Appendix 2

Quality Control Procedure for Diagnostic X-Ray Units

Blank Form, from SAEC.

INSPECTION NO.:		**DATE:**	
NAME OF INSTITUTE:			
ADDRESS:			
ROOM NUMBER:		**TEL.NO:**	

X-RAY GENERATOR					
Manufacturer					
MODEL		**SERIAL No**			
DATE PURCHASED					
DATE OF LAST MAINTENANCE			**REPAIR**		
FIXED			**MOBILE**		
TYPE					
MAXIMUM KVp					

X-RAY TUBE			
MANUFACTURER			
MODEL		**SERIAL No.**	
RADIOGRAPHIC		**FLUORO**	
DATE INSTALLED		**FOCAL SPOT SIZE**	
DATE OF LAST MAINTENANCE		**REPAIR**	
INHERENT FILTERATION		**ADDED FILTERATION**	
TOTAL FILTERATION			
OPERATIONAL MANUAL		**SERVICE MANUAL**	

STAFF			
	3		**1**
	4		**2**

REMARKS
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1	KVp & TIME ACCURACY								
First Exposure Factors	KVp (80-100)	80	mA (200-400)	200	t (100-200)ms		mAs	20	
FDD	75 cm	Wave Form							
No	KVp	KVp Measured	Corrected KVp	KVp Difference	Accepted*	Time	Time Measured	Time Error (%)	Accepted**
1	60								
2	70								
3	81								
4	90								
5	96								
*	*± 5KVp			**	** ± 5%				

2	RELATIVE mA & mAs LINEARITY (Using the KV meter)					
KVp	80	t	50 msec			
i	mA	R	Acceptable*	mAs	R	Acceptable*
1						
2						
3						
4						
*	$\lvert Ri - (mAs_i * R_1 / mAs_1) \rvert / (mAs_i * R_1 / mAs_1) \leq 10\%$			*	$\lvert Ri - (mA_i * R1 / mA_1) \rvert / (mAi * R_1 / mA_1) \leq 10\%$	

3	mAs CONSISTENCY								
mAs				10					
No	KVp	60		KVp	80		KVp	100	
1	mA	t	R_1	mA	t	R_2	mA	t	R_3
2									
3									
4									
Average				Average			Average		
Acceptable*	Yes(0.58)			Acceptable*	Yes(1.55)		Acceptable*	Yes(2.79)	
*	$\{Sqrt(\sum(R- R_{a\ v})^2/(n-1))/ R_{a\ v}) \leq 0.05\}$								

4	KVp AND TIME REPRODUCIBILITY AND LINEARITY TEST						
KVp	70	t msec	50	mAs_1	9.5	mAs_2 (2* mAs_1)	19
No	KVp	Time	D_1(R)	D_2 (R)			
1							
2							
3							
Average							

Coefficient of variation{sqrt($\sum(D- D_{av})^2/(n-1)$)/ d_{av} ≤0.05}= 0.1	Acceptable	
KVp Reproducibility {sqrt($\sum(KVp- KVp_{av})^2/(n-1)$)/ KVp_{av} ≤0.05}= 0.05	Acceptable	
Time Reproducibility {sqrt($\sum(t-t_{av})^2/(n-1)$)/ t_{av} ≤0.05}= 0	Acceptable	

X_1= $D1_{a\ v}$ / mAs_1		X2= D2a v / mAs2	
$\lvert x_1 - x_2 \rvert$ =	$x_1 + x_2$ =7.08	$0.1*(x_1 + x_2)$ =0.70	Acceptable*
*	$\lvert x_1 - x_2 \rvert \leq 0.1*(x_1 + x_2)$		

5	HALF VALUE LAYER (HVL) TEST			
KVp			Field Size	15 X 15 cm^2
No	Added filter(t)(mm)	I_1 (R)	I_2 (R)	I_{av} (R)
1				
2				
3				
4				
5				

HVL	

RECOMMENDED MINIMUM HVLS AT VARIOUS KVPS					
Measured KVp	Minimum HVL(mmAl)	Measured KVp	Minimum HVL(mmAl)	Measured KVp	Minimum HVL(mmAl)
30	0.3	70	1.5	110	3.0
40	0.4	71	2.1	120	3.2
49	0.5	80	2.3	130	3.5
50	1.2	90	2.5	140	3.8
60	1.3	100	2.7	150	4.1

6	RADIATION FIELD	
A	COLLIMATOR	
Working	☐ YES	☐ NO
Light working	☐ YES	☐ NO
Light edge clear	☐ YES	☐ NO
Cross indication	☐ YES	☐ NO
Cross centered	☐ YES	☐ NO

B	BEAM ALIGNMENT TEST						
I	PERPENDICULARITY TEST						
F-table top	100 cm						
KVp	47	mA	100	t	10 msec	mAs	16

Balls Images overlap (perpendicularity within 0.5°)	Ball Image in the 1st circle (misalignment is 1.5 °)	Ball Image in the 2nd circle (misalignment is 3.0 o)	Ball Image out of circles	Acceptable	
				Yes	No

II	COINCIDING TEST			
FFD	**mAs**	**Measured Variance Long Axis Short Axis**	**% Variance Long Axis Short Axis**	**Acceptable***
100 cm	10	**1.5**	**1**	**Yes**
122 cm	14			
*	≤ 2% of FFD (2cm)			

7	FOCAL SPOT SIZE TEST				
FFD	61 cm	**F-TOOL DISTANCE**	46 cm	**M**	4/3

Focal spot size	**Tube focal size**	**Smallest group resolved**	**Measured focal spot size****	**Variance**	**Acceptable***	
					Yes	**No**
Large						
Small						
(M/M-1)*(1/lp/mm)						

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*	Acceptable Error	
f ≤ 0.8 mm	**0.8 ≤ f ≤ 1.5mm**	**F ≥ 1.5mm**
Long axis = 1.4 X short axis		

INSPECTION TEAM			
	3		1
	4		2