



**Transportation
Security
Administration**

January 19, 2012

Mr. Joseph Terrell
Federal Security Director
Transportation Security Administration
Pittsburgh International Airport (PIT)

Dear Mr. Terrell:

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 PIT was conducted on November 7-9, 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

The findings for the surveyed AIT systems are described on page 2 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 that the slave unit of two AIT systems were making "loud idle sounds," and the access panel of one AIT system was found to be unlocked during the survey (the key was located and the cabinet locked). It was recommended to have the maintenance service provider check the cause of the sounds during the provider's next scheduled visit. See items (a) through (c) 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 and 3 of the attached report and in the survey worksheets (Enclosure 2 of the attached report), and are summarized as follows:

A total of 13 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 the absence of a user's manual at Reveal and Rapiscan system locations (manuals for Rapiscan systems were located after the departure of the survey team), and the absence of warning labels on some of the systems. Please see the details in (a) through (c) in the top half of page 2.

In addition, several administrative items were noted in paragraphs (d) through (f) on page 3, mostly concerning the lack of labels with the service provider survey dates and illegible manufacturer labels on some of the systems.

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 February 20, 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

Sincerely,



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

cc: Mr. Leo C. Jones, TSA PIT AFSD-Screening
Mr. Nicholas Bruich, TSA PIT AFSD-Operations / Designated Occupational Safety and Health Officer
Ms. Christine Halfacre, Chief of Staff, Office of Security Technology

Enclosure: TSA PIT Radiation Protection Survey Report, dated 19 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 7-9, 2011 at Pittsburgh International Airport (PIT), Pittsburgh, PA, Project No. 26-MF-0FJU-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, Consolidated Safety Services. A total of 5 AIT x-ray systems were evaluated for compliance with the requirements of ANSI/HPS N43.17-2009 and 13 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: Reveal CT-80, Rapiscan 520B, Rapiscan 522B, and Rapiscan 620DV. After departure of the survey team TSA PIT personnel indicated user's manuals for the Rapiscan systems (520B, 522B and 620DV) had been located.
- 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.
Main Checkpoint, Lane 1	Rapiscan 520B	unreadable
Main Checkpoint, Lane 2	Rapiscan 522B	7012806
Main Checkpoint, Lane 4	Rapiscan 522B	7012807
Alternate Checkpoint, Lane 15	Rapiscan 522B	7032904

- c. Rapiscan 620DV, Serial No. 7083204, Main Checkpoint, Lane 5: The warning label "Caution: Do Not Insert Any Part of the Body When System is Energized – X-Ray Hazard" was not present at the exit port.

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

- a. Rapiscan Secure 1000 SP, Serial No.S51012004, Alternate Checkpoint, Lane 11 AIT: The slave unit made unusually loud idle noises. The cause of the mechanical sounds should be checked by the maintenance service provider during their next visit.
- b. Rapiscan Secure 1000 SP, Serial No.S51011005, Alternate Checkpoint, Lane 13 AIT: The slave unit made unusually loud idle noises. The cause of the mechanical sounds should be checked by the maintenance service provider during their next visit.
- c. Rapiscan Secure 1000 SP, Serial No.S51011004, Main Checkpoint, Lane 5 AIT: The cabinet access panel on the slave unit was unlocked. The key was obtained and the access panel locked.

d. A service provider survey date was not posted on the following systems.

Location	Model	Serial No.
North Resolution Room	Reveal CT-80	040131
International	Reveal CT-80	040548
Main Checkpoint, Lane 6	Rapiscan 620DV	7104801

e. Rapiscan 520B, Serial No. unreadable, Main Checkpoint, Lane 1: The serial number and the date of manufacture were unreadable on the system label.

f. The date of manufacture was unreadable on the following system labels: Rapiscan 522B, Serial No. 7012806, Main Checkpoint, Lane 2 and Rapiscan 522B, Serial No. 7012807, Main Checkpoint, Lane 4.

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. Joseph Terrell, TSA PIT Federal Security Director (FSD); Mr. Leo C. Jones, TSA PIT Assistant FSD for Screening; and six other TSA PIT staff on November 9, 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

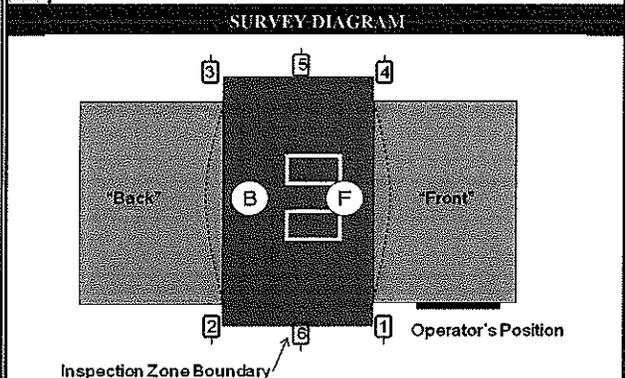
Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Main Checkpoint, Lane 3 AIT		
Survey Date	7 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	28 Jul 2012	Rapiscan	Secure 1000SP	S51011006	Mar-2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40155	*	Service Provider Survey Date		1 Aug 2011	

VISUAL INSPECTION					
Y	N	Requirement	Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)	X		At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)	X		X-ray emission terminates after a preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Technique factors preset for each mode of operation? (ANSI N43.17-2009, paragraph 7.2.2.b)	X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
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		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)	X		User provided with required information? (ANSI N43.17-2009, paragraph 7.5)
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)	NT=not tested; NA=not applicable.		



SCANNING MEASUREMENTS

Scanning below action levels? Yes 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 μ R	0.00 μ R	0.00 μ R	0.00 μ R
#2	0.07 μ R	0.00 μ R	0.00 μ R	0.02 μ R
#3	0.00 μ R	0.07 μ R	0.07 μ R	0.05 μ R
#4	0.13 μ R	0.13 μ R	0.13 μ R	0.13 μ R
#5	0.00 μ R	#6	0.00 μ R	

DOSE PER SCREENING

Trial	Exposure (X)		Reference Effective Dose per Screening (max 25 μ rem):
	"Front" Side	"Back" Side	
a	5.53 μ R	5.46 μ R	1.8 μ rem or 0.018 μ Sv
b	5.67 μ R	5.39 μ R	
c	5.53 μ R	5.46 μ R	
d	5.53 μ R	5.46 μ R	
e	5.66 μ R	5.46 μ R	
AVG	5.58 μR	5.45 μR	
Energy Correction Factor	1.25		

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X)		HVL "Front" Side	HVL "Back" Side	Conversion Factor	Min. Filtration ¹
	"Front" Side	"Back" Side				
0	1.36 μ R	1.90 μ R	1.1 mm Al	1.1 mm Al	0.126	1.0 mm Al
0	1.29 μ R	1.84 μ R				
1	0.68 μ R	0.95 μ R	¹ An HVL of 1 mm Al corresponds to a filtration of 1 mm Al for this system			
1	0.68 μ R	1.02 μ R				
1.5	0.54 μ R	0.82 μ R				
1.5	0.54 μ R	0.82 μ R				

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.

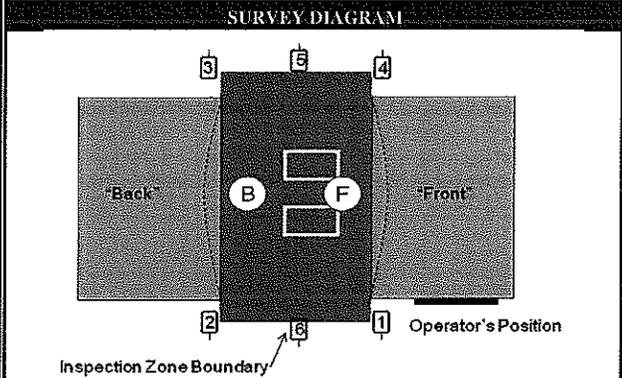
Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Main Checkpoint, Lane 5 AIT		
Survey Date	7 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA ZIP 15231

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	28 Jul 2012	Rapiscan	Secure 1000SP	S51011004	Mar-2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40155	*	Service Provider Survey Date	3 Aug 2011		

VISUAL INSPECTION		VISUAL INSPECTION			
Y	N	Requirement	Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)	X		At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)	X		X-ray emission terminates after a preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Technique factors preset for each mode of operation? (ANSI N43.17-2009, paragraph 7.2.2.b)	X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
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		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)	X		User provided with required information? (ANSI N43.17-2009, paragraph 7.5)
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)			NT=not tested; NA=not applicable.



SCANNING MEASUREMENTS

Scanning below action levels? Yes 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	0.07 μR	0.07 μR	0.07 μR
#2	0.07 μR	0.00 μR	0.13 μR	0.07 μR
#3	0.07 μR	0.07 μR	0.07 μR	0.07 μR
#4	0.00 μR	0.07 μR	0.07 μR	0.05 μR
#5	0.07 μR		#6	0.07 μR

DOSE PER SCREENING

Trial	Exposure (X)		Reference Effective Dose per Screening (max 25 μrem):
	"Front" Side	"Back" Side	
a	6.34 μR	7.01 μR	2.1 μrem or 0.021 μSv
b	6.48 μR	6.95 μR	
c	6.47 μR	6.95 μR	
d	6.41 μR	7.02 μR	
e	6.48 μR	7.03 μR	
AVG	6.44 μR	6.99 μR	
Energy Correction Factor	1.25		RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X)		HVL "Front" Side
	"Front" Side	"Back" Side	
0	1.71 μR	2.33 μR	1.1 mm Al
0	1.71 μR	2.33 μR	
1	0.89 μR	1.23 μR	0.118
1	0.89 μR	1.16 μR	
1.5	0.62 μR	0.96 μR	1.0 mm Al
1.5	0.68 μR	1.03 μR	

Conversion Factor

Min. Filtration¹

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 access panel was unlocked at the time of the survey. The key was obtained and the 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 Worksheet - AIT X-Ray Systems

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

SURVEY DATA SURVEY LOCATION

Project No.	26-MF-0FJU-12	Location	Alternate Checkpoint, Lane 11 AIT		
Survey Date	7 Nov 2011	Organization	Pittsburgh International Airport		
Surveyor(s)	[REDACTED]	Street Address	1000 Airport Dr.		
		City/Installation	Pittsburgh	State	PA

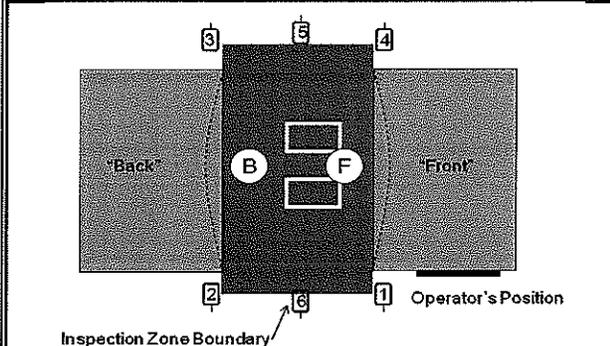
INSTRUMENTS USED SYSTEM INFORMATION

Instrument #	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	28 Jul 2012	Rapiscan	Secure 1000SP	S51012004	Mar-2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40155	*	Service Provider Survey Date	14 Jul 2011		

VISUAL INSPECTION

Y	N	Requirement	Y	N	Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	X-ray emission terminates after a preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Technique factors preset for each mode of operation? (ANSI N43.17-2009, paragraph 7.2.2.b)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Means to initiate emission of radiation other than an interlock or main power control? (ANSI N43.17-2009, paragraph 7.2.1.d)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	User provided with required information? (ANSI N43.17-2009, paragraph 7.5)
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Scan in progress indicator visible for any location from which a scan can be initiated? (ANSI N43.17-2009, paragraph 7.2.1.a)	NT=not tested; NA=not applicable.		

SURVEY DIAGRAM SCANNING MEASUREMENTS



Scanning below action levels? Yes 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

Exposure (X)		
Trial	"Front" Side	"Back" Side
a	6.08 μR	6.42 μR
b	6.09 μR	6.34 μR
c	6.02 μR	6.35 μR
d	6.08 μR	6.35 μR
e	6.09 μR	6.35 μR
AVG	6.07 μR	6.36 μR
Energy Correction Factor	1.25	

Reference Effective Dose per Screening (max 25 μrem):
 μrem
 or
 μSv

RESULT

Measurements made with Instruments #1 & #2

BEAM QUALITY

Exposure (X)			
mm Al	"Front" Side	"Back" Side	
0	2.02 μR	2.16 μR	HVL "Front" Side <input type="text" value="1.2"/> mm Al
0	2.02 μR	2.23 μR	HVL "Back" Side <input type="text" value="1.1"/> mm Al
1	1.15 μR	1.15 μR	Conversion Factor <input type="text" value="0.130"/>
1	1.08 μR	1.22 μR	Min. Filtration ¹ <input type="text" value="1.0"/> mm Al
1.5	0.81 μR	0.95 μR	¹ An HVL of 1 mm Al corresponds to a filtration of 1 mm Al for this system
1.5	0.88 μR	0.88 μR	

RESULT

Measurements made with Instruments #4 & #5

COMMENTS AND RECOMMENDATIONS

Slave unit noisy idle.

Additional Instruments Used:

Instrument #	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.

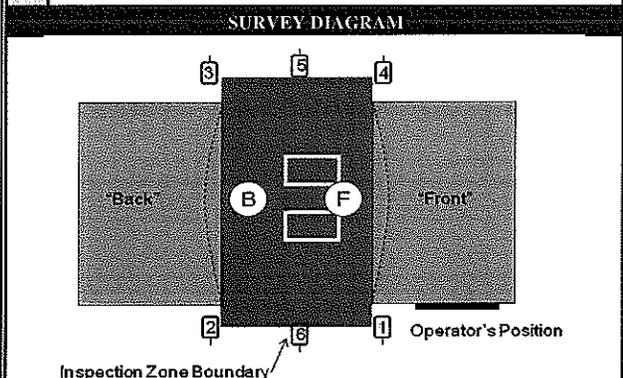
Survey Worksheet - AIT X-Ray Systems

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

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 13 AIT		
Survey Date	7 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)	[REDACTED]			Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	28 Jul 2012	Rapiscan	Secure 1000SP	S51011005	Mar-2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40155	*	Service Provider Survey Date		28 Jul 2011	

VISUAL INSPECTION					
Y	N	Requirement	Y	N	Requirement
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)	X		At least one lighted scan in progress indicator visible from the inspection zone? (ANSI N43.17-2009, paragraph 7.2.1.b)
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)	X		X-ray emission terminates after a preset time or exposure? (ANSI N43.17-2009, paragraph 7.2.2.e)
X		Technique factors preset for each mode of operation? (ANSI N43.17-2009, paragraph 7.2.2.b)	X		Operators have a clear view of the scanning area? (ANSI N43.17-2009, paragraph 7.2.1.f)
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		Tool or key required to open or remove access panels? (ANSI N43.17-2009, paragraph 7.2.1.i)
X		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)	X		User provided with required information? (ANSI N43.17-2009, paragraph 7.5)
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)	NT=not tested; NA=not applicable.		



SCANNING MEASUREMENTS

Scanning below action levels? Yes 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	0.06 μ R	0.07 μ R	0.07 μ R	0.07 μ R
#2	0.07 μ R	0.07 μ R	0.07 μ R	0.07 μ R
#3	0.13 μ R	0.07 μ R	0.13 μ R	0.11 μ R
#4	0.13 μ R	0.07 μ R	0.13 μ R	0.11 μ R
#5	0.07 μ R		#6	0.07 μ R

DOSE PER SCREENING

Trial	Exposure (X)		Reference Effective Dose per Screening (max 25 μ rem):
	"Front" Side	"Back" Side	
a	6.14 μ R	7.01 μ R	2.5 μ rem or 0.025 μ Sv
b	6.21 μ R	6.95 μ R	
c	6.14 μ R	7.01 μ R	
d	6.14 μ R	7.01 μ R	
e	6.15 μ R	6.95 μ R	
AVG	6.16 μ R	6.99 μ R	

Energy Correction Factor: 1.25

RESULT: **PASS**

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X)		HVL "Front" Side	HVL "Back" Side	Conversion Factor	Min. Filtration ¹
	"Front" Side	"Back" Side				
0	1.42 μ R	2.03 μ R	1.3 mm Al	1.1 mm Al	0.144	1.0 mm Al
0	1.49 μ R	2.03 μ R				
1	0.81 μ R	1.01 μ R				
1	0.81 μ R	1.09 μ R				
1.5	0.68 μ R	0.81 μ R				
1.5	0.68 μ R	0.81 μ R				

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 noisy idle.

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

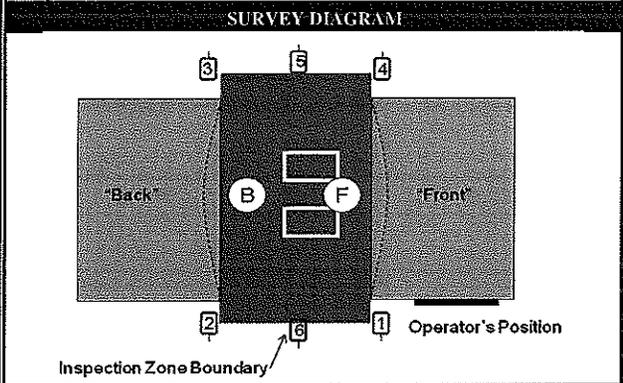
U.S. Army Public Health Command

Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 15 AIT		
Survey Date	7 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	28 Jul 2012	Rapiscan	Secure 1000SP	S51011003	Mar-2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40155	*	Service Provider Survey Date	29 Jul 2011		

VISUAL INSPECTION			
Y	N	Requirement	Y N
X		Key activated control with key capture? (ANSI N43.17-2009, paragraph 7.2.1.c)	X
X		"Caution: X-Rays Produced When Energized" label present at control to initiate scan? (ANSI N43.17-2009, paragraph 7.2.2.d)	X
X		Technique factors preset for each mode of operation? (ANSI N43.17-2009, paragraph 7.2.2.b)	X
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
X		Means to terminate emission of radiation other than an interlock? (ANSI N43.17-2009, paragraph 7.2.1.e)	X
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)	
			NT=not tested; NA=not applicable.



SCANNING MEASUREMENTS

Scanning below action levels? Yes 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)		Reference Effective Dose per Screening (max 25 μrem):
	"Front" Side	"Back" Side	
a	6.09 μR	5.85 μR	1.8 μrem or 0.018 μSv
b	5.97 μR	5.92 μR	
c	6.04 μR	5.85 μR	
d	5.84 μR	5.87 μR	
e	5.91 μR	5.99 μR	
AVG	5.97 μR	5.90 μR	
Energy Correction Factor	1.25		

RESULT **PASS**

BEAM QUALITY

mm Al	Exposure (X)		HVL "Front" Side	HVL "Back" Side	Conversion Factor	Min. Filtration ¹
	"Front" Side	"Back" Side				
0	1.74 μR	2.08 μR	1.1 mm Al	1.1 mm Al	0.121	1.0 mm Al
0	1.74 μR	2.08 μR				
1	0.94 μR	1.07 μR				
1	0.87 μR	1.07 μR				
1.5	0.74 μR	0.80 μR				
1.5	0.74 μR	0.87 μR				

RESULT **PASS**

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

Measurements made with Instruments #1 & #2 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 Results for Thirteen Cabinet X-Ray Systems

Survey Worksheet - Cabinet X-Ray Systems

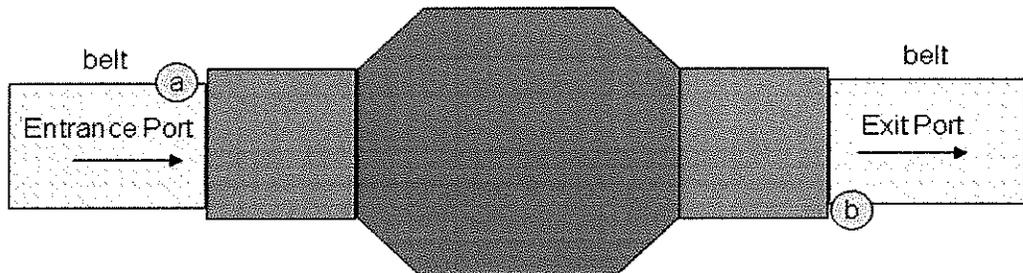
Health Physics Program
U.S. Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	North Resolution Room CT-80		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)	[REDACTED]			Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION			
	<i>Manufacturer</i>	<i>Model</i>	<i>Serial No.</i>	<i>Cal. Due</i>	<i>Manufacturer</i>	<i>Model</i>	<i>Serial No.</i>	<i>Manuf. Date</i>
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Reveal	CT-80	040131	Nov. 2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	<i>Certified</i>	<i>Yes</i> <input checked="" type="checkbox"/> <i>No</i> <input type="checkbox"/>	<i>Place of Manufacture</i> Bedford, MA	
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	<i>Type</i>	<i>Checkpoint</i>	<i>EDS:</i>	<i>In-line</i> <input type="checkbox"/> <i>Stand-Alone</i> <input checked="" type="checkbox"/>
Instrument #4	WB Johnson	TVX-2000	40155	*	<i>Manufacturer Survey Date</i>		none found†	

VISUAL INSPECTION			
Y	N	<i>Requirement</i>	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/>
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>
			NT=not tested; NA=not applicable.

SURVEY DIAGRAM



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

DOSE TO BAGGAGE			EXPOSURE OUTSIDE CABINET†				
<i>Trial</i>	<i>Exposure (X_i)</i>		Ambient Background		0.00	μR	
1	30.62 mR	$X_{avg} = 27.5$ mR $CV = 0.0987$	<i>Location</i>	<i>Exposure</i>	<i>Time</i>	<i>Exposure in 1 hr</i>	<i>RESULT</i>
2	25.77 mR		a	4.55 μR	5.0 min	0.055 mR	PASS
3	30.34 mR	Coefficient of Variation (CV): $CV = (1/X_{avg})(\sum(X_i - X_{avg})^2/(n-1))^{1/2}$	b	9.29 μR	5.0 min	0.111 mR	PASS
4	25.62 mR		c	μR	min	mR	
5	25.23 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.
†Empty bins were run through the system for the exposure outside cabinet measurements.
‡Unable to be determined at the time of the survey because a service provider survey date was not found on the system.

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

Survey Worksheet - Cabinet X-Ray Systems

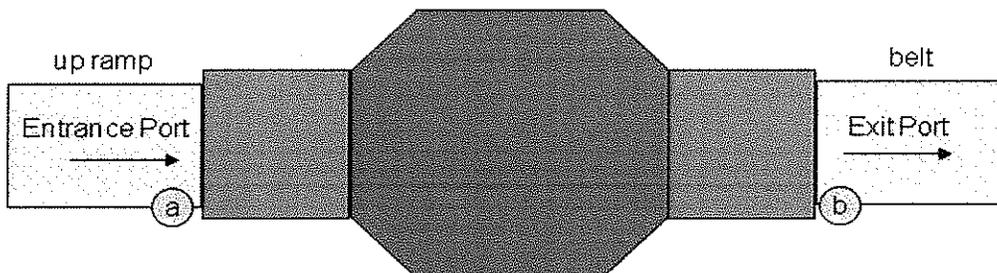
Health Physics Program
U.S. Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	International CT-80		
Survey Date	8 Nov. 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date	
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Reveal	CT-80	040548	Nov. 2008	
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture		Bedford, MA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input type="checkbox"/>	EDS:	In-line <input type="checkbox"/>	Stand-Alone <input checked="" type="checkbox"/>
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date		none found†		

VISUAL INSPECTION							
Y	N	Requirement		Y	N	Requirement	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Leaded drapes in good condition?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Interlocks not bypassed?	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Current User's Manual available? (21 CFR 1020.40(c)(9))	
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))		<input checked="" type="checkbox"/>	<input type="checkbox"/>	Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))	
NA	<input type="checkbox"/>	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 No (If no, explain below)

DOSE TO BAGGAGE				EXPOSURE OUTSIDE CABINET†								
Trial	Exposure (X_i)			Ambient Background 0.00 μR								
1	22.71 mR	<table border="1" style="margin: auto;"> <tr> <td>X_{avg}</td> <td>25.6 mR</td> </tr> <tr> <td>CV</td> <td>0.0978</td> </tr> </table>	X _{avg}	25.6 mR	CV	0.0978		Location	Exposure	Time	Exposure in 1 hr	RESULT
X _{avg}	25.6 mR											
CV	0.0978											
2	26.96 mR		a	0.94 μR	5.0 min	0.011 mR	PASS					
3	27.07 mR		b	3.75 μR	5.0 min	0.045 mR	PASS					
4	23.00 mR		c	μR	min	mR						
5	28.02 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.
 †Empty bins were run through the system for the exposure outside cabinet measurements.
 ‡Unable to be determined at the time of the survey because a service provider survey date was not found on the system.

* 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

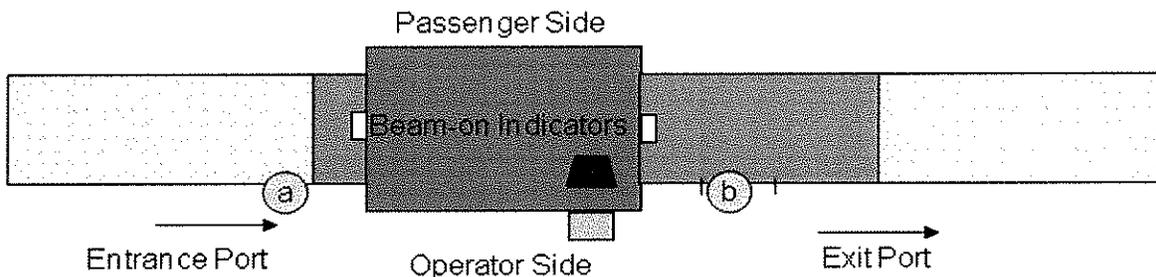
SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Main Checkpoint, Lane 2		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)	[REDACTED]			Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA ZIP 15231

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	522B	7012806	unreadable
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Hawthorne, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/>	EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>	
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	14 Sep 2011		

VISUAL INSPECTION			
Y	N	Requirement	Requirement
	<input checked="" type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (worn off) (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>		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))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>		Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>		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 No (If no, explain below)

DOSE TO BAGGAGE				EXPOSURE OUTSIDE CABINET†				
Trial	Exposure (X _i)	X _{avg}	CV	Ambient Background				
1	0.2577 mR	0.26 mR	0.0099	0.00	μR			
2	0.2627 mR			Location	Exposure	Time	Exposure in 1 hr	RESULT
3	0.2625 mR			a	1.62 μR	5.0 min	0.019 mR	PASS
4	0.2592 mR			b	2.50 μR	5.0 min	0.030 mR	PASS
5	0.2638 mR			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.
† Empty bins were run through the system for the exposure outside cabinet measurements.

* 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

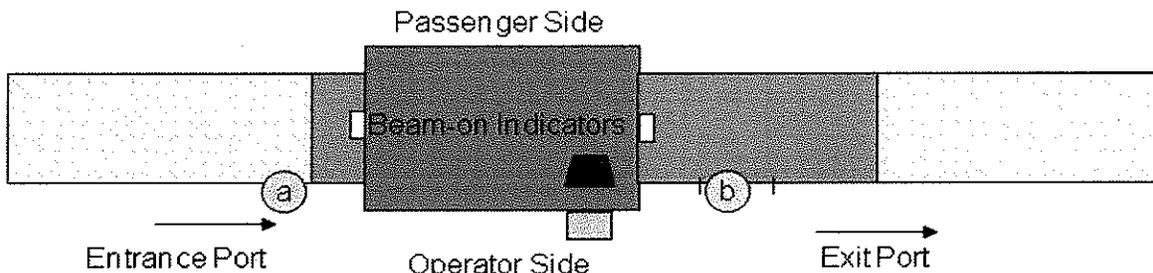
SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Main Checkpoint, Lane 4		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	522B	7012807	unreadable
Instrument #2	Radcal	10X5-180	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture Hawthorne, CA	
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/> EDS; In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>		
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	15 Sep 2011		

VISUAL INSPECTION			
Y	N	Requirement	Y N
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (worn off) (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 No (If no, explain below)

DOSE TO BAGGAGE				EXPOSURE OUTSIDE CABINET				
Trial	Exposure (X _i)			Ambient Background 0.00 μR				
1	0.2383 mR	X _{avg}	0.23 mR	Location	Exposure	Time	Exposure in 1 hr	RESULT
2	0.2283 mR	CV	0.0173	a	2.91 μR	5.0 min	0.035 mR	PASS
3	0.2301 mR	Coefficient of Variation (CV): CV = (1/X _{avg})(Σ(X _i - X _{avg}) ² /(n-1)) ^{1/2}		b	1.76 μR	5.0 min	0.021 mR	PASS
4	0.2300 mR			c	μR	min	mR	
5	0.2297 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

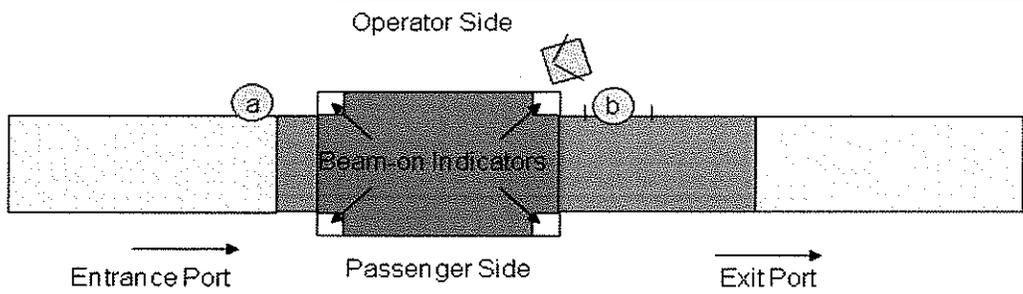
Health Physics Program
U.S. Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Main Checkpoint, Lane 5		
Survey Date	8 Nov. 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	620DV	7083204	Aug. 2008
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Torrance, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/>	EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>	
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	3 Oct 2011		

VISUAL INSPECTION			
Y	N	Requirement	Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: Do Not Insert Any Part of the Body When System Is Energized - X-Ray Hazard" present at each port? (Exit port missing label.) (21 CFR 1020.40(c)(8)(ii))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 No (If no, explain below)

DOSE TO BAGGAGE			EXPOSURE OUTSIDE CABINET				
X_{avg}	0.67 mR		Ambient Background	0.00		μR	
CV	0.26		Location	Exposure	Time	Exposure in 1 hr	RESULT
Coefficient of Variation (CV): $CV = (1/X_{avg})(\sum(X_i - X_{avg})^2/(n-1))^{1/2}$			a	4.13 μR	5.0 min	0.050 mR	PASS
			b	3.11 μR	5.0 min	0.037 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.

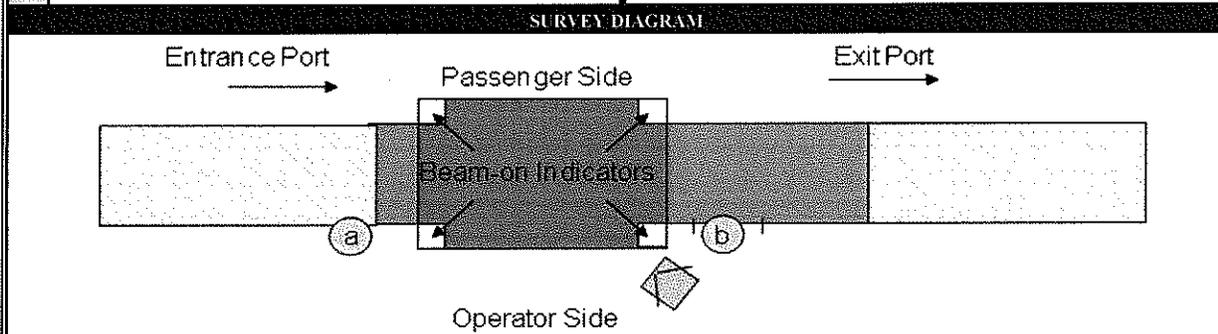
* Instrument #4 was response checked before and after the survey.

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA				SURVEY LOCATION				
Project No.	26-MF-0EJU-12			Location	Main Checkpoint, Lane 6			
Survey Date	8 Nov. 2011			Organization	Pittsburgh International Airport			
Surveyor(s)				Street Address	1000 Airport Dr.			
				City/Installation	Pittsburgh	State	PA	ZIP
INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	620DV	7104801	Mar. 2010
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Torrance, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/>	EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>	
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	none found†		

VISUAL INSPECTION			
Y	N	Requirement	Requirement
<input checked="" type="checkbox"/>		Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>		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))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>		Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>		Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))	
NT—not tested; NA—not applicable.			



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

DOSE TO BAGGAGE			EXPOSURE OUTSIDE CABINET				
Trial	Exposure (X_i)		Ambient Background 0.00 μR				
1	0.7081 mR	$X_{avg} = 0.92$ mR CV = 0.28	Location	Exposure	Time	Exposure in 1 hr	RESULT
2	0.8062 mR		a	3.65 μR	5.0 min	0.044 mR	PASS
3	0.9711 mR	Coefficient of Variation (CV): $CV = (1/X_{avg})(\sum(X_i - X_{avg})^2/(n-1))^{1/2}$	b	1.42 μR	5.0 min	0.017 mR	PASS
4	0.7762 mR		c	μR	min	mR	
5	1.351 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.
‡Unable to be determined at the time of the survey because a service provider survey date was not found on the system.

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

Survey Worksheet - Cabinet X-Ray Systems

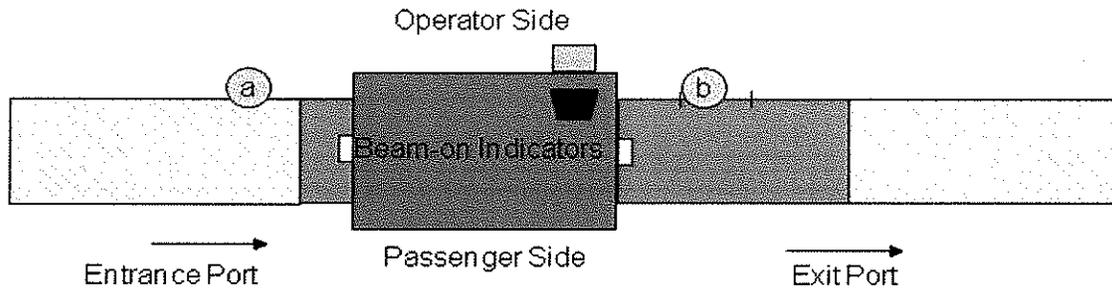
Health Physics Program
U.S. Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 11		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	520B	70433N09	Aug. 2004
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Hawthorne, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/>	EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>	
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	Aug. 2011		

VISUAL INSPECTION			
Y	N	Requirement	Y N
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> <input type="checkbox"/>
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))	<input checked="" type="checkbox"/> <input type="checkbox"/>
			NT=not tested; NA=not applicable.

SURVEY DIAGRAM



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

DOSE TO BAGGAGE			EXPOSURE OUTSIDE CABINET†				
Trial	Exposure (X _i)		Ambient Background		0.00	μR	
1	0.1859 mR	X _{avg} 0.18 mR CV 0.014	Location	Exposure	Time	Exposure in 1 hr	RESULT
2	0.1799 mR		a	5.90 μR	5.0 min	0.071 mR	PASS
3	0.1818 mR	Coefficient of Variation (CV): CV = (1/X _{avg}) * (Σ(X _i - X _{avg}) ² / (n-1)) ^{1/2}	b	2.28 μR	5.0 min	0.027 mR	PASS
4	0.1797 mR		c	μR	min	mR	
5	0.1830 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.
† Empty bins were run through the system for the exposure outside cabinet measurements.

Survey Worksheet - Cabinet X-Ray Systems

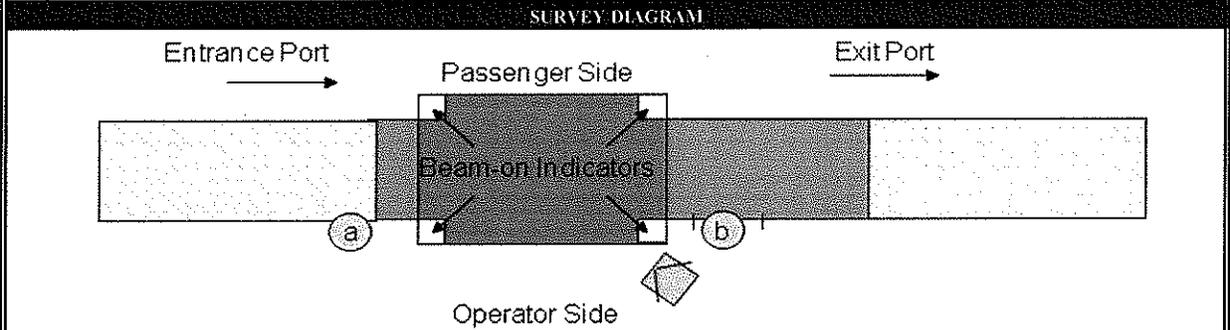
Health Physics Program
U.S. Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 12		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	620DV	7091002	Mar. 2009
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Torrance, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/>	EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>	
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	6 Oct 2011		

VISUAL INSPECTION			
Y	N	Requirement	Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Means to require operator presence at control panel? (21 CFR 1020.40(c)(10))	

NT=not tested; NA=not applicable.



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

DOSE TO BAGGAGE				EXPOSURE OUTSIDE CABINET				
Trial	Exposure (X_i)	X_{avg}	CV	Ambient Background 0.00 μR				
1	0.5377 mR	0.7	mR	Location	Exposure	Time	Exposure in 1 hr	RESULT
2	0.5817 mR	0.374		a	4.62 μR	5.0 min	0.055 mR	PASS
3	1.118 mR			b	1.74 μR	5.0 min	0.021 mR	PASS
4	0.5518 mR			c	μR	min	mR	
5	0.5629 mR			d	μR	min	mR	
				e	μR	min	mR	

Coefficient of Variation (CV):
CV = (1/X_{avg}) * (Σ(X_i - X_{avg})² / (n-1))^{1/2}

COMMENTS AND RECOMMENDATIONS

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

Survey Worksheet - Cabinet X-Ray Systems

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

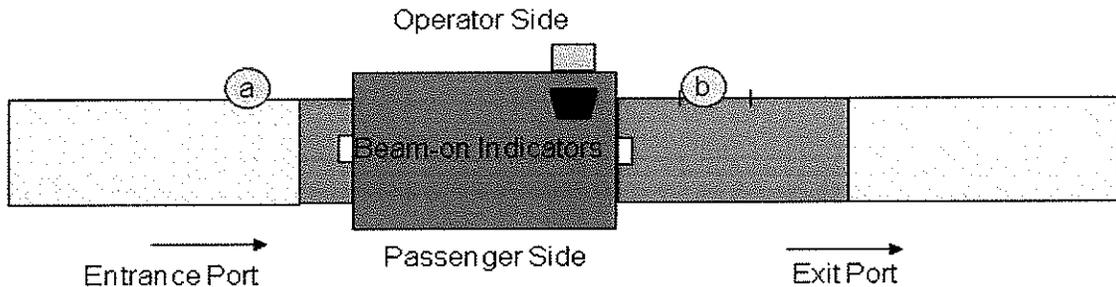
SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 13		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)	[REDACTED]			Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA ZIP 15231

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	520B	7052607	Jun. 2005
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Hawthorne, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/>	EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>	
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	25 Aug 2011		

VISUAL INSPECTION			
Y	N	Requirement	Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 No (If no, explain below)

DOSE TO BAGGAGE				EXPOSURE OUTSIDE CABINET†				
Trial	Exposure (X_i)			Ambient Background 0.00 μR				
1	0.1876 mR	$X_{avg} = 0.19 \text{ mR}$ $CV = 0.0079$ Coefficient of Variation (CV): $CV = (1/X_{avg})(\sum(X_i - X_{avg})^2/(n-1))^{1/2}$	Location	Exposure	Time	Exposure in 1 hr	RESULT	
2	0.1844 mR		a	8.62 μR	5.0 min	0.103 mR	PASS	
3	0.1878 mR		b	4.54 μR	5.0 min	0.054 mR	PASS	
4	0.1876 mR		c	μR	min	mR		
5	0.1878 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.
 † Empty bins were run through the system for the exposure outside cabinet measurements.

Survey Worksheet - Cabinet X-Ray Systems

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

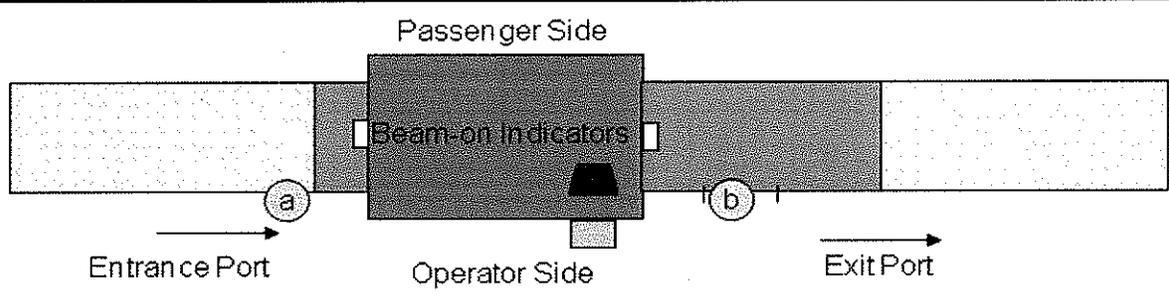
SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 14		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA

INSTRUMENTS USED					SYSTEM INFORMATION			
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	520B	7052608	Jun. 2005
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture: Haethorne, CA	
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/> EDS: In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>		
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	25 Aug 2011		

VISUAL INSPECTION			
Y	N	Requirement	Requirement
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/> Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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))	<input checked="" type="checkbox"/> Leaded drapes in good condition?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/> Interlocks not bypassed?
<input checked="" type="checkbox"/>	<input type="checkbox"/>	One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))	<input checked="" type="checkbox"/> Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	Key Activated Control present? (21 CFR 1020.40(c)(6)(i))	<input checked="" type="checkbox"/> Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>	<input type="checkbox"/>	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 No (If no, explain below)

DOSE TO BAGGAGE				EXPOSURE OUTSIDE CABINET†				
Trial	Exposure (X _i)			Ambient Background 0.00 μR				
1	0.2350 mR	X _{avg}	0.24 mR	Location	Exposure	Time	Exposure in 1 hr	RESULT
2	0.2374 mR	CV	0.0077	a	10.97 μR	5.0 min	0.132 mR	PASS
3	0.2384 mR	Coefficient of Variation (CV): CV = (1/X _{avg})(Σ(X _i - X _{avg}) ² /(n-1)) ^{1/2}		b	3.61 μR	5.0 min	0.043 mR	PASS
4	0.2339 mR			c	μR	min	mR	
5	0.2357 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.
†Empty bins were run through the system for the exposure outside cabinet measurements.

Survey Worksheet - Cabinet X-Ray Systems

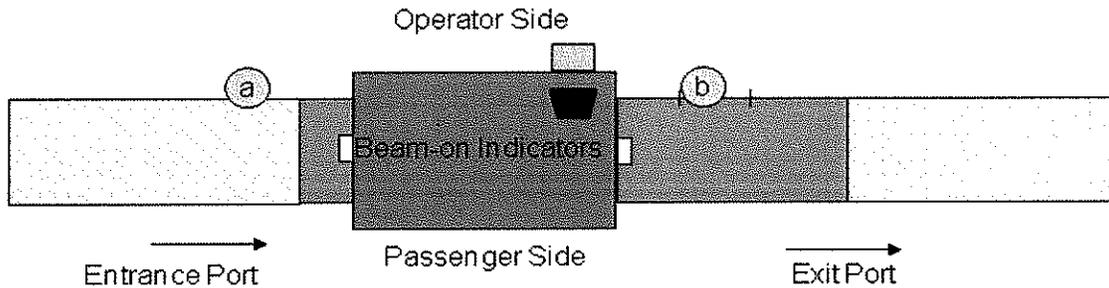
Health Physics Program
U.S. Army Public Health Command
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-0FJU-12			Location	Alternate Checkpoint, Lane 15 (Employee Lane)		
Survey Date	8 Nov 2011			Organization	Pittsburgh International Airport		
Surveyor(s)				Street Address	1000 Airport Dr.		
				City/Installation	Pittsburgh	State	PA ZIP 15231

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3290	17 Mar 2012	Rapiscan	522B	7032904	Jul. 2003
Instrument #2	Radcal	10X5-1800	10299	28 Jul 2012	Certified	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Place of Manufacture	Hawthorne, CA
Instrument #3	Radcal	10X5-180	18793	28 Jul 2012	Type	Checkpoint <input checked="" type="checkbox"/> EDS: <input type="checkbox"/> In-line <input type="checkbox"/> Stand-Alone <input type="checkbox"/>		
Instrument #4	WB Johnson	TVX-2000	40155	*	Manufacturer Survey Date	1 Sep 2011		

VISUAL INSPECTION					
Y	N	Requirement	Y	N	Requirement
	<input checked="" type="checkbox"/>	Warning label "Caution: X-Rays Produced When Energized" present at control panel? (worn off) (21 CFR 1020.40(c)(8)(i))	<input checked="" type="checkbox"/>		Means to initiate and terminate x-ray generation? (21 CFR 1020.40(c)(6)(ii); 1020.40(c)(10)(i) or (ii))
<input checked="" type="checkbox"/>		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))	<input checked="" type="checkbox"/>		Leaded drapes in good condition?
<input checked="" type="checkbox"/>		Two independent "x-ray on" indicators visible from control panel? (21 CFR 1020.40(c)(6)(iii))	<input checked="" type="checkbox"/>		Interlocks not bypassed?
<input checked="" type="checkbox"/>		One "x-ray on" indicator visible from each port and access panel? (21 CFR 1020.40(c)(6)(iv))		<input checked="" type="checkbox"/>	Current User's Manual available? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>		Key Activated Control present? (21 CFR 1020.40(c)(6)(i))		<input checked="" type="checkbox"/>	Maintenance performed according to recommended schedule? (21 CFR 1020.40(c)(9))
<input checked="" type="checkbox"/>		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 No (If no, explain below)

DOSE TO BAGGAGE			EXPOSURE OUTSIDE CABINET				
Trial	Exposure (X _i)		Ambient Background 0.00 μR				
1	0.2762 mR	$X_{avg} = 0.28 \text{ mR}$ $CV = 0.1142$ Coefficient of Variation (CV): $CV = (1/X_{avg})(\sum(X_i - X_{avg})^2/(n-1))^{1/2}$	Location	Exposure	Time	Exposure in 1 hr	RESULT
2	0.3047 mR		a	4.56 μR	5.0 min	0.055 mR	PASS
3	0.3066 mR		b	1.61 μR	5.0 min	0.019 mR	PASS
4	0.2292 mR		c	μR	min	mR	
5	0.2974 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.

Survey Notes Provided on November 9, 2011

Exit Briefing Notes

1. Project Information.

- a. Radiation Protection Survey No. 26-MF-0FJU-12
- b. Survey dates: 7-8 Nov 2011
- c. Pittsburgh International Airport (PIT), Pittsburgh, PA
- d. Survey Officer(s): [REDACTED] CHP, U.S. Army Public Health Command (USAPHC); and [REDACTED] CHP, Consolidated Safety Services (CSS).

2. Background Information.

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

b. Airport Contacts:

- (1) Joseph P. Terrell, TSA PIT Federal Security Director, Phone: [REDACTED]
- (2) Thomas Zoppetti, TSA PIT Security Manager, Phone: [REDACTED]

c. Individuals Assisting the Survey Team:

Name	Title/Position
[REDACTED]	Health Physicist TSA HQ
[REDACTED]	Health Physicist TSA HQ
[REDACTED]	TSA PIT Security Manager
[REDACTED]	TSA PIT Security Manager

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

Model	Serial No.	Location
Rapiscan Secure 1000 SP	S51011006	Main Checkpoint, Lane 3 AIT
Rapiscan Secure 1000 SP	S51011004	Main Checkpoint, Lane 5 AIT
Rapiscan Secure 1000 SP	S51012004	Alternate Checkpoint, Lane 11 AIT
Rapiscan Secure 1000 SP	S51011005	Alternate Checkpoint, Lane 13 AIT
Rapiscan Secure 1000 SP	S51011003	Alternate Checkpoint, Lane 15 AIT

e. Cabinet X-Ray Systems Surveyed:

Model	Serial No.	Location
Reveal CT-80	040131	North Resolution Room
Reveal CT-80	040548	International
Rapiscan 520B	unreadable	Main Checkpoint, Lane 1
Rapiscan 522B	7012806	Main Checkpoint, Lane 2
Rapiscan 620DV	7090508	Main Checkpoint, Lane 3
Rapiscan 522B	7012807	Main Checkpoint, Lane 4
Rapiscan 620DV	7083204	Main Checkpoint, Lane 5
Rapiscan 620DV	7104801	Main Checkpoint, Lane 6
Rapiscan 520B	70433N09	Alternate Checkpoint, Lane 11
Rapiscan 620DV	7091002	Alternate Checkpoint, Lane 12
Rapiscan 520B	7052607	Alternate Checkpoint, Lane 13
Rapiscan 520B	7052608	Alternate Checkpoint, Lane 14
Rapiscan 520B	7032904	Alternate Checkpoint, Lane 15 (Employee Lane)

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.S51012004, Alternate Checkpoint, Lane 11 AIT: The slave unit made unusually loud idle noises. Request service provider to check during next visit.

(b) Rapiscan Secure 1000 SP, Serial No.S51011005, Alternate Checkpoint, Lane 13 AIT: The slave unit made unusually loud idle noises. Request service provider to check during next visit.

(c) Rapiscan Secure 1000 SP, Serial No.S51011004, Main Checkpoint, Lane 5 AIT: The cabinet access panel on the slave unit 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) Reveal CT-80, Serial No. 040131, North Resolution Room and Reveal CT-80, Serial No. 040548, International: A Reveal CT-80 User's Manual was not available at the time of the survey.

(b) Rapiscan 520B, Serial No. unreadable, Main Checkpoint, Lane 1; Rapiscan 520B, Serial No. 7012806, Main Checkpoint, Lane 2; Rapiscan 520B, Serial No. 70433N09, Alternate Checkpoint, Lane 11; Rapiscan 520B, Serial No. 7052607, Alternate Checkpoint, Lane 13; Rapiscan 520B, Serial No. 7052608, Alternate Checkpoint, Lane 14; and, Rapiscan 520B, Serial No. 7032904, Alternate Checkpoint, Lane 15 (Employee Lane): A Rapiscan 520B User's Manual was not available at the time of the survey.

(c) Rapiscan 620DV, Serial No. 7090508, Main Checkpoint, Lane 3; Rapiscan 620DV, Serial No. 7083204, Main Checkpoint, Lane 5; Rapiscan 620DV, Serial No. 7104801, Main Checkpoint, Lane 6; and, Rapiscan 620DV, Serial No. 7091002, Alternate Checkpoint, Lane 12: A Rapiscan 620DV User's Manual was not available at the time of the survey.

(d) Rapiscan 522B, Serial No. 7012807, Main Checkpoint, Lane 4: A Rapiscan 522B User's Manual was not available at the time of the survey.

(e) Rapiscan 520B, Serial No. unreadable, Main Checkpoint, Lane 1; Rapiscan 520B, Serial No. 7012806, Main Checkpoint, Lane 2; Rapiscan 522B, Serial No. 7012807, Main Checkpoint, Lane 4; and, Rapiscan 520B, Serial No. 7032904, Alternate Checkpoint, Lane 15 (Employee Lane): The warning label "Caution: X-Ray Produced When Energized" was not present at the control panel.

(f) Rapiscan 620DV, Serial No. 7083204, Main Checkpoint, Lane 5: The warning label "Caution: Do Not Insert Any Part of the Body When System is Energized – X-Ray Hazard" was not present at the exit port.

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

(a) Reveal CT-80, Serial No. 040131, North Resolution Room and Reveal CT-80, Serial No. 040548, International: The service provider's survey dates were not posted on the systems.

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(b) Rapiscan 520B, Serial No. unreadable, Main Checkpoint, Lane 1: The serial number and the date of manufacture were unreadable on the system label.

(c) Rapiscan 520B, Serial No. 7012806, Main Checkpoint, Lane 2: The date of manufacture was unreadable on the system label.

(d) Rapiscan 522B, Serial No. 7012807, Main Checkpoint, Lane 4: The date of manufacture was unreadable on the system label.

(e) Rapiscan 620DV, Serial No. 7104801, Main Checkpoint, Lane 6: The service provider's survey date was not posted on the system.

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.