt head, RWI 30CM microwave transmitter, and a Panasonic CT1384Y color monitor.

The site operator should service the video system approximately every 7 days. During each site visit the operator should check the performance of the video system, clean system components, and perform troubleshooting and/or emergency maintenance as required. Preventive maintenance site visits are performed every six months or as required by the project manager. The effective performance and documentation of each of these tasks is the key to quality data collection and minimal data loss.

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 the monitoring effort. 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 schedule and requirements for routine and remedial maintenance.
- Review status/assessment sheets.

### **2.2 FIELD SPECIALIST**

The field specialist shall:

- Coordinate with the project manager, site operator, his/her supervisor, and data coordinator concerning the schedule and requirements for routine and remedial maintenance.

- Train the site operator in all phases of video system maintenance.
- Provide technical support to the site operator via telephone to assure high quality site visits.
- 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 schedule and requirements for routine or remedial maintenance.
- Verify that scheduled visits are performed and notify the site operator if he/she fails to make a scheduled visit.
- Review all site documentation completed by the site operator for accuracy and completeness. File all documentation and correspondence.
- Resolve problems reported by the site operator.
- Enter the results of all performed procedures into the site-specific Quality Assurance Database.
- Supply the site operator with all necessary monitoring supplies.
- Coordinate the replacement and repair of all malfunctioning units.
- 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 schedule and requirements for routine or remedial maintenance.
- Schedule regular site maintenance visits and perform all procedures described in this TI.
- Thoroughly document all procedures on the Time-Lapse Video Monitoring Status/Assessment Sheet.
- Immediately report any noted inconsistencies 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 routine site visit or scheduled 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 Institute of Standards and Technology (NIST) Time (303/499-7111)
- 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 routine or remedial maintenance be thoroughly documented. Specific model and serial numbers of the exchanged enclosure, camera, 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 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*.

### 4.0 METHODS

This section includes two (2) major subsections:

- 4.1 Routine Servicing
- 4.2 Scheduled Preventive Maintenance

All procedures described in this TI refer to the Sony SSC-S20 camera with Panasonic CT1384Y color monitor. Schematic diagrams of the video system components are provided as Figures 4-1 and 4-2.

#### **4.1 ROUTINE SERVICING**

Weekly site visits are required to properly maintain and service the time-lapse video monitoring system. Weekly system servicing by the site operator includes:

- Inspecting and cleaning the camera assembly components and shelter.
- Verifying camera alignment.
- Securing the system.
- Documenting the servicing visit on a Time-Lapse Video Monitoring Status/Assessment Sheet.

Proper documentation of each servicing visit performed on the status/assessment sheet is required. A properly completed status/assessment sheet must accompany each videotape cassette mailed to ARS.

##### **4.1.1 Completing the Time-Lapse Video Monitoring Status/Assessment Sheet**

Figure 4-3 presents an example Time-Lapse Video Monitoring Status/Assessment Sheet for the DNPP and Garner Hill Monitoring Sites. The top section of the sheet requires information pertinent to tracking the videotape and system servicing performed during the recording period. The body of the sheet has checkboxes for each of the required system and videotape servicing procedures. Each status/assessment sheet covers three site visits. The site operator should check off the procedures performed during these three visits in columns 1, 2, and 3, respectively.

The comment column is to be used by the operator to note any inconsistencies or general observations during each visit. Comments concerning heavy dirt buildup, camera misalignment, power failure during the servicing visit, etc., are appropriate here. It is extremely important that the site operator properly complete the Time-Lapse Video Monitoring Status/Assessment Sheet and enclose it with each videotape mailed to ARS.

##### **4.1.2 System Servicing Procedures**

The site operator should complete the following procedures during each system servicing visit. A generic, quick-look reference guide that summarizes these procedures is also provided to the operator. A copy of this quick reference, titled "Automatic Time-Lapse Video Monitoring System Users Manual" is provided in Appendix A.

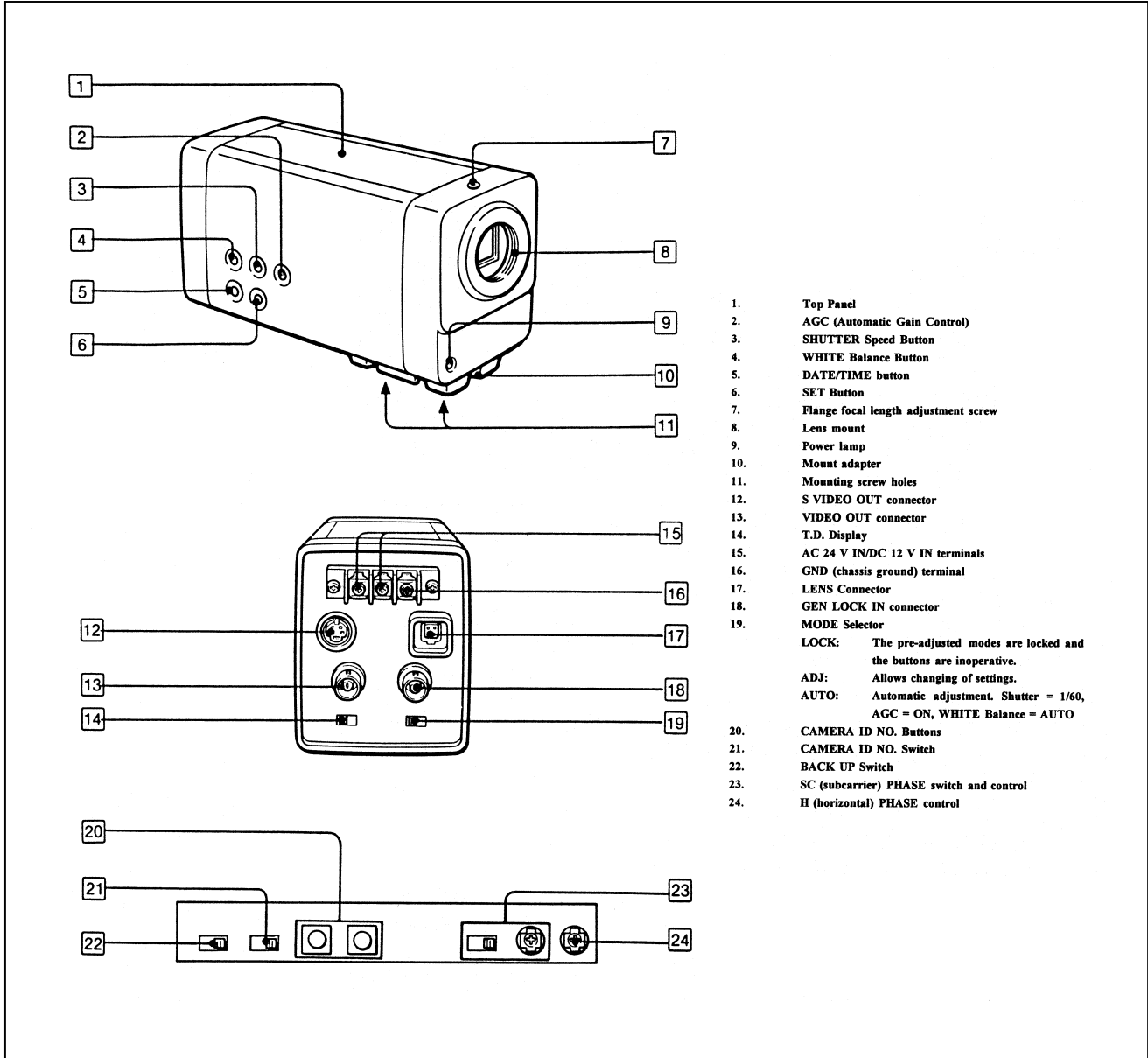


Figure 4-1. Sony CCD Camera Control Schematic.



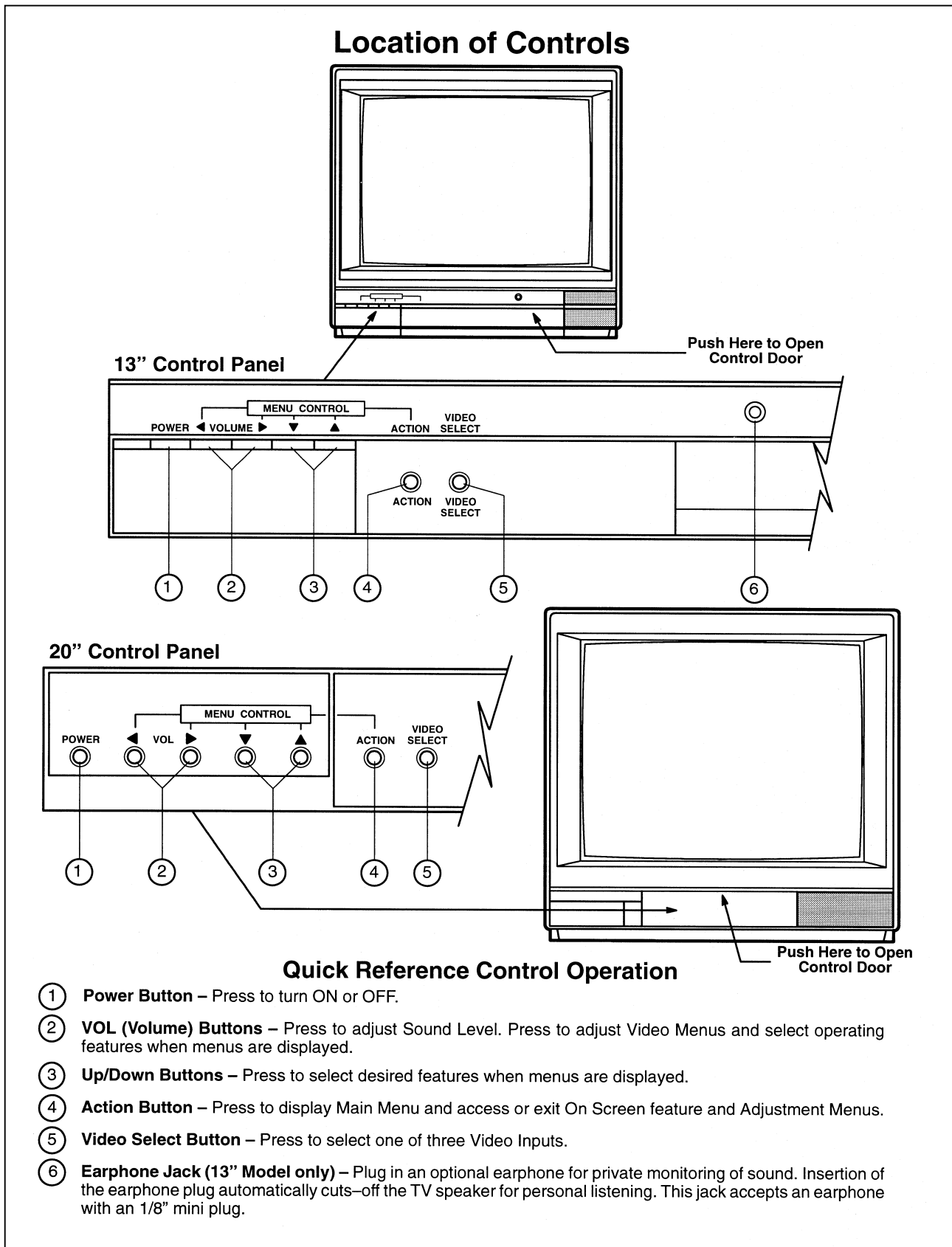


Figure 4-2. Panasonic CT1384Y Color Monitor Schematic.


TIME-LAPSE VIDEO MONITORING STATUS/ASSESSMENT SHEET DNPP AND GARNER HILL MONITORING SITES		Location: _____ Tape No. _____		
		Operator: _____		
Date/Time of Site Visits #1: _____ : _____ #2: _____ : _____ #3: _____ : _____				
Check procedures performed during each site visit in the appropriate column.				
<b>VIDEOTAPE LOADED</b>	<b>#1</b>	<b>#2</b>	<b>#3</b>	<b>Comments</b>
Labeled videotape cassette	<input type="checkbox"/>			_____
Loaded videotape	<input type="checkbox"/>			_____
<b>OPERATION/MAINTENANCE CHECK</b>				
<u>DNPP:</u> Inspected camera assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Cleaned viewport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Checked air filter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Verified camera sled alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Verified adjustable head alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Inspected video recording assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Record tape counter #	# _____	# _____	# _____	_____
Verified recorded image, date, and time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<i>***Proceed to VIDEOTAPE REMOVAL section if changing tape***</i>				
Repositioned tape	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<u>Garner Hill:</u> Inspected camera assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Cleaned viewport	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Checked air filter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Verified pan/tilt head alignment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>CHECK OPERATION SETTINGS</b>				
INT TIMER displayed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
REC displayed (appears only if activated during recording hours)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>SECURE SYSTEM</b>				
<u>DNPP:</u> Secured camera assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Secured video recording assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Secured shelter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<u>Garner Hill:</u> Secured camera assembly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Secured shelter	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<b>VIDEOTAPE REMOVAL</b>				
Removed videotape			<input type="checkbox"/>	_____
Completed videotape cassette label			<input type="checkbox"/>	_____
Mailed videotape and assessment sheet to ARS			<input type="checkbox"/>	_____
<b>ADDITIONAL COMMENTS/ACTIONS TAKEN:</b> _____				
_____				
<b>SUPPLIES NEEDED:</b> _____				
_____				
Enclose this Status/Assessment Sheet with the labeled videotape cassette and send to:				
 1901 Sharp Point Drive, Suite E Fort Collins, CO 80525 Phone: 970-484-7941 Fax: 970-484-3423				

Figure 4-3. Example Time-Lapse Video Monitoring Status/Assessment Sheet for the DNPP and Garner Hill Monitoring Sites.

INSPECT  
AND SERVICE  
CAMERA  
ASSEMBLY

Inspect and evaluate the camera assembly for any physical damage or abnormality. If damage is found, note it on the status/assessment sheet and call the ARS data coordinator.

Clean the camera assembly enclosure exterior viewport with the supplied wipes and cleaning solution. The inside of the enclosure viewport should be inspected and cleaned only if visual inspection from the outside indicates that dirt has accumulated on the inside. To clean the inside surface of the viewport, open the Pelco camera enclosure door by inserting the key in the latch on the top-rear of the enclosure and lifting the lid. Loosen the two Phillips-head screws holding the camera mount and slide the camera back from the viewport. Clean the viewport with supplied wipes and cleaning solution. Inspect the camera lens and clean similarly if necessary.

Inspect the camera enclosure air filter for any accumulation of dust or debris. The filter is a thin, gray foam material approximately 2" x 1" and is located under the viewport. If necessary, remove and clean with water. Shake out excess water (or dry) and replace. Close the housing lid and properly secure the assembly.

VERIFY  
CAMERA  
ASSEMBLY  
ALIGNMENT

Verify that the camera assembly remote pan/tilt head is aligned properly by viewing the image on the control monitor. If alignment is not correct, notify the HCCP plant operator to adjust.

Note any alignment changes on the status/assessment sheet. The camera view alignment must match the photograph provided in the "Site Specifications" section of the Time-Lapse Video Monitoring Field Procedures Notebook.

SECURE  
SYSTEM

Carefully verify that the camera assembly and any other access to the time-lapse video system is secured and locked.

Routine procedures cannot be performed on the microwave transmitter system and dish. The site operator should contact ARS immediately if the microwave system is suspected to be malfunctioning.

#### **4.1.3 Reporting Problems to ARS**

If at any time operational problems or mechanical failure occurs, contact ARS immediately at the following:

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

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

## **4.2 SCHEDULED PREVENTIVE MAINTENANCE**

Periodic preventive maintenance will help to ensure consistent, high quality data collection. Preventive maintenance servicing visits are performed as scheduled or required by the data coordinator.

Additional servicing tasks identified by the data coordinator may include:

- Camera, monitor, or cable changes.
- Camera alignment changes.
- Revision of data collection procedures.

All scheduled preventive maintenance requested by the data coordinator or performed by the site operator must be thoroughly documented on the Time-Lapse Video Monitoring Status/Assessment Sheet and in the site-specific Quality Assurance Database.

Any equipment malfunctions or data collection discrepancies observed during a scheduled maintenance visit should be reported to ARS immediately.