U.S. DEPARTMENT OF ENERGY

PNNL-18452

Prepared for the U.S. Department of Energy
under Contract DE-AC05-76RL01830

Second Line of Defense Megaports Initiative Sustainment Plan

PORT KLANG MALAYSIA

September 2009
Rev. 0

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CA King

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Pacific Northwest National Laboratory
Richland, Washington 99352

REVISIONS		
Rev #, Date	**Affected Sections**	**Description**
0.0, 08/25/2009	All	1st Version based on new SLD guidelines
1.0, 09/01/2009	2.0, 3.2, 3.6.2	Final version after PNNL review

TABLE OF CONTENTS

ACRONYMS

µCi	Microcurie (a unit of radioactivity)
ALARA	As Low As Reasonably Achievable
Bq	Becquerel (a unit of radioactivity)
CAS	Central Alarm Station
ConOps	Concept of Operations
CSI	Container Security Initiative
DHS	U.S. Department of Homeland Security
DOE	U.S. Department of Energy
DoP	Declaration of Principles
GOM	Government of Malaysia
IAEA	International Atomic Energy Agency
LANL	Los Alamos National Laboratory
LSA	Local System Administrator
NII	Non-Intrusive Imaging
NNSA	National Nuclear Security Administration
ORNL	Oak Ridge National Laboratory
OT&E	Operational Test and Evaluation
PNNL	Pacific Northwest National Laboratory
POC	Point of Contact
RMC	Royal Malaysian Customs
RPM	Radiation Portal Monitor
SLD	Second Line of Defense
SNL	Sandia National Laboratories
SOP	Standard Operating Procedures
SWS	Secondary WorkStation
T3	Train-the-Trainer
TMP	Training Management Plan
US CBP	U.S. Customs and Border Protection
USG	United States Government
VPN	Virtual Private Network

REFERENCE DOCUMENTS

1. *Agreement Between the Government of the United States of America and the Government of Malaysia Concerning Cooperation to Prevent the Illicit Trafficking in Nuclear and Other Radioactive Material*, signed 27 February 2008.
2. Port Klang, Malaysia, *Concept of Operations* Version 1.2 dated 3 March 2009
3. Port Klang, Malaysia *Training Management Plan*, Version 0.5 dated 5 July 2009

EXECUTIVE SUMMARY

The U.S. Department of Energy's National Nuclear Security Administration office of Second Line of Defense established the Megaports Initiative in 2003. This initiative provides for the screening of containerized cargo as it moves through the global maritime shipping network. To reduce the risk of illicit trafficking of special nuclear and other radiological materials, the Megaports Initiative installs radiation detection systems at international seaports. Port Klang, Malaysia is one such seaport identified by the Megaports Initiative as a key area to install equipment to accomplish the mission of preventing the acquisition and smuggling of materials that could be used to create weapons of mass destruction or radiological dispersal devices.

The Agreement between the Government of the United States of America and the Government of Malaysia describes the scope of the Megaports Initiative systems in Malaysia. It includes provisions for equipment supply, delivery, installation, training, and maintenance, as well as commitments for data sharing, and sustainment. At the conclusion of system installation and testing, it is intended that ownership and responsibility for operation of the Megaports Initiative systems be assumed by the Government of Malaysia through Royal Malaysian Customs. The U.S. Department of Energy will provide, for a period of time not to exceed three years, maintenance services in order to ensure each Megaports Initiative system remains fully operational. At the conclusion of the Department of Energy sponsored maintenance period, it is intended that these responsibilities will be transferred to the Government of Malaysia through Royal Malaysian Customs.

Sustainment is a critical factor of all components of the Megaports Initiative. The sustainment plan is developed to assist the partner country in managing the technical, financial, and policy commitments required to develop and implement a country-specific strategy. A robust sustainment plan will define the long-term relationship between the U.S. Department of Energy and the Government of Malaysia as well as promote the ongoing proficient radiation detection system operations within Malaysia.

1.0 INTRODUCTION

In 2003, the U.S. Department of Energy's National Nuclear Security Administration Office of Second Line of Defense (SLD) established the Megaports Initiative. This initiative provides for the screening of containerized seaport cargo to reduce the risk of illicit trafficking of special nuclear and other radiological materials. Radiation detection systems are installed at international seaports as part of mutual agreements between the U.S. Government and the host nation. Port Klang, Malaysia is one such seaport identified by the Megaports Initiative as a key area to install equipment to accomplish the mission of preventing the acquisition and smuggling of materials that could be used to create weapons of mass destruction or radiological dispersal devices.

The Agreement between the Government of the United States of America and the Government of Malaysia describes the scope of the Megaports Initiative system at Port Klang. It includes provisions for equipment supply, delivery, installation, training, and maintenance, as well as commitments for data sharing, and sustainment. At the conclusion of system installation and testing, it is intended that ownership and responsibility for operation of the Megaports Initiative system be assumed by the Government of Malaysia through Royal Malaysian Customs. The U.S. Department of Energy will provide, for a period of time not to exceed three years, maintenance services in order to ensure the Megaports Initiative system remains fully operational. At the conclusion of the SLD sponsored maintenance period, it is intended that these responsibilities will be transferred to the Government of Malaysia through Royal Malaysian Customs.

2.0 APPROACH

A sound approach to effectively sustain the radiation monitoring system includes the following principles:

- Training
- Staffing and Operations
- Preventive Maintenance and Repair
- Data Sharing and Analysis, and Performance Assurance
- Configuration Management
- Transition and Long Term Planning

The sustainment phase begins when the Operational Test and Evaluation (OT&E) program has been successfully completed. At that point, the system components have been proven to operate as an integrated system, and system operators have demonstrated skills sufficient to operate the radiation detection system. Key stakeholder roles and responsibilities are summarized in Appendix A.

This sustainment plan should be updated as necessary during the implementation phase of the project as well as each year of the SLD sponsored maintenance phase. Sustainment efforts will be managed by sustainment lead personnel designated from both the US and Malaysia as noted below.

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3.0 PRINCIPLES

The approach outlined in this sustainment plan focuses on six key principles that, when properly addressed, ensure sustained operation of the radiation detection system in accordance with SLD program guidance. Table 1 illustrates these principles and associated objectives.

Table 1

Principle	Elements	SLD Objective
Training	Initial system operator, maintenance personnel, system administrator, and train-the-trainer training provided by the USG during system startup. Host country developed and maintained training capability and provision of personnel.	Ensure host country has capability to train and provide appropriate number of trained and qualified system operators, system administrators, maintenance personnel, and trainers.
Staffing and Operations	Staffing requirements established during system start-up, adjustments as appropriate during the SLD sponsored maintenance period. Staffing plans developed and maintained based on optimum use of radiation detection system. Operational infrastructure provided as needed.	Ensure host country has established program to provide appropriate number of trained and qualified system operators. Ensure host country can supply necessary infrastructure.
Preventive Maintenance and Repair	Transition plan from SLD sponsored maintenance to host country sponsored maintenance. Provision and management of key spare parts, repair and/or replacement of defective components.	Establish host country capability to maintain optimum system performance while minimizing system down time and impact on port operations.

Principle	Elements	SLD Objective
Data Sharing and Analysis, and Performance Assurance	Mutually agreed data sharing plan, maintained by host country. Periodic reviews of data analyses and possible system adjustments. Periodic assurance visits to assess the operational readiness of the radiation detection system.	Ensure information on detections and seizures is provided to the USG in accordance with the Agreement. Maintain optimal radiation detection capability throughout operational lifespan. Incorporate new or improved practices as they are discovered.
Configuration Management	Control and accountability plans for system materials and configuration information. Change tracking and validation of revised drawings, new equipment, new software and hardware, and verification of system parameter settings.	Ensure system components and settings are only changed in a controlled manner such that the effect on system performance can be quantified.
Transition and Long Term Planning	Communications with host country regarding implementation strategies, successes, challenges seen during SLD-sponsored maintenance period, and forecasts by host country including financial aspects.	Eliminate obstacles and ensure host country has prepared financial elements necessary to take over full system ownership, including maintenance, without interruption in system operations or level of performance.

3.1 TRAINING

In conjunction with system startup, the DOE will provide system operators with sufficient training to effectively operate the radiation detection system. This training is based on the Training Management Plan developed by PNNL and is included in Appendix B.

Personnel appointed to system operations are expected to be familiar with port operations and security, as well as have basic computer skills in a Microsoft Windows operating environment. Once initial operator training is complete, and OT&E has been completed, future training related to the operations of the radiation detection system and processing of alarmed containers will be the responsibility of Royal Malaysian Customs (RMC). This includes both training of new operators and refresher training for existing operators. US training leads will remain available for remote support, if needed, and will continue to provide new/updated materials as they become available.

The DOE will also provide initial training for maintenance personnel and system administrators. Maintenance personnel will be trained to perform routine system maintenance and perform emergency equipment repairs. System administrators will be trained to monitor, troubleshoot, and repair the communication system hardware and software components. Due to the complex nature of the communication system, only trained and qualified personnel should perform these duties

A basic assumption over the project lifecycle is that there will be staff turnover. The DOE will assist the Government of Malaysia (GOM) with the design and development of an indigenous training program, and ultimately transfer full ownership of the training program to the GOM. The Training Management Plan developed by PNNL may be used as a suitable template. The DOE will train a select group of Malaysian officials as trainers who will be responsible for maintaining an indigenous training program. At a minimum, refresher training for operators, system administrators, and maintenance personnel will be provided by DOE at least once a year during the SLD sponsored maintenance period.

Additional courses are available upon request during the transition period. Where noted, Megaports may provide this training. Some courses may also be provided by other organizations such as the IAEA or other DOE/NNSA programs and will need to be requested directly by the GOM. The GOM is encouraged to develop a process to track indigenous training activities, including a record of training participants and courses conducted. Table 2 is a summary of training courses recommended for each operational port.

Table 2

Training Course	Training Provider	Recommended Frequency
Recommended Annual Training for Operational Sites		
CAS Operator Refresher Training	DOE/NNSA (SLD)	Once per year
Instructor Refresher Training	DOE/NNSA (SLD)	Once per year for 2 years
Source Recovery Refresher	DOE/NNSA (SLD)	Once per year
Communications System Administrator/Routine Maintenance Training	Software Vendor	Once during transition phase
RPM Maintenance Training	RPM Vendor	Once per year
Recommended Supplemental Training for Operational Sites		
Commodity Identification Training for Customs officers	DOE/NNSA (International Nuclear Export Control Program)	Once
Search and Secure Training for Nuclear Regulators	DOE/NNSA (Global Threat Reduction Initiative)	Once
Source Packaging and Transport Training	IAEA or AELB	Once

Training Course	Training Provider	Recommended Frequency
Emergency Response Training	IAEA or AELB	Once

3.2 STAFFING AND OPERATIONS

The GOM should ensure that the Megaports radiation detection system is staffed with an appropriate number of trained and qualified operators whenever the system is in operation. Once the radiation detection system has passed System Level Acceptance Test (SLAT) and the CAS Operators have completed the necessary training, RMC will be responsible for operation of the Central Alarm Station (CAS) and associated Secondary Workstations (SWS).

3.2.1 Staff Levels

Currently, Port Klang operates three shifts per day, 365 days per year. There will be one CAS located within the Westport customs office that requires a minimum of three trained and qualified operators per shift to safely and efficiently operate. In addition, there is one SWS located at the Westport Secondary Inspection Site (SIS) that requires one trained and qualified operator per shift, and one SWS located at the Northport SIS that requires one trained and qualified operator per shift. A trained and qualified operator will also be required when requested by RMC to perform secondary inspections using handheld instruments. To ensure ongoing computer hardware and software performance, at least one trained and qualified staff member will also be required to perform system administrator (SA) duties. A staffing summary is shown in Table 3. These levels may need adjustment based on changes in port operational schedules and available staff. It is expected that the radiation monitoring system will be adequately staffed at all times during operation.

Table 3

Function	Staff/Shift	Staff/Day
CAS Operations	3	9
Punch Gate Operations	1	3
CFS Gate Operations	1	3
Secondary Inspection Site	As needed	As needed
System Administrator	As needed	1 (minimum)

3.2.2 Operator Responsibilities

System operator responsibilities include reviewing and adjudicating all alarms from the radiation detection system, and conducting secondary inspections of containers when appropriate. The system operators are also responsible for providing troubleshooting within the guidelines provided during training and on the job experience, and for

notifying the maintenance provider or system administrator if an equipment malfunction occurs that they cannot resolve. It is anticipated that RMC will appoint supervisory staff to the CAS, and in that role, supervisors should assume prime responsibility for equipment over checks and reporting system problems to the maintenance provider and to PNNL. This includes equipment such as Radiation Portal Monitors (RPM's), Optical Character Recognition cameras (OCR's), visual cameras, workstations, hand-held instruments, and other associated infrastructure such as communication lines and traffic controls.

3.2.3 System Administrator

The System Administrator (SA) supports software and hardware maintenance and repair issues, adds new users to the system, maintains passwords, configures routers and switches, and conducts system-performance checks. More complex issues, such as advanced network configuration and Windows and Oracle system administration, if not within the qualification scope of the designated SA, are handled by contractor(s) designated by the DOE. It is expected that the SA will provide support to all radiation detection system workstations throughout the operational lifetime, as well as provide training for new SA personnel. Qualifications, education, and experience necessary to perform system administrator duties are shown in Appendix C.

3.2.4 Operating Procedures

RMC is also responsible for developing, maintaining, and implementing Standard Operating Procedures (SOP) based on the Conduct of Operations (ConOps) and training provided by DOE. Responding to and processing alarmed containers is the responsibility of RMC and is assumed to be consistent with defined operations, provided training, and Malaysian law. These procedures should include the following components:

- identification of all in-country stakeholders who have roles and responsibilities associated with radiation detection system operations and alarm-response procedures
- description of how the procedures are incorporated into formal agency authority and reduced to standard practices by site personnel
- description of procedures in the event of verified discovery of special nuclear materials and other radioactive materials
- indicators of proper system performance and troubleshooting guidelines

3.2.5 CAS and SWS Office Supplies

Following SLAT, provision for and replacement of typical office supplies necessary for CAS and SWS operations will be the responsibility of RMC. This includes but is not limited to stationary, printer cartridges, and office amenities such as small appliances.

3.2.6 Operational Infrastructure

During the SLD sponsored maintenance period, DOE will provide, on a mutually agreeable contract basis only, certain site infrastructure such as high speed communication line service used by the radiation detection system. After the SLD sponsored maintenance period, the GOM and/or port will be responsible for such costs.

3.3 PREVENTIVE MAINTENANCE AND REPAIR

The DOE will provide maintenance, repair, and calibration of the radiation detection system for up to three years following SLAT by using a combination of local maintenance providers (LMP) and technical specialists. Repair or replacement during this period may not be provided for willful or blatant damage as a result of local port activities not associated with standard radiation detection system operations.

The Pacific Northwest National Laboratory (PNNL) will establish the maintenance contracts for equipment associated with the radiation detection system during the SLD sponsored maintenance period. A list of covered equipment is shown in Appendix D. Maintenance of equipment not shown in Appendix D will be the responsibility of the Malaysian government or port operator. For non-routine or emergency maintenance service, the system operators will directly communicate with the LMP and PNNL for the exchange of information critical to providing and coordinating good maintenance service. The system operators may contact the SLD Help Desk; however this option should only be exercised if the LMP or system administrator has been unable to resolve the issue.

Maintenance contracts support the sustainment plan and address specific aspects of maintenance and emergency repair, including the following:

- identification and qualification of provider
- schedule of maintenance items
- emergency repair protocol
- response time for maintenance and repairs
- reports of all maintenance and emergency repairs.

3.3.1 Equipment List, Key Spare Parts, and Handheld Instruments

At the completion of system installation, a master equipment list will be generated for the port and included in Appendix E. The list will include all equipment provided by the Megaports Initiative as well as identify key spare parts and handheld instruments. The master equipment list will be managed by RMC and updated any time there is a change in equipment due to repair or replacement. The maintenance provider will maintain the inventory of key spare parts throughout the life of the maintenance agreement. Handheld instruments are provided for and maintained by the DOE throughout the SLD sponsored maintenance period.

For replacement of equipment and parts outside the scope of the maintenance agreement during the SLD sponsored maintenance period, the maintenance contractor will coordinate with the appropriate DOE Point of Contact (POC) to procure replacement items. The System Administrator may also request information technology related replacement equipment or parts from the appropriate DOE POC.

3.3.2 Test and Calibration Sources

Test and calibration sources are provided to RMC for use in RPM maintenance, alignment, and calibration activities. RMC is responsible for the licensing, custody, and

management of the sources, which are maintained in a secure location specified by RMC. These sources may decay beyond their minimum useful activity levels during the SLD sponsored maintenance period. In this event, the DOE will provide replacement sources to RMC. At the conclusion of the SLD sponsored maintenance period, RMC will be responsible for replacement of these sources.

Isotope	Half-Life	Initial Activity (Bq)	Min Activity (Bq)
Cobalt – 57 (Co-57)	270 days	$1.8x10^5$	$4.6x10^4$
Cesium – 137 (Cs-137)	30 years	$3.7x10^5$	N/A
Californium – 252 (Cf-252)	2.5 years	$1.8x10^5$	$3.7x10^4$

3.3.3 SLD Help Desk

The DOE has established a single point of contact for partner countries to access technical support in resolving equipment faults. This SLD Help Desk provides technical expertise in radiation detection systems, including equipment manufacturers, software vendors, and DOE/NNSA National Laboratories. This support is extended to all SLD deployed equipment, including handheld radiation detection and communications equipment.

Local maintenance providers or regional technical support organizations can request technical assistance from the SLD Help Desk. When a service request is submitted, an SLD service request manager (SRM) will contact the requestor to begin discussions on the corrective action plan. This same SRM will support the service request through to its complete resolution. In extreme cases, the corrective action plan may entail mobilizing an equipment vendor to provide on-site service.

A Virtual Private Network (VPN) connection to the radiation detection system allows controlled remote access by SLD troubleshooters. In addition to facilitating data exchange, a VPN connection can be used to provide remote technical support for maintenance and repair issues. The SLD Help Desk brochure and process flowchart is attached in Appendix F.

3.4 DATA SHARING AND ANALYSIS, PERFORMANCE ASSESSMENT

To ensure the radiation detection system continues to operate as efficiently and effectively as possible, and for its intended purpose, the DOE collects and analyzes data files generated by the system, reviews alarm notification data, and conducts periodic performance assessments.

3.4.1 Data Sharing

As defined in the Agreement, information on verified detections or seizures of special nuclear material and of other radioactive material made as a result of the use of the DOE provided equipment will be furnished to the United States Government (USG). Such

information should be provided to the project points of contact noted in Section 4.0 of this document immediately upon discovery.

3.4.2 Data Analysis

To allow data analysis and performance assessment, RMC will also provide CAS daily files on a monthly basis. These files may be provided by storage media such as CD, or may be directly acquired through VPN remote access. The method of transfer is at the discretion of RMC. Daily files are stored on the communications system servers; one file is generated each day for each RPM installation. The size of each file varies depending on traffic passing through the monitor but may generally be considered to vary in size from 1-3 megabytes each.

The daily files contain the following information:

- raw data in two forms
  - background counts while unoccupied
  - scanning counts while occupied
- parameter settings of each portal
- occupancy data (e.g., the number of vehicles passing through the portal)
- radiation profiles (neutron, gamma) in raw data form of each occupancy
- alarm data, indication of when and by how much an occupancy exceeds the alarm threshold (neutron and gamma)
- RPM fault conditions

The daily files **DO NOT** contain the following type of information:

- container identification information
- cargo information
- photographic images

The analysis of this data is documented in a quarterly report and used to monitor sustained system performance and identify areas for improvement. Distribution of this report is limited to DOE, but may include RMC upon request.

3.4.3 Performance Assessment

DOE representatives will visit the port on a periodic basis to conduct performance assessments of the system. These assessments will not only lead to immediate, onsite corrective actions for acute issues but will also help identify more systemic issues at the site to be addressed later. The assessments will be conducted by appropriate representatives from DOE sponsored national laboratories with direct support from appropriate Malaysian officials. Guidance for assessments, as well as a checklist is included in Appendix G.

Assessments will include both basic equipment checks and an overall operational evaluation that incorporates the composite performance of equipment, processes, and people. The assessments will also provide an opportunity to review training activities and needs with RMC and other relevant stakeholders. The SLD Program will coordinate

all assurance visit observations with Malaysia. After the SLD sponsored maintenance period, the GOM will take over responsibility for conducting periodic assessments.

3.5 CONFIGURATION MANAGEMENT

To protect the integrity of system operations, it is imperative that equipment and associated operating parameters are properly documented and controlled, and are only changed under controlled conditions.

3.5.1 System Upgrades and Changes

During the SLD sponsored maintenance period, DOE will be responsible for upgrades and changes to the system that represent repairs or fixes to known or discovered defects or software problems. Additionally, DOE will be responsible for upgrades or changes where the responsibility has been negotiated and DOE has agreed to accept that responsibility.

Upgrades and changes initiated by DOE will be managed in accordance with current program-level change-control requirements. Prior to implementation of any changes, the appropriate documentation will be presented to RMC for concurrence. During the SLD sponsored maintenance period, RMC must notify DOE of any changes it intends to make to the system so that information regarding system configuration can be kept accurate for the maintenance providers.

3.5.2 Port Changes

Upgrades and/or changes to the system resulting from desired changes to operations or port configuration will be the responsibility of the GOM. DOE will provide reasonable consulting services during the planning of these changes, which may include design services and background radiation surveys. Planned expansions or port reconfigurations should be addressed during periodic sustainment discussions as soon as possible so that they can be accounted for in the Sustainment Plan.

3.6 TRANSITION AND LONG-TERM PLANNING

The transitional plan for the Megaports radiation detection system includes official transfer of ownership of all related equipment from the USG to the GOM. In addition, maintenance and repair responsibilities will transfer to the GOM after the SLD sponsored maintenance period.

3.6.1 Transfer of Ownership

Once the Megaports system has been fully tested and deemed acceptable, the USG will formally transfer ownership of the equipment and system to the GOM. The property transfer will be executed by signing a joint letter forwarding the Master Equipment list for the port.

3.6.2 Long-Term Planning

During the SLD sponsored maintenance period, the DOE will provide the GOM with details on maintenance contracts, including costs and performance issues. Based on data

from Megaports installations worldwide, and the size and complexity of the installation at Port Klang, annual maintenance costs for the radiation detection system at Port Klang are estimated at USD 250,000. This includes routine maintenance and emergency repairs for all associated components including, but not limited to, site infrastructure, radiation portal monitors, cameras, and communication system hardware and software. As the GOM prepares to take full responsibility for sustained operations and maintenance of the radiation detection system, annual budget needs should be considered. Budget planning should be included in the overall budget cycle used by the GOM and other key Malaysian stakeholders.

3.6.3 International Partnerships and Lessons Learned

It is a principal tenet of the SLD Program that the global community will optimize progress in combating nuclear smuggling only if:

- Detection systems are effectively sustained through strong joint maintenance and training efforts;
- Detection systems are effectively integrated into a local, national, regional and global strategy for detecting illicit trafficking; and
- Information and experiences related to detection systems are appropriately shared to facilitate improved monitoring and deployment approaches.

Regional workshops provide opportunities for the international community of operators of SLD deployed systems to share their experiences in installing, operating and maintaining the radiation detection equipment at their key seaports in response to threats to international security. The outcomes of the workshops are a greater regional awareness of deployments and a greater understanding of how best to sustain the full operational benefits of the radiation detection equipment. Malaysia may be requested by Megaports to participate in and/or host a regional workshop.

Generally, the illicit movement of radioactive material across host country borders can only be fully resolved by working in collaboration with neighboring countries in the region. Accordingly, a program of regional exercises is encouraged to facilitate cooperation and promote a timely and effective response if such an incident would occur. The SLD program can help facilitate initiation of planning for such a regional activity by coordinating with regional and international organizations and agencies.

4.0 PROJECT POINTS OF CONTACT

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APPENDIX A

Key Roles & Responsibilities

Plan Section	Activity	DOE	RMC	Period
2.1	Provide & Validate Initial CAS & Secondary Inspection Operator Training	✓		Through System Turnover
2.1	Provide & Maintain Staff Level to Operate CAS & Secondary Workstations & Conduct Secondary Inspections		✓	Through Operational Lifespan
2.1	Troubleshoot System Errors & Report Problems to Local Maintenance Provider		✓	Through Operational Lifespan
2.1	Maintain System Administrator Staff		✓	Through Operational Lifespan
2.2	Provide Initial System Administrator Training	✓		Through System Turnover
2.2	Develop In-Country Training Program		✓	Following DOE Training
2.2	Provide Remote Training Support	✓		Through DOE Maintenance Contract
2.2	Provide Operator Training to Newly Assigned Personnel		✓	Through Operational Lifespan
2.2	Provide System Administrator Training for Newly Assigned Personnel		✓	Through Operational Lifespan
2.2	Provide New & Updated Training Materials	✓		Through Operational Lifespan
2.3	Develop, Implement, & Maintain Standard Operating Procedures		✓	Through Operational Lifespan

Plan Section	Activity	DOE	RMC	Period
2.3	Respond to and Process Alarmed Containers		✓	Through Operational Lifespan
2.4	Provide Maintenance, Emergency Repair, & Calibration of Radiation Detection System	✓		Through DOE Maintenance Contract
2.4	Maintain Non-Critical Equipment		✓	Through Operational Lifespan
2.4	Provide Maintenance, Emergency Repair, & Calibration of Radiation Detection System		✓	After DOE Maintenance Contract
2.4	Provide SLD Help Desk Support	✓		Through DOE Maintenance Contract
2.4	Reimburse Site Infrastructure Costs	✓		Through DOE Maintenance Contract
2.4	Provide & Maintain Site Infrastructure		✓	After DOE Maintenance Contract
2.4	Maintain System Administration Duties		✓	Through Operational Lifespan
2.4	Provide High Level System Administration Support	✓		Through DOE Maintenance Contract
2.4	Provide Test & Calibration Radiation Sources	✓		Through DOE Maintenance Contract
2.4	Maintain Test & Calibration Radiation Sources		✓	Through Operational Lifespan
2.4	Provide System Upgrades & Changes for Known or Discovered System Deficiencies	✓		Through DOE Maintenance Contract

Plan Section	Activity	DOE	RMC	Period
2.4	Provide System Upgrades & Changes Requested by Host Government		✓	Through Operational Lifespan
2.5	Provide & Maintain Inventory of Critical Spare Parts and Handheld Instruments	✓		Through DOE Maintenance Contract
2.5	Maintain Inventory of Critical Spare Parts and Handheld Instruments		✓	After DOE Maintenance Contract
2.5	Provide Non-Critical Spare parts & Standard Consumable Items Used During Normal CAS Operations		✓	Through Operational Lifespan
2.6	Provide Remote Software Maintenance Support and System Performance Reviews by VPN Access	✓		Through Operational Lifespan
2.6	Control VPN Access to Communication System		✓	Through Operational Lifespan
2.6	Perform Technical Evaluations of System	✓		Through DOE Maintenance Contact
2.7	Provide Daily File Package on Monthly Basis		✓	Through Operational Lifespan
2.7	Analyze & Report on Data Analyses	✓		Through Operational Lifespan
2.8	Provide and Maintain Key Points of Contact	✓	✓	Through Operational Lifespan

APPENDIX B

Training Management Plan

APPENDIX C

System Administrator Qualifications, Education, and Experience

The system administrator (SA) position supports hardware and software maintenance and repair issues. Accordingly, requisite education, skills, and experience are required for the position as described below. A qualified SA will be able to perform at least the following:

- Restart workstations and servers
- Diagnose and replace defective hardware components, including boards, routers, switches
- Respond to system user difficulties and diagnose and solve problems.
- Assist PNNL or its authorized agents with application installation and upgrades
- Manage user accounts and security settings
- Perform database backups on a defined schedule and perform system recovery when necessary
- Microsoft Windows services
- Working knowledge of Microsoft Operating Systems (Windows 2003 Server, Windows XP, etc)
- Remote management software (PC Anywhere or Microsoft Terminal Services)
- Experience with deploying and supporting server and workstation hardware
- Basic understanding of the terms, concepts, and software components of the Central Alarm Station (CAS) application

Demonstrated experience with the following skills is desirable but not mandatory provided the above mentioned capabilities are met:

- Cisco Certified Network Associate or equivalent hands-on experience including:
  - Working knowledge of Cisco routers, switches, and Voice over Internet protocol devices
  - General understanding of CiscoWorks Local Area Network Management Solution software
- Working knowledge of Transmission Control Protocol/Internet Protocol
- Basic understanding of communications circuits (i.e., Channel Service Unit/ Digital Service Unit, E1, and Integrated Services Digital Network)
- Basic understanding of audio/visual communications systems
- Basic understanding of VPN
- Client-Server architecture using Windows applications
- Oracle databases
- Microsoft Internet Information Services (IIS) and web applications
- Backup software
- Tape backup hardware/Tape libraries

APPENDIX D

Maintenance Items

Lane Area

- Radiation Portal Monitor (RPM)
- Optical Character Recognition (OCR) Camera
- License Plate Reader (LPR) Camera
- Fixed Focus Camera
- Proximity Sensor
- Bollard
- Concrete Barrier
- Gantry
- Electrical Cabinet
- Control Cabinet
- Traffic Control Light
- Lane Striping
- Overhead Lighting

CAS/SWS

- Computer Server
- Computer Workstation
- Printer (excludes consumables)
- Router
- Switch
- Media Converter
- Cable
- Voice over Internet Protocol Phone (VoIP)
- Cooling and Ventilating Equipment (installed as part of new CAS/SWS)
- Doors and Windows (installed as part of new CAS/SWS)
- Handheld Instrument and/or Radiation Source Storage Cabinet (installed as part of new CAS/SWS)

APPENDIX E

Equipment List and Key Spare Parts

TBD

APPENDIX F

SLD Help Desk
(Brochure)

Program Description

The Second Line of Defense (SLD) program at the U.S. Department of Energy's (DOE) National Nuclear Security Administration (NNSA) works with the international community to strengthen the capability to deter, detect and interdict the illicit trafficking of proliferation concern materials. In close cooperation with partner countries, the SLD program installs radiation detection systems at select land border crossings, airports, seaports and other transit points. SLD is committed to providing the training and technical support necessary to ensure sustained operation of these systems. Accordingly, a single point of contact has been established for partner countries to access technical support in resolving performance problems with the radiation detection systems. The SLD Help Desk is designed to serve as the partner country's pathway to gain access to the technical expertise available from the equipment manufacturers and the DOE National Laboratories. This support is extended to all SLD-deployed equipment, including hand-held secondary inspection equipment.

Contacting the Help Desk

Local maintenance providers or any other in-country stakeholders can request technical assistance from the SLD Help Desk. To facilitate this process, the SLD Help Desk will provide program participants a Service Request Form, translated into the local language. The Service Request Form can be submitted by either e-mail or fax.

When a service request is submitted, a computer-generated e-mail acknowledging receipt will be immediately sent to the requesting party. Within 24 to 48 hours, a Service Request Manager will contact the requester by e-mail or fax to begin discussions on a corrective action plan. The same Service Request Manager will support the service request until final resolution of the technical problems.

Service Request Information

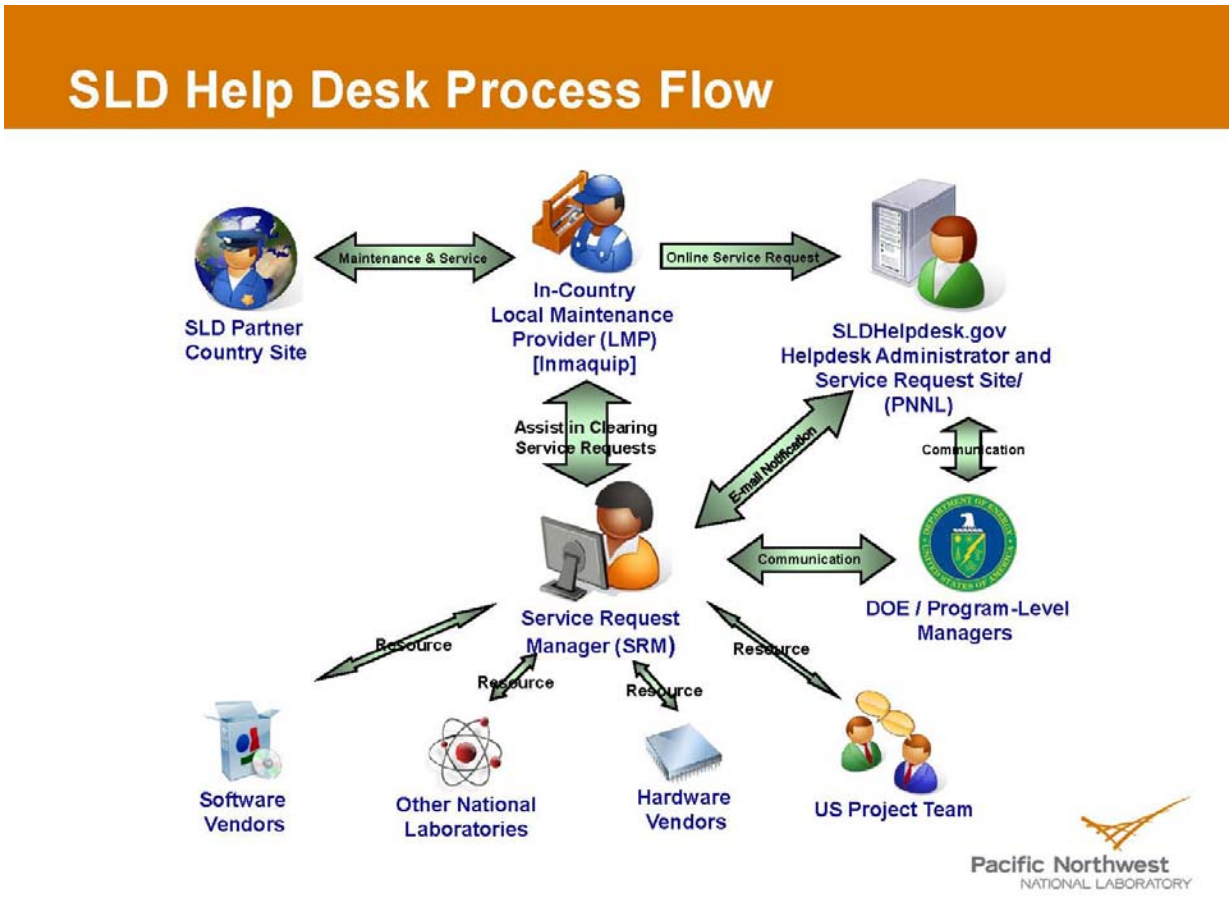
In the absence of the Service Request Form, the following information should be e-mailed to SLDHelpdesk@pnl.gov or faxed to 001-509-372-4686:

- Name and contact information of person making service request
  - E-mail address, fax and telephone number
  - Agency or organization person represents
- Country, Site name and location of problem
- Description of system problem
- Corrective actions already performed
- Any additional data critical to resolving the request (daily files, status of health messages, etc.)

Supporting Our Partners

Operating and maintaining the radiation detection systems after installation and site commissioning is critical to achieving our long-term nonproliferation goals. To this end, the SLD program supports partner countries in establishing the infrastructure necessary to effectively maintain these systems. Central to this effort is the selection of a Local Maintenance Provider (LMP) to perform routine preventative maintenance and as-needed repairs. Comprehensive training in diagnostics and system maintenance/repair is provided to each LMP to ensure they have the technical proficiency to resolve the majority of equipment malfunctions. All radiation detection system problems should first be communicated to the designated LMP for resolution. In those cases where the LMP cannot restore full system functionality, the SLD Help Desk should be contacted.

(Process Flow Chart)



(Service Request Form)

Contact Information:
E-mail: SLDHelpDesk@pnl.gov
Fax: +001 509 372 4686

Requesters Name:
Requesters Title:
Company/Organization Affiliation:
Phone Number:
E-Mail Address:
Country:
Site Requesting Service:

ISSUE (Please check all that apply)	**MODEL / VERSION** (Please list for all issues checked)
1. ☐ Central Alarm Station (CAS) Software	
2. ☐ Computer(s) (Server, CAS workstation, etc)	
3. ☐ Camera	
4. ☐ Network	
5. ☐ Radiation Portal Monitor	
6. ☐ Power	
7. ☐ Optical Character Recognition	
8. ☐ Handheld Inspection Equipment	
9. ☐ Virus Scan Software Request	
10. ☐ Firmware Upgrade Request	
11. ☐ Manuals Request	
12. ☐ Critical Spare Parts Request	
13. ☐ Calibration Assistance	
14. ☐ Other:	

Problem Description and Comments

Revised 01/15/2009

APPENDIX G

Performance Assessment Guidelines and Sample Checklist

An established program of periodic operational readiness assessments providing system performance tracking is important in identifying faulty equipment, inadequate procedures, and training deficiencies. A site assurance survey will include both basic equipment checks and an overall operational evaluation that incorporates the composite performance of equipment, processes, and people. The primary areas of interest can be categorized as follows:

- Operational status of the equipment (radiation portal monitors, handheld radiation detectors, communications system, peripheral equipment)
- Technical proficiency of operators and maintenance providers
- Management practices

These site assurance surveys may lead both to immediate corrective actions for acute site-specific issues and to remediation of systemic deficiencies.

Objective

- Conduct site assurance surveys at each operational site at periodic intervals to assess system performance, evaluate operators' knowledge/ability to properly execute work flow and adjudicate radiation alarms, measure the efficiency and adequacy of the operational procedures, and address system deficiencies.

Schedule

- 2-3 times per year during transition phase

Proposed Assurance Survey Activities

The intent of the assurance survey is to determine if assistance is needed at a site and, if so, identify the appropriate level of assistance. The site assurance visits are intended to be conducted jointly with the SLD project team (led by the Sustainment Lead) and the SLD operators in-country (led by the in-country sustainment POC). Listed below are some examples of activities that may take place during an assurance visit:

- Perform equipment performance diagnostics and testing
- Review maintenance reports, logs, troubleshooting reports and complete outstanding preventative maintenance tasks
- Repair any faults and collect operator feedback
- Conduct refresher training on alarm adjudication, as required
- Review and analyze data from RPMs
- Server defrag, clean-up, and performance analysis
- Interview SLD operators on operational procedures
- Exchange lessons learned
- Red-teaming exercises to test operator performance
- Observe if the Concept of Operations is still being followed since OT&E

Checklists and questionnaires

The intent of the assurance survey is to provide objective, quantified measures of system performance and identify faults that require corrective action. The checklists and discussion topics used in the assurance survey must be designed to collect information in a manner that is transparent and non-threatening and allows rapid and precise (repeatable) analysis. Accordingly, the discussion topics and possible answers should be carefully defined, even prescriptive where possible. For each evaluation task and discussion topic, there will be:

- Identification and description of component or system function
- Identification and description of the observable – the function to examine or the question to ask
- 3 to 5 performance indicators
- If component or system function is found in a failed state, an estimate of condition/fault criticality to the overall system operation.

Prior to arriving at the site for an assurance visit, the SLD Sustainment Lead will provide a set of checklists and questionnaires that will be used to compile a one-page report identifying strengths and weaknesses and areas that need to be addressed in subsequent assurance visits. An example of the summary report is shown below.

Example: Assurance Survey Summary Sheet

	Site/Gate/Lane 1 (Date)	Site/Gate/Lane 2 (Date)	Site/Gate/Lane 3 (Date)	Site/Gate/Lane 4 (Date)
Equipment				
Radiation Portal Monitor				
Pedestrian				
Vehicle				
Rail				
Com System				
CAS Workstation				
Server				
Hand-held equipment				
Personal Radiation Detector (Pager)				
Survey Meter (TSA PRM470G)				
Radioactive Isotope Identification Device (ThermoElectron RIID)				
Auxillary Components				
Printer				
Uninterruptible Power Supply				
People and Processes				
Operators				
Maintenance Providers				
Processes				
Pedestrian				
Vehicle				
Rail				
Management and Infrastructure				
Electrical Service				
Storage of Equipment				
Consumables (paper, printer cartidges, batteries)				

●	Performing as designed
◕	Deficiencies exist that do not impact screening capacity
◑	Deficiencies exist that partially impact screening capacity
◔	Deficiencies exist that severely impact screening capacity
○	Screening capacity compromised
☒	Did not observe or does not apply