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

Transportation Security Administration

January 19, 2012

Mr. James Spinden
Federal Security Director
Transportation Security Administration
Seattle-Tacoma International Airport (SEA)

Dear Mr. Spinden:

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 SEA was conducted on August 1-3, 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 reports (Enclosure 1 of report), and are summarized as follows:

A total of 14 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 requirements of the standard.

However, administrative concerns for three of the AIT systems were noted by the survey officers during the survey, such as an incorrect survey date posted on the system by the service provider, an improperly functioning "Scan in Progress" light, and unlocked access panel doors. Please see Table a. AIT Systems on page 2 of the attached report and the affected worksheets in Enclosure 1 of the report (pages 9, 11, and 15, respectively).

Cabinet X-ray Systems

The findings for the surveyed cabinet x-ray system (S/N 19976) is described on page 2 of the survey and in the survey worksheet in Enclosure 2, and is summarized as follows:

The cabinet x-ray system was 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 this cabinet x-ray system provided the appropriate operating procedures are followed.

The cabinet x-ray system complied with other (non-emission) requirements of Title 21, CFR, Subchapter J, with the exception that all four "beam-on" indicators did not illuminate.

As an administrative concern, Table b. Cabinet System on page 2 of the report indicates that the inner set of curtains at the entrance port showed significant wear and should be replaced.

A special measurement was obtained by the survey team to evaluate potential exposures to employees when a curtain flap on this cabinet x-ray system was misaligned for a time period before it was replaced. The analysis, which concluded that any exposure to employees were well below occupational and public limits, is provided on page 3 of the report.

Your early attention to correcting the identified findings in this report 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 [redacted].

Sincerely,

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

cc: Mr. Keith Emberton, Assistant FSD for Operations / Designated Occupational Safety and Health Officer
Ms. Christine Halfacre, Chief of Staff, Office of Security Technology

Enclosure: TSA SEA Radiation Protection Survey Report, dated 27 September 2011

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

27 SEP 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 SEA Radiation Safety Surveys, 13 July 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 1-3 August 2011 at Seattle-Tacoma International Airport (SEA), Seattle, WA, Project No. 26-MF-0EYF-11. 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 one cabinet x-ray system 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); [redacted], Health Physicist, HPP, AIPH; [redacted], CHP, Consolidated Safety Services (CSS); and [redacted], Industrial Hygienist, CSS. A total of 14 AIT x-ray systems were evaluated for compliance with the requirements of ANSI/HPS N43.17-2009 and one cabinet x-ray system was evaluated for compliance with the requirements of Title 21, CFR, Subchapter J. The survey results for each AIT system are provided in Enclosure 1. The survey results for the cabinet x-ray system are provided in Enclosure 2.

All AIT x-ray systems tested were found to be in compliance with the radiation dose limits specified in ANSI/HPS N43.17-2009. The cabinet x-ray system tested was 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 system was found to be in compliance with the other requirements of Title 21, CFR, Subchapter J, with the exception that all four "beam-on" indicators did not illuminate.

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

a. AIT Systems:

Location	Serial No.	Description
Main Terminal Checkpoint 3, Lane 8	S51024002	The service provider survey date was incorrectly posted as 15 March 2010 and it should have been 15 March 2011. The survey due date was correctly posted as 15 March 2012.
Main Terminal Checkpoint 4, Lane 2	S51021009	The "Scan in Progress" light on the master unit faded out before the scan ended.
Main Terminal Checkpoint 5, Lane 6	S51021010	The access panel doors were not locked on both the master and slave units.

b. Cabinet System:

Location	Serial No.	Description
Main Terminal Checkpoint 4, Lane 4	19976	The inner set of curtains at the entrance port showed significant wear. Replacement of these curtains should be considered.

Based on dosimetry and field measurements around each Secure 1000 SP and the cabinet x-ray system, it is estimated that Transportation Security Officers (TSOs) 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 exposure less than 100 millirem per year.

An additional measurement was performed on the cabinet x-ray system (Heimann Systems 6040i, Serial No. 19976, Checkpoint 4, Lane 4) to evaluate potential exposures to personnel working around this system during the period in which a misaligned curtain flap resulted in a gap in curtain coverage. To obtain a "worst case" estimate, four curtain flaps were taped to the top of the exit tunnel during the measurement. This resulted in a measured value of 0.22 milliroentgen (mR) in one hour. Note that this is still below the maximum emission limit of 0.5 mR in one hour specified in 21 CFR 1020.40.

Based on the above measurement, an individual present at this location for 40 hours per week for four weeks would receive a radiation dose of approximately 35 mrem. This is well below both the occupational dose limit of 5,000 mrem per year and the TSA administrative goal of 100 mrem per year. Since Transportation Security Officers spend much of their time at other locations that are further from the exit port, actual radiation doses would be much smaller than the "worst case" estimate given above.

The survey officers discussed the survey results with Mr. Jim Spinden, Federal Security Director (FSD); Mr. Keith Emberton, Assistant FSD for Operations; Ms. Machelle Kalb, Transportation Security Manager; and Mr. Thomas Kay, Senior Screening Manager, on 3 August 2011. A copy of the survey notes is provided in Enclosure 3. The location of the Rapiscan Secure 1000 SP, Serial No. S51037009 was incorrectly listed on the original survey notes and has been corrected.

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

Sincerely,

[redacted]

Portfolio Director
Occupational Health Sciences

Enclosures

Survey Results for 14 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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 2, Lane 2				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

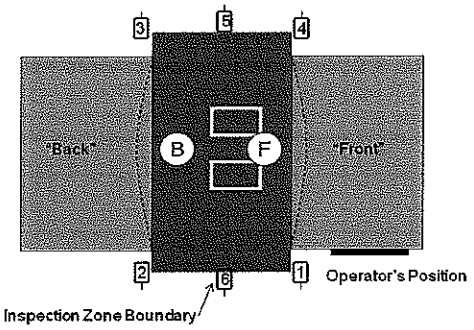
Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024009	Jun 2010
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	14 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	Scan 1	Scan 2	Scan 3	Average
1	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 when the survey team was present.*

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		"Back" Side	
a	6.35	µR	6.42	µR
b	6.00	µR	6.35	µR
c	6.28	µR	6.35	µR
d	6.35	µR	6.42	µR
e	6.35	µR	6.42	µR
AVG	6.27	µR	6.39	µR

Energy Correction Factor: 1.25

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

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side		"Back" Side	
0	1.87	µR	2.20	µR
0	1.87	µR	2.20	µR
1	1.00	µR	1.13	µR
1	0.94	µR	1.21	µR
1.5	0.80	µR	0.93	µR
1.5	0.80	µR	0.94	µR

HVL "Front" Side: 1.1 mm Al
HVL "Back" Side: 1.1 mm Al
Conversion Factor: 0.125
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 2, Lane 4				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024005	Jun 2010

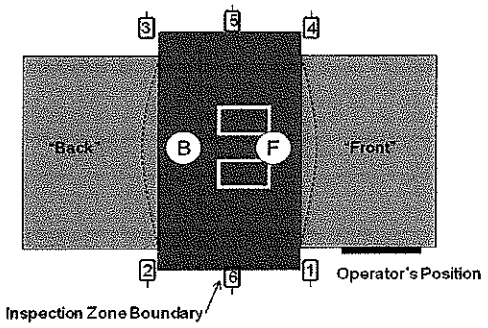
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	6 Jul 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	Scan 1	Scan 2	Scan 3	Average
1	0.00 µR	0.07 µR	0.07 µR	0.05 µR
2	0.00 µR	0.00 µR	0.07 µR	0.02 µR
3	0.07 µR	0.00 µR	0.07 µR	0.05 µR
4	0.00 µR	0.00 µR	0.00 µR	0.00 µR
5	0.00 µR	6	0.00 µR	

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	"Back" Side
a	5.32 µR	4.69 µR
b	5.32 µR	4.83 µR
c	5.32 µR	4.76 µR
d	5.32 µR	4.77 µR
e	5.25 µR	4.84 µR
AVG	5.31 µR	4.78 µR

Energy Correction Factor: 1.25

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

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	"Back" Side
0	1.88 µR	1.54 µR
0	1.82 µR	1.54 µR
1	1.01 µR	0.87 µR
1	0.94 µR	0.87 µR
1.5	0.81 µR	0.74 µR
1.5	0.74 µR	0.74 µR

HVL "Front" Side: 1.1 mm Al
HVL "Back" Side: 1.4 mm Al
Conversion Factor: 0.151
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 2, Lane 6				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024001	Jun 2010

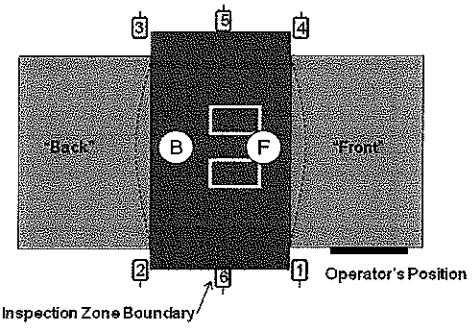
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	14 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	Scan 1	Scan 2	Scan 3	Average
1	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 when the survey team was present.*

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	Exposure (X) "Back" Side
a	5.68 µR	6.38 µR
b	5.75 µR	6.52 µR
c	5.82 µR	6.52 µR
d	5.82 µR	6.45 µR
e	5.68 µR	6.45 µR
AVG	5.75 µR	6.46 µR
Energy Correction Factor	1.25	

Reference Effective Dose per Screening (max 25 µrem):

2.0 µrem

or

0.020 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	Exposure (X) "Back" Side
0	1.35 µR	2.08 µR
0	1.41 µR	2.02 µR
1	0.74 µR	1.08 µR
1	0.74 µR	1.08 µR
1.5	0.54 µR	0.83 µR
1.5	0.61 µR	0.94 µR

HVL "Front" Side 1.1 mm Al
HVL "Back" Side 1.1 mm Al
Conversion Factor 0.125
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	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-0BYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 2, Lane 8				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Rapiscan	Secure 1000 SP	S51024007	Jun 2010

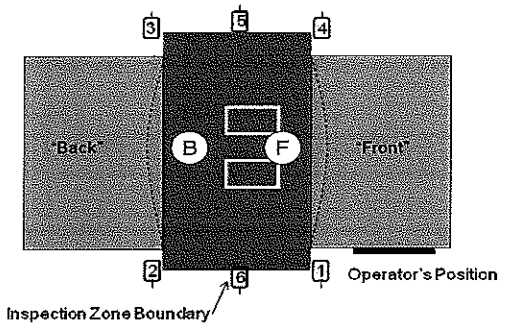
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	14 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	*Scan 1*	*Scan 2*	*Scan 3*	*Average*
1	0.00 µR	0.00 µR	0.00 µR	0.00 µR
2	0.00 µR	0.00 µR	0.07 µR	0.02 µR
3	0.00 µR	0.00 µR	0.00 µR	0.00 µR
4	0.00 µR	0.07 µR	0.07 µR	0.05 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	5.93 µR	6.42 µR
b	5.65 µR	6.42 µR
c	5.44 µR	6.28 µR
d	5.86 µR	6.35 µR
e	5.72 µR	6.28 µR
AVG	5.72 µR	6.35 µR
Energy Correction Factor	1.25	

Reference Effective Dose per Screening (max 25 µrem):

1.9 µrem

or

0.019 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	*Exposure (X) "Front" Side*	*Exposure (X) "Back" Side*
0	1.80 µR	2.66 µR
0	1.80 µR	2.60 µR
1	0.93 µR	1.40 µR
1	0.93 µR	1.40 µR
1.5	0.80 µR	1.06 µR
1.5	0.73 µR	1.07 µR

HVL "Front" Side 1.1 mm Al
HVL "Back" Side 1.1 mm Al
Conversion Factor 0.123
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 2, Lane 10				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024004	Jun 2010

Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	14 Mar 2011		

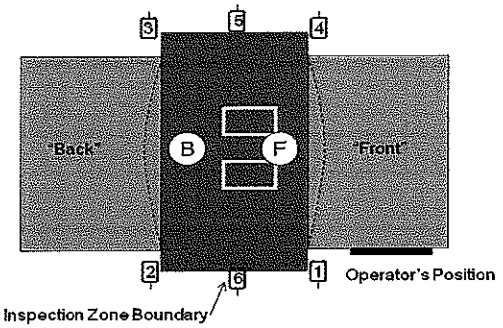
VISUAL INSPECTION

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

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	Scan 1	Scan 2	Scan 3	Average
1	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 when the survey team was present.*

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		Exposure (X) "Back" Side	
a	6.27	µR	6.83	µR
b	6.26	µR	6.82	µR
c	6.26	µR	6.82	µR
d	6.33	µR	6.76	µR
e	6.33	µR	6.83	µR
AVG	6.29	µR	6.81	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	1.86	µR	2.39	µR
0	1.86	µR	2.39	µR
1	0.93	µR	1.26	µR
1	0.93	µR	1.26	µR
1.5	0.73	µR	1.00	µR
1.5	0.73	µR	1.00	µR

HVL "Front" Side: 1.0 mm Al
HVL "Back" Side: 1.1 mm Al
Conversion Factor: 0.123
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 3, Lane 4				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51037009	Sep 2010

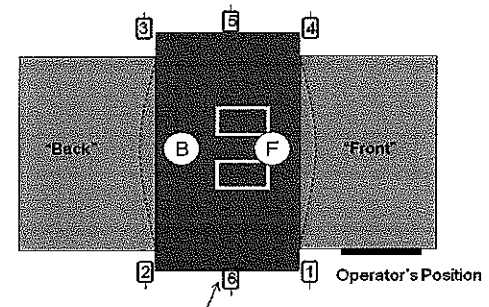
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	15 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	Scan 1	Scan 2	Scan 3	Average
1	0.00 µR	0.00 µR	0.00 µR	0.00 µR
2	0.00 µR	0.00 µR	0.00 µR	0.00 µR
3	0.00 µR	0.00 µR	0.00 µR	0.00 µR
4	0.00 µR	0.00 µR	0.00 µR	0.00 µR
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	5.67 µR	5.88 µR
b	5.81 µR	5.81 µR
c	5.88 µR	5.95 µR
d	5.74 µR	5.95 µR
e	5.81 µR	5.95 µR
AVG	5.78 µR	5.91 µR
Energy Correction Factor	1.25	

Reference Effective Dose per Screening (max 25 µrem):

1.9 µrem

or

0.019 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	Exposure (X) "Back" Side
0	2.01 µR	1.61 µR
0	2.01 µR	1.68 µR
1	1.07 µR	0.87 µR
1	1.01 µR	0.87 µR
1.5	0.80 µR	0.74 µR
1.5	0.74 µR	0.74 µR

HVL "Front" Side	1.1 mm Al
HVL "Back" Side	1.2 mm Al
Conversion Factor	0.129
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 3, Lane 6				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024006	Jun 2010

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

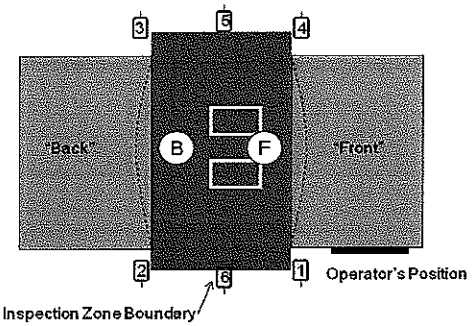
VISUAL INSPECTION

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

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

(If no, explain in comments)

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	Scan 1	Scan 2	Scan 3	Average
1	µR	µR	µR	µR
2	µR	µR	µR	µR
3	µR	µR	µR	µR
4	µR	µR	µR	µR
5	µR	6 µR	µR	

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

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	Exposure (X) "Back" Side
a	4.70 µR	4.34 µR
b	4.56 µR	4.27 µR
c	4.63 µR	4.48 µR
d	4.77 µR	4.48 µR
e	4.77 µR	4.41 µR
AVG	4.69 µR	4.40 µR
Energy Correction Factor	1.25	

Reference Effective Dose per Screening (max 25 µrem):

1.6 µrem

or

0.016 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	Exposure (X) "Back" Side
0	2.01 µR	1.34 µR
0	2.08 µR	1.34 µR
1	1.07 µR	0.73 µR
1	1.07 µR	0.74 µR
1.5	0.80 µR	0.60 µR
1.5	0.87 µR	0.60 µR

HVL "Front" Side 1.1 mm Al

HVL "Back" Side 1.2 mm Al

Conversion Factor 0.135

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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 3, Lane 8				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024002	Jun 2010

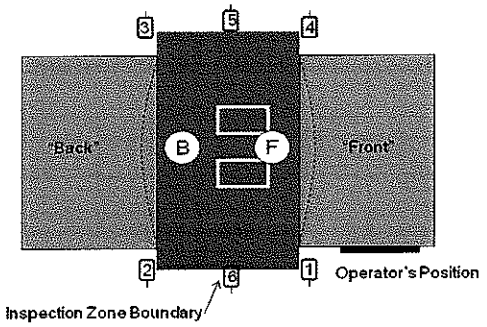
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	15 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	Scan 1	Scan 2	Scan 3	Average
1	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 when the survey team was present.*

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		"Back" Side	
a	6.16	µR	5.53	µR
b	6.65	µR	6.52	µR
c	6.51	µR	6.65	µR
d	6.51	µR	6.24	µR
e	6.58	µR	6.73	µR
AVG	6.48	µR	6.33	µR
Energy Correction Factor	1.25			

Reference Effective Dose per Screening (max 25 µrem):

2.0 µrem

or

0.020 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side		"Back" Side	
0	2.21	µR	2.34	µR
0	2.14	µR	2.27	µR
1	1.20	µR	1.20	µR
1	1.14	µR	1.27	µR
1.5	0.94	µR	1.00	µR
1.5	0.87	µR	0.93	µR

HVL "Front" Side 1.1 mm Al
HVL "Back" Side 1.1 mm Al
Conversion Factor 0.126
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

† Scattered radiation measurements could not be made at location 4 due to lack of space.
The service provider's survey date was incorrectly listed on the system as 15 Mar 2010 (should be 15 Mar 2011). The survey due date is correctly listed as 15 March 2012.
Additional Instruments Used:

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #4	Radcal	9010	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 3, Lane 10				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51024003	Jun 2010

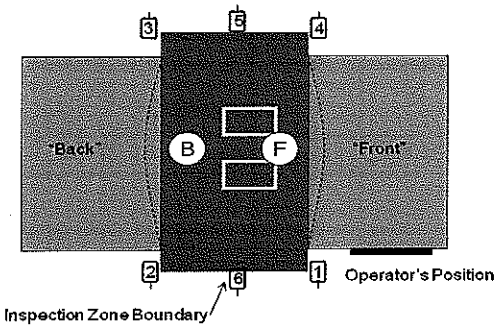
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	15 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

(If no, explain in comments)

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	Scan 1	Scan 2	Scan 3	Average
1	0.00 µR	0.00 µR	0.00 µR	0.00 µR
2	0.00 µR	0.00 µR	0.07 µR	0.02 µR
3	0.00 µR	0.00 µR	0.00 µR	0.00 µR
4	0.00 µR	0.07 µR	0.07 µR	0.05 µR
5	0.00 µR	6	0.00 µR	

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side	"Back" Side
a	6.23 µR	6.37 µR
b	5.95 µR	6.51 µR
c	6.58 µR	6.72 µR
d	6.28 µR	6.58 µR
e	6.28 µR	6.72 µR
AVG	6.26 µR	6.58 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem): 2.0 µrem or 0.020 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	"Back" Side
0	2.41 µR	2.61 µR
0	2.34 µR	2.61 µR
1	1.20 µR	1.40 µR
1	1.27 µR	1.40 µR
1.5	0.94 µR	1.07 µR
1.5	0.94 µR	1.07 µR

HVL "Front" Side: 1.1 mm Al

HVL "Back" Side: 1.1 mm Al

Conversion Factor: 0.124

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	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-0BYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 4, Lane 2				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Rapiscan	Secure 1000 SP	S51021009	May 2010

Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	16 Mar 2011		

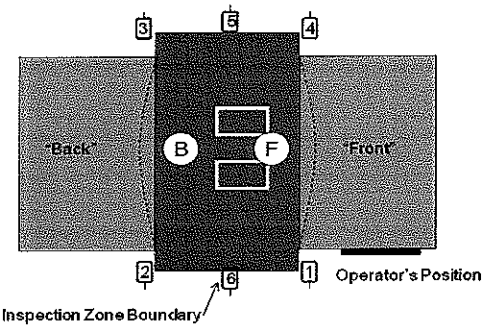
VISUAL INSPECTION

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

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	*Scan 1*	*Scan 2*	*Scan 3*	*Average*
1	µR	µR	µR	µR
2	µR	µR	µR	µR
3	µR	µR	µR	µR
4	µR	µR	µR	µR
5	µR	6 µR	µR	

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

DOSE PER SCREENING

Trial	*Exposure (X) "Front" Side*	*"Back" Side*
a	6.17 µR	6.74 µR
b	6.59 µR	7.15 µR
c	6.45 µR	7.15 µR
d	6.45 µR	7.15 µR
e	6.45 µR	7.15 µR
AVG	6.42 µR	7.07 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem): 2.4 µrem or 0.024 µSv

RESULT: PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	*Exposure (X) "Front" Side*	*"Back" Side*
0	2.07 µR	2.28 µR
0	2.08 µR	2.21 µR
1	1.07 µR	1.27 µR
1	1.14 µR	1.21 µR
1.5	0.80 µR	1.00 µR
1.5	0.80 µR	1.00 µR

HVL "Front" Side: 1.1 mm Al
HVL "Back" Side: 1.2 mm Al
Conversion Factor: 0.135
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

† The "Scan in Progress" light on the master unit flickered and went off before the end of the scan.

Additional Instruments Used:

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #4	Radcal	9010	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 4, Lane 4				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Rapiscan	Secure 1000 SP	S50949002	Dec 2009

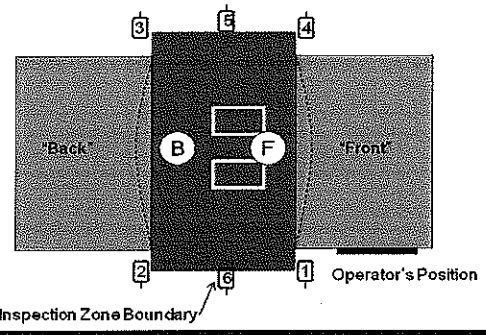
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	16 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	*Scan 1*	*Scan 2*	*Scan 3*	*Average*
1	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 when the survey team was present.*

DOSE PER SCREENING

Trial	*Exposure (X) "Front" Side*	*"Back" Side*
a	6.16 μR	5.46 μR
b	6.16 μR	.5.46 μR
c	6.16 μR	5.46 μR
d	6.23 μR	5.53 μR
e	6.23 μR	5.46 μR
AVG	6.19 μR	5.47 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*	*"Back" Side*
0	1.54 μR	1.95 μR
0	1.54 μR	1.95 μR
1	0.80 μR	1.08 μR
1	0.80 μR	1.08 μR
1.5	0.67 μR	0.88 μR
1.5	0.67 μR	0.81 μR

HVL "Front" Side: 1.1 mm Al
HVL "Back" Side: 1.2 mm Al
Conversion Factor: 0.133
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 4, Lane 6				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51021011	May 2010

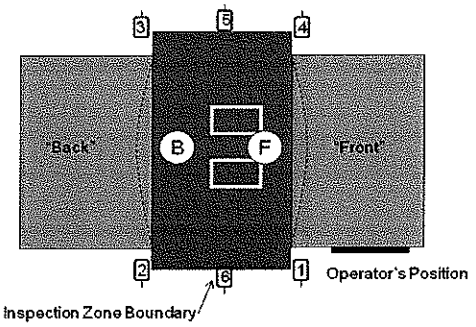
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	16 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	Scan 1	Scan 2	Scan 3	Average
1	0.00 µR	0.00 µR	0.00 µR	0.00 µR
2	0.00 µR	0.00 µR	0.00 µR	0.00 µR
3	0.00 µR	0.00 µR	0.00 µR	0.00 µR
4	0.00 µR	0.00 µR	0.00 µR	0.00 µR
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	6.17 µR	6.18 µR
b	6.17 µR	6.18 µR
c	6.38 µR	6.31 µR
d	6.39 µR	6.32 µR
e	6.38 µR	6.25 µR
AVG	6.30 µR	6.25 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem): 1.9 µrem or 0.019 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side	Exposure (X) "Back" Side
0	1.67 µR	2.47 µR
0	1.67 µR	2.40 µR
1	0.87 µR	1.34 µR
1	0.87 µR	1.27 µR
1.5	0.73 µR	0.96 µR
1.5	0.67 µR	1.00 µR

HVL "Front" Side: 1.1 mm Al
HVL "Back" Side: 1.1 mm Al
Conversion Factor: 0.123
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 5, Lane 4				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Rapiscan	Secure 1000 SP	S51037010	Sep 2010

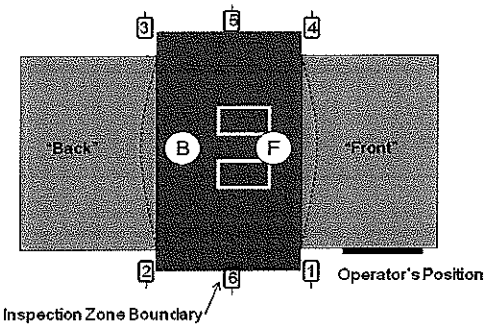
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	15 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)†

Location	Scan 1	Scan 2	Scan 3	Average
1	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 when the survey team was present.*

DOSE PER SCREENING

Trial	Exposure (X) "Front" Side		"Back" Side	
a	4.97	μR	6.10	μR
b	5.04	μR	6.18	μR
c	5.04	μR	6.10	μR
d	4.97	μR	6.10	μR
e	5.11	μR	6.17	μR
AVG	5.03	μR	6.13	μR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 μrem): 2.0 μrem or 0.020 μSv

RESULT: PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	Exposure (X) "Front" Side		"Back" Side	
0	1.08	μR	2.62	μR
0	1.14	μR	2.55	μR
1	0.60	μR	1.35	μR
1	0.60	μR	1.34	μR
1.5	0.47	μR	1.14	μR
1.5	0.47	μR	1.14	μR

HVL "Front" Side: 1.2 mm Al
HVL "Back" Side: 1.1 mm Al
Conversion Factor: 0.128
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	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-0EYF-11
Survey Date	2 Aug 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 5, Lane 6				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #1	Radcal	9010	90-2067	20 May 2012
Instrument #2	Radcal	10X5-1800	13115	20 May 2012
Instrument #3	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	*Model*	*Serial No.*	*Manuf. Date*
Rapiscan	Secure 1000 SP	S51021010	May 2010

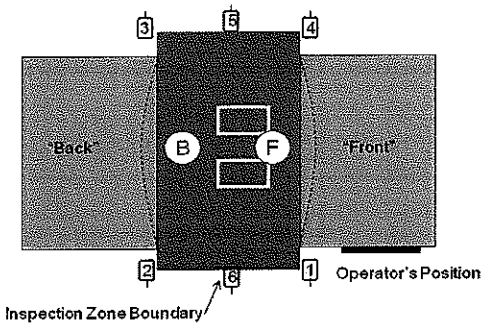
Certified	NA	*Place of Manufacture*	Torrance, CA
Service Provider Survey Date	15 Mar 2011		

VISUAL INSPECTION

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

NT=not tested; NA=not applicable.

SURVEY DIAGRAM



SCANNING MEASUREMENTS

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

Inspection zone boundary scanned with Instrument #3.

SCATTERED RADIATION (Optional)

Location	*Scan 1*	*Scan 2*	*Scan 3*	*Average*
1	0.00 µR	0.00 µR	0.00 µR	0.00 µR
2	0.00 µR	0.00 µR	0.00 µR	0.00 µR
3	0.00 µR	0.00 µR	0.00 µR	0.00 µR
4	0.00 µR	0.00 µR	0.00 µR	0.00 µR
5	0.00 µR	6	0.00 µR	

Measurements made with Instruments #1 & #2

DOSE PER SCREENING

Trial	*Exposure (X) "Front" Side*	*"Back" Side*
a	6.86 µR	6.87 µR
b	7.22 µR	7.01 µR
c	7.22 µR	6.94 µR
d	7.08 µR	7.01 µR
e	7.08 µR	6.87 µR
AVG	7.09 µR	6.94 µR

Energy Correction Factor: 1.25

Reference Effective Dose per Screening (max 25 µrem):

2.0 µrem

or

0.020 µSv

RESULT PASS

Measurements made with Instruments #1 & #2

BEAM QUALITY

mm Al	*Exposure (X) "Front" Side*	*"Back" Side*
0	2.61 µR	2.07 µR
0	2.54 µR	2.14 µR
1	1.27 µR	1.07 µR
1	1.34 µR	1.07 µR
1.5	1.00 µR	0.87 µR
1.5	1.07 µR	0.87 µR

HVL "Front" Side: 1.0 mm Al
HVL "Back" Side: 1.0 mm Al
Conversion Factor: 0.114
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

† The access panel doors were unlocked on both the master and slave units.

Additional Instruments Used:

	Manufacturer	*Model*	*Serial No.*	*Cal. Due*
Instrument #4	Radcal	9010	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 One Cabinet X-Ray System

Encl 2

Survey Worksheet - Cabinet X-Ray Systems

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

SURVEY DATA

Project No.	26-MF-0EYF-11
Survey Date	2 / 3 August 2011
Surveyor(s)	[redacted]

SURVEY LOCATION

Location	Checkpoint 4, Lane 4				
Organization	Seattle-Tacoma International				
Street Address	17801 International Blvd				
City/Installation	Seattle	State	WA	ZIP	98158

INSTRUMENTS USED

	Manufacturer	Model	Serial No.	Cal. Due
Instrument #1	Radcal	9010	90-3290	17 Mar 2012
Instrument #2	Radcal	10X5-1800	10302	17 Mar 2012
Instrument #3				
Instrument #4	WB Johnson	TVX-2000	40155	*

SYSTEM INFORMATION

Manufacturer	Model	Serial No.	Manuf. Date
Heimann Systems	6040i	19976	Nov 2000

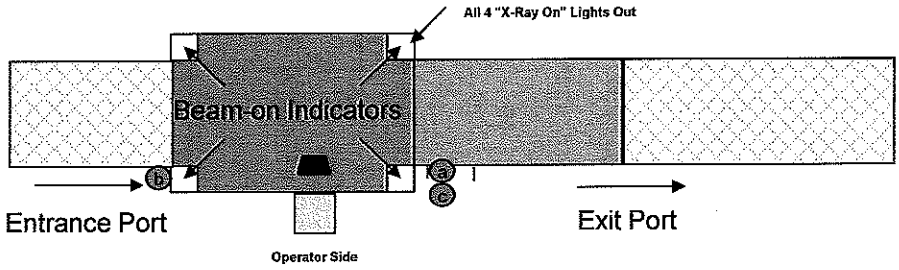
Certified	Yes	X	No		*Place of Manufacture*	Weisbaden, Germany		
Type	Checkpoint	X	EDS:	In-line		Stand-Alone		
Manufacturer Survey Date	27 Jul 2011							

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(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?
NT		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	109.40	mR
2	113.60	mR
3	109.90	mR
4	109.70	mR
5	109.30	mR

X_{avg}	110.4	mR
CV	0.0165	

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	0.80	µR	5.0	min	0.010	mR	PASS
b	0.33	µR	5.0	min	0.004	mR	PASS
c**	18.33	µR	5.0	min	0.220	mR	PASS
d		µR		min		mR	
e		µR		min		mR	

COMMENTS AND RECOMMENDATIONS

†All four "beam-on" indicators were out (see diagram above).

‡Second set of curtains inside the entrance tunnel are worn - consider replacing them.

** Location c is the same as location a. Four curtain flaps were taped to the top of the exit tunnel, creating a large gap in curtain coverage during the measurement. This measurement was made to assess potential exposures to TSOs due to a misaligned curtain flap. The curtain flap was misaligned for approximately 1 month, but had been repaired by the time of this survey. The measurement at location c represents a "worst case" situation in which there is no curtain present. Even in this "worst case" scenario, the system met the emission limit in 21 CFR 1010.40 during normal operation.

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

Survey Notes Provided on 3 August 2011

Encl 3

MCHB-IP-OHP 3 August 2011

Exit Briefing Notes

1. Project Information.

a. Radiation Protection Survey No. 26-MF-0EYF-11

b. Survey dates: 1-3 August 2011

c. Seattle-Tacoma International Airport (SEA), Seattle, WA

d. Survey Officer(s): [redacted]

2. Background Information.

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

b. Airport Contact: Machelle Kalb, Transportation Security & Safety Manager, Phone: [redacted]

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

Model	Serial No.	Location
Rapiscan Secure 1000 SP	S51024009	Checkpoint 2, Lane 2
Rapiscan Secure 1000 SP	S51024005	Checkpoint 2, Lane 4
Rapiscan Secure 1000 SP	S51024001	Checkpoint 2, Lane 6
Rapiscan Secure 1000 SP	S51024007	Checkpoint 2, Lane 8
Rapiscan Secure 1000 SP	S51024004	Checkpoint 2, Lane 10
Rapiscan Secure 1000 SP	S51037009	Checkpoint 3, Lane 4
Rapiscan Secure 1000 SP	S51024006	Checkpoint 3, Lane 6
Rapiscan Secure 1000 SP	S51024002	Checkpoint 3, Lane 8
Rapiscan Secure 1000 SP	S51024003	Checkpoint 3, Lane 10
Rapiscan Secure 1000 SP	S51021009	Checkpoint 4, Lane 2
Rapiscan Secure 1000 SP	S50949002	Checkpoint 4, Lane 4
Rapiscan Secure 1000 SP	S51021011	Checkpoint 4, Lane 6
Rapiscan Secure 1000 SP	S51037010	Checkpoint 5, Lane 4
Rapiscan Secure 1000 SP	S51021010	Checkpoint 5, Lane 6

d. Cabinet X-Ray Systems Surveyed:

Model	Serial No.	Location
HS 6040i	19976	Checkpoint 4, Lane 4

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, SN S51024002, Checkpoint 3, Lane 8: The service providers survey date was incorrectly posted as 15 March 2010 (should have been 15 March 2011). The survey due date was correctly posted as 15 March 2012.

(b) Rapiscan Secure 1000 SP, SN S51021009, Checkpoint 4, Lane 2: The "Scan in Progress" light on the master unit faded out before the scan ended.

(c) Rapiscan Secure 1000 SP, SN S51021010, Checkpoint 5, Lane 6: The access panel doors were not locked on both the master and slave units.

b. Cabinet X-ray System.

(1) The system was 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: Heimann Systems HS 6040i, SN 19976, Checkpoint 4, Lane 4: All four "x-ray on" lights were out.

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

(a) Heimann Systems HS 6040i, SN 19976, Checkpoint 4, Lane 4: The inner set of curtains at the entrance port showed significant wear. Replacement of these curtains should be considered.