APPENDIX I

RESULTS OF THE DOSIMETRIC FINDINGS AND STATUS OF EQUIPMENT AND FACILITY

This appendix contains the detailed data on the calibration of the Co-60 beam, clinical dosimetry and quality control of the equipment by the Expert Team. Additionally, it contains the layout and radiation levels in the spaces adjoining the emplacement of the Alcyon II radiotherapy unit.

Table I.I (1 page) shows the results of the IAEA/WHO TLD postal dose check service for the dosimeters irradiated after the beam calibration performed during the IAEA Expert mission.

Table I.II (11 pages) shows the spreadsheets with the results of the beam calibration.

Table I.III (3 pages) shows the results of the quality control of the Alcyon II machine performed during the IAEA Expert mission.

Table I.IV (5 pages) shows the patient dose data. These data cover all patients.

Table I.V (1 page) shows the doses to organs at risk for selected patients.

Table I.VI (1 page) shows the calculation of doses in 2 Gy fractions which would be biologically equivalent to the doses actually delivered.

Figure I.1 (1 page) shows the layout of the irradiation room of the Alcyon II and adjoining spaces with the measured dose rate levels of the radiation fields

ORGANISMO INTERNACIONAL DE ENERGIA ATOMICA
Sección de Dosimetría y Física Médica - División de Salud Humana
Wagramerstraße 5, P.O. Box 100, A-1400 VIENNA, AUSTRIA
Fax: +43 1 20607-21662, Teléfono. +43 1 2060-21662, e-mail· DOSIMETRY@IAEA ORG

SERVICIO POSTAL DE VERIFICACION DE DOSIS CON TLD DEL OIEA/OMS (OPS en America Latina)

Institución: *Hospital San Joan de Dios*
Dirección: *San Jose, Distrito Hospital*
Pais: *Costa Rica*

Num. TLD batch: *SR971*
TLDs irradiados por: *Ronald Pacheco*
Fecha de irradiación: *05-Aug-97*
Evaluación: *18-Aug-97*

RESULTADO DE LAS MEDIDAS CON TLD EN HACES DE Co-60 Y FOTONES DE ALTA-ENERGIA

Haz	Unidad de radiación	TLD num.	Dosis determinada por el usuario [Gy]	Dosis medidas por el OIEA [Gy]*	Dosis media OIEA [Gy]	desviación relativa** a la dosis media OIEA	Dosis media OIEA / Dosis determ usuario
Co-60	*Alcyon II*	*SR 97101*	*2.00*	*1 98* *1.98* *1 95*	*1 97*	*1 5*	*0.98*

* La incertidumbre de la medida de la dosis con TLD es 1 8% (1 desviación estándar); ésta no incluye la incertidumbre intrinseca al protocolo de dosimetría (véase IAEA TRS-277)

** % desviación relativa a la dosis media OIEA = 100 x (Dosis determ usuario - Dosis media OIEA)/ Dosis media OIEA. Una desviación con signo negativo (positivo) indica que la determinación por el usuario es menor (mayor) que la dosis medida por el OIEA; un paciente recibiría entonces una dosis mayor (menor) que la prescrita según el factor indicado en la última columna.

Se considera satisfactoria una concordancia dentro del intervalo ±5% entre la Dosis determinada por el usuario y la Dosis medida por el OIEA.

Dra. J. Izewska
TLD Officer - DMRP Section

Fecha:

Prof. Dr P Andreo
Head - DMRP Section

INFORMACION IMPORTANTE: Estos resultados representan una verificación independiente del rendimiento del haz, pero no suponen una calibración del mismo ni son sustituto de medidas frecuentes realizadas por un físico médico calificado **El presente informe no establece ninguna conclusión con respecto a la calidad de los tratamientos de Radioterapia.**

Table I.I,. Certificate of the IAEA/WHO Postal Dose Check Service of the irradiation made upon the Expert Mission

Determination of the absorbed-dose-to-air chamber factor $N_{D,air}$ for a cylindrical chamber

Responsible physicist: Group experts Date: 10-Jul-97

1. Ionization chamber

Chamber model: PTW 30001 PMMA/Al Farmer Serial no. 1423

Cavity inner radius (mm): 3.05

Wall material:	PMMA	thickness (g/cm^2)	0.045
Buildup cap material:	PMMA	thickness (g/cm^2)	0.541
		total thickness	0.586

Central electrode: aluminium

2. Chamber calibration data

Calibration laboratory: PTW Laboratory Date: 20-Jun-97

Calibration factor ref chamber (N_K/N_X; units) NK 4.723E-02 Gy/div

Calibration factor ref chamber (N_K): **4.723E-02 Gy/div**

given at	Pressure, P_o	101.3 kPa
	Temperature, T_o	20.0 °C
	Relative humidity	50.0 %
	Polarizing volt	-250.0 V
	Field size	10 x 10 cm x cm
	Source-chamber dist	85.0 cm

3. Constants and factors

$k_{att}\,k_m$ =	0.972	
W/e =	33.97	
1-g =	0.997	(for Co-60 gamma radiation)

4. Absorbed dose to air chamber factor

Calibration factor ref chamber ($N_{D,air}$): **45.769E-3 Gy/div**

given at	Pressure, P_o	101.3 kPa
	Temperature, T_o	°C
	Relative humidity	50.0 %
	Polarizing volt	-250.0 V

Table I.II. Spreadsheets of the beam calibration performed by the Expert Team

Determination of the absorbed dose to water in a Co-60 beam

Responsible physicist: Group experts Date: 10-Jul-97

1. Radiation treatment unit and referedive conditions for Dw determination

Co-60 unit ALCYONII

Reference phantom: water
Reference field size: 10x10 cm x cm at S.S.D. = 80 cm
Depth in water of the center of the chamber, z(ctr) = 5.0 cm
he shift of the effective point of measurent is 0.6 r
Reference depth in water of the P_{eff} of the chamber, z_{ref} = 4.8 cm

2. Ionization chamber

Chamber model PTW 30001 PMMA/Al Farmer Serial no. 1423
Wall material: PMMA thickness (g/cm^2) 0.045
Central electrode: aluminium
Electrometer model : UNIDOS Serial no.

Absorbed dose to air ch factor $N_{D,air}$ (Gy/div)= 45.769E-3
given at P_o 101.3 kPa
T_o 20.0 °C
R.H. 50.0 %
Polarizing volt -250.0 V

3. Electrometer reading corrections

All readings should be corrected for leakage

Pressure, P (kPa) 88.6 p_{TP} = 1.151
Temperature, T (°C) 22 M_o = 22.51 div/min
Recombination correction (continuous radiation; fig 13) p_s = 1.000
Average of chamber readings (div/min) M_u = 25.91

4. Absorbed dose to water

Stopping-power ratio, water/air (Table XIII): $s_{w,air}$ = 1.133
Perturbation factor (eq (25), Tables XX, XXI) p_{wall} = 1.001

α = 0.414
$s_{wall,air}$ = 1.102
$(\mu_{en}/\rho)_{w,wall}$ = 1.030

Central electrode correction = p_{cel} = 1.000

$D_w(z_{ref})$ = 1.3447 Gy/min
$D_w(z_{max})$ = 1.6873 Gy/min (%DD zref)= 79.697

%DD Co-60 10x10

	SSD	60	80	100
z=	4	81.5	83.7	85.0
z=	5	76.2	78.8	80.4

Table I.II. Spreadsheets of the beam calibration performed by the Expert Team (continued)

Determination of the absorbed-dose-to-air chamber factor $N_{D,air}$ for a cylindrical chamber

Responsible physicist: Group experts Date: 10-Jul-97

1. Ionization chamber

Chamber model : PTW 30002 C/C Farmer Serial no. 152

Cavity inner radius (mm):	3.05		
Wall material:	graphite	thickness (g/cm^2)	0.079
Buildup cap material:	PMMA	thickness (g/cm^2)	0.541
Buildup cap material:		total thickness	0.620
Buildup cap material:	graphite		

2. Chamber calibration data

Calibration laboratory: PTW Laboratory Date: 20-Jun-97

NK 4.623E-02 Gy/div

4.623E-02

Pressure, P_o	101.3	kPa
Temperature, T_o	20.0	°C
Relative humidity	50.0	%
Polarizing volt	-250.0	V
Field size	10 x 10	cm x cm
Source-chamber dist	85.0	cm

Gy/div

3. Constants and factors

$k_{att}\,k_m$ =	0.982	
W/e =	33.97	
1-g =	0.997	(for Co-60 gamma radiation)

4. Absorbed dose to air chamber factor

Calibration factor ref chamber ($N_{D,air}$): **45.262E-3 Gy/div**

given at	Pressure, P_o	101.3 kPa
	Temperature, T_o	20.0 °C
	Relative humidity	50.0 %
	Polarizing volt	-250.0 V

Table I.II. Spreadsheets of the beam calibration performed by the Expert Team (continued)

Determination of the absorbed dose to water in a Co-60 beam

Responsible physicist: *Group experts* Date: 10-Jul-97

1. Radiation treatment unit and referedive conditions for Dw determination

Co-60 unit *ALCYONII*

Reference phantom: water
Reference field size: 10x10 cm x cm at S.S.D. = 80 cm
Depth in water of the center of the chamber, z(ctr) = 5.0 cm
he shift of the effective point of measurent is 0.6 r
Reference depth in water of the P_{eff} of the chamber, z_{ref} = 4.8 cm

2. Ionization chamber

Chamber model PTW 30002 C/C Farmer Serial no. 152
Wall material: graphite thickness (g/cm^2) 0.079
Central electrode: graphite

Electrometer model : UNIDOS Serial no.

Absorbed dose to air ch factor $N_{D,air}$ (Gy/div)= **45.262E-3**
given at P_o 101.3 kPa
T_o 20.0 °C
R.H. 50.0 %
Polarizing volt -250.0 V

3. Electrometer reading corrections

All readings should be corrected for leakage

Pressure, P (kPa) 88.6 p_{TP} = 1.151
Temperature, T (°C) 22 M_o = 22.814 div/min
Recombination correction (continuous radiation; fig 13) p_s = 1.000
Average of chamber readings (div/min) M_u = 26.26

4. Absorbed dose to water

Stopping-power ratio, water/air (Table XIII): $s_{w,air}$ = 1.133
Perturbation factor (eq (25), Tables XX, XXI) p_{wall} = 0.990

α = 0.609
$s_{wall,air}$ = 1.002
$(\mu_{en}/\rho)_{w,wall}$ = 1.113

Central electrode correction = p_{cel} = 1.000

$D_w(z_{ref})$ = 1.3339 Gy/min
$D_w(z_{max})$ = 1.6737 Gy/min (%DD zref)= 79.697

%DD Co-60 10x10

SSD	60	80	100
z= 4	81.5	83.7	85.0
z= 5	76.2	78.8	80.4

Table I.II. Spreadsheets of the beam calibration performed by the Expert Team (continued)

Determination of the absorbed-dose-to-air chamber factor $N_{D,air}$ for a cylindrical chamber

Responsible physicist: Group experts Date: 10-Jul-97

1. Ionization chamber

Chamber model : NE 2505/3, 3B '74-present Serial no. 19

Cavity inner radius (mm):	3.15		
Wall material:	nylon 66	thickness (g/cm^2)	0.041
Buildup cap material:	PMMA	thickness (g/cm^2)	0.551
		total thickness	0.592
Central electrode:	aluminium		

2. Chamber calibration data

Calibration laboratory: SSDL Guatemala Date: 10-Nov-95

Calibration factor ref chamber (N_K/N_X; units) NK 8.677E-03 Gy/div

Calibration factor ref chamber (N_K): 8.677E-03 Gy/div

given at	Pressure, P_o	101.3 kPa
	Temperature, T_o	20.0 °C
	Relative humidity	50.0 %
	Polarizing volt	-250.0 V
	Field size	10 x 10 cm x cm
	Source-chamber dist	85.0 cm

3. Constants and factors

$k_{att}\,k_m$ =	0.965	
W/e =	33.97	
1-g =	0.997	(for Co-60 gamma radiation)

4. Absorbed dose to air chamber factor

Calibration factor ref chamber ($N_{D,air}$): 8.348E-3 Gy/div

given at	Pressure, P_o	101.3 kPa
	Temperature, T_o	20.0 °C
	Relative humidity	50.0 %
	Polarizing volt	-250.0 V

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able I.II. Spreadsheets of the beam calibration performed by the Expert Team (continued)

Determination of the absorbed dose to water in a Co-60 beam

Responsible physicist: *Group experts* Date: 10-Jul-97

1. Radiation treatment unit and referedive conditions for Dw determination

Co-60 unit *ALCYONII*

Reference phantom: water
Reference field size: 10x10 cm x cm at S.S.D. = 80 cm
Depth in water of the center of the chamber, z(ctr) = 5.0 cm
The shift of the effective point of measurent is 0.6 r
Reference depth in water of the P_{eff} of the chamber, z_{ref} = 4.8 cm

2. Ionization chamber

Chamber model NE 2505/3, 3B '74-present Serial no. 19
Wall material: nylon 66 thickness (g/cm^2) 0.041
Central electrode: aluminium

Electrometer model : NE 2502 Serial no. 10261

Absorbed dose to air ch factor $N_{D,air}$ (Gy/div)= **8.348E-3**
given at P_o 101.3 kPa
T_o 20.0 °C
R.H. 50.0 %
Polarizing volt -250.0 V

3. Electrometer reading correction

All readings should be corrected for leakage

Pressure, P (kPa) 88.6 p_{TP} = 1.151
Temperature, T (°C) 22 M_o = 121.84 div/min
Recombination correction (continuous radiation; fig 13) p_s = 1.000
Average of chamber readings (div/min) M_u = 140.25

4. Absorbed dose to water

Stopping-power ratio, water/air (Table XIII): $s_{w,air}$ = 1.133
Perturbation factor (eq (25), Tables XX, XXI) p_{wall} = 1.009

α = 0.386
$s_{wall,air}$ = 1.142
$(\mu_{en}/\rho)_{w,wall}$ = 1.015

Central electrode correction = p_{cel} = 1.000

$D_w(z_{ref})$ = 1.3384 Gy/min
$D_w(z_{max})$ = 1.6787 Gy/min (%DD zref)= 79.726

%DD Co-60 10x10

	SSD	60	80	100
z=	4	81.5	83.7	85.0
z=	5	76.2	78.8	80.4

Table I.II. Spreadsheets of the beam calibration performed by the Expert Team (continued)

TABLE I.III

CONTROL DE CALIDAD DE LA UNIDAD ALCYON CGR II

Funcionarios que efectuaron las mediciones:
Ing. Luis Bermúdez J. M.S.
M.Sc. Hugo Marenco Z. C.C.S.S.
Ing. Ronald Pacheco J. M.S.

❶ Retículo en el eje del colimador ***Tolerancia: ± 1 mm***

☒ Poner colimador al horizontal

☒ Encender el sistema de simulación luminosa

☒ Rotar el colimador 360°

La proyección permanece inmóvil sobre un plano situado a 80 cm de la fuente?

☒ Si ☐ No

❷ Verificación del isocentro ***Tolerancia: 2 mm***

☒ Rotación del colimador: ángulo de origen

☒ Poner un campo de 30 cm x 30 cm

☒ Con un objeto puntiforme buscar la posición del eje de rotación.

Anotar las distancias entre la cruz y el isocentro en las cuatro posiciones.

0°	90°
0	0.5
180°	270°
0	0

Se encuentra la rotación del isocentro dentro del margen de tolerancia?

☒ Si ☐ No

❸ Telémetro ***Tolerancia: 2 mm entre:***
DSA - 4 y DSA + 80cm

☒ Colimador a 0°

☐

X Brazo a 0°

DSA = 70 cm (25 cm de la cruz)	DSA = 80 cm (35 cm de la cruz)	DSA = 90 cm (45 cm de la cruz)
Telem.: 70 cm	Telem.: 80 cm	Telem.: 90 cm
Dist. real: 69.6 cm	Dist. real: 80 cm	Dist. real: 90 cm
No aceptable	**Aceptable**	**Aceptable**

❶ Verificación de correspondencia entre las dimensiones del campo luminoso y las dimensiones medidas a 80 cm.

Tolerancia: ± 2 mm

[X] Rotación del colimador a 0°

[X] Brazo a 0°

[X] Plano a DSA = 80 cm, papel milimétrico de por lo menos 35 cm x 35 cm

CAMPO COLOCADO		DIMENSIONES DEL CAMPO LUMINOSO			
Barra X	**Barra Y**	**Barra X**		**Barra Y**	
			Error		Error
5.0	5.0	4.5	0.5	4.8	0.2
10.0	10.0	10.0	0.0	10.0	0.0
15.0	15.0	15.0	0.0	15.0	0.0
20.0	20.0	20.0	0.0	20.0	0.0
25.0	25.0	25.0	0.0	25.0	0.0
30.0	30.0	30.0	0.0	30.0	0.0

Se encuentra dentro de la tolerancia?

[X] Si [ ] No

❺ Verificación de coincidencia del haz de luz con el haz de radiación (placa de control)

[X] Colocar un campo luminoso de 10 cm x 10 cm.

[X] Brazo a 0°

[X] Plano a DSA = 80 cm, sobre una placa radiográfica para cobalto.

[X] Marcar con alfiler las puntas del campo sobre la patalla.

[X] Colocar lámina de acrilico de 3 mm sobre la placa e irradiar 0.1 min.

Num	Dd	Site	FS	Fields	cGy Pd	FX<	Depth	cGy d>	FX>	cGy D	cGy dM<	cGy DM>	Comments
1		Post Axilla	12x12	1	200	0	7	310	4	1240	292	1810 4	
2		Larynx	18x13	2	100	0	6	155	6	930			2f-day
2		Neck	22x8	1	200	0	3	310	6	1860	230	2139	
4		Pelvis	18x16	2	200	0	9	310	12	3720			2f.day isoc
6	yes	Pelvis	15x15	2	200	0	8.5	310	5	1550			2f-day isoc
8		Lat pelvis	12x7	2	200	-	16	310	5	1550	552		
8		Pelvis	15x15	2	200	20	10	310	5	5550	342		
10		Pelvis	15x15	2	200	0	10	310	6	1860	343		
11	yes	Costal	9x4	1	400	0	0.5	620	5	3100	400	3100	prev. breast irrad.
12		Neck	8x9	2	200	0	4,5	310	12	3720			2f-day
13		Pelvis	15x15	2	200	0	10.5	310	8	2480	354		
13		Lat pelvis	12x10	2	267	5	16	413.85	0	1335			2f-day
14		Femur	31x12	2	200	0	6,5	310	4		270		After calib.correct
14		Spine	11x6	1	300	0	6	465	10		413		After calib Correct
15	?	Pelvis	14x14	2	200	9	10	310	6	3660	343		
16	yes	Mediast	17x14	2	200	0	9	310	4	1240	327		
16		Inverted Y	24x18	2	150	0	10	232.5	9	2092.5	247		
17		Foot	16x7	2	200	0	3.5	310	11	3410			
18	yes	Pelvis	15x15	2	200	0	11	310	12	3720	366	6807.6	
19		Shoulder	14x11	2	300	1	7	465	2	1230	429		
20		Oblig. latl L.	7x7	1	134	0	5	207.7	4	830 8			isoc
20		Oblig. post.	7x7	1	66	0	11	102.3	4	409 2			isoc
21		Pelvis	15x15	2	200	0	11	310	8	2480	366		
22	yes	Scrotum	16x14	1	200	0	4	310	10	3100	240		
23		Upper arm	21x10	2	200	0	4,5	310	13	4030	243		
24	yes	Neck	12x9	1	300	0	0.5	465	10	4650	305	4727.5	
25		Costal ribs	8x13	1	800	1	0 5	1240	4	5760	800	5760	
26		Neck	13x14	1	250	0	0,5	387 5	14	5425	250	5425	Deaf
26		Eye	5x6	1	250	0	0,5	387.5	14	5425	255	5534	
27	yes	Oesophagus	12x6	2	200	5	8.5	310	15	5650			2f-day iso
28	yes	Mediast	15x10	2	200	11	12	310	9	4990	404		
29		R Shoulder	15x8	1	400	0	5	620	5	3100	510	3953	
29	yes	Spine	19x7	1	300	0	5	465	3	1395	382	1776	
30	yes	L-spine	15x7	1	300	0	5	465	8	3720	382	4737	
31		Dorsal ribs	16x10	1	267	3	4	413.9	12	5767	318	6869	
32		Spine	12x6	1	400	0	4	620	5	3100	490	3798	
33	yes	Pelvis	19x17	2	300	0	8.5	465	10	4650	463		
34	yes	Pelvis	18x18	1	400	0	7	620	5	3100	565	4379	
35		Pelvis ant	8x8	1	200	0	8	310	20	6200	320	9920	
36		Spine	15x6	1	267	11	5	413.9	3	4179	340	5321	
37		Prostate	14x14	2	200	17	9	310	4	4640			
37		boost	8x8	r	200	0	6	310	12	3720			DMT(pros)=8200
38		Cranium	5x5	2	200	15	7	310	10	6100			
39		Inguinal	18x14	1	170	0	9	263.5	14	3689	270	5859	
40		Mediast	19x18	2	200	0	9	310	17	5270	296		
41		Post T11	19x6	1	250	0	5	387.5	15	5813	318	7394	DT(5)=5600
42		Parotid	6x10	2	200	0	4	310	23	7130			wpair2f-day
43	yes	Cranium	18x15	2	300	0	7	465	9	4185	416		
44		Pelvis	10x10	1	1000	0	0,5	1550	2	3100	1000	3100	
45		Pituitary	5x5	2	200	18	7	310	7	5770	311		
46	yes	Face	8x7	2	200	5	0	310	20	7200	266		
46		Neck	16x7	1	200	0	0.5	310	20	6200	204		
47		Pituitary	5x5	2	200	5	7	310	23	8130(*)	311		
48		Mediast	10x6	2	267	0	8	413.9	15	6208	425		
49		Esophagus	4x8	2	200	0	9	310	8	2480			2 fields per day
50		Ant neck	11x8	1	200	0	0,5	310	17	5270	204	5375	

Table I.IV. Patient dose data

(*) In this case, the dose obtained with the factor 1.55 differ significantly from the dose calculated from the recorded treatmetn time

Num	Dd	Site	FS	Fields	cGy Pd	FX<	Depth	cGy d>	FX>	cGy D	cGy dM<	cGy DM>	Comments
51		Pelvis	15x15	2	200	9	11.5	310	10	4900			1 lat d=16,600cGy
52	yes	Tonsil	13x9	2	200	9	4	310	24	9240	242		
53		Pelvis	14x14	2	200	0	10.5	310	15	4650	354		
54	yes	Fosa	15x12	2	200	16	7	310	9	5990	283		
54		T-spine	31x16	1	200	0	4	310	15	4650	240	5580	
54		L-spine	19x6	1	200	0	5	310	15	4650	255	5929	
55		Neck	18x19	1	200	0	0,5	310	13	4030	200	4030	
56		Pelvis	14x14	2	200	1	9.5	310	11	3610			
57	yes	Abdomen	29x23	1	160	12	2	248	10	4400	170	4675	
58		Fosa post.	17x14	2	200	9	6.5	310	13	5830	274		
58		Spine	16x5	1	200	3	6	310	6	2460	276	3395	overlap?
58		Spine	33x5	1	200	3	6	310	6	2460	274	3370	
59	yes	Neck	12x20	1	200	0	0 5	310	20	6200	204	6324	cord dose?
60	yes	LFace Naso	13x8	1	44	0	7	68.2	24	1637			irrad same day
60		R Face	13x8	1	110	0	7	170.5	24	4092			
60		Ant Face	9x7	1	66	0	9	102.3	24	2455	115	4278	
60		Neck	25x10	1	200	0	0.5	310	24	7440	200	7440	
61	yes	Pelvis	15x15	2	200	0	9	310	9	2790	321		
61		R Tonsil	8x11	1	125	0	5	193.8	15	2906			2 fields-day
61		L. Tonsil	8x11	1	75	0	5	116.3	15	1744			
62		Pelvis	15x15	2	200	0	11	310	15	4650	366		
63	yes	pelvis	14x14	2	200	0	8.5	310	14	4340	311		
64		Pelvis	15x15	2	200	10	11.5	310	8	4480	378		
65	yes	L.Arm	20x10	1	500	0	0.5	775	5	3875	500	3875	
66		Mantle	16x16	2	200	0	10	310	11	3410	348		2-1ant
67	yes	Abdomen	31x22	2	200	0	9	310	16	4960			isocenter
68	yes	Pelvis	18x17	2	200	0	10	310	19	5890			2f/day iso
69		Hockey stick'+D28	14x14	1	200	12	7	310	13	6430	224	7202	Brachyplexis?
70		Parotid	15x9	1	200	5	3	310	20	7200	229	8244	
71	yes	Pelvis lat.	10x7	2	200	0	18	310	5	1550			5000 cgy appa prev.
72	yes	Thorax	15x19.5	2	300	0	11	465	10	4650			2fday isoc
73	yes	Pelvis ap.	15x15	2	200	9	8	310	16	6760			isocenter 1f/day
74		Pelvis ap.	20x26	2	200	10	10	310	11	5410			2f-day isoc
75		R Axilla	15x19	1	200	0	4	310	17	5270	239		
75		Forearm	13x6	1	200	0	5	310	7	2170			
76		Lat Thorax	19x4	2	200	0	13	310	7	2170			2f-d prev- 600
77		Pelvis ap.	15x14	2	200	7	9	310	18	6980			2f-day isoc
78		Pelvis ap.	15x15		200	9	10	310	16	6760			isoc
79		Pelvis ap	15x16	2	200	0	10	310	14	4340			2f-day iso
80		Lat naso	12x17	2	200	0	7	310	16	4960	219		
80		Neck	23x8	1	200	0	3	310	16	4960	230	5704	
81		R.Neck	10x10	1	77	12	6	119.4	8	1879			
81		L. Neck	10x10	1	33	12	6	51 15	8	805			prev tx
82	yes	Pelvis ap.	14x14	2	338	0	6.5	523.9	6	3143			isoc
83		Pelvis ap	16x20	2	200	5	9.5	310	20	7200			2f-day
83		Pelvis lat.	10x10	2	200	0	16	310	5	1550			2f-day
84	yes	AP Thorax	26x15	2	200	0	8.5	310	20	6200			2f-day isoc
85		Pelvis ap.	18x15	2	200	6	10	310	12	4920(*)			2f-day iso
86	yes	Mantle	32x35	2	200	0	10	310	14	4340			2f-day
87		T-spine	5x32	1	200	2	4	310	4	1640	240	1968	
87		L-spine	5x7	1	200	2	4	310	4	1640	247	2025	
88		Nasal	3x3	1	200	0	3	310	5	1550	236	1829	prev dose 5000
89		Pelvis ap.	16.5x15	2	200	0	10	310	11	3410			2f-day isoc
92	yes	Pelvis ap.	24x29	2	200	14	9	310	11	6210			1f-day isoc
94	yes	A Neck	21x5	1	200	0	3	310	15	4650	232	5394	
94		Lat neck	12x17	2	200	0	5.5	310	15	4650	256		

Table I.IV. Patient dose data

(*) In this case, the dose obtained with the factor 1.55 differs significantly from the dose calculated from the recorded treatmetn time

Num	Dd	Site	FS	Fields	cGy Pd	FX<	Depth	cGy d>	FX>	cGy D	cGy dM<	cGy DM>	Comments
95		Pelvis ap.	16x14	2	100	0	9	155	14	2170			iso
96	yes	Neck	14x21	1	200	3	3	310	14	4940	227	5607	
96		Anterior sinus	9.5x11	1	100	3	8	155	14	2470	156		
96		Lat. sinus	11x11	1	100	3	8	155	14	2470	153		
97		A.Neck	7x31	1	200	11	3	310	8	4680	230		
97		Naso lat	12x17	2	200	11	6	310	8	4680	270		
98		IMNodes	14x5	1	200	0	3	310	23	7130	230		
100		Pariet p	6x7	1	100	16		155	14	3770			wedge 2f day
100		Parit.lat	9x7	1	100	16		155	14	3770			
101		Forehead	6x8	2	143	24		221.7	6	4762			2 f day
102		Cranium	14x18	2	200	4	6,5	310	8	3280	274		
102		T-spine	28x5	1	200	0	5	310	6	1860	258	2399	
102		L-spine	14x15	1	200	0	5	310	6	1860	261	2427	
103		L Testis	4x4	1	200	9	0,5	310	2	2420	200	2420	
104	yes	R S'Clav	6x6	1	250	0	0.5	387.5	18	6975			
105		Cranium	10x17	2	200	2	7,75	310	16	5360	297		
105		L-spine	16x5	1	200	0	6	310	6	1860	279	2595	
105		T-spine	23x5	1	200	0	6	310	6	1860	276		
106		P.Fossa	15x12	2	200	13	6	310	12	6320	265		
106		Spine	33x5	1	200	0	4	310	10	3100	240	3720	
107	yes	Cranium	14x16	2	200	28	7,75	310	5	7150	270		
108	yes	L Hip	10x8	1	267	0	0.5	413.9	15	6208	267	6208	
109		Cranium	16x9	2	200	4	7	310	16	5760	282		
110	yes	L Cranium	16x18	2	200	7	7	310	6	3260	283		
111		Ant Lung	16x10	2	200	18	10	310	2	4220	362		
111		Lung	13x10	1	300	3	10	465	0	900	527	1581	
112	yes	Clitoris	5x5	1	300	0	0,5	465	11	5115	300		
112		Pelvis	14x14	1	200	0	9.5	310	5	1550	331		
113	yes	neck	11x17	1	600	0	0.5	930	5	4650			
113		Arm	8x7	1	600	0	0 5	930	5	4650			
113		Abdom p	10x4	1	400	0	0.5	620	3	1860			
113		Abdom p	12x4	1	600	0	0.5	930	5	4650			
114	yes	Spine	15x12	1	300	6	5	465	2	2730		0	
114		¿	5x5	1	300	0	0.5	465	5	2325		0	
115		L-spine	18x6	1	300	0	5	465	10	4650	382	5921	
115		T-spine	20x5	1	300	0	5	465	10	4650	388	6014	
116	yes	Pelvis	17x17	2	100	0	10	155	2		110		
117		Pelvis	16x15	2	100	0	9		3				2f day

Table I.IV. Patient dose data

Num	Dd	Site	FS	Fields	cGy Pd	FX<	cGy D<	cm Depth	cm x cm EqFS	FSF	DD or TAR	min time	cGy d>	FX>	cGy D>	cGy D	cGy Dose organ	Critical organ Critical organ
8		Lat pelvis	12x7	2	200	-	0	16	8 8	0.988	0.359	4.3	303 3	5	1516	1516.3		
8		Pelvis	15x15	2	200	20	4000	10	15	1.035	0.592	2.6	311.4	5	1557	5557.1		
26		Neck	13x14	1	250	0	0	0,5	13.5	1 025	1	1.9	387.7	14	5428	5427.7	4179	Cervical spine
26		Eye	5x6	1	250	0	0	0,5	5.5	0.947	1	2 1	395.5	14	5537	5537.1		Eye (with lead block)
26		Ear															8500	Ear dose due to overlap
39		Inguinal	18x14	1	170	0	0	9	16	1 04	0.631	2	259 9	14	3638	3637.9	5800	Inguinal vessels
40		Medlast.	19x18	2	200	0	0	9	18 5	1.048	0.638	2.3	300 3	17	5105	5105 4	5105/5105	T spine/heart
41		T spine- L spine	19x6	1	250	0	0	5	8.9	0.99	0 783	2.5	381 8	15	5727	5726 6	4349	T and L spine
44		Pelvis	10x10	1	1000	0	0	0,5	10	1	1	7 9	1548.4	2	3097	3096 8	2500/1220	Gut, bladder, rectum
47		Pituitary	5x5	2	200	5	1000	7	5	0.94	0.647	2.1	251.6	23	5787	6786.9	6787 to both	Eye nerve/ ears
58		Fosa post.	17x14	2	200	9	1800	6.5	15.3	1.037	0 74	2 1	311.4	13	4048	5848.4	5848	Cerebellum
58		L Spine	16x5	1	200	3	600	6	7.6	0 987	0.722	2.2	310.3	6	1862	2461.5	2462	L spine
58		Spine	33x5	1	200	3	600	6	8.3	0 985	0 727	2.1	301.9	6	1811	2411.3	2411	T spine
62		Pelvis	15x15	2	200	0	0	11	15	1.036	0 553	2.6	290.1	15	4351	4351	4351	Gut, bladder, rectum
78		Pelvis ap.	15x15	2	200	9	1800	10	15	1.035	0 779	2	324.0	16	5184	6984 3	6984 to all3	Gut, bladder, rectum
80		Lat naso	12x17	2	200	0	0	7	13.7	1.03	0.708	1.1	321 8	16	5149	5148 8	5149	Cervical spine
80		Neck	23x8	1	200	0	0	3	11.4	1.06	0.891	1 8	327.5	16	5239	5239 4		Spine block
85		Pelvis ap.	18x15	2	200	6	1200	8 5	16.3	1.04	0.853	1 1	395.0	12	4740	5939 6	5940	Gut, bladder, rectum
97		A.Neck	7x31	1	200	11	2200	3	10	1	0.887	1 8	307.5	8	2460	4660 3		
105		Cranium	10x17	2	200	2	400	7.75	12 4	1.02	0.658	2 2	290.9	16	4654	5054 1	5054	Brain and cerebellum
105		Colum dorsal	23x5	1	200	0	0	6	8	0.983	0.726	2.2	310 7	6	1864	1864.2	1864	Spine
105		Colum lumbar	16x5	1	200	0	0	6	7 6	0.98	0.723	2.3	316 9	6				
106		P.Fossa	15x12	2	200	13	2600	6	13 3	1.023	0.751	2	302 7	12	3632	6232.4	6232	Cerebellum
106		Spine	33x5	1	200	0	0	4	8 3	0.983	0.822	1.9	299 3	10	2993	2992.6	2993	Whole spine
109		Cranium	16x19	2	200	4	800	7	17.3	1 044	0.7255	2.1	313 3	16	5014	5813 5	5814	Brain and cerebellum

Table I.VI Dose to organs at risk for selected patients

Patient No.	Gy d<	FX<	Gy D<	Gy d>	FX>	Gy D>	Gy D	Gy alpha/beta	tissue	Gy BED	Gy D(2.0)	
44	0	0	0	15.5	2	31.0	31.0	3	skin	191.2	114.70	
44	0	0	0	12.5	2	25.0	25.0	5	bowel	87.5	62.50	
47	2	5	10	2.5	23	57.7	67.7	2	brain	150.2	75.09	
54	2	16	32	3.0	9	27.0	59.0	2	brain	131.5	65.75	
54	2	0	0	3.5	15	52.1	52.1	2	t-spinal cord	142.4	71.18	
83	2	5	10	3.1	20	62.0	72.0	5	bowel	114.4	81.74	total
83	0	0	0	3.3	5	16.6	16.6	5	bowel	27.6	19.73	101.5
109	2	4	8	3.1	16	50.1	58.1	2	brain	144.5	72.23	

Table I.VI Biologically equivalent dose, D(2 Gy) in 2 Gy fractions

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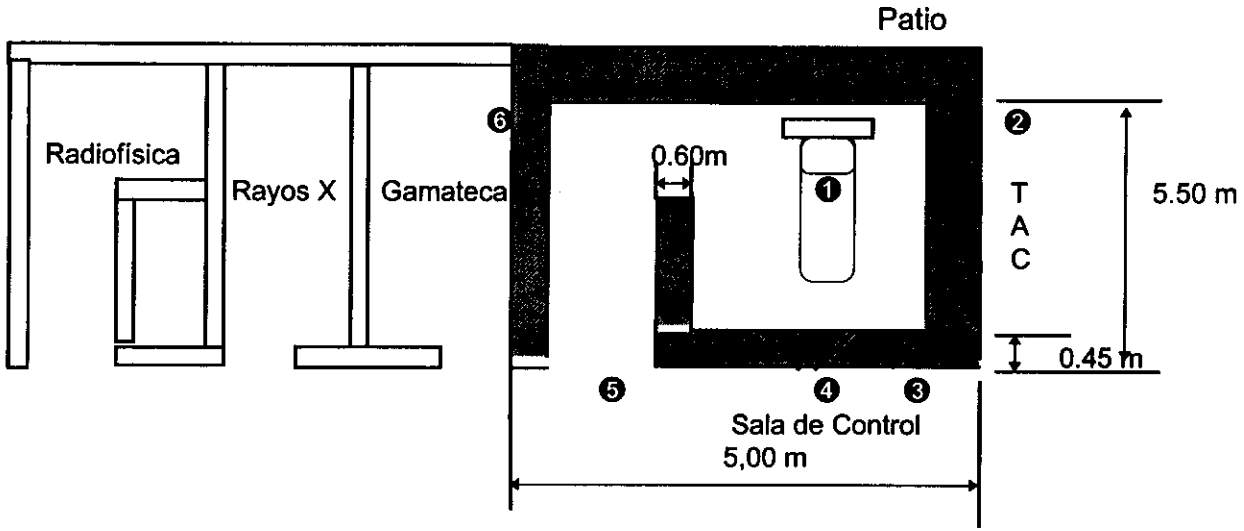
DIAGRAMA DE SALA
ALCYON CGR II



LEVANTAMIENTO RADIOMETRICO
mSv/h

❶ ☆	❷	❸	❹	❺	❻
4	0.02	0.015	0.00	0.02	0.25

Notas:
Lecturas con colimador abierto a campo de 30 cmx 30 cm sin maniquí ni paciente (Haz directo)
☆ Lectura sobre el techo a altura de gónadas
Figure I.1