

AE-253

UDC 614.876:  
614.83

AE-253

Report on the Personnel Dosimetry at  
AB Atomenergi during 1965

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AKTIEBOLAGET ATOMENERGI

STOCKHOLM, SWEDEN 1966



REPORT ON THE PERSONNEL DOSIMETRY AT  
AB ATOMENERGI DURING 1965

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SUMMARY

This report presents the results of the personnel dosimetry at AB Atomenergi during 1965.

No doses exceeding the recommendations of ICRP were reported.

For AB Atomenergi the average external total body dose during the year was 60 mrem which corresponds to 89.4 manrem.

31200 gamma films and 5850 neutron films were evaluated. 2067 urine analyses and 692 measurements of body activity were made.

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## 1. INTRODUCTION

The dosimeters used and the general lines on which the personnel dosimetry in the company is run have been described in earlier AE-reports (AE-126, AE-147 and AE-211). Most of the previous descriptions apply also to 1965.

## 2. EXTENT OF DOSIMETRY IN THE COMPANY

Personnel dosimetry was run at company establishments in the following places during 1965:

Stockholm, Studsvik and Ägesta.

In Stockholm there are a reactor (R1), a uranium refinery plant, and fuel element factory and active laboratories.

The research station at Studsvik had during 1965 four reactors (R0, R2, R2-0 and FR-0), one Van de Graaff generator, laboratories for active metallurgy, an isotope production centre, a plant for disposal of active waste, a central hot laboratory and a number of other active laboratories.

At the Ägesta Heat and Power Station (65 MWth) there is a heavy water reactor (R3) with workshop, laboratory and waste systems necessary for the operation.

The following abbreviations are used in the tables and diagrams for the different sections of the company:

FFD = Group for Operation of Critical Facilities  
RMA = Hot Laboratory for Fuel Elements  
RMB = Section for Fuel Elements  
SIT = Section for Isotope Service  
SSD = Section for Operation of R2  
SSH = Group for Operation of R1  
SSS = Section for Health and Safety  
SSL = Section for Operation of Laboratories  
STV = Workshop Studsvik

## 3. RESULTS

During 1965 there has not been any exposure exceeding the norms recommended by ICRP. 31200 gamma films and 5850 neutron

films were developed and evaluated in the company. 2067 urine analyses and 692 measurements of body activity were made. The number of employees at AB Atomenergi was about 1500. The total amount of measured and reported whole body exposures ( $\geq 100$  mrem/quarter) during 1965 was 89.4 manrem which, distributed over the whole personnel of the company, is equivalent to an average dose of about 60 mrem/year and person, or about 1 % of the maximum permissible dose. Detailed figures for 1965 are given in the following tables and diagrams.

REFERENCE

DEVELL, L., VENNER, L. and MANDAHL, B.,  
Monitoring for Internal Contamination of Nuclear Energy Personnel.  
Acta Radiol. Suppl. 254 (1966) p. 111

TABLE 1

Number of evaluated films, urine analyses and whole body measurements during 1965

Gamma films	31200
Neutron films	5850
Urine analyses	2067
Whole body measurements	692



TABLE 2

Number of reported persons and mean dose for these persons

Quarter	Whole company				Stockholm				Studsvik				Ågesta			
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Number of persons	80	76	75	71	33	21	21	32	43	55	54	39	4	0	-	-
Mean dose in mrem	275	240	347	325	183	202	292	326	360	255	368	324	129	0	-	-

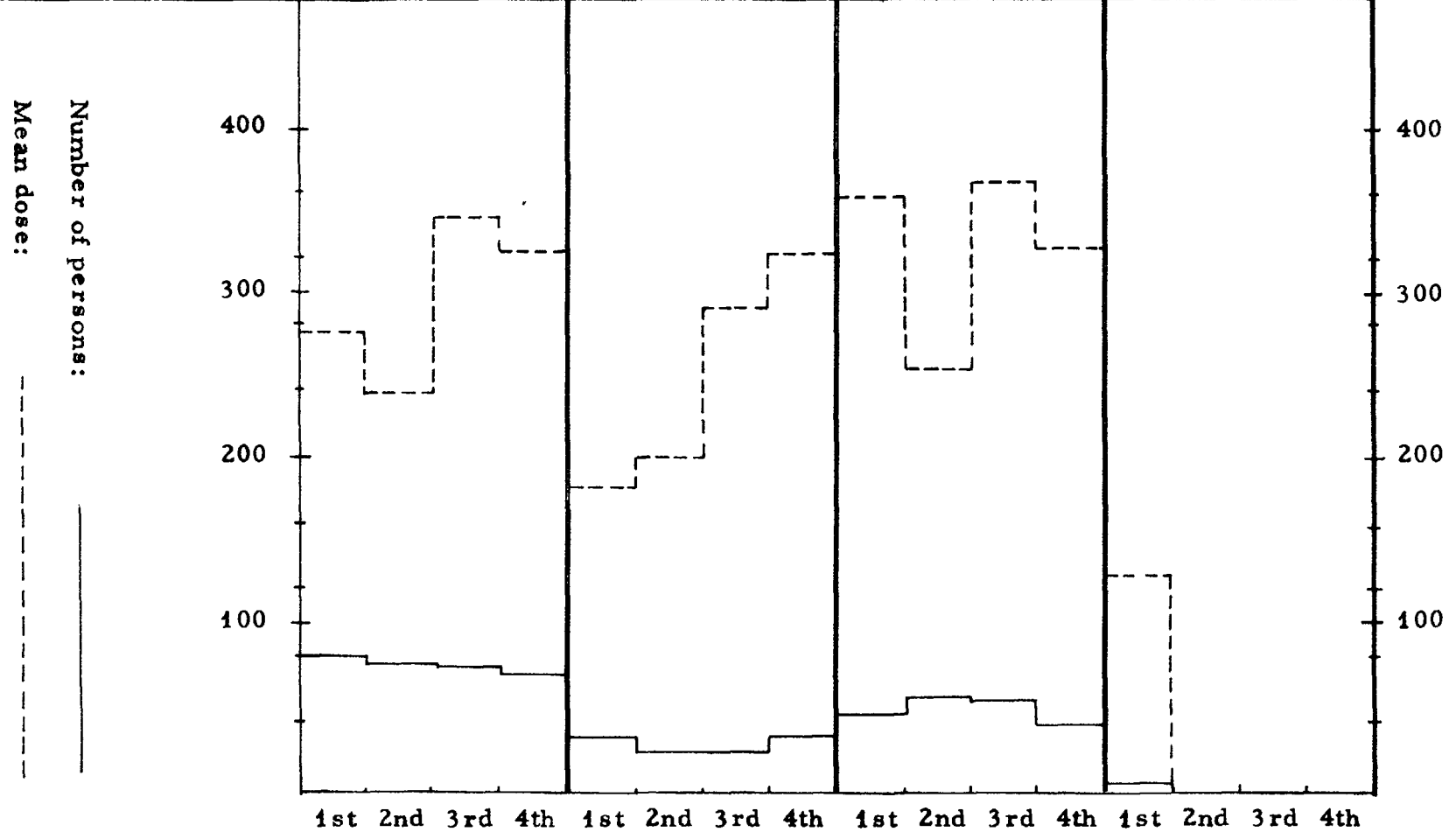


TABLE 3

Number of reported exposures during 1965 with quarterly dose  $\geq$  100 mrem.

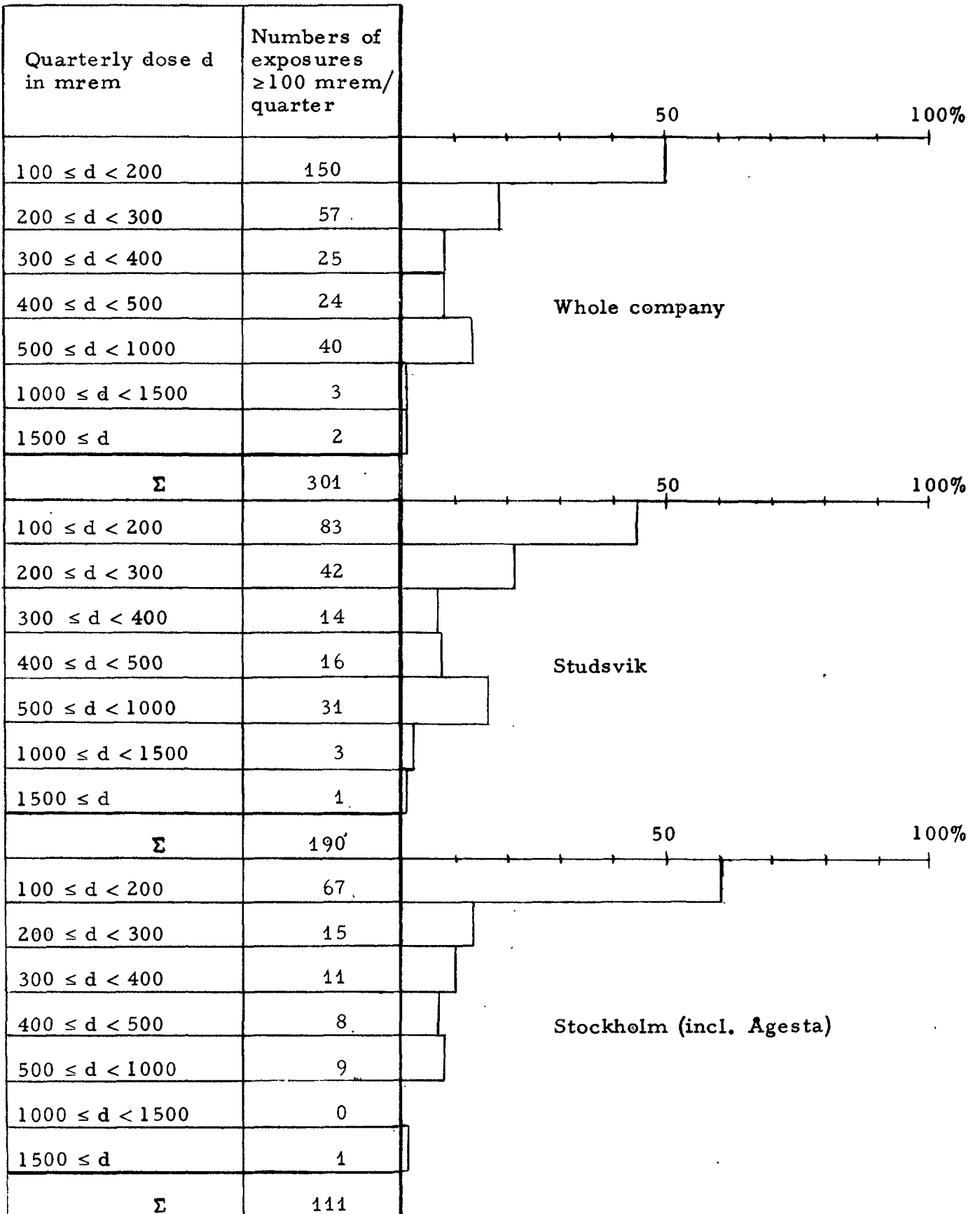
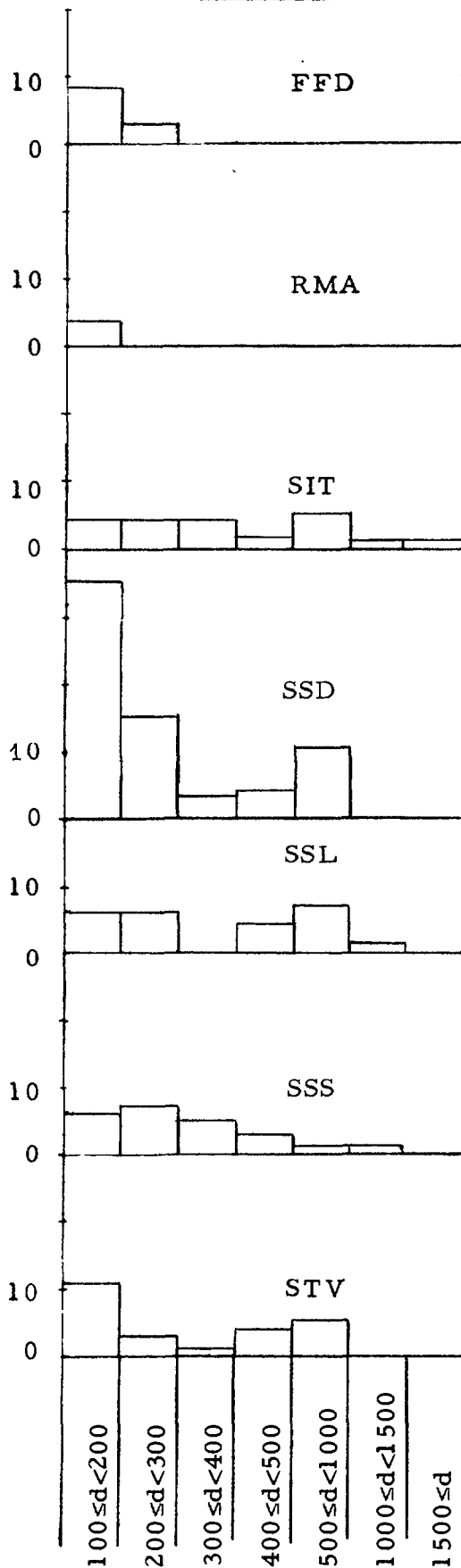


TABLE 4

Number of reported exposures (quarterly dose  $\geq 100$  mrem) in different working areas.

Number of reported exposures

Studsvik



Number of reported exposures

Stockholm

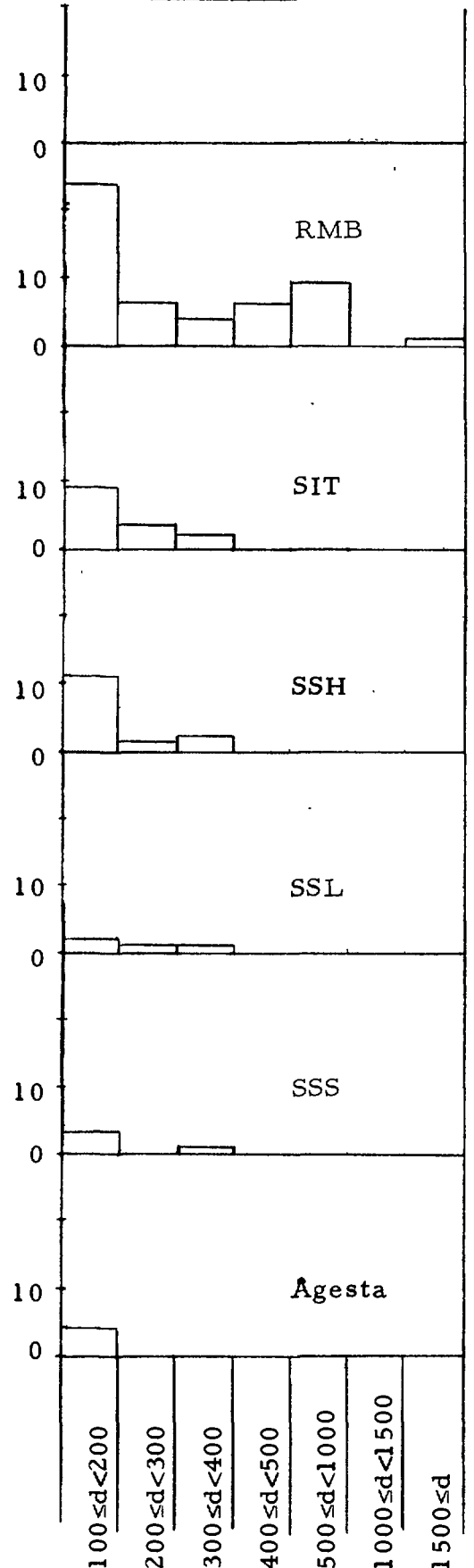


TABLE 5

Summary of the yearly doses during 1965

Yearly dose D in mrem	Whole company		Studsvik		Stockholm (incl. Agesta)		D in % of max. permissible dose
	Number of persons	%	Number of persons	%	Number of persons	%	
D < 500	120	69	52	78	68	64	D < 10 %
500 ≤ D < 1500	43	25	13	19	30	28	10 % ≤ D < 30 %
1500 ≤ D < 5000	10	6	2	3	8	8	30 % ≤ D < 100 %
5000 ≤ D	0	0	0	0	0	0	
	173		67		106		

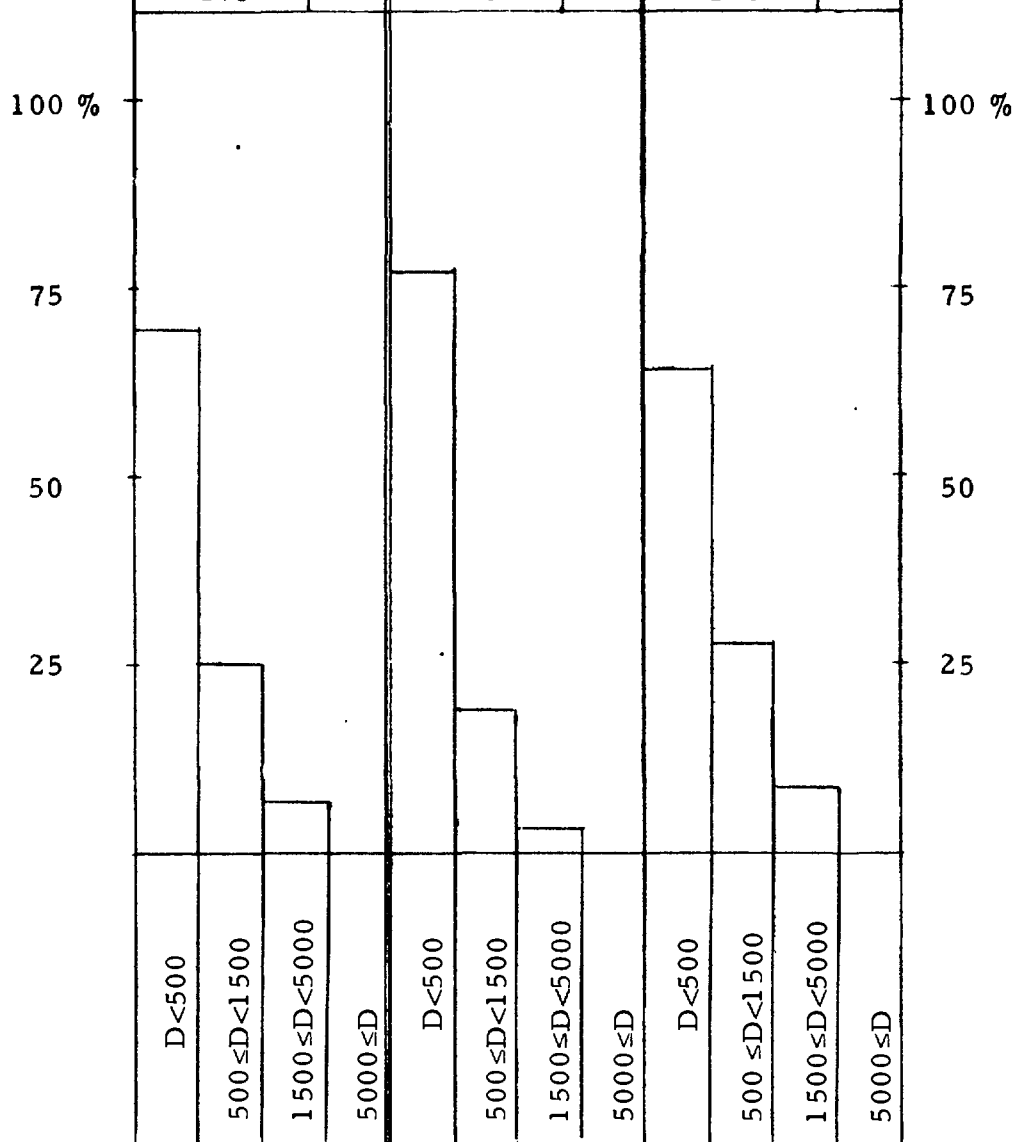


TABLE 6

The AE part of the genetic dose (external dose) in the Swedish population. (Population 8 millions. Normal background exposure assumed to be 0.3 R/year and person.)

Year	Manrem	Additional dose in % of nat. background
1961	61.7	$2.7 \cdot 10^{-3}$
1962	74.2	$3.3 \cdot 10^{-3}$
1963	64.2	$2.9 \cdot 10^{-3}$
1964	51.5	$2.1 \cdot 10^{-3}$
1965	89.4	$3.7 \cdot 10^{-3}$

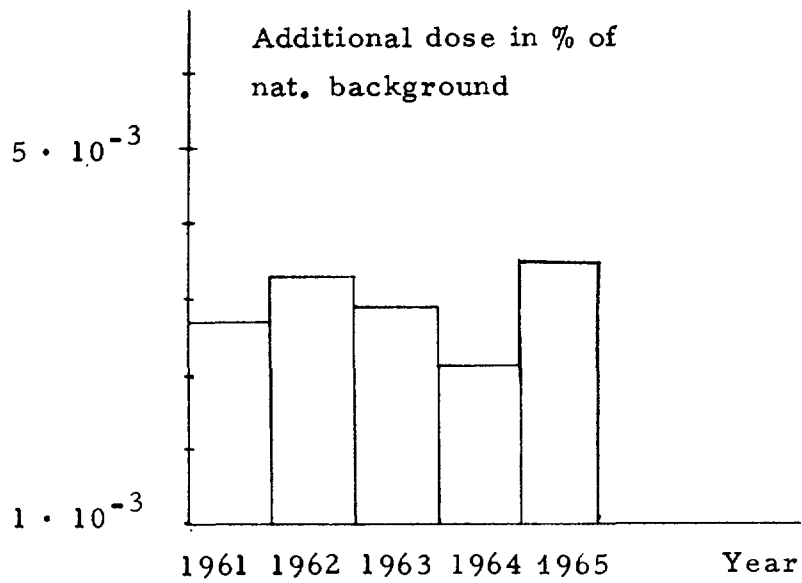


TABLE 7

Biological monitoring. Urine analyses

	<u>Studsvik</u>	<u>Stockholm</u>	<u>Ågesta</u>	<u>Σ</u>
Tritium	161	0	199 <sup>x)</sup>	360
Gross α	1	12		13
Phosphate β		5		5
Plutonium	116			116
Uranium	3	1574		1577
Σ	281	1591	199	2071

x) From 1.1.65 - 30.6.65

TABLE 8

Number of whole body measurements 1965 with abnormal body radioactivity. The results have been divided into the two categories acute/routine, depending on whether they were incidents or regular checks.

Nuclide	Number of measurements	Number of measurements divided into type of work and per cent of reference level														
		Research reactors			Production of radionuclides			Chemistry and Metallurgy			Decontamination and Waste			Other activities		
		< 1 %	1-10 %	10-100 %	< 1 %	1-10 %	10-100 %	< 1 %	1-10 %	10-100 %	< 1 %	1-10 %	10-100 %	< 1 %	1-10 %	10-100 %
Na22	2				/1									/1		
Na24	6	2/			/4											
Cl38	2	2/														
Ar41	2	2/														
Sc46	13	1/			/8	/3					/1					
Cr51	5	2/1			/1						/1					
Mn54	1				/1											
Co58	13	2/1			1/			/4			/2			/3		
Fe59	4				/1			1/2								
Co60	90	5/6			4/29	/2		/3			/24			15/2		
Zn65	48	3/8			1/27			/1			/6			/2		
Br82	5				/5											
Kr82 <sup>m</sup>	1	1/														
Zr95	9	1/			1/2			/5								
Ru109	1	/1														
I131	34	/1			/8	/18	/2	/2			/1	/1		/1		
I133	2	1/									1/					
Xe133	3	2/									1/					
Gd159	2	1/									1/					
Yb175	1				1/											
Au198	2				/2											
Hg203	2	/1									/1					

NuclideT<sub>eff</sub> < 4 days or f<sub>1</sub>\* < 0.014 days < T<sub>eff</sub> < 13 weeksT<sub>eff</sub> > 13 weeks\* f<sub>1</sub> = fraction from GI tract to bloodReference level

Maximum permissible quarterly intake according to ICRP 1959 and 1962 (the lowest quoted figure)

Maximum permissible quarterly dose

MPBB







LIST OF PUBLISHED AE-REPORTS

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