**NSDD Program**

**Inspection, Testing, and Turnover Guide for Radiation Portal Monitor Systems**

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Acronyms and Abbreviations

|  |  |
| --- | --- |
| CAS | central alarm station |
| ConOps | concept of operations |
| COR | contracting officer’s representative |
| DICCE | design, integration, construction, communications and engineering (contractor) |
| FCT | functional compliance testing |
| LMP | local maintenance provider |
| NSDD  RPM | Nuclear Smuggling, Detection and Deterrence  radiation portal monitor |
|  |  |

# Overview

This document serves as the Office of Nuclear Smuggling, Detection and Deterrence’s (NSDD) guidance for inspection, testing, and turnover of radiation portal monitor system installations. This supports the NSDD mission to build the capacity of foreign governments to deter, detect, and interdict illicit trafficking in special nuclear and other radiological materials. This guidance provides a comprehensive process to inspect, test, and assess deployed systems and the capability of partner country operators prior to the transfer of operational responsibility to a partner country and the Sustainability Program. The process consists of four phases, each with specific objectives.

* Phase 1: Contractor Completion
* Phase 2: System Readiness and Operational Preparedness
* Phase 3: Site Inspection and Testing
* Phase 4: Final Inspection and Turnover

These phases are managed by the NSDD country manager and require coordination of all members of the project team: typically, the **responsible contractor (usually the design, integration, construction, communications and engineering [DICCE] contractor), equipment technicians/experts, sustainability manager, and the partner country stakeholders**. Careful coordination and thorough evaluation of the results of each phase are critical to successful implementation and transition to operational status.

The multi-phased process is tailored to facilitate timely partner country readiness to assume operation of systems while providing U.S. Government assurance the installation meets contractual requirements and the system functions as intended. Although the requirements remain constant, the country manager may make adjustments to the specific activities within each phase to account for project or site-specific needs.

These four phases form a comprehensive assessment of the installed system, initial partner country operator readiness, and site operating procedures. Phases 1 through 3 and associated activities are scheduled with as little or no time gap as is practical beginning when the responsible contractor certifies that construction work at the site is complete and systems are functional and ready for inspection and operational use evaluation (Phase 1).

Phase 2 prepares site officials for successful operation of the installed systems while NSDD conducts an initial evaluation of the installed system. This is most often accomplished through operator training, but can also be tailored to meet the needs of the site and partner country operators. Once systems have been evaluated and partner country operators have gained an understanding of proper system use, NSDD conducts the inspection of installation work and functional testing of the equipment (Phase 3). If the system is determined to be fully functional, the installation is then turned over to the partner country for operation.

Phase 4 is typically planned 4 to 6 weeks after the conclusion of Phase 3. The final inspection and turnover process provides the opportunity to follow up with partner country operators, assess initial operation of the system, and address questions on system functionality and operations to facilitate effective use by the partner country. Phase 4 also concludes the process to validate earlier inspection results and system stability, while assessing effectiveness of the site concept of operations (ConOps) and operator training (not to be confused with assurance visits conducted under the Sustainability Program). This final assessment allows the Implementation Program to verify it has met the requirement to deliver a functioning system to trained partner country operators. Following this verification step, the site is accepted under the contract and transferred from the Implementation Program to the Sustainability Program, where it enters the transition phase.

# Phase Objectives and Process

The phases contained in this guide are intended to be conducted in the order presented; however, there may be circumstances that necessitate modification to or reordering of the phases. The NSDD country manager is responsible for assuring all objectives are achieved. The country manager identifies appropriate resources and works with the project team and partner country to schedule all activities. In the event changes are needed to meet project-specific requirements, the country manager is responsible for approving deviations in the process or test cases while ensuring changes achieve program objectives. Waivers of test cases or reordering of test phases require country manager approval with NSDD Implementation Program Manager concurrence. Technical direction is provided by the contracting officer’s representative (COR) where contractually required.

## Phase 1: Contractor Completion

Following installation of all equipment, the responsible contractor (typically DICCE) shall verify that the construction work is complete and the systems are functional. The purpose of this phase is to confirm the system is ready for Phase 2 and that the personnel performing the training and evaluation have access to the completed system.

To complete Phase 1, the responsible contractor is expected to perform all tests in the contractor completion checklist in accordance with the task order requirements and identify and report any outstanding punch list items, along with a projected date for completion of each. In the event a punch list item may interfere with any part of the next phase, the completion notification will provide this information and the country manager will determine whether to delay Phase 2. Punch list completion is important to this process as partner country operators, trainers, and other system evaluation personnel need access to a fully functional system and be able to safely move about the site throughout the training and evaluation period.

Contractor completion verification requires the use of sources. The responsible contractor is in charge of making arrangements for the test sources identified in Section 6.0. Obtaining the proper radioactive test sources may include coordination with national laboratories, local maintenance providers (LMPs), or partner government officials, as necessary.

Contractor completion verification is deemed successfully complete when:

* All required tests are concluded with a “pass” score as defined in the test instructions.
* The responsible contractor has submitted the required contractor completion summary and punch list report to the country manager and COR.
* The summary and punch list report has been approved by the country manager.

This phase is to be concluded through formal notification to the country manager and COR prior to starting the next phase. The responsible contractor is required to coordinate their schedules with the country manager, national laboratories, and others as designated by the country manager, to facilitate the orderly movement from one phase to the next. Immediately following successful contractor completion, the contractor provides a contractor completion summary report to the country manager and COR notifying the program that the site is ready for Phase 2. This report is sent in accordance with applicable contract requirements and is further defined in Section 4.0 of this document.

## Phase 2: System Readiness and Operational Preparedness

Upon receipt of the responsible contractor’s verification of completion, the country manager confirms the site’s readiness for operations. Typically, this is done through initial operator training performed either by NSDD trainers, partner country trainers, or a combination of both. The objective of performing training as the primary activity of this phase is twofold. First, by using the system during training, trainers and partner country operators are able to identify potential problems with the system or planned ConOps that can be addressed prior to Phase 3. Second, training partner country operators at this phase prepares them to operate the system on their own when the system is turned over at the completion of the next phase.

Initial operator training is expected to take place at the site to enhance the training experience and give partner country operators’ practical experience with the equipment and planned ConOps. The goals of training partner country operators prior to turnover are to:

* Familiarize them with the systems and ConOps at their site.
* Confirm they are ready to assume operation of the systems at the time of turnover.
* Facilitate participation in inspections and testing processes.
* Evaluate the adequacy and feasibility of site-specific operating procedures and make any necessary modifications.

NSDD-funded operator training is expected to occur over the course of 3 to 5 calendar days. When multiple sites within a country are involved, trainers rotate from site to site in coordination with the responsible contractor. The exact duration, schedule, and composition of the training is determined through consultation with the partner country and country manager. This initial training is designed to provide program-approved curriculum and incorporate on-the-job training elements that entail site-specific procedures, particularly in the area of interagency coordination and secondary inspection.

Any system failures identified during this period shall be reported to the country manager. The responsible contractor shall correct the failure, with country manager approval, and re-verify the system before moving on to the next phase. If there is disagreement between any parties as to the nature or applicability of the failure, the issue is forwarded to the COR for direction as described below. Anomalies identified in the central alarm station (CAS) do not require correction and are documented in the system readiness and operational preparedness report submitted by the team. There is no mandatory “hands-off” period.

The responsible contractor and communications vendor will be available to support training as needed and to address questions or issues that arise during this time. The level of support needed will be in accordance with the statement of work and coordinated with the country manager prior to contractor completion. The country manager may also request a radiation portal monitor (RPM) technical expert be available to participate in this phase.

In the event NSDD has already transitioned some or all of the training responsibility to the partner country or onsite training is not possible, the country manager, along with the sustainability manager and other project team members, will develop an alternative system readiness and operational preparedness activity. The alternative activity will permit the project team to evaluate the system in as close to a real-life operating scenario as possible. The country manager approves all alternative activity plans, schedules, and participants.

During Phase 2, the CM and SM will receive daily reports tracking the readiness of partner country operators and detailing any system deficiencies or anomalies discovered. When deficiencies are identified as potential test failures, the CM in coordination with the COR shall notify the responsible contractor. In cases where there is disagreement about the potential impact on test results between the responsible contractor and others on the project team, the country manager and COR make the determination and the COR provides appropriate direction to those involved. ***No member of the project team shall give any direction to the responsible contractor.***

When the failure is not in dispute between the responsible contractor and the project team, the responsible contractor makes corrective actions, repeats the appropriate portion of the test procedure, and submits a supplemental contractor completion summary report to the country manager and COR. In the event the failure cannot be corrected, this phase may be suspended and subsequent phases delayed until corrective actions can be completed. Notwithstanding necessary corrective actions, the team lead is responsible for notifying the country manager when this phase is complete and the site is ready for Phase 3.

For complex sites (such as large ports, airports, or complex border crossings) where ConOps, unusual communications systems issues, training concerns, or other issues suggest the partner country may require additional support during the early days of system operation, the country manager may allow for a supplemental or extended system readiness and operational preparedness by asking key team members to remain in support of initial operations after completion of Phase 3. This supplemental or extended activity should last no more than 2 to 5 days and should consist of a small team of subject matter experts to assist partners in implementing the new program and processes. In cases where staff sizes require multiple initial operator training courses, the additional classes may be scheduled after Phase 3 and support the extended system readiness and operational preparedness. The country manager should identify the need for this type of additional support as early in the implementation phase as possible.

A successful Phase 2 is expected to result in a sufficient staff of trained partner country operators capable of executing the site ConOps and response procedures and in operating the NSDD-provided equipment. Any system failures must be corrected and retested before moving on to Phase 3.

## Phase 3: Site Inspection and Testing

Provided no unresolved failures are identified, Phase 3 may begin immediately after the successful conclusion of Phase 2 at each site.Inspection and testing includes verification that the installed system meets all contractual requirements (design compliance, CAS operations, and overall quality and functionality). All equipment provided, whether U.S. government or responsible contractor furnished, is tested during this process. The country manager or designee acts as the test conductor and is generally responsible for verifying contractual requirements and CAS operations. To complete Phase 3, the test conductor is expected to perform all tests and inspections per the contractor compliance checklists.

During this phase, the radiation detection technical expert or certified designee conducts FCT on the RPMs. This process involves validating or performing RPM alignment, generating alarms, and taking measurements to determine detector efficiency. These actions require the radioactive check sources identified in Section 6.0. Availability and handling of check sources are coordinated by the responsible contractor and should be planned well in advance. Extra attention to planning and scheduling is required when multiple sites within a country are undergoing Phases 1, 2, and 3 concurrently and/or consecutively.

It is important to note that, once an RPM has successfully completed FCT and is determined to be functioning as intended, all alarms generated by that RPM are considered actionable. This requires the project team to confirm that a trained and capable partner country operator is available to respond to any alarm between the conclusion of FCT and actual turnover of the entire system for partner country operations. This can become complex during testing at large sites and when testing occurs over more than 1 day. In these cases, project teams must choose to either turn off the neutron detectors or shutdown the entire system when capable partner country operators are not present. ***In no case is a project team to leave functionally compliant RPMs in a fully operational state without confirming there are capable partner country operators available to respond to actionable alarm events.***

NSDD participants may vary slightly depending on the needs of the site. Generally, a site inspection and testing team consists of the country manager or designee, DICCE or other responsible contractor, CAS vendor, radiation detection system expert, RPM vendor, and the LMP where possible. Ideally, partner country personnel participate in testing by operating the CAS and observing the overall testing procedure. The radiation detection system expert is responsible for verifying RPM functionality through FCT as well as handheld functionality. In all cases, there shall be expertise available to deal with any installation, communications system, and RPM issues that may arise during testing.

A successful site inspection and testing is achieved by meeting the following critical objectives:

* U.S. Government representatives or designees formally inspect and document that the contractor’s performance meets the contract requirements.
* All equipment is tested and determined to meet program requirements.
* Operational responsibility for the system is assumed by the partner country.

Successful completion of Phase 3 indicates the responsible contractor has fulfilled the contractual requirements and the equipment is functioning properly. Although Phase 4 is not complete, the site transfers to partner country operations and the process for official transfer of the equipment can begin.

It is important to note that, until the conclusion of Phase 4, the Implementation Program remains responsible for equipment maintenance and repair. In most cases, the responsible contractor continues to provide for any needed maintenance and repair until the next phase is concluded.

In the event inspection and test findings identify failures in contractor-furnished systems or equipment, the country manager works with the COR and contractor to plan any necessary corrective and contracting actions. The country manager may also work with the COR or other program and project team members to effect repairs to any failed U.S. government-furnished property. When severe failures negatively impact proper function of the system, turnover is delayed until the deficiencies are remedied and the system is retested.***Direction that changes any requirement or causes changes in cost, scope, or schedule, regardless of test results, may not be provided by any member of the site inspection and testing*** ***team, including the country manager. Any such direction must be given by the COR.***

## Phase 4: Final Inspection and Turnover

Despite thorough testing and rigorous training, the initial period of partner country site management and operation of the radiation detection systems has the potential to reveal latent defects, performance issues or bring attention to unresolved questions or concerns from the partner country operators, and/or impractical procedural steps. Due to the remoteness of many NSDD sites and costs for extended onsite presence, it is not feasible for project team members to remain at sites for extended periods of time. Accordingly, the country manager shall coordinate with the partner country to perform a final inspection and turnover visit no sooner than two weeks and no later than six weeks after the successful site inspection and testing. Factors to be considered in the timing and project team members needed for the final inspection and turnover visit may include reports from the partner country, LMPs, daily file analysis, Help Desk requests, site access issues, weather, safety issues, prior experience, and reports from other sites.

The country manager is responsible coordinating with the responsible contractor to develop the schedule and plan for Phase 4. The CM will decide on the team composition. At a minimum, the team will include members of DICCE or other responsible contractor and a test conductor. . Depending on site-specific issues, other expertise from the national laboratories, LMP, equipment vendor, and communications systems provider may also be needed. Whenever possible, data (daily files and any other data provided by the partner country) should be reviewed to assess RPM and system performance prior to the visit. In addition, a team member trained in data analysis may be needed to perform onsite analysis.

The final inspection and turnover visit may result in the team identifying defects or additional work needed for proper system function. Changes in scope, schedule, or cost for national laboratory support must be approved by the country manager and funding identified prior to implementation. ***Proposed changes in scope, schedule, or cost for any NSDD contractor must be approved by the country manager and issued in accordance with contract requirements (technical direction or contract modification from the COR and CO).***

# Other Testing: Expansions and Reconfigurations

When determined to be in the best interest of NSDD mission, NSDD may perform additional work at existing sites. This work is often the result of site expansions and reconfigurations. The program may also perform corrective actions when systems fail or are damaged. In these cases, only part of the typical site implementation scope is performed, hence a modified approach to testing is appropriate.

## Changes Directly Impacting RPM Performance

Changes that involve installation of an RPM require FCT. This includes relocation of previously installed RPMs as well as installation and integration of new RPMs. Design compliance and quality inspection for the installation or relocation, as well as RPM testing, will generally necessitate performance of Phases 1 and 3. Other RPM work that may require simplified phases include major component replacement, addition of collimation, or major repairs that could impact RPM alignment or sensitivity. For these and similar cases, project teams are required to complete the applicable portions of Phases 1 and 3. Schedules should be modified accordingly. Country and sustainability manager onsite participation is optional and at the discretion of the country manager.

## Upgrades and Changes Involving CAS Software

For any changes that impact the operability of the CAS, some or all of Phases 1 and 3 are performed. In the event that software changes require additional operator training or retraining, Phase 2 is included. Schedules and test cases for these site upgrades and changes are managed by the country manager. If new or different test cases are applied, the country manager works with the appropriate COR to provide those test cases to the responsible contractor in a timely manner. In the event the upgrade warrants such a step, Phase 4 may be scheduled, particularly if the reason for the upgrade is to replace unstable or non-functioning software.

# Deliverables and Contractual Acceptance

## Verification of Contractor Completion

### Contractor Completion Documentation

The contractor completion documentation is completed by the responsible contractor and shall include the appropriate test cases as referenced in Section 8.0 for the installed system at a minimum. Separate checklists shall be completed for each site within a group of sites and a single checklist shall be completed for all lanes within a given site. For large sites, additional checklists may be required. The responsible contractor is responsible for completing and retaining these checklists for inclusion in the test package for each site.

### Contractor Completion Summary Report

The contractor completion summary report is prepared by the responsible contractor to advise the country manager that the site is ready for Phase 2. The report shall identify the following:

* Sites covered
* Participants of the contractor completion
* Dates of contractor completion
* Punch list items including projected completion dates
* Description of any issues or concerns about the installation (unexpected equipment behaviors or other issues of interest to the inspection and testing teams)
* Affirmation of the successful verification of Phase 1 and site readiness for Phases 2 and 3.

The report shall be provided in accordance with contract requirements and must be received by the country manager prior to start of the next phase of inspection and testing. In order for Phase 1 to be successful, the report will not contain any unresolved or un-retested failures. A copy of the report shall be attached to the contractor completion checklists and included in the test package for each site.

### Supplemental Contractor Completion Summary Reports

Supplemental reports are prepared when failures or operational problems are discovered during Phase 2 or before the start of Phase 3. This report is prepared by the responsible contractor and shall include all the identified information in the contractor completion summary report, as well as describe and explain the failure, describe the corrective action, and report retest results.

## Operator Training Report

The SM is responsible for coordinating and reporting the results of initial operator training. The training report shall identify the following:

* Trainers involved
* Date and location of training
* Trainees by name, position, and post assignment (if different than the training location)
* A summary of the materials presented, apparent trainee response to and absorption of the materials, and any modifications recommended for future training in the country
* Failures, anomalies, and observations impacting the system; include discussion of the impacts of failures, anomalies, and/or observations identified during training as well as any possible long-term system operational issues
* Recommendations for corrective actions or system modifications, if known.

***The training lead is responsible for immediately notifying the country manager of any failure that may impact the inspection and test schedule. The training lead is also responsible for notifying the country manager of the successful conclusion of training at each site as soon as practical. Email notification is sufficient.***

The final training report shall be sent to the country manager. In the event of a system failure, draft summaries of the failure may be required sooner. The country manager and sustainability manager are responsible for communicating any information related to failures or issues to the responsible contractor, with appropriate coordination with the COR.

## Site Inspection and Testing

### Test Package

In accordance with the requirements of the applicable contract, the DICCE or other responsible contractor shall prepare a test package for each site and make the package available prior to start of testing. When using paper media for the test package, a three-ring-type binder with tabs is required. A single binder may contain the test plans for multiple sites. When electronic media is used, the responsible contractor shall provide the test package on clean, writable media (thumb drive or disk) and is responsible for providing a virus-free laptop for the test conductor to record results during testing. When paper media is used, the laptop is not be required. Note that test packages contain Official Use Only information and must be protected accordingly.

The test package shall, at a minimum, include:

* Design requirements document, field change requests, and requirements addenda
* Scoping meeting minutes
* General arrangement drawings
* Communications systems requirements specification document (non-Aspect systems)
* Completed contractor completion checklists and summary report
* NSDD test instructions and checklists for installed system (non-Aspect or Aspect)
* Other documents due at the start of Phase 3 as required in the individual applicable contract.[[1]](#footnote-1)

When multiple sites are covered in a single test package, care should be taken to avoid unnecessary duplication. For example, only one systems requirements specification document may be required per group or country. The country manager may request any combination of hard copy and electronic copy documents in the test package. Contractors are encouraged to discuss contents and media with the country manager well in advance of the scheduled delivery, ideally during the scoping meeting.

The test conductor shall complete the checklists and retain the test package. The system readiness and operational preparedness report and FCT reports shall be added to the test package when received by the country manager and becomes the complete record of the inspection and testing. The sustainability manager transfers the appropriate site documentation to the Sustainability Program for inclusion in supporting documentation for the LMP, Help Desk, and other sustainability records.

### Functional Compliance Test Report

Radiation detection technical experts report test results and measurements from the RPMs. An FCT report is completed for each RPM at each location. The radiation detection technical expert is responsible for using the most current version of the appropriate baselined FCT checklists to complete this report. The country manager is encouraged to discuss and review a draft of this report with the radiation detection technical expert at the time of testing. The radiation detection technical expert delivers the final report to the country manager and records it in program databases within 20 days of trip conclusion. In the event Phase 4 is scheduled sooner than 20 days after FCT, a draft report shall be submitted upon request. The FCT checklists are located on NSDD web portals.

## Final Inspection and Turnover

The country manager is responsible for determining that the radiation detection system is functioning as intended and that the partner country operators have received sufficient training to operate the system. When this determination is made for new sites, the site is counted as a completed Implementation Program metric and is immediately transferred to the Sustainability Program for management and oversight of capacity building activities. For site expansions and reconfigurations, the work is not counted as a completed Implementation Program metric; however, the Sustainability Program is informed that the work is completed and is provided with all requisite documentation of the work performed. A final inspection using the contractor compliance checklist is completed by the country manager and recorded in the test package. The country manager provides written notification of the site completion (metric and non-metric) to the Implementation Program and Sustainability Program Directors. Completions of metric sites are also to be reported to the project control team tracking NSDD metrics.

Contractual site acceptance is handled outside the inspection, testing, and turnover process. In most cases, the site acceptance request is submitted by the responsible contractor along with the final installation package. However, the responsible contractor may be directed to submit requests for site acceptance individually or in groups in advance of the final installation package. The country manager reviews the site acceptance request form and submits it to the COR with a recommendation to accept the site or request additional work or corrective action. In the event sites are accepted in phases, partial final reports may be required.

# Roles and Responsibilities

The following individuals/organizations have responsibilities associated with inspection and testing activities:

* **Country manager** has overall responsibility for all inspection and testing activities and approves all schedules and participants, including locating an alternate test conductor (designee) when necessary. The federal country manager or federal employee providing oversight of a non-federal country manager is the default test conductor. The test conductor records inspection and test results and makes recommendations to the COR regarding any actions needed to resolve deficiencies noted during the inspection and testing process.
* **Responsible Contractor** is responsible for conducting and reporting contractor completion tests and results, preparing test packages for each site, coordinating schedules for all activities, coordinating use of sources for concurrent and consecutive testing and training activities, usually in cooperation with the sustainability manager, coordinating logistics needs for all activities and participants,[[2]](#footnote-2) and ensuring appropriate contractor and communications vendor representation is available during all phases to provide support as required.
* **Sustainability manager** is responsible for ensuring the Phase 2 training activity (or alternative activity) is properly planned, coordinated, and scheduled, including arranging for logistics such as interpretation, travel, and lodging. The sustainability manager is responsible for sources to be delivered to the sites for Phase 2. Sustainability managers may also participate in the final inspection and turnover visit with the country manager.
* **Radiation detection technical experts** are responsible for testing and verifying the RPMs meet NSDD requirements and verify operability of handheld equipment according to the FCT procedure. The expert completes the FCT report and submits directly to Headquarters. The expert may be requested to participate in final inspection and turnover where issues related to RPM performance or placements are anticipated.
* **CORs** have overall responsibility for contract oversight and are responsible for giving direction and site acceptance. Depending on the issue, the COR may direct corrective actions deemed necessary as a result of any step of the process.
* **Other expertise** at the discretion of the country manager.
* Source handler/health physicist may be required depending on the provider of sources and local regulations. The country manager coordinates with team members to confirm the required expertise responsibility is assigned and available.
* RPM vendor representative or LMP may be present to assist the radiation detection technical expert.
* The communications vendor is responsible for the CAS/server software and hardware.
* Additional expertise or support as determined by the country manager.

NSDD may use resources other than those identified above; for example, members from other national laboratories or other NSDD contractor resources may fill some roles. The country manager will identify when these changes are needed and coordinate with the project team and COR as appropriate.

# Special Equipment Needs

The responsible contractor arranges for all equipment and materials needed to be onsite and available to complete testing. At a minimum, the following equipment is required:

* Gamma and neutron sources:

Gamma Activity = ~ Co-57 370 – 37.5kBq (10 –1.0μCi)

Gamma Activity = ~ Cs-137 370 – 75kBq (10 – 2.0μCi)

Neutron Activity = ~ Cf-252 185 – 59.2kBq (5 – 1.6μCi) ~ 20,000 – 6,500 N/sec

* Radios, walkie-talkies, or local cellular phones to allow communications between different testing points
* Ladder(s) as needed
* Measuring Tape, or other measuring device (e.g. laser)

# Safety and Operational Concerns

The country manager or designee is responsible for working with the responsible contractor and partner country representatives to verify that required U.S. and local safety procedures are followed during testing. The country manager or designee is also responsible for minimizing the impact of test activities on normal site operations.

# Test Procedures

Compliance with established test procedures provides confidence that all tests are conducted in the same manner and ensures consistency across the program. Regardless of the CAS software being tested, the requirements for reporting alarm events and storing data are consistent and can be tested uniformly, and definitions of “pass” and “fail” can be uniformly applied.

Any time the system does not exhibit the required functionality to satisfy contract requirements, a failure has occurred. Many failures are correctable during the inspection and testing process. In the event a failure appears during Phase 1, the responsible contractor corrects the failure and retests until it exhibits required functionality. All corrections and retests must be successfully completed prior to submitting the contractor completion summary report. The responsible contractor is responsible for advising the country manager if the failure and resulting corrective action impact the training and/or testing schedules.

When a failure is discovered during Phase 3, the responsible contractor for that element may be allowed time to correct the problem depending on the nature of the fault, time needed to correct it, cost impact, and remaining time available on site.

Phases 1 and 3 consist of a series of test checklists in five categories:

* Test Case A – CAS Workstation Alarm / Fault Review and Assessment
* Test Case B – Peripherals
* Test Case C – State of Health
* Test Case D – CAS User Display
* Test Case E – Contract Compliance (documentation, design, and quality)

These are (1) TSA FCT checklists, (2) Aspect FCT checklists, and (3) contractor compliance checklists.

The checklists are formatted in tables that provide instructions for the initiation of the test event and the output and expected result. The same checklists are used in both Phase 1 and Phase 3 and may be used in Phase 4 per the country manager direction. Additional checklists or test cases may be added when site requirements include elements not in the standard checklists; however, additional checklists and test cases must be prepared and delivered in accordance with contract requirements. Tests may be waived by the country manager when those elements are not present at the site. Tests for installed systems may not be waived without approval of the Implementation Program manager and COR. As required by the contract, additional tests to validate compliance with contract requirements can be added.

## Contractor Completion Test Instructions

For contractor completion testing, the responsible contractor confirms the installation has been completed in accordance with the design requirements document and approved changes, functions properly, and is ready for Phase 2. Contractor completion is achieved through successful completion of all test cases. In the event of a failure, testing is suspended until corrective action is taken. The assigned test conductor determines which test results have been impacted by the corrective action and schedule retesting accordingly.

The checklists provide test instructions, expected results, and the block to indicate a “P” or a “√” for Pass or an “F” for fail. The “F” category may only be used during the government’s testing. The U.S. government will not accept a contractor completion test report that contains any failures.

The test conductor signs the bottom of each page where indicated and the responsible contractor provides the completed checklists in the test package.

## Site Inspection and Testing Instructions

Upon arrival at the site, the test conductor shall confirm readiness for inspection and testing. The process begins by meeting with site personnel to explain the purpose and activities to be conducted during the visit. The test conductor determines if site personnel will participate as CAS operators or observers and explains their roles and responsibilities. The test conductor is also responsible for obtaining and enforcing any restrictions or requirements provided by site operators. The responsible contractor briefs the team on the site safety requirements that must be observed by all members of the team at all times while on site. Once the logistics of the visit are concluded, the test conductor begins by a review of the responsible contractor-prepared test package including review of all checklists. The contractor completion test sheets must indicate all test cases have been completed successfully and each checklist is dated and signed by the test conductor. This concludes readiness preparation and evaluation.

The test conductor follows the tests and visual inspection instructions in the same five test categories contained in the contractor completion checklists and completes, signs, and dates new checklists to document U.S. government inspection and testing. The order of testing is at the discretion of the test conductor. Test procedures and expected results may not be changed; however, any test or series of tests may be repeated at the discretion of the test conductor. New tests may be added in accordance with the contract. Tests for unbaselined requirements shall not be performed. No tests are to be waived without prior written approval of the COR. In the event the test conductor identifies any failures during the inspection and testing, the responsible contractor is to be given a reasonable opportunity to correct the failure. The test conductor makes the final determination when a correction is no longer possible within the time allotted onsite or in-country. The test conductor considers factors such as team safety, disruption at the site, additional time needed for the repair/correction, likelihood of success, and remaining schedule.

Failures that cannot be corrected in the time available are documented and noted in the acceptance test issue report (Attachment B). This ensures the issue is properly recorded and allows for comment and suggested corrective actions from the responsible contractor or other members of the project team. It is important to note that anomalies and observations may be recorded in a test issue report, but these are not failures. The purpose of recording these findings is to collect information relative to the overall performance of the NSDD systems and identify anomalies that are common across sites and/or systems. Responsible contractors and other project team members are welcome to comment on anomalies and observations.

Attachment A: Alarm Initiation Steps for RPMs

**Gamma alarm** – Initiate and maintain an occupancy by interrupting the beam of the occupancy sensor and driving/walking a Cs-137 or Co-57 source through the monitor pair (or past the single monitor, in the case of a pedestrian monitor). This method serves to replicate possible real-life smuggling circumstances. Alternatively, if this is not possible, hold the source near the front of the master or slave cabinet while ensuring that the occupancy sensors are interrupted.

**Neutron alarm** – Initiate and maintain an occupancy by interrupting the beam of the occupancy sensor and holding the Cf-252 source on the back of the master or slave cabinet, taking advantage of the lead shielding so as to not produce a gamma alarm. Note: a gamma alarm may also occur during this step; if unacceptable, temporarily disable the gamma detectors.

**Neutron-gamma pair alarm** – Initiate and maintain an occupancy by interrupting the beam of the occupancy sensor and driving/walking a Cs-137 or Co-57 AND Cf-252 sources through the monitor pair (or past the single monitor, in the case of a pedestrian monitor). This should generate a neutron-gamma pair alarm. Alternatively, if this is not possible, hold the sources near the front of the master or slave cabinet.

**Gamma hi (background)** – Hold a Cs-137 or Co-57 source near the front of either the master or slave cabinet without initiating an occupancy.

**Neutron hi (background)** – Hold the Cf-252 source on the back of either the master or slave cabinet without initiating an occupancy. Note: a gamma hi alarm may also occur during this step; if unacceptable, temporarily disable the gamma detectors.

**Gamma lo (TSA monitors)** – With the tamper switch defeated and cabinet open, disconnect the SIGNAL cable from any of the plastic scintillators. This can be done on the detector itself or at the SCA-775 box. Take care not to disconnect a high-voltage connector while the system is energized.

**Gamma lo (Yantar monitors)** – Use the PVC-01 controller to temporally set the upper level discriminator of one gamma detector to ‘0’. Alternatively, the Yantar control software installed on the operator workstation may be used to make this adjustment.

**Tamper fault** – The preferred method for generating a tamper event is by opening one of the RPM cabinet doors. Additionally (TSA systems only) a tamper event may be generated with the loss of alternating current power.

Attachment B: Issue Report

**Issue Report**

(Not required unless issues are identified)

|  |  |
| --- | --- |
| Country/Site: | Test Date/Time: |
| Contractor: | Comms Vendor: |
| Test Conductor: | Software Version: |
| Test Number(s): | |
| Level 1 – **Failure**. System does not exhibit the required functionality.  Level 2 – **Anomaly**. System exhibits required functionality, but includes unexpected behavior.  Level 3 – **Observation**. System exhibits required functionality and does not exhibit unexpected behavior. Improvements are suggested to increase operability. | |
| Description of Issue: | |
| Contractor Response/Explanation: | |
| Suggested Corrective Action: | |
| Retest Plan, if known: | |

Attachment C: Password, Keys, and Manuals Transfer Record

**Password, Keys, and Manuals Transfer Record**

|  |  |
| --- | --- |
| Country/Site: | Date: |
| Contractor: | NSDD Country Manager: |
| Monitor Manufacturer: | Communications Vendor: |
| **Software/Firmware Version:**   |  |  | | --- | --- | | Item | Version | | Camera |  | | CAS |  | | Concentrator (if applicable) |  |   **Passwords, User IDs and IP Addresses:**   |  |  |  |  | | --- | --- | --- | --- | | System Location | Password | User ID | IP Addresses | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | |  |  |  |  | | |
| **Keys:**   |  |  |  | | --- | --- | --- | | Lock | Quantity | Delivered to: | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  | | |
| **Manuals/Documentation**   |  |  |  | | --- | --- | --- | | Type | Quantity | Delivered to: | |  |  |  | |  |  |  | |  |  |  | |  |  |  | |  |  |  | | |
| **Signed:**  **For NSDD:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ For Site:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | |

1. Templates are provided for recording the turnover of password, keys, and manuals (Attachment C). Other templates for compiling the NSDD master equipment list, equipment transfer, user documentation, and Help Desk documentation packages can be found on NSDD web portals. These templates may be modified to address partner country requests. [↑](#footnote-ref-1)
2. There may be cases where it is more efficient for the contractor to arrange training logistics and use of sources for the inspection and testing processes. Whenever possible, assignment of logistics responsibilities for training and coordination of radioactive sources is to be identified during the scoping meeting. [↑](#footnote-ref-2)