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

Transportation Security Administration

February 15, 2012

Mr. Derek DePietro
Federal Security Director
Transportation Security Administration
Buffalo Niagara International Airport (BUF)

Dear Mr. DePietro:

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 BUF was conducted on November 14-15, 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, 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

The findings for the surveyed AIT systems are described on pages 2-3 of the attached report and in applicable survey worksheets (Enclosure 1 of attached report), and are summarized as follows:

A total of five general-use backscatter x-ray AIT systems were tested and found to be in compliance with the radiation dose limits specified in ANSI/HPS N43.17-2009. 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. In addition, the general-use backscatter x-ray AIT systems were in compliance with other (non-emission) requirements of the standard.

Several administrative items were noted by the survey officers during the AIT surveys, specifically loud noises in the slave or master unit, partial illumination of the "Scan in Progress" indicator, and an unlocked access panel. It was recommended to have the maintenance service provider check the cause of the noises and the partially illuminated indicator during the next scheduled visit. For system descriptions, see items (a) through (d) starting in the bottom half of page 2.

Cabinet X-ray Systems

The findings for the surveyed cabinet x-ray systems are described on pages 2-3 of the attached report and in the survey worksheets (Enclosure 2 of the attached report), and are summarized as follows:

A total of 7 cabinet x-ray systems were tested and found to be in compliance with the 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.

The cabinet x-ray systems complied with other (non-emission) requirements of Title 21, CFR, Subchapter J, with the exception of (1) unavailability of a user's manual at the time of the survey, (2) absence of a warning label, and (3) lack of a means to require operator presence at the control panel. The affected systems are described in paragraphs (a) through (c) in the top half of page 2.

In addition, an administrative item was found for the cabinet x-ray system noted in paragraph (e) on page 3, concerning unlocked access panels.

Your early attention to correcting the remaining uncorrected findings is requested. Please contact the TSA Service Response Center at 1-800-820-8535 for assistance, and advise me of progress via email by March 21, 2012, or when the corrections are completed, whichever is sooner.

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

Sincerely,

Jill M. Segraves

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

cc: Mr. Jeff Kline, TSA BUF Deputy Assistant FSD - Screening
Mr. Tom Koch, TSA BUF Assistant FSD - Operations / Designated Occupational Safety and Health Officer
Ms. Christine Halfacre, Chief of Staff, Office of Security Technology

Enclosure: TSA BUF Radiation Protection Survey Report, dated 12 December 2011

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

12 Dec 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 Radiation Safety Surveys, 26 October 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 November 14-15, 2011, at Buffalo Niagara International Airport (BUF), Buffalo, NY, Project No. 26-MF-0FKH-12. The survey was performed to:

a. Evaluate the advanced imaging technology (AIT) x-ray systems to ensure compliance with the requirements of 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 five AIT x-ray systems were evaluated for compliance with the requirements of ANSI/HPS N43.17-2009 and seven cabinet x-ray systems were evaluated for compliance with the requirements of Title 21, CFR, Subchapter J. The survey results for the AIT systems are provided in Enclosure 1 and the survey results for the cabinet systems are provided in Enclosure 2.

All AIT x-ray systems were found to be in compliance with the radiation dose limits specified in ANSI/HPS N43.17-2009. The cabinet x-ray systems tested were found to be in compliance with the emissions limit specified in Title 21, CFR, Subchapter J.

There is no health hazard associated with the use of these systems provided appropriate operating procedures are followed.

All AIT systems surveyed were found to be in compliance with the other requirements of ANSI/HPS N43.17-2009. The cabinet x-ray systems surveyed were found to be in compliance with the other requirements of Title 21, CFR, Section 1020.40, with the following exceptions:

a. User's manuals were not available at the time of the survey for the following systems: Rapiscan 520B, Smiths Detection 6040AT, and L3 Communication Examiner 6000.

b. The warning label "Caution: X-Rays Produced When Energized" was not present at the control panel on the following systems.

Location	Model	Serial No.
Zone 1, Lane 1A	Smiths Detection 6040AT	79648
Zone 1, Lane 1B	Smiths Detection 6040AT	79521
Zone 5, Lane 5A	Smiths Detection 6040AT	80346

c. The following systems did not have a means to require operator presence at the control panel.

Location	Model	Serial No.
Zone 3, Lane 3A	Rapiscan 520B	Worn off
Zone 4, Lane 4B	Rapiscan 520B	Worn off
Zone 5, Lane 5B	Rapiscan 520B	7031808

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

a. Rapiscan Secure 1000 SP, Serial No.S51011009, Lane 1: The slave unit made unusually loud idle and travel noises. Request service provider to check during next visit.

b. Rapiscan Secure 1000 SP, Serial No.S51011008, Lane 2: The master unit made unusually loud idle noises. The master unit "Scan in Progress" indicator was partially illuminated. Request service provider to check during next visit.

c. Rapiscan Secure 1000 SP, Serial No.S51011011, Lane 4: The slave unit "Scan in Progress" indicator was partially illuminated. Request service provider to check during next visit.

d. Rapiscan Secure 1000 SP, Serial No.S51011010, Lane 5: The master unit access panel was unlocked. The key was obtained and the access panel locked.

e. L3 Examiner 6000, Serial No.6256, Oversized Checked Bags: All access panels were unlocked. Obtain the key and lock the access panels.

Based on dosimetry and field measurements around the Secure 1000 SP and cabinet x-ray systems, it is estimated that Transportation Security Officers will receive a radiation dose of less than 10 millirem per year. For comparison, the occupational limit under Occupational Safety and Health Administration regulations is 1,250 millirem per quarter (5,000 millirem per year). The goal of the TSA radiation safety program is to keep all radiation doses less than 100 millirem per year.

The survey officers discussed the survey results with Mr. Derek DePietro, TSA BUF Federal Security Director (FSD); Mr. Jeff Kline, TSA BUF Deputy Assistant FSD - Screening; and Mr. Tom Koch, TSA BUF Assistant FSD - Operations on November 15, 2011. A copy of the survey notes is provided in Enclosure 3.

For more information concerning the survey, please contact the AIPH, HPP, at [redacted]

Sincerely,

[redacted]

Portfolio Director
Occupational Health Sciences

Enclosures

Survey Results for Five AIT X-Ray Systems

Encl 1

Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 1				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000SP	S51011009	Mar. 2010

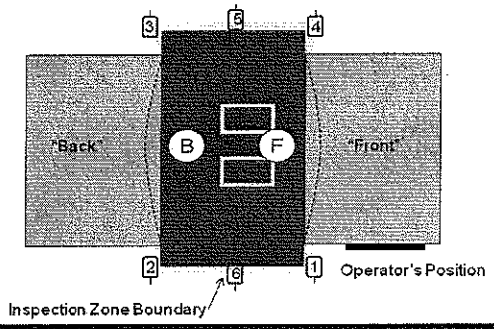
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	10 Aug 2011		

VISUAL INSPECTION

Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)
X		Technique factors preset for each mode of operation? (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 initiated? (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 preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
X		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		User provided with required information? (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	μR	μR	μR	μR
#2	μR	μR	μR	μR
#3	μR	μR	μR	μR
#4	μR	μR	μR	μR
#5	μR	#6	μR	

Measurements not performed because passengers were not being screened with this system while the survey team was present.

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		"Back" Side	
a	5.61	μR	6.16	μR
b	5.54	μR	6.08	μR
c	5.68	μR	6.15	μR
d	5.68	μR	6.08	μR
e	5.68	μR	6.08	μR
AVG	5.64	μR	6.11	μR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 μrem): 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	1.84	μR	2.46	μR
0	1.91	μR	2.46	μR
1	1.02	μR	1.30	μR
1	1.02	μR	1.30	μR
1.5	0.89	μR	1.03	μR
1.5	0.89	μR	1.03	μR

HVL "Front" Side: 1.3 mm Al
HVL "Back" Side: 1.1 mm Al
Conversion Factor: 0.144
Min. Filtration[1]: 1.0 mm Al

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

RESULT: PASS

Measurements made with Instruments #4 & #5

COMMENTS AND RECOMMENDATIONS

Slave unit idle and travel loud.

Additional Instruments Used:

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #4	Radcal	9010	90-3290	17 Mar 2012
Instrument #5	Radcal	10X5-1800	10302	17 Mar 2012

* Instrument #3 was response checked before and after the survey.

Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 2				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000SP	S51011008	Mar. 2010

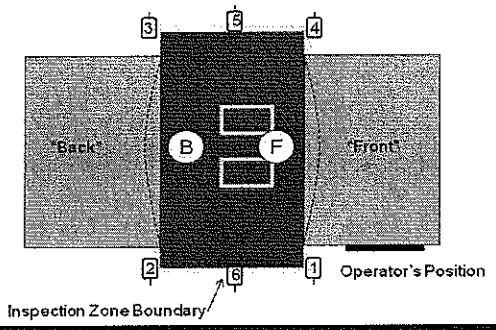
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	15 Aug 2011		

VISUAL INSPECTION

Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)
X		Technique factors preset for each mode of operation? (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 initiated? (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 preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
X		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		User provided with required information? (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	µR	µR	µR	µR
#2	µR	µR	µR	µR
#3	µR	µR	µR	µR
#4	µR	µR	µR	µR
#5	µR	#6	µR	

Measurements not performed because passengers were not being screened with this system while the survey team was present.

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	Exposure (X) "Back" Side
a	6.81 µR	6.72 µR
b	6.87 µR	6.67 µR
c	6.81 µR	6.81 µR
d	6.87 µR	6.74 µR
e	6.87 µR	6.82 µR
AVG	6.85 µR	6.75 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem):

2.1 µrem

or

0.021 µSv

RESULT: PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	Exposure (X) "Back" Side
0	2.32 µR	2.11 µR
0	2.31 µR	2.17 µR
1	1.16 µR	1.09 µR
1	1.16 µR	1.16 µR
1.5	0.89 µR	0.88 µR
1.5	0.89 µR	0.88 µR

HVL "Front" Side: 1.0 mm Al
HVL "Back" Side: 1.1 mm Al
Conversion Factor: 0.121
Min. Filtration[1]: 1.0 mm Al

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

RESULT: PASS

Measurements made with Instruments #4 & #5

COMMENTS AND RECOMMENDATIONS

Master unit loud idle.
† Master unit "Scan in Progress" indicator was only partially illuminated.

Additional Instruments Used:

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #4	Radcal	9010	90-3290	17 Mar 2012
Instrument #5	Radcal	10X5-1800	10302	17 Mar 2012

* Instrument #3 was response checked before and after the survey.

Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 3				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000SP	S51011007	Mar. 2010

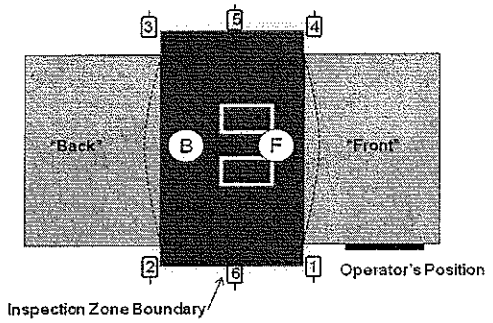
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	24 Aug 2011		

VISUAL INSPECTION

Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)
X		Technique factors preset for each mode of operation? (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 initiated? (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 preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
X		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		User provided with required information? (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	0.13 µR	0.07 µR	0.07 µR	0.09 µR
#2	0.00 µR	0.00 µR	0.06 µR	0.02 µR
#3	0.13 µR	0.07 µR	0.07 µR	0.09 µR
#4	0.07 µR	0.07 µR	0.13 µR	0.09 µR
#5	0.13 µR	#6	0.00 µR	

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	"Back" Side
a	7.14 µR	6.67 µR
b	7.07 µR	6.67 µR
c	7.14 µR	6.61 µR
d	7.14 µR	6.69 µR
e	7.21 µR	6.60 µR
AVG	7.14 µR	6.65 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem):

2.3 µrem

or

0.023 µSv

RESULT: PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	"Back" Side
0	1.92 µR	1.51 µR
0	1.85 µR	1.51 µR
1	1.03 µR	0.82 µR
1	1.03 µR	0.82 µR
1.5	0.76 µR	0.62 µR
1.5	0.75 µR	0.69 µR

HVL "Front" Side: 1.1 mm Al
HVL "Back" Side: 1.2 mm Al
Conversion Factor: 0.130
Min. Filtration[1]: 1.0 mm Al

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

RESULT: PASS

Measurements made with Instruments #4 & #5

COMMENTS AND RECOMMENDATIONS

Additional Instruments Used:

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #4	Radcal	9010	90-3290	17 Mar 2012
Instrument #5	Radcal	10X5-1800	10302	17 Mar 2012

* Instrument #3 was response checked before and after the survey.

Survey Worksheet - AIT X-Ray Systems

Health Physics Program

U.S. Army Public Health Command

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 4				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000SP	S51011011	Mar. 2010

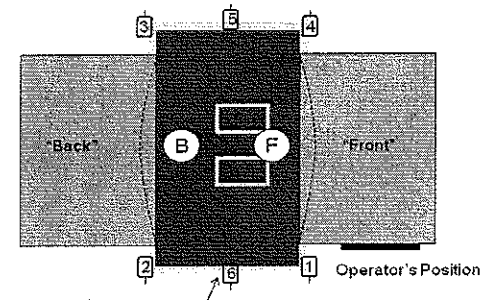
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	24 Aug 2011		

VISUAL INSPECTION

Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)
X		Technique factors preset for each mode of operation? (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 initiated? (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 preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
X		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		User provided with required information? (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	0.00 µR	0.00 µR	0.02 µR
#2	0.07 µR	0.07 µR	0.07 µR	0.07 µR
#3	0.00 µR	0.00 µR	0.00 µR	0.00 µR
#4	0.07 µR	0.07 µR	0.07 µR	0.07 µR
#5	0.00 µR	#6	0.00 µR	

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	Exposure (X) "Back" Side
a	6.54 µR	5.66 µR
b	6.61 µR	5.66 µR
c	6.62 µR	5.66 µR
d	6.53 µR	5.66 µR
e	6.53 µR	5.66 µR
AVG	6.57 µR	5.66 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem):

2.2 µrem

or

0.022 µSv

RESULT: PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	Exposure (X) "Back" Side
0	1.79 µR	1.17 µR
0	1.79 µR	1.10 µR
1	0.90 µR	0.62 µR
1	0.90 µR	0.62 µR
1.5	0.69 µR	0.48 µR
1.5	0.69 µR	0.55 µR

HVL "Front" Side: 1.0 mm Al

HVL "Back" Side: 1.2 mm Al

Conversion Factor: 0.136

Min. Filtration[1]: 1.0 mm Al

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

RESULT: PASS

Measurements made with Instruments #4 & #5

COMMENTS AND RECOMMENDATIONS

† Slave unit "Scan in Progress" indicator was only partially illuminated.

Additional Instruments Used:

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #4	Radcal	9010	90-3290	17 Mar 2012
Instrument #5	Radcal	10X5-1800	10302	17 Mar 2012

* Instrument #3 was response checked before and after the survey.

Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Lane 5				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000SP	51011010	Mar. 2010

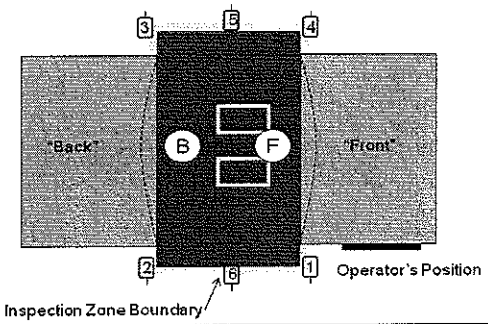
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	24 Aug 2011		

VISUAL INSPECTION

Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)
X		Technique factors preset for each mode of operation? (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 initiated? (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 preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
X		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		User provided with required information? (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	μR	μR	μR	μR
#2	μR	μR	μR	μR
#3	μR	μR	μR	μR
#4	μR	μR	μR	μR
#5	μR	#6	μR	

Measurements not performed because passengers were not being screened with this system while the survey team was present.

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		"Back" Side	
a	6.39	μR	6.39	μR
b	6.39	μR	6.39	μR
c	6.24	μR	6.38	μR
d	6.32	μR	6.39	μR
e	6.38	μR	6.31	μR
AVG	6.34	μR	6.37	μR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 μrem):

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	1.57	μR	1.37	μR
0	1.64	μR	1.37	μR
1	0.89	μR	0.75	μR
1	0.82	μR	0.75	μR
1.5	0.62	μR	0.62	μR
1.5	0.62	μR	0.62	μR

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

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

RESULT: PASS

Measurements made with Instruments #4 & #5

COMMENTS AND RECOMMENDATIONS

Master unit access panel unlocked. Key obtained and access panel locked.

Additional Instruments Used:

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #4	Radcal	9010	90-3290	17 Mar 2012
Instrument #5	Radcal	10X5-1800	10302	17 Mar 2012

* Instrument #3 was response checked before and after the survey.

Survey Results for Seven Cabinet X-Ray Systems

Encl 2

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Zone 1, Lane 1A				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Smiths Detection	6040AT	79648	Sep. 2008

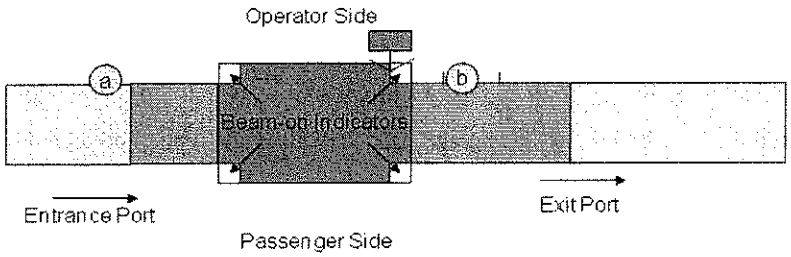
Certified	Yes	X	No		*Place of Manufacture*	Wiesbaden, Germany			
Type	Checkpoint	X	EDS:	In-line		Stand-Alone			
Manufacturer Survey Date	19 Jul 2011								

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 1020.40(c)(6)(i))
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?
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	Exposure (X_i)	
1	1.079	mR
2	1.077	mR
3	1.082	mR
4	1.079	mR
5	1.076	mR

X_{avg}	1.08	mR
CV	0.0021	

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	1.82	µR	5.0	min	0.022	mR	PASS
b	1.49	µR	5.0	min	0.018	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#2 combination.
Exposure outside cabinet measured with instrument #1/#2 combination.

* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Zone 1, Lane 1B				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smiths Detection	6040AT	79521	Sep. 2008

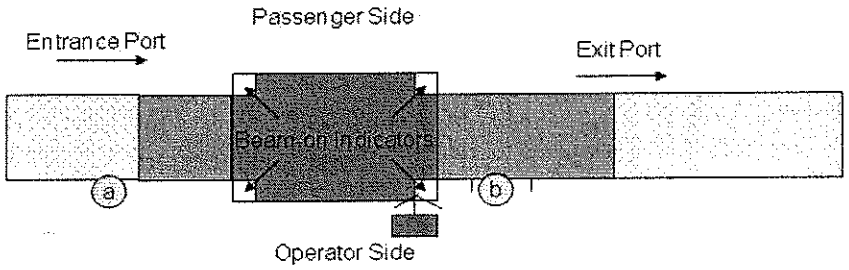
Certified	Yes	X	No		*Place of Manufacture*	Wiesbaden, Germany			
Type	Checkpoint	X	EDS:	In-line		Stand-Alone			
Manufacturer Survey Date	19 Jul 2011								

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 1020.40(c)(6)(i))
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?
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	*Exposure (X_i)*	
1	1.016	mR
2	1.014	mR
3	1.009	mR
4	1.006	mR
5	1.008	mR

X_{avg}	1.01	mR
CV	0.0042	

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	2.49	µR	5.0	min	0.030	mR	PASS
b	0.54	µR	5.0	min	0.006	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#2 combination.
Exposure outside cabinet measured with instrument #1/#2 combination.

* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	14 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Zone 3, Lane 3A				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	520B	worn off	worn off

Certified	Yes	X	No		*Place of Manufacture*	Hawthorne, CA			
Type	Checkpoint	X	EDS:	In-line		Stand-Alone			
Manufacturer Survey Date	13 Jul 2011								

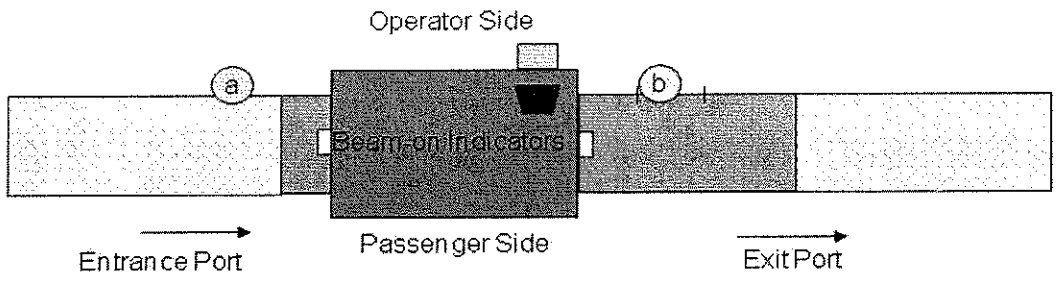
VISUAL INSPECTION

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 1020.40(c)(6)(i))
	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?
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	Exposure (X_i)	
1	0.2441	mR
2	0.2686	mR
3	0.2509	mR
4	0.2386	mR
5	0.2475	mR

X_{avg}	0.25	mR
CV	0.0455	

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	2.43	µR	5.0	min	0.029	mR	PASS
b	1.82	µR	5.0	min	0.022	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#2 combination.
Exposure outside cabinet measured with instrument #1/#2 combination.

* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

Health Physics Program

U.S. Army Public Health Command

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	15 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Zone 4, Lane 4B				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	520B	worn off	worn off

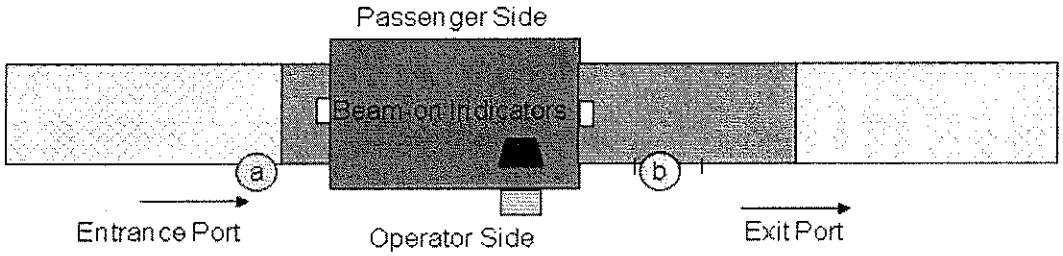
Certified	Yes	X	No		*Place of Manufacture*	Hawthorne, CA			
Type	Checkpoint	X	EDS:	In-line		Stand-Alone			
Manufacturer Survey Date	2 Aug 2011								

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 1020.40(c)(6)(i))
	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?
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	Exposure (X_i)	
1	0.3519	mR
2	0.3443	mR
3	0.3477	mR
4	0.3467	mR
5	0.3408	mR

X_{avg}	0.35	mR
CV	0.0119	

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	1.34	µR	5.0	min	0.016	mR	PASS
b	2.74	µR	5.0	min	0.033	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#2 combination.

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

* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	15 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Zone 5, Lane 5A				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Smiths Detection	6040AT	80346	Nov. 2008

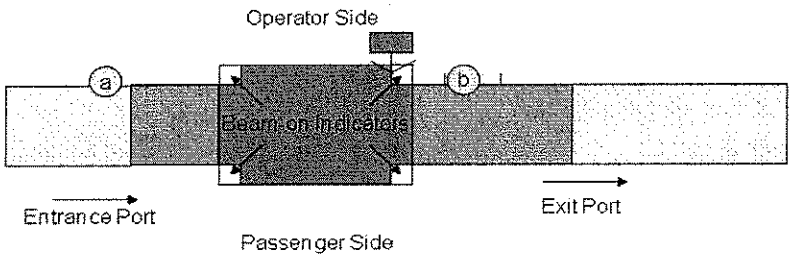
Certified	Yes	X	No		*Place of Manufacture*	Wiesbaden, Germany			
Type	Checkpoint	X	EDS:	In-line		Stand-Alone			
Manufacturer Survey Date	23 Jun 2011								

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 1020.40(c)(6)(i))
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?
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	*Exposure (X_i)*	
1	1.144	mR
2	1.147	mR
3	1.141	mR
4	1.142	mR
5	1.146	mR

X_{avg}	1.14	mR
CV	0.0022	

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	0.27	µR	5.0	min	0.003	mR	PASS
b	2.61	µR	5.0	min	0.031	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#2 combination.
Exposure outside cabinet measured with instrument #1/#2 combination.

* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	15 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint Zone 5, Lane 5B				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	520B	7031808	Apr. 2003

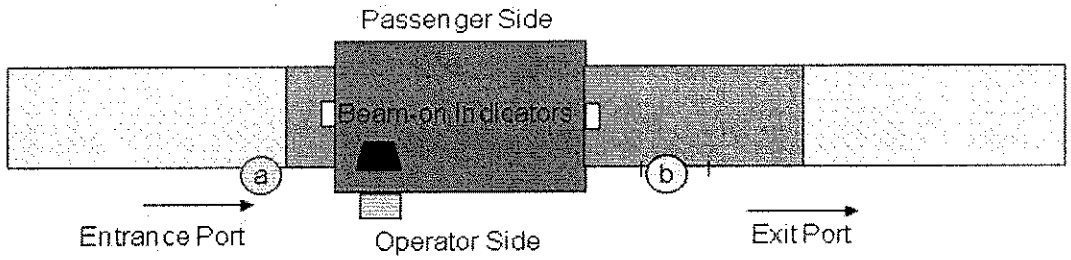
Certified	Yes	X	No		*Place of Manufacture*	Hawthorne, CA			
Type	Checkpoint	X	EDS:	In-line		Stand-Alone			
Manufacturer Survey Date	15 Jul 2011								

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 1020.40(c)(6)(i))
	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?
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	Exposure (X_i)	
1	0.2385	mR
2	0.2321	mR
3	0.2442	mR
4	0.2274	mR
5	0.2477	mR

X_{avg}	0.24	mR
CV	0.03515	

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	0.53	µR	5.0	min	0.006	mR	PASS
b	1.13	µR	5.0	min	0.014	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#2 combination.
Exposure outside cabinet measured with instrument #1/#2 combination.

* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0FKH-12
Survey Date	15 Nov 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Oversize, Checked Baggage				
Organization	Buffalo Niagara International Airport				
Street Address	4200 Genesee Street				
City/Installation	Buffalo	State	NY	ZIP	14225

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3291	28 Jul 2012
Instrument #2	Radcal	10X5-180	10299	28 Jul 2012
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
L3 Communications	Examiner 6000	6256	Oct. 2002

Certified	Yes	X	No		*Place of Manufacture*	Woburn, MA			
Type	Checkpoint		EDS:	In-line		Stand-Alone	X		
Manufacturer Survey Date	9 Dec 2010								

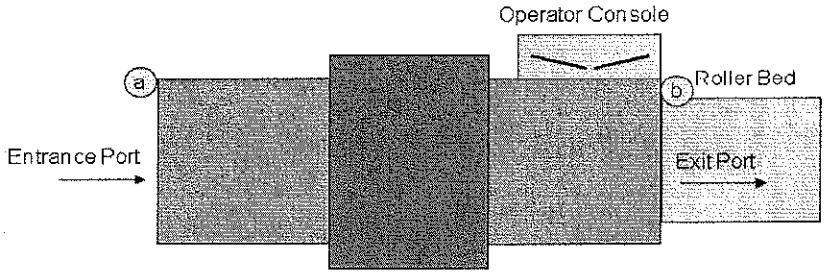
VISUAL INSPECTION

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 1020.40(c)(6)(i))
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? †
	X	Current User's Manual available? (21 CFR 1020.40(c)(9))
X		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

Trial	Exposure (X_i)	
1	259.8	mR
2	220.2	mR
3	212.3	mR
4	207.8	mR
5	240.7	mR

X_{avg}	228.2	mR
CV	0.0952	

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	3.40	µR	5.0	min	0.041	mR	PASS
b	5.34	µR	5.0	min	0.064	mR	PASS
c		µR		min		mR	
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

Dose to baggage measured with instrument #1/#3 combination.
Exposure outside cabinet measured with instrument #1/#2 combination.
†All access panels were unlocked and therefore could be inadvertently opened.

* Instrument #4 was response checked before and after the survey.

Survey Notes Provided on November 15, 2011

Encl 3

MCHB-IP-OHP 15 November 2011

Exit Briefing Notes

1. Project Information.

a. Radiation Protection Survey No. 26-MF-0FKH-12

b. Survey dates: 14-15 November 2011

c. Buffalo Niagara International Airport (BUF), Buffalo, NY

d. Survey Officer(s): [redacted] CHP, U.S. Army Public Health Command (USAPHC); and [redacted] CHP, USAPHC.

2. Background Information.

a. TSA Headquarters Contact: Jill Segraves, Director, Occupational Safety, Health, and Environment (OSHE), phone: [redacted], e-mail: [redacted]

b. Airport Contacts:

(1) Derek DePietro, TSA BUF Federal Security Director (FSD), Phone: [redacted]

(2) Thomas Koch, TSA BUF Assistant FSD – Operations, Phone: [redacted]

c. Individuals Assisting the Survey Team:

Name	Title/Position
[redacted]	Health Physicist TSA HQ
[redacted]	Health Physicist TSA HQ

d. AIT (Backscatter X-Ray) Systems Surveyed:

Model	Serial No.	Location
Rapiscan Secure 1000 SP	S51011009	Lane 1
Rapiscan Secure 1000 SP	S51011008	Lane 2
Rapiscan Secure 1000 SP	S51011007	Lane 3
Rapiscan Secure 1000 SP	S51011011	Lane 4
Rapiscan Secure 1000 SP	S51011010	Lane 5

e. Cabinet X-Ray Systems Surveyed:

Model	Serial No.	Location
Smiths Detection 6040AT	79648	Zone 1, Lane 1A
Smiths Detection 6040AT	79521	Zone 1, Lane 1B
Rapiscan 520B	Worn off	Zone 3, Lane 3A
Rapiscan 520B	Worn off	Zone 4, Lane 4B
Smiths Detection 6040AT	80346	Zone 5, Lane 5A
Rapiscan 520B	7031808	Zone 5, Lane 5B
L3 Examiner 6000	6256	Oversized Checked Bags

3. Findings and Recommendations.

a. AIT (Backscatter X-Ray) Systems.

(1) All x-ray personnel screening systems surveyed 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 surveyed were found to be in compliance with the other requirements of ANSI/HPS N43.17-2009.

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

(a) Rapiscan Secure 1000 SP, Serial No.S51011009, Lane 1: The slave unit made unusually loud idle and travel noises. Request service provider to check during next visit.

(b) Rapiscan Secure 1000 SP, Serial No.S51011008, Lane 2: The master unit made unusually loud idle noises. The master unit "Scan in Progress" indicator was partially illuminated. Request service provider to check during next visit.

(c) Rapiscan Secure 1000 SP, Serial No.S51011011, Lane 4: The slave unit "Scan in Progress" indicator was partially illuminated. Request service provider to check during next visit.

(d) Rapiscan Secure 1000 SP, Serial No.S51011010, Lane 5: The master unit access panel was unlocked. The key was obtained and the access panel locked.

b. Cabinet X-ray Systems.

(1) All systems were found to be in compliance with the radiation emission limits of Title 21, Code of Federal Regulations, Section 1020.40.

(2) All 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 6040 ATs were missing the label "Caution: X-Rays Produced When Energized" at the control panel. Request service provided to attach label.

(b) All Rapiscan 520Bs did not have a means to require the operator presence at the control panel. Request to service provider to install means to ensure operator presence.

(c) At the time of the survey, User's Manuals were not available for the Rapiscan 520B, Smith Detection 6040AT, and the L3 Communications Examiner 6000.

(3) The following item was also noted during the surveys: L3 Examiner 6000, Serial No.6256, Oversized Checked Bags: All access panels were unlocked. Obtain the key and lock the access panels.

c. Based on dosimetry and field measurements around the Secure 1000 SP and cabinet x-ray systems, it is estimated that TSOs will receive a radiation dose of less than 10 millirem in a year. For comparison, the occupational limit under Occupational Safety and Health Administration regulations is 1,250 millirem per quarter (5,000 millirem per year) and the goal of the TSA radiation safety program is to keep all radiation doses less than 100 millirem per year.