Commissioning Security Systems for Drinking Water Utilities

United States
Environmental Protection
Agency

Disclaimer

This document was developed by the U.S. Environmental Protection Agency (EPA) Division of Ground Water and Drinking Water's Water Security Initiative. The information presented in this document is intended to provide guidance and to assist drinking water utilities in the commissioning of security equipment. The EPA does not provide any guarantees for actions taken by any persons in response to this guidance. The use of the word "should" in this guidance is intended solely to recommend or suggest and does not connote a requirement.

Executive Summary

This report discusses commissioning of security systems and provides a step-wise commissioning process and commissioning forms for use by drinking water utilities. Commissioning is the testing of both new and upgraded systems to verify that the operation and performance meet contract document requirements. Increasingly, water utilities are installing sophisticated security systems at their facilities, yet utility management often finds that these systems do not operate at the expected level of performance. Even worse, some security systems are abandoned because the systems have never worked as the owner intended. Proper commissioning of equipment ensures that installed security systems will operate at the expected level of performance and decreases the likelihood that this equipment will be abandoned soon after installation.

The objectives of commissioning are to ensure security systems perform as designed, meet the owner's needs, and minimize nuisance alarms that can reduce operator confidence in the systems. Benefits of commissioning include increased operator and management confidence in the security systems, validated system documentation, and reinforced owner training. Additional benefits include increased system effectiveness and improved system maintenance by having a baseline of expected system performance. Failure to adequately commission a security system can result in the delay of system startup, owner dissatisfaction, increased maintenance, professional liability claims, warranty issues, and placing utility assets at risk.

The commissioning process begins with a plan that establishes and identifies the major elements of commissioning: systems and components to be commissioned, participants in commissioning, and participant roles. Commissioning forms are developed and incorporated into the contract documents. Pre-startup testing ensures that the system equipment is ready to be started, and functional testing provides the formal commissioning of the system (ensuring correct system operation and performance). Retesting occurs when a system does not pass functional testing, after a repair to a system, or on a periodic basis. After completion of functional testing and any re-tests of failed functional tests, a testing report, along with the system operation and maintenance manuals, is submitted to the owner. The owner then assumes responsibility for operating and maintaining the system, including retesting.

This report includes eight example forms for commissioning security equipment, including access-controlled doors, perimeter detection systems, camera systems, and video recording systems. The forms can be edited to meet individual owner needs and included in contract documents.

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List of Acronyms

The list below includes acronyms approved for use in this document. Acronyms are defined at first use in the document.

ANSI	American National Standards Institute
AWWA	American Water Works Association
BCA	Building Commissioning Association
CCTV	Closed-Circuit Television
DVR	Digital Video Recorder
EPA	U.S. Environmental Protection Agency
HVAC	Heating, Ventilation, and Air Conditioning
NVR	Network Video Recorder
PTZ	Pan-Tilt-Zoom
REX	Request to Exit

Section 1.0: Introduction

An increasing number of water utilities are installing sophisticated security systems at their facilities, yet utility management often finds that these systems do not operate at a level of performance that is expected. Even worse, some security systems are abandoned because the systems have never worked as the owner intended. Proper commissioning of equipment ensures that installed security systems will operate at an expected level of performance and decreases the likelihood that this equipment will be abandoned soon after installation. Properly designed and maintained security systems are a vital component of protective security programs for drinking water utilities, as stated in the American Water Works Association (AWWA) standard *ANSI/AWWA G430-09: Security Practices for Operation and Management*, 2009.

Commissioning is the testing of systems to verify that the operation and performance of both new and upgraded systems meet contract document requirements. A system consists of equipment, and equipment consists of components. Commissioning a system begins with commissioning components, followed by commissioning equipment, and then commissioning the entire system.

Federal and state agencies have not developed or adopted commissioning standards for security systems. The Building Commissioning Association (BCA), an industry trade group, develops standard commissioning documents. The documents consist of commonly used administrative and technical forms, training templates, and checklists[1]. BCA has yet to develop security system commissioning documents, but may do so in the future.   The authors of this report are not aware of other trade groups that have developed commissioning documents, but new and existing trade groups could develop these documents in the future. This report documents a commissioning process and provides forms developed by the authors based on professional experience in the commissioning of security systems on numerous projects. Commissioning of data management and communication systems is not addressed.

1.1   Commissioning Objectives

Commissioning objectives include:

- **Perform as Designed.** The systems and equipment should perform in accordance with the contract documents (i.e., drawings and specifications). The contract documents may include a commissioning or functional test form that contains a checklist for the commissioning process. This form provides documentation that the system is installed in accordance with the system specifications and indicates whether the standard of workmanship is acceptable. (Examples are included in the appendix of this report.)

- **Meet Owners' Needs.** The systems should perform in accordance with owners' needs. The owner requirements must be clearly stated in the contract documents. Commissioning involves owners and their end users at the onset of the project to help identify expectations.

- **Minimize Nuisance Alarms.** Nuisance alarms are caused by an external source such as animals, wind, rain, etc, whereas a false alarm is generated solely by the internal electronic elements of a sensor, such as a faulty circuit. The frequency of nuisance alarms should be low. Recurring nuisance alarms lead to a reduction in operator confidence in the system. Operators may start ignoring alarms that they perceive as nuisance alarms without thoroughly investigating the alarms. Recurring nuisance alarms can also unnecessarily burden emergency response services.

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[1] For closed-circuit television (CCTV), BCA has developed a *Security CCTV System Construction Checklist* (BCA, 2006) to verify that a CCTV system is ready for commissioning, but has yet to develop a CCTV system commissioning document.

1.2   Benefits of Commissioning

Utility managers are increasingly commissioning equipment systems and buildings to verify that the system has been installed as designed and to improve the likelihood that the system equipment will maintain a specified level of performance throughout its life. Benefits of commissioning new systems include:

- **Increased Confidence and Satisfaction.** Utility operators and management gain confidence in the system by knowing proper system operation and that the system is functioning properly through systematic testing. Performance or achieving lifecycle and maintenance requirements can result in owner satisfaction.

- **Validated System Documentation.** Contract documents require the completion of commissioning forms that provide complete and accurate documentation of each system.

- **Improved System Maintenance.** Commissioning establishes a baseline of expected system performance for comparison purposes when maintaining the system. Operators and maintenance staff (the "end users") learn how the system is expected to operate through the commissioning process.

- **Reinforced Owner Training.** Owner participation in startup commissioning reinforces the system training that is typically required in the contract documents. The owner also becomes more familiar with expected system performance and how to troubleshoot aspects of the system. Owner participation promotes a more effective and sustainable security culture.

- **Increased System Effectiveness.** Commissioning identifies and tests as many single points of failure as possible, thereby improving system effectiveness before the system becomes operational. Commissioning avoids delays in system startup by eliminating unexpected issues or system faults, which could require the utility to hire or assign security guards, or even cease operations, until the security system is online.

- **Less Risk.** Commissioning reduces the likelihood a faulty or ineffective security system will place staff and key utility assets at potential health and safety risks that could be caused by theft, vandalism or terrorist attack. A faulty system could put the utility at financial risk to professional liability claims.

- **Fewer Warranty Claims.** Continual callbacks with the vendor to solve system problems and settle warranty claims may arise when working with a noncommissioned system. The start date of a warranty is vague without commissioning. The contract documents should state that the manufacturer's warranty starts after successful commissioning. Without commissioning, a manufacturer could claim that the warranty began upon delivery of the equipment which can occur months before the system begins operation.

Section 2.0: The Commissioning Process

The commissioning process consists of the following steps:

1. Specify overall plan and process
2. Identify systems, equipment, and components
3. Develop functional test procedures
4. Incorporate forms and checklists into contract documents
5. Install equipment
6. Perform pre-startup tests
7. Perform functional tests
8. Retest as necessary
9. Turn over

A plan is essential to commissioning a system as the plan establishes and identifies the major elements of commissioning: systems and components to be commissioned, participants in commissioning, and participant roles. Commissioning forms are developed and incorporated into the contract documents. Pre-start-up testing ensures that the system equipment is ready to be started, and functional testing provides the formal commissioning of the system (ensuring correct system operation and performance). Retesting occurs when a system does not pass functional testing, after a repair to a system, or on a periodic basis. After completion of functional testing and any re-tests of failed functional tests, a testing report along with the system operation and maintenance manuals are submitted to the owner. The owner then assumes responsibility for operating and maintaining the system, including retesting.

2.1 Step 1: Specify Overall Plan and Processes

A commissioning team typically consists of representatives of the contractor, owner, engineer, and end user. The team meets to decide on team member roles and responsibilities, and the associated tasks for all project phases and activities. Review and acceptance procedures, documentation requirements, and the development and approval of related commissioning checklists and forms are also decided by the team. The contractor is often not selected until after the preparation of contract documents. In these instances, the contractor joins the commissioning team once the contract is awarded.

2.2 Step 2: Identify Systems, Equipment, and Components

The commissioning team develops a list of all of the system elements to be commissioned. This list provides a complete and thorough investigation of the security system's components and equipment.

2.3 Step 3: Develop Functional Test Procedures

The functional tests are the main elements of commissioning. The commissioning team develops functional test forms and checklists for the equipment inspections or component tests that verify proper installation and performance (e.g., camera positioning, sensor calibration, etc.). Forms are discussed in more depth in Section 3. The completed forms and checklists should be reviewed by the engineer or owner's representative prior to approval of the equipment or system for initial operation.

2.4 Step 4: Incorporate Forms and Checklists into Contract Documents

The forms, checklists, and procedures to be used during commissioning are included in the contract documents (i.e., specifications and drawings).

2.5   Step 5: Install Equipment

Installation of the equipment is expected to meet or exceed all applicable federal, state, and local requirements. Installation is also expected to conform to codes (e.g., National Electrical Code, National Fire Protection Association) and ordinances of authorities that have jurisdiction in accordance with the contract documents. Equipment is installed in accordance with the manufacturers' published recommendations.

2.6   Step 6: Perform Pre-startup Tests

Pre-startup tests are the initial testing and procedures that occur in advance of the formal functional testing. The contractor performs the pre-startup tests to verify the equipment is powered, calibrated, operational, and ready for functional testing. Pre-startup tests can include verifying initial settings such as camera focus, system communication, video recording settings, system calibration, and tuning. During this stage, the contractor may find faults in the installation, hardware, or software settings, which must be corrected prior to functional testing. Even common components such as video cameras will benefit from a quick pre-startup bench test prior to installation to ensure correct focus, field of view, and backlight compensation settings. Pre-startup testing allows components damaged in shipment to be replaced and systems that require calibration or adjustment to be more efficiently serviced. The owner and engineer are typically not present during pre-startup tests.

2.7   Step 7: Perform Functional Tests

Functional testing is the formal testing of the entire security system under full operation. Successful completion of functional testing commissions the system. The purpose of functional testing is to thoroughly review and document the equipment and installation to verify that functional and performance requirements in the contract documents are met. The functional performance test consists of individual component testing and progresses to the testing of entire systems as an integrated security platform. The system is operated through all the modes of operation and under varying conditions, and each component verified to be responding during the process is documented.

During functional testing, temporary modifications may be necessary as the test proceeds. The specific tests required and the order of tests will vary depending on the type and size of systems, number of systems, sequence of installation, and relationship with the building elements (e.g., heating, ventilation, and air conditioning; building doors). Testing of systems may occur in stages depending on the progress of work or as proposed by the contractor. For example, an internet connection may not be available until after completion of building construction. Commissioning of portions of the system can occur prior to the internet connection, but the portions that require an interconnect connection are commissioned at a later date. The commissioning team uses the functional test forms developed in Step 3 and contained with the contract documents to coordinate and document the testing. The tests are typically performed by the installing contractor or vendor, and witnessed by the engineer and owner's representative.

2.8   Step 8: Retest as Necessary

Retesting may occur for three separate reasons: First, retesting may be necessary for systems that do not pass the functional test. Second, re-testing may occur after repairs are made to a system to reconfirm system performance. Third, periodic retesting of commissioned systems is recommended to ensure that system performance continues to meet contract document requirements and system performance is satisfactory. Periodic retesting occurs on a regular basis and is typically performed semi-annually or annually. Periodic retests incorporate monitoring, review, and analysis of system performance data provided by the users as well as low-level functional testing of the system by the utility. Retesting after repairs or on a periodic basis is most effective for systems that have been properly commissioned and have an established baseline performance measurement from the initial commissioning process (i.e., when

the systems are fine tuned and operating as efficiently as possible). Retesting is an essential element in security system maintenance and should be incorporated within the initial planning of the commissioning program. A schedule of required periodic testing could be a contract deliverable for the owner. The schedule could specify retesting by component, equipment, or system wide.

2.9   Step 9: Turn Over

The installing contractor prepares a functional performance test report covering all measured data, data sheets, and a comprehensive summary describing system operation at the time of the functional performance tests. The test report is submitted along with system operation and maintenance manuals to the owner. The owner accepts responsibility for operating and maintaining the security system.

Section 3.0: Commissioning Forms

During the commissioning process, the commissioning team develops functional testing forms to verify that the test results and system performance are consistent with the criteria established in the contract documents. These forms consist of project-specific tests and checklists.

3.1   Functional Test Forms

Several example security functional test forms are provided in Appendix A. These forms are provided to point out some of the more critical testing elements that are important when commissioning security systems.

3.1.1   Access Control Systems

Access control systems electronically control entry into buildings or facilities. These systems consist of door readers, access badges, computer servers, wiring, and communication protocols for allowing or denying entry to areas within a facility based on predetermined employee authorizations. The functional test form included for commissioning access control systems is the Access-controlled Door Example Form. This form can be found in Appendix A.1.

3.1.2   Intrusion Detection Systems

Intrusion detection systems provide a means for detecting unauthorized entry within a protected area by monitoring doors, hatches, fences, and perimeter boundaries. The functional test forms for commissioning intrusion detection systems include the Intrusion System Example Form and Perimeter-Detection System Example Form and can be found in Appendix A.2 and A.3.

3.1.3   Video Surveillance Systems

A video surveillance system consists of video cameras transmitting a signal to a monitoring station or recording device. There are several elements that can make up the video system, including cameras, digital or network recording systems, and system software. The functional test forms for commissioning video surveillance systems include the CCTV Fixed Position Camera, Pan-Tilt-Zoom (PTZ) Camera, Digital Video Recorder (DVR), Network Video Recorder (NVR), and Security Client Workstation Software Example Forms. These example forms can be found in Appendix A.4 through A.7.

3.2   Other Commissioning Forms

The following types of commissioning forms may be useful in addition to the included functional testing forms:

- Progress Check Forms. These forms track the progress of systems and equipment from submittal phase through installation, pre-startup testing, functional testing, and retesting.

- Pre-Startup Testing Check Forms. These forms document that the systems and equipment are powered, calibrated, operational, and ready for functional tests.

Section 4.0: References

American National Standards Institute/American Water Works Association. 2009. *AWWA Standard for Security Practices for Operation and Management,* G430-09.

Building Commissioning Association. 2006*. Security CCTV System Construction Checklist*. <http://www.bcxa.org/resources/templates/templates.htm>.

Appendix A. Example Commissioning Forms

A.1 Security Access System – Access-controlled Door Example Form

JOB #: _____ **FUNCTIONAL TEST FORM**

PROJECT: _____ **BUILDING:** _____

<u>SECURITY ACCESS SYSTEM – ACCESS CONTROLLED DOOR</u>

Panel #: _____ Port #: _____ Address #: _____

Unique Identifier: _____

Performed by: _____ Date: _____

Witnessed by: _____ Date: _____

Access-Controlled Door: ☐ New   ☐ Upgrade

A. General Notes:
1. The following procedure is to confirm the installation and operation of the Security Access System for compliance with the Contract Documents and its intended operation.

B. Checklist:

1. Door unlock time, entry reader *(present card and doesn't open door)*	_____ Seconds		
2. Valid entry – No alarms?	☐ No	☐ Yes	
3. Forced door alarms?	☐ No	☐ Yes	
4. Held door alarm after valid card read? *(present card and hold door open)*	☐ No	☐ Yes	
5. Held door alarm after Request to Exit (REX)?	☐ No	☐ Yes	
6. Local noise operates when door held too long?	☐ No	☐ Yes	
7. Door relocks upon? *(opening, closing or other – specify)*	_____		
8. Valid card read while REX active?	☐ No	☐ Yes	
9. REX shunts alarm functions on exit?	☐ No	☐ Yes	
10. REX operates when approached from all directions?	☐ No	☐ Yes	
11. Does REX <u>NOT</u> unlock the door?	☐ No	☐ Yes	
12. "No Special Knowledge" required to exit? *(If NO, write explanation under "Comments")*	☐ No	☐ Yes	
13. Door unlock time, exit reader? *(present card and doesn't open door)*	☐ No	☐ Yes	
14. Local noise operates when card not used?	☐ No	☐ Yes	
15. Does door close and lock securely?	☐ No	☐ Yes	
16. Theft-resistant screws installed?	☐ No	☐ Yes	
17. Invalid card detected?	☐ No	☐ Yes	
18. Workmanship clean and neat?	☐ No	☐ Yes	
19. Wire tagging and panel label per specifications?	☐ No	☐ Yes	

Comments:

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JOB #: _____   **FUNCTIONAL TEST FORM**

PROJECT: _____   **BUILDING:** _____

</div>

<u>INTRUSION SYSTEM</u>

System Type: _____   Account number: _____

Location: _____

Primary phone number: _____   Secondary phone number: _____

Performed by: _____   Date: _____

Witnessed by: _____   Date: _____

Intrusion System: ☐ New   ☐ Upgrade

A.   General Notes:

1.   The following procedure is to confirm the installation and operation of the Intrusion System for compliance with the Contract Documents and its intended operation.

B.   Checklist:

1.   Put system in test!

2.   Workmanship clean and neat.   ☐ No ☐ Yes

3.   Wire tagging and panel label(s) per specifications.   ☐ No ☐ Yes

4.   Battery installed?   ☐ N/A   ☐ No   ☐ Yes Date: _____

5.   Panel communicates with Central Station?   ☐ N/A ☐ No ☐ Yes

6.   All zones verified with Central Station?   ☐ N/A ☐ No ☐ Yes

7.   Panel communicates with keyboard?   ☐ N/A ☐ No ☐ Yes

8.   User codes tested?   ☐ N/A ☐ No ☐ Yes

9.   System arms?   ☐ No ☐ Yes

10. System disarms locally?   ☐ No ☐ Yes

11. System disarms remotely?   ☐ No ☐ Yes

12. Zone boundaries conform?   ☐ No ☐ Yes

13. Local sounder activates upon alarm?   ☐ No ☐ Yes

14. Sequence of operations written?   ☐ No ☐ Yes

15. Sequence of operations programmed?   ☐ No ☐ Yes

16. User group trained on normal system operation?   ☐ No ☐ Yes

17. User group trained to verify and respond to alarm condition?   ☐ No ☐ Yes

18. Central station has current list of contacts and call order?   ☐ No ☐ Yes

19. Test autodialer system. Are phone numbers correct?   ☐ No ☐ Yes

ZONE LIST:

AREA	ZONE / POINT	DESCRIPTION

Comments:

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A.3   Perimeter Detection System Example Form

JOB #: _____   **FUNCTIONAL TEST FORM**

PROJECT: _____   **BUILDING:** _____

PERIMETER DETECTION SYSTEM

System Type: _____   Panel type: _____

Location: _____

Com Port: _____

Performed by: _____   Date: _____

Witnessed by: _____   Date: _____

Perimeter Detection System: ☐ New   ☐ Upgrade

A. General Notes:

1. The following procedure is to confirm the installation and operation of the Intrusion System for compliance with the Contract Documents and its intended operation.

B. Checklist:

1. Check if panel is communicating.   ☐ No ☐ Yes

2. Check signal strength per manufacturer's instructions. ☐ N/A ☐ No ☐ Yes

3. Fence in good repair?   ☐ No ☐ Yes

4. Test zones walked?   ☐ No ☐ Yes

5. Complimentary sensors alarm in margins of perimeter detection

    system?   ☐ No ☐ Yes

6. Valid alarms simulated?

    a. Climb attempts detected?   ☐ No ☐ Yes

    b. Cut attempts detected?   ☐ No ☐ Yes

    c. Crawl attempts detected?   ☐ No ☐ Yes

7. Valid intrusion detected along entire detection zone?   ☐ No ☐ Yes

8. Alarm thresholds tuned?

    a. Alarm on shadows?   ☐ No ☐ Yes

    b. Alarm due to headlights?   ☐ No ☐ Yes

9. System distinguishes between valid and false alarms

    appropriately?   ☐ No ☐ Yes

10. Video records on alarm?   ☐ N/A ☐ No ☐ Yes

11. Correct camera or camera view called up?   ☐ N/A ☐ No ☐ Yes

12. Cameras views line up with zone requirements?   ☐ N/A ☐ No ☐ Yes

ZONE LIST:

AREA	ZONE / POINT	DESCRIPTION

Comments:

A.4   CCTV Fixed Position Camera Example Form

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JOB #: _____   **FUNCTIONAL TEST FORM**

PROJECT: _____   **BUILDING:** _____

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VIDEO SURVEILLANCE SYSTEM (CCTV) – FIXED POSITION CAMERA

Point Identification: _____   Location: _____

Performed by: _____   Date: _____

Witnessed by: _____   Date: _____

CCTV – Fixed Position Camera: ☐ New   ☐ Upgrade

A. General Notes:

1. The following procedure is to confirm the installation and operation of the Video Surveillance System for compliance with the Contract Documents, the National Electrical Code, and industry-accepted standards.

B. Checklist:

1. Transformer location: _____

2. Workmanship clean and neat?   ☐ No   ☐ Yes

3. Back-focus adjustment appropriate?   ☐ No   ☐ Yes

4. Lens adjustment appropriate?   ☐ No   ☐ Yes

5. Auto Iris lens functioning correctly?   ☐ No   ☐ Yes

6. Wire tagging per specifications?   ☐ No   ☐ Yes

7. Proper device per specifications and drawings?   ☐ No   ☐ Yes

8. Housing property installed?   ☐ No   ☐ Yes

9. Housing and mount stout enough for expected conditions?   ☐ No   ☐ Yes

10. Blower working?   ☐ No   ☐ Yes

11. Heater working?   ☐ No   ☐ Yes

12. Fiber transmitter functional?   ☐ No   ☐ Yes

13. Video synchronization adjusted?   ☐ No   ☐ Yes

14. Theft resistant screws installed?   ☐ No   ☐ Yes

15. Field of view _____

16. Changes from day to night view successfully?   ☐ No   ☐ Yes

17. Low light vision tested?   ☐ No   ☐ Yes

18. Backlight compensation tested?   ☐ No   ☐ Yes

19. System acts as required on power loss?   ☐ No   ☐ Yes

Comments:

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A.5 CCTV PTZ Camera Example Form

JOB #: _____ **FUNCTIONAL TEST FORM**

PROJECT: _____ **BUILDING:** _____

VIDEO SURVEILLANCE SYSTEM (CCTV) – PAN, TILT, AND ZOOM CAMERA

Point Identification: _____ Location: _____

Performed by: _____ Date: _____

Witnessed by: _____ Date: _____

CCTV: ☐ New   ☐ Upgrade

A. General Notes:

1. The following procedure is to confirm the installation and operation of the Video Surveillance System for compliance with the Contract Documents, the National Electrical Code, and industry-accepted standards.

B. Checklist:
1. Transformer location: _____
2. Workmanship clean and neat?   ☐ No   ☐ Yes
3. Wire tagging per specifications?   ☐ No   ☐ Yes
4. Housing property installed?   ☐ No   ☐ Yes
5. Blower working?   ☐ No   ☐ Yes
6. Heater working?   ☐ No   ☐ Yes
7. Fiber transmitter functional?   ☐ No   ☐ Yes
8. Pan left and right?   ☐ No   ☐ Yes
9. Theft resistant screws installed?   ☐ No   ☐ Yes
10. Tilt up and down?   ☐ No   ☐ Yes
11. Mechanical stops set?   ☐ No   ☐ Yes
12. Electronic stops set?   ☐ No   ☐ Yes
13. Limit stops on pant-tilt motor functional?   ☐ N/A ☐ No   ☐ Yes
14. Receiver drive test modes all functional?   ☐ No   ☐ Yes
15. Receiver drive address _____
16. Power source   ☐ Emergency ☐ Utility ☐ UPS
17. Panelboard and circuit number _____
18. Video synchronization adjusted?   ☐ No   ☐ Yes
19. Field of view _____

Comments:

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A.6   DVR or NVR Example Form

JOB #: _____   **FUNCTIONAL TEST FORM**

PROJECT: _____   **BUILDING:** _____

DIGITAL or NETWORK VIDEO RECORDER (DVR or NVR)

Panel type: _____ Software Version: _____

Serial Number: _____ IP Address: _____

Subnet Mask: _____ Gateway: _____

Panel location: _____

Performed by: _____ Date: _____

Witnessed by: _____ Date: _____

DVR/NVR: ☐ New   ☐ Upgrade

Location: _____ Bldg.: _____ Floor: _____

Unit Designation: _____

A.   Checklist:

1. Workmanship clean and neat?	☐ No	☐ Yes
2. Wire tagging per specifications?	☐ No	☐ Yes
3. Proper device per specifications and drawings?	☐ No	☐ Yes
4. Server software restarts when system rebooted?	☐ No	☐ Yes
5. Recognizes and communicates with all cameras?	☐ No	☐ Yes
6. Alarm generated on loss of video?	☐ No	☐ Yes
7. Recordings schedules set?	☐ No	☐ Yes
8. Camera views set to client requirements?	☐ No	☐ Yes
9. Motion detection or analytics programmed for each camera?	☐ No	☐ Yes
10. Nuisance alarm issues?	☐ No	☐ Yes
11. Integration with access control server programmed? ☐ N/A	☐ No	☐ Yes
12. Spot monitor or camera pop up upon alarm?	☐ No	☐ Yes
13. Connects with remote view software?	☐ No	☐ Yes
14. Video recording functional?	☐ No	☐ Yes
15. Successfully find motion event.	☐ No	☐ Yes
16. Successfully search for video?	☐ No	☐ Yes
17. Successfully export video clip?	☐ No	☐ Yes
18. Client trained on system administration?	☐ No	☐ Yes
19. Secured logon in place?	☐ No	☐ Yes

Comments:

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A.7   Client Workstation Example Form

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JOB #: _____   **FUNCTIONAL TEST FORM**

PROJECT: _____   **BUILDING:** _____

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CLIENT WORKSTATION

Client Software:_____   Software Version: _____

Serial Number: _____   IP Address: _____

Subnet Mask: _____   Gateway: _____

Performed by: _____   Date: _____

Witnessed by: _____   Date: _____

Client Workstation: ☐ New   ☐ Upgrade

Location: _____   Bldg.: _____   Floor: _____

Unit Designation: _____

A. Checklist:

1.	Proper device per specifications and drawings?	☐ No	☐ Yes
2.	Client software restarts when system rebooted?	☐ No	☐ Yes
3.	Monitors positioned for ease of viewing?	☐ No	☐ Yes
4.	Cables coiled and tied neatly?	☐ No	☐ Yes
5.	Recognizes and communicates with network and cameras?	☐ No	☐ Yes
6.	Alarm list view set to client requirements?	☐ No	☐ Yes
7.	Camera views set to client requirements?	☐ No	☐ Yes
8.	Alarm notification at sufficient volume to notify system users?	☐ No	☐ Yes
9.	Integration with access control server programmed? ☐ N/A	☐ No	☐ Yes
10.	Spot monitor or camera pop up upon alarm?	☐ No	☐ Yes
11.	Successfully find motion event.	☐ No	☐ Yes
12.	Successfully search for video?	☐ No	☐ Yes
13.	Successfully export video clip?	☐ No	☐ Yes
14.	Client trained on system monitoring?	☐ No	☐ Yes
15.	Client can connect to all sites?	☐ No	☐ Yes
16.	Client can display cameras on all monitors?	☐ No	☐ Yes
17.	Client can control PTZ cameras?	☐ No	☐ Yes
18.	Secured logon hierarchy in place?	☐ No	☐ Yes
19.	Third party software enabled?	☐ No	☐ Yes

Comments:

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