



DEPARTMENT OF THE ARMY
US ARMY INSTITUTE OF PUBLIC HEALTH
6168 BLACKHAWK ROAD
ABERDEEN PROVING GROUND MD 21010-5403

Health Physics Program

DEC 09 2010

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 US Army Medical Command and the Transportation Security Administration signed September 10, 2008; Title 21, Code of Federal Regulations, Subchapter J; and American National Standards Institute/Health Physics Society (ANSI/HPS) N43.17-2009, Radiation Safety for Personnel Security Screening Systems Using X-Ray or Gamma Radiation.

A previous survey report (26-MF-TSAX-LAX2-10) for advanced imaging technology X-ray systems at Los Angeles International Airport contained a typographical error in the units of measurement listed for the half-value layer measurements. The original survey worksheets indicated the measured exposures made for the half-value were in units of milliroentgen (mR). These measurements should have been reported in units of microroentgen (μ R).

During a review of our methods for calculating the reference effective dose, we identified an issue with the ANSI/HPS N43.17-2009 standard for dual-beam systems that results in a slight underestimation of the effective dose per screening received by an individual. The standard states that the measurement will be made at the point of maximum exposure over the number of scans needed for an entire screening. It was also determined that the ANSI/HPS N43.17-2009 methodology assumes that both sides of the scanner contribute equally to the measurement. For dual-beam systems, such as the Secure 1000 SP, the measured value includes contributions of both x-ray tubes, but those contributions are not equal.

Subsequent analysis indicated that simply multiplying the measurement by two produces a slight overestimate of the effective dose. Since an overestimate of the effective dose is preferable to an underestimate and the skin entrance exposure for each tube cannot be measured separately without the assistance of a service engineer, this simple correction was adopted.

These items have been corrected and the updated survey worksheets are provided in the Enclosure.

Note that the general conclusion in the report was not affected by the above changes. The updated reference effective dose values are still well below the radiation dose per screening limits specified in ANSI/HPS N43.17-2009. There are no health hazards associated with the use of these systems provided appropriate operating procedures are followed.

For more information concerning the survey report, please contact the Health Physics Program at [REDACTED].

Sincerely,

[REDACTED]

CIH

Portfolio Director
Occupational Health Sciences

Enclosure

Corrected Survey Worksheets for 2 AIT X-Ray Systems at LAX

Enclosure

Survey Worksheet - AIT X-Ray Systems

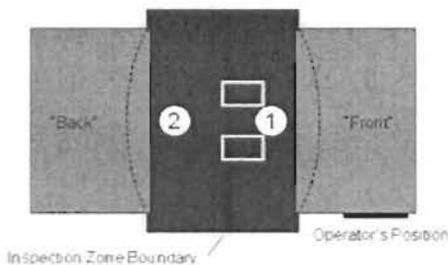
Health Physics Program
U.S. Army Public Health Command (Provisional)
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-TSAX-LAX2-10			Location	TBIT, North Checkpoint		
Survey Date	30 Jun 2010			Organization	Los Angeles International Airport		
Surveyor(s)	[REDACTED]			Street Address	1 World Way		
				City/Installation	Los Angeles	State	CA ZIP 90045

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	20 May 2011	Rapiscan	Secure 1000SP	550950002	Dec 2009
Instrument #2	Radcal	10XS-1800	10302	29 Jan 2011	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40174	†resp cked	Manufacturer Survey Date	Not Found		

Y	N	Requirement	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		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? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2 d)	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		Technique factors preset for each mode of operation? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2 b)	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		Means to inhibit 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? (21 CFR 1020.31(j); 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)	NT		User provided with required information? (21 CFR 1020.31(j); 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

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #3. All scanning results below action levels? Yes No (If no, explain below)

DOSE PER SCREENING				BEAM QUALITY						
Trial	Exposure (X)		Reference Effective Dose per Screening (max 25 µrem)	mm Al	Exposure (X)		HVL "Front" Side	HVL "Back" Side	Conversion Factor	Minimum Filtration
	"Front" Side	"Back" Side			"Front" Side	"Back" Side				
1	5.36 µR	6.29 µR	2.03 µrem or 0.0203 µSv	0	2.63 µR	1.97 µR	1.2 mm Al	1.1 mm Al	0.127	1.0 mm Al
2	5.30 µR	6.16 µR		0	2.63 µR	1.91 µR				
3	5.36 µR	6.48 µR		1	1.38 µR	0.99 µR				
4	5.36 µR	6.42 µR		1	1.44 µR	0.99 µR				
5	5.37 µR	6.75 µR		1.5	1.12 µR	0.85 µR				
AVG	5.35 µR	6.42 µR	1.5	1.12 µR	0.79 µR					
Energy Correction Factor	1.25		RESULT	PASS						

COMMENTS AND RECOMMENDATIONS

†resp cked = instrument was response checked before survey.
‡For this system 1 mm Al filtration is approximately equal to 1 mm Al HVL.

Corrected copy: 9 December 2010

Survey Worksheet - AIT X-Ray Systems

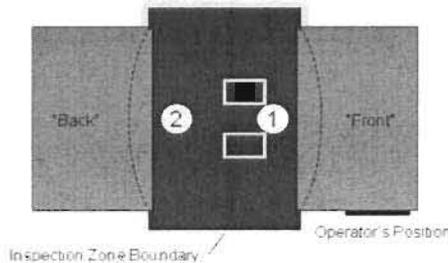
Health Physics Program
U.S. Army Public Health Command (Provisional)
Aberdeen Proving Ground, Maryland 21010-5403

SURVEY DATA				SURVEY LOCATION			
Project No.	26-MF-TSAX-LAX2-10			Location	TBIT, South Checkpoint		
Survey Date	30 Jun 2010			Organization	Los Angeles International Airport		
Surveyor(s)				Street Address	1 World Way		
				City/Installation	Los Angeles	State	CA

INSTRUMENTS USED				SYSTEM INFORMATION				
	Manufacturer	Model	Serial No.	Cal. Due	Manufacturer	Model	Serial No.	Manuf. Date
Instrument #1	Radcal	9010	90-3291	20 May 2011	Rapiscan	Secure 1000SP	550949001	Dec 2009
Instrument #2	Radcal	10X5-1800	10302	29 Jan 2011	Certified	NA	Place of Manufacture	Torrance, CA
Instrument #3	WB Johnson	TVX-2000	40174	resp cked	Manufacturer Survey Date	Not Found		

VISUAL INSPECTION				
Y	N	Requirement	Requirement	
X		Key activated control with key capture? (21 CFR 1020.31(j); 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? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.d)	X	X-ray emission terminates after a present time or exposure? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.e)
X		Technique factors preset for each mode of operation? (21 CFR 1020.31(j); ANSI N43.17-2009, paragraph 7.2.2.b)	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		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? (21 CFR 1020.31(j); 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)	NT	User provided with required information? (21 CFR 1020.31(j); 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.

SURVEY DIAGRAM



Accessible exterior surfaces of cabinet scanned with Instrument #3. All scanning results below action levels? Yes No (If no, explain below)

DOSE PER SCREENING				BEAM QUALITY			
		Exposure (X)				Exposure (X)	
Trial	"Front" Side	"Back" Side	Reference Effective Dose per Screening (max 25 μ rem)	mm Al	"Front" Side	"Back" Side	HVL "Front" Side
1	5.45 μ R	5.32 μ R	1.74 μ rem or 0.0174 μ Sv	0	1.64 μ R	2.10 μ R	1.1 mm Al
2	5.45 μ R	5.32 μ R		0	1.65 μ R	2.10 μ R	1.2 mm Al
3	5.52 μ R	5.25 μ R		1	0.85 μ R	1.18 μ R	Conversion Factor 0.127
4	5.45 μ R	5.19 μ R		1	0.85 μ R	1.12 μ R	Minimum Filtration 1.0 mm Al
5	5.52 μ R	5.25 μ R		1.5	0.59 μ R	0.85 μ R	
AVG	5.48 μ R	5.27 μ R	1.5	0.66 μ R	0.86 μ R		RESULT PASS
Energy Correction Factor	1.25						

COMMENTS AND RECOMMENDATIONS

†resp cked = instrument was response checked before survey.
‡For this system 1 mm Al filtration is approximately equal to 1 mm Al HVL.

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