U.S. Department of Homeland Security
601 South 12th Street
Arlington, VA 20598-6017

Transportation Security Administration

July 22, 2011

Mr. Frank Lisi
Acting Federal Security Director
Transportation Security Administration
T.F. Green International Airport (PVD)

Dear Mr. Lisi:

The TSA Office of Occupational Safety, Health, and Environment (OSHE) is sponsoring an independent radiation protection survey project of general-use backscatter x-ray advanced imaging technology (AIT) systems and cabinet x-ray systems through an interagency agreement with the U.S. Army Public Health Command (USAPHC). This survey project is not to be confused with the radiation surveys performed during preventive maintenance checks. The annual equipment inspections are conducted by certified equipment maintenance personnel under specific testing conditions, whereas the survey project is conducted by USAPHC personnel under normal operating conditions; e.g., baggage flow-through or passenger screening with TSOs in attendance.

As part of the survey project, a radiation protection survey of selected general-use backscatter x-ray AIT and cabinet x-ray systems used at TSA PVD was conducted on March 24-25, 2011, by a team of certified health physicists from USAPHC's Health Physics Program, Army Institute of Public Health. The purpose of the survey was to ensure that the general-use backscatter x-ray AIT systems comply with the requirements of ANSI/HPS N43.17-2009, and that the cabinet x-ray systems comply with the Food and Drug Administration's Performance Standards for Ionizing Radiation Emitting Products (21 CFR 1020.40), and to identify any health hazards associated with the use of either of these x-ray systems.

General-use Backscatter X-ray AIT Systems

All three of the general-use backscatter x-ray AIT systems present at PVD at the time of the survey were tested and found to be in compliance with the radiation dose limits specified in ANSI/HPS N43.17-2009. In addition, the general-use backscatter x-ray AIT systems were in compliance with other requirements of the standard. There are no health hazards associated with the use of these general-use backscatter x-ray AIT systems provided the appropriate operating procedures are followed. Please see the survey results in Enclosure 1 of the attached report.

Cabinet X-ray Systems

Eleven cabinet x-ray systems were evaluated for compliance with the requirements of Title 21, CFR, Subchapter J. However, please note that radiation emission measurements could not be performed on four cabinet x-ray systems because of lack of baggage flow through the systems when the survey team was present.

Seven cabinet x-ray systems were tested and found to be in compliance with the radiation emissions limit specified in Title 21, CFR, Subchapter J. There are no health hazards associated with the use of these cabinet x-ray systems provided the appropriate operating procedures are followed.

All of the cabinet x-ray systems complied with other, non-emission, requirements of Title 21, CFR, Subchapter J with several exceptions. In addition, the survey officers noted a number of "administrative items" during the surveys. These findings are described on page 2 of the attached report and in the survey reports (Enclosure 2 of report).

Your early attention to correcting the identified findings is requested. Please contact the TSA Service Response Center at 1-800-820-8535 for assistance.

If you have questions or comments about the report's contents, please direct them to me at [redacted].

Sincerely,

Jill M. Segraves

Jill Segraves, CSP
Director
Office of Occupational Safety, Health, and Environment

cc: Christine Halfacre, Chief of Staff, Office of Security Technology
Enclosure: TSA PVD Radiation Protection Survey Report, dated 6 June 2011

DEPARTMENT OF THE ARMY
U.S. ARMY INSTITUTE OF PUBLIC HEALTH
5158 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MD 21010-5403

0 6 JUN 2011

Health Physics Program

Ms. Jill Segraves
Transportation Security Administration
TSA-170SHE
601 South 12th Street
Arlington, Virginia 22202

Dear Ms. Segraves:

This letter is in reference to the Memorandum of Agreement between the U.S. Army Medical Command and the Transportation Security Administration (TSA), signed September 10, 2008; electronic mail message, subject: 2400.2.1 PVD Radiation Surveys, 17 March 2011; American National Standards Institute/Health Physics Society (ANSI/HPS) N43.17-2009; and Title 21, Code of Federal Regulations (CFR), Subchapter J.

A radiation protection survey was performed on 24-25 March 2011 at T.F. Green International Airport (PVD), Warwick, RI, Project No. 26-MF-OEHF-11. The survey was performed to:

a. evaluate all advanced image technology (AIT) x-ray systems for compliance with ANSI/HPS N43.17-2009.

b. evaluate selected cabinet x-ray systems to ensure compliance with the requirements of Title 21, CFR, Subchapter J.

c. identify any health hazards associated with the use of these x-ray systems.

d. provide recommendations to assist in correcting any areas of regulatory noncompliance or health hazards.

The survey was performed by [redacted] Certified Health Physicist (CHP), Health Physics Program (HPP), Army Institute of Public Health (AIPH) and [redacted] CHP, HPP, AIPH.

A total of 3 AIT x-ray systems were evaluated for compliance with the requirements of ANSI/HPS N43.17-2009, a voluntary national consensus standard and 11 cabinet x-ray systems were evaluated for compliance with the requirements of Title 21, CFR, Subchapter J. The survey results for each AIT x-ray system and cabinet x-ray system are provided in Enclosures 1 and 2, respectively.

All AIT x-ray systems tested were found to be in compliance with the radiation dose limits specified in ANSI/HPS N43.17-2009. Radiation emission measurements could not be performed on four cabinet x-ray systems because of lack of baggage flow through the systems when the survey team was present. All other cabinet x-ray systems tested were found to be in compliance with the radiation emissions limit specified in Title 21, CFR, Subchapter J. There are no health hazards associated with the use of these systems provided appropriate operating procedures are followed.

All AIT x-ray systems were found to be in compliance with the other requirements of ANSI/HPS N43.17-2009. All cabinet x-ray systems were found to be in compliance with the other requirements of Title 21, CFR, Subchapter J, with the following exceptions:

a. All Smiths Detection systems, Checkpoint, Lanes 1, 2, 6, 7, and 8: The control panel warning label "Caution: X-Rays Produced When Energized" was missing.

b. Smiths Detection 6040i, SN 40566, Checkpoint, Lane 8: The warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" was missing at the entrance port.

In addition, the survey officers noted the following administrative items during the surveys:

a. L3 3DX-6000, SN 6758, Southwest Pod EDS #3: The maintenance service provider's survey date posted on the system was over one year old.

b. L3 3DX-6000, SN 6757, Southwest Pod EDS #4: The maintenance service provider's survey date posted on the system was over one year old.

c. L3 3DX-6000, SN 6760, US Air Pod EDS #5: The screws in the plate holding the exit tunnel to the main system gantry (on side toward EDS #6) were loose.

d. L3 3DX-6000, SN 6754, United/Continental Pod EDS #8: The maintenance service provider's survey date posted on the system was over one year old.

e. Smiths Detection 6040i, SN 40061, Checkpoint, Lane 6: The "x-ray on" light was inoperable at the entrance port on the operator's side. The maintenance service provider's survey date was not posted on the system.

f. Smiths Detection 6040aTiX, SN 79522, Checkpoint, Lane 7: The maintenance service provider's survey date was not posted on the system.

g. Smiths Detection 6040i, SN 40566, Checkpoint, Lane 8: The maintenance service provider's survey date was not posted on the system..

Based on the survey measurements at the inspection zone boundaries of the AIT systems, it is estimated that an individual would need to be present at the inspection zone boundary for 1,000,000 screenings in one year to reach the public dose limit.

Assuming 600 screenings are accomplished each hour, then an individual would need to be at the inspection zone boundary for 1666 hours of the work year to reach the public dose limit of 100 millirem per year.

Long-term measurements using area dosimeters are being made on all three AIT x-ray systems. Six dosimeters were mounted on each system. The area dosimeters will be collected in approximately two to three months. The measurement data from the area dosimeters along with the number of screenings on each of the AIT systems over this time period will be used to update the estimates of the potential dose to Transportation Security Officers who operate or work near these systems. The results of these long-term measurements will be provided in a separate report.

The survey officers discussed the survey results with Mr. Frank Lisi, Assistant Federal Security Director - Operations and Ms. Diane Marley, Customer Support Quality Improvement Manager on 25 March 2011. The survey notes were provided to Mr. Lisi by electronic mail on 6 April 2011 and a copy is provided in Enclosure 3.

For more information concerning the survey, please contact the AIPH, Health Physics Program, at [redacted]

Sincerely,

[redacted]

Portfolio Director
Occupational Health Sciences

Enclosures

Survey Results for 3 AIT X-Ray Systems

Encl 1

Survey Worksheet - AIT X-Ray Systems

Health Physics Program
U.S. Army Public Health Command (Provisional)
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 1/2				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000SP	S51009004	Mar 2010

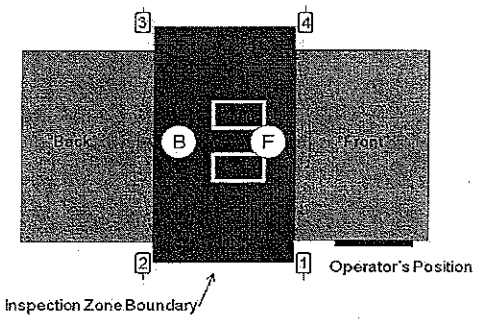
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	8 Mar 2011		

VISUAL INSPECTION

Y	N	Requirement
x		Key activated control with key capture? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.c)
x		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.d)
x		Technique factors preset for each mode of operation? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.b)
x		Means to initiate emission of radiation other than an interlock or main power control? (ANSI N43.17-2009, paragraph 7.2.1.d)
x		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)
x		Scan in progress indicator visible for any location from which a scan can be inititiated? (ANSI N43.17-2009, paragraph 7.2.1.a)
x		At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
x		X-ray emission terminates after a present time or exposure? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.e)
x		Operators have a clear view of the scanning area? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.f)
x		Tool or key required to open or remove access panels? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.i)
x		User provided with required information? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.5)

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

Scanning below action levels? Yes [x] No [ ]
(If no, explain in comments)

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	Scan 1		Scan 2		Scan 3		Average	
1	0.07	µR	0.26	µR	0.07	µR	0.13	µR
2	0.26	µR	0.07	µR	0.00	µR	0.11	µR
3	0.07	µR	0.00	µR	0.13	µR	0.07	µR
4	0.00	µR	0.00	µR	0.00	µR	0.00	µR

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		Exposure (X) "Back" Side	
a	5.56	µR	5.89	µR
b	5.75	µR	5.82	µR
c	5.68	µR	5.83	µR
d	5.82	µR	5.82	µR
e	5.69	µR	5.89	µR
AVG	5.70	µR	5.85	µR

Energy Correctin Factor 1.25

Reference Effective Dose per Screening (max 25 µrem)[1]:

2.0 µrem

or

0.020 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side		Exposure (X) "Back" Side	
0	1.19	µR	1.12	µR
0	1.13	µR	1.12	µR
1	0.60	µR	0.60	µR
1	0.66	µR	0.59	µR
1.5	0.53	µR	0.53	µR
1.5	0.46	µR	0.53	µR

HVL "Front" Side	1.2 mm Al
HVL "Back" Side	1.3 mm Al
Conversion Factor	0.139
Min. Filtration[1]	1.0 mm Al

[1] An HVL of 1 mm Al corresonds to a filtration of 1 mm Al for this system

RESULT PASS

Measurements made with Instruments #1 & #2

COMMENTS AND RECOMMENDATIONS

OSL Apr-Jun 2011 dosimeters 1711 to 1712 mounted on system with field IDs of 1-1 to 1-6, respectively.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - AIT X-Ray Systems

Health Physics Program
U.S. Army Public Health Command (Provisional)
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 5/6				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Rapiscan	Secure 1000SP	S51009005	Mar 2010

Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	8 Mar 2011		

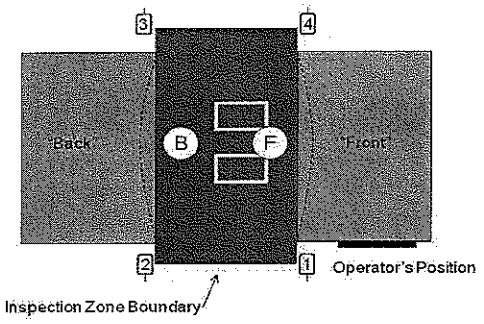
VISUAL INSPECTION

Y	N	*Requirement*
x		Key activated control with key capture? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.c)
x		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.d)
x		Technique factors preset for each mode of operation? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.b)
x		Means to initiate emission of radiation other than an interlock or main power control? (ANSI N43.17-2009, paragraph 7.2.1.d)
x		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)
x		Scan in progress indicator visible for any location from which a scan can be inititiated? (ANSI N43.17-2009, paragraph 7.2.1.a)

Y	N	*Requirement*
x		At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
x		X-ray emission terminates after a present time or exposure? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.e)
x		Operators have a clear view of the scanning area? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.f)
x		Tool or key required to open or remove access panels? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.i)
x		User provided with required information? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.5)

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

Scanning below action levels? Yes [x] No [ ]
(If no, explain in comments)

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	*Scan 1*		*Scan 2*		*Scan 3*		*Average*	
1	0.00	µR	0.00	µR	0.00	µR	0.00	µR
2	0.00	µR	0.00	µR	0.00	µR	0.00	µR
3	0.00	µR	0.00	µR	0.00	µR	0.00	µR
4	0.00	µR	0.00	µR	0.00	µR	0.00	µR

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	*Exposure (X)* "Front" Side		"Back" Side	
a	5.80	µR	6.39	µR
b	6.79	µR	6.33	µR
c	6.52	µR	6.33	µR
d	6.53	µR	6.40	µR
e	6.79	µR	6.40	µR
AVG	6.49	µR	6.37	µR

Energy Correctin Factor 1.25

Reference Effective Dose per Screening (max 25 µrem)[1]:

2.2 µrem

or

0.022 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	*Exposure (X)* "Front" Side		"Back" Side	
0	0.93	µR	1.39	µR
0	0.93	µR	1.39	µR
1	0.53	µR	0.73	µR
1	0.53	µR	0.73	µR
1.5	0.40	µR	0.53	µR
1.5	0.40	µR	0.60	µR

HVL "Front" Side	1.2	mm Al
HVL "Back" Side	1.1	mm Al
Conversion Factor	0.136	
Min. Filtration[1]	1.0	mm Al

[1] An HVL of 1 mm Al corresonds to a filtration of 1 mm Al for this system

RESULT PASS

Measurements made with Instruments #1 & #2

COMMENTS AND RECOMMENDATIONS

OSL Apr-Jun 2011 dosimeters 1717 to 1722 mounted on system with field IDs of 2-1 to 2-6, respectively.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - AIT X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 7/8				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Rapiscan	Secure 1000SP	S51009006	Mar 2010

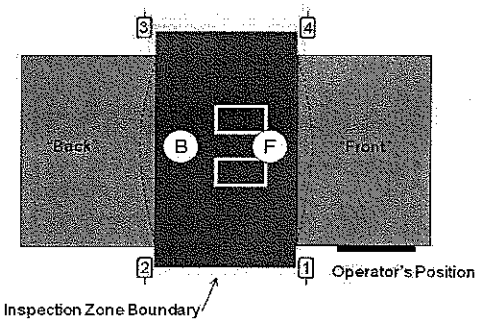
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	8 Mar 2011		

VISUAL INSPECTION

Y	N	*Requirement*
x		Key activated control with key capture? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.c)
x		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.d)
x		Technique factors preset for each mode of operation? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.b)
x		Means to initiate emission of radiation other than an interlock or main power control? (ANSI N43.17-2009, paragraph 7.2.1.d)
x		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)
x		Scan in progress indicator visible for any location from which a scan can be inititiated? (ANSI N43.17-2009, paragraph 7.2.1.a)
x		At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
x		X-ray emission terminates after a present time or exposure? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.e)
x		Operators have a clear view of the scanning area? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.f)
x		Tool or key required to open or remove access panels? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.1.i)
x		User provided with required information? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.5)

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

Scanning below action levels? Yes [x] No [ ]

(If no, explain in comments)

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	*Scan 1*		*Scan 2*		*Scan 3*		*Average*	
1	0.00	µR	0.00	µR	0.00	µR	0.00	µR
2	0.00	µR	0.00	µR	0.00	µR	0.00	µR
3	0.00	µR	0.00	µR	0.00	µR	0.00	µR
4	0.00	µR	0.00	µR	0.00	µR	0.00	µR

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

	Exposure (X)			
Trial	*"Front" Side*		*"Back" Side*	
a	5.64	µR	6.37	µR
b	6.04	µR	6.24	µR
c	6.17	µR	6.31	µR
d	5.97	µR	6.31	µR
e	6.03	µR	6.24	µR
AVG	5.97	µR	6.29	µR

Energy Correctin Factor 1.25

Reference Effective Dose per Screening (max 25 µrem)[1]:

2.4 µrem

or

0.024 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

	Exposure (X)			
mm Al	*"Front" Side*		*"Back" Side*	
0	0.99	µR	1.39	µR
0	0.99	µR	1.39	µR
1	0.53	µR	0.79	µR
1	0.53	µR	0.80	µR
1.5	0.46	µR	0.66	µR
1.5	0.46	µR	0.66	µR

HVL "Front" Side	1.2	mm Al
HVL "Back" Side	1.4	mm Al
Conversion Factor	0.150	
Min. Filtration[1]	1.0	mm Al

[1] An HVL of 1 mm Al corresonds to a filtration of 1 mm Al for this system

RESULT PASS

Measurements made with Instruments #1 & #2

COMMENTS AND RECOMMENDATIONS

OSL Apr-Jun 2011 dosimeters 1723 to 1728 mounted on system with field IDs of 3-1 to 3-6, respectively.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Results for 11 Cabinet X-Ray Systems

Encl 2

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 1				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smith Detection	6040i	40089	Aug 2002

Certified Yes [x] No [ ] *Place of Manufacture* Wiesbaden, Germany

Type Checkpoint [x] EDS: In-line [ ] Stand-Alone [ ]

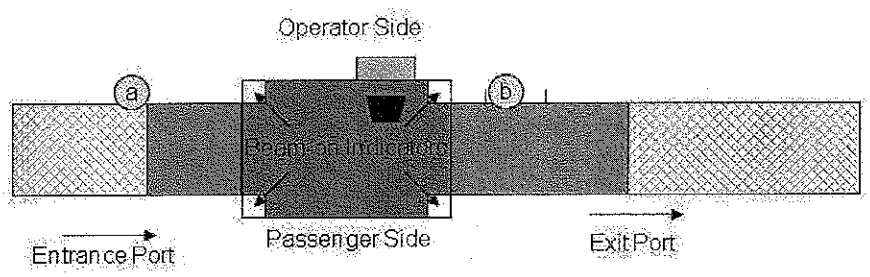
Manufacturer Survey Date 10 Feb 2011

VISUAL INSPECTION

Y	N	*Requirement*
	x	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
x		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes [x] No [ ] (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a	0.99	µR	5.0	min	0.012	mR	PASS
b	0.13	µR	5.0	min	0.002	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - optional measurement not performed due to time constraints.

Exposure outside cabinet measured with instrument #1/#2 comination.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 2				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smith Detection	6040i	40091	Aug 2002

Certified Yes x No ; *Place of Manufacture* Wiesbaden, Germany

Type Checkpoint x EDS: In-line Stand-Alone

Manufacturer Survey Date 10 Feb 2011

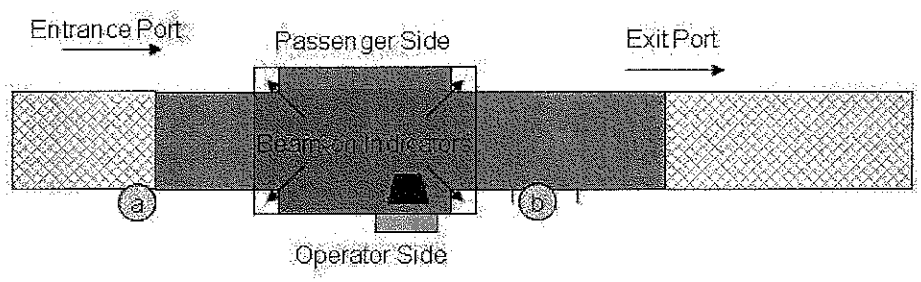
VISUAL INSPECTION

Y	N	*Requirement*
	x	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? Exit label slightly worn. (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? "X-ray on" not working as shown in diagram. (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
x		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))

Y	N	*Requirement*
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition? Entrance slightly worn.
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a	2.59	µR	5.0	min	0.031	mR	PASS
b	0.66	µR	5.0	min	0.008	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - optional measurement not performed due to time constraints.

Exposure outside cabinet measured with instrument #1/#2 comination.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 6				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smith Detection	6040i	40061	Jun 2002

Certified	Yes	x	No		*Place of Manufacture*	Wiesbaden, Germany	
Type	Checkpoint	x	EDS:	In-line		Stand-Alone	
Manufacturer Survey Date	Not Found						

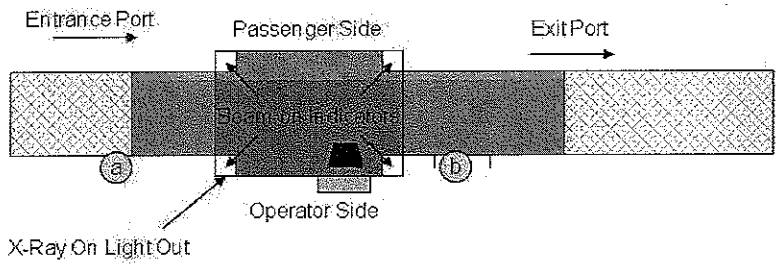
VISUAL INSPECTION

Y	N	*Requirement*
	x	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
x		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))

Y	N	*Requirement*
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a	1.92	µR	5.0	min	0.023	mR	PASS
b	2.12	µR	5.0	min	0.025	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - optional measurement not performed due to time constraints.

Exposure outside cabinet measured with instrument #1/#2 comination.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program
U.S. Army Public Health Command (Provisional)
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 8				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-180	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smith Detection	6040i	40566	Jan 2006

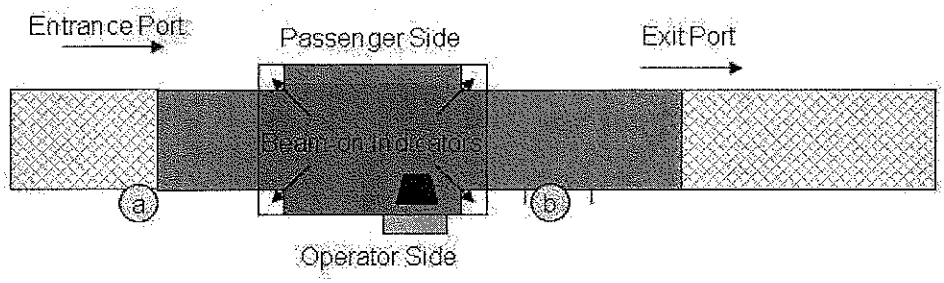
Certified	Yes x	No	*Place of Manufacture*	Wiesbaden, Germany	
Type	Checkpoint x	EDS:	In-line	Stand-Alone	
Manufacturer Survey Date	Not Found				

VISUAL INSPECTION

Y	N	*Requirement*
	x	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
	x	Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? Missing at entrance port. (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
x		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition? Entrance slightly worn.
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a	1.66	µR	5.0	min	0.020	mR	PASS
b	0.00	µR	5.0	min	0.000	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - optional measurement not performed due to time constraints.
Exposure outside cabinet measured with instrument #1/#2 comination.
Warning label "Caution: Do Not Insert Any Part of the Body When Systems Is Energized - X-Ray Hazard" was missing at the entrance port.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 7				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smiths Detection	6040aTiX	79522	Sep 2008

Certified	Yes	x	No	*Place of Manufacture*	Weisbaden, Germany		
Type	Checkpoint	x	EDS:	In-line		Stand-Alone	
Manufacturer Survey Date	Not Found						

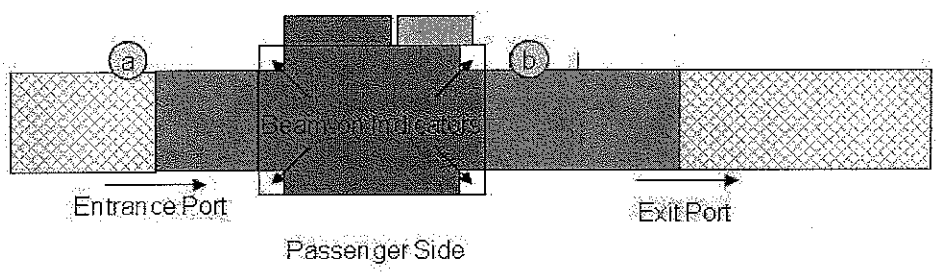
VISUAL INSPECTION

Y	N	*Requirement*
	x	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
x		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))

Y	N	*Requirement*
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a	0.07	µR	5.0	min	0.001	mR	PASS
b	2.69	µR	5.0	min	0.032	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - optional measurement not performed due to time constraints.

Exposure outside cabinet measured with instrument #1/#2 comination.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program
U.S. Army Public Health Command (Provisional)
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA		SURVEY LOCATION					
Project No.	26-MF-OEHF-11	Location	Southwest Pod EDS #3				
Survey Date	24 Mar 2011	Organization	T.F. Green International				
Surveyor(s)	[redacted]	Street Address	475 Kilvert St., Suite 220				
		City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION							
Manufacturer		Model		Serial No.		Manuf. Date	
L3		3DX6000		6758		Oct 2006	
Certified	Yes x	No		Place of Manufacture	St. Petersburg, FL		
Type	Checkpoint		EDS:	In-line x	Stand-Alone		
Manufacturer Survey Date	16 Mar 2009						

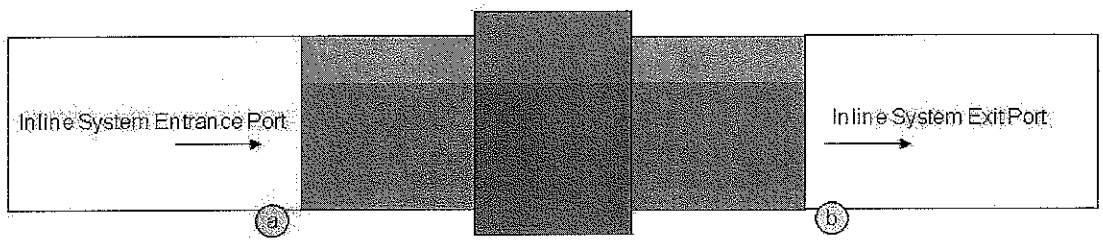
VISUAL INSPECTION

Y	N	Requirement
x		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
NA		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))

Y	N	Requirement
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	Exposure (X_i)	
1	204.5	mR
2	204.2	mR
3	204.1	mR
4	205.1	mR
5	206.0	mR

X_{avg}	204.8	mR
CV	0.0038	

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	Exposure		Time		Exposure in 1 hr		RESULT
a	0.00	µR	5.0	min	0.000	mR	PASS
b	0.00	µR	5.0	min	0.000	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#3 combination.
Exposure outside cabinet measured with instrument #1/#2 comination.
Service provider's survey date posted on the system was over 1 year ago.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Southwest Pod EDS #4				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-180(	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
L3	3DX6000	6757	Oct 2006

Certified	Yes	x	No		*Place of Manufacture*	St. Petersburg, FL	
Type	Checkpoint		EDS:	In-line	x	Stand-Alone	
Manufacturer Survey Date	2 Nov 2009						

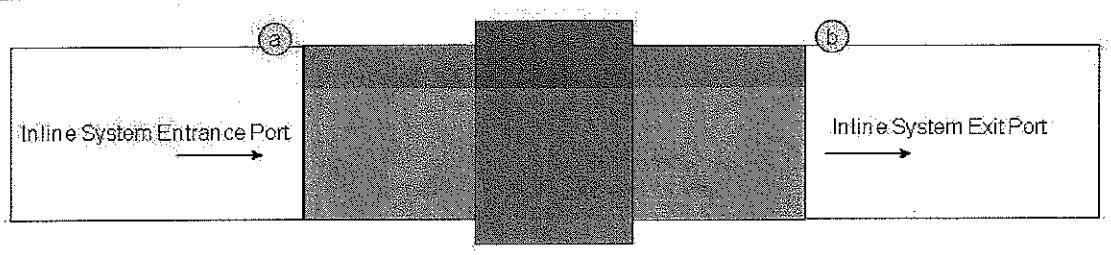
VISUAL INSPECTION

Y	N	*Requirement*
x		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
NA		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))

Y	N	*Requirement*
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes [x] No [ ] (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET

Ambient Background 0.00 µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a	0.00	µR	5.0	min	0.000	mR	PASS
b	0.00	µR	5.0	min	0.000	mR	PASS
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - not measured in order to minimize impact on bag accounting procedures for in-line systems.
Exposure outside cabinet measured with instrument #1/#2 comination.
Service provider's survey date posted on the system was over 1 year ago.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA		SURVEY LOCATION					
Project No.	26-MF-OEHF-11	Location	US Air Pod EDS #5				
Survey Date	24 Mar 2011	Organization	T.F. Green International				
Surveyor(s)	[redacted]	Street Address	475 Kilvert St., Suite 220				
		City/Installation	Warwick	State	RI	ZIP	02886-1360

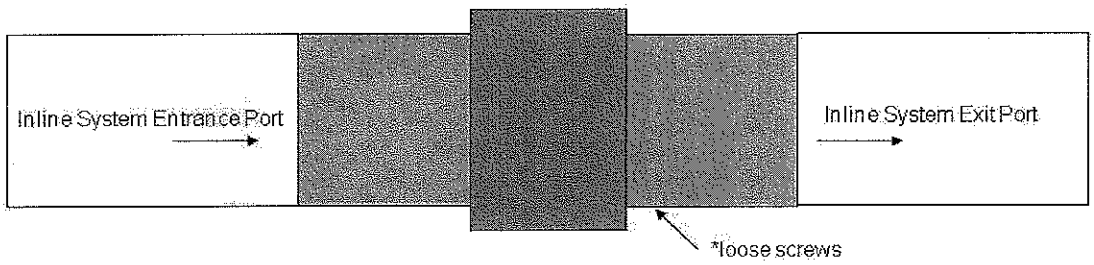
INSTRUMENTS USED	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION							
Manufacturer		Model		Serial No.		Manuf. Date	
L3		3DX6000		6760		Oct 2006	
Certified	Yes x	No	Place of Manufacture	St. Petersburg, FL			
Type	Checkpoint		EDS:	In-line x	Stand-Alone		
Manufacturer Survey Date	24 Mar 2011						

VISUAL INSPECTION

Y	N	Requirement	Y	N	Requirement
x		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))	x		Leaded drapes in good condition?
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	x		Interlocks not bypassed?
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
x		Key Activated Control present? (21 CFR 1020.31(j))	NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
NA		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))			NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	Exposure (X_i)	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET†

Ambient Background µR

Location	Exposure		Time		Exposure in 1 hr		RESULT
a		µR	5.0	min		mR	
b		µR	5.0	min		mR	
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - not measured in order to minimize impact on bag accounting procedures for in-line systems.

†Exposure outside cabinet - unable to be measured because of lack of baggage being screened at the time of the survey. Scanning measurements indicated no areas of unusual radiation emission.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA		SURVEY LOCATION					
Project No.	26-MF-OEHF-11	Location	US Air Pod EDS #6				
Survey Date	24 Mar 2011	Organization	T.F. Green International				
Surveyor(s)	[redacted]	Street Address	475 Kilvert St., Suite 220				
		City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-180(	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

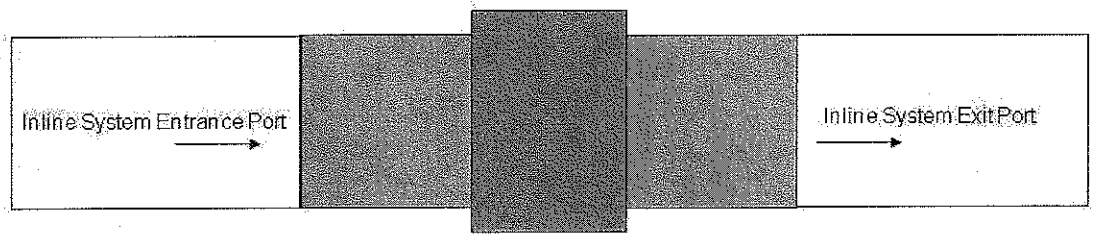
SYSTEM INFORMATION							
Manufacturer		Model		Serial No.		Manuf. Date	
L3		3DX6000		6750		Nov 2006	
Certified	Yes x	No	Place of Manufacture	St. Petersburg, FL			
Type	Checkpoint		EDS:	In-line x	Stand-Alone		
Manufacturer Survey Date	25 Mar 2011						

VISUAL INSPECTION

Y	N	Requirement
x		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
NA		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	Exposure (X_i)	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET†

Ambient Background µR

Location	Exposure		Time		Exposure in 1 hr		RESULT
a		µR	5.0	min		mR	
b		µR	5.0	min		mR	
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - not measured in order to minimize impact on bag accounting procedures for in-line systems.

†Exposure outside cabinet - unable to be measured because of lack of baggage being screened at the time of the survey.

Scanning measurements indicated no areas of unusual radiation emission.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	United/Continental Pod EDS #7				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
L3	3DX6000	6756	Oct 2006

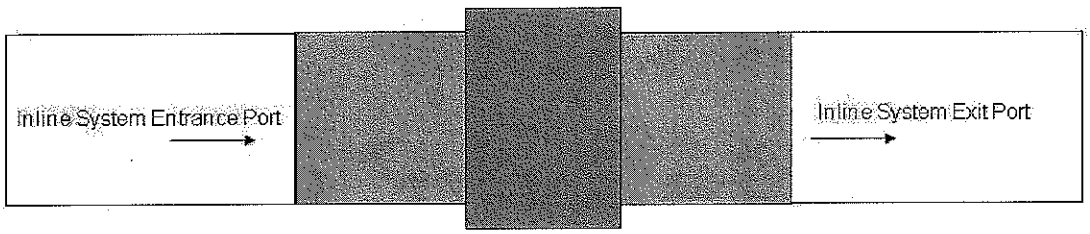
Certified	Yes	x	No		*Place of Manufacture*	St. Petersburg, FL	
Type	Checkpoint		EDS:	In-line	x	Stand-Alone	
Manufacturer Survey Date	9 Nov 2009						

VISUAL INSPECTION

Y	N	*Requirement*
x		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
NA		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET†

Ambient Background µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a		µR	5.0	min		mR	
b		µR	5.0	min		mR	
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - not measured in order to minimize impact on bag accounting procedures for in-line systems.

†Exposure outside cabinet - unable to be measured because of lack of baggage being screened at the time of the survey.

Scanning measurements indicated no areas of unusual radiation emission.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command (Provisional)

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-OEHF-11
Survey Date	24 Mar 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	United/Continental Pod EDS #8				
Organization	T.F. Green International				
Street Address	475 Kilvert St., Suite 220				
City/Installation	Warwick	State	RI	ZIP	02886-1360

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3315	30 Jul 2011
Instrument #2	Radcal	10X5-1800	10357	30 Jul 2011
Instrument #3	Radcal	10X5-180	18953	30 Jul 2011
Instrument #4	WB Johnson	TVX-2000	40036	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
L3	3DX6000	6754	Oct 2006

Certified	Yes	x	No		*Place of Manufacture*	St. Petersburg, FL		
Type	Checkpoint		EDS:	In-line	x	Stand-Alone		
Manufacturer Survey Date	19 Nov 2009							

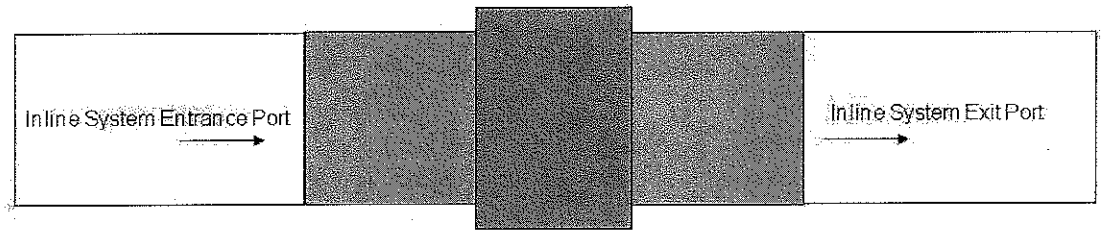
VISUAL INSPECTION

Y	N	*Requirement*
x		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))
x		Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (21 CFR 1020.40(c)(8)(ii))
x		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))
x		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))
x		Key Activated Control present? (21 CFR 1020.31(j))
NA		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))

Y	N	*Requirement*
x		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
x		Leaded drapes in good condition?
x		Interlocks not bypassed?
NT		Current User's Manual available? (21 CFR 1020.40(c)(9))
NT		Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #4. All scanning results below action levels? Yes x No (If no, explain below)

DOSE TO BAGGAGE (Optional)

Trial	*Exposure (X_i)*	
1		mR
2		mR
3		mR
4		mR
5		mR

X_{avg}		mR
CV		

Coefficient of Variation (CV):

$$CV = (1/X_{avg})(\Sigma(X_i - X_{avg})^2/(n-1))^{1/2}$$

EXPOSURE OUTSIDE CABINET†

Ambient Background µR

Location	*Exposure*		*Time*		*Exposure in 1 hr*		RESULT
a		µR	5.0	min		mR	
b		µR	5.0	min		mR	
c		µR	5.0	min		mR	
d		µR	5.0	min		mR	
e		µR	5.0	min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage - not measured in order to minimize impact on bag accounting procedures for in-line systems.

†Exposure outside cabinet - unable to be measured because of lack of baggage being screened at the time of the survey. Scanning measurements indicated no areas of unusual radiation emission.

* The WB Johnson TVX-2000 was response checked before and after the survey.

Survey Notes Provided on 6 April 2011

Encl 3

MCHB-IP-OHP 6 April 2011

Survey Notes

1. Project Information.

   a. Radiation Protection Survey No. 26-MF-OEHF-11

   b. Survey dates: 24-25 March 2011

   c. T.F. Green International (PVD), Warwick, RI

   d. Survey Officer(s): [redacted]

2. Background Information.

   a. TSA Headquarters Contact: Jill Segraves, Director, Occupational Safety, Health, and Environment, phone: [redacted]

   b. Airport Contacts:

      (1) Frank Lisi, AFSD/OPS, Phone: [redacted]

      (2) Diane Marley, Quality Improvement Manager, Phone: [redacted]

   c. Individuals assisting the survey team:

Name	Title/Position
[redacted]	Health Physicist, Consolidated Safety Services (CSS)
[redacted]	Project Manager, CSS
[redacted]	Safety Specialist, CSS

   d. Personnel screening x-ray systems surveyed:

Model	Serial No.	Location
Rapiscan Secure 1000 SP	S51009004	Checkpoint Lane 1/2
Rapiscan Secure 1000 SP	S51009005	Checkpoint Lane 5/6
Rapiscan Secure 1000 SP	S51009006	Checkpoint Lane 7/8

e. Cabinet x-ray systems surveyed:

Model	Serial No.	Location
Smiths Detection 6040i	40089	Checkpoint Lane 1
Smiths Detection 6040i	40091	Checkpoint Lane 2
Smiths Detection 6040i	40061	Checkpoint Lane 6
Smiths Detection 6040aTiX	79522	Checkpoint Lane 7
Smiths Detection 6040i	40566	Checkpoint Lane 8
L3 3DX-6000	6757	Southwest Pod EDS #4
L3 3DX-6000	6756	United/Continental Pod EDS #7
L3 3DX-6000	6760	US Air Pod EDS #5
L3 3DX-6000	6750	US Air Pod EDS #6
L3 3DX-6000	6754	United/Continental Pod EDS #8
L3 3DX-6000	6758	Southwest Pod EDS #3

3. Findings and Recommendations.

a. Personnel Screening X-Ray Systems.

(1) All x-ray personnel screening systems were found to be in compliance with the radiation dose limits of American National Standards Institute/Health Physics Society (ANSI/HPS) Standard N43.17-2009, Radiation Safety for Personnel Security Screening Systems Using X-Ray or Gamma Radiation.

(2) All systems were found to be in compliance with the other requirements of ANSI/HPS N43.17-2009.

b. Cabinet X-Ray Systems.

(1) Radiation emissions were not measured for EDS #5-8 due to lack of baggage flow. All other cabinet systems were found to be in compliance with the radiation emission limits of Title 21, Code of Federal Regulations, Section 1020.40.

(2) All cabinet systems were found to be in compliance with the other requirements of Title 21, Code of Federal Regulations, Section 1020.40, with the following exceptions:

(a) All Smiths Detection systems, Checkpoint, Lanes 1, 2, 6, 7, and 8: The control panel warning label "Caution: X-Rays Produced When Energized" was missing.

(b) Smiths Detection 6040i, SN 40566, Checkpoint, Lane 8: The warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" was missing at the entrance port.

(3) The following items were also noted during the surveys:

(a) L3 3DX-6000, SN 6758, Southwest Pod EDS #3: The maintenance service provider's survey date posted on the system was over one year old.

(b) L3 3DX-6000, SN 6757, Southwest Pod EDS #4: The maintenance service provider's survey date posted on the system was over one year old.

(c) L3 3DX-6000, SN 6760, US Air Pod EDS #5: The screws in the plate holding the exit tunnel to the main system gantry (on side toward EDS #6) were loose.

(d) L3 3DX-6000, SN 6754, United/Continental Pod EDS #8: The maintenance service provider's survey date posted on the system was over one year old.

(e) Smiths Detection 6040i, SN 40061, Checkpoint, Lane 6: The "x-ray on" light was inoperable at the entrance port on the operator's side. The maintenance service provider's survey date was not posted on the system.

(f) Smiths Detection 6040aTiX, SN 79522, Checkpoint, Lane 7: The maintenance service provider's survey date was not posted on the system.

(g) Smiths Detection 6040i, SN 40566, Checkpoint, Lane 8: The maintenance service provider's survey date was not posted on the system.