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Radiological consequences of radionuclide releases to sewage systems from hospitals in Sweden

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Swedish Radiation Protection Authority

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TITLE / TITEL: Radiological consequences of radionuclide releases to sewage systems from hospitals in Sweden. / Radiologiska konsekvenser av utsläpp av radioaktiva ämnen från sjukhus till avloppssystem i Sverige.

DEPARTMENT / AVDELNING: Department Nuclear Facilities & Waste Management/ Avdelningen för kärnteknik och avfall.

SUMMARY: The report addresses radioactive discharges to sewers originating from hospitals, mainly in the form of the excretion of patients treated with radioisotopes for diagnostic or therapeutic purposes. Assessments of doses to the public, including sewage workers, arising from such discharges are performed. Doses are compared against the exemption level of 10 µSv/a and the dose constraint of 100 µSv/a.

As a basis for the dose assessments, information on the use of radionuclides in Swedish hospitals during the period 1999-2004 is presented and estimates of discharges to the sewage systems are derived. Current sewage treatment practices in Sweden are summarised focusing particularly on the fate of sewage sludge, both in the sewage plant and outside.

Radiological impact assessments are performed in two steps. The assessments in the first stage are performed using a simple screening model, not intending to predict exposures realistically but only to identify exposure pathways and radionuclides that are potentially relevant and require further consideration in the more detailed assessments. Results show that only a few of those radionuclides used in the period 1999-2004 in Swedish hospitals for radiotherapy and radiodiagnostics could lead to potentially significant doses (P-32, Y-90, Tc-99m, In-111, I-123, I-131 and Tl-201). Relevant exposure pathways are the external exposure of sewage workers (for Tc-99m, I-123, I-131, In-111 and Tl-201) and the exposure of the public via ingestion of water (I-131) and fish (P-32, Y-90 and In-111 and I-131).

The objective of the second stage is to perform realistic assessments of the doses to sewage workers and to the public through the use of contaminated agricultural sludge and through the contamination of drinking water. For this purpose, the LUCIA model was developed. This model dynamically addresses the behaviour of radionuclides in the different process steps of a sewage plant. The model can address continuous releases as well as pulse releases of radionuclides.

In a first step of applying the LUCIA model, realistic assessments of the external exposure of sewage workers and of exposures of the public are carried out for the Kungsängsverket sewage plant in Uppsala. The results show that there is a significant probability (from 0.2 to close to 1) for the doses to exceed the exemption level for the radionuclides In-111 and I-131. In the case of In-111, there is also a significant probability (from 0.16 to close to 1) for the doses to exceed the dose constraint (100 µSv/a).

A sensitivity study of the LUCIA model is performed, showing that the predicted concentrations in the digested sludge are highly sensitive to the distribution coefficient Kd between the liquid phase and the sludge. The efficiency of the wastewater treatment is, in addition, highly sensitive to the water flux. Specific values for the distribution coefficients for sludge are not available. Therefore, it is recommended to perform measurements for the determination of this parameter. The LUCIA model can then be used to interpret the measurements and derive values for the distribution coefficients.

In a second step, the LUCIA model is extended to also address doses to the public. Dose estimates for all exposure pathways are presented for all sewage plants that are affected by radionuclide releases originating from hospitals.

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Effective dose factors are derived for the affected sewage plants, relating doses over the different pathways to the activity that is discharged annually and to the activity concentration in the wastewater. These effective dose factors can be used in order to estimate exposures associated with a certain release of activity in cases of changes of the annually administered activities of the different radionuclides. These factors also can be used if the effects of measures are to be evaluated to reduce the releases of individual radionuclides.

SAMMANFATTNING: Rapporten handlar om vilka radiologiska konsekvenser som kan uppkomma till följd av utsläpp av radiofarmaka från sjukhus till kommunala reningsverk. Stråldoser har beräknats till såväl allmänhet som arbetstagare i reningsverken och resultaten har jämförts med två olika dosnivåer, 10 µSv/år och 100 µSv/år.

Informationen om användning av radiofarmaka på de svenska sjukhusen under perioden 1999-2004 har använts som underlag till dosbedömningarna. Likaså har en kartläggning av de reningsprocesser som idag tillämpas vid de kommunala reningsverken genomförts inom projektet, och som sammanfattas i rapporten.

Dosbedömningarna utfördes i två omgångar där en enkel screeningsmodell utnyttjades först för att identifiera vilka exponeringsvägar och radioaktiva ämnen som kan vara relevanta ur dos/risk synpunkt när det gäller hantering av flytande radioaktivt avfall från de svenska sjukhusen. Resultaten visade att de radioaktiva ämnena P-32, Y-90, Tc-99m, In-111, I-123, I-131, In-111 och TI-201 som används inom strålterapi och diagnostik kunde ge upphov till stråldoser som översteg den lägre undersökningsgränsen på 10µSv/år och i vissa fall även den högre gränsen på 100 µSv/år. De viktigaste exponeringsvägarna var extern exponering av arbetare i reningsverken och exponering till allmänhet via intag av vatten och fisk.

En modell, LUCIA, utvecklades för att genomföra mer realistiska dosbestämningar till personal på reningsverken. Denna modell belyser de olika radionuklidernas uppträdande i de olika processerna i reningsverken. Modellen kan hantera pulsformiga utsläpp om sker från de patienter som genomgår nukleärmedicinsk behandling vi sjukhusen.

LUCIA modellen verifierades genom att doser till personalen och till allmänhet vid ett reningsverk (Kungsängsverket i Uppsala) bestämdes. Resultaten visade att det förelåg en signifikant sannolikhet att stråldoserna för utsläpp av de radioaktiva ämnena In-111 och I-131 kommer att överskrida 10µSv/år. När det gäller In-111, fanns också en signifikant sannolikhet att doserna överskred 100 µSv/år.

Den känslighetsanalys som redovisas i rapporten visade att de uppskattade aktivitetskoncentrationerna i slam är mest känsliga för distributionen av aktivitet (Kd) för respektive radionuklid mellan vatten och slam i reningsverket. För vissa radionuklider (In-111) är denna fördelning okänd.

I rapporten redovisas dosfaktorer för alla exponeringsvägar för samtliga reningsverk som berörs av utsläppen från sjukhusen, beräknade med hjälp av LUCIA modellen. Dessa värden kan användas som referensnivåer för att uppskatta exponeringar associerade med olika typer av utsläpp.

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1 Introduction

The current Swedish regulations on handling and disposal of medical radioactive waste from hospitals and research institutions were issued in 1983 and are to large extent based on the recommendations of ICRP 26 from 1977. The ALI[1] concept as defined in ICRP 26 was introduced for limiting the release of radioactive waste. The ALI values are based on an annual dose limit of 50 mSv to workers and calculated as the (committed) equivalent dose in any tissue and year.

It was at that time considered that the main exposure pathways associated with the disposal of liquid radioactive waste were the possibility to inhale or ingest radioactive material, because external exposures could be controlled by limiting the dose rate at the surface of radioactive waste packages. Since it was assumed that only very small fractions of the released activity could be inhaled or ingested in one event, the limiting amount of activity of 1 ALI was chosen. In the regulations, the most restrictive ALI for each radionuclide was chosen (ALI_{min}) as the limiting value and 10 ALI_{min} per month from one practitioner were decided to be acceptable. The ALI_{min} concept has also proved to be a simple tool for regulating other types of medical radioactive waste from hospitals and research institutions

It was known that releases of activity with the excreta from patients undergoing treatment in nuclear medicine were higher than the ALI_{min} values. Nevertheless, these were exempted from the regulations. This was done based on the demonstration by measurements and calculations that the doses from intake for sewage workers are minimal. Also, calculations revealed very low doses to members of the public from liquid discharges. In addition, the exemption of excreta from patients took account of the fact that such releases cannot be easily monitored and controlled. In ICRP 60, the ALI concept has been superseded by dose conversion factors for workers as well as members of the public, encompassing several age groups. This was regarded as more advantageous since dose limits may change over time. This change is not yet reflected in the existing Swedish regulations.

The radionuclides released to sewers from nuclear medicine are predominantly Tc-99m (more than 50 %), followed by I-131. Studies have been undertaken to measure radioiodine activity at two sewage treatment plants in south of Sweden receiving radioactive disposals from large hospitals. The concentration of various radionuclides has been measured in the incoming and the outgoing water, and in the sludge (Erlandsson *et al.* 1978, 1979; Ingemansson *et al.* 1981). These studies show that the release from the hospitals enters the wastewater treatment plant as a pulse after a delay of some hours. Furthermore, it has been confirmed that a certain fraction of the radionuclides is bound to sewage sludge, while others follow the water phase. The percentage bound to the sludge depends on the type of radionuclide and on the chemical environment.

1.1 Objectives of the study

The objective of the study reported here is to perform an assessment of doses to the public, including sewage workers, which arise from liquid discharges from hospitals, mainly from patients. The results of this assessment are intended to provide supporting information to be used during the revision of the regulations. In this respect, an objective of particular interest is to identity releases and exposure pathways, which could lead to doses above the exemption level of 10 µSv/a, since these situations would require some kind of regulatory control.

One of the specific objectives of the study is to collate information on the use of radionuclides at Swedish hospitals in the period 1999-2004 and to make estimations of discharges to the sewage system (Section 2). Another specific objective is to review the current sewage treatment practises in

[1] Annual limit of intake

Sweden focusing particularly on the fate of sewage sludge, both in the sewage plant and outside (Section 3).

It was decided to perform the assessment of the radiological impact of the discharges in three stages:

- The assessments of the first stage (Section 4) are performed using a simple screening model. The intention is not to realistically predict exposures, but to identify those exposure pathways and radionuclides which are potentially relevant and require further consideration in the more detailed modelling.

- The objective of the second stage is to perform realistic assessments of the doses to sewage workers (Section 6). These are considered likely to be above the exemption level based on the results from studies carried out in the UK (Titley *et al.* 2000). As a part of this work, the LUCIA model (Section 5) was developed for deriving prognoses of the fate of radionuclides discharged from hospitals and research institutions in sewage plants.

- In a third step, other relevant pathways are considered and assessments for all sewage plants in Sweden are derived which can be affected from radionuclides originating from hospitals (Section 7).

2 Use of radionuclides in nuclear medicine at Swedish hospitals

Unsealed radionuclides are used in nuclear and veterinary medicine both for diagnostic and therapeutic purposes. Generally, the unsealed radionuclides are radiopharmaceuticals that are administered to patients by injection, via ingestion or inhalation. The radionuclides can be localised in specific tissues until they decay or be eliminated through various pathways (such as urine).

In diagnostics relatively energetic gamma emitters are being used with short half-lives to obtain informative images with gamma cameras. Examples of diagnostic examinations are bone scans to assess the presence of metastasis and cardiac scans to investigate the functional capacity of the heart muscle. Tc-99m with a decay half-life of six hours is the most common radionuclide used in nuclear medicine, about 80 % of the applications of radioisotopes use Tc-99m. It decays to Tc-99 with a much longer half-life implying that these releases will eventually reach the sea and contribute to increase in the global activity levels of Tc-99 activity levels. World wide approximately 32 million diagnostic nuclear medicine procedures are performed each year (UNSCEAR 2000). Annually approximately 100 000 examinations are performed in Sweden at about 30 hospitals. In addition there are six animal hospitals that perform diagnostics with radiopharmaceuticals, mainly Tc-99m scintography on horses.

Compared with diagnostic applications, therapeutic treatments are fewer in number but use in general greater activities and beta emitting radionuclides with longer effective half-lives (biological and physical). The use of radiopharmaceuticals has increased during the years and radio-immune therapy is a growing area for treatment of wide spread cancer (lymphoma) in the body. Examples of therapy treatments include sodium iodide-131 for hyperthyroidism or thyroid cancer, Sr-89 and Sm-153 for bone metastases. ^{131}I-iodobenzylguanidine (MIBG) is an organic compound used for treatment of adrenal cancers.

Table 2.1 shows the number of radiotherapy treatments with radionuclides at Swedish hospitals during 2004, while Table 2.2 shows the total activity of all radionuclides that were administered to patients during the same year. The most significant radionuclide used for therapy is I-131, which is excreted primarily in the urine with smaller amounts in saliva, sweat and faeces. The retained activity in the patient is a function of a number factors *e.g.* the radiopharmaceutical, the condition of the thyroid gland. During the first 24 hours following treatment approximately 60 % of administered iodine activity is excreted and after 5 days the total activity in the body of the patient has reduced by about 90 %.

Table 2.1. Number of therapy treatments with radionuclides at Swedish hospitals in 2004.

Hospital		Consultant **)	P-32 phosphate Polycytemi (PCV)	Sr-89 chlorid g	I-131 NaI I. Cancer	I-131 NaI II. Hyperthyreos	I-131 MBG III. Cancer	IV. Sm-153 V. EDTMP Pain treatment	Other treatments	Total
Borås	Södra Älvs-borgs sjukhus		10	1		77				88
Eskilstuna	Mälar-sjukhuset		2		12	49		12		75
Falun	Lasarettet	Gävle, Uppsala		9	13	58				80
Gävle	Gävle Sjukhus		4		16	57		3		80
Göteborg	Sahlgrenska univ.sjukhuset		33	1	46	196	1	13	3B, 2H	295
Halmstad	Lasarettet	Lund	5			74		5		84
Huddinge	Karolinska Huddinge		14			259		8		281
Jönköping	Läns-sjukhuset		24		10	93		6		133
Kalmar	Läns-sjukhuset	Linköping				96				96
Karlskrona	Blekinge-sjukhuset	Växjö		6				9		15
Karlstad	Central-sjukhuset		28		7	31				66
Kristianstad	Central-sjukhuset	Lund		8						8
Linköping	Universitets-sjukhuset		20	9	15	79			5J	128
Luleå	Sunderby sjukhus	Umeå				82				82
Lund	Universitets-sjukhuset		44	14	19	290	1	28	5A, 2D, 8J	411
Lund	Universitets-sjukhuset		2		2	137		22	1B	164
Skövde	Kärn-sjukhuset	Eskilstuna		3		56		6		65
Stockholm	Karolinska		18	24	66	343	6	2	4C,5E, 1G,	487

Hospital	Consultant **)	P-32 phosphate Polycytemi (PCV)	Sr-89 chlorid g	I-131 NaI I. Cancer	I-131 NaI II. Hyperthyreos	I-131 MBG III. Cancer	IV. Sm-153 V. EDTMP Pain treatment	Other treatments	Total
	Solna							18J	
Sundsvall	Läns-sjukhuset			2	43		5	23J	73
Uddevalla	Central-lasarettet		3				52		55
Umeå	Norrlands univ.sjukhus	2		3	88		31	3A	127
Uppsala	Akademiska sjukhuset	3		17	45	2	16	2E, 27F	112
Västerås	Central-lasarettet	3		7	71		5		86
Växjö	Central-lasarettet	19	3		116				138
Örebro	Universitets-sjukhuset	12		9	27		8	2A	58
Östersund	Sjukhuset	1	23		36				60
TOTALT		**244**	**104**	**244**	**2403**	**10**	**231**	**111**	**3347**

***)** ”Other treatments ”are here given

A)	Y-90 1033-Mab; Lymphoma	F)	In-111 Octreotid; Cancer
B)	Y-90 colloid; Joint synovitis	G)	I-131 Lipiocis, Livercancer
C)	Y-90 colloid; Craniopharyngiom	H)	Re-186 Colloid, Synovitis
D)	Y-90 hLL2, NHL	J)	Ra-223; Pain treatment
E)	Y-90 Zevalin, NHL		

****)** Note. If therapies are provided by consultants from other hospitals, these hospitals are also given in this column.

From medsys.uas.se/sfit/index2.htm

*Table 2.2. Activity administered to patients at Swedish hospitals during 2004 **

Hospitals	**Activity, MBq**											
	Cr-51	I-123	I-125	I-131	In-111	P-32	Se-75	Sm-153	Sr-89	Tc-99m	TI-201	Y-90
Akademiska Uppsala	2.4E2	6.5E2	-	1.3E5	3.5E4	5.7E2	1.2E1	4.8E4		1.4E6	-	1.9E3
Blekinge Kalskrona	9.2E2	-	-	-	2.1E3			2.6E4	8.9E2	7.5E5	-	-
Centrallasarettet Västerås	1.1E2	-	-	5.6E4		6.8E2	4.2E0	1.4E4	-	6.3E5	-	-
Centrallasarettet Växjö	9.0E1	2.3E3	-	3.1E4	5.1E2	2.8E3	1.2E1	-	4.4E2	1.0E6	9.0E2	-
Centralsjukhuset Karlstad	2.3E2	4.6E2	-	5.0E4	-	6.8E3	1.5E1	-	-	9.4E5	-	-
Centralsjukhuset Kristianstad	1.5E2	-	-	-	-	-	-	-	1.2E3	1.3E6	-	-
Danderyds Sjukhus	1.9E2	-	-	-	-	-	3.3E0	-	2.7E0	1.4E6	-	-
Drottning Silvias barnsjukhus	1.1E3	1.1E3	-	-	7.8E1	-	-	-	-	8.8E4	-	-
Falu lasarett	-	-	-	5.7E4	-	-	-	-	1.4E3	6.2E5	-	-
Helsingborgs lasarett	-	-	-	-	-	-	-	-	-	8.2-E5	-	-
Huddinge sjukhus	4.2E2	5.8E3	2.1E0	1.2E5	-	3.7E3	4.8E0	2.5E4	-	1.8E6	-	-
Kalmar-Västervik	1.4E2		5.0E-1	3.8E4	3.5E2		-	-	-	9.0E5	-	-
Karolinska sjukhuset	4.0E2	2.0E4	1.1E1	4.9E5	2.3E4	3.8E3	3.3E1	6.2E3	3.6E3	1.6E6	-	5.7E3
Kärnsjukhuset Skövde	3.5E3	3.9E1	-	2.1E4	2.8E3		4.3E1	1.8E4	4.5E2	5.7E5	-	-
Länssjukhuset GävleSandviken	-	1.2E3	-	8.9E4	-	9.4E2	2.6E0	8.0E3	-	8.7E5	-	-
Länssjukhuset Halmstad	5.4E1	-	-	2.1E4	-	1.3E3	-	1.3E4	-	4.4E5	-	-
Länssjukhuset Ryhov Jönköping	5.2E1	1.5E3	-	8.7E4	-	4.1E3	1.6E0	1.6E4	-	1.0E6	-	-
Mälarsjukhuset Eskilstuna	-	-	-	7.2E4	-	4.0E1	-	3.2E4	-	7.7E5	7.6E2	-
Norra Älvsborgs Länssjukhus	1.6E3	-	7.5E-1	-	-		-	-	-	4.2E5	-	-
Norrlands Universitetssjukhus Umeå	2.3E3	3.1E4	3.6E0	3.6E4	6.0E3	4.0E2	3.0E1	9.4E4	-	1.8E6	-	2.9E3
Regionssjukhuset Örebro	-	2.8E3	-	4.7E4	3.4E3	2.2E3	2.4E1	2.1E4	-	7.1E5	1.0E2	2.4E3
Sahlgrenska Universitetssjukhuset	6.3E3	8.3E3	5.9E0	2.9E5	2.6E4	7.0E3	7.1E1	3.4E4	1.3E2	2.2E6	-	5.5E2
St.Görans sjukhus	-	-	-	-	-	-	-	-	-	1.4E5	-	-
Sunderby sjukhus	-	-	-	4.9E4	-	-	-	-	-	1.1E6	-	-
Sundsvalls sjukhus	5.6E2	1.6E3		2.3E4	-	-	-	1.5E4	-	9.9E5	-	-

Hospitals	**Activity, MBq**											
	Cr-51	I-123	I-125	I-131	In-111	P-32	Se-75	Sm-153	Sr-89	Tc-99m	TI-201	Y-90
Södersjukhuset SÖS	-	-	3.6E0	6.5E1	-	-	-	-	-	1.6E6	-	-
Södra Älvsborgs Sjukhus Borås	1.7E3	-	-	1.9E4	1.5E1	2.0E3	-	-	1.5E2	4.4E5	-	-
Uddevalla sjukhus	-	-	-		1.7E3	-	1.1E1	1.3E5	4.5E2	4.4E5	-	-
Universitetssjukhuset Linköping	4.7E2	1.9E3	-	8.9E4	3.5E3	5.4E3	4.1E0	-	1.4E3	1.2E6	-	-
Universitetssjukhuset Lund	3.0E0	1.4E4	-	2.2E5	2.5E4	1.1E4	2.2E0	8.2E4	2.1E3	3.2E6	-	6.1E3
Universitetssjukhuset MAS Malmö	2.5E2	3.6E3	-	9.0E4	1.8e3	5.2E2	5.3E0	6.9E4	-	2.4E6	-	3.7E1
Uppsala Imanet	-	-	-	-	-	-	-	-	-	-	-	-
Östersunds sjukhus	2.2E2	-	-	1.3E4	-	1.8E2	4.0E0	-	3.5E3	4.4E5	-	2.2E2
Östra sjukhuset	3.4E2	-	4.0E0	-	-	-	3.3E0	-	-	4.7E5	-	-

** Estimated from data on treatments at all Swedish hospitals taken from SSI´s webpage (http://www.ssi.se/isotop/index.asp) in July 2006.*

3 Waste water treatment in Sweden

The purpose of the sewage effluent treatment is to clean the effluents so they can be discharged into the environment. Pollutants which are removed from the effluents during the treatment are: larger inorganic and organic solids (floating items), suspended solids (particles larger than 0.45 micrometer, very fine particles) and dissolved oxygen consuming matter (organic substances), phosphorous and nitrogen.

The load of pollutants varies during the season of the year and within the day. Stormy weather can also influence the fluxes of water and pollutants to the sewage plant. Although the waste water and storm water are usually transported in different pipe systems, there exist leakages in the system, which explains why heavy rains can affect the fluxes of waste water into the sewage plant.

Similar systems for waste water treatment are used all over Sweden. The waste water treatment is carried out in a number of local and regional sewage plants of similar design, the differences among them being mainly in their size, commonly measured by the number of persons-equivalent[2] served. The final recipient to where the treated waste water is discharged also varies from plant to plant. The size and recipient of the sewage plants that receive radionuclide releases from Swedish hospitals are given in Table 3.1. The size is given in units of person-equivalent (P.E.).

The waste water treatment includes treatment of the effluents and of the generated sludge (Figure 3.1). The effluent treatment (see Section 3.2) includes mechanical, biological and chemical processes for cleaning the waste water, while the sludge treatment aims mainly at stabilising and reducing the volume of the generated sludge.

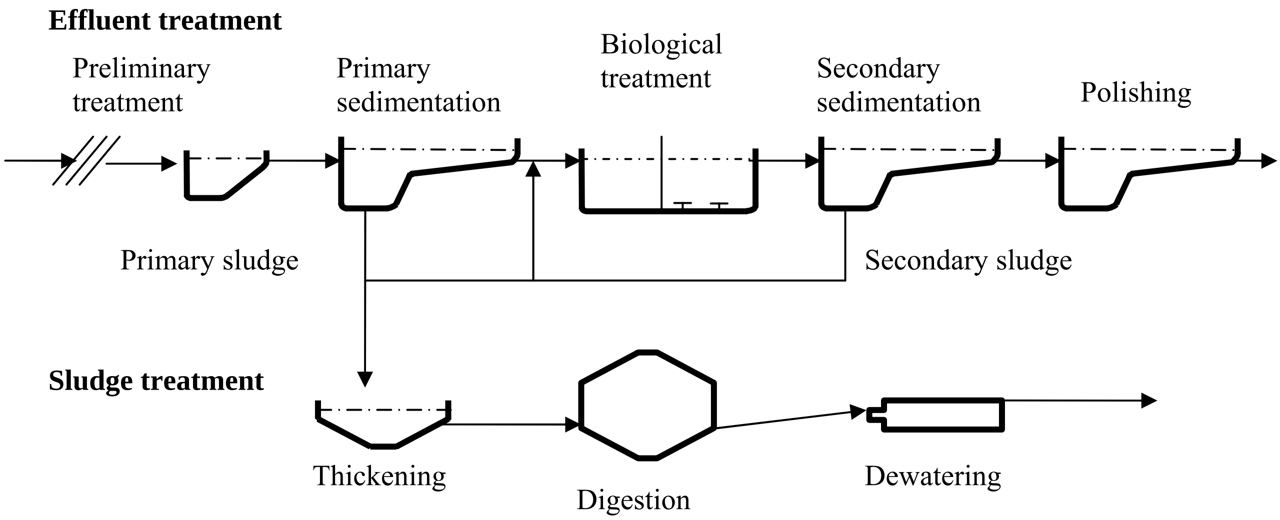


Figure 3.1. Schematic representation of the waste water treatment at Swedish sewage plants.

[2] The number of persons-equivalent measures indirectly the waste water flux coming into the sewage plant, including domestic and industrial waste water.

Table 3.1. Size and waste water recipient of the sewage plants that receive radioactive releases from hospitals

Hospital	Plant	Size in P.E.*	Recipient
Borås	Gässlösa	97 000	Viskan
Danderyd	Käppalaverket	520 000	Askrikefjärden
Eskilstuna	Ekeby	60 000	Eskilstuna å
Falun	Fränby	40 000	Sjön Runn
Gävle	Duvbacken	80 000	Inre fjärden, Gävlebukten
Göteborg	Ryaverket	775 500	Göta älv
Halmstad	Västra stranden	110 000	Laholmsviadukten
Helsingborg	Öresundsverket	150 000	Havet
Huddinge, Sth.	Henriksdal	768 000	Halvkakssundet
Jönköping	Simsholmen	80 000	Munksjön
Kalmar	Tegelviken	80 000	Kalmar sund
Karlskrona	Koholmen	40 000	Östersjön
Karlstad	Sjöstadsverket	90 000	Vänern
Kristianstad	Centrala reningsverket	205 000	Hammarsjön
Linköping	Tekniska verken	165 000	Stångån till sjön Rocksen
Luleå	Uddebo	70 000	Luleå älv
Lund	Källby	90 000	Höje å
Malmö	Sjölunda	270 000	Öresund
Skövde	Statskvarn	57 000	Mörkerbäcken till Tidans vattensystem
KS, Sth.	Henriksdal	768 000	Halvkakssundet
St Göran, Sth	Henriksdal	768 000	Halvkakssundet
Söder Sjukh, Sthlm	Henriksdal	768 000	Halvkakssundet
Sundsvall	Fillanverket	20 000	Alnösundet
Uddevalla	Skansverket	47 000	Bävån till Byfjorden
Umeå	Ön	103 000	Umeå älv
Uppsala	Kungsängsverket	180 000	Fyrisån
Västerås	Kungsängen	120 000	Mälaren
Växsjö	Sundet	60 000	Norra Bergundasjön
Örebro	Skebäck	153 000	Hjälmaren
Östersund	Göviken	64 800	Storsjön

* *Person-equivalent*

3.1 Effluent treatment

The effluent treatment consists of five main steps: preliminary treatment, primary sedimentation, biological treatment, secondary sedimentation and final polishing. The treatment processes that take place in each step are described below.

Preliminary treatment

The purpose of this initial step is to remove large pieces of material by screening and rapid sedimentation. The process is continuous and fast. Radionuclides and other contaminants absorbed onto the removed materials will be extracted from the effluent. This preliminary treatment does not affect significantly the suspended solid load and will therefore have a small effect on the overall radionuclide concentration in the effluent (Titley *et al.* 2000).

Primary sedimentation

The main treatment process of this stage is the mechanical settling of suspended solids. The suspended particles are heavier than water and are settled by gravity under quiescent conditions in large settling tanks. Chemical coagulation of the raw waste water before settling promotes flocculation of finely divided solids, thereby increasing the removal of suspended solids and organic matter. Settling with coagulation and flocculation may remove 60 to 90 % of the suspended solids and 30-60 % of the chemical oxygen demand (COD). Adding of chemical substances for flocculation also withdraws phosphorous from the raw waste water. The residence time of water in the primary sedimentation tanks is only a few hours, but can be sufficient to reduce significantly the activity of radionuclides with very short half lives such as Tc-99m. The radionuclides in settled solids will be removed from the effluent together with the primary sludge.

Biological treatment

After the primary sedimentation treatment the effluent is pumped into basins for biological treatment. The purpose of the biological treatment is to remove the remaining chemical oxygen demand (COD) in the form of fine suspended organic matter. The two processes most commonly used in Sweden for biological treatment are activated sludge (suspended growth) and attached growth.

The activated sludge treatment is predominantly an aerobic process that achieves high concentrations of micro-organisms through the recycle of the sludge containing micro-organisms. The micro-organisms convert the biodegradable organic matter present in the waste water into carbon dioxide (35-45 %) and cell mass (45-55 %). The cell mass is subsequently removed from the system by settling (secondary sedimentation). About 10-25 % of the organic matter is not biodegradable and leaves the plant with the outgoing treated water.

The attached growth treatment provides a surface (medium) on which the microbial layer can grow and expose this surface repeatedly to wastewater for adsorption of organic material and to the atmosphere for oxygen.

The residence time of water in biological treatment tanks is several hours and can be sufficient to reduce significantly the activity of radionuclides with very short half lives such as Tc-99m. During the treatment the concentration of solids in the waste water is about ten times higher than in the raw waste water, which can favour the sorption of radionuclides to solids, which are subsequently removed during the secondary sedimentation.

Secondary sedimentation

Solids remaining in the effluent after the biological sedimentation, mainly as biomass, are removed by settling in sedimentation tanks. The micro-organisms used in the biological treatment have a relatively low growth rate. To keep the concentrations of micro-organisms at the necessary level, about 40-50% of the sludge collected in the secondary sedimentation tank, is pumped back to the biological treatment. The secondary sedimentation is a short duration process, but due to the sludge recycling a solid particle will stay for several days in the biological and secondary sedimentation basins. The radionuclides that have been absorbed onto the sludge particles can decay considerably before the secondary sludge is removed for further treatment.

Polishing step

In the last step of the effluent treatment, remaining suspended solids, organic matter and nutrient phosphorus are removed. This part of the treatment is considered a polishing or fine-cleanup process. A small quantity of precipitation chemicals is used in order to promote flocculation which enhances the removal of phosphorous. Flocks are formed in the flocculation chamber and then settled in the following sedimentation process. The sludge generated in this processes is usually pumped back to the primary sedimentation process. This process has a small influence on the overall concentration of radionuclides in the waste water.

Retention time in the effluent treatment

The retention time of a water particle in the plant is typically 15-30 hours. However, there exist plants, like Ryaverket in Gothenburg, where the retention time is only 8 hours because the water flow is high in relation to the basin volumes. In some plants, for example the Källby plant in Lund, the outgoing flow is led into a system of dams which makes the total retention time for a water particle longer, 4 to 5 days.

3.2 Sludge treatment

Sludge removed in the primary (primary sludge) and secondary (secondary sludge) sedimentation is conveyed to a thickener where the sludge volume is reduced by a factor of two to three and the solids concentration increases proportionally. This leads to a corresponding increase of the radionuclide concentrations. The residence time of a sludge particle in the process is around one day and hence a substantial reduction of the activity of short life radionuclides, such as Tc-99m (6 hours) and I-131 (8 days) will take place.

After thickening the sludge is conveyed to a digestion chamber where the sludge is stabilised by decomposition of organic matter to reduce odour and pathogens. The retention time in the digester is typically 20 days and hence there will be a substantial reduction of the activity of short live radionuclides. Releases to air of C-14 and volatile radionuclides, such as I-131, in principle can take place at this stage, although the potential of releases will depend on the chemical state in which these radionuclides are bound.

After digestion the sludge is dewatered by physical processes such as air drying and centrifugation. This process has a short duration and therefore this stage is unlikely to result in any significant additional decay to radionuclides still present after stabilisation. Dewatering reduces further the sludge volume. The concentration of solids in the final sludge is around 25 %, but in some plants, such as the plant in Umeå, further drying is practiced and the solids concentration can reach 90-95 %.

Retention time in the sludge treatment

The overall retention time of a particle in the sludge treatment is typically 20-30 days. In plants with nitrogen removal the retention time is longer than in plants without this process.

4 The screening study

The aim of the screening study was to identify the radionuclides and exposure pathways of potential concern and thus to reduce the scope of further detailed assessments. To achieve this, conservative dose estimates were made. Exposure estimates resulting from the screening model, therefore, are not to be seen as predictions of actual risks. The output of the screening study is merely a list of radionuclides and exposure pathways which require a more realistic consideration.

The method applied in the screening study is based on the generic methodology recommended by IAEA (2001) and represents a simple ‘no dilution’ model. Such models represent the first stage in the iterative approach to exposure modelling (IAEA 2001). Further consideration by using more detailed models is, according to this publication, only required if the doses resulting from the ‘no dilution’ model exceed the applicable dose criterion.

The study was performed for all sewage plants which receive releases from different hospitals performing both radiotherapy treatments and diagnostics (see Table 4.1). The maximum annual release rates in the period 1999-2004 were used in the calculations. These are summarised for some of the sewage plants in Table 4.2. Detailed data for all plants are provided in Appendix A. These annual release rates were estimated from available information of activities administered to patients at the hospitals which release to these plants, assuming that all administered activity will reach the sewage plants.

Table 4.1. Sewage plants included in the screening study and hospitals with radionuclide discharges to these plants.

Sewage plant, City	Hospitals
Henriksdal, Stockholm	Huddinge Universitetssjukhus Karolinska Sjukhuset St Görans Sjukhus Södersjukhuset Stockholm
Ryaverket, Gothenburg	Sahlgrenska Universitetssjukhuset
Ön, Umeå	Norrlands Universitetssjukhus
Kungsängsverket ,Uppsala	Akademiska sjukhuset
Källby, Lund	Universitetssjukhuset
Centrala Reningsverket, Kristianstad	Centralsjukhuset i Kristianstad
Duvbacken, Gävle	Länssjukhuset Gävle-Sandviken
Ekeby, Eskilstuna	Mälarsjukhuset
Fillanverket, Sundsvall	Sjukhuset i Sundsvall
Gässlösa, Borås	Borås Lasarett
Göviken, Östersund	Östersunds sjukhus
Käppalaverket, Lidingö	Danderyds sjukhus
Koholmen, Karlskrona	Blekingesjukhuset

Sewage plant, City	Hospitals
Öresundsverket, Helsingborg	Helsingborgs lasarett
Simsholmen, Jönköping	Länssjukhuset Ryhov
Sjölunda, Malmö	Universitetssjukhuset Malmö
Sjöstadsverket, Karlstad	Centralsjukhuset Karlstad
Skansverket, Uddevalla	Uddevalla sjukhus
Sundet, Växjö	Centrallasarettet Växjö
Tegelviken, Kalmar	Länssjukhuset Kalmar
Uddebo, Luleå	Sunderby sjukhus

Table 4.2. Maximum yearly release rates of radionuclides to the studied sewage plants, estimated from treatments reported during 1999-2004 for the hospitals with radionuclide releases to these plants (source: www.ssi.se).

Nuclide	Release rate Q^j, Bq/y				
	Henriksdal	Ryaverket	Ön	Kungsängsverket	Källby
Co-58	0,0E+00	0,0E+00	0,0E+00	3,0E+05	9,0E+04
Cr-51	9,7E+08	6,8E+09	2,3E+09	4,5E+08	2,1E+07
Cu-64	3,7E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	2,0E+08	8,7E+09	0,0E+00	4,0E+08	5,6E+08
I-123	2,8E+10	1,0E+10	3,1E+10	9,9E+08	1,8E+10
I-125	2,2E+07	2,0E+07	6,8E+06	0,0E+00	1,1E+07
I-131	6,3E+11	2,9E+11	5,9E+10	1,3E+11	2,9E+11
In-111	2,9E+10	2,6E+10	1,1E+10	1,7E+11	2,6E+10
P-32	1,3E+10	1,5E+10	7,9E+08	1,2E+10	1,6E+10
Se-75	5,0E+07	9,8E+07	4,2E+07	1,2E+07	5,2E+06
Sr-89	6,2E+09	2,3E+09	0,0E+00	0,0E+00	5,3E+09
Tc-99m	6,2E+12	2,2E+12	2,0E+12	1,4E+12	3,2E+12
TI-201	7,5E+07	6,2E+10	3,4E+08	2,9E+10	0,0E+00
Y-90	5,7E+09	1,5E+09	2,9E+09	9,6E+10	1,1E+10

4.1 The screening method

The screening approach consists of deriving pessimistic estimates for the annual doses to the general public and sewage workers and comparing these estimates with a screening dose level, in our case set to 10 µSv/a, which is the internationally agreed exemption level (EU). If, for a specific pathway, the calculated doses are equal to or below the screening level, it can be concluded that this pathway does not have a significant contribution to the exposure and no further assessment is required. On the other hand, if the calculated doses are above the screening level, more realistic exposure assessments are required.

Two calculation cases were considered (see Figure 4.1):

1. **Case 1 - no retention in the sewage sludge**. In this case it was assumed that the radionuclides released from the hospitals are not retained in the sewage sludge, *i.e.* all radionuclides entering the sewage system will reach the final recipient of the wastewater. Further, it was assumed that no dilution of the wastewater discharged from the plant occurs before the water is used. This maximizes the estimates of activity concentrations in water. The calculation endpoints in this case were: doses to an adult from ingestion of contaminated water and fish.

2. **Case 2 - full retention in the sewage sludge**. In this case it was assumed that the radionuclides entering the sewage plant are fully retained in the sludge, which maximizes the estimate of the activity concentration in the sludge. The calculation endpoints in this case were: doses to a sewage worker from external exposure to the sludge and from incorporation of sludge particles via inhalation; doses to an adult from ingestion of food produced in an agricultural land where the sludge has been used as fertiliser. The latter endpoint also covers the disposal of sludge on a landfill used for agriculture after its closure, because it was conservatively assumed that crops are grown directly on the sludge, *i.e.* dilution from mixing with soil is neglected.

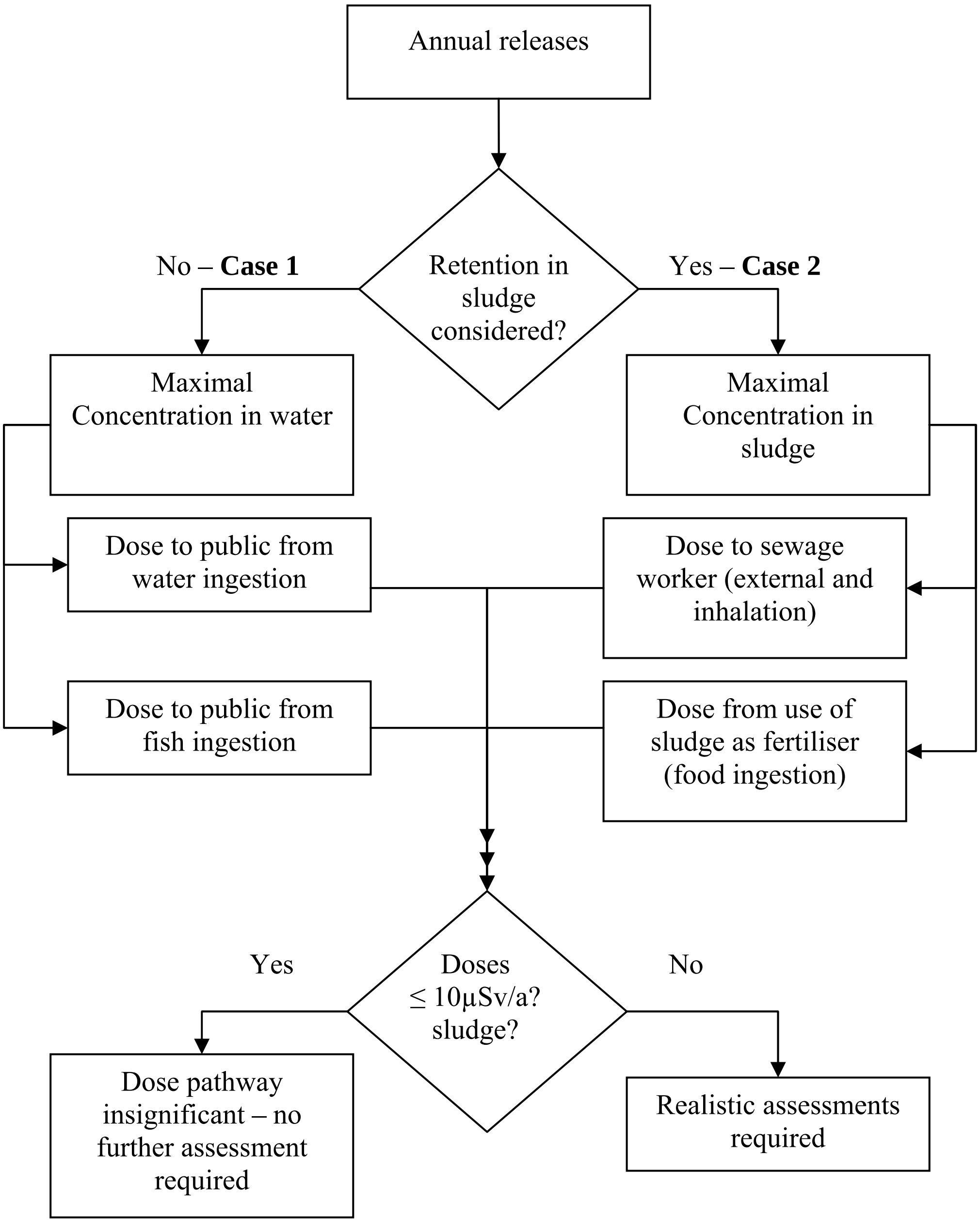


Figure 4.1. Schematic representation of the approach used in the screening study with two calculation cases: Case 1 with no retention in the sludge and Case 2 with full retention in the sludge.

In both calculation cases, reduction of activity concentrations due to radioactive decay is not taken into account. Since most of the released radionuclides are relatively short lived, this is a conservative and in some cases (Tc-99m) a very conservative assumption. This conservative approach, however, is consistent with the aim of this screening study to only identify possible pathways and radionuclides of concern and not to derive realistic dose estimates.

The screening model for these calculation cases and the parameters used are described in Appendix B.

4.3 Results and Discussion

Results for the screening model are provided in Appendix B. A summary is given in Tables 4.3 and 4.4 which present Risk Quotients defined as the ratio between calculated doses and the dose criterion (10 µSv/a). Only the cases with RQ above 1, corresponding to potentially significant exposure pathways, are shown in Tables 4.3 and 4.4. The tables provide the maximum values of the Risk Quotients for the different plants considered in Appendix B.

Despite the very conservative assumptions made in the screening study, for most of the radionuclide and pathways, the calculated doses are well below the screening criterion. Hence, only a few radionuclide-pathway combinations can be considered as potentially significant, which are discussed below in more detail for each calculation case.

Table 4.3. Maximum Risk Quotients, RQ (dimensionless), for the exposure pathways in Case 1 (no retention in sludge). Only radionuclides with RQ values above 1 are shown.

Nuclide	RQ Water ingestion	RQ Fish ingestion
I-131	37	74
In-111	< 1	87
P-32	< 1	560
Y-90	< 1	1,3

Table 4.4. Maximum Risk Quotients, RQ (dimensionless), for the exposure pathways in Case 2 (full retention in sludge). Only radionuclides with RQ values above 1 are shown.

Nuclide	RQ External exposure worker	RQ Ingestion Crops	RQ Ingestion Milk	RQ Ingestion Meat
I-123	27	< 1	< 1	< 1
I-131	650	880	920	130
In-111	240	< 1	< 1	< 1
P-32	< 1	450	1200	350
Sr-89	< 1	140	130	54
Tc-99m	3300	< 1	70	< 1
TI-201	170	54	21	< 1

Discussion of results for Case 1 - no retention in the sludge

The calculation results for the case with no retention in the sewage sludge are presented in Tables B-11 – B-31 in Appendix B. From Table 4.3 it can be seen that I-131, In-111, P-32 and Y-90 are the only radionuclides with RQ above 1. However, it has to be taken into account that in the calculations a direct use of the water discharged from the plant was assumed, *i.e.* dilution from mixing with the recipient water and reduction of the activity by radioactive decay were not considered. To account for these reduction factors, it is necessary to consider the specific conditions at the final recipient of the wastewater discharged from the sewage plant. It can be expected that the reduction factors will vary widely from case to case, since different sewage plants discharge to recipients with very different properties (see Table 3.1 in Section 3), ranging from small rivers to open coastal areas.

As an example, the reduction factor for the case of the Kungsängsverket sewage plant in Uppsala with discharges into Fyrisån was estimated by dividing the annual average flux of Fyrisån (4.73E+8 m^3/a) by the water flux into the plant (1.73E+7 m^3/a) used in the calculations of the activity concentrations in water. This gives a reduction factor of 27.3 which is not sufficient for reducing the RQ for I-131, In-111 and P-32 below 1 (see Table 4.3).

In reality, a further reduction of the doses from water and fish ingestion might take place due to the removal of radionuclides from the water during the wastewater treatment. This is not taken into account in this calculation case, since it is assumed that there is no retention in the sludge. A large variation in the removal efficiency of the waste treatment processes has been reported for different radionuclides (Titley *et al.* 2000). For example for I-131, values of removal efficiencies varying from 5 to 90 % have been reported (Erlandsson *et al.* 1978, 1979, Ingemansson *et al.* 1981).

Discussion of results for Case 2 - full retention in the sludge

The calculation results for the case with full retention in the sewage sludge are presented in Tables B-32 – B-73 in Appendix B. As for Case 1, only a few radionuclides can give rise to significant exposures (see Table 4.4).

The exposure of sewage workers via inhalation was insignificant for all studied radionuclides, while the external exposure showed significant values for several gamma emitters: I-123, I-131, In-111, Tc-99m and Tl-201. Two of them, I-123 and Tc-99m, have a very short decay half-life, 13,2 and 6,02 hours respectively, as compared with the residence time of the sludge in the sewage treatment (around 30 days). Therefore, their real exposure can be expected to be much lower. Also, the radionuclides are usually not fully removed with the sludge as it was assumed, and therefore the concentrations in the sludge as well as the external exposure will be lower. Finally, the dose factors used for the calculation of the external doses might still be over-conservative, since these assume an infinite lateral and vertical geometry, while in reality the sources of exposure are of limited size. These issues will be discussed in more detail in Section 6 where realistic assessments are presented for this exposure pathway.

The screening study showed that the exposure resulting from ingestion of food grown in contaminated sludge could be significant only for five radionuclides: I-131, P-32, Sr-89, Tc-99m and Tl-201. Table 4.5 shows recalculated RQ values taking into consideration radioactive decay and dilution from mixing with uncontaminated soil. This was done by multiplying the sum of RQ in Table 4.4 (which assumes that one person is exposed to all ingestion pathways simultaneously) by appropriate correction factors.

The correction factor for decay was estimated by assuming that there is a time period of at least 60 days before the exposure can take place: 30 days for the sludge residence time in the sewage plant and 30 days corresponding to the minimum time needed to produce the different types of foods, assuming that sludge with the average activity based on annual releases to the plant and total sludge production is applied before the growing season starts.

Direct cultivation in sludge, as it was assumed in the screening calculations, is not a normal practice. Commonly, around 10 kg DW/m^2 of sludge is applied to land to restore its fertility (Dickson 1994). Assuming that the applied sludge is homogeneously distributed in a soil layer of 20 cm with a density of 1500 kg/m^3, a dilution factor of 0.03 is obtained.

The recalculated values of the RQ (Table 4.5) indicate that radioactive decay alone would reduce the doses from Tc-99m and Tl-201 by this pathway below the screening criterion, while the dilution with uncontaminated soil would do the same for the doses from Tl-201. The combination of both reduction factors would be sufficient to categorize this exposure pathway as insignificant for all studied radionuclides, except for P-32 and Sr-89, which still show values slightly above the screening criterion. At the same time, it should be taken into account that the applied reduction factors were also conservatively estimated. Moreover, it is unlikely that a long term exposure from this pathway would take place at the same place, exposing the same group of individuals. Hence, this exposure pathway seems to be insignificant and in any case have a lower significance than the exposure of sewage workers. Nevertheless, it has to be taken into account that this exposure pathway potentially may affect relatively large population groups in comparison to the small group of workers at a sewage plant.

Table 4.5. Risk Quotients, RQ (dimensionless), for the ingestion pathways in Case 2 (full retention in sludge) recalculated from the sum of RQ in Table 4.3 (RQ Max), taking into consideration radioactive decay before the exposure starts (RQ Decay), dilution by mixing with soil (RQ Dilution) and both decay and dilution (RQ Decay and Dilution).

Nuclide	RQ Max	RQ Decay	RQ Dilution	RQ Decay + Dilution
I-131	1930	11	58	< 1
P-32	2000	109	60	3.3
Sr-89	324	229	9.8	4.3
Tc-99m	70	< 1	2.1	< 1
Tl-201	21	< 1	< 1	< 1

5 Dynamic model of the turnover of radionuclides in a sewage plant

The screening study showed that realistic assessments of the doses to sewage workers are needed, especially for those radionuclides frequently used in nuclear medicine, such as I-131 and Tc-99m. For doing this, more realistic estimates of the radionuclide concentrations in the sludge are required. Although radionuclides are released from hospitals during the whole year, their releases are not continuous and constant, but occur as pulses during a few days. This is particularly true for excreta from patients that have received high doses for therapeutic purposes. This means that a steady state situation with equilibrium radionuclide concentrations will not exist at the sewage plant. To be able to make predictions of the radionuclide concentration in the sludge, the dynamic model LUCIA is developed to address the dynamic behaviour of radionuclides in the plant.

Developing the dynamic model LUCIA has several purposes:

- Using the model to compare releases occurring as pulses to continuous releases will (1) allow to identify the differences in results arising, (2) to derive conclusions on whether dynamic modelling is required and (3) whether a simpler static model could be used.

- An important parameter for each model addressing releases from hospitals is the distribution of the radionuclides between the discharged water and the sludge. This will be highly dependent on the radionuclides considered and will also be influenced by details of the treatment process. The best way of establishing a data basis for this purpose is to carry out measurements of the radionuclide distribution in the sewage plants. Due to pulse pattern of the releases, a dynamic model is needed to derive parameter values for distribution coefficients from these measured data by comparing model prediction to measurements.

- A dynamic model can also be used to assess consequences from accidental releases.

This model was developed for the sewage plant *Kungsängsverket* (Uppsala). Nevertheless, the model can also be applied for other plants of similar design (see Appendix C).

5.1 The conceptual model

A detailed scheme of the technological process used in the *Kungsängsverket* sewage plant is shown in Figure 5.1. The processes are the same as described in Section 3, but the different treatment steps take place simultaneously in several basins and tanks of different volume. There are three main technical lines, corresponding to different pathways for the incoming water. For the purpose of the model such level of detail is unnecessary and therefore all basins and tanks of the same type were treated as single compartments. This is indicated by the rectangular boxes in Figure 5.1.

The LUCIA conceptual model is shown schematically in Figure 5.2. The model consists of 9 compartments, 7 of which correspond to the rectangular boxes in Figure 5.1: R1, R2, R3, R4, T1, T2 and T3 and two (R1sed and R3sed) additional compartment that correspond to the precipitated sludge in the sedimentation basins (R1 and R3). Each of the 9 compartments represents a state variable with an associated radionuclide inventory as indicated in Table 5.1, where also the associated plant components are indicated. The final polishing step is described in a more simplified form in the model, where precipitation of sludge is considered to be insignificant in normal conditions and therefore not considered.

The arrows in the conceptual diagram represent the radionuclide fluxes between the different compartments, which are driven by the fluxes of water and sludge in the plant. Most fluxes are in one direction, from the inlet to the outlet of the plant. The only exceptions are the fluxes from the compartments associated with the secondary sedimentation basins (R3 and R3sed) back to the basins for biological treatment. These fluxes correspond to the pumping of a fraction of the secondary sludge into the basins for biological treatment to provide bacterial stock needed for the treatment.

Model assumptions

The model describes the plant as a series of interconnected compartments. A main assumption of this type of models is that the radionuclides and other species, such as water, solid particles and organic material that enter a compartment get instantaneously fully mixed in the compartment. At the same time, it is assumed that the transfer rate of the radionuclides from one compartment to another is proportional to the inventory of radionuclides in the donor compartment.

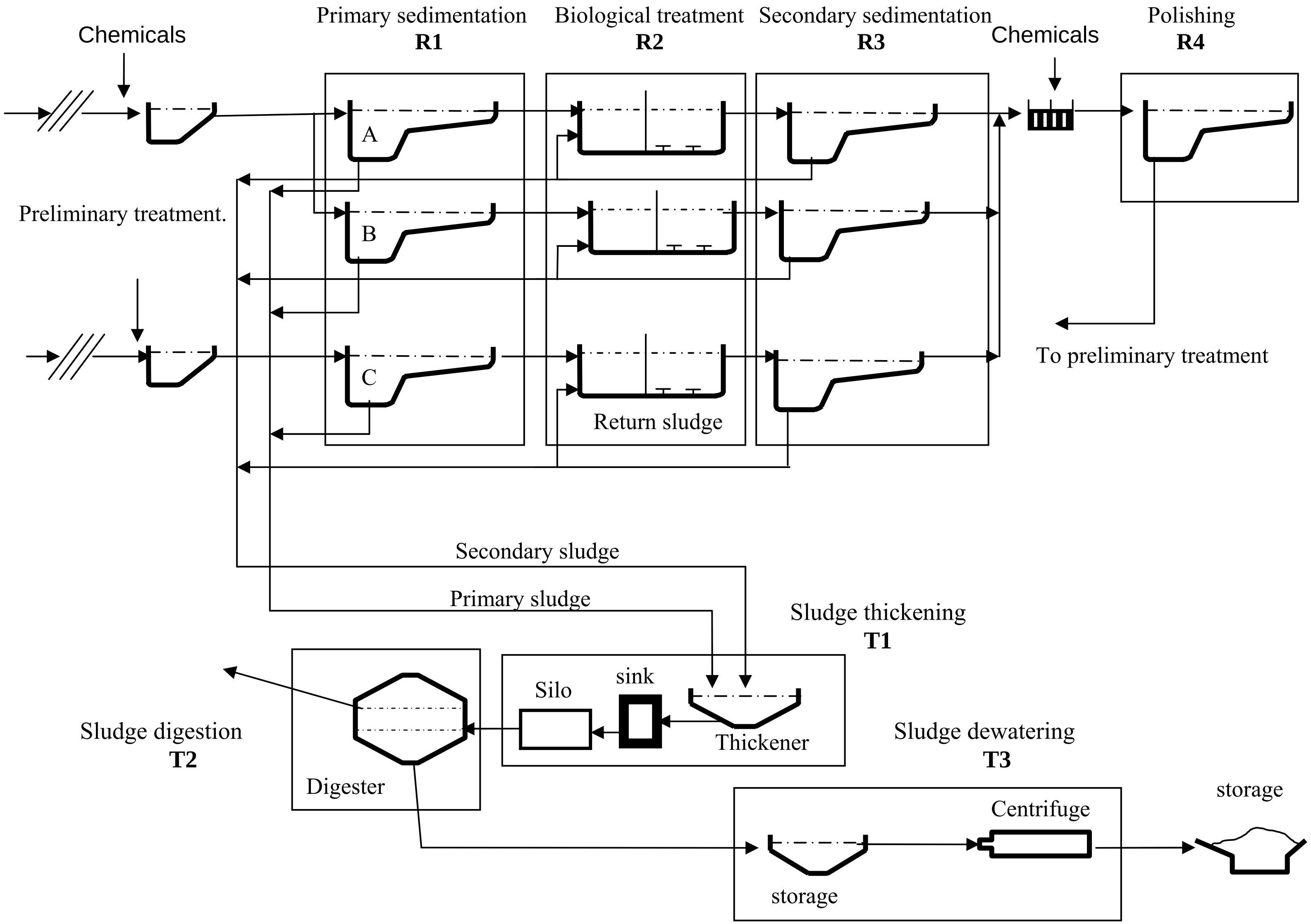


Figure 5.1 Schematic representation of the technological process at the Kungsängsverket sewage plant (Uppsala). The rectangular boxes indicate how the components have been grouped into compartments in the conceptual model.

Table 5.1. Compartments in the model, associated plant components and definition of the corresponding state variables.

Compartment	Plant components	State variable
R1	Primary sedimentation basins Water phase	Total radionuclide inventory in dissolved form and absorbed to suspended particles
R1sed	Primary sedimentation basins Precipitated sludge	Radionuclide inventory in the precipitated sludge
R2	Basins for biological treatment	Total radionuclide inventory in dissolved form and absorbed to suspended particles
R3	Secondary sedimentation basins Water phase	Total radionuclide inventory in dissolved form and absorbed to suspended particles
R3sed	Secondary sedimentation basins Precipitated sludge	Radionuclide inventory in the precipitated sludge
R4	Sedimentation basin for final polishing Water phase	Total radionuclide inventory in dissolved form and absorbed to suspended particles
T1	Thickener, sink and silo	Total radionuclide inventory in the components
T2	Digester	Total radionuclide inventory in the digester
T3	Centrifuge and sludge storage	Total radionuclide inventory in the components

The model assumes steady state conditions for the wastewater, solids and organic material in the system. This means that the levels of these species are kept constant with time in all compartments. If the fluxes of a species into a compartment increase or decrease, then the fluxes leaving this compartment will increase or decrease proportionally, so that the levels in the compartments remain constant. This assumption is consistent with the way sewage plants function in normal situations. However, in special conditions, like in case of a storm, it could be that it is not possible to keep a constant level in the basins. Hence, the model cannot be directly applied, without modifications, to such situations. The assumption of steady state does not apply for the radionuclides, which levels are allowed to vary without restrictions. This way the model can be applied to any type of releases, including pulse releases.

Another assumption is that losses of radionuclides from the plant occur only via discharged water and sludge that is transported away from the plant. Although losses to air may occur, especially for volatile radionuclides as I-131, these are conservatively neglected.

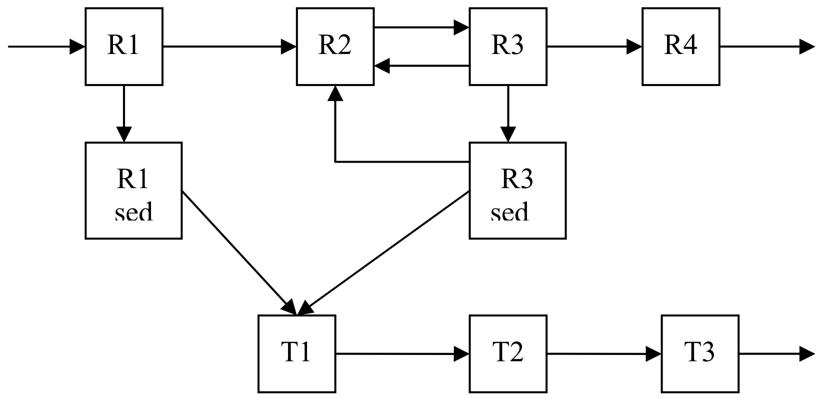


Figure 5.2. Conceptual representation of the LUCIA conceptual model for the Uppsala sewage plant. The boxes correspond to model compartments (see Table 5.1) and the arrows to radionuclide fluxes between compartments.

5.2 Mathematical model and parameters

The mathematical model of LUCIA consists of a system of ordinary differential equations (ODE). These represent the mass balance in the different compartments defined in Table 5.1. The equations used are provided in Appendix C and allow for the estimation of the concentration of radionuclides in water and sludge depending on the radionuclide concentration in the plant inlet. The model was implemented using the software package Ecolego (Avila *et al.* 2003).

Model parameters are defined as probability distributions. Parameters relating to the treatment processes are derived from data measured in the Kungsängsverket sewage plant, Uppsala, during 2003-2004. Parameter values used are described in Section C-3 of Appendix C.

The only radionuclide specific parameters required by the model are the distribution coefficients KdR1 and KdR2. These represent, for the radionuclides of interest, the distribution coefficients (Kd) between water and sludge in the compartments R1 and R2, respectively. The distribution coefficient is the ratio between the radonuclide concentration in the soil phase (in Bq/kg dry weigth) and the radionuclide concentration in the water (in Bq/m^3). Their values depend on the concentration of suspended solids and the chemical conditions.

Although an extensive literature review was carried out in this study, distribution coefficients for sludge were not found for any of the elements of interest. Instead, Kd values reported for organic soils were used, which to some extend can be considered as representative for sewage sludge, consisting mainly of organic material. Details of the values used are given in Section C-3 of Appendix C.

5.3 Sensitivity analysis

The sensitivity of the model to variation in the model parameters was studied using the software package Eikos (Ekström *et al.* 2006). The sensitivity study was carried out for I-131, which is one of the significant radionuclides for the exposure of workers (see screening study in Section 4). The studied endpoints were the concentration of I-131 in the digested sludge (T2 in Figure 5.2) and the efficiency (Eff) of the wastewater treatment, defined as the activity concentration in the water coming into the plant divided by the activity concentration in the water released from the plant.

The results of the sensitivity analysis are presented in Section C-4 of Appendix C. They show that the predictions of the concentration in the digested sludge are highly sensitive to the distribution coefficient for the primary sedimentation (KdR1), slightly sensitive to the distribution coefficient for the biological treatment (KdR2) and practically insensitive to all other model parameters, when considered individually. The same is valid for the efficiency of the wastewater treatment, but this endpoint was also highly sensitive to the water flux Q, since this parameter determines the residence time of the I-131 in the wastewater treatment.

The contribution of the model parameters to the variance of the predictions was estimated using Total Sensitivity Indexes calculated with the Extended Fourier Amplitude Sensitivity Test, EFAST (Ekström *et al.* 2006). This method takes into account interactions between parameters. The obtained results indicate that 46 % of the variance in the predictions of the concentrations in digested sludge is explained by the variance of the KdR1 and the rest by other parameters, but no single parameter contributes with more than 6 %.

These results from the sensitivity analysis imply the important conclusion that reasonable values for the distributions coefficients and for the water flux are primarily required in order to arrive at realistic exposure assessments.

6 Realistic dose assessments

This section presents the results of realistic assessments of doses to sewage workers using the LUCIA model for the radionuclides identified as particularly relevant in the screening study (Section 4): I-123, I-131, In-111, Tc-99m and Tl-201. The only exposure pathway considered in this section is the external exposure to radionuclides in the sewage sludge. The inhalation pathway is not included, since the screening study showed that this is not a significant pathway. All calculations in this section are performed for the *Kungsängsverket* sewage plant (Uppsala).

The realistic dose assessments are carried out by performing probabilistic simulations with the LUCIA model to obtain probability distributions of the sludge concentrations. The concentrations in the digested sludge are used, since according to the information provided by the sewage plants, the workers can be exposed to the sludge mainly during and after the digestion process. The probability distributions of the LUCIA model parameters given in Appendix C are used. Probability distributions of the external doses to workers are obtained from the probability distributions of sludge concentrations using the same equations and parameters values as in the screening study (Section 4).

The goal of this section is to analyse the importance of the dynamics of the releases by comparing a continuous release case to pulse releases (Section 6.2) and to provide and discuss estimates for the worker doses (Section 6.2). These results and their discussion provide a basis for applying the LUCIA model to other exposure pathways and treatment plants in Section 7.

6.1 Investigation of the dynamics of releases

Constant releases rate were used as input to the LUCIA model, set at the maximum value of the yearly radionuclide releases in the period 1999-2004 (Table 4.2). In reality the releases occur as pulses, but since the workers are exposed continuously, the doses will be proportional to the yearly average of the sludge concentrations. To study the potential effect of the release dynamics, a simulation was carried out for a scenario with the same total yearly release, but occurring as three-days release pulses at the beginning of each month.

The values of the mean concentration in the sludge obtained for this scenario were close to the values obtained for the scenario with continuous releases at a constant rate (see Figure 6.1). In the scenario with constant release rate, a constant level in the digested sludge was achieved in about 30 days. The concentration at equilibrium was the same as the median value obtained for the scenario of pulse releases, though the mean value was slightly higher. Normally, the pulse releases will occur more frequently and at a lower release rate. Hence, the fluctuations will probably be lower and the mean values for both scenarios will be even closer.

It can therefore be concluded, that for estimations of the annual doses to sewage workers the constant release scenario can be used. However, for comparison with measured data it is necessary to take into account the dynamics of the releases. It can be seen from Figure 6.1 that depending on when the measurements are done, it is possible to obtain values that differ by a factor of 10.

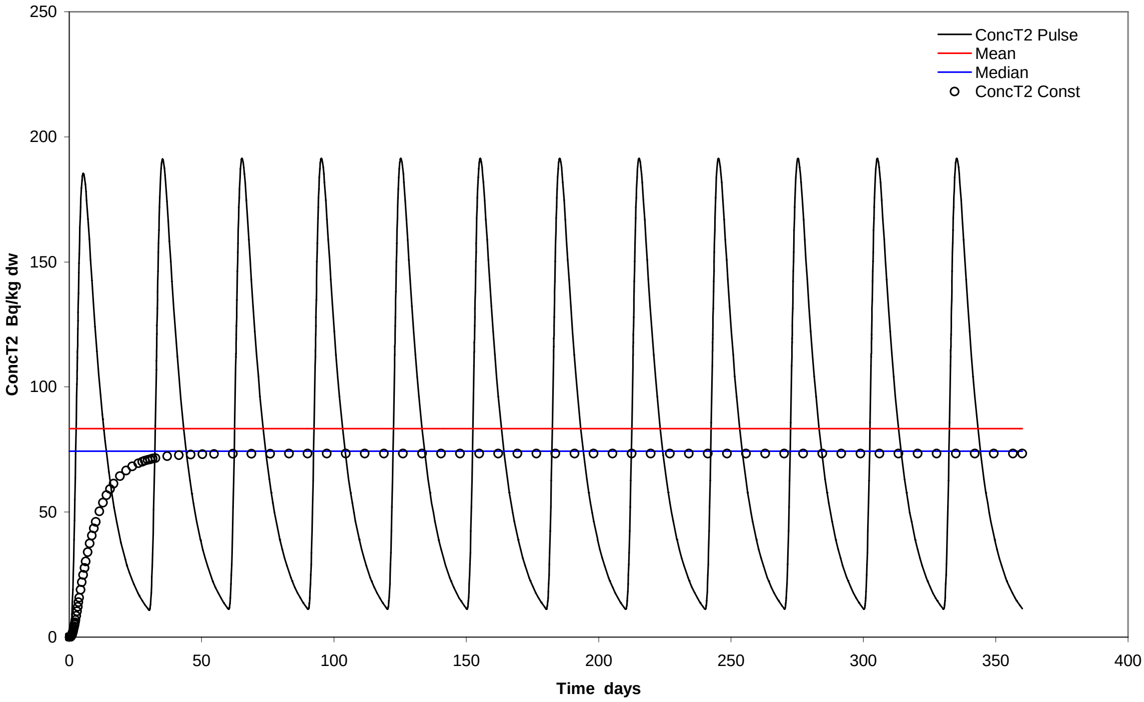


Figure 6.1. Values of the concentrations in the digested sludge (ConcT2) simulated with the LUCIA model for two scenarios: one with a constant release rate (ConcT2Const) and one with pulse releases (ConcT2Pulse). The median and mean values for the scenario with pulse releases are also shown.

6.2 Results and discussion

The results of the simulations are summarised in Tables 6.1 and 6.2. The realistic estimates of the sludge concentrations and external doses to sewage workers are one or more orders of magnitude below the values obtained in the screening study (Table C-16 in Appendix C). For I-123, I-131, Tc-99m and Tl-201 the mean and median values are below the exemption level of 10 µSv/a. For all of these radionuclides, except I-131, even the 95 percentile of the distribution is below the exemption level. In the case of I-131, the 95 percentile is only slightly above 10 µSv/a. The results for In-111 are well above the exemption level and in some cases above 100 µSv/a. This is in general valid for the three variant calculations performed, *i.e.* using three alternative probability distributions for the Kd of In, corresponding to the Kd of Cd, Pb and Sn.

A more clear idea of the likelihood of receiving doses which exceed the exemption level and the dose constraint can be obtained from Table 6.3. This table presents calculated values of the probabilities of the estimated doses exceeding these levels. For I-123, Tc-99m and Tl-201 these probabilities are practically zero. For I-131 the probability of the dose exceeding the dose constraint is also practically nil, while there is a 0.2 probability of exceeding the exemption level. In the case of In-111, the probability of exceeding the exemption level is high for the three calculation cases considered. At the same time, for this radionuclide the value of the probability of the doses exceeding the dose constraint depends markedly on which probability distribution is used for the Kd.

Hence, for In-111 and to a lesser extend also for I-131, it is important to obtain direct estimations of the Kd values. This can be done by performing sorption studies in the laboratory using sludge and water samples taken from the sewage plants, or even better, by conducting in-situ studies at the sewage plants. The in-situ studies could consist of measuring radionuclide concentrations in water and sludge before and after different water and sludge treatment processes. The measurements should be done at several points in time, when it is known that patients have been treated with these radionuclides. The values of releases, calculated from the activities administered to the patients, can be used as inputs to the LUCIA model. The model can then be used to obtain predictions of the measured concentrations. An optimisation procedure can subsequently be used for estimating Kd values that provide better agreement between the model predictions and the measured data.

Table 6.1. Values of the concentration in digested sludge (Bq/kg DW) estimated from probabilistic simulations with the LUCIA model performed for the Kungsängsverket sewage plant, Uppsala.

Nuclide		Median	Mean	Std.	5%	95%
I-123		1.6E-02	2.6E-02	2.6E-02	2.9E-03	8.1E-02
I-131		1.1E+2	1.6E+02	1.4E+2	2.0E+1	4.7E+02
Tc99m		4.5E-01	7.7E-01	9.0E-01	1.1E-01	2.7E+00
In-111	Cd	1.1E+03	1.3E+03	9.5E+02	1.3E+02	3.0E+03
	Pb	3.2E+03	3.3E+03	7.8E+02	2.2E+03	4.7E+03
	Sn	1.6E+03	1.7E+03	6.9E+02	6.8E+02	2.9E+03
TI-201	Cd	2.1E+02	2.4E+02	1.8E+02	2.4E+01	5.6E+02
	Pb	6.1E+02	6.3E+02	1.5E+02	4.2E+02	8.9E+02
	Sn	3.0E+02	3.1E+02	1.3E+02	1.3E+02	5.5E+02

Note: For In-111 and Tl-201 values are given for three calculation variants using different distributions for the Kd, corresponding to the Kd of Cd, Pb and Sn

Table 6.2. Values of the doses to sewage workers (Sv/a) estimated from probabilistic simulations with the LUCIA model performed for the Kungsängsverket sewage plant, Uppsala.

Nuclide		Median	Mean	Std.	5%	95%
I-123		2.9E-10	4.5E-10	4.5E-10	5.0E-11	1.4E-9
I-131		4.4E-06	6.3E-06	5.9E-06	8.2E-07	1.9E-5
Tc99m		6.7E-09	1.2E-08	1.3E-08	1.7E-09	4.0E-08
In-111	Cd	4.8E-05	5.7E-05	4.2E-05	5.7E-06	1.3E-04
	Pb	1.4E-04	1.5E-4	3.4E-05	9.7E-05	2.1E-04
	Sn	7.0E-05	7.3E-05	3.0E-05	3.0E-5	1.3E-04
TI-201	Cd	2.1 E-06	2.4E-06	1.8E-06	2.4E-07	5.7E-06
	Pb	6.1E-06	6.3E-06	1.5E.06	4.2E-06	9.0E-06
	Sn	3.0E-06	3.2E-06	1.3E-06	1.3E-06	5.5E-06

Note: For In-111 and Tl-201 values are given for three calculation variants using different distributions for the Kd, corresponding to the Kd of Cd, Pb and Sn.

Table 6.3. Probabilities that the calculated doses exceed the exemption level (10 µSv/a) and the dose constraint (100 µSv/a) estimated from probabilistic simulations with the LUCIA model performed for the Kungsängsverket sewage plant using the maximum yearly release during the period from 1999 to 2004.

Nuclide		**P dose > 10 µSv/a**	**P dose > 100 µSv/a**
I-123		≈ 0	≈ 0
I-131		0.2	≈ 0
Tc99m		≈ 0	≈ 0
In-111	Cd	0.9	0.16
	Pb	≈ 1	0.94
	Sn	≈ 1	0.18
TI-201	Cd	0	≈ 0
	Pb	0.02	≈ 0
	Sn	< 0.01	≈ 0

Note: For In-111 and Tl-201 values are given for three calculation variants using different distributions for the Kd, corresponding to the Kd of Cd, Pb and Sn.

7 Dose Estimates for All Treatment Plants and Exposure Pathways

The LUCIA model discussed in Section 6 is applied to all hospitals using radionuclides in this section. Estimates are provided for the doses over all relevant pathways:

- dose due to the ingestion of water and fish resulting from radionuclides released with the discharged water;
- dose to the sewage workers (as given in Section 6);
- dose caused by the agricultural use of the sludges.

In the following, results are presented (Section 7.1) and discussed (Section 7.2) for all treatment plants. In Section 7.3, effective dose factors are derived based on the LUCIA model. These give the doses resulting from a unit concentration of each radionuclide in the influx water to the treatment plant and from a unit release of a specific radionuclide.

7.1 Results

The dose estimates are based on the radionuclide concentrations in the discharge water and in the sludges calculated with the LUCIA model (see Appendix C). Exposure assessments based on these outputs of the LUCIA model use the models described in Section B-2 of Appendix B.

It has to be borne in mind that the LUCIA model was developed for the Kungsängsverket sewage plant in Uppsala. Since treatment processes in other plants, however, are similar it is believed that the model is also applicable to the other plants. Plant specific parameters have been used to the extent that they have been provided by the plant operators.

The resulting dose estimates for all relevant pathways are provided in Table 7.1 for the different treatment plants. These are given as key probabilistic properties (mean value, 5 and 95 percentiles). The detailed results for all radionuclides are given in Table C-6 of Appendix C.

The contributions of different radionuclides vary substantially for the different plants. This is partially due to the fact that the type and quantitities of radionuclides administered in the different hospitals are not identical. Nevertheless, some general trends of those radionuclides which can give rise to doses exceeding the 10 μSv/a criterion can be given:

- For the external exposure of the workers, in particular the radionuclides I-131 and In-111 are relevant. To a lesser extent also Tl-201 contributes to this pathway. Based on the 95 percentiles, all three radionuclides can cause doses exceeding the 10 μSv/a criterion.
- Doses associated with the use of sludges for agricultural purposes are dominated by Sr-89. P-32 can also cause the 10 μSv/a criterion to be exceeded, but only based on the results of the conservative calculations (high Kd).
- The doses over the water pathway are dominated by P-32, I-131 and In-111. All three radionuclides can, under the assumptions made, cause the 10 μSv/a criterion to be exceeded over this pathway.

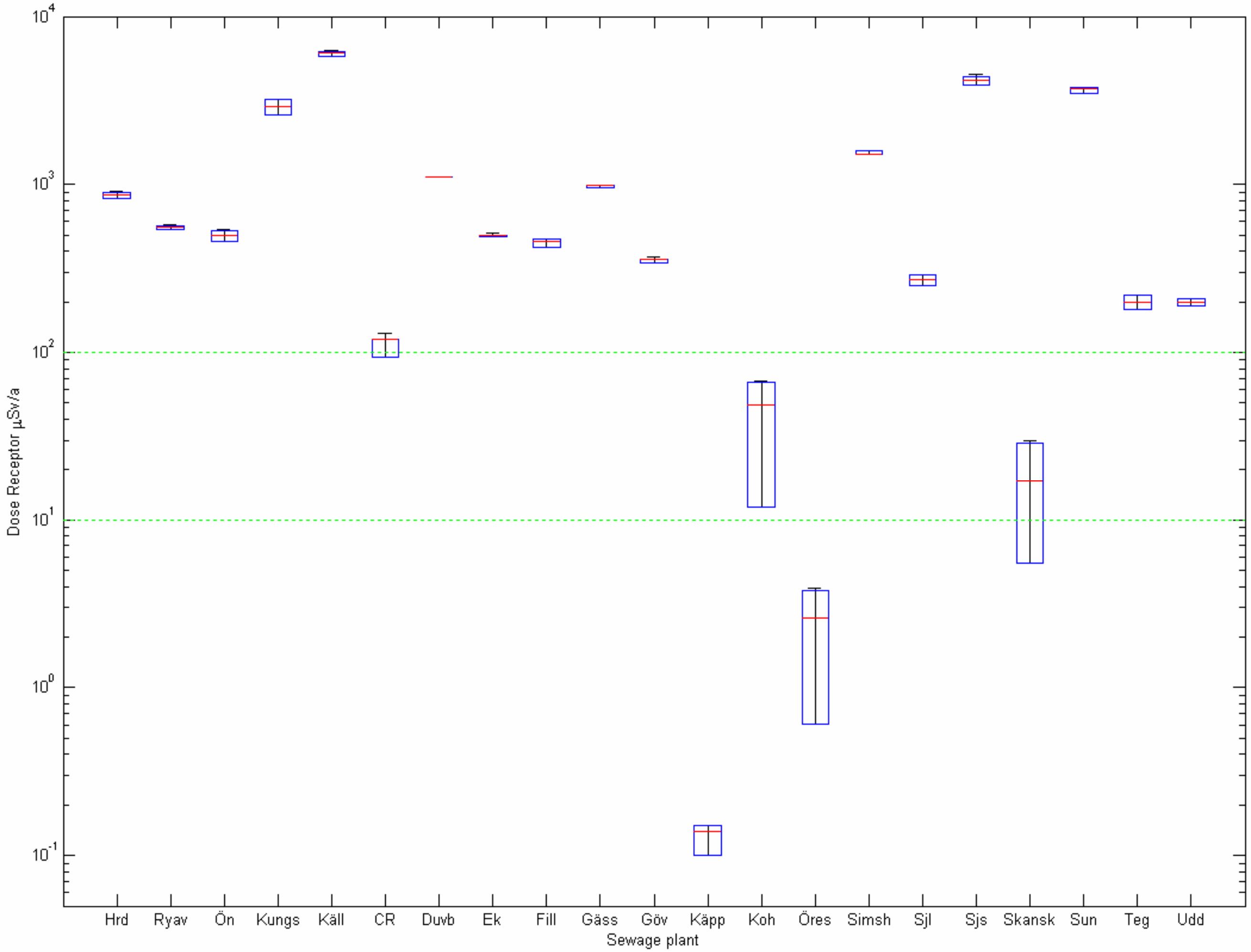
These results for the importance of different radionuclides are in general in agreement with the results obtained from the screening study. The only difference is that for the pathways associated with sludges (worker, agricultural use of sludges), also the radionuclides T-99m and I-123 were found to be potentially important in the screening study. This difference is understandable because the screening study used the assumption of a full retention of the radionuclides in the sludges, while the probabilistic modelling applied ranges for the Kd's, which are very low for the mobile elements technecium and iodine.

In addition to the probabilistic results, conservative estimates are provided in the following for the different pathways. These correspond to the assumptions of the screening model, *i.e.* no retention in sludge for the water pathway (Kd = 0) and high retention in sludge (Kd = 1000 m^3/kg) for the other pathways. Applying these extreme assumptions for the Kd's, conservative estimates are provided as values resulting from a deterministic simulation. Detailed results for all radionuclides are provided in Table C-4 of Appendix C.

The results summarised in Table 7.1 are graphically shown in Figures 7.1 to 7.3 for the three relevant pathways. Probabilistic results are shown as boxes corresponding to 5 and 95 percentiles with the mean values indicated as red lines within these boxes. In addition, minimum and maximum values corresponding to the extreme cases of no retention and full retention in the sludges are shown.

Table 7.1. Estimates of total dose for all sewage plants arising from all radionuclides administered in hospitals associated to these plants for all relevant exposure pathways based on maximum annual releases during the period from 1999 to 2005. Results are derived from the LUCIA model and provided as key probabilistic properties (mean value, 5 and 95 percentiles). In addition, conservative estimates (no retention in sludge for the water pathway and high retention in sludge for the other pathways) are given in the last columns for each exposure pathway.

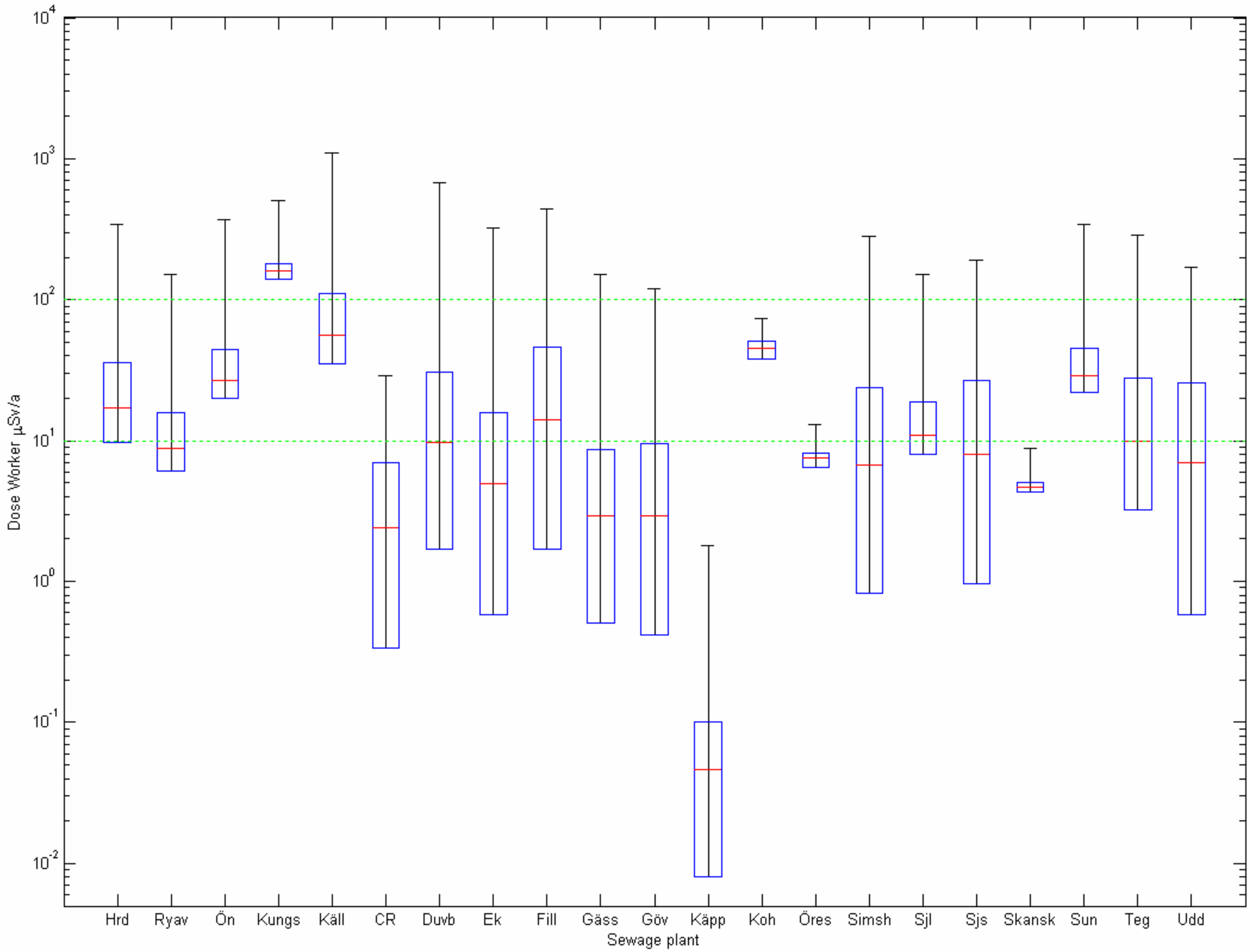
Plant	Dose due to ingestion water and fish Sv/a				Dose to worker Sv/a				Dose due to agricultural use of sludge Sv/a			
	Mean	**5%**	**95%**	**Cons.**	**Mean**	**5%**	**95%**	**Cons.**	**Mean**	**5%**	**95%**	**Cons.**
Henriksdal plant	8.6E-04	8.3E-04	8.9E-04	9.1E-04	1.7E-05	9.7E-06	3.6E-05	3.4E-04	5.4E-07	1.3E-07	1.5E-06	7.2E-06
Ryaverket plant	5.6E-04	5.4E-04	5.7E-04	5.8E-04	8.8E-06	6.1E-06	1.6E-05	1.5E-04	2.3E-07	8.2E-08	5.3E-07	4.7E-06
Ön plant	5.0E-04	4.6E-04	5.3E-04	5.4E-04	2.7E-05	2.0E-05	4.4E-05	3.7E-04	1.6E-07	8.0E-08	2.9E-07	4.0E-06
Kungsängsverket plant	2.9E-03	2.6E-03	3.2E-03	3.2E-03	1.6E-04	1.4E-04	1.8E-04	5.1E-04	6.7E-07	2.6E-07	1.4E-06	1.6E-05
Källby plant	6.1E-03	5.8E-03	6.2E-03	6.3E-03	5.6E-05	3.5E-05	1.1E-04	1.1E-03	3.4E-06	7.7E-07	9.2E-06	4.8E-05
Centrala Reningsverket plant	1.2E-04	9.3E-05	1.2E-04	1.3E-04	2.4E-06	3.4E-07	7.0E-06	2.9E-05	4.2E-07	4.0E-08	9.7E-07	1.3E-06
Duvbacken plant	1.1E-03	1.1E-03	1.1E-03	1.1E-03	9.7E-06	1.7E-06	3.1E-05	6.7E-04	1.2E-06	3.4E-07	3.4E-06	2.2E-05
Ekeby plant	5.0E-04	4.9E-04	5.0E-04	5.1E-04	4.9E-06	5.8E-07	1.6E-05	3.2E-04	1.6E-07	3.5E-08	4.7E-07	4.2E-06
Fillanverket plant	4.6E-04	4.2E-04	4.7E-04	4.7E-04	1.4E-05	1.7E-06	4.6E-05	4.4E-04	1.1E-06	8.3E-08	3.7E-06	7.8E-06
Gässlösa plant	9.8E-04	9.6E-04	9.9E-04	9.9E-04	2.9E-06	5.1E-07	8.6E-06	1.5E-04	5.6E-07	1.1E-07	1.6E-06	1.0E-05
Göviken plant	3.6E-04	3.4E-04	3.6E-04	3.7E-04	2.9E-06	4.2E-07	9.6E-06	1.2E-04	4.1E-06	2.1E-07	1.5E-05	2.7E-05
Käppalaverket	1.4E-07	1.0E-07	1.5E-07	1.5E-07	4.6E-08	8.1E-09	1.0E-07	1.8E-06	6.1E-08	4.0E-09	2.1E-07	3.7E-07
Koholmen plant	4.9E-05	1.2E-05	6.6E-05	6.7E-05	4.5E-05	3.8E-05	5.1E-05	7.3E-05	3.5E-06	4.2E-08	1.8E-05	3.5E-05
Öresundsverket plant	2.6E-06	6.1E-07	3.8E-06	3.9E-06	7.5E-06	6.5E-06	8.2E-06	1.3E-05	6.5E-09	3.6E-09	1.0E-08	1.3E-08
Simsholmen plant	1.5E-03	1.5E-03	1.6E-03	1.6E-03	6.8E-06	8.2E-07	2.4E-05	2.8E-04	1.0E-06	1.8E-07	3.5E-06	1.3E-05
Sjölunda plant	2.7E-04	2.5E-04	2.9E-04	2.9E-04	1.1E-05	8.0E-06	1.9E-05	1.5E-04	6.6E-08	2.5E-08	1.3E-07	1.6E-06
Sjöstadsverket plant	4.2E-03	3.9E-03	4.4E-03	4.5E-03	8.0E-06	9.6E-07	2.7E-05	1.9E-04	1.2E-05	1.3E-06	3.5E-05	6.7E-05
Skansverket plant	1.7E-05	5.5E-06	2.9E-05	3.0E-05	4.7E-06	4.3E-06	5.0E-06	8.9E-06	1.0E-06	7.1E-08	3.5E-06	5.1E-06
Sundet plant	3.7E-03	3.5E-03	3.8E-03	3.8E-03	2.9E-05	2.2E-05	4.5E-05	3.4E-04	2.3E-06	6.0E-07	5.7E-06	3.4E-05
Tegelviken plant	2.0E-04	1.8E-04	2.2E-04	2.2E-04	1.0E-05	3.2E-06	2.8E-05	2.9E-04	1.3E-06	1.0E-07	3.4E-06	9.9E-06
Uddebo plant	2.1E-04	1.9E-04	2.1E-04	2.1E-04	7.0E-06	5.8E-07	2.6E-05	1.7E-04	7.0E-08	2.2E-08	1.7E-07	8.5E-07



Sewage plant names:

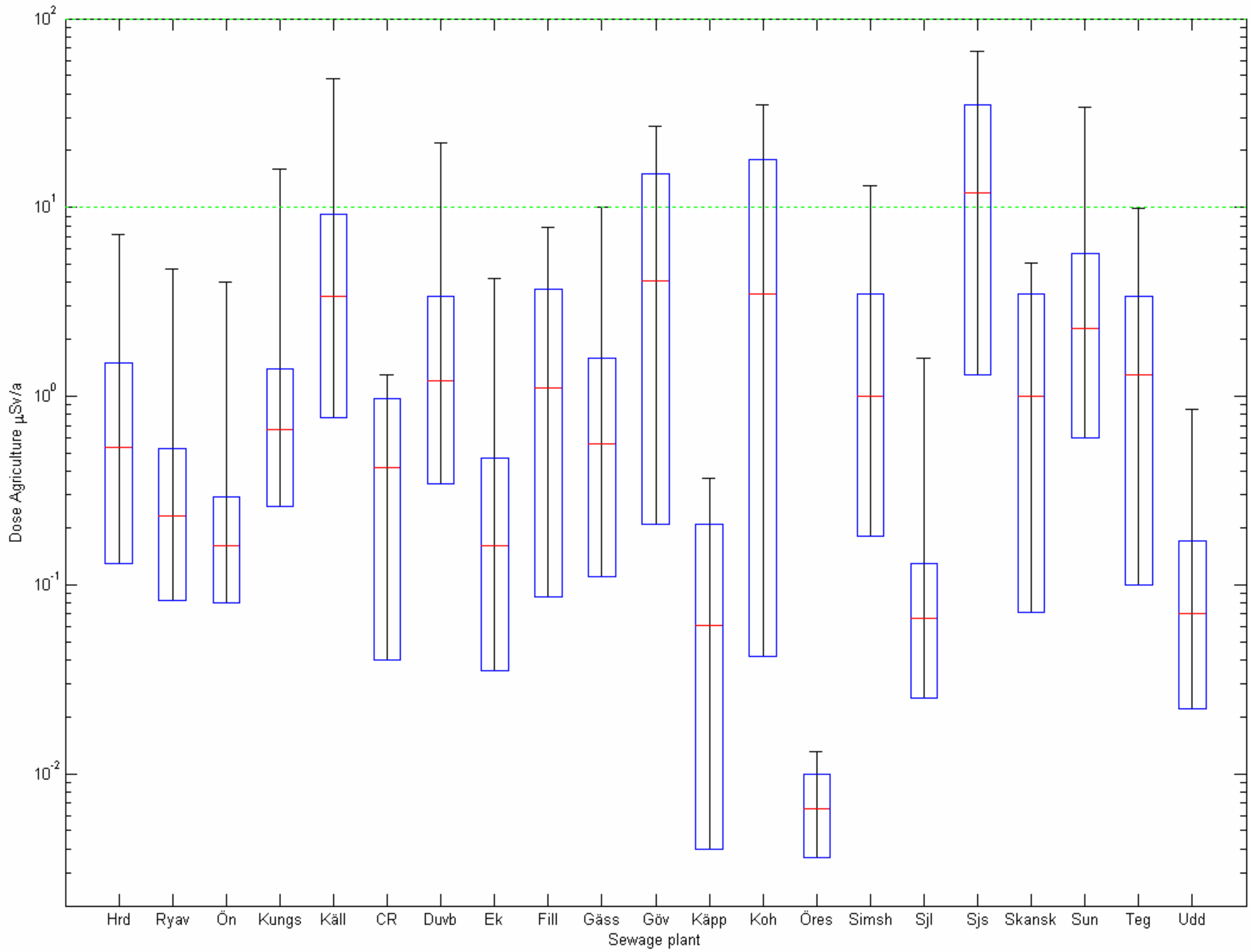
- Henriksdal
- Ryaverket
- Ön
- Kungsängsverket
- Källby
- Centrala Reningsverket
- Duvbacken
- Ekeby
- Fillanverket
- Gässlösa
- Göviken
- Käppalaverket
- Koholmen
- Öresundsverket
- Simsholmen
- Sjölunda
- Sjöstadsverket
- Skansverket
- Sundet
- Tegelviken
- Uddebo

Figure 7.1. Graphical representation of total doses for the water pathway as provided in Table 7.1. Probabilistic results (mean value, 5 and 95 percentiles) are shown as boxes with the mean value given as the horizontal line within the box. In addition, the conservative values are indicated.



Sewage plant names:
- Henriksdal
- Ryaverket
- Ön
- Kungsängsverket
- Källby
- Centrala Reningsverket
- Duvbacken
- Ekeby
- Fillanverket
- Gässlösa
- Göviken
- Käppalaverket
- Koholmen
- Öresundsverket
- Simsholmen
- Sjölunda
- Sjöstadsverket
- Skansverket
- Sundet
- Tegelviken
- Uddebo

Figure 7.2. Graphical representation of total worker doses as provided in Table 7.1. Probabilistic results (mean value, 5 and 95 percentiles) are shown as boxes with the mean value given as the horizontal line within the box. In addition, the conservative values are indicated.



Sewage plant names:

- Henriksdal
- Ryaverket
- Ön
- Kungsängsverket
- Källby
- Centrala Reningsverket
- Duvbacken
- Ekeby
- Fillanverket
- Gässlösa
- Göviken
- Käppalaverket
- Koholmen
- Öresundsverket
- Simsholmen
- Sjölunda
- Sjöstadsverket
- Skansverket
- Sundet
- Tegelviken
- Uddebo

Figure 7.3. Graphical representation of total doses for the agricultural use of sludge as provided in Table 7.1. Probabilistic results (mean value, 5 and 95 percentiles) are shown as boxes with the mean value given as the horizontal line within the box. In addition, the conservative values are indicated.

7.2 Discussion of Results

7.2.1 Exposure associated with sludges

The results show that the agricultural use of the sludge in general does not give rise to doses above the de-minimis level. With the exception of Sjöstadsverket, all mean values of the dose estimates for this pathway are below 10 μSv/a and the estimate for Sjöstadsverket is only slightly above this level. For most plants, the 95 percentiles and the conservative estimates are also below 10 μSv/a. Even in cases which exceed this level for the 95 percentiles and the conservative estimates, the values are well below the dose constraint of 100 μSv/a.

It has to be considered that the estimates still have conservative elements. In particular, no dilution of the sludges is taken into account (see Section 4.3). Applying the dilution factor of 0.03 derived in Section 4.3, doses for all plants would become negligible. Therefore, it can be concluded that this pathway is not significant.

Worker doses, on the other hand, can be quite substantial as compared to the 10 μSv/a criterion, with the mean values in several cases exceeding this level. The 95 percentiles exceed this criterion for most plants and the conservative estimates are higher than 10 μSv/a in all cases except for the Käppalaverket plant.

For the probabilistic simulations, the dose constraint of 100 μSv/a is only exceeded by the mean value for the Kungsängsverket plant and (slightly) by the 95 percentile for the Källby plant. For all other plants the dose constraint is complied with for the 95 percentile.

Due to the uncertainties in assigning Kd distributions, however, the conservative calculation results should also be considered. These exceed the dose constraint for most plants, in one case (Källby) even by a factor of more than ten.

These results show that the exposure of sewage plant workers can be relevant and that further activities to improve the reliability of the estimates by improving the data basis should be undertaken. It also may be necessary to investigate options for reducing exposures.

A particular situation arises with regard to the radionuclide P-32. The model results are based on the consideration of sorption mechanisms. In reality, however, there are special treatment steps to remove phosphorous from the waste water by precipitation. According to the official statistics (SCB 2002), at the Swedish sewage plants 95-96 % of phosphorous is removed from the wastewater. This means that the concentration in the outgoing water is less than 4-5 % of the concentration in the incoming water.

Such processes are not considered in the LUCIA model. They give rise to an enhancement of the P-32 concentration in the sludges and reduce the P-32 concentration in the discharged water as compared to the model results presented.

As a consequence, for P-32 the conservative results assuming a high Kd will be closest to reality for the pathways associated with sludges. However, this does not affect the above conclusions, because this radionuclide is not relevant for the worker exposure and the agricultural use of sludges does not give rise to significant doses. With regard to the doses over the water pathway, however, a substantial reduction is to be expected. This pathway is discussed in the following section.

7.2.2 Water pathway

The dose estimates for the water pathway show even higher values than for the workers. But it has to be considered that these estimates have been derived based on the unrealistic assumption that no dilution takes place between the discharge from the plant and the intake of drinking water and the environment in which fish are growing. This aspect already has been discussed in Section 4.3 with regard to the results of the screening study.

Furthermore, the contribution from P-32 will be overestimated because of phosphate reduction processes in the sewage plants which are not taken account of in the LUCIA model (see Section 7.2.1). Since P-32 has a very high contribution for the water pathway (mainly through its accumulation in fish), consideration of such processes will lead to a substantial reduction of dose estimates for those hospitals which use this radionuclide.

Currently, no data basis is available to derive reliable estimates for the dilution factors. Also the removal of P-32 from the water will need additional consideration in order to arrive at reliable estimates for all plants, taking account of differences in their processes regarding the removal of phosphates. Nevertheless, an attempt is made in the following to put the dose estimates for the water pathway into perspective by considering these aspects applying some rough estimates.

Table 7.2 provides the flow rates and identifies the discharge locations for each plant. To the extent that these are available, flow rates of rivers and rates for the inflow into lakes are provided which determine the dilution of the water discharged from the plants. The flow rates have been collated from readily accessible information and need to be checked. For Hammarsjön Lake no flow rate was found and the dilution factor derived for the other small lake (N. Bergundasjön) was used as estimate.

From the flow rates a first approximation of a dilution factor was derived. In cases of large lakes this can be in the order of 1000 or more. In such cases a maximum value of 100 was used in order to take account of the fact that there will be, even in the longer term, no perfect mixing of the discharges from the sewage plant with the lake water.

For the sea or for fjords, a large dilution is to be assumed. A first estimate is developed based on the assumption that the discharged water mixes within a distance of 1 km from the discharge point and a depth of 10 m. Assuming further that there is a current with a speed of 1 m/s, this corresponds to an approximate mixing volume of 3E+11 m^3. This would give rise to a dilution factor of about 3000 for the plant with the highest water flux (Ryaverket). To be conservative and also to take account of the situation in fjords with a smaller mixing volume, a dilution factor of 100 is assumed.

In order to take account of the fact that the removal of phosphorous in the sewage plants will reduce the P-32 concentrations, the average removal rate of 95 % (see previous section) is used, *i.e.* the estimates for the water pathway are revised to take into account 5 % of the P-32 contribution as obtained from the Kd = 0 case.

For discharges into the sea, the further assumption is used that no drinking water supply is taking place. Also, the exposure assessments take account of marine fish instead of sweetwater fish by using the parameters provided in Table C-3 of Appendix 4. This leads in some cases to higher values, which is mainly due to the fact that the bioaccumulation factor of Tl-201 is about five times higher for marine fish as compared to sweetwater fish and that also the consumption rates are higher for marine fish.

Applying these modifications, the revised estimates in the last column of Table 7.2 are obtained. It has to be emphasised that these revised estimates are only meant as rough indications and that they are not supported by verified data and models.

These indicative results show that realistically it is not to be expected that doses over the water pathway play a substantial role. It is rather to be expected that these are at maximum in the order of the de-minimis criterion.

However, this expectation has not been derived based on reliable data. A further investigation of dilution effects seems necessary in order to support this tentative conclusion.

The results show that realistic estimations of the exposure of the public from ingestion of contaminated water and fish are needed taking into account the dilution of the water discharged from the sewage plant. Taking into account the variety of recipients of the discharged wastewaters, such assessments will have to be done on a case by case basis, or at least for a range of generic cases that cover all existing situations. If exposures over the water pathway could be relevant based on the generic modelling presented in this report, site-specific hydrological aspects as well as the actual use of rivers and lakes for drinking water supply and their usability for fishing should be taken into account.

Table 7-2: Revised estimates for the water pathway.

Sewage plant	Water flux (m^3/y)	Discharge point	Consideration of doses taking into account high removal of P-32 (Sv/a)	Consideration of fish pathway (only for discharge into sea) (Sv/a)	Assumed dilution factor	Revised dose estimate for water pathway (Sv/a)
Henriksdal	7,70E+07	sea	3.7E-04	6.9E-04	100	6.9E-06
Ryaverket	1,16E+08	sea	1.5E-04	5.2E-04	100	5.2E-06
Ön	1,10E+07	fjord	3.0E-04	3.4E-04	100	3.4E-06
Kungsängsverket	1,73E+07	Fyrisån (4.7E8 m^3/y)	9.8E-04	9.8E-04	27	3.6E-05
Källby	1,04E+07	Vänern lake (1.8E10 m^3/y)	1.4E-03	1.4E-03	100	1.4E-05
Centrala Reningsverket	7,3E+06	Hammarsjön lake (?)	1.3E-04	1.3E-04	7	1.9E-05
Duvbacken	1,3E+07	sea	3.1E-04	1.0E-03	100	1.0E-05
Ekeby	1,5E+07	Eskilstunaån (7.6E8 m^3/y)	2.6E-04	2.6E-04	51	5.1E-06
Fillanverket	4,4E+06	sea	4.7E-04	1.3E-04	100	1.3E-06
Gässlösa	1,8E+07	Viskan (> 2E8 m^3/y)	1.5E-04	1.5E-04	11	1.4E-05
Göviken	6,9E+06	Storsjön lake (7.8E9 m^3/y)	1.1E-04	1.1E-04	100	1.1E-06
Käppalaverket	4,9E+07	fjord	1.5E-07	1.8E-07	100	1.8E-09

Sewage plant	Water flux (m^3/y)	Discharge point	Consideration of doses taking into account high removal of P-32 (Sv/a)	Consideration of fish pathway (only for discharge into sea) (Sv/a)	Assumed dilution factor	Revised dose estimate for water pathway (Sv/a)
Koholmen	5,9E+06	sea	6.7E-05	6.5E-05	100	6,5E-07
Öresundsverket	2,0E+07	sea	3.9E-06	3.0E-05	100	3,0E-07
Simsholmen	1,1E+07	Vättern lake (1.1E9 m^3/y)	3.6E-04	3.6E-04	100	3,6E-06
Sjölunda	3,7E+07	sea	1.7E-04	1.7E-04	100	1.7E-06
Sjöstadsverket	9,1E+06	Vänern lake (1.8E10 m^3/y)	5.2E-04	5.2E-04	100	5.2E-06
Skansverket	6,6E+06	Byfjord	3.0E-05	7.6E-06	100	7.6E-08
Sundet	7,7E+06	N. Bergundasjön lake (5.4E7 m^3/y)	4.3E-04	4.3E-04	7	6.1E-05
Tegelviken	8,0E+06	sea	2.2E-04	6.0E-05	100	6.0E-07
Uddebo	8,9E+06	sea	2.1E-04	6.0E-05	100	6.0E-07

7.3 Derivation of Effective Dose Factors

Based on the LUCIA model, effective dose factors are derived. These give the doses resulting from a unit concentration of each radionuclide in the influx water to the treatment plant and from a unit release of a specific radionuclide.

Detailed results for these dose factors are provided in Appendix C. Tables C-5 gives the conservative factors obtained from the deterministic simulations for the extreme cases of no retention or full retention in sludges. Tables C-7 and C-8 contain the probabilistic results for the Kd ranges defined in Table C-2.

From these results, the maximum values over all treatment plants are determined and given in Table 7.3 (effective dose factor based on activity concentration in influx water to the treatment plant) and in Table 7.4 (effective dose factor based on unit release of activity).

These effective dose factors can be used in order to estimate exposures associated with a certain release of activity in cases of changes of the annually administered activities of the different radionuclides. These factors also can be used if the effect of measures to reduce the releases of individual radionuclides is to be evaluated. Another possible use of these factors is the assessment of discharges from other institutions (*e.g.* research) discharging radionuclides which have not been explicitly considered in this report.

With regard to the dose factors for the water pathway it has to be taken into account that dilution is not considered and that the enhanced removal of P-32 is not taken into account. Therefore, the actual doses are expected to be at least one and in most cases several orders of magnitude lower (see previous section).

Table 7.3. Effective dose factor for each radionuclide relating the exposure to the activity concentration in the influx water to the treatment plants given as maximum over all plants. Results are derived from the LUCIA model and provided as key probabilistic properties (mean value, 5 and 95 percentiles). In addition, conservative estimates (no retention in sludge for the water pathway and high retention in sludge for the other pathways) are given in the last columns for each exposure pathway.

Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
	Mean	**5%**	**95%**	**Cons.**	**Mean**	**5%**	**95%**	**Cons.**	**Mean**	**5%**	**95%**	**Cons.**
Co-58	4.7E-09	2.1E-09	6.7E-09	7.1E-09	1.1E-07	1.5E-08	2.3E-07	3.1E-07	4.9E-09	6.4E-10	1.0E-08	1.4E-08
Cr-51	2.1E-10	1.3E-10	2.5E-10	2.5E-10	4.3E-09	4.3E-11	1.4E-08	1.7E-08	1.7E-11	1.7E-13	5.6E-11	7.1E-11
I-123	2.5E-10	2.4E-10	2.6E-10	2.6E-10	1.4E-11	1.8E-12	4.6E-11	4.4E-10	9.4E-16	1.2E-16	3.0E-15	2.9E-14
I-125	2.6E-08	2.5E-08	2.7E-08	2.7E-08	7.8E-11	7.8E-11	7.8E-12	6.0E-10	2.2E-10	2.2E-11	7.7E-10	1.1E-08
I-131	3.8E-08	3.6E-08	3.8E-08	3.8E-08	1.5E-09	2.0E-10	4.7E-09	5.0E-08	7.9E-12	1.0E-12	2.5E-11	2.7E-10
In-111(Cd)	5.9E-08	3.6E-08	7.6E-08	7.6E-08	8.6E-09	4.6E-11	2.9E-08	3.1E-08	2.9E-12	1.5E-14	9.6E-12	1.0E-11
In-111(Pb)	3.4E-08	2.9E-08	4.0E-08	7.6E-08	2.4E-08	1.8E-08	2.8E-08	3.1E-08	8.1E-12	6.1E-12	9.4E-12	1.0E-11
In-111(Sn)	5.7E-08	4.0E-08	7.1E-08	7.6E-08	9.9E-09	1.1E-09	2.4E-08	3.1E-08	3.3E-12	3.6E-13	8.1E-12	1.0E-11
P-32	3.4E-06	3.4E-06	3.5E-06	3.5E-06	1.1E-14	3.3E-15	2.6E-14	5.8E-13	8.2E-10	2.5E-10	1.9E-09	4.3E-08
Se-75	1.2E-08	7.2E-09	1.6E-08	1.7E-08	6.9E-08	1.7E-08	1.4E-07	2.0E-07	1.8E-08	4.5E-09	3.6E-08	5.4E-08
Sr-89	6.7E-09	5.0E-09	7.3E-09	7.4E-09	6.9E-12	2.1E-13	2.7E-11	6.0E-11	6.7E-09	2.1E-10	2.6E-08	5.8E-08
Tc-99m	1.2E-11	1.2E-11	1.2E-11	1.2E-11	4.2E-13	3.0E-14	1.5E-12	5.3E-11	1.2E-17	9.0E-19	4.5E-17	1.6E-15
TI-201(Cd)	1.9E-09	8.9E-10	2.5E-09	2.5E-09	2.2E-09	1.2E-11	7.3E-09	7.8E-09	8.0E-13	4.2E-15	2.7E-12	2.9E-12
TI-201(Pb)	9.0E-10	7.1E-10	1.1E-09	2.5E-09	6.1E-09	4.7E-09	7.2E-09	7.8E-09	2.2E-12	1.7E-12	2.6E-12	2.9E-12
TI-201(Sn)	1.8E-09	1.1E-09	2.3E-09	2.5E-09	2.5E-09	2.8E-10	6.1E-09	7.8E-09	9.3E-13	1.0E-13	2.2E-12	2.9E-12

Note: For In-111 and Tl-201 values are given for three calculation variants using different distributions for the Kd, corresponding to the Kd of Cd, Pb and Sn.

Table 7.4. Effective dose factor for each radionuclide relating the exposure to a unit release of activity given as maximum over all plants. Representation as in Table 7.3.

Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
	Mean	**5%**	**95%**	**Cons.**	**Mean**	**5%**	**95%**	**Cons.**	**Mean**	**5%**	**95%**	**Cons.**
Co-58	4.3E-16	1.7E-16	6.4E-16	6.7E-16	1.1E-14	1.4E-15	2.2E-14	2.9E-14	4.6E-16	6.0E-17	9.7E-16	1.3E-15
Cr-51	3.7E-17	7.7E-18	5.6E-17	5.6E-17	6.5E-16	6.5E-19	2.9E-15	3.2E-15	2.6E-18	2.6E-21	1.2E-17	1.3E-17
I-123	4.1E-17	3.9E-17	4.2E-17	4.2E-17	2.1E-18	1.9E-19	7.5E-18	8.0E-17	1.4E-22	1.2E-23	4.9E-22	5.2E-21
I-125	3.3E-15	2.7E-15	3.6E-15	3.6E-15	9.6E-18	1.1E-18	3.0E-17	3.3E-16	2.8E-17	3.2E-18	8.7E-17	9.5E-16
I-131	8.3E-15	7.7E-15	8.5E-15	8.5E-15	2.4E-16	2.2E-17	8.3E-16	7.9E-15	1.3E-18	1.2E-19	4.4E-18	4.2E-17
In-111(Cd)	7.1E-15	6.4E-16	9.9E-15	9.9E-15	1.5E-15	7.8E-18	4.9E-15	5.2E-15	4.9E-19	2.6E-21	1.6E-18	1.7E-18
In-111(Pb)	2.1E-15	8.3E-16	4.0E-15	9.9E-15	4.1E-15	3.1E-15	4.8E-15	5.2E-15	1.4E-18	1.0E-18	1.6E-18	1.7E-18
In-111(Sn)	6.7E-15	2.1E-15	9.5E-15	9.9E-15	1.7E-15	1.8E-16	4.1E-15	5.2E-15	5.7E-19	6.2E-20	1.4E-18	1.7E-18
P-32	4.7E-13	4.5E-13	4.8E-13	4.9E-13	1.4E-21	3.8E-22	3.4E-21	4.2E-20	1.0E-16	2.8E-17	2.5E-16	3.1E-15
Se-75	1.4E-15	5.6E-16	2.1E-15	2.5E-15	7.3E-15	2.1E-15	1.3E-14	1.6E-14	1.9E-15	5.7E-16	3.4E-15	4.3E-15
Sr-89	1.4E-15	5.8E-16	1.7E-15	1.7E-15	1.1E-18	7.5E-21	5.5E-18	1.1E-17	1.1E-15	7.3E-18	5.3E-15	1.1E-14
Tc-99m	1.6E-18	1.5E-18	1.6E-18	1.6E-18	6.1E-20	3.2E-21	2.2E-19	1.1E-17	1.8E-24	9.5E-26	6.6E-24	3.3E-22
TI-201(Cd)	2.4E-16	2.2E-17	3.4E-16	3.4E-16	3.7E-16	2.0E-18	1.2E-15	1.3E-15	1.4E-19	7.2E-22	4.6E-19	4.9E-19
TI-201(Pb)	7.4E-17	2.9E-17	1.4E-16	3.4E-16	1.0E-15	7.9E-16	1.2E-15	1.3E-15	3.8E-19	2.9E-19	4.5E-19	4.9E-19
TI-201(Sn)	2.3E-16	7.4E-17	3.3E-16	3.4E-16	4.3E-16	4.7E-17	1.0E-15	1.3E-15	1.6E-19	1.7E-20	3.8E-19	4.9E-19

Note: For In-111 and Tl-201 values are given for three calculation variants using different distributions for the Kd, corresponding to the Kd of Cd, Pb and Sn.

8 Conclusions and recommendations

The following conclusions and recommendations can be derived with regard to exposures resulting from hospital discharges:

- The screening study (Section 4) shows that only a few of those radionuclides used in the period 1999-2004 in Swedish hospitals for radiotherapy and radiodiagnostics could lead to potentially significant doses (above the exemption level of 10 μSv/a). These radionuclides are: P-32, Y-90, Tc-99m, In-111, I-123, I-131 and Tl-201. It should be taken into account that the screening study was designed for a low probability of screening out radionuclides and exposure pathways that might be potentially significant. To achieve this, over-conservative and in some cases unrealistic assumptions were made. Hence, the calculated doses cannot be used directly for the estimation of radiological risks.

- The screening study also shows that the exposure pathways for which realistic assessments are required are: the external exposure of sewage workers (for Tc-99m, I-123, I-131, In-111 and Tl-201) and the exposure of the public via ingestion of water (I-131) and fish (P-32, Y-90 and In-111 and I-131). Other exposure pathways considered (exposure of sewage workers via inhalation of contaminated dust and ingestion of food grown on agricultural lands where contaminated sludge has been used as fertilizer or disposed of on a landfill) were found to have an insignificant dose contribution.

- Realistic assessments (Section 6) of the external exposure of sewage workers were carried out for the Kungsängsverket sewage plant in Uppsala. For this purpose a dynamic model, LUCIA, of the turnover of radionuclides in sewage plants was developed. The results of the realistic assessments show that there is a significant probability (from 0.2 to close to 1) for the doses exceeding the exemption level for the radionuclides In-111 and I-131. In the case of In-111, there is also a significant probability (from 0.16 to close to 1) for the doses exceeding the dose constraint (100 μSv/a). It should be noted, however, that the values of the distribution coefficients (Kd) used in the calculations were not specific values for sewage sludge, but values reported for organic soils. Moreover, for Indium, Kd values in organic soils were not found in the literature and therefore values for the "analogous" elements (Cd, Pb and Sn) were used. For I-123 and I-131 the calculations have shown that the probability for the doses exceeding the exemption levels is low.

The LUCIA model was also applied to derive realistic dose assessments for the other sewage plants because it was considered as sufficiently generic to provide reasonable dose estimates also for other plants. The following key results were achieved:

- The exposure of workers at sewage plants is relevant and may exceed the de-minimis level and even the dose constraint for several plants (based on conservative values). Dominating radionuclides are I-131, In-111 and, to a lesser extent, Tl-201.

- Doses associated with the agricultural use of sludges are negligible.

- Derived dose estimates for the water pathway are substantial in comparison to the de-minimis level, and in some cases even the dose constraint. However, taking into account dilution factors and retention of P-32 at the sewage plant, the doses by this pathway will be substantially smaller than predicted by the LUCIA model (which only considers sorption but no phosphate remove processes which are applied in sewage plants). In conclusion, it is not expected that the 10 μSv/a criterion will be exceeded for the water pathway. Nevertheless, this conclusion will require to be verified after improving the LUCIA model (in particular with regard to the removal of P-32 from the waste water) and also by taking into account the specific hydrological situation at the discharge sites of the sewage plants.

The report also presents effective dose factors which relate the exposure by the different pathways to unit activity releases, or to unit concentrations, for each radionuclide in the waste water. These effective dose factors can be used as reference levels for regulatory activities to estimate exposures associated with a certain release of activity in cases of changes of the annually administered activities of the different radionuclides. These factors also can be used if the effect of measures to reduce the releases of individual radionuclides is to be evaluated. Another possible use of these factors is the assessment of discharges from other institutions (*e.g.* research) discharging radionuclides which have not been explicitly considered in this report.

With regard to further activities, the following conclusions can be drawn from the assessment results.

- The sensitivity study of the LUCIA model shows that the predictions of the concentrations in the digested sludge are highly sensitive to the distribution coefficient for the primary sedimentation (KdR1), slightly sensitive to the distribution coefficient for the biological treatment (KdR2) and practically insensitive to all other model parameters, when considered individually. The same is valid for the efficiency of the wastewater treatment which was also highly sensitive to the water flux. Considering that no specific Kd data for sludge are available, it appears important that empirical studies are carried out to obtain appropriate Kd values, at least for indium and iodine.

- The derivation of Kd values from measurements in treatment plants can be performed by using the dynamic LUCIA model, relating time dependent measurements of radionuclide concentrations in the inlet to resulting radionuclide concentrations in the sludge and in the treated water. Kd values that reproduce the measurements can then also be used in other models.

- The LUCIA model was developed specifically for the Kungsängsverket sewage plant in Uppsala, but it is sufficiently generic to be applied to other sewage plants, especially if they are of the same type. Also, the probabilistic study has shown that the predictions of input and output relationships are rather simple, which facilitates the model simplification and the application to other situations. However, one has to be aware that there are strong interactions between the model parameters and therefore sensible values have to be used for all parameters, even if the model seems relatively insensitive to most of them individually. The application of the LUCIA model to other plants performed in this report should be reviewed based on these considerations and it should be decided whether particular features of other plants require further deliberations in the modelling.

- The results show that realistic estimations of the exposure of the public from ingestion of contaminated water and fish are needed, taking into account the dilution of the water discharged from the sewage plant. Taking into account the variety of recipients of the discharged wastewaters, such assessments will have to be done on a case by case basis, or at least for a range of generic cases that cover all existing situations. If exposures over the water pathway could be relevant based on the generic modelling presented in this report, site-specific hydrological aspects as well as the actual use of rivers and lakes for drinking water supply and their usability for fishing should be taken into account.

- It should be checked in the further modelling whether the model for the external exposure needs be modified to reflect the actual exposure situations. This can be done by comparing external dose factors for geometries relevant for treatment plants to those used at the moment (relating to a semi-infinite plane).

- Some radionuclides require special treatment. In particular, the behaviour of P-32 in a sewage treatment plant will probably not be adequately described by the sorption model used. Instead, an explicit consideration of treatment steps to reduce phosphates (which may also influence other radionuclides) is required. Such aspects should be taken into account in a more general model.

Special consideration also would need to be given to C-14 (not considered in this study) if releases from this radionuclide should be relevant.

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Appendix A: Estimated yearly releases to the studied sewage plants for the period 1999-2004/2005

Table A-1. Estimated yearly releases to the Henriksdal plant (Stockholm) for the period 1999-2004.

Nuclide	Release rate Q^j, Bq/y								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**Min**	**Max**	**Mean**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	9.7E+08	9.2E+08	7.8E+08	7.5E+08	7.5E+08	8.2E+08	7.5E+08	9.7E+08	8.3E+08
Cu-64	3.7E+08	1.1E+08	1.7E+08	7.6E+07	7.6E+07	0.0E+00	0.0E+00	3.7E+08	1.3E+08
Ga-67	2.0E+08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.0E+08	3.3E+07
I-123	1.7E+10	2.3E+10	2.1E+10	1.8E+10	1.7E+10	2.8E+10	1.7E+10	2.8E+10	2.0E+10
I-125	1.7E+07	1.9E+07	1.2E+07	2.2E+07	1.7E+07	1.7E+07	1.2E+07	2.2E+07	1.7E+07
I-131	3.9E+11	5.7E+11	4.3E+11	6.2E+11	6.3E+11	6.1E+11	3.9E+11	6.3E+11	5.4E+11
In-111	2.6E+10	2.4E+10	2.6E+10	2.9E+10	2.3E+10	2.3E+10	2.3E+10	2.9E+10	2.5E+10
P-32	4.9E+09	1.1E+10	1.0E+10	7.7E+09	1.3E+10	7.4E+09	4.9E+09	1.3E+10	9.1E+09
Se-75	5.9E+06	5.9E+06	2.5E+07	5.0E+07	3.8E+07	3.8E+07	5.9E+06	5.0E+07	2.7E+07
Sr-89	2.6E+09	3.8E+09	2.1E+09	6.2E+09	5.4E+09	3.6E+09	2.1E+09	6.2E+09	3.9E+09
Tc-99m	5.6E+12	5.7E+12	5.5E+12	6.2E+12	5.7E+12	5.2E+12	5.2E+12	6.2E+12	5.6E+12
TI-201	7.5E+07	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	7.5E+07	1.3E+07
Y-90	1.0E+08	1.2E+08	9.9E+08	1.1E+08	1.1E+08	5.7E+09	1.0E+08	5.7E+09	1.2E+09

Table A-2. Estimated yearly releases to the Ryaverket plant (Gothenburg) for the period 1999-2004.

Nuclide	Release rate Q^j, Bq/y								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**Min**	**Max**	**Mean**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	5.7E+09	6.8E+09	5.5E+09	5.5E+09	6.1E+09	6.5E+09	5.5E+09	6.8E+09	6.0E+09
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	8.7E+09	4.2E+09	4.0E+09	2.5E+09	1.3E+09	3.8E+09	1.3E+09	8.7E+09	4.1E+09
I-123	8.7E+09	1.0E+10	5.0E+09	6.8E+09	6.7E+09	8.3E+09	5.0E+09	1.0E+10	7.6E+09
I-125	1.3E+07	1.9E+07	2.0E+07	1.1E+07	6.6E+06	5.9E+06	5.9E+06	2.0E+07	1.3E+07
I-131	2.2E+11	2.2E+11	2.2E+11	2.1E+11	1.7E+11	2.9E+11	1.7E+11	2.9E+11	2.2E+11
In-111	2.0E+10	2.3E+10	2.0E+07	2.0E+10	2.1E+10	2.6E+10	2.0E+07	2.6E+10	1.8E+10
P-32	1.5E+10	1.3E+10	1.0E+10	1.1E+10	1.1E+10	7.0E+09	7.0E+09	1.5E+10	1.1E+10
Se-75	5.6E+07	9.1E+07	9.8E+07	9.7E+07	8.4E+07	7.1E+07	5.6E+07	9.8E+07	8.3E+07
Sr-89	2.3E+09	7.5E+08	1.4E+09	6.0E+08	0.0E+00	1.5E+08	0.0E+00	2.3E+09	8.5E+08
Tc-99m	1.7E+12	1.9E+12	1.9E+12	2.2E+12	2.1E+12	2.2E+12	1.7E+12	2.2E+12	2.0E+12
TI-201	6.2E+10	4.6E+10	0.0E+00	4.8E+08	1.1E+08	0.0E+00	0.0E+00	6.2E+10	1.8E+10
Y-90	8.0E+08	1.5E+09	1.0E+09	4.0E+08	9.0E+08	5.5E+08	4.0E+08	1.5E+09	8.6E+08

Table A-3. Estimated yearly releases to the Ön plant (Umeå) for the period 1999-2004.

Nuclide	Release rate Q^j, Bq/y								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**Min**	**Max**	**Mean**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.0E+09	2.1E+09	2.1E+09	1.6E+09	2.2E+09	2.3E+09	1.6E+09	2.3E+09	2.0E+09
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	5.9E+09	9.5E+09	1.2E+10	1.1E+10	2.0E+10	3.1E+10	5.9E+09	3.1E+10	1.5E+10
I-125	6.8E+06	6.6E+06	4.0E+06	3.8E+06	5.3E+06	3.6E+06	3.6E+06	6.8E+06	5.0E+06
I-131	5.9E+10	5.8E+10	6.8E+09	4.7E+10	5.6E+10	3.6E+10	6.8E+09	5.9E+10	4.4E+10
In-111	1.1E+10	8.9E+09	4.7E+09	5.4E+09	5.8E+09	6.0E+09	4.7E+09	1.1E+10	7.0E+09
P-32	7.9E+08	1.8E+08	7.6E+08	0.0E+00	0.0E+00	4.0E+08	0.0E+00	7.9E+08	3.5E+08
Se-75	4.0E+07	4.2E+07	3.7E+07	3.9E+07	3.3E+07	3.0E+07	3.0E+07	4.2E+07	3.7E+07
Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	2.0E+12	1.8E+12	1.8E+12	1.6E+12	1.8E+12	1.8E+12	1.6E+12	2.0E+12	1.8E+12
TI-201	0.0E+00	3.4E+08	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.4E+08	5.6E+07
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.9E+09	0.0E+00	2.9E+09	4.8E+08

Table A-4. Estimated yearly releases to the Kungsängsverket plant (Uppsala) for the period 1999-2004.

Nuclide	Release rate Q^j, Bq/y								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**Min**	**Max**	**Mean**
Co-58	3.0E+05	2.1E+05	6.0E+04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.0E+05	9.5E+04
Cr-51	2.8E+08	2.8E+08	4.2E+08	4.5E+08	3.0E+08	2.4E+08	2.4E+08	4.5E+08	3.3E+08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	4.0E+08	0.0E+00	0.0E+00	4.0E+08	6.7E+07
I-123	0.0E+00	0.0E+00	0.0E+00	1.9E+08	9.9E+08	6.5E+08	0.0E+00	9.9E+08	3.1E+08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	1.0E+11	8.3E+10	8.2E+10	1.2E+11	9.5E+10	1.3E+11	8.2E+10	1.3E+11	1.0E+11
In-111	1.4E+11	1.0E+11	8.4E+10	1.7E+11	1.7E+11	3.5E+10	3.5E+10	1.7E+11	1.2E+11
P-32	1.2E+10	1.1E+10	1.5E+09	0.0E+00	5.0E+08	5.7E+08	0.0E+00	1.2E+10	4.2E+09
Se-75	4.8E+06	3.6E+06	8.4E+06	9.3E+06	8.9E+06	1.2E+07	3.6E+06	1.2E+07	7.8E+06
Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	1.4E+12	1.4E+12	1.2E+12	1.3E+12	1.4E+12	1.4E+12	1.2E+12	1.4E+12	1.4E+12
TI-201	0.0E+00	1.4E+08	2.9E+10	0.0E+00	0.0E+00	0.0E+00	0.0E+00	2.9E+10	4.8E+09
Y-90	7.4E+09	0.0E+00	0.0E+00	9.6E+10	0.0E+00	1.9E+09	0.0E+00	9.6E+10	1.8E+10

Table A-5. Estimated yearly releases to the Källby plant (Lund) for the period 1999-2004.

Nuclide	Release rate Q^j, Bq/y								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**Min**	**Max**	**Mean**
Co-58	9.0E+04	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	9.0E+04	1.5E+04
Cr-51	1.4E+07	2.0E+06	4.0E+06	2.1E+07	9.0E+06	3.0E+06	2.0E+06	2.1E+07	8.9E+06
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	5.6E+08	1.9E+08	0.0E+00	2.0E+08	0.0E+00	0.0E+00	0.0E+00	5.6E+08	1.6E+08
I-123	1.6E+10	1.8E+10	1.7E+10	8.9E+09	1.3E+10	1.4E+10	8.9E+09	1.8E+10	1.4E+10
I-125	1.2E+06	3.0E+05	3.0E+05	2.1E+06	1.1E+07	3.3E+05	3.0E+05	1.1E+07	2.4E+06
I-131	2.9E+11	2.6E+11	1.9E+11	1.8E+11	2.6E+11	2.2E+11	1.8E+11	2.9E+11	2.3E+11
In-111	9.2E+09	1.9E+10	1.9E+10	2.3E+10	2.1E+10	2.6E+10	9.2E+09	2.6E+10	2.0E+10
P-32	1.6E+10	1.4E+10	1.4E+10	1.6E+10	1.2E+10	1.1E+10	1.1E+10	1.6E+10	1.4E+10
Se-75	2.6E+06	5.2E+06	3.0E+06	1.9E+06	2.2E+06	2.2E+06	1.9E+06	5.2E+06	2.8E+06
Sr-89	4.9E+09	5.3E+09	2.9E+09	4.5E+09	3.0E+09	2.1E+09	2.1E+09	5.3E+09	3.8E+09
Tc-99m	2.9E+12	3.0E+12	3.0E+12	3.1E+12	3.1E+12	3.2E+12	2.9E+12	3.2E+12	3.1E+12
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	2.7E+09	2.8E+04	1.1E+10	8.5E+09	3.6E+09	4.2E+09	2.8E+04	1.1E+10	4.9E+09

Table A-6. Estimated yearly releases to the Centrala Reningsverket plant (Kristianstad) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	2000	2001	2002	2003	2004	2005	Min	Max	Mean
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,1E+08	9,4E+07	1,5E+08	1,4E+08	1,1E+08	1,5E+08	2,6E+08	9,4E+07	2,6E+08	1,4E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	2,7E+06	2,0E+05	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,7E+06	4,2E+05
I-131	2,6E+10	1,7E+10	4,6E+07	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,6E+10	6,1E+09
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	1,4E+09	1,2E+09	1,1E+09	9,0E+08	1,1E+09	1,2E+09	6,0E+08	6,0E+08	1,4E+09	1,1E+09
Tc-99m	1,3E+12	1,3E+12	9,9E+11	8,6E+11	1,2E+12	1,3E+12	1,3E+12	8,6E+11	1,3E+12	1,2E+12
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-7. Estimated yearly releases to the Duvbacken plant (Gävle-Sandviken) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	2000	2001	2002	2003	2004	2005	Min	Max	Mean
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,0E+07	1,1E+07	9,0E+06	6,0E+06	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,1E+07	5,1E+06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	6,8E+08	1,2E+09	6,6E+08	1,5E+08	1,2E+09	1,0E+09	0,0E+00	1,2E+09	7,0E+08
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	8,2E+10	8,7E+10	5,4E+10	6,1E+10	4,5E+10	8,9E+10	5,5E+10	4,5E+10	8,9E+10	6,8E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	3,2E+09	2,4E+09	2,0E+09	1,6E+09	4,5E+08	9,4E+08	1,4E+09	4,5E+08	3,2E+09	1,7E+09
Se-75	4,8E+06	2,2E+06	2,2E+06	1,5E+08	2,2E+06	2,6E+06	3,7E+06	2,2E+06	1,5E+08	2,4E+07
Sr-89	0,0E+00	5,5E+06	4,0E+08	1,5E+09	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,5E+09	2,7E+08
Tc-99m	7,1E+11	6,6E+11	7,3E+11	7,9E+11	8,0E+11	8,7E+11	9,2E+11	6,6E+11	9,2E+11	7,8E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-8. Estimated yearly releases to the Ekeby plant (Eskilstuna) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	2,4E+08	0,0E+00	0,0E+00	4,4E+08	0,0E+00	4,4E+08	9,8E+07
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	7,0E+10	5,8E+10	4,8E+10	5,1E+10	6,3E+10	7,2E+10	9,9E+10	4,8E+10	9,9E+10	6,6E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	3,8E+08	1,0E+09	1,1E+09	1,1E+09	9,9E+08	4,0E+08	4,0E+08	3,8E+08	1,1E+09	7,8E+08
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	3,0E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	3,0E+08	4,3E+07
Tc-99m	1,1E+12	9,2E+11	1,0E+12	9,3E+11	9,4E+11	7,7E+11	6,9E+11	6,9E+11	1,1E+12	9,0E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	4,2E+08	2,9E+08	7,6E+08	4,4E+08	0,0E+00	7,6E+08	2,7E+08
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-9. Estimated yearly releases to the Fillanverket plant (Sundsvall) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	7,6E+08	5,8E+08	1,0E+09	5,0E+08	4,2E+08	5,6E+08	4,6E+08	4,2E+08	1,0E+09	6,2E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	1,2E+09	1,7E+09	1,6E+09	1,6E+09	4,3E+09	0,0E+00	4,3E+09	1,5E+09
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	3,9E+10	1,8E+10	3,2E+10	5,5E+10	3,6E+10	3,1E+10	3,2E+10	1,8E+10	5,5E+10	3,5E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	3,0E+08	4,4E+08	1,0E+09	4,5E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,0E+09	3,2E+08
Tc-99m	9,9E+11	8,4E+11	8,1E+11	8,7E+11	9,9E+11	9,9E+11	8,7E+11	8,1E+11	9,9E+11	9,1E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-10. Estimated yearly releases to the Gässlösa plant (Borås) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	2000	2001	2002	2003	2004	2005	Min	Max	Mean
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,5E+09	1,5E+09	1,3E+09	1,3E+03	1,9E+09	2,2E+09	2,0E+09	1,3E+03	2,2E+09	1,5E+09
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	7,4E+08	3,5E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	7,4E+08	1,6E+08
I-123	5,0E+07	0,0E+00	1,0E+08	1,0E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,0E+08	3,6E+07
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	4,6E+10	3,6E+10	4,9E+10	3,8E+10	2,8E+10	1,9E+10	2,0E+10	1,9E+10	4,9E+10	3,4E+10
In-111	3,0E+07	0,0E+00	1,5E+07	1,5E+07	3,0E+07	4,2E+07	0,0E+00	0,0E+00	4,2E+07	1,9E+07
P-32	4,6E+09	4,6E+09	2,8E+09	3,7E+09	3,2E+09	2,0E+09	2,3E+09	2,0E+09	4,6E+09	3,3E+09
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	6,0E+08	0,0E+00	1,2E+09	1,4E+09	4,4E+08	1,5E+08	1,5E+08	0,0E+00	1,4E+09	5,6E+08
Tc-99m	5,4E+11	4,5E+11	4,9E+11	4,4E+11	4,4E+11	4,4E+11	3,4E+11	3,4E+11	5,4E+11	4,5E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-11. Estimated yearly releases to the Göviken plant (Östersund) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	2,0E+08	2,1E+08	2,7E+08	2,4E+08	2,8E+08	2,2E+02	2,5E+08	2,2E+02	2,8E+08	2,1E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,7E+10	1,7E+10	1,5E+10	6,8E+08	9,3E+09	1,3E+10	1,0E+10	6,8E+08	1,7E+10	1,2E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	5,6E+08	0,0E+00	0,0E+00	1,8E+08	1,8E+08	0,0E+00	5,6E+08	1,3E+08
Se-75	2,6E+06	4,1E+06	4,4E+06	5,2E+06	7,4E+05	3,0E+06	7,7E+06	7,4E+05	7,7E+06	4,0E+06
Sr-89	3,9E+09	3,8E+09	4,1E+09	5,4E+09	4,7E+09	3,5E+09	3,2E+09	3,2E+09	5,4E+09	4,1E+09
Tc-99m	4,8E+11	4,7E+11	4,8E+11	4,3E+11	4,4E+11	4,4E+11	4,8E+11	4,3E+11	4,8E+11	4,6E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-12. Estimated yearly releases to the Käppalaverket plant (Lidingö) for the period 1999-2005.

Nuclide	**Release rate Q^j, Bq/y**									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,3E+08	5,4E+08	2,7E+08	2,0E+08	1,9E+08	1,9E+08	3,3E+07	3,3E+07	5,4E+08	2,2E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	3,7E+05	7,4E+05	5,9E+06	3,3E+06	2,2E+06	0,0E+00	5,9E+06	1,8E+06
Sr-89	0,0E+00	5,5E+08	2,9E+08	2,7E+08	2,7E+08	2,7E+08	0,0E+00	0,0E+00	5,5E+08	2,4E+08
Tc-99m	1,1E+12	1,2E+12	1,2E+12	0,0E+00	1,3E+12	1,4E+12	1,4E+12	0,0E+00	1,4E+12	1,1E+12
TI-201	0,0E+00	0,0E+00	0,0E+00	1,2E+12	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,2E+12	1,7E+11
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-13. Estimated yearly releases to the Koholmen plant (Karlskrona) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	2000	2001	2002	2003	2004	2005	Min	Max	Mean
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	5,5E+08	6,1E+08	9,4E+08	6,8E+08	7,9E+08	9,2E+08	5,1E+08	5,1E+08	9,4E+08	7,1E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	1,0E+08	3,8E+08	6,0E+08	2,4E+08	0,0E+00	6,0E+08	1,9E+08
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	1,7E+09	1,2E+09	2,0E+09	1,6E+09	2,7E+09	2,1E+09	5,6E+09	1,2E+09	5,6E+09	2,4E+09
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	0,0E+00	2,7E+09	3,3E+09	2,1E+09	1,0E+09	8,9E+08	3,0E+08	0,0E+00	3,3E+09	1,5E+09
Tc-99m	6,5E+11	7,4E+11	8,0E+11	6,8E+11	6,5E+11	7,5E+11	8,4E+11	6,5E+11	8,4E+11	7,3E+11
TI-201	2,0E+10	5,7E+09	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,0E+10	3,6E+09
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-14. Estimated yearly releases to the Öresundsverket plant (Helsinborg) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	4,4E+06	0,0E+00	4,4E+06	6,3E+05
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	6,6E+11	8,8E+11	1,2E+12	1,0E+12	9,8E+11	8,2E+11	9,5E+11	6,6E+11	1,2E+12	9,3E+11
TI-201	3,2E+10	1,6E+10	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	3,2E+10	6,8E+09
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-15. Estimated yearly releases to the Simsholmen plant (Jönköping) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	6,7E+08	6,7E+08	3,5E+08	2,8E+08	1,4E+08	5,2E+07	3,0E+07	3,0E+07	6,7E+08	3,1E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	7,2E+08	1,3E+08	2,5E+08	3,8E+08	3,7E+08	1,5E+09	9,9E+08	1,3E+08	1,5E+09	6,2E+08
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	5,9E+10	5,5E+10	5,4E+10	4,4E+10	4,7E+10	8,7E+10	6,1E+10	4,4E+10	8,7E+10	5,8E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	1,6E+09	1,9E+09	1,6E+09	1,5E+09	2,8E+09	4,1E+09	3,1E+09	1,5E+09	4,1E+09	2,4E+09
Se-75	3,0E+06	1,6E+06	1,2E+06	1,2E+06	2,4E+06	1,6E+06	4,4E+06	1,2E+06	4,4E+06	2,2E+06
Sr-89	2,3E+09	7,8E+08	1,3E+09	7,7E+08	7,6E+08	0,0E+00	0,0E+00	0,0E+00	2,3E+09	8,4E+08
Tc-99m	1,0E+12	9,9E+11	8,7E+11	9,8E+11	1,0E+12	1,0E+12	9,7E+11	8,7E+11	1,0E+12	9,8E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,5E+09	0,0E+00	1,5E+09	2,1E+08

Table A-16. Estimated yearly releases to the Sjölunda plant (Malmö) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	6,0E+04	9,0E+04	6,0E+04	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	9,0E+04	3,0E+04
Cr-51	5,6E+08	6,5E+08	4,5E+08	2,9E+08	1,9E+08	2,5E+08	1,5E+08	1,5E+08	6,5E+08	3,6E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	1,3E+09	1,7E+09	5,6E+08	1,9E+08	1,9E+08	1,9E+08	0,0E+00	1,7E+09	5,8E+08
I-123	4,4E+09	2,9E+09	5,1E+09	7,4E+09	5,3E+09	3,6E+09	7,1E+09	2,9E+09	7,4E+09	5,1E+09
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	9,9E+10	1,0E+11	8,9E+10	1,2E+11	1,0E+11	9,0E+10	9,3E+10	8,9E+10	1,2E+11	9,9E+10
In-111	2,3E+10	3,5E+09	3,6E+09	6,1E+09	3,1E+09	1,8E+09	3,4E+09	1,8E+09	2,3E+10	6,3E+09
P-32	5,9E+08	3,7E+08	1,0E+09	1,3E+09	1,9E+08	5,2E+08	1,9E+08	1,9E+08	1,3E+09	6,0E+08
Se-75	2,8E+06	3,2E+06	4,2E+06	4,3E+06	5,5E+06	5,3E+06	4,4E+06	2,8E+06	5,5E+06	4,2E+06
Sr-89	0,0E+00	0,0E+00	0,0E+00	1,5E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,5E+08	2,1E+07
Tc-99m	2,5E+12	2,8E+12	2,6E+12	2,5E+12	2,8E+12	2,4E+12	2,4E+12	2,4E+12	2,8E+12	2,6E+12
TI-201	3,4E+08	3,4E+08	4,3E+08	3,4E+08	1,7E+08	1,7E+08	8,5E+07	8,5E+07	4,3E+08	2,7E+08
Y-90	5,6E+08	4,4E+08	0,0E+00	0,0E+00	0,0E+00	3,7E+07	1,3E+09	0,0E+00	1,3E+09	3,3E+08

Table A-17. Estimated yearly releases to the Sjöstadsverket plant (Karlstad) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,8E+08	8,8E+07	1,7E+08	2,9E+08	2,1E+08	2,3E+08	3,5E+08	8,8E+07	3,5E+08	2,2E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	7,2E+08	6,9E+08	5,5E+08	8,8E+07	7,3E+08	4,6E+08	1,1E+09	8,8E+07	1,1E+09	6,1E+08
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	5,5E+10	1,2E+10	7,3E+10	2,9E+10	6,9E+10	5,0E+10	6,9E+04	6,9E+04	7,3E+10	4,1E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	3,8E+09	5,0E+09	1,1E+10	2,2E+09	4,0E+09	6,8E+09	3,2E+09	2,2E+09	1,1E+10	5,1E+09
Se-75	1,1E+07	1,9E+06	1,7E+07	0,0E+00	1,5E+07	1,5E+07	1,6E+07	0,0E+00	1,7E+07	1,1E+07
Sr-89	7,3E+08	2,9E+10	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,9E+10	4,3E+09
Tc-99m	9,1E+11	3,8E+11	3,9E+11	8,2E+11	2,4E+11	9,4E+11	1,1E+12	2,4E+11	1,1E+12	6,8E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-18. Estimated yearly releases to the Skansverket plant (Uddevalla) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	9,0E+08	7,8E+08	1,9E+09	1,2E+09	2,1E+09	1,7E+09	2,6E+09	7,8E+08	2,6E+09	1,6E+09
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	2,0E+07	1,4E+07	1,9E+07	1,1E+07	1,3E+07	1,1E+07	1,0E+07	1,0E+07	2,0E+07	1,4E+07
Sr-89	0,0E+00	0,0E+00	7,5E+08	1,5E+09	3,0E+08	4,5E+08	1,5E+08	0,0E+00	1,5E+09	4,5E+08
Tc-99m	4,5E+11	4,4E+11	4,2E+11	4,1E+11	2,4E+11	4,4E+11	3,9E+11	2,4E+11	4,5E+11	4,0E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,1E+09	0,0E+00	1,1E+09	1,5E+08

Table A-19. Estimated yearly releases to the Sundet plant (Växjö) for the period 1999-2005.

Nuclide	**Release rate Q^j, Bq/y**									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	4,1E+08	3,5E+08	3,9E+08	3,2E+08	0,0E+00	1,8E+06	0,0E+00	0,0E+00	4,1E+08	2,1E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	2,0E+08	1,0E+08	1,0E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,0E+08	5,7E+07
I-123	0,0E+00	0,0E+00	0,0E+00	2,4E+08	1,2E+09	2,3E+09	1,8E+09	0,0E+00	2,3E+09	7,9E+08
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	2,5E+10	3,4E+10	4,7E+10	3,0E+10	3,1E+10	3,9E+04	0,0E+00	4,7E+10	2,4E+10
In-111	7,2E+08	8,4E+08	1,2E+09	1,1E+09	1,1E+09	5,1E+08	1,4E+09	5,1E+08	1,4E+09	9,8E+08
P-32	0,0E+00	0,0E+00	7,9E+09	6,5E+09	1,5E+09	2,8E+09	3,4E+09	0,0E+00	7,9E+09	3,1E+09
Se-75	1,5E+07	2,0E+07	1,3E+07	1,7E+07	1,4E+07	1,2E+07	2,2E+07	1,2E+07	2,2E+07	1,6E+07
Sr-89	1,9E+09	1,0E+09	1,9E+09	1,4E+09	7,4E+08	4,4E+08	4,4E+08	4,4E+08	1,9E+09	1,1E+09
Tc-99m	5,0E+11	4,4E+11	8,8E+11	8,2E+11	8,2E+11	9,8E+11	1,0E+12	4,4E+11	1,0E+12	7,8E+11
TI-201	3,5E+10	3,0E+10	1,3E+10	1,8E+10	1,4E+10	9,0E+08	9,8E+08	9,0E+08	3,5E+10	1,6E+10
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-20. Estimated yearly releases to the Tegelviken plant (Kalmar) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	2,3E+08	2,3E+08	3,5E+08	2,6E+08	1,4E+08	1,4E+08	1,5E+08	1,4E+08	3,5E+08	2,1E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,5E+09	0,0E+00	2,5E+09	3,6E+08
I-125	1,8E+06	9,0E+05	3,0E+05	0,0E+00	1,2E+06	5,0E+05	1,5E+06	0,0E+00	1,8E+06	8,9E+05
I-131	3,0E+10	4,4E+10	0,0E+00	1,1E+10	2,9E+10	3,8E+10	4,5E+10	0,0E+00	4,5E+10	2,8E+10
In-111	8,7E+08	7,8E+08	5,3E+08	1,6E+09	7,7E+06	3,5E+08	1,1E+09	7,7E+06	1,6E+09	7,4E+08
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	2,4E+09	2,5E+09	0,0E+00	1,5E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00	2,5E+09	7,2E+08
Tc-99m	1,0E+12	1,0E+12	6,7E+11	6,4E+11	8,8E+11	9,0E+11	9,5E+11	6,4E+11	1,0E+12	8,7E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table A-21. Estimated yearly releases to the Uddebo plant (Luleå) for the period 1999-2005.

Nuclide	Release rate Q^j, Bq/y									
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**Min**	**Max**	**Mean**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	1,5E+09	1,5E+09	1,6E+09	0,0E+00	0,0E+00	0,0E+00	0,0E+00	1,6E+09	6,7E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	6,4E+07	6,4E+07	6,4E+07	2,1E+10	4,9E+10	3,2E+10	0,0E+00	4,9E+10	1,5E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	0,0E+00	3,4E+11	3,4E+11	2,4E+11	9,0E+11	1,1E+12	9,6E+11	0,0E+00	1,1E+12	5,5E+11
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Appendix B: Screening Model

B-1. Purpose

This appendix describes the details of the screening model which was developed to derive conservative estimates of the exposures resulting for all potential recipients and for all radionuclides used in hospitals. The aim of this model is to identify those pathways and radionuclides which could be of concern and which should be addressed in a more detailed and less conservative model.

Section B-2 describes the two calculation cases for the screening model which have been identified in Section 4 of the main document. The parameters used for the screening calculations are provided in Section B-3. Detailed results for the different calculation cases and end points are given in Section B-4.

B-2. Model Assumptions for the Calculation Cases

B-2.1 Calculations for Case 1 (no retention in the sludge)

Activity concentrations in water and fish

Since retention in the sewage sludge and radioactive decay are not considered, the activity concentration in the water discharged from the plant is simply calculated by dividing the annual activity released to the sewage plant (Table B-1 to B4) by the water flux into the plant (Table B-5):

$$C^j_{water} = \frac{Q^j}{F_{water}} \qquad \text{(B-1)}$$

where

$C_{water}{}^j$ is the activity concentration of the *j-th* radionuclide in the water discharged from the sewage plant [Bq/m^3],
Q^j is the maximal annual release of the *j-th* radionuclide into the sewage plant [Bq/y],
F_{water} is the water flux into the sewage plant [m^3/y].

The activity concentrations in fish are calculated by multiplying the activity concentration in water (see equation B-1) by a bioaccumulation factor (Table B-6):

$$C^j_{fish} = C^j_{water} * BF^j \qquad \text{(B-2)}$$

where

$C_{fish}{}^j$ is the activity concentration of the *j-th* radionuclide in fish [Bq/kg FW],
$C_{water}{}^j$ is the activity concentration of the *j-th* radionuclide in the water discharged from the sewage plant [Bq/m^3],
BF^j is the bioaccumulation factor in fish for the *j-th* radionuclide [Bq/kg FW per Bq/m^3].

Doses from water and fish ingestion

The doses are calculated for a hypothetical person that consumes contaminated fish and water; by multiplying the radionuclide activity concentrations in water (see equation B-1) and fish (see equation B-2) with the corresponding consumption rates (Table B-7) and the dose factor for ingestion (Table B-8):

$$Dose^{j}_{water} = C^{j}_{water} * IR_{water} * DF^{j}_{ing} \quad \text{(B-3)}$$

$$Dose^{j}_{fish} = C^{j}_{fish} * IR_{fish} * DF^{j}_{ing} \quad \text{(B-4)}$$

where,

$Dose_{water}{}^{j}$ is the annual dose from the *j-th* radionuclide via water ingestion [Sv/a],
$Dose_{fish}{}^{j}$ is the annual dose from the *j-th* radionuclide via fish ingestion [Sv/a],
$C_{water}{}^{j}$ is the activity concentration of the *j-th* radionuclide in the water discharged from the sewage plant [Bq/m^3],
$C_{fish}{}^{j}$ is the activity concentration of the *j-th* radionuclide in fish [Bq/kg FW],
IR_{water} is the consumption rate of water [m^3/y],
IR_{fish} is the consumption rate of fish [kg FW/y],
$DF_{ing}{}^{j}$ is the *j-th* radionuclide dose factor for ingestion [Sv/Bq].

It was conservatively that the same individual gets doses from both water and fish ingestion and therefore the sum of these doses was compared with the screening criterion.

B-2.2. Calculations for Case 2 (full retention in the sludge)

Activity concentration in the sludge

It was assumed that the radionuclides are fully retained in the sewage sludge and therefore the activity concentration in the sludge was simply estimated by dividing the annual release into the sewage plant (Table B-1 to B-4) by the sludge production in the plant (Table B-5):

$$C^{j}_{sludge} = \frac{Q^{j}}{P_{sludge}} \quad \text{(B-5)}$$

where

$C_{sludge}{}^{j}$ is the activity concentration of the *j-th* radionuclide in the sludge [Bq/kg DW],
Q^{j} is the annual release of the *j-th* radionuclide into the sewage plant [Bq/y],
P_{sludge} is the annual production of sludge in the sewage plant [kg DW/y].

Activity concentrations in food produced in contaminated sludge

It was assumed that contaminated sludge is used directly for agricultural purposes neglecting reduction in activity concentrations from radioactive decay and dilution from mixing of the sludge with uncontaminated soil. The activity concentration in crops and animal feed was calculated by multiplying the activity concentration in sewage sludge (see equation B-5) with appropriate transfer factors (Table B-6) and other correction coefficients (Table B-9):

$$C^{j}_{crops} = C^{j}_{sludge} * CF^{j}_{crops} * \exp(-\lambda^{j} * T_{crops}) \qquad \text{(B-6)}$$

where

$C_{crops}{}^{j}$ is the activity concentration of the *j-th* radionuclide in crops at the time of consumption by humans [Bq/kg FW],
$C_{sludge}{}^{j}$ is the activity concentration of the *j-th* radionuclide in the sludge [Bq/kg DW],
$CF_{crops}{}^{j}$ is the concentration factor for uptake of the *j-th* radionuclide from soil by edible parts of crops [Bq/kg FW per Bq/kg DW],
T_{crops} is the time period between harvest and consumption of the crops [days],
λ^{j} is the *j-th* radionuclide decay constant [1/days].

$$C^{j}_{Feed} = C^{j}_{sludge} * CF^{j}_{pasture} * (f_{p} + (1 - f_{p}) * \exp(-\lambda^{j} * T_{StFeed})) \qquad \text{(B-7)}$$

where

$C_{Feed}{}^{j}$ is the activity concentration of the *j-th* radionuclide in animal feed [Bq/kg DW],
$C_{sludge}{}^{j}$ is the activity concentration of the *j-th* radionuclide in the sewage sludge [Bq/kg DW],
$CF_{pasture}{}^{j}$ is the concentration factor for uptake of the *j-th* radionuclide from soil by pasture [Bq/kg DW per Bq/kg DW],
f_{p} is the fraction of the year that animals consume fresh pasture vegetation [dimensionless],
T_{StFeed} is the time period between harvest of pasture and consumption of storage feed [days],
λ^{j} is the *j-th* radionuclide decay constant [1/days].

The activity concentrations in milk and meat at the time of consumption by humans were calculated with the following equations:

$$C^{j}_{milk} = C^{j}_{Feed} * F^{j}_{milk} * DMI_{milk} * \exp(-\lambda^{j} * T_{milk}) \qquad \text{(B-8)}$$

where

$C_{milk}{}^{j}$ is the activity concentration of the *j-th* radionuclide in milk [Bq/l],
$C_{Feed}{}^{j}$ is the activity concentration of the *j-th* radionuclide in animal feed [Bq/kg DW],
F_{milk} j is the fraction of animal's daily intake of the *j-th* radionuclide that appears in each litre of milk at equilibrium [d/l],
DMI_{milk} is the amount of feed (in dray matter) consumed by milk producing cows [kg DW/day],
T_{milk} is the average time between collection and human consumption of fresh milk [day],
λ^{j} is the *j-th* radionuclide decay constant [1/day].

$$C^{j}_{meat} = C^{j}_{Feed} * F^{j}_{meat} * DMI_{meat} * \exp(-\lambda^{j} * T_{meat}) \qquad \text{(B-9)}$$

where

$C_{meat}{}^{j}$ is the activity concentration of the *j-th* radionuclide in cow meat [Bq/kg FW],
$C_{Feed}{}^{j}$ is the activity concentration of the *j-th* radionuclide in animal feed [Bq/kg DW],
$F_{meat}{}^{j}$ is the fraction of animal's daily intake of the *j-th* radionuclide that appears in each kg of cow meat at equilibrium or at the time of slaughter [day/kg FW],
DMI_{meat} is the amount of feed (in dray matter) consumed by meat producing cows [kg DW/day],

T_{meat} is the average time between slaughter and human consumption of cow meat [day],

Doses from ingestion of food produced on contaminated sludge

The doses from the consumption of food contaminated as result of the use of sewage sludge for fertilization of agricultural lands (landfill) was calculated by multiplying the activity concentrations in crops (see equation B-6), milk (see equation B-8) and meat (see equation B-9) with the consumption rates of each type of food (Table B-7) and the dose factor for ingestion (Table B-8), respectively:

$$Dose^{j}_{crop} = C^{j}_{crop} * IR_{crop} * DF^{j}_{ing} \quad \text{(B-10)}$$

$$Dose^{j}_{milk} = C^{j}_{milk} * IR_{milk} * DF^{j}_{ing} \quad \text{(B-11)}$$

$$Dose^{j}_{meat} = C^{j}_{meat} * IR_{meat} * DF^{j}_{ing} \quad \text{(B-42)}$$

where

$Dose_{crop}{}^{j}$ is the annual effective dose of the *j-th* radionuclide from consumption of crops [Sv/a],
$Dose_{milk}{}^{j}$ is the annual effective dose of the *j-th* radionuclide from consumption of cow milk [Sv/a],
$Dose_{meat}{}^{j}$ is the annual effective dose of the *j-th* radionuclide from consumption of cow meat [Sv/a],
C^{j}_{crop} is the ….., concentration factor for uptake of the *j-th* radionuclide from soil by edible parts of crops [Bq/kg FW per Bq/kg DW],
C^{j}_{milk} is the ….., activity concentration of the *j-th* radionuclide in milk [Bq/l],
C^{j}_{meat} is the ….., activity concentration of the *j-th* radionuclide in cow meat [Bq/kg FW],
IR_{crop} is the consumption rate of crops [kg FW/y],
IR_{milk} is the consumption rate of cow milk [L/y],
IR_{meat} is the consumption rate of cow meat [kg FW/y],
$DF_{ing}{}^{j}$ is the *j-th* radionuclide dose factor for ingestion [Sv/Bq].

Doses to sewage workers

The most important potential pathway of exposure of sewage workers from radionuclides in the sludge are external irradiation and inhalation of resuspended material (IAEA 2001). The following equations were used in the calculations of external and inhalation doses:

$$Dose^{j}_{ext} = C^{j}_{sludge} * \rho * ConvF * OF * DF^{j}_{ext} \quad \text{(B-53)}$$

where

$Dose_{ext}{}^{j}$ is the external radiation dose from the sewage sludge for the *j-th* radionuclide [Sv/a]
$C_{sludge}{}^{j}$ is the activity concentration of the *j-th* radionuclide in the sludge [Bq/kg DW],
ρ is the density of sewage sludge [kg WW/m^3],
ConvF is a conversion factor between dry weight and wet weight of sludge [kg DW/kg WW],
OF is the fraction of the year during which exposure occurs [dimensionless].
$DF_{ext}{}^{j}$ is the dose factor for external exposure [Sv/a per Bq/m^3].

$$Dose_{inht}^{j} = C_{sludge}^{j} * RF * ConvF * OF * InhR * DF_{inh}^{j} \quad \text{(B-4)}$$

where

$Dose_{inh}^{j}$ is the annual dose from inhalation of the *j-th* radionuclide with resuspended sewage sludge [Sv/a]
C_{sludge}^{j} is the activity concentration of the *j-th* radionuclide in the sludge [Bq/kg DW],
RF is the concentration of resuspended particles in air [kgWW/m^3],
ConvF is a conversion factor between dry weight and wet weight [kg DW/kg WW],
OF is the fraction of the year during which exposure occurs [dimensionless],
InhR is the annual inhalation rate [m^3/a],
DF_{inh}^{j} is the dose factor for intake by inhalation [Sv/Bq].

B-3. Parameter values

The values of the parameters used in the screening calculations are presented in Tables B-1 to B-10.

The annual activity released to the sewage plant is given in Tables B-1 to B-4. The water flux into the plants in Table B-5 was obtained from answers to a questionnaire provided by the studied sewage plants.

The values used for the transfer factors to fish, crops, pasture, milk and meat (Table B-6) are recommended values in IAEA (2001) for screening purposes. The same holds for the values of the consumption rates of each type of food (Table B-7), the dose factors for ingestion and inhalation (Table B-8) and other correction coefficients used in the calculations (Table B-9 and B-10).

However, the values of the dose factors for external exposure of sewage workers recommended in IAEA (2001) were considered not appropriate for the present screening study. These values are valid for situations with surface contamination and are over-conservative for the case studied here, for which assuming an homogeneous contamination of the whole mass of produced sludge is more appropriate. The values of dose factors reported in (Titley *et al.* 2000) for exposure above a homogeneous sludge layer of infinite lateral and vertical size were considered better suitable for the purpose, still providing sufficient conservatism.

Table B-1. Maximum annual release rates of radionuclides into the studied sewage plants, estimated from treatments reported during 1999-2004 for the hospitals with radionuclide releases to these plants (source: www.ssi.se).

Nuclide	**Release rate Q^j, Bq/y**				
	Henriksdal	Ryaverket	Ön	Kungsängsverket	Källby
Co-58	0,0E+00	0,0E+00	0,0E+00	3,0E+05	9,0E+04
Cr-51	9,7E+08	6,8E+09	2,3E+09	4,5E+08	2,1E+07
Cu-64	3,7E+08	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	2,0E+08	8,7E+09	0,0E+00	4,0E+08	5,6E+08
I-123	2,8E+10	1,0E+10	3,1E+10	9,9E+08	1,8E+10
I-125	2,2E+07	2,0E+07	6,8E+06	0,0E+00	1,1E+07
I-131	6,3E+11	2,9E+11	5,9E+10	1,3E+11	2,9E+11
In-111	2,9E+10	2,6E+10	1,1E+10	1,7E+11	2,6E+10
P-32	1,3E+10	1,5E+10	7,9E+08	1,2E+10	1,6E+10
Se-75	5,0E+07	9,8E+07	4,2E+07	1,2E+07	5,2E+06
Sr-89	6,2E+09	2,3E+09	0,0E+00	0,0E+00	5,3E+09
Tc-99m	6,2E+12	2,2E+12	2,0E+12	1,4E+12	3,2E+12
TI-201	7,5E+07	6,2E+10	3,4E+08	2,9E+10	0,0E+00
Y-90	5,7E+09	1,5E+09	2,9E+09	9,6E+10	1,1E+10

Table B-2. Maximum annual release rates of radionuclides into the studied sewage plants, estimated from treatments reported during 1999-2005 for the hospitals with radionuclide releases to these plants (source: www.ssi.se).

Nuclide	Release rate Q^j, Bq/y					
	Centrala Reningsverket	Duvbacken	Ekeby	Fillanverket	Gässlösa	Göviken
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	2,6E+08	1,1E+07	0,0E+00	1,0E+09	2,2E+09	2,8E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	7,4E+08	0,0E+00
I-123	0,0E+00	1,2E+09	4,4E+08	4,3E+09	1,0E+08	0,0E+00
I-125	2,7E+06	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	2,6E+10	8,9E+10	9,9E+10	5,5E+10	4,9E+10	1,7E+10
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	4,2E+07	0,0E+00
P-32	0,0E+00	3,2E+09	1,1E+09	0,0E+00	4,6E+09	5,6E+08
Se-75	0,0E+00	1,5E+08	0,0E+00	0,0E+00	0,0E+00	7,7E+06
Sr-89	1,4E+09	1,5E+09	3,0E+08	1,0E+09	1,4E+09	5,4E+09
Tc-99m	1,3E+12	9,2E+11	1,1E+12	9,9E+11	5,4E+11	4,8E+11
TI-201	0,0E+00	0,0E+00	7,6E+08	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-3. Maximum annual release rates of radionuclides into the studied sewage plants, estimated from treatments reported during 1999-2005 for the hospitals with radionuclide releases to these plants (source: www.ssi.se).

Nuclide	**Release rate Q^j, Bq/y**				
	Käppalaverket	Koholmen	Öresundsverket	Simsholmen	Sjölunda
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	9,0E+04
Cr-51	5,4E+08	9,4E+08	0,0E+00	6,7E+08	6,5E+08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	6,0E+08	0,0E+00	0,0E+00	1,7E+09
I-123	0,0E+00	0,0E+00	0,0E+00	1,5E+09	7,4E+09
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	8,7E+10	1,2E+11
In-111	0,0E+00	5,6E+09	0,0E+00	0,0E+00	2,3E+10
P-32	0,0E+00	0,0E+00	0,0E+00	4,1E+09	1,3E+09
Se-75	5,9E+06	0,0E+00	4,4E+06	4,4E+06	5,5E+06
Sr-89	5,5E+08	3,3E+09	0,0E+00	2,3E+09	1,5E+08
Tc-99m	1,4E+12	8,4E+11	1,2E+12	1,0E+12	2,8E+12
TI-201	1,2E+12	2,0E+10	3,2E+10	0,0E+00	4,3E+08
Y-90	0,0E+00	0,0E+00	0,0E+00	1,5E+09	1,3E+09

Table B-4. Maximum annual release rates of radionuclides into the studied sewage plants, estimated from treatments reported during 1999-2005 for the hospitals with radionuclide releases to these plants (source: www.ssi.se).

Nuclide	**Release rate Q^j, Bq/y**				
	Sjöstadsverket	Skansverket	Sundet	Tegelviken	Uddebo
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	3,5E+08	0,0E+00	4,1E+08	3,5E+08	1,6E+09
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	2,0E+08	0,0E+00	0,0E+00
I-123	1,1E+09	0,0E+00	2,3E+09	2,5E+09	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	1,8E+06	0,0E+00
I-131	7,3E+10	0,0E+00	4,7E+10	4,5E+10	4,9E+10
In-111	0,0E+00	2,6E+09	1,4E+09	1,6E+09	0,0E+00
P-32	1,1E+10	0,0E+00	7,9E+09	0,0E+00	0,0E+00
Se-75	1,7E+07	2,0E+07	2,2E+07	0,0E+00	0,0E+00
Sr-89	2,9E+10	1,5E+09	1,9E+09	2,5E+09	0,0E+00
Tc-99m	1,1E+12	4,5E+11	1,0E+12	1,0E+12	1,1E+12
TI-201	0,0E+00	0,0E+00	3,5E+10	0,0E+00	0,0E+00
Y-90	0,0E+00	1,1E+09	0,0E+00	0,0E+00	0,0E+00

Table B-5. Water fluxes and sludge production at the studied sewage plants - From answers to questionnaire.

Sewage plant	**Water flux** F_{water} m^3/y	**Sludge production** P_{sludge} kg DW/y
Henriksdal	7,70E+07	1,40E+07
Ryaverket	1,16E+08	1,45E+07
Ön	1,10E+07	2,00E+06
Kungsängsverket	1,73E+07	3,20E+06
Källby	1,04E+07	1,80E+06
Centrala Reningsverket	7,3E+06	2,15E+06
Duvbacken	1,3E+07	1,50E+06
Ekeby	1,5E+07	2,00E+06
Fillanverket	4,4E+06	4,40E+05
Gässlösa	1,8E+07	3,00E+06
Göviken	6,9E+06	9,88E+05
Käppalaverket	4,9E+07	7,10E+06
Koholmen	5,9E+06	1,40E+06
Öresundsverket	2,0E+07	2,80E+06
Simsholmen	1,1E+07	1,60E+06
Sjölunda	3,7E+07	2,35E+07
Sjöstadsverket	9,1E+06	1,30E+09
Skansverket	6,6E+06	1,14E+06
Sundet	7,7E+06	1,70E+06
Tegelviken	8,0E+06	1,21E+06
Uddebo	8,9E+06	3,50E+06

Table B-6. Element specific transfer factors used in the calculations: Bioaccumulation factor for fish (BF in Bq/kg FW per Bq/m^3), Concentration Factor for crops (CF_{crops} in Bq/kg FW per Bq/kg DW), Concentration Factor for pasture ($CF_{pasture}$ in Bq/kg DW per Bq/kg DW), Transfer Factor to milk (F_{milk} in d/L) and Transfer Factor to meat (F_{meat} in d/kg FW) - IAEA (2001).

Element	BF^j	CF^j_{crops}	$CF^j_{pasture}$	F^j_{milk}	F^j_{meat}
Co	3,0E-01	8,0E-02	2,0E+00	1,0E-02	7,0E-02
Cr	2,0E-01	1,0E-03	1,0E-01	2,0E-04	9,0E-02
Cu	2,0E-01	5,0E-01	2,0E+00	2,0E-03	1,0E-02
Ga	4,0E-01	3,0E-03	1,0E-01	1,0E-05	3,0E-04
I	4,0E-02	2,0E-02	1,0E-01	1,0E-02	5,0E-02
In	1,0E+01	3,0E-03	1,0E-01	2,0E-04	4,0E-03
P	5,0E+01	1,0E+00	1,0E+01	2,0E-02	5,0E-02
Se	2,0E-01	1,0E-01	1,0E+00	1,0E-03	1,0E-01
Sr	7,5E-02	3,0E-01	1,0E+01	3,0E-03	1,0E-02
Tc	2,0E-02	5,0E+00	8,0E+01	1,0E-03	1,0E-03
TI	1,0E+00	2,0E+00	2,0E+00	3,0E-03	2,0E-02
Y	3,0E-02	3,0E-03	1,0E-01	6,0E-05	1,0E-02

Table B-7. Consumption rates used in the screening dose calculations - IAEA (2001).

	Units	**Value**
Water, IR_{water}	m^3/y	0.6
Freshwater fish, IR_{fish}	kg FW/y	30
Crops, IR_{crops}	kg FW/y	410
Milk, IR_{milk}	l/y	250
Meat, IR_{meat}	kg FW/y	100

Table B-8. Dose factors for ingestion (D_{ing}) - IAEA (2001), inhalation (D_{inh}) - IAEA (2001) and external exposure (D_{ext}) – Titley et al. (2002) used in the screening dose calculations.

Nuclide	D^j_{ing} Sv/Bq	D^j_{inh} Sv/Bq	D^j_{ext} Sv/a per Bq/m^3
Co-58	7,4E-10	2,1E-09	1,49E-09
Cr-51	3,8E-11	3,7E-11	5,97E-11
Cu-64	1,2E-10	1,2E-10	2,75E-10
Ga-67	1,9E-10	2,4E-10	3,06E-10
I-123	2,1E-10	7,4E-11	3,07E-10
I-125	1,5E-08	5,1E-09	1,51E-11
I-131	2,2E-08	7,4E-09	7,12E-10
In-111	2,9E-10	2,3E-10	7,67E-10
P-32	2,4E-09	3,4E-09	0,00E+00
Se-75	2,6E-09	1,3E-09	4,60E-10
Sr-89	2,6E-09	7,9E-09	1,57E-13
Tc-99m	2,2E-11	1,2E-11	2,61E-10
TI-201	9,5E-11	4,4E-11	1,76E-10
Y-90	2,7E-09	1,5E-09	5,83E-19

Table B-9. Correction **c***oefficients applied in the screening dose calculations - IAEA (2001).*

Correction coefficient	Units	Value
Time period between harvest and consumption of the crops, T_{crops}	day	14
Time period between harvest and consumption of storage feed, T_{StFeed}	day	90
Average time between collection and human consumption of fresh milk , T_{milk}	day	1
Average time between slaughter and human consumption of cow meat , T_{meat}	day	20
Amount of feed consumed by milk producing cows, DMI_{milk}	kg DW/day	16
Amount of feed consumed by meat producing cows, DMI_{meat}	kg DW/day	12

Table B-10. Parameter values used in the calculations of the dose to workers in the screening study-IAEA (2001).

Parameter	Units	Value
Density of the sewage sludge, ρ	kg/m^3	1000
Conversion factor between dry weight and wet weight, $ConvF$	kg DW/kg WW	0.25
Fraction of the year during which exposure occurs , OF	dimensionless	0.228
Concentration of resuspended particles in air, RF	kg/m^3	1E-7

B-4. Results

Results for the two calculation cases and the different plants are given in Tables B-8 to B-22. These are used in the main part of the report to derive RQ values (Section 4.3).

The detailed results obtained were compared to the generic dose calculation factors for discharges derived in (IAEA 2001). This reference uses different assumptions for external dose conversion factors (see Section B-3) and also uses a lower annual sludge volume (400 t/a) as compared to the calculations presented here using the actual data for the plants considered. Taking these differences into account, an agreement of the results of the dose calculations was found.

Table B-11. Results of the calculations for the Henriksdal´s plant for Case 1 (no retention in the sludge).

Nuclide	Concentration water Bq/m^3	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,3E+01	2,5E+00	2,9E-10	2,9E-09	3,2E-09
Cu-64	4,8E+00	9,5E-01	3,4E-10	3,4E-09	3,8E-09
Ga-67	2,6E+00	1,0E+00	3,0E-10	5,9E-09	6,2E-09
I-123	3,6E+02	1,4E+01	4,5E-08	9,1E-08	1,4E-07
I-125	2,9E-01	1,1E-02	2,6E-09	5,1E-09	7,7E-09
I-131	8,2E+03	3,3E+02	**1,1E-04**	**2,2E-04**	**3,2E-04**
In-111	3,8E+02	3,8E+03	6,6E-08	**3,3E-05**	**3,3E-05**
P-32	1,7E+02	8,3E+03	2,4E-07	**6,0E-04**	**6,0E-04**
Se-75	6,5E-01	1,3E-01	1,0E-09	1,0E-08	1,1E-08
Sr-89	8,1E+01	6,1E+00	1,3E-07	4,7E-07	6,0E-07
Tc-99m	8,0E+04	1,6E+03	1,1E-06	1,1E-06	2,1E-06
TI-201	9,7E-01	9,7E-01	5,6E-11	2,8E-09	2,8E-09
Y-90	7,4E+01	2,2E+00	1,2E-07	1,8E-07	3,0E-07

Table B-12. Results of the calculations for the Ryaverket plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m^3**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	5,8E+01	1,2E+01	1,3E-09	1,3E-08	1,5E-08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	7,5E+01	3,0E+01	8,5E-09	1,7E-07	1,8E-07
I-123	8,7E+01	3,5E+00	1,1E-08	2,2E-08	3,3E-08
I-125	1,8E-01	7,1E-03	1,6E-09	3,2E-09	4,8E-09
I-131	2,5E+03	9,8E+01	**3,3E-05**	**6,5E-05**	**9,8E-05**
In-111	2,2E+02	2,2E+03	3,8E-08	**1,9E-05**	**1,9E-05**
P-32	1,3E+02	6,6E+03	1,9E-07	**4,7E-04**	**4,7E-04**
Se-75	8,4E-01	1,7E-01	1,3E-09	1,3E-08	1,4E-08
Sr-89	1,9E+01	1,5E+00	3,0E-08	1,1E-07	1,4E-07
Tc-99m	1,9E+04	3,8E+02	2,5E-07	2,5E-07	5,0E-07
TI-201	5,4E+02	5,4E+02	3,1E-08	1,5E-06	1,6E-06
Y-90	1,3E+01	3,9E-01	2,1E-08	3,1E-08	5,2E-08

Table B-13. Results of the calculations for the Ön plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m^3**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	2,1E+02	4,1E+01	4,7E-09	4,7E-08	5,2E-08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	2,8E+03	1,1E+02	3,6E-07	7,1E-07	1,1E-06
I-125	6,2E-01	2,5E-02	5,6E-09	1,1E-08	1,7E-08
I-131	5,4E+03	2,2E+02	**7,1E-05**	**1,4E-04**	**2,1E-04**
In-111	1,0E+03	1,0E+04	1,8E-07	**8,8E-05**	**8,8E-05**
P-32	7,2E+01	3,6E+03	1,0E-07	**2,6E-04**	**2,6E-04**
Se-75	3,8E+00	7,6E-01	5,9E-09	5,9E-08	6,5E-08
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	1,9E+05	3,7E+03	2,5E-06	2,5E-06	4,9E-06
TI-201	3,1E+01	3,1E+01	1,7E-09	8,7E-08	8,9E-08
Y-90	2,6E+02	7,8E+00	4,2E-07	6,3E-07	1,1E-06

Table B-14. Results of the calculations for the Kungsängsverket plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m^3**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	1,7E-02	5,2E-03	7,7E-12	1,2E-10	1,2E-10
Cr-51	2,6E+01	5,2E+00	5,9E-10	5,9E-09	6,5E-09
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	2,3E+01	9,2E+00	2,6E-09	5,3E-08	5,5E-08
I-123	5,7E+01	2,3E+00	7,2E-09	1,4E-08	2,2E-08
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	7,8E+03	3,1E+02	**1,0E-04**	**2,1E-04**	**3,1E-04**
In-111	1,0E+04	1,0E+05	1,7E-06	**8,7E-04**	**8,7E-04**
P-32	6,8E+02	3,4E+04	9,8E-07	**2,4E-03**	**2,5E-03**
Se-75	6,9E-01	1,4E-01	1,1E-09	1,1E-08	1,2E-08
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	8,3E+04	1,7E+03	1,1E-06	1,1E-06	2,2E-06
TI-201	1,6E+03	1,6E+03	9,4E-08	4,7E-06	4,8E-06
Y-90	5,5E+03	1,7E+02	9,0E-06	**1,3E-05**	**2,2E-05**

Table B-15. Results of the calculations for the Källby plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m^3**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	8,6E-03	2,6E-03	3,8E-12	5,7E-11	6,1E-11
Cr-51	2,1E+00	4,1E-01	4,7E-11	4,7E-10	5,1E-10
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	5,3E+01	2,1E+01	6,1E-09	1,2E-07	1,3E-07
I-123	1,8E+03	7,1E+01	2,2E-07	4,5E-07	6,7E-07
I-125	1,0E+00	4,0E-02	9,1E-09	1,8E-08	2,7E-08
I-131	2,8E+04	1,1E+03	**3,7E-04**	**7,4E-04**	**1,1E-03**
In-111	2,5E+03	2,5E+04	4,3E-07	**2,1E-04**	**2,1E-04**
P-32	1,6E+03	7,8E+04	2,3E-06	**5,6E-03**	**5,7E-03**
Se-75	5,0E-01	9,9E-02	7,7E-10	7,7E-09	8,5E-09
Sr-89	5,0E+02	3,8E+01	7,8E-07	2,9E-06	3,7E-06
Tc-99m	3,1E+05	6,2E+03	4,1E-06	4,1E-06	8,2E-06
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	1,0E+03	3,0E+01	1,6E-06	2,5E-06	4,1E-06

Table B-16. Results of the calculations for the Centrala Reningsverket plant for Case1 (no retention in the sludge).

Nuclide	Concentration water Bq/m^3	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	3,5E+01	7,1E+00	8,1E-10	8,1E-09	8,9E-09
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	3,7E-01	1,5E-02	3,4E-09	6,7E-09	1,0E-08
I-131	3,5E+03	1,4E+02	**4,7E-05**	**9,3E-05**	**1,4E-04**
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	1,8E+02	1,4E+01	2,9E-07	1,1E-06	1,4E-06
Tc-99m	1,8E+05	3,6E+03	2,4E-06	2,4E-06	4,8E-06
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-17. Results of the calculations for the Duvbacken plant for Case1 (no retention in the sludge).

Nuclide	Concentration water Bq/m^3	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	8.7E-01	1.7E-01	2.0E-11	2.0E-10	2.2E-10
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	9.5E+01	3.8E+00	1.2E-08	2.4E-08	3.6E-08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	7.1E+03	2.8E+02	**9.3E-05**	**1.9E-04**	**2.8E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	2.5E+02	1.3E+04	3.6E-07	**9.1E-04**	**9.1E-04**
Se-75	1.2E+01	2.4E+00	1.8E-08	1.8E-07	2.0E-07
Sr-89	1.2E+02	8.7E+00	1.8E-07	6.8E-07	8.6E-07
Tc-99m	7.3E+04	1.5E+03	9.7E-07	9.7E-07	1.9E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-18. Results of the calculations for the Ekeby plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m^3**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	3.0E+01	1.2E+00	3.8E-09	7.5E-09	1.1E-08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	6.7E+03	2.7E+02	**8.8E-05**	**1.8E-04**	**2.6E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	7.6E+01	3.8E+03	1.1E-07	**2.7E-04**	**2.7E-04**
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	2.0E+01	1.5E+00	3.2E-08	1.2E-07	1.5E-07
Tc-99m	7.1E+04	1.4E+03	9.4E-07	9.4E-07	1.9E-06
TI-201	5.1E+01	5.1E+01	2.9E-09	1.5E-07	1.5E-07
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-19. Results of the calculations for the Fillanverket plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m^3**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.4E+02	4.8E+01	5.4E-09	5.4E-08	6.0E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	9.8E+02	3.9E+01	1.2E-07	2.5E-07	3.7E-07
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	1.2E+04	5.0E+02	**1.6E-04**	**3.3E-04**	**4.9E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	2.4E+02	1.8E+01	3.7E-07	1.4E-06	1.8E-06
Tc-99m	2.3E+05	4.5E+03	3.0E-06	3.0E-06	6.0E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-20. Results of the calculations for the Gässlösa plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,2E+02	2,4E+01	2,7E-09	2,7E-08	3,0E-08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	4,1E+01	1,6E+01	4,6E-09	9,2E-08	9,7E-08
I-123	5,5E+00	2,2E-01	6,9E-10	1,4E-09	2,1E-09
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	2,7E+03	1,1E+02	**3,6E-05**	**7,1E-05**	**1,1E-04**
In-111	2,3E+00	2,3E+01	4,0E-10	2,0E-07	2,0E-07
P-32	2,5E+02	1,3E+04	3,7E-07	**9,2E-04**	**9,2E-04**
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	7,4E+01	5,5E+00	1,2E-07	4,3E-07	5,5E-07
Tc-99m	3,0E+04	5,9E+02	3,9E-07	3,9E-07	7,8E-07
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-21. Results of the calculations for the Göviken plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	4.1E+01	8.2E+00	9.3E-10	9.3E-09	1.0E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	2.5E+03	1.0E+02	**3.3E-05**	**6.6E-05**	**1.0E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	8.0E+01	4.0E+03	1.2E-07	**2.9E-04**	**2.9E-04**
Se-75	1.1E+00	2.2E-01	1.7E-09	1.7E-08	1.9E-08
Sr-89	7.8E+02	5.8E+01	1.2E-06	4.6E-06	5.8E-06
Tc-99m	7.0E+04	1.4E+03	9.2E-07	9.2E-07	1.8E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-22. Results of the calculations for the Käppalaverket plant for Case1 (no retention in the sludge).

Nuclide	Concentration water Bq/m³	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	1.1E+01	2.2E+00	2.5E-10	2.5E-09	2.8E-09
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	1.2E-01	2.4E-02	1.9E-10	1.9E-09	2.1E-09
Sr-89	1.1E+01	8.4E-01	1.7E-08	6.6E-08	8.3E-08
Tc-99m	3.0E+04	5.9E+02	3.9E-07	3.9E-07	7.8E-07
TI-201	2.5E+04	2.5E+04	1.4E-06	**7.0E-05**	**7.1E-05**
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-23. Results of the calculations for the Koholmen plant for Case1 (no retention in the sludge)

Nuclide	Concentration water Bq/m³	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	1.6E+02	3.2E+01	3.6E-09	3.6E-08	4.0E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	1.0E+02	4.1E+01	1.2E-08	2.3E-07	2.4E-07
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	9.5E+02	9.5E+03	1.7E-07	**8.3E-05**	**8.3E-05**
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	5.6E+02	4.2E+01	8.8E-07	3.3E-06	4.2E-06
Tc-99m	1.4E+05	2.9E+03	1.9E-06	1.9E-06	3.8E-06
TI-201	3.4E+03	3.4E+03	1.9E-07	9.6E-06	9.8E-06
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-24. Results of the calculations for the Öresundsverket plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	2.2E-01	4.4E-02	3.5E-10	3.5E-09	3.8E-09
Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	5.8E+04	1.2E+03	7.6E-07	7.6E-07	1.5E-06
TI-201	1.6E+03	1.6E+03	9.0E-08	4.5E-06	4.6E-06
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-25. Results of the calculations for the Simsholmen plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	6.1E+01	1.2E+01	1.4E-09	1.4E-08	1.5E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	1.4E+02	5.4E+00	1.7E-08	3.4E-08	5.1E-08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	8.0E+03	3.2E+02	**1.1E-04**	**2.1E-04**	**3.2E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	3.8E+02	1.9E+04	5.4E-07	**1.4E-03**	**1.4E-03**
Se-75	4.0E-01	8.0E-02	6.3E-10	6.3E-09	6.9E-09
Sr-89	2.1E+02	1.5E+01	3.2E-07	1.2E-06	1.5E-06
Tc-99m	9.5E+04	1.9E+03	1.3E-06	1.3E-06	2.5E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	1.4E+02	4.1E+00	2.2E-07	3.3E-07	5.5E-07

Table B-26. Results of the calculations for the Sjölunda plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	2.5E-03	7.4E-04	1.1E-12	1.6E-11	1.8E-11
Cr-51	1.8E+01	3.5E+00	4.0E-10	4.0E-09	4.4E-09
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	4.6E+01	1.8E+01	5.2E-09	1.0E-07	1.1E-07
I-123	2.0E+02	8.1E+00	2.6E-08	5.1E-08	7.7E-08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	3.3E+03	1.3E+02	**4.3E-05**	**8.6E-05**	**1.3E-04**
In-111	6.2E+02	6.2E+03	1.1E-07	**5.4E-05**	**5.4E-05**
P-32	3.5E+01	1.8E+03	5.1E-08	**1.3E-04**	**1.3E-04**
Se-75	1.5E-01	3.0E-02	2.4E-10	2.4E-09	2.6E-09
Sr-89	4.1E+00	3.1E-01	6.4E-09	2.4E-08	3.0E-08
Tc-99m	7.7E+04	1.5E+03	1.0E-06	1.0E-06	2.0E-06
TI-201	1.2E+01	1.2E+01	6.6E-10	3.3E-08	3.4E-08
Y-90	3.4E+01	1.0E+00	5.6E-08	8.4E-08	1.4E-07

Table B-27. Results of the calculations for the Sjöstadsverket plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	3.8E+01	7.6E+00	8.6E-10	8.6E-09	9.5E-09
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	1.2E+02	4.6E+00	1.5E-08	2.9E-08	4.4E-08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	7.9E+03	3.2E+02	**1.0E-04**	**2.1E-04**	**3.1E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	1.2E+03	6.0E+04	1.7E-06	**4.3E-03**	**4.3E-03**
Se-75	1.9E+00	3.8E-01	3.0E-09	3.0E-08	3.3E-08
Sr-89	3.2E+03	2.4E+02	5.0E-06	**1.9E-05**	**2.4E-05**
Tc-99m	1.2E+05	2.3E+03	1.5E-06	1.5E-06	3.1E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-28. Results of the calculations for the Skansverket plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	3.9E+02	3.9E+03	6.8E-08	**3.4E-05**	**3.4E-05**
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	3.0E+00	6.1E-01	4.7E-09	4.7E-08	5.2E-08
Sr-89	2.3E+02	1.7E+01	3.6E-07	1.3E-06	1.7E-06
Tc-99m	6.9E+04	1.4E+03	9.1E-07	9.1E-07	1.8E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	1.6E+02	4.8E+00	2.6E-07	3.9E-07	6.5E-07

Table B-29. Results of the calculations for the Sundet plant for Case1 (no retention in the sludge).

Nuclide	**Concentration water Bq/m³**	**Concentration fish Bq/kg FW**	**Dose water ingestion Sv/a**	**Dose fish ingestion Sv/a**	**Dose total Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	5.3E+01	1.1E+01	1.2E-09	1.2E-08	1.3E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	2.6E+01	1.0E+01	3.0E-09	5.9E-08	6.2E-08
I-123	3.0E+02	1.2E+01	3.7E-08	7.4E-08	1.1E-07
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	6.2E+03	2.5E+02	**8.2E-05**	**1.6E-04**	**2.5E-04**
In-111	1.9E+02	1.9E+03	3.3E-08	**1.6E-05**	**1.6E-05**
P-32	1.0E+03	5.1E+04	1.5E-06	**3.7E-03**	**3.7E-03**
Se-75	2.8E+00	5.7E-01	4.4E-09	4.4E-08	4.9E-08
Sr-89	2.5E+02	1.9E+01	3.9E-07	1.5E-06	1.9E-06
Tc-99m	1.4E+05	2.7E+03	1.8E-06	1.8E-06	3.6E-06
TI-201	4.6E+03	4.6E+03	2.6E-07	**1.3E-05**	**1.3E-05**
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-30. Results of the calculations for the Tegelviken plant for Case1 (no retention in the sludge).

Nuclide	Concentration water Bq/m^3	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	4.3E+01	8.6E+00	9.8E-10	9.8E-09	1.1E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	3.1E+02	1.3E+01	4.0E-08	7.9E-08	1.2E-07
I-125	2.2E-01	9.0E-03	2.0E-09	4.0E-09	6.1E-09
I-131	5.6E+03	2.2E+02	**7.4E-05**	**1.5E-04**	**2.2E-04**
In-111	2.0E+02	2.0E+03	3.5E-08	**1.7E-05**	**1.7E-05**
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	3.1E+02	2.3E+01	4.9E-07	1.8E-06	2.3 E-06
Tc-99m	1.3E+05	2.6E+03	1.7E-06	1.7E-06	3.4E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-31. Results of the calculations for the Uddebo plant for Case1 (no retention in the sludge).

Nuclide	Concentration water Bq/m^3	Concentration fish Bq/kg FW	Dose water ingestion Sv/a	Dose fish ingestion Sv/a	Dose total Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	1.9E+02	3.7E+01	4.2E-09	4.2E-08	4.6 E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	5.5E+03	2.2E+02	**7.2E-05**	**1.4E-04**	**2.2E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	1.2E+05	2.5E+03	1.6E-06	1.6E-06	3.2E-06
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-32. Results of the calculations of the exposure of workers for the Henriksdal´s plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,7E+01	2,4E-07	1,2E-13	2,4E-07
Cu-64	6,5E+00	4,1E-07	1,5E-13	4,1E-07
Ga-67	3,6E+00	2,5E-07	1,6E-13	2,5E-07
I-123	5,0E+02	**3,5E-05**	7,0E-12	**3,5E-05**
I-125	3,9E-01	1,4E-09	3,8E-13	1,4E-09
I-131	1,1E+04	**1,8E-03**	1,6E-08	**1,8E-03**
In-111	5,2E+02	**9,0E-05**	2,3E-11	**9,0E-05**
P-32	2,3E+02	0,0E+00	1,5E-10	0,0E+00
Se-75	8,9E-01	9,2E-08	2,2E-13	9,2E-08
Sr-89	1,1E+02	4,0E-09	1,7E-10	4,0E-09
Tc-99m	1,1E+05	**6,6E-03**	2,5E-10	**6,6E-03**
TI-201	1,3E+00	5,4E-08	1,1E-14	5,4E-08
Y-90	1,0E+02	1,3E-14	2,9E-11	1,3E-14

Table B-33. Results of the calculations of the exposure of workers for the Ryaverket. plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv//a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,2E+02	1,6E-06	8,3E-13	1,6E-06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	1,5E+02	1,0E-05	6,9E-12	1,0E-05
I-123	1,7E+02	**1,2E-05**	2,5E-12	**1,2E-05**
I-125	3,5E-01	1,2E-09	3,4E-13	1,2E-09
I-131	4,9E+03	**7,7E-04**	7,0E-09	**7,7E-04**
In-111	4,4E+02	**7,7E-05**	1,9E-11	**7,7E-05**
P-32	2,6E+02	0,0E+00	1,7E-10	0,0E+00
Se-75	1,7E+00	1,8E-07	4,2E-13	1,8E-07
Sr-89	3,9E+01	1,4E-09	5,9E-11	1,4E-09
Tc-99m	3,8E+04	**2,3E-03**	8,8E-11	**2,3E-03**
TI-201	1,1E+03	**4,3E-05**	9,0E-12	**4,3E-05**
Y-90	2,6E+01	3,5E-15	7,4E-12	3,5E-15

Table B-34. Results of the calculations of the exposure of workers for the Ön plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	2,8E+02	3,8E-06	2,0E-12	3,8E-06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	3,3E-12	0,0E+00
I-123	3,9E+03	**2,7E-04**	5,5E-11	**2,7E-04**
I-125	8,5E-01	2,9E-09	8,3E-13	2,9E-09
I-131	7,4E+03	**1,2E-03**	1,0E-08	**1,2E-03**
In-111	1,4E+03	**2,4E-04**	6,1E-11	**2,4E-04**
P-32	9,9E+01	0,0E+00	1,4E-10	0,0E+00
Se-75	5,2E+00	5,4E-07	1,3E-12	5,4E-07
Sr-89	0,0E+00	0,0E+00	2,0E-11	0,0E+00
Tc-99m	2,6E+05	**1,5E-02**	5,9E-10	**1,5E-02**
TI-201	4,2E+01	1,7E-06	6,7E-12	1,7E-06
Y-90	3,6E+02	4,8E-14	1,0E-10	4,8E-14

Table B-35. Results of the calculations of the exposure of workers for the Kungsängsverket plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	2,3E-02	7,9E-09	9,4E-15	7,9E-09
Cr-51	3,5E+01	4,7E-07	2,5E-13	4,7E-07
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	3,1E+01	2,2E-06	1,4E-12	2,2E-06
I-123	7,8E+01	5,5E-06	1,1E-12	5,5E-06
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,1E+04	**1,7E-03**	1,5E-08	**1,7E-03**
In-111	1,3E+04	**2,4E-03**	5,9E-10	**2,4E-03**
P-32	9,2E+02	0,0E+00	6,0E-10	0,0E+00
Se-75	9,4E-01	1,0E-07	2,3E-13	1,0E-07
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	1,1E+05	**1,4E-02**	2,6E-10	**1,4E-02**
TI-201	2,2E+03	**8,8E-05**	1,9E-11	**8,8E-05**
Y-90	7,5E+03	1,0E-12	2,2E-09	1,0E-12

Table B-36. Results of the calculations of the exposure of workers for the Källby plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	1,3E-02	4,3E-09	5,0E-15	4,3E-09
Cr-51	3,0E+00	4,0E-08	2,1E-14	4,0E-08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	7,7E+01	5,3E-06	3,5E-12	5,3E-06
I-123	2,6E+03	**1,8E-04**	3,6E-11	**1,8E-04**
I-125	1,5E+00	5,1E-09	1,4E-12	5,1E-09
I-131	4,1E+04	**6,5E-03**	5,8E-08	**6,5E-03**
In-111	3,6E+03	**6,3E-04**	1,6E-10	**6,3E-04**
P-32	2,3E+03	0,0E+00	1,5E-09	0,0E+00
Se-75	7,2E-01	7,7E-08	1,8E-13	7,7E-08
Sr-89	7,3E+02	2,6E-08	1,1E-09	2,6E-08
Tc-99m	4,5E+05	**2,7E-02**	1,0E-09	**2,7E-02**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	1,5E+03	2,0E-13	4,2E-10	2,0E-13

Table B-37. Results of the calculations of the exposure of workers for the Centrala Reningsverket plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	3.0E+01	4.1E-07	2.1E-13	4.1E-07
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	3.2E-01	1.1E-09	3.1E-13	1.1E-09
I-131	3.0E+03	**4.9E-04**	4.3E-09	**4.9E-04**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	1.6E+02	5.6E-09	2.4E-10	5.9E-09
Tc-99m	1.6E+05	**9.2E-03**	3.6E-10	**9.2E-03**
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-38. Results of the calculations of the exposure of workers for the Duvbacken plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0.0E+00	0.0E+00	0,0E+00	0,0E+00
Cr-51	1.8E+00	2.5E-08	1,3E-14	2,5E-08
Cu-64	0.0E+00	0.0E+00	0,0E+00	0,0E+00
Ga-67	0.0E+00	0.0E+00	0,0E+00	0,0E+00
I-123	2.0E+02	**1.4E-05**	2,8E-12	**1,4E-05**
I-125	0.0E+00	0.0E+00	0,0E+00	0,0E+00
I-131	1.5E+04	**2.4E-03**	2,1E-08	**2,4E-03**
In-111	0.0E+00	0.0E+00	0,0E+00	0,0E+00
P-32	5.3E+02	0.0E+00	3,4E-10	3,4E-10
Se-75	2.5E+01	2.6E-06	6,1E-12	2,6E-06
Sr-89	2.4E+02	8.7E-09	3,7E-10	9,1E-09
Tc-99m	1.5E+05	**9.1E-03**	3,5E-10	**9,1E-03**
TI-201	0.0E+00	0.0E+00	0,0E+00	0,0E+00
Y-90	0.0E+00	0.0E+00	0,0E+00	0,0E+00

Table B-39. Results of the calculations of the exposure of workers for the Ekeby plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	5,6E+01	3,9E-06	7,9E-13	3,9E-06
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,2E+04	**2,0E-03**	1,8E-08	**2,0E-03**
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	1,4E+02	0,0E+00	9,2E-11	9,2E-11
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	3,8E+01	1,3E-09	5,7E-11	1,4E-09
Tc-99m	1,3E+05	**7,9E-03**	3,1E-10	**7,9E-03**
TI-201	9,5E+01	3,8E-06	8,0E-13	3,8E-06
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-40. Results of the calculations of the exposure of workers for the Fillanverket plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	5,9E+02	8,1E-06	4,2E-12	8,1E-06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	2,4E+03	**1,7E-04**	3,5E-11	**1,7E-04**
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	3,1E+04	**5,0E-03**	4,4E-08	**5,0E-03**
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	5,9E+02	2,1E-08	9,0E-10	2,2E-08
Tc-99m	5,6E+05	**3,3E-02**	1,3E-09	**3,3E-02**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-41. Results of the calculations of the exposure of workers for the Gässlösa plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0.0E+00
Cr-51	1,8E+02	2,5E-06	1,3E-12	**2.5E-06**
Cu-64	0,0E+00	0,0E+00	0,0E+00	0.0E+00
Ga-67	6,2E+01	4,3E-06	2,8E-12	**4.3E-06**
I-123	8,3E+00	5,8E-07	1,2E-13	**5.8E-07**
I-125	0,0E+00	0,0E+00	0,0E+00	0.0E+00
I-131	4,1E+03	**6,6E-04**	5,8E-09	**6.6E-04**
In-111	3,5E+00	6,1E-07	1,5E-13	**6.1E-07**
P-32	3,9E+02	0,0E+00	2,5E-10	**2.5E-10**
Se-75	0,0E+00	0,0E+00	0,0E+00	0.0E+00
Sr-89	1,1E+02	4,0E-09	1,7E-10	**4.2E-09**
Tc-99m	4,5E+04	**2,7E-03**	1,0E-10	**2.7E-03**
TI-201	0,0E+00	0,0E+00	0,0E+00	0.0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0.0E+00

Table B-42. Results of the calculations of the exposure of workers for the Göviken plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	7,2E+01	9,8E-07	5,1E-13	9,8E-07
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	4,4E+03	**7,2E-04**	6,3E-09	**7,2E-04**
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	1,4E+02	0,0E+00	9,1E-11	9,1E-11
Se-75	1,9E+00	2,0E-07	4,9E-13	2,0E-07
Sr-89	1,4E+03	4,9E-08	2,1E-09	5,1E-08
Tc-99m	1,2E+05	**7,3E-03**	2,8E-10	**7,3E-03**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-43. Results of the calculations of the exposure of workers for the Käppalaverket plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,9E+01	2,6E-07	1,3E-13	2,6E-07
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	2,1E-01	2,2E-08	5,2E-14	2,2E-08
Sr-89	1,9E+01	6,9E-10	2,9E-11	7,2E-10
Tc-99m	5,1E+04	**3,0E-03**	1,2E-10	**3,0E-03**
TI-201	4,2E+04	**1,7E-03**	3,6E-10	**1,7E-03**
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-44. Results of the calculations of the exposure of workers for the Koholmen plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,7E+02	2,3E-06	1,2E-12	2,3E-06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	1,1E+02	7,5E-06	4,9E-12	7,5E-06
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	1,0E+03	**1,8E-04**	4,4E-11	**1,8E-04**
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	5,9E+02	2,1E-08	8,9E-10	**2,2E-08**
Tc-99m	1,5E+05	**8,9E-03**	3,4E-10	**8,9E-03**
TI-201	3,5E+03	**1,4E-04**	3,0E-11	**1,4E-04**
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-45. Results of the calculations of the exposure of workers for the Öresundsverket plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	4,0E-01	4,2E-08	9,9E-14	4,2E-08
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	1,0E+05	**6,2E-03**	2,4E-10	**6,2E-03**
TI-201	2,8E+03	**1,1E-04**	2,4E-11	**1,1E-04**
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-46. Results of the calculations of the exposure of workers for the Simsholmen plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,1E+02	1,4E-06	7,5E-13	1,4E-06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	2,3E+02	**1,6E-05**	3,3E-12	**1,6E-05**
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,4E+04	**2,2E-03**	1,9E-08	**2,2E-03**
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	6,5E+02	0,0E+00	4,2E-10	4,2E-10
Se-75	6,9E-01	7,2E-08	1,7E-13	7,2E-08
Sr-89	3,5E+02	1,3E-08	5,3E-10	1,3E-08
Tc-99m	1,6E+05	**9,7E-03**	3,7E-10	**9,7E-03**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	2,3E+02	3,1E-14	6,7E-11	6,7E-11

Table B-47. Results of the calculations of the exposure of workers for the Sjölunda plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	9,6E-04	3,3E-10	3,9E-16	3,3E-10
Cr-51	6,9E+00	9,4E-08	4,9E-14	9,4E-08
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	1,8E+01	1,2E-06	8,1E-13	1,2E-06
I-123	7,9E+01	5,5E-06	1,1E-12	5,5E-06
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,3E+03	**2,1E-04**	1,8E-09	**2,1E-04**
In-111	2,4E+02	**4,2E-05**	1,1E-11	**4,2E-05**
P-32	1,4E+01	0,0E+00	9,0E-12	9,0E-12
Se-75	5,9E-02	6,2E-09	1,5E-14	6,2E-09
Sr-89	1,6E+00	5,7E-11	2,4E-12	6,0E-11
Tc-99m	3,0E+04	**1,8E-03**	6,9E-11	**1,8E-03**
TI-201	4,5E+00	1,8E-07	3,8E-14	1,8E-07
Y-90	1,3E+01	1,8E-15	3,8E-12	3,8E-12

Table B-48. Results of the calculations of the exposure of workers for the Sjöstadsverket plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	6,6E-02	9,0E-10	4,7E-16	9,0E-10
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	2,0E-01	1,4E-08	2,9E-15	1,4E-08
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,4E+01	2,3E-06	2,0E-11	2,3E-06
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	2,1E+00	0,0E+00	1,4E-12	1,4E-12
Se-75	3,3E-03	3,5E-10	8,3E-16	3,5E-10
Sr-89	5,7E+00	2,0E-10	8,6E-12	2,1E-10
Tc-99m	2,0E+02	**1,2E-05**	4,7E-13	**1,2E-05**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-49. Results of the calculations of the exposure of workers for the Skansverket plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	0,0E+00	0,0E+00	0,0E+00	0,0E+00
In-111	5,6E+02	**9,8E-05**	2,5E-11	9,8E-05
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	4,4E+00	4,6E-07	1,1E-12	4,6E-07
Sr-89	3,3E+02	1,2E-08	5,0E-10	1,2E-08
Tc-99m	9,9E+04	**5,9E-03**	2,3E-10	5,9E-03
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	2,3E+02	3,1E-14	6,6E-11	6,6E-11

Table B-50. Results of the calculations of the exposure of workers for the Sundet plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	6,0E+01	8,1E-07	4,2E-13	8,1E-07
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	2,9E+01	2,1E-06	1,4E-12	2,1E-06
I-123	3,3E+02	**2,3E-05**	4,7E-12	2,3E-05
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	7,0E+03	**1,1E-03**	9,9E-09	**1,1E-03**
In-111	2,1E+02	**3,7E-05**	9,3E-12	**3,7E-05**
P-32	1,2E+03	0,0E+00	7,5E-10	7,5E-10
Se-75	3,2E+00	3,4E-07	8,0E-13	3,4E-07
Sr-89	2,8E+02	1,0E-08	4,3E-10	1,1E-08
Tc-99m	1,5E+05	**9,2E-03**	3,5E-10	**9,2E-03**
TI-201	5,2E+03	**2,1E-04**	4,4E-11	**2,1E-04**
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-51. Results of the calculations of the exposure of workers for the Tegelviken plant obtained for Case2 (full retention in the sludge).

Nuclide	Concentration sludge Bq/kg WW	Dose External Sv/a	Dose Inhalation Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	7,1E+01	9,7E-07	5,1E-13	9,7E-07
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	5,2E+02	**3,7E-05**	7,4E-12	**3,7E-05**
I-125	3,7E-01	1,3E-09	3,6E-13	1,3E-09
I-131	9,3E+03	**1,5E-03**	1,3E-08	**1,5E-03**
In-111	3,3E+02	**5,8E-05**	1,5E-11	**5,8E-05**
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	5,2E+02	1,9E-08	7,9E-10	1,9E-08
Tc-99m	2,2E+05	**1,3E-02**	4,9E-10	1,3E-02
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-52. Results of the calculations of the exposure of workers for the Uddebo plant obtained for Case2 (full retention in the sludge).

Nuclide	**Concentration sludge Bq/kg WW**	**Dose External Sv/a**	**Dose Inhalation Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1,2E+02	1,6E-06	8,3E-13	1,6E-06
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	3,5E+03	**5,6E-04**	4,9E-09	**5,6E-04**
In-111	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Tc-99m	7,8E+04	**4,6E-03**	1,8E-10	**4,6E-03**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-53. Results of the calculations of food ingestion doses resulting from the use of sludge from the Henriksdal´s plant for landfill (Case 2 – full retention in the sludge).

Nuclide	Concentration in soil Bq/kg DW	Dose Crops Sv/a	Dose Milk Sv/a	Dose Meat Sv/a	Dose Total Sv/a
Co-58	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	6,9E+01	7.6E-10	1.5E-10	1.3E-08	1.4E-08
Cu-64	2,6E+01	7.0E-15	9.5E-09	2.2E-19	9.5E-09
Ga-67	1,4E+01	1.7E-10	6.1E-12	9.7E-13	1.8E-10
I-123	2,0E+03	7.5E-14	3.3E-07	2.0E-17	3.3E-07
I-125	1,6E+00	1.6E-07	7.5E-08	9.1E-08	3.3E-07
I-131	4,5E+04	**2.4E-03**	**2.5E-03**	**7.4E-04**	**5.7E-03**
In-111	2,1E+03	2.4E-08	2.7E-08	1.5E-09	5.2E-08
P-32	9,2E+02	**4.6E-04**	**1.2E-03**	**3.5E-04**	**2.0E-03**
Se-75	3,6E+00	3.5E-07	3.2E-08	8.7E-07	1.3E-06
Sr-89	4,5E+02	**1.2E-04**	**1.1E-04**	**8.3E-05**	**3.1E-04**
Tc-99m	4,4E+05	3.3E-19	**1.4E-04**	6.9E-28	**1.4E-04**
TI-201	5,4E+00	1.7E-08	6.8E-09	1.8E-10	2.4E-08
Y-90	4,0E+02	3.5E-08	1.4E-08	5.1E-09	5.5E-08

Table B-54. Results of the calculations of food ingestion doses resulting from the use of sludge from the Ryaverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Dose Crops Sv/a**	**Dose Milk Sv/a**	**Dose Meat Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	4,7E+02	5.1E-09	1.0E-09	8.5E-08	9.1E-08
Cu-64	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	6,0E+02	7.1E-09	2.6E-10	4.0E-11	7.4E-09
I-123	7,0E+02	2.6E-14	1.2E-07	7.0E-18	1.2E-07
I-125	1,4E+00	1.5E-07	6.8E-08	8.1E-08	3.0E-07
I-131	2,0E+04	**1.1E-03**	**1.1E-03**	**3.2E-04**	**2.5E-03**
In-111	1,8E+03	2.0E-08	2.2E-08	1.3E-09	4.4E-08
P-32	1,1E+03	**5.2E-04**	**1.4E-03**	**4.0E-04**	**2.3E-03**
Se-75	6,7E+00	6.6E-07	6.1E-08	1.6E-06	2.4E-06
Sr-89	1,6E+02	**4.1E-05**	**3.8E-05**	**2.9E-05**	**1.1E-04**
Tc-99m	1,5E+05	1.1E-19	**4.8E-05**	2.4E-28	**4.8E-05**
TI-201	4,3E+03	**1.4E-05**	5.4E-06	1.4E-07	**1.9E-05**
Y-90	1,0E+02	9.0E-09	3.6E-09	1.3E-09	1.4E-08

Table B-55. Results of the calculations of food ingestion doses resulting from the use of sludge from the Ön plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Dose Crops Sv/a**	**Dose Milk Sv/a**	**Dose Meat Sv/a**	**Dose Total Sv/a**
Co-58	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	1,1E+03	1.2E-08	2.4E-09	2.1E-07	2.2E-07
Cu-64	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	1,5E+04	5.8E-13	2.6E-06	1.5E-16	2.6E-06
I-125	3,4E+00	3.6E-07	1.6E-07	2.0E-07	7.1E-07
I-131	3,0E+04	**1.6E-03**	**1.7E-03**	**4.9E-04**	**3.8E-03**
In-111	5,6E+03	6.4E-08	7.1E-08	4.0E-09	1.4E-07
P-32	3,9E+02	**2.0E-04**	**5.1E-04**	**1.5E-04**	**8.6E-04**
Se-75	2,1E+01	2.1E-06	1.9E-07	5.1E-06	7.3E-06
Sr-89	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	1,0E+06	7.6E-19	**3.2E-04**	1.6E-27	**3.2E-04**
TI-201	1,7E+02	5.4E-07	2.1E-07	5.6E-09	7.5E-07
Y-90	1,4E+03	1.2E-07	5.0E-08	1.8E-08	1.9E-07

Table B-56. Results of the calculations of food ingestion doses resulting from the use of sludge from the Kungsängsverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Dose Crops Sv/a**	**Dose Milk Sv/a**	**Dose Meat Sv/a**	**Dose Total Sv/a**
Co-58	9,4E-02	2.0E-09	4.5E-09	7.9E-09	1.4E-08
Cr-51	1,4E+02	1.5E-09	3.0E-10	2.5E-08	2.7E-08
Cu-64	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	1,3E+02	1.5E-09	5.4E-11	8.5E-12	1.5E-09
I-123	3,1E+02	1.2E-14	5.2E-08	3.1E-18	5.2E-08
I-125	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	4,2E+04	**2.3E-03**	**2.4E-03**	**6.9E-04**	**5.3E-03**
In-111	5,4E+04	6.2E-07	6.8E-07	3.9E-08	1.3E-06
P-32	3,7E+03	**1.8E-03**	**4.7E-03**	**1.4E-03**	**8.0E-03**
Se-75	3,8E+00	3.7E-07	3.4E-08	9.2E-07	1.3E-06
Sr-89	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	4,5E+05	3.3E-19	**1.4E-04**	7.0E-28	**1.4E-04**
TI-201	8,9E+03	**2.9E-05**	**1.1E-05**	3.0E-07	**4.0E-05**
Y-90	3,0E+04	2.6E-06	1.0E-06	3.7E-07	4.0E-06

Table B-57. Results of the calculations of food ingestion doses resulting from the use of sludge from the Källby plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	5,0E-02	1.1E-09	2.4E-09	4.2E-09	7.7E-09
Cr-51	1,2E+01	1.3E-10	2.6E-11	2.2E-09	2.3E-09
Cu-64	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	3,1E+02	3.7E-09	1.3E-10	2.1E-11	3.8E-09
I-123	1,0E+04	3.9E-13	1.7E-06	1.0E-16	1.7E-06
I-125	5,8E+00	6.1E-07	2.8E-07	3.4E-07	1.2E-06
I-131	1,6E+05	**8.8E-03**	**9.2E-03**	**2.7E-03**	**2.1E-02**
In-111	1,4E+04	1.6E-07	1.8E-07	1.0E-08	3.6E-07
P-32	9,1E+03	**4.5E-03**	**1.2E-02**	**3.5E-03**	**2.0E-02**
Se-75	2,9E+00	2.8E-07	2.6E-08	7.0E-07	1.0E-06
Sr-89	2,9E+03	**7.7E-04**	**7.1E-04**	**5.4E-04**	**2.0E-03**
Tc-99m	1,8E+06	1.3E-18	**5.6E-04**	2.8E-27	**5.6E-04**
TI-201	0,0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	5,9E+03	5.1E-07	2.1E-07	7.4E-08	7.9E-07

Table B-58. Results of the calculations of food ingestion doses resulting from the use of sludge from the Centrala Reningsverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	1.2E+02	1,3E-09	2,6E-10	2,2E-08	2,4E-08
Cu-64	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-123	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-125	1.3E+00	1,3E-07	6,1E-08	7,3E-08	2,7E-07
I-131	1.2E+04	**6,5E-04**	**6,8E-04**	**2,0E-04**	**1,5E-03**
In-111	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
P-32	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Se-75	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	6.3E+02	**1,7E-04**	**1,5E-04**	**1,2E-04**	**4,4E-04**
Tc-99m	6.2E+05	4,6E-19	**1,9E-04**	9,8E-28	**1,9E-04**
TI-201	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0.0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-59. Results of the calculations of food ingestion doses resulting from the use of sludge from the Duvbacken plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	7.3E+00	8,1E-11	1.6E-11	1.3E-09	1.4E-09
Cu-64	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	8.0E+02	3,0E-14	1.3E-07	8.0E-18	1.3E-07
I-125	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	5.9E+04	**3,2E-03**	**3.4E-03**	**9.8E-04**	**7.5E-03**
In-111	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	2.1E+03	**1,1E-03**	**2.7E-03**	**8.1E-04**	**4.6E-03**
Se-75	9.9E+01	9,7E-06	9.0E-07	**2.4E-05**	**3.5E-05**
Sr-89	9.8E+02	**2,6E-04**	**2.4E-04**	**1.8E-04**	**6.8E-04**
Tc-99m	6.1E+05	4,6E-19	**1.9E-04**	9.7E-28	**1.9E-04**
TI-201	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-60. Results of the calculations of food ingestion doses resulting from the use of sludge from the Ekeby plant for landfill (Case 2 – full retention in the sludge).

Nuclide	Concentration in soil Bq/kg DW	Crops Sv/a	Milk Sv/a	Meat Sv/a	Total dose Sv/a
Co-58	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Cu-64	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	2.2E+02	8,3E-15	3.7E-08	2.2E-18	3.7E-08
I-125	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	4.9E+04	**2,7E-03**	**2.8E-03**	**8.1E-04**	**6.3E-03**
In-111	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	5.7E+02	**2,8E-04**	**7.3E-04**	**2.2E-04**	**1.2E-03**
Se-75	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	1.5E+02	**4,0E-05**	**3.6E-05**	**2.8E-05**	**1.0E-04**
Tc-99m	5.3E+05	4,0E-19	**1.7E-04**	8.4E-28	**1.7E-04**
TI-201	3.8E+02	1,2E-06	4.8E-07	1.3E-08	1.7E-06
Y-90	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-61. Results of the calculations of food ingestion doses resulting from the use of sludge from the Fillanverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.4E+03	2,6E-08	5.2E-09	4.3E-07	4.6E-07
Cu-64	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	9.8E+03	3,7E-13	1.6E-06	9.8E-17	1.6E-06
I-125	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	1.2E+05	**6,7E-03**	**7.0E-03**	**2.0E-03**	**1.6E-02**
In-111	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	2.4E+03	**6,3E-04**	**5.7E-04**	**4.4E-04**	**1.6E-03**
Tc-99m	2.2E+06	1,7E-18	**7.0E-04**	3.5E-27	**7.0E-04**
TI-201	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-62. Results of the calculations of food ingestion doses resulting from the use of sludge from the Gässlösa plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Cr-51	7,2E+02	7,9E-09	1,6E-09	1,3E-07	1,4E-07
Cu-64	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Ga-67	2,5E+02	2,9E-09	1,1E-10	1,7E-11	3,0E-09
I-123	3,3E+01	1,3E-15	5,6E-09	3,3E-19	5,6E-09
I-125	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
I-131	1,6E+04	**8,8E-04**	**9,3E-04**	**2,7E-04**	**2,1E-03**
In-111	1,4E+01	1,6E-10	1,8E-10	1,0E-11	3,5E-10
P-32	1,5E+03	**7,7E-04**	**2,0E-03**	**5,9E-04**	**3,4E-03**
Se-75	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Sr-89	4,5E+02	**1,2E-04**	**1,1E-04**	**8,4E-05**	**3,1E-04**
Tc-99m	1,8E+05	1,3E-19	**5,6E-05**	2,8E-28	**5,6E-05**
TI-201	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00
Y-90	0,0E+00	0,0E+00	0,0E+00	0,0E+00	0,0E+00

Table B-63. Results of the calculations of food ingestion doses resulting from the use of sludge from the Göviken plant for landfill (Case 2 – full retention in the sludge).

Nuclide	Concentration in soil Bq/kg DW	Crops Sv/a	Milk Sv/a	Meat Sv/a	Total dose Sv/a
Co-58	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.9E+02	3,2E-09	6.2E-10	5.2E-08	5.6E-08
Cu-64	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	1.8E+04	**9,5E-04**	**1.0E-03**	**2.9E-04**	**2.2E-03**
In-111	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	5.6E+02	**2,8E-04**	**7.2E-04**	**2.2E-04**	**1.2E-03**
Se-75	7.8E+00	7,7E-07	7.1E-08	1.9E-06	2.7E-06
Sr-89	5.5E+03	**1,4E-03**	**1.3E-03**	**1.0E-03**	**3.8E-03**
Tc-99m	4.9E+05	3,7E-19	**1.5E-04**	7.7E-28	**1.5E-04**
TI-201	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-64. Results of the calculations of food ingestion doses resulting from the use of sludge from the Käppalaverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg TS**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	7.6E+01	8.4E-10	1.6E-10	1.4E-08	1.5E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	8.3E-01	8.2E-08	7.6E-09	2.0E-07	2.9E-07
Sr-89	7.7E+01	**2.0E-05**	**1.9E-05**	**1.4E-05**	**5.3E-05**
Tc-99m	2.0E+05	1.5E-19	**6.3E-05**	3.2E-28	**6.3E-05**
TI-201	1.7E+05	**5.4E-04**	**2.1E-04**	5.6E-06	**7.6E-04**
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-65. Results of the calculations of food ingestion doses resulting from the use of sludge from the Koholmen plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg TS**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	6.7E+02	7.3E-09	1.5E-09	1.2E-07	1.3E-07
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	4.3E+02	5.1E-09	1.8E-10	2.9E-11	5.3E-09
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	4.0E+03	4.6E-08	5.1E-08	2.9E-09	1.0E-07
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	2.4E+03	**6.2E-04**	**5.7E-04**	**4.4E-04**	**1.6E-03**
Tc-99m	6.0E+05	4.5E-19	**1.9E-04**	9.4E-28	**1.9E-04**
TI-201	1.4E+04	**4.5E-05**	1**.8E-05**	4.7E-07	**6.3E-05**
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-66. Results of the calculations of food ingestion doses resulting from the use of sludge from the Öresundsverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg TS**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	1.6E+00	1.6E-07	1.4E-08	3.9E-07	5.6E-07
Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	4.1E+05	3.1E-19	**1.3E-04**	6.5E-28	**1.3E-04**
TI-201	1.1E+04	**3.6E-05**	**1.4E-05**	3.8E-07	**5.1E-05**
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-67. Results of the calculations of food ingestion doses resulting from the use of sludge from the Simsholmen plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg TS**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	4.2E+02	4.6E-09	9.1E-10	7.7E-08	8.2E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	9.3E+02	3.5E-14	1.5E-07	9.3E-18	1.5E-07
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	5.5E+04	**2.9E-03**	**3.1E-03**	**9.0E-04**	**6.9E-03**
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	2.6E+03	**1.3E-03**	**3.3E-03**	**9.9E-04**	**5.6E-03**
Se-75	2.8E+00	2.7E-07	2.5E-08	6.7E-07	9.7E-07
Sr-89	1.4E+03	**3.7E-04**	**3.4E-04**	**2.6E-04**	**9.7E-04**
Tc-99m	6.5E+05	4.8E-19	**2.0E-04**	1.0E-27	**2.0E-04**
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	9.3E+02	8.1E-08	3.2E-08	1.2E-08	1.2E-07

Table B-68. Results of the calculations of food ingestion doses resulting from the use of sludge from the Sjölunda plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	3.8E-03	8.1E-11	1.9E-10	3.2E-10	5.9E-10
Cr-51	2.8E+01	3.0E-10	6.0E-11	5.0E-09	5.4E-09
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	7.1E+01	8.4E-10	3.0E-11	4.8E-12	8.7E-10
I-123	3.2E+02	1.2E-14	5.3E-08	3.2E-18	5.3E-08
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	5.1E+03	**2.7E-04**	**2.9E-04**	**8.3E-05**	**6.4E-04**
In-111	9.6E+02	1.1E-08	1.2E-08	7.0E-10	2.4E-08
P-32	5.5E+01	**2.7E-05**	**7.1E-05**	**2.1E-05**	**1.2E-04**
Se-75	2.3E-01	2.3E-08	2.1E-09	5.7E-08	8.3E-08
Sr-89	6.4E+00	1.7E-06	1.5E-06	1.2E-06	4.4E-06
Tc-99m	1.2E+05	9.0E-20	**3.7E-05**	1.9E-28	**3.7E-05**
TI-201	1.8E+01	5.8E-08	2.3E-08	6.0E-10	8.1E-08
Y-90	5.4E+01	4.7E-09	1.9E-09	6.7E-10	7.2E-09

Table B-69. Results of the calculations of food ingestion doses resulting from the use of sludge from the Sjöstadsverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	Concentration in soil Bq/kg DW	Crops Sv/a	Milk Sv/a	Meat Sv/a	Total dose Sv/a
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.7E-01	2.9E-12	5.8E-13	4.8E-11	5.2E-11
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	8.1E-01	3.1E-17	1.4E-10	8.2E-21	1.4E-10
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	5.6E+01	3.0E-06	3.2E-06	9.2E-07	7.1E-06
In-111	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	8.5E+00	4.2E-06	**1.1E-05**	3.3E-06	**1.8E-05**
Se-75	1.3E-02	1.3E-09	1.2E-10	3.3E-09	4.7E-09
Sr-89	2.3E+01	6.0E-06	5.5E-06	4.2E-06	**1.6E-05**
Tc-99m	8.1E+02	6.1E-22	2.5E-07	1.3E-30	2.5E-07
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-70. Results of the calculations of food ingestion doses resulting from the use of sludge from the Skansverket plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
In-111	2.2E+03	2.6E-08	2.9E-08	1.6E-09	5.6E-08
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	1.8E+01	1.7E-06	1.6E-07	4.3E-06	6.2E-06
Sr-89	1.3E+03	**3.5E-04**	**3.2E-04**	**2.5E-04**	**9.1E-04**
Tc-99m	4.0E+05	3.0E-19	**1.2E-04**	6.2E-28	**1.2E-04**
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	9.2E+02	8.0E-08	3.2E-08	1.2E-08	1.2E-07

Table B-71. Results of the calculations of food ingestion doses resulting from the use of sludge from the Sundet plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.4E+02	2.6E-09	5.2E-10	4.3E-08	4.7E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	1.2E+02	1.4E-09	5.1E-11	8.0E-12	1.5E-09
I-123	1.3E+03	5.0E-14	2.2E-07	1.3E-17	2.2E-07
I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	2.8E+04	**1.5E-03**	**1.6E-03**	**4.6E-04**	**3.5E-03**
In-111	8.5E+02	9.8E-09	1.1E-08	6.1E-10	2.1E-08
P-32	4.6E+03	**2.3E-03**	**6.0E-03**	**1.8E-03**	**1.0E-02**
Se-75	1.3E+01	1.3E-06	1.2E-07	3.1E-06	4.5E-06
Sr-89	1.1E+03	**3.0E-04**	**2.7E-04**	**2.1E-04**	**7.8E-04**
Tc-99m	6.2E+05	4.6E-19	**1.9E-04**	9.7E-28	**1.9E-04**
TI-201	2.1E+04	**6.7E-05**	**2.7E-05**	7.0E-07	**9.4E-05**
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-72. Results of the calculations of food ingestion doses resulting from the use of sludge from the Tegelviken plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg DW**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	2.9E+02	3.1E-09	6.2E-10	5.2E-08	5.6E-08
Cu-64	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	2.1E+03	7.9E-14	3.5E-07	2.1E-17	3.5E-07
I-125	1.5E+00	1.6E-07	7.1E-08	8.6E-08	3.1E-07
I-131	3.7E+04	**2.0E-03**	**2.1E-03**	**6.2E-04**	**4.7E-03**
In-111	1.3E+03	1.5E-08	1.7E-08	9.6E-10	3.3E-08
P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	2.1E+03	**5.5E-04**	**5.0E-04**	**3.9E-04**	**1.4E-03**
Tc-99m	8.6E+05	6.4E-19	**2.7E-04**	1.4E-27	**2.7E-04**
TI-201	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table B-73. Results of the calculations of food ingestion doses resulting from the use of sludge from the Uddebo plant for landfill (Case 2 – full retention in the sludge).

Nuclide	**Concentration in soil Bq/kg TS**	**Crops Sv/a**	**Milk Sv/a**	**Meat Sv/a**	**Total dose Sv/a**
Co-58	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Cr-51	4.7E+02	5,1E-09	1.0E-09	8.5E-08	9.2E-08
Cu-64	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Ga-67	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-123	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-125	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
I-131	1.4E+04	**7,5E-04**	**7.9E-04**	**2.3E-04**	**1.8E-03**
In-111	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
P-32	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Se-75	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Sr-89	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Tc-99m	3.1E+05	2,3E-19	**9.7E-05**	4.9E-28	**9.7E-05**
TI-201	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00
Y-90	0.0E+00	0,0E+00	0.0E+00	0.0E+00	0.0E+00

Appendix C: Dynamic Model LUCIA

C-1. Purpose

This appendix describes the details of the dynamic model LUCIA which was developed to derive realistic estimates of the exposures resulting for all potentially relevant recipients and radionuclides identified from the results of the screening model in Appendix B.

Section C-2 describes the mathematical model. Parameter values are discussed in Section C-3. The following Section C-4 describes the results of a sensitivity analysis performed with the aim to identify the most important input parameters. Results of the LUCIA model are discussed in Section 6 of the main report.

C-2. The mathematical model

The mathematical model consists of system of ordinary differential equations (ODE) representing the mass balance in different compartments (see Table 5.1 in the main report). Each ODE accounts for radionuclide fluxes in and out from a compartment and losses by radioactive decay. The fluxes between compartments are calculated by multiplying a transfer rate coefficient (TC) by the radionuclide inventory in the compartment:

$$\frac{dA_k^j}{dt} = F_{Out\ to\ k}^j - F_{k\ to\ Out}^j + \sum_i F_{i\ to\ k}^j - \sum_i F_{k\ to\ i}^j - \lambda^j * A_k^j$$

$$F_{i\ to\ k}^j = TC_{i\ to\ k}^j * A_i^j$$

$$F_{k\ to\ i}^j = TC_{k\ to\ i}^j * A_k^j \qquad \text{(C-1)}$$

$$F_{k\ to\ Out}^j = TC_{k\ to\ Out}^j * A_k^j$$

where

A_k^j is the inventory of the ***j-th*** radionuclide in compartment ***k*** [Bq]

A_i^j is the inventory of the ***j-th*** radionuclide in compartment ***i*** [Bq]

$F_{Out\ to\ k}^j$ is the flux of the ***j-th*** radionuclide from outside the system (source) into compartment ***k*** [Bq/day],

$F_{k\ to\ Out}^j$ is the flux of the ***j-th*** radionuclide from compartment ***k*** out from the system [Bq/day],

$F_{i\ to\ k}^j$ is the flux of the ***j-th*** radionuclide from compartment ***i*** to compartment ***k*** [Bq/day],

$F_{k\ to\ i}^j$ is the flux of the ***j-th*** radionuclide from compartment ***k*** to compartment ***i*** [Bq/day],

$TC_{i\ to\ k}^j$ is the transfer rate coefficient of the ***j-th*** radionuclide from compartment ***i*** to compartment ***k*** [1/day],

$TC_{k\ to\ i}^j$ is the transfer rate coefficient of the ***j-th*** radionuclide from compartment ***k*** to compartment ***i*** [1/day],

$TC_{k\ to\ Out}^j$ is the transfer rate coefficient of the ***j-th*** radionuclide from compartment ***k*** out from the system [1/day],

λ^j is the decay rate of the ***j-th*** radionuclide [1/day].

The equations for the transfer rate coefficients (TC) are given below. All *TCs* are expressed with functions of the fluxes of water, suspended solids and sludge between compartments. This approach allows keeping the number of radionuclide specific parameters to a minimum. Most model parameters can be easily obtained from common quantities measured at the sewage works.

Transfer rate coefficients for the transport with water (TC_{R1ToR2}, TC_{R2ToR3}, TC_{R3ToR2}, TC_{R3ToR4}, $TC_{R4ToOut}$)

$$TC_{R1ToR2} = \frac{Q}{V_{R1}} \tag{C-2}$$

$$TC_{R2ToR3} = \frac{(1 + par1) * Q}{V_{R2}} \tag{C-3}$$

$$TC_{R3ToR2} = \frac{par1 * Q}{V_{R3}} \tag{C-4}$$

$$TC_{R3ToR4} = \frac{Q}{V_{R3}} \tag{C-5}$$

$$TC_{R4ToOut} = \frac{Q}{V_{R4}} \tag{C-6}$$

where

Q is the waste water flux into the sewage plant [m^3/day],
V_{R1}, V_{R2}, V_{R3} *and* V_{R4} are the total volumes of the primary sedimentation basins, the basins for biological treatment, the secondary sedimentation basins and the basin for final polishing respectively [m^3],
par1 is the fraction of the waste water flux that is returned as backflow to the basins for biological treatment [r.u].

The above equations assume that the flux of waste water between compartments is the same as the flux of incoming water. Losses of water to the air and to the sludge treatment are considered be negligible.

Transfer rate coefficients for the processes of sedimentation ($TC_{R1ToR1sed}$ and $TC_{R3ToR3sed}$)

$$TC_{R1ToR1sed} = \frac{FluxPrimSludge}{V_{R1}} * \frac{Kd_{R1}}{ConcSS * Ess_{R1} * Kd_{R1} + 1} \qquad \text{C-7)}$$

$$FluxPrimSludge = Q * (ConcSS * (1 - Ess_{R1}) + ConcCOD * (1 - ECOD_{R1}) * ConF_{R1}) \qquad \text{(C-8)}$$

$$TC_{R3ToR3sed} = \frac{FluxSecSludge}{(1 - par2) * V_{R2}} * \frac{Kd_{R2}}{ConcSS_{R2} * Kd_{R2} + 1} * \frac{R2}{R3} \qquad \text{(C-9)}$$

$$FluxSecSludge = Q * ConcCOD * ECOD_{R1} * ConF_{R2} \qquad \text{(C-10)}$$

$$ConcSS_{R2} = \frac{ConcCOD * ECOD_{R1} * ConF_{R2}}{(1 + par1) * (1 - par2)} + ConcSS * Ess_{R1} * Ess_{R2} \qquad \text{(C-11)}$$

where

Q is the waste water flux into the sewage plant [m^3/day],
$V_{R\,1}$ *is* the total volume of the primary sedimentation basins [m^3],
$V_{R\,2}$ *is* the total volume of the basins for biological treatment [m^3],
ConcSS is the concentration of suspended solids (SS) in the incoming waste water [kg dw/m^3],
$ConcSS_{R2}$ is the concentration of suspended solids (SS) in R2 [kg dw/m^3],
ConcCOD is the concentration of chemical oxygen demand (COD) in the incoming wastewater [kgCOD/m^3],
$ConF_{R1}$ is a conversion factor between COD and SS units for R1 [kgSS/kgCOD],
$ConF_{R2}$ is a conversion factor between COD and SS units for R2 [kgSS/kgCOD],
Ess_{R1} is the efficiency for reduction of the concentration of SS in R1 [r.u],
Ess_{R2} is the efficiency for reduction of the concentration of SS in R2 [r.u],
$ECOD_{R1}$ is the efficiency for reduction of the concentration of COD in R1 [r.u]
Kd_{R1} is the distribution coefficient of the radionuclide in R1 [m^3/kg],
Kd_{R2} is the distribution coefficient of the radionuclide in R2 [m^3/kg],
par1 is the fraction of the waste water flux that is returned from R3 to the basins for biological treatment [r.u],
par2 is the fraction of the secondary sludge that is returned from R3sed to the basins for biological treatment [r.u.].
FluxPrimSludge is the flux of primary sludge to the sludge treatment [kg/day],
FluxSecSludge is the flux of secondary sludge to the sludge treatment [kg/day],
R2 is the radionuclide inventory in R2 [Bq],
R3 is the radionuclide inventory in R3 [Bq].

Equations (C-7) and (C-9) describe the rate of removal of radionuclides absorbed to suspended solids by sedimentation. The sorption of radionuclides to suspended solids in R1 and R2 is assumed to occur instantaneously. The resulting partition between water and suspended solids depends of the distribution coefficients (*Kd*), which values depend on the concentration of suspended solids and the chemical conditions. Different *Kd* values are used in equations 7 and 9 because different conditions prevail in R1 and R2.

The sedimentation of suspended solids is estimated from the production of primary and secondary sludge. If values of the fluxes of primary and secondary sludge are not available, then these can be estimated using equations (C-8) and (C-10). These equations express the production of sludge as a function of the concentration of suspended solids and COD in the incoming waste water and the efficiency for their removal from the water during the treatment. The efficiencies are defined as follows:

- Ess_{R1} is the ratio between the concentration of suspended solids in the water that is pumped from R1 to R2 and the water incoming to the plant.

- Ess_{R2} is the ratio between the concentration of suspended solids in the water that is pumped from R3 to R4 and the water that is pumped from R1 to R2.

- $ECOD_{R1}$ is the ratio between the concentration of COD in the water that is pumped from R1 to R2 and the water incoming to the plant.

Equations (C-7) and (C-9) also take into account the sludge production from dissolved and small particles of organic matter (COD) that takes place in R1 and R2. Part of the sludge removed in the secondary sedimentation is pumped back to the basins for biological treatment to maintain a constant stock of bacteria. To account for this, a correction was introduced in equation (C-9) with the help of an additional - *par2*. The value of this parameter affects the concentration of suspended solids in R2 and the time spent by a particle in the biological treatment. The concentration of suspended solids in R2 is normally kept at a more or less constant value and is usually known. If values are not available, then these can be estimated with equation (C-11).

Transfer rate coefficients for the transport with sludge to the biological and sludge treatments ($TC_{R1sedToT1}$, $TC_{R3sedToR2}$ and $TC_{R3sedToT1}$)

$$TC_{R1sedToT1} = \frac{1}{RT_{R1sed}} \tag{C-12}$$

$$TC_{R3sedToT1} = \frac{1 - par2}{RT_{R3sed}} \tag{C-13}$$

$$TC_{R3sedToR2} = \frac{par2}{RT_{R3sed}} \tag{C-14}$$

where

par2 is the fraction of the secondary sludge that is returned from R3sed to the basins for biological treatment [r.u.],
RT_{R1sed} is the residence time of the sludge in R1sed [days],
RT_{R3sed} is the residence time of the sludge in R3sed [days].

Transfer rate coefficients for the radionuclide transport between different stages of the sludge treatment (TC_{T1ToT2}, TC_{T2ToT3} and $TC_{T3ToOut}$)

$$TC_{T1ToT2} = \frac{1}{RT_{T1}} \tag{C-15}$$

$$TC_{T2ToT3} = \frac{1 - FracToAir}{RT_{T2}} \tag{C-16}$$

$$TC_{T3ToOut} = \frac{1}{RT_{T3}} \tag{C-17}$$

where

RT_{T1} is the residence time of the sludge in T1 [days],
RT_{T2} is the residence time of the sludge in T2 [days],
RT_{T3} is the residence time of the sludge in T3 [days],
FracToAir is the fraction of sludge that is released to air in T2 [r.u]

A fraction of the sludge is released to air (*FracToAir*) which results in reduction of the sludge flux to T3 and increase of the radionuclide concentrations. It is conservatively assumed that the radionuclides are not released to air.

Calculation of radionuclide concentrations in water and sludge

The concentration of radionuclides in water and sludge released from sewage works can be estimated by dividing the radionuclide fluxes calculated with the model by the fluxes of outgoing water and sludge respectively:

$$C^j_{WaterOut} = \frac{Flux^j_{R4ToOut}}{Q} \tag{C-18}$$

$$C^j_{SludgeOut} = \frac{Flux^j_{T3ToOut}}{(1 - FracToAir) * (FluxPrimSludge + FluxSecSludge)} \tag{C-19}$$

where

$C^j_{WaterOut}$ is the *j-th* radionuclide concentration in the water discharged from the plant [Bq/m^3],
$C^j_{SludgeOut}$ is the *j-th* radionuclide concentration in the sludge released from the plant [Bq/kg dw],
Q is the waste water flux into the sewage plant [m^3/day],
FluxPrimSludge is the flux of primary sludge to the sludge treatment [kg/day],
FluxSecSludge is the flux of secondary sludge to the sludge treatment [kg/day],
$Flux^j_{R4ToOut}$ is the *j-th* radionuclide flux from R4 out from the plant [Bq/day],
$Flux^j_{T3ToOut}$ is the *j-th* radionuclide flux from T3 out from the plant [Bq/day].

The radionuclide concentrations in sludge and water in intermediate stages of the treatment process can be calculated in a similar way, by dividing the appropriated radionuclide fluxes by the water or sludge fluxes. For example, the radionuclide concentration in the primary sludge can be estimated by dividing the radionuclide flux from R1 to T1 by the flux of primary sludge, *i.e.* the primary sludge production.

The dose calculations use the same models as already described in Appendix B for the screening model. In addition to the pathways considered there, the external dose to the farmer staying on the agricultural land on which sludges have been used as fertilisers are included. This pathway is not deemed to be very important, but included for the sake of completeness.

External doses to the farmer are calculated based on the external dose for the sewage plant workers as:

$$Dose^{j}_{farmer,ext} = Dose^{j}_{worker,ext} * f_{red} * \frac{(1 - \exp(-\lambda^{j} * T_{exp}))}{\lambda^{j} * T_{exp}} \qquad \text{(C-20)}$$

where

$Dose_{farmere,xt}^{j}$ is the external radiation dose for the farmer for the *j-th* radionuclide [Sv/a],
$Dose_{workere,xt}^{j}$ is the external radiation dose for the sewage plant worker for the *j-th* radionuclide [Sv/a],
f_{red} is a dimensionless reduction factor to take account of different geometries (see below) ,
T_{exp} is the total exposure duration chosen as 365 days.

The exponential factor in Equation C-20 takes account of the fact that sludges are added only once per year and that during the further external exposure radioactive decay will occur. This is different from the exposure of the sewage plant worker who is exposed to fresh sludges on a relatively continuous basis.

The reduction factor f_{red} takes account of the fact that the sludges are only present in a thin layer on the agriculatoral land as opposed to their deposition in heaps in the sewage plant. This factor was chosen as $f_{red} = 0.03$, *i.e.* it is assumed that 3 % of the upper soil layer which contributes to the external exposure is comprised of sludges (see Section 4.3 of the main report). Since sludges are only added in thin layers as fertilisers to agricultural land, this assumption is seen as sufficiently conservative.

C-3. Model parameters

Most of the parameters required by the model are features of the sewage system that are either known (as the volume of the basins) or are commonly measured (as the water and sludge fluxes). In Table C-1 deterministic values and in some cases probability distributions are provided for these model parameters. These values were derived from data measured in Kungsängsverket sewage plant, Uppsala, during 2003-2004.

The only radionuclide specific parameters required by the model are the distribution coefficients KdR1 and KdR2. Although an extensive literature review was carried out, distribution coefficients for sludge were not found for any of the elements of interest: Iodine, Technetium, Indium and Thallium. In the case of Iodine and Technetium Kd values have been reported for organic soils, which to some extent can be considered as representative for sewage sludge, consisting mainly of organic material. In the case of Indium and Thallium and their analogues from the same group of the periodic system (Boron, Aluminium and Gallium), values for organic soil have not been reported. For the sensitivity studies presented below and for the realistic calculations presented in Section 6 the Kd values presented in Table C-2 were used. For Iodine and Technetium the values were taken from Avila (2006), where a review of values for organic soils is included. For Indium and Thallium three set of values were used corresponding to values reported for Cadmium, Tin and Lead in organic soils (SKB 2002). These elements were judged to have the closest chemical properties to Indium and Thallium, among those elements for which Kd values for organic soils were found in the literature.

Table C-1. Radionuclide independent parameters used in the LUCIA model for the Kungsängsverket sewage plant, Uppsala (estimated from measured data at the sewage plant during 2003-2004).

Parameter	Units	Best estimate	Min	Max	Distribution
Conversion factor between COD and SS units for R1, $ConFR1$	kg DW/kgCOD	0.58	0.29	0.87	Triangular (0.29, 0.58, 0.87)
Conversion factor between COD and SS units for R2, $ConFR2$	kg DW/kgCOD	0.33	0.165	0.495	Triangular (0.165, 0.33, 0.495)
Concentration of chemical oxygen demand (COD) in the incoming water , $ConcCOD$	$kgCOD/m^3$	0.51	0.27	0.71	Normal (0.51, 0.13)
Concentration of suspended solids (SS) in the incoming waste water, $ConcSS$	$kg\ DW/m^3$	0.22	0.11	0.34	Normal (0.22, 0.07)
Efficiency for reduction of the concentration of COD in R1, $ECODR1$	r.u	0.47	0.36	0.58	Triangular (0.36, 0.47, 0.58)
Efficiency for reduction of the concentration of SS in R1, $EssR1$	r.u	0.36	0.17	0.54	Triangular (0.17, 0.38, 0.54)
Efficiency for reduction of the concentration of SS in R2, $EssR2$	r.u	0.075	0.048	0.11	Triangular (0.048, 0.075, 0.11)
Fraction of sludge that is released to air in T2 , $FractToAirT2$	r.u	0.4	0.32	0.48	Triangular (0.32, 0.4, 0.48)
Waste water flux in the sewage plant , Q_{water}	m^3/day	46066	36506	64435	Lognormal (47701, 8812)
Residence time of the sludge in R1sed, $\mathrm{Re}\,sTimeR1sed$	days	0.8	0.6	1	Uniform (0.8, 1)

Parameter	Units	Best estimate	Min	Max	Distribution
Residence time of the sludge in R3sed, $\mathrm{Re}\,sTimeR3sed$	days	0.8	0.6	1	Uniform (0.6, 1)
Residence time of the sludge in T1, $\mathrm{Re}\,sTimeT1$	days	0.8	0.6	1	Triangular (0.6, 0.8, 1)
Residence time of the sludge in T2, $\mathrm{Re}\,sTimeT2$	days	17	13.6	20.4	Triangular (13.6, 17, 20.4)
Residence time of the sludge in T3, $\mathrm{Re}\,sTimeT3$	days	4	3.2	4.8	Triangular (3.2, 4, 4.8)
Total volume of the primary sedimentation basins, $VR1$	m^3	8520			
Total volume of the basins for biological treatment, $VR2$	m^3	31300			
Total volume of the secondary sedimentation basins, $VR3$	m^3	27130			
Total volume of the basin for final polishing, $VR4$	m^3	11950			
Fraction of the waste water flux that is returned from R3 to the basins for biological treatment , $par1$	r.u	0.6	0.3	0.9	Triangular (0.3, 0.6, 0.9)
Fraction of the secondary sludge that is returned from R3sed to the basins for biological treatment , $par2$	r.u	0.45	0.225	0.675	Triangular (0.225, 0.45, 0.675)

Table C-2. Distribution coefficients Kd used in the LUCIA model (m^3/kg).

Element	Best estimate	Min	Max	Distribution	Reference
I	0.03	0.0008	0.3	Lognormal (0.08, 0.19)	Avila (2006)
Tc	0.003	0.00045	0.07	Logtriangular (0.00045, 0.003, 0.07)	Avila (2006)
In, TI	0.8	0.008	80	Logtriangular (0.008, 0.8, 80)	Values for Cd in organic soils - SKB (2002)
	20	8	60	Logtriangular (8, 20, 60)	Values for Pb in in organic soils -SKB (2002)
	2	0.2	20	Logtriangular (0.2, 2, 20)	Values for Sn in in organic soils -SKB (2002)

Model parameters used in the dose assessment are identical to those used in the screening study (see Appendix B). The only exception are assessments carried out in Section 7.2 taking into account the differences arising for marine fish as opposed to sweet water fish considered in the screening study. For marine fish, the bioaccumulation factors given in Table C-3 are used. As consumption rate of marine fish the value $IR_{marine fish}$, 50 kg/a (IAEA 2001) is applied.

Table C-3. Bioaccumulation factor for marine fish (BF in Bq/kg per Bq/m3) (IAEA 2001).

Element	BF
Co	1.0E+00
Cr	2.0E-01
I	1.0E-02
In	1.0E+00
P	3.0E+01
Se	6.0E+00
Sr	2.0E-03
Tc	3.0E-02
TI	5.0E+00

C-4. Sensitivity analysis

The LUCIA model was implemented in the software package Ecolego (Avila *et al.* 2003), where the numerical solver ode15s was used for solving the system of differential equations. The sensitivity of the model to variation in the model parameters was studied using the software package Eikos (Ekström *et al.* 2006). The sensitivity study was carried out for I-131, which is one of the significant radionuclides for the exposure of workers (see screening study in Section 4 of the main document).

A probabilistic simulation was carried out using Latin-Hypercube sampling for the case of a constant input rate of the radionuclide into the sewage plant. The parameters were assigned the distributions shown in Tables C-1 and C-2. The studied endpoints were the concentration of I-131 in the digested sludge (T2 in Figure 5.2 of the main document) and the efficiency (Eff) of the wastewater treatment, defined as the activity concentration in the water coming into the plant divided by the activity concentration in the water released from the plant. The concentration in digested sludge was selected as endpoint because, according to the information provided by the sewage plants, the workers can be exposed to the sludge mainly during and after the digestion process.

The results of the sensitivity analysis are presented in Figure C-1 showing values of the Spearman Rank Correlation Coefficients obtained for the two studied endpoints. The Spearman Rank Correlation Coefficient is a good measure of sensitivity for this model, since the dependencies between inputs and inputs is monotonic. The predictions of the concentration in the digested sludge are highly sensitive to the distribution coefficient for the primary sedimentation (KdR1), slightly sensitive to the distribution coefficient for the biological treatment (KdR2) and practically insensitive to all other model parameters, when considered individually. The same is valid for the efficiency of the wastewater treatment, but this endpoint was also highly sensitive to the water flux, since this parameter determines the residence time of the I-131 in the wastewater treatment.

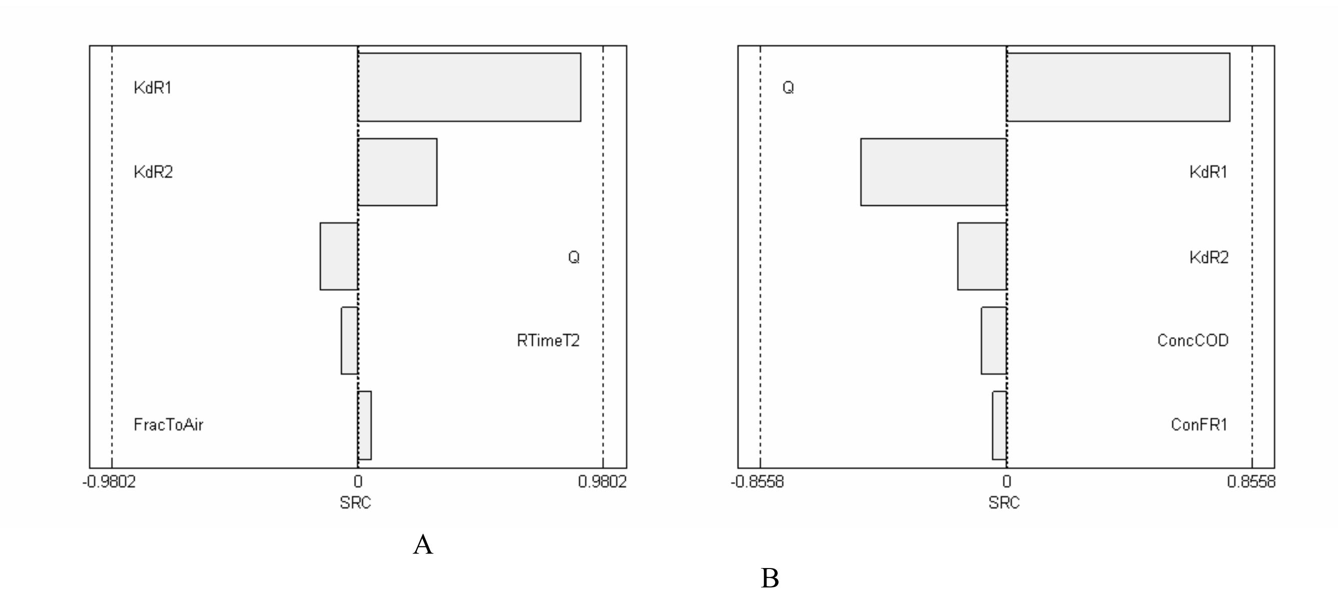

Figure C-1. Tornado graphic showing the Spearman Rank Correlation Coefficients (SRC) obtained for the studied endpoints: Concentration in the digested sludge (A) and Efficiency of the waste water treatment (B).

The type of dependency between inputs and outputs predicted by the model LUCIA is illustrated in figures C-2 and C-3. The dependencies are monotonic and close to linear. The concentrations in the digested sludge experience a larger variation (up-to a factor of about 8) than the efficiencies of the waste treatment (maximum of about 20 %) for the same variation of the model parameters. From these figures it appears that for the case of chronic releases a simplified regression model could be set-up satisfactorily for these two endpoints.

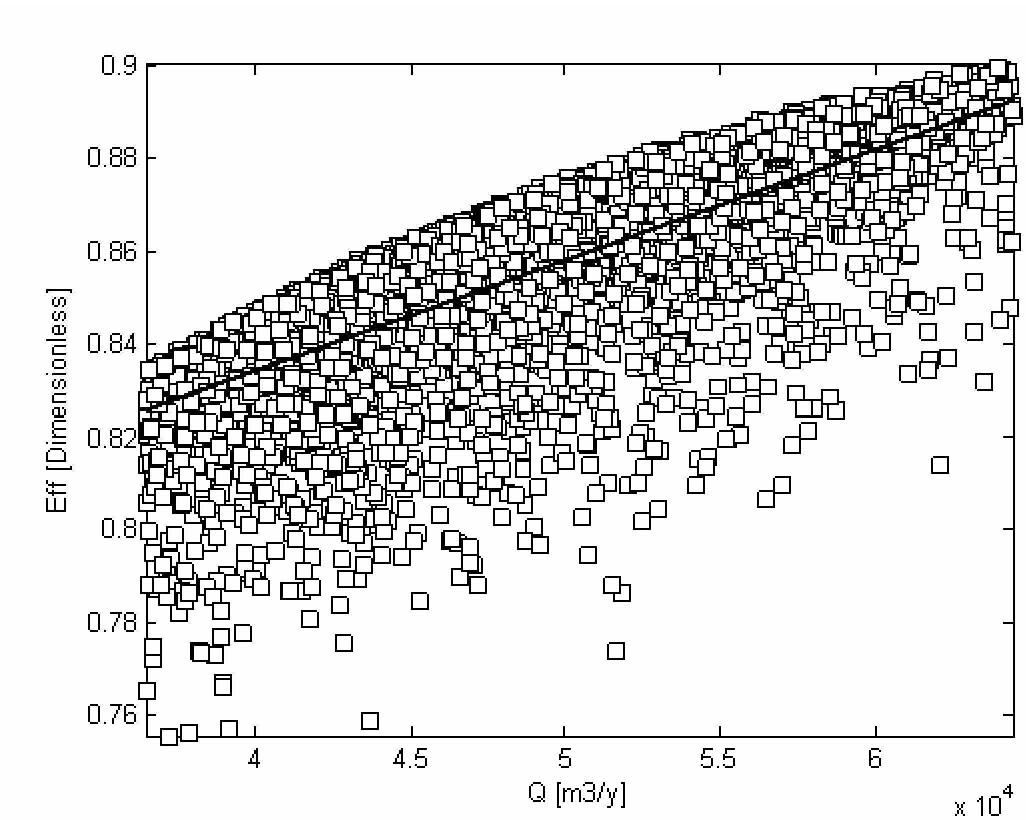

Figure C-2. Scatter plot of efficiency of the wastewater treatment (Eff) against the water flux into the plant (Q) obtained from probabilistic simulations with the LUCIA model.

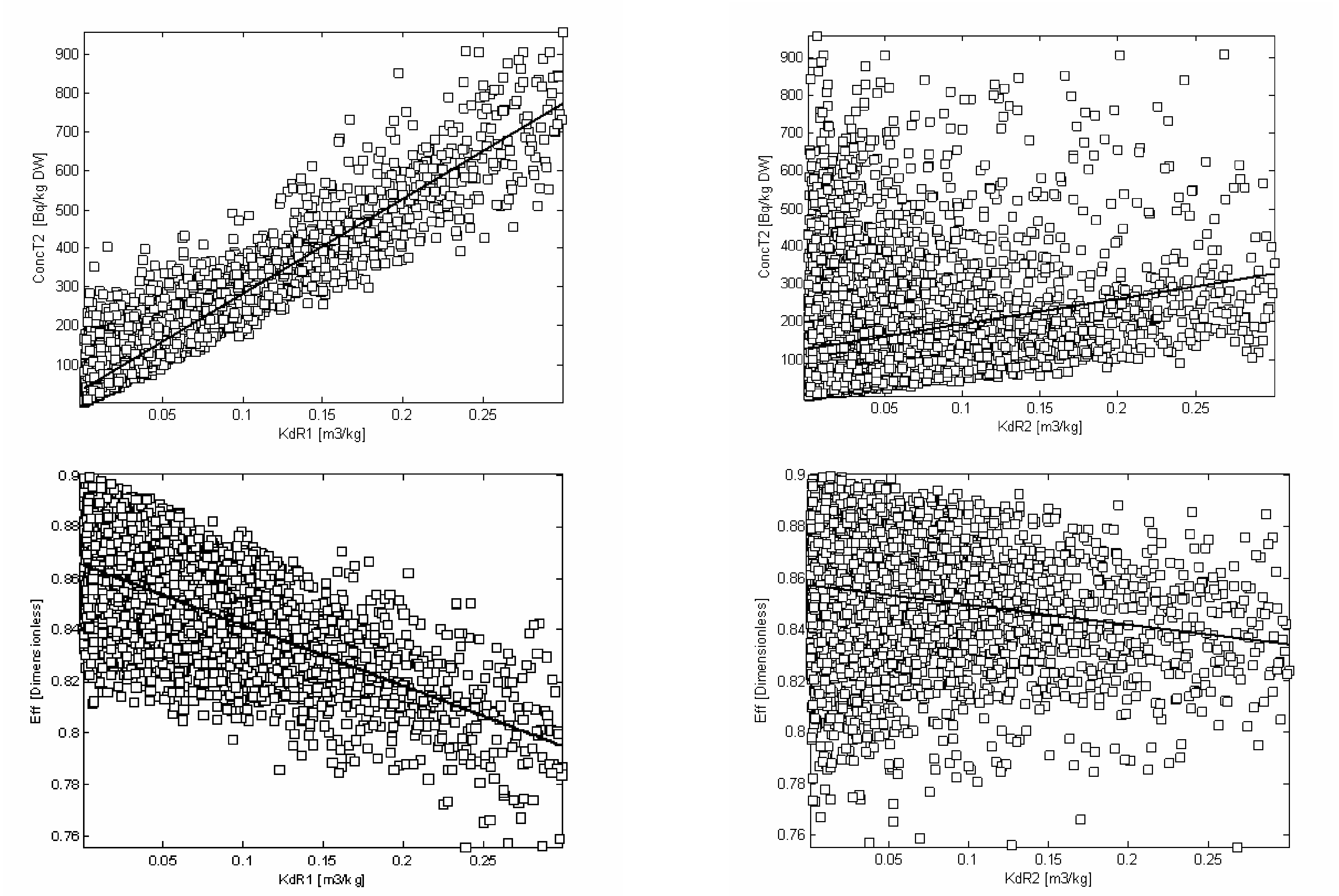

Figure C-3. Scatter plots of the concentrations in digested sludge (ConcT2) and efficiency of the wastewater treatment (Eff) against the distribution coefficients used for the primary sedimentation (KdR1) and biological (KdR2) processes obtained from probabilistic simulations with the LUCIA model.

The contribution of the model parameters to the variance of the predictions was estimated using Total Sensitivity Indexes calculated with the Extended Fourier Amplitude Sensitivity Test, EFAST (Ekström *et al.* 2006). This method takes into account interactions between parameters.

The results (Figure C-4) indicate that 46 % of the variance in the predictions of the ConcT2 is explained by the variance of the KdR1 and the rest by other parameters, but no single parameter contributes with more than 6 %. The sensitivity of this output to other individual parameters, excluding the KdR1, is low. Hence, it seems that the 54 % contribution to the variance of these parameters is associated with higher order interactions. The same observation is valid for the Eff ; the 36 % contribution to the variance from parameters others than KdR1 and Q is probably associated with interactions between parameters.

The values of the First Order Sensitivity Indexes, which do not account for interactions between the parameters, are shown in Figure C-5. From comparison of Figures C-4 and C-5 it can be concluded that the sensitive parameters (KdR1 and Q) have a much higher individual contribution to the variance when interactions are not taken into account. This result indicates that it is important to use sensible initial values even for relatively insensitive parameters. The estimation sensible initial values for the parameters of the LUCIA model is relatively easy since these correspond to commonly available characteristics of the sewage system.

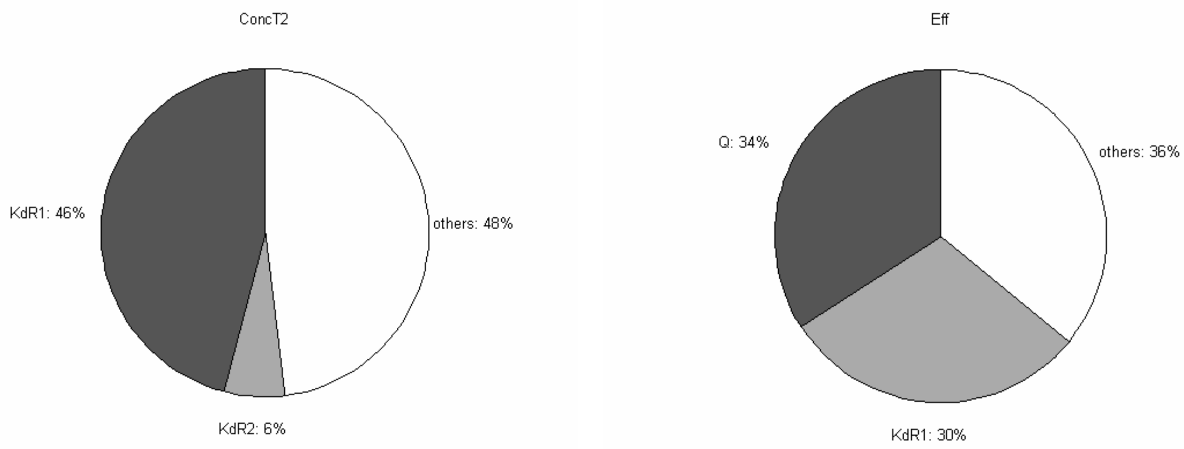

Figure C-4. Contribution of model parameters to the variance in the predictions of the concentration in the digested sludge (ConcT2) and the efficiency of the wastewater treatment (Eff) estimated from the Total Sensitivity Indexes in the Extended Fourier Amplitude Sensitivity Test (EFAST).

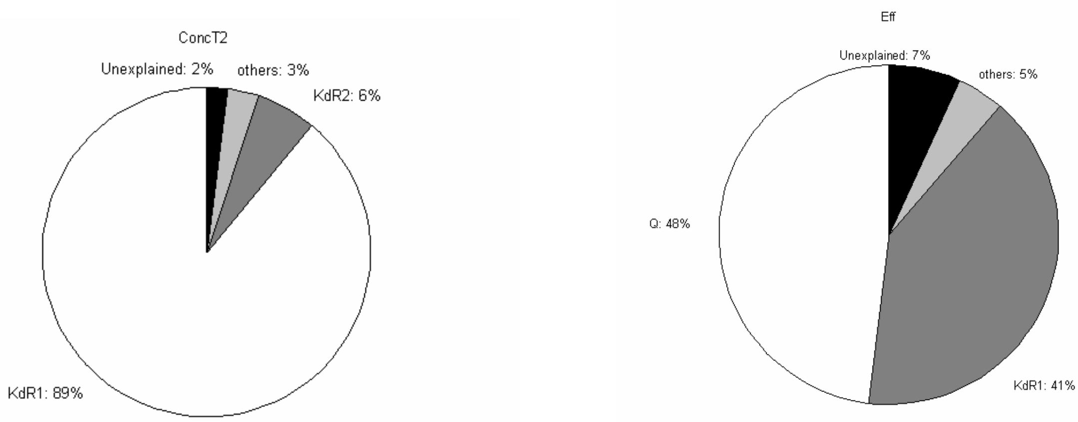

Figure C-5. Contribution of model parameters to the variance in the predictions of the concentration in the digested sludge (ConcT2) and the efficiency of the wastewater treatment (Eff) estimated from the First Order Sensitivity Indexes in the Extended Fourier Amplitude Sensitivity Test (EFAST).

C-5. Simulation results obtained with the LUCIA model, performed for other plants in Sweden

Simulations were performed with the LUCIA model for other plants in Sweden using information, *i.e.* parameter values obtained from a questionnaire answered by the different plants.
If parameter values were missing or unknown, the corresponding values for the Kungsängsverket plant in Uppsala were used.

Results are given in the following tables. Table C-3 provides conservative dose estimates for all treatment plants and radionuclides based on Kd = 0 for the water pathway and Kd = 1000 m^3/kg for the exposures associated to the sludges. Table C-4 gives conservative effective dose factors related to the concentrations in the influx water and to unit annual releases for all treatment plants and radionuclides. Corresponding results of the probabilistic simulation of doses for the different plants over all relevant pathways are given in Tables C-5 and C-6.

Table C-4. Conservative dose estimates for all treatment plants and radionuclides based on Kd = 0 for the water pathway and Kd = 1000 m^3/kg for the exposures associated to the sludges.

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
Henriksdal	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.1E-09	1.9E-10	1.0E-07	4.2E-10
	I-123	4.1E-08	2.5E-09	1.2E-07	8.0E-12
	I-125	7.6E-09	4.8E-10	8.1E-10	6.3E-10
	I-131	2.9E-04	1.8E-05	3.2E-04	1.7E-06
	In-111(Cd)	4.9E-05	2.9E-06	1.0E-05	3.4E-09
	In-111(Pb)	4.9E-05	2.9E-06	1.0E-05	3.4E-09
	In-111(Sn)	4.9E-05	2.9E-06	1.0E-05	3.4E-09
	P-32	5.7E-04	3.6E-05	4.3E-11	3.2E-06
	Se-75	1.1E-08	7.1E-10	6.7E-08	3.1E-09
	Sr-89	5.9E-07	3.7E-08	2.3E-09	2.3E-06
	Tc-99m	2.7E-07	1.8E-08	3.6E-06	1.1E-10
	TI-201(Cd)	2.1E-09	1.3E-10	3.3E-09	1.2E-12
	TI-201(Pb)	2.1E-09	1.3E-10	3.3E-09	1.2E-12
	TI-201(Sn)	2.1E-09	1.3E-10	3.3E-09	1.2E-12
	Total	**9.1E-04**	**5.7E-05**	**3.4E-04**	**7.2E-06**
Ryaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.5E-08	4.6E-10	6.1E-07	2.5E-09
	I-123	2.2E-08	5.8E-10	4.2E-08	2.8E-12
	I-125	4.6E-09	1.5E-10	6.2E-10	1.8E-09
	I-131	1.0E-04	3.2E-06	1.4E-04	7.4E-07
	In-111(Cd)	1.8E-05	5.2E-07	4.1E-06	1.4E-09
	In-111(Pb)	1.8E-05	5.2E-07	4.1E-06	1.4E-09
	In-111(Sn)	1.8E-05	5.2E-07	4.1E-06	1.4E-09

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
	P-32	4.6E-04	1.4E-05	4.3E-11	3.2E-06
	Se-75	1.4E-08	4.6E-10	1.1E-07	2.9E-08
	Sr-89	1.5E-07	4.7E-09	7.3E-10	7.1E-07
	Tc-99m	2.3E-07	6.2E-09	1.3E-06	3.8E-11
	TI-201(Cd)	1.4E-06	4.2E-08	2.5E-06	9.0E-10
	TI-201(Pb)	1.4E-06	4.2E-08	2.5E-06	9.0E-10
	TI-201(Sn)	1.4E-06	4.2E-08	2.5E-06	9.0E-10
	Total	**5.8E-04**	**1.8E-05**	**1.5E-04**	**4.7E-06**
Ön	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	5.2E-08	1.5E-09	2.4E-06	9.9E-09
	I-123	7.8E-07	2.0E-08	2.1E-06	1.3E-10
	I-125	1.7E-08	4.9E-10	2.4E-09	6.9E-09
	I-131	2.1E-04	5.8E-06	3.3E-04	1.8E-06
	In-111(Cd)	7.8E-05	2.1E-06	2.2E-05	7.4E-09
	In-111(Pb)	7.8E-05	2.1E-06	2.2E-05	7.4E-09
	In-111(Sn)	7.8E-05	2.1E-06	2.2E-05	7.4E-09
	P-32	2.5E-04	7.3E-06	2.8E-11	2.0E-06
	Se-75	6.6E-08	1.9E-09	5.2E-07	1.4E-07
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.7E-06	4.9E-08	1.4E-05	4.3E-10
	TI-201(Cd)	8.1E-08	2.2E-09	1.7E-07	6.3E-11
	TI-201(Pb)	8.1E-08	2.2E-09	1.7E-07	6.3E-11
	TI-201(Sn)	8.1E-08	2.2E-09	1.7E-07	6.3E-11
	Total	**5.4E-04**	**1.5E-05**	**3.7E-04**	**4.0E-06**

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
Kungsängsverket	Co-58	1.2E-10	2.1E-12	5.1E-09	2.2E-10
	Cr-51	6.4E-09	1.1E-10	2.2E-07	9.0E-10
	I-123	1.4E-08	2.4E-10	7.8E-08	5.1E-12
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.7E-04	4.4E-06	3.4E-04	1.8E-06
	In-111(Cd)	6.0E-04	9.8E-06	1.6E-04	5.3E-08
	In-111(Pb)	6.0E-04	9.8E-06	1.6E-04	5.3E-08
	In-111(Sn)	6.0E-04	9.8E-06	1.6E-04	5.3E-08
	P-32	2.4E-03	4.0E-05	1.9E-10	1.4E-05
	Se-75	1.2E-08	2.1E-10	6.9E-08	1.8E-08
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.3E-07	2.7E-09	5.1E-06	1.5E-10
	TI-201(Cd)	3.5E-06	5.7E-08	6.8E-06	2.5E-09
	TI-201(Pb)	3.5E-06	5.7E-08	6.8E-06	2.5E-09
	TI-201(Sn)	3.5E-06	5.7E-08	6.8E-06	2.5E-09
	Total	**3.2E-03**	**5.4E-05**	**5.1E-04**	**1.6E-05**
Källby	Co-58	6.0E-11	6.1E-13	2.6E-09	1.1E-10
	Cr-51	4.9E-10	4.9E-12	1.6E-08	6.6E-11
	I-123	1.8E-07	1.7E-09	4.7E-07	3.1E-11
	I-125	2.8E-08	2.8E-10	3.1E-09	8.8E-09
	I-131	9.8E-04	9.6E-06	1.0E-03	5.4E-06
	In-111(Cd)	1.9E-04	1.9E-06	3.6E-05	1.2E-08
	In-111(Pb)	1.9E-04	1.9E-06	3.6E-05	1.2E-08
	In-111(Sn)	1.9E-04	1.9E-06	3.6E-05	1.2E-08
	P-32	5.2E-03	5.1E-05	3.7E-10	2.8E-05
	Se-75	8.5E-09	8.6E-11	5.4E-08	1.4E-08

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	Dose for ingestion water and fish, Sv/a	Dose to worker, Sv/a	Dose to agricultural, Sv/a
	Sr-89	3.7E-06	3.7E-08	1.5E-08	1.5E-05
	Tc-99m	7.8E-07	8.2E-09	1.1E-05	3.2E-10
	TI-201(Cd)	9.3E-07	8.9E-09	1.3E-06	4.7E-10
	TI-201(Pb)	9.3E-07	8.9E-09	1.3E-06	4.7E-10
	TI-201(Sn)	9.3E-07	8.9E-09	1.3E-06	4.7E-10
	Total	**6.3E-03**	**6.3E-05**	**1.1E-03**	**4.8E-05**
Centrala Reningsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	8.6E-09	8.8E-11	5.9E-08	2.4E-10
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	9.9E-09	1.0E-10	2.3E-10	6.6E-10
	I-131	1.2E-04	1.3E-06	2.7E-05	1.4E-07
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.3E-06	1.4E-08	1.2E-09	1.1E-06
	Tc-99m	5.1E-07	5.4E-09	1.7E-06	5.0E-11
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.3E-04**	**1.3E-06**	**2.9E-05**	**1.3E-06**
Duvbacken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.1E-10	5.6E-12	1.5E-08	6.2E-11
	I-123	1.5E-08	3.7E-10	8.4E-08	5.5E-12
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
	I-131	2.6E-04	6.6E-06	6.6E-04	3.5E-06
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	8.7E-04	2.2E-05	1.5E-10	1.1E-05
	Se-75	2.0E-07	5.2E-09	2.4E-06	6.3E-07
	Sr-89	8.5E-07	2.2E-08	7.0E-09	6.7E-06
	Tc-99m	4.0E-07	1.0E-08	8.5E-06	2.5E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.1E-03**	**2.9E-05**	**6.7E-04**	**2.2E-05**
Ekeby	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	5.1E-09	1.1E-09	1.3E-08	8.4E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.5E-04	5.4E-05	3.2E-04	1.7E-06
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	2.6E-04	5.6E-05	2.4E-11	1.7E-06
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.5E-07	3.2E-08	8.3E-10	8.1E-07
	Tc-99m	4.2E-07	9.8E-08	4.5E-06	1.3E-10
	TI-201(Cd)	1.3E-07	2.7E-08	2.0E-07	7.4E-11
	TI-201(Pb)	1.3E-07	2.7E-08	2.0E-07	7.4E-11
	TI-201(Sn)	1.3E-07	2.7E-08	2.0E-07	7.4E-11

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
	Total	**5.1E-04**	**1.1E-04**	**3.2E-04**	**4.2E-06**
Fillanverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	5.9E-08	1.2E-09	1.6E-06	6.6E-09
	I-123	1.8E-07	3.5E-09	3.4E-07	2.2E-11
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	4.7E-04	9.0E-06	4.3E-04	2.3E-06
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.7E-06	3.4E-08	5.7E-09	5.5E-06
	Tc-99m	1.5E-06	3.5E-08	1.1E-05	3.3E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**4.7E-04**	**9.1E-06**	**4.4E-04**	**7.8E-06**
Gässlösa	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.9E-08	9.7E-09	1.3E-06	5.5E-09
	I-123	1.1E-09	3.7E-10	2.7E-09	1.8E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	1.0E-04	3.3E-05	1.5E-04	7.7E-07
	In-111(Cd)	1.8E-07	5.7E-08	4.2E-08	1.4E-11
	In-111(Pb)	1.8E-07	5.7E-08	4.2E-08	1.4E-11
	In-111(Sn)	1.8E-07	5.7E-08	4.2E-08	1.4E-11

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
	P-32	8.9E-04	2.9E-04	9.0E-11	6.6E-06
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	5.4E-07	1.8E-07	3.1E-09	3.0E-06
	Tc-99m	2.5E-07	8.6E-08	1.9E-06	5.7E-11
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**9.9E-04**	**3.3E-04**	**1.5E-04**	**1.0E-05**
Göviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	9.9E-09	2.1E-10	3.7E-07	1.5E-09
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	8.9E-05	1.9E-06	1.2E-04	6.2E-07
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	2.7E-04	5.7E-06	2.4E-11	1.7E-06
	Se-75	1.9E-08	4.0E-10	1.2E-07	3.3E-08
	Sr-89	5.7E-06	1.2E-07	2.5E-08	2.4E-05
	Tc-99m	2.2E-07	5.5E-09	4.3E-06	1.3E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**3.7E-04**	**7.7E-06**	**1.2E-04**	**2.7E-05**
Käppalaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.7E-09	3.3E-11	1.0E-07	4.2E-10
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	Dose for ingestion water and fish, Sv/a	Dose to worker, Sv/a	Dose to agricultural, Sv/a
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	2.1E-09	2.6E-11	1.41E-08	3.7E-09
	Sr-89	8.1E-08	1.0E-09	3.75E-10	3.6E-07
	Tc-99m	6.6E-08	9.6E-10	1.70E-06	5.0E-11
	TI-201(Cd)	2.6E-12	1.0E-13	2.52E-15	9.2E-19
	TI-201(Pb)	2.6E-12	1.0E-13	2.52E-15	9.2E-19
	TI-201(Sn)	2.6E-12	1.0E-13	2.52E-15	9.2E-19
	Total	**1.5E-07**	**2.0E-09**	**1.8E-06**	**3.7E-07**
Koholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.8E-08	2.3E-10	3.0E-06	1.2E-08
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	5.5E-05	3.0E-07	2.9E-05	9.8E-09
	In-111(Pb)	5.5E-05	3.0E-07	2.9E-05	9.8E-09
	In-111(Sn)	5.5E-05	3.0E-07	2.9E-05	9.8E-09
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	4.1E-06	2.4E-08	3.6E-08	3.5E-05
	Tc-99m	3.0E-07	1.5E-09	1.4E-05	4.1E-10
	TI-201(Cd)	6.8E-06	3.7E-08	2.7E-05	9.7E-09
	TI-201(Pb)	6.8E-06	3.7E-08	2.7E-05	9.7E-09

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
	TI-201(Sn)	6.8E-06	3.7E-08	2.7E-05	9.7E-09
	Total	**6.7E-05**	**3.7E-07**	**7.3E-05**	**3.5E-05**
Öresundsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	3.8E-09	8.5E-11	3.6E-08	9.5E-09
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	2.2E-07	5.2E-09	4.0E-06	1.2E-10
	TI-201(Cd)	3.6E-06	7.7E-08	8.9E-06	3.3E-09
	TI-201(Pb)	3.6E-06	7.7E-08	8.9E-06	3.3E-09
	TI-201(Sn)	3.6E-06	7.7E-08	8.9E-06	3.3E-09
	Total	**3.9E-06**	**8.2E-08**	**1.3E-05**	**1.3E-08**
Simsholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.5E-08	5.0E-09	4.4E-07	1.8E-09
	I-123	1.8E-08	7.1E-09	4.7E-08	3.0E-12
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.9E-04	9.7E-05	2.8E-04	1.5E-06
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	1.3E-03	4.3E-04	8.5E-11	6.3E-06

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	Dose for ingestion water and fish, Sv/a	Dose to worker, Sv/a	Dose to agricultural, Sv/a
	Se-75	6.9E-09	2.3E-09	3.7E-08	9.9E-09
	Sr-89	1.5E-06	5.0E-07	5.3E-09	5.2E-06
	Tc-99m	3.9E-07	1.7E-07	4.5E-06	1.3E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.6E-03**	**5.3E-04**	**2.8E-04**	**1.3E-05**
Sjölunda	Co-58	1.7E-11	9.6E-13	7.7E-10	3.4E-11
	Cr-51	4.4E-09	2.4E-10	1.5E-07	6.2E-10
	I-123	3.9E-08	1.9E-09	8.1E-08	5.3E-12
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	1.2E-04	6.5E-06	1.4E-04	7.3E-07
	In-111(Cd)	4.6E-05	2.3E-06	9.0E-06	3.0E-09
	In-111(Pb)	4.6E-05	2.3E-06	9.0E-06	3.0E-09
	In-111(Sn)	4.6E-05	2.3E-06	9.0E-06	3.0E-09
	P-32	1.2E-04	6.7E-06	9.7E-12	7.2E-07
	Se-75	2.6E-09	1.4E-10	1.7E-08	4.4E-09
	Sr-89	3.0E-08	1.7E-09	1.3E-10	1.2E-07
	Tc-99m	5.8E-07	3.0E-08	4.3E-06	1.3E-10
	TI-201(Cd)	2.9E-08	1.5E-09	4.3E-08	1.6E-11
	TI-201(Pb)	2.9E-08	1.5E-09	4.3E-08	1.6E-11
	TI-201(Sn)	2.9E-08	1.5E-09	4.3E-08	1.6E-11
	Total	**2.9E-04**	**1.6E-05**	**1.5E-04**	**1.6E-06**
Sjöstadsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	9.3E-09	5.3E-10	1.8E-07	7.3E-10
	I-123	1.8E-08	9.5E-10	2.6E-08	1.7E-12
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	**Dose for ingestion water and fish, Sv/a**	**Dose to worker, Sv/a**	**Dose to agricultural, Sv/a**
	I-131	2.9E-04	1.6E-05	1.9E-04	1.0E-06
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	4.1E-03	2.3E-04	1.8E-10	1.4E-05
	Se-75	3.3E-08	1.9E-09	1.1E-07	3.0E-08
	Sr-89	2.4E-05	1.4E-06	5.4E-08	5.2E-05
	Tc-99m	6.0E-07	3.6E-08	3.6E-06	1.1E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**4.5E-03**	**2.5E-04**	**1.9E-04**	**6.7E-05**
Skansverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	2.8E-05	8.7E-07	5.0E-06	1.7E-09
	In-111(Pb)	2.8E-05	8.7E-07	5.0E-06	1.7E-09
	In-111(Sn)	2.8E-05	8.7E-07	5.0E-06	1.7E-09
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	5.2E-08	1.7E-09	2.3E-07	6.2E-08
	Sr-89	1.7E-06	5.3E-08	5.2E-09	5.0E-06
	Tc-99m	3.9E-07	1.6E-08	3.7E-06	1.1E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	Dose for ingestion water and fish, Sv/a	Dose to worker, Sv/a	Dose to agricultural, Sv/a
	Total	**3.0E-05**	**9.4E-07**	**8.9E-06**	**5.1E-06**
Sundet	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.3E-08	2.8E-10	5.1E-07	2.1E-09
	I-123	4.7E-08	9.5E-10	1.4E-07	9.1E-12
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.3E-04	4.7E-06	3.1E-04	1.6E-06
	In-111(Cd)	1.3E-05	2.6E-07	3.2E-06	1.1E-09
	In-111(Pb)	1.3E-05	2.6E-07	3.2E-06	1.1E-09
	In-111(Sn)	1.3E-05	2.6E-07	3.2E-06	1.1E-09
	P-32	3.6E-03	7.5E-05	3.3E-10	2.4E-05
	Se-75	4.9E-08	1.1E-09	3.2E-07	8.6E-08
	Sr-89	1.8E-06	3.9E-08	8.2E-09	8.0E-06
	Tc-99m	6.6E-07	1.5E-08	7.8E-06	2.3E-10
	TI-201(Cd)	1.1E-05	2.2E-07	2.1E-05	7.5E-09
	TI-201(Pb)	1.1E-05	2.2E-07	2.1E-05	7.5E-09
	TI-201(Sn)	1.1E-05	2.2E-07	2.1E-05	7.5E-09
	Total	**3.8E-03**	**8.1E-05**	**3.4E-04**	**3.4E-05**
Tegelviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.1E-08	4.6E-10	3.7E-07	1.5E-09
	I-123	4.2E-08	1.5E-09	1.4E-07	9.0E-12
	I-125	6.0E-09	2.6E-10	6.0E-10	1.7E-09
	I-131	2.0E-04	8.5E-06	2.8E-04	1.5E-06
	In-111(Cd)	1.4E-05	5.5E-07	3.7E-06	1.2E-09
	In-111(Pb)	1.4E-05	5.5E-07	3.7E-06	1.2E-09
	In-111(Sn)	1.4E-05	5.5E-07	3.7E-06	1.2E-09
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0	Kd = 1000		
		Dose for ingestion water and fish, Sv/a	Dose for ingestion water and fish, Sv/a	Dose to worker, Sv/a	Dose to agricultural, Sv/a
	Sr-89	2.3E-06	9.8E-08	8.6E-09	8.4E-06
	Tc-99m	4.7E-07	1.8E-08	6.6E-06	2.0E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**2.2E-04**	**9.2E-06**	**2.9E-04**	**9.9E-06**
Uddebo	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	4.5E-08	1.2E-08	9.3E-07	3.8E-09
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.1E-04	5.8E-05	1.6E-04	8.4E-07
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.2E-06	4.4E-07	5.7E-06	1.7E-10
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**2.1E-04**	**5.8E-05**	**1.7E-04**	**8.5E-07**

Table C-5. Conservative effective dose factors related to the concentrations in the influx water and to unit annual releases for all treatment plants and radionuclides based on Kd = 0 for the water pathway and Kd = 1000 m^3/kg for the exposures associated to the sludges. Columns are identified as follows:

Kd = 0
- 1 Dose for ingestion water and fish / Concentration in water , [(Sv/a) / Bq/m^3)]
- 2 Dose for ingestion water and fish / Release, [(Sv/a) / Bq/y)]

Kd = 1000
- 1 Dose for ingestion water and fish / Concentration in water , [(Sv/a) / Bq/m^3)]
- 2 Dose for ingestion water and fish / Release, [(Sv/a) / Bq/y)]
- 3 Dose to worker / Concentration in water , [(Sv/a) / Bq/m^3)]
- 4 Dose to worker / Release, [(Sv/a) / Bq/y)]
- 5 Dose to agricultural / Concentration in water , [(Sv/a) / Bq/m^3)]
- 6 Dose to agricultural / Release , [(Sv/a) / Bq/y)]

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
Henriksdal plant	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	3.1E-18	1.5E-11	2.0E-19	8.1E-09	1.1E-16	3.3E-11	4.3E-19
	I-123	1.1E-10	1.5E-18	6.9E-12	9.0E-20	3.4E-10	4.4E-18	2.2E-14	2.9E-22
	I-125	2.7E-08	3.4E-16	1.7E-09	2.2E-17	2.8E-09	3.7E-17	2.2E-09	2.9E-17
	I-131	3.5E-08	4.6E-16	2.2E-09	2.8E-17	3.9E-08	5.1E-16	2.1E-10	2.7E-18
	In-111(Cd)	6.4E-08	8.3E-16	3.8E-09	5.0E-17	1.3E-08	1.7E-16	4.4E-12	5.7E-20
	In-111(Pb)	6.4E-08	8.3E-16	3.8E-09	5.0E-17	1.3E-08	1.7E-16	4.4E-12	5.7E-20
	In-111(Sn)	6.4E-08	8.3E-16	3.8E-09	5.0E-17	1.3E-08	1.7E-16	4.4E-12	5.7E-20
	P-32	3.4E-06	4.4E-14	2.1E-07	2.7E-15	2.6E-13	3.3E-21	1.9E-08	2.5E-16
	Se-75	1.7E-08	2.2E-16	1.1E-09	1.4E-17	1.0E-07	1.3E-15	4.8E-09	6.2E-17
	Sr-89	7.3E-09	9.4E-17	4.6E-10	6.0E-18	2.9E-11	3.8E-19	2.8E-08	3.7E-16
	Tc-99m	3.3E-12	4.3E-20	2.2E-13	2.9E-21	4.5E-11	5.8E-19	1.3E-15	1.7E-23
	TI-201(Cd)	2.2E-09	2.8E-17	1.3E-10	1.7E-18	3.4E-09	4.4E-17	1.2E-12	1.6E-20
	TI-201(Pb)	2.2E-09	2.8E-17	1.3E-10	1.7E-18	3.4E-09	4.4E-17	1.2E-12	1.6E-20
	TI-201(Sn)	2.2E-09	2.8E-17	1.3E-10	1.7E-18	3.4E-09	4.4E-17	1.2E-12	1.6E-20

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
Ryaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	2.1E-18	7.9E-12	6.8E-20	1.0E-08	9.0E-17	4.2E-11	3.6E-19
	I-123	2.6E-10	2.2E-18	6.7E-12	5.8E-20	4.9E-10	4.2E-18	3.2E-14	2.8E-22
	I-125	2.7E-08	2.3E-16	8.6E-10	7.4E-18	3.6E-09	3.1E-17	1.0E-08	8.8E-17
	I-131	3.8E-08	3.3E-16	1.2E-09	1.0E-17	5.2E-08	4.5E-16	2.8E-10	2.4E-18
	In-111(Cd)	8.0E-08	6.9E-16	2.3E-09	2.0E-17	1.8E-08	1.6E-16	6.1E-12	5.2E-20
	In-111(Pb)	8.0E-08	6.9E-16	2.3E-09	2.0E-17	1.8E-08	1.6E-16	6.1E-12	5.2E-20
	In-111(Sn)	8.0E-08	6.9E-16	2.3E-09	2.0E-17	1.8E-08	1.6E-16	6.1E-12	5.2E-20
	P-32	3.5E-06	3.1E-14	1.1E-07	9.6E-16	3.3E-13	2.9E-21	2.5E-08	2.1E-16
	Se-75	1.7E-08	1.5E-16	5.5E-10	4.7E-18	1.3E-07	1.1E-15	3.4E-08	2.9E-16
	Sr-89	7.4E-09	6.4E-17	2.4E-10	2.0E-18	3.7E-11	3.2E-19	3.6E-08	3.1E-16
	Tc-99m	1.2E-11	1.1E-19	3.3E-13	2.8E-21	6.7E-11	5.8E-19	2.0E-15	1.7E-23
	TI-201(Cd)	2.7E-09	2.3E-17	7.9E-11	6.8E-19	4.6E-09	4.0E-17	1.7E-12	1.5E-20
	TI-201(Pb)	2.7E-09	2.3E-17	7.9E-11	6.8E-19	4.6E-09	4.0E-17	1.7E-12	1.5E-20
	TI-201(Sn)	2.7E-09	2.3E-17	7.9E-11	6.8E-19	4.6E-09	4.0E-17	1.7E-12	1.5E-20
Ön	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	2.3E-17	7.2E-12	6.6E-19	1.2E-08	1.1E-15	4.7E-11	4.3E-18
	I-123	2.2E-10	2.0E-17	5.9E-12	5.3E-19	6.0E-10	5.4E-17	3.9E-14	3.5E-21
	I-125	2.7E-08	2.5E-15	7.9E-10	7.2E-17	3.9E-09	3.5E-16	1.1E-08	1.0E-15
	I-131	3.8E-08	3.5E-15	1.1E-09	9.9E-17	6.2E-08	5.6E-15	3.3E-10	3.0E-17
	In-111(Cd)	7.8E-08	7.1E-15	2.1E-09	1.9E-16	2.2E-08	2.0E-15	7.4E-12	6.7E-19
	In-111(Pb)	7.8E-08	7.1E-15	2.1E-09	1.9E-16	2.2E-08	2.0E-15	7.4E-12	6.7E-19
	In-111(Sn)	7.8E-08	7.1E-15	2.1E-09	1.9E-16	2.2E-08	2.0E-15	7.4E-12	6.7E-19
	P-32	3.5E-06	3.2E-13	1.0E-07	9.3E-15	3.8E-13	3.5E-20	2.8E-08	2.6E-15
	Se-75	1.7E-08	1.6E-15	5.0E-10	4.6E-17	1.4E-07	1.2E-14	3.6E-08	3.3E-15
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	0.0E+00	0.0E+00	2.7E-13	2.4E-20	7.9E-11	7.2E-18	2.4E-15	2.2E-22
	TI-201(Cd)	2.5E-10	2.3E-17	7.2E-11	6.6E-18	5.6E-09	5.1E-16	2.0E-12	1.9E-19

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	TI-201(Pb)	2.2E-10	2.0E-17	7.2E-11	6.6E-18	5.6E-09	5.1E-16	2.0E-12	1.9E-19
	TI-201(Sn)	2.7E-08	2.5E-15	7.2E-11	6.6E-18	5.6E-09	5.1E-16	2.0E-12	1.9E-19
Kungsängsverket	Co-58	7.0E-09	4.2E-16	1.2E-10	7.1E-18	2.8E-07	1.7E-14	1.2E-08	7.36E-6
	Cr-51	2.4E-10	1.4E-17	4.1E-12	2.4E-19	8.3E-09	4.9E-16	3.4E-11	1.99E-8
	I-123	7.8E-11	4.6E-18	1.4E-12	8.1E-20	4.4E-10	2.6E-17	2.9E-14	1.70E-1
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.4E-08	2.0E-15	5.7E-10	3.4E-17	4.4E-08	2.6E-15	2.3E-10	1.38E-7
	In-111(Cd)	5.9E-08	3.5E-15	9.7E-10	5.7E-17	1.6E-08	9.3E-16	5.2E-12	3.12E-9
	In-111(Pb)	5.9E-08	3.5E-15	9.7E-10	5.7E-17	1.6E-08	9.3E-16	5.2E-12	3.12E-9
	In-111(Sn)	5.9E-08	3.5E-15	9.7E-10	5.7E-17	1.6E-08	9.3E-16	5.2E-12	3.12E-9
	P-32	3.3E-06	2.0E-13	5.6E-08	0.0E+00	2.7E-13	1.6E-20	2.0E-08	1.20E-5
	Se-75	1.7E-08	1.0E-15	2.9E-10	3.3E-15	9.7E-08	5.8E-15	2.6E-08	1.53E-5
	Sr-89	0.0E+00	0.0E+00	0.0E+00	1.7E-17	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.6E-12	9.4E-20	3.2E-14	1.9E-21	6.1E-11	3.6E-18	1.8E-15	1.08E-2
	TI-201(Cd)	2.0E-09	1.2E-16	3.3E-11	2.0E-18	4.0E-09	2.4E-16	1.4E-12	8.60E-0
	TI-201(Pb)	2.0E-09	1.2E-16	3.3E-11	2.0E-18	4.0E-09	2.4E-16	1.4E-12	8.60E-0
	TI-201(Sn)	2.0E-09	1.2E-16	3.3E-11	2.0E-18	4.0E-09	2.4E-16	1.4E-12	8.60E-0
Källby	Co-58	0.0E+00	0.0E+00	7.1E-11	6.8E-18	3.1E-07	2.9E-14	1.3E-08	1.3E-15
	Cr-51	2.4E-10	3.1E-18	2.4E-12	2.3E-19	8.0E-09	7.7E-16	3.3E-11	3.1E-18
	I-123	1.1E-10	1.5E-18	9.8E-13	9.4E-20	2.7E-10	2.6E-17	1.8E-14	1.7E-21
	I-125	2.7E-08	3.4E-16	2.7E-10	2.6E-17	2.9E-09	2.8E-16	8.3E-09	8.0E-16
	I-131	3.5E-08	4.6E-16	3.5E-10	3.3E-17	3.7E-08	3.5E-15	2.0E-10	1.9E-17
	In-111(Cd)	6.4E-08	8.3E-16	6.1E-10	5.8E-17	1.2E-08	1.1E-15	4.0E-12	3.8E-19
	In-111(Pb)	6.4E-08	8.3E-16	6.1E-10	5.8E-17	1.2E-08	1.1E-15	4.0E-12	3.8E-19
	In-111(Sn)	6.4E-08	8.3E-16	6.1E-10	5.8E-17	1.2E-08	1.1E-15	4.0E-12	3.8E-19
	P-32	3.4E-06	4.4E-14	3.4E-08	3.2E-15	2.4E-13	2.3E-20	1.8E-08	1.7E-15
	Se-75	1.7E-08	2.2E-16	1.7E-10	1.6E-17	1.1E-07	1.0E-14	2.9E-08	2.8E-15
	Sr-89	7.3E-09	9.4E-17	7.3E-11	7.0E-18	3.0E-11	2.8E-18	2.9E-08	2.8E-15

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	Tc-99m	3.3E-12	4.3E-20	2.7E-14	2.6E-21	3.5E-11	3.3E-18	1.0E-15	9.9E-23
	TI-201(Cd)	2.2E-09	2.8E-17	2.1E-11	2.0E-18	3.0E-09	2.9E-16	1.1E-12	1.1E-19
	TI-201(Pb)	2.2E-09	2.8E-17	2.1E-11	2.0E-18	3.0E-09	2.9E-16	1.1E-12	1.1E-19
	TI-201(Sn)	2.2E-09	2.8E-17	2.1E-11	2.0E-18	3.0E-09	2.9E-16	1.1E-12	1.1E-19
Centrala Reningsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	3.3E-17	2.5E-12	3.4E-19	1.7E-09	2.3E-16	6.8E-12	9.3E-19
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	2.7E-08	3.6E-15	2.7E-10	3.7E-17	6.2E-10	8.5E-17	1.8E-09	2.4E-16
	I-131	3.5E-08	4.8E-15	3.5E-10	4.8E-17	7.6E-09	1.0E-15	4.0E-11	5.5E-18
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	7.3E-09	9.9E-16	7.5E-11	1.0E-17	6.3E-12	8.6E-19	6.1E-09	8.3E-16
	Tc-99m	2.8E-12	3.8E-19	3.0E-14	4.1E-21	9.2E-12	1.3E-18	2.8E-16	3.8E-23
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Duvbacken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	2.0E-17	6.4E-12	5.1E-19	1.7E-08	1.4E-15	7.1E-11	5.6E-18
	I-123	1.6E-10	1.3E-17	3.8E-12	3.1E-19	8.8E-10	7.0E-17	5.8E-14	4.6E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	2.9E-15	9.3E-10	7.4E-17	9.4E-08	7.4E-15	5.0E-10	3.9E-17
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.5E-06	2.7E-13	8.9E-08	7.1E-15	5.8E-13	4.6E-20	4.3E-08	3.4E-15

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	Se-75	1.7E-08	1.4E-15	4.5E-10	3.5E-17	2.0E-07	1.6E-14	5.4E-08	4.3E-15
	Sr-89	7.3E-09	5.8E-16	1.9E-10	1.5E-17	6.0E-11	4.8E-18	5.8E-08	4.6E-15
	Tc-99m	5.5E-12	4.3E-19	1.4E-13	1.1E-20	1.2E-10	9.2E-18	3.5E-15	2.7E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ekeby	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	1.7E-10	1.2E-17	3.7E-11	2.5E-18	4.3E-10	2.9E-17	2.8E-14	1.9E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	2.5E-15	8.1E-09	5.4E-16	4.7E-08	3.2E-15	2.5E-10	1.7E-17
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.5E-06	2.3E-13	7.6E-07	5.1E-14	3.2E-13	2.1E-20	2.4E-08	1.6E-15
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	7.3E-09	4.9E-16	1.6E-09	1.1E-16	4.1E-11	2.8E-18	4.0E-08	2.7E-15
	Tc-99m	5.7E-12	3.8E-19	1.3E-12	8.9E-20	6.0E-11	4.0E-18	1.8E-15	1.2E-22
	TI-201(Cd)	2.5E-09	1.7E-16	5.3E-10	3.6E-17	4.0E-09	2.7E-16	1.5E-12	9.8E-20
	TI-201(Pb)	2.5E-09	1.7E-16	5.3E-10	3.6E-17	4.0E-09	2.7E-16	1.5E-12	9.8E-20
	TI-201(Sn)	2.5E-09	1.7E-16	5.3E-10	3.6E-17	4.0E-09	2.7E-16	1.5E-12	9.8E-20
Fillanverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	5.6E-17	4.8E-12	1.1E-18	6.8E-09	1.6E-15	2.8E-11	6.3E-18
	I-123	0.0E+00	4.2E-17	3.6E-12	8.2E-19	3.5E-10	8.0E-17	2.3E-14	5.2E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	1.9E-10	8.5E-15	7.2E-10	1.6E-16	3.5E-08	7.9E-15	1.8E-10	4.2E-17
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	7.3E-09	1.7E-15	1.4E-10	3.3E-17	2.4E-11	5.5E-18	2.3E-08	5.3E-15
	Tc-99m	6.8E-12	1.6E-18	1.5E-13	3.5E-20	4.9E-11	1.1E-17	1.5E-15	3.3E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Gässlösa	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	1.4E-17	8.2E-11	4.5E-18	1.1E-08	6.2E-16	4.6E-11	2.5E-18
	I-123	2.1E-10	1.1E-17	6.8E-11	3.7E-18	4.9E-10	2.7E-17	3.2E-14	1.8E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.8E-08	2.1E-15	1.2E-08	6.8E-16	5.4E-08	3.0E-15	2.9E-10	1.6E-17
	In-111(Cd)	7.6E-08	4.2E-15	2.5E-08	1.4E-15	1.8E-08	1.0E-15	6.2E-12	3.4E-19
	In-111(Pb)	7.6E-08	4.2E-15	2.5E-08	1.4E-15	1.8E-08	1.0E-15	6.2E-12	3.4E-19
	In-111(Sn)	7.6E-08	4.2E-15	2.5E-08	1.4E-15	1.8E-08	1.0E-15	6.2E-12	3.4E-19
	P-32	3.5E-06	1.9E-13	1.2E-06	6.4E-14	3.5E-13	1.9E-20	2.6E-08	1.4E-15
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	7.4E-09	4.0E-16	2.4E-09	1.3E-16	4.1E-11	2.3E-18	4.0E-08	2.2E-15
	Tc-99m	8.4E-12	4.6E-19	2.9E-12	1.6E-19	6.5E-11	3.6E-18	1.9E-15	1.1E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Göviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	3.5E-17	5.1E-12	7.4E-19	9.1E-09	1.3E-15	3.7E-11	5.3E-18
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.5E-08	5.1E-15	7.4E-10	1.1E-16	4.6E-08	6.6E-15	2.4E-10	3.5E-17

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.4E-06	4.9E-13	7.1E-08	1.0E-14	2.9E-13	4.2E-20	2.2E-08	3.1E-15
	Se-75	1.7E-08	2.5E-15	3.6E-10	5.2E-17	1.1E-07	1.6E-14	3.0E-08	4.3E-15
	Sr-89	7.3E-09	1.1E-15	1.5E-10	2.2E-17	3.2E-11	4.6E-18	3.1E-08	4.5E-15
	Tc-99m	3.1E-12	4.5E-19	7.9E-14	1.1E-20	6.2E-11	8.9E-18	1.8E-15	2.7E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Koholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	4.1E-17	1.4E-12	2.4E-19	1.9E-08	3.2E-15	7.6E-11	1.3E-17
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	5.8E-08	9.9E-15	3.2E-10	5.4E-17	3.1E-08	5.2E-15	1.0E-11	1.7E-18
	In-111(Pb)	5.8E-08	9.9E-15	3.2E-10	5.4E-17	3.1E-08	5.2E-15	1.0E-11	1.7E-18
	In-111(Sn)	5.8E-08	9.9E-15	3.2E-10	5.4E-17	3.1E-08	5.2E-15	1.0E-11	1.7E-18
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	7.2E-09	1.2E-15	4.3E-11	7.3E-18	6.5E-11	1.1E-17	6.3E-08	1.1E-14
	Tc-99m	2.1E-12	3.5E-19	1.1E-14	1.8E-21	9.6E-11	1.6E-17	2.9E-15	4.9E-22
	TI-201(Cd)	2.0E-09	3.4E-16	1.1E-11	1.9E-18	7.8E-09	1.3E-15	2.9E-12	4.9E-19
	TI-201(Pb)	2.0E-09	3.4E-16	1.1E-11	1.9E-18	7.8E-09	1.3E-15	2.9E-12	4.9E-19
	TI-201(Sn)	2.0E-09	3.4E-16	1.1E-11	1.9E-18	7.8E-09	1.3E-15	2.9E-12	4.9E-19
Käppalaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	4.9E-18	3.0E-12	6.2E-20	9.5E-09	1.9E-16	3.8E-11	7.9E-19
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.7E-08	3.5E-16	2.1E-10	4.4E-18	1.2E-07	2.4E-15	3.1E-08	6.3E-16
	Sr-89	7.2E-09	1.5E-16	9.1E-11	1.9E-18	3.3E-11	6.8E-19	3.2E-08	6.6E-16
	Tc-99m	2.2E-12	4.6E-20	3.2E-14	6.6E-22	5.7E-11	1.2E-18	1.7E-15	3.5E-23
	TI-201(Cd)	1.1E-16	2.2E-24	4.2E-18	8.7E-26	1.0E-19	2.1E-27	3.8E-23	7.7E-31
	TI-201(Pb)	1.1E-16	2.2E-24	4.2E-18	8.7E-26	1.0E-19	2.1E-27	3.8E-23	7.7E-31
	TI-201(Sn)	1.1E-16	2.2E-24	4.2E-18	8.7E-26	1.0E-19	2.1E-27	3.8E-23	7.7E-31
Öresundsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.7E-08	8.5E-16	3.8E-10	1.9E-17	1.6E-07	8.1E-15	4.3E-08	2.1E-15
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	3.8E-12	1.9E-19	8.9E-14	4.4E-21	6.8E-11	3.4E-18	2.0E-15	1.0E-22
	TI-201(Cd)	2.3E-09	1.1E-16	4.8E-11	2.4E-18	5.6E-09	2.8E-16	2.0E-12	1.0E-19
	TI-201(Pb)	2.3E-09	1.1E-16	4.8E-11	2.4E-18	5.6E-09	2.8E-16	2.0E-12	1.0E-19
	TI-201(Sn)	2.3E-09	1.1E-16	4.8E-11	2.4E-18	5.6E-09	2.8E-16	2.0E-12	1.0E-19
Simsholmen plant	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	Cr-51	2.4E-10	2.2E-17	8.1E-11	7.4E-18	7.1E-09	6.5E-16	2.9E-11	2.6E-18
	I-123	1.4E-10	1.2E-17	5.2E-11	4.8E-18	3.4E-10	3.1E-17	2.2E-14	2.1E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.6E-08	3.3E-15	1.2E-08	1.1E-15	3.5E-08	3.2E-15	1.9E-10	1.7E-17
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.4E-06	3.1E-13	1.1E-06	1.0E-13	2.3E-13	2.1E-20	1.7E-08	1.5E-15
	Se-75	1.7E-08	1.6E-15	5.6E-09	5.2E-16	9.3E-08	8.5E-15	2.5E-08	2.3E-15
	Sr-89	7.3E-09	6.7E-16	2.4E-09	2.2E-16	2.6E-11	2.4E-18	2.5E-08	2.3E-15
	Tc-99m	4.1E-12	3.7E-19	1.8E-12	1.6E-19	4.7E-11	4.3E-18	1.4E-15	1.3E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sjölunda	Co-58	7.1E-09	1.9E-16	3.9E-10	1.1E-17	3.1E-07	8.6E-15	1.4E-08	3.7E-16
	Cr-51	2.5E-10	6.8E-18	1.4E-11	3.7E-19	8.6E-09	2.4E-16	3.5E-11	9.6E-19
	I-123	1.9E-10	5.2E-18	9.2E-12	2.5E-19	4.0E-10	1.1E-17	2.6E-14	7.1E-22
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	1.0E-15	2.0E-09	5.5E-17	4.2E-08	1.2E-15	2.3E-10	6.2E-18
	In-111(Cd)	7.4E-08	2.0E-15	3.8E-09	1.0E-16	1.5E-08	4.0E-16	4.9E-12	1.3E-19
	In-111(Pb)	7.4E-08	2.0E-15	3.8E-09	1.0E-16	1.5E-08	4.0E-16	4.9E-12	1.3E-19
	In-111(Sn)	7.4E-08	2.0E-15	3.8E-09	1.0E-16	1.5E-08	4.0E-16	4.9E-12	1.3E-19
	P-32	3.5E-06	9.5E-14	1.9E-07	5.2E-15	2.7E-13	7.5E-21	2.0E-08	5.5E-16
	Se-75	1.7E-08	4.7E-16	9.5E-10	2.6E-17	1.1E-07	3.0E-15	2.9E-08	7.9E-16
	Sr-89	7.3E-09	2.0E-16	4.0E-10	1.1E-17	3.1E-11	8.5E-19	3.0E-08	8.2E-16
	Tc-99m	7.5E-12	2.1E-19	3.9E-13	1.1E-20	5.5E-11	1.5E-18	1.7E-15	4.5E-23
	TI-201(Cd)	2.5E-09	6.8E-17	1.3E-10	3.5E-18	3.7E-09	1.0E-16	1.4E-12	3.7E-20
	TI-201(Pb)	2.5E-09	6.8E-17	1.3E-10	3.5E-18	3.7E-09	1.0E-16	1.4E-12	3.7E-20

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	TI-201(Sn)	2.5E-09	6.8E-17	1.3E-10	3.5E-18	3.7E-09	1.0E-16	1.4E-12	3.7E-20
Sjöstadsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	2.7E-17	1.4E-11	1.5E-18	4.8E-09	5.2E-16	1.9E-11	2.1E-18
	I-123	1.5E-10	1.7E-17	8.2E-12	9.0E-19	2.3E-10	2.5E-17	1.5E-14	1.6E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	4.0E-15	2.0E-09	2.2E-16	2.4E-08	2.6E-15	1.3E-10	1.4E-17
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.4E-06	3.8E-13	1.9E-07	2.1E-14	1.5E-13	1.7E-20	1.1E-08	1.2E-15
	Se-75	1.7E-08	1.9E-15	9.8E-10	1.1E-16	5.8E-08	6.4E-15	1.6E-08	1.7E-15
	Sr-89	7.3E-09	8.0E-16	4.2E-10	4.6E-17	1.7E-11	1.8E-18	1.6E-08	1.8E-15
	Tc-99m	5.1E-12	5.6E-19	3.1E-13	3.4E-20	3.1E-11	3.4E-18	9.3E-16	1.0E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Skansverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	7.3E-08	1.1E-14	2.2E-09	3.4E-16	1.3E-08	2.0E-15	4.3E-12	6.5E-19
	In-111(Pb)	7.3E-08	1.1E-14	2.2E-09	3.4E-16	1.3E-08	2.0E-15	4.3E-12	6.5E-19
	In-111(Sn)	7.3E-08	1.1E-14	2.2E-09	3.4E-16	1.3E-08	2.0E-15	4.3E-12	6.5E-19
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.7E-08	2.6E-15	5.4E-10	8.3E-17	7.7E-08	1.2E-14	2.0E-08	3.1E-15
	Sr-89	7.3E-09	1.1E-15	2.3E-10	3.5E-17	2.3E-11	3.4E-18	2.2E-08	3.3E-15
	Tc-99m	5.7E-12	8.6E-19	2.3E-13	3.5E-20	5.4E-11	8.2E-18	1.6E-15	2.4E-22

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sundet	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	3.2E-17	5.2E-12	6.8E-19	9.6E-09	1.3E-15	3.9E-11	5.1E-18
	I-123	1.6E-10	2.0E-17	3.2E-12	4.1E-19	4.6E-10	6.1E-17	3.0E-14	3.9E-21
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	4.8E-15	7.7E-10	1.0E-16	5.0E-08	6.6E-15	2.7E-10	3.5E-17
	In-111(Cd)	7.1E-08	9.3E-15	1.4E-09	1.9E-16	1.8E-08	2.3E-15	6.0E-12	7.8E-19
	In-111(Pb)	7.1E-08	9.3E-15	1.4E-09	1.9E-16	1.8E-08	2.3E-15	6.0E-12	7.8E-19
	In-111(Sn)	7.1E-08	9.3E-15	1.4E-09	1.9E-16	1.8E-08	2.3E-15	6.0E-12	7.8E-19
	P-32	3.5E-06	4.5E-13	7.3E-08	9.5E-15	3.2E-13	4.1E-20	2.3E-08	3.0E-15
	Se-75	1.7E-08	2.2E-15	3.7E-10	4.8E-17	1.1E-07	1.5E-14	3.0E-08	3.9E-15
	Sr-89	7.3E-09	9.6E-16	1.6E-10	2.0E-17	3.3E-11	4.3E-18	3.2E-08	4.2E-15
	Tc-99m	5.0E-12	6.6E-19	1.2E-13	1.5E-20	6.0E-11	7.8E-18	1.8E-15	2.3E-22
	TI-201(Cd)	2.4E-09	3.1E-16	4.9E-11	6.4E-18	4.5E-09	5.9E-16	1.6E-12	2.1E-19
	TI-201(Pb)	2.4E-09	3.1E-16	4.9E-11	6.4E-18	4.5E-09	5.9E-16	1.6E-12	2.1E-19
	TI-201(Sn)	2.4E-09	3.1E-16	4.9E-11	6.4E-18	4.5E-09	5.9E-16	1.6E-12	2.1E-19
Tegelviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-10	3.0E-17	1.1E-11	1.3E-18	8.5E-09	1.1E-15	3.4E-11	4.3E-18
	I-123	1.3E-10	1.7E-17	5.0E-12	6.2E-19	4.4E-10	5.5E-17	2.9E-14	3.6E-21
	I-125	2.7E-08	3.3E-15	1.2E-09	1.4E-16	2.7E-09	3.3E-16	7.6E-09	9.5E-16
	I-131	3.6E-08	4.5E-15	1.5E-09	1.9E-16	5.0E-08	6.2E-15	2.7E-10	3.3E-17
	In-111(Cd)	6.9E-08	8.6E-15	2.7E-09	3.4E-16	1.8E-08	2.3E-15	6.2E-12	7.7E-19
	In-111(Pb)	6.9E-08	8.6E-15	2.7E-09	3.4E-16	1.8E-08	2.3E-15	6.2E-12	7.7E-19
	In-111(Sn)	6.9E-08	8.6E-15	2.7E-09	3.4E-16	1.8E-08	2.3E-15	6.2E-12	7.7E-19
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Kd = 0		Kd = 1000					
		1	2	1	2	3	4	5	6
	Sr-89	7.3E-09	9.1E-16	3.2E-10	3.9E-17	2.8E-11	3.5E-18	2.7E-08	3.4E-15
	Tc-99m	3.7E-12	4.7E-19	1.4E-13	1.8E-20	5.3E-11	6.6E-18	1.6E-15	2.0E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Uddebo	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.5E-10	2.8E-17	6.7E-11	7.6E-18	5.2E-09	5.8E-16	2.1E-11	2.4E-18
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.8E-08	4.3E-15	1.0E-08	1.2E-15	2.9E-08	3.2E-15	1.5E-10	1.7E-17
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	9.7E-12	1.1E-18	3.5E-12	4.0E-19	4.6E-11	5.2E-18	1.4E-15	1.5E-22
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table C-6. Results of probabilistic simulation of doses for the different plants over all relevant pathways.

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
Henriksdal	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.2E-09	6.3E-10	3.0E-09	8.1E-10	3.2E-08	4.0E-10	8.5E-08	2.9E-08	1.3E-10	1.6E-12	3.4E-10	1.2E-10
	I-123	4.0E-08	3.8E-08	4.1E-08	1.2E-09	2.9E-09	2.4E-10	9.9E-09	4.4E-09	1.9E-13	1.6E-14	6.5E-13	2.9E-13
	I-125	7.4E-09	7.0E-09	7.6E-09	2.2E-10	2.0E-11	2.1E-12	6.4E-11	2.6E-11	1.6E-11	1.6E-12	5.0E-11	2.0E-11
	I-131	2.8E-04	2.7E-04	2.9E-04	8.9E-06	8.0E-06	8.9E-07	2.7E-05	1.1E-05	1.9E-13	1.6E-14	6.5E-13	2.9E-13
	In-111(Cd)	3.0E-05	8.3E-06	4.8E-05	1.3E-05	3.9E-06	1.9E-07	8.6E-06	2.8E-06	1.3E-09	6.3E-11	2.9E-09	9.4E-10
	In-111(Pb)	8.7E-06	5.4E-06	1.3E-05	2.4E-06	8.8E-06	7.9E-06	9.5E-06	4.9E-07	3.0E-09	2.7E-09	3.2E-09	1.6E-10
	In-111(Sn)	2.8E-05	1.3E-05	4.3E-05	9.2E-06	4.6E-06	1.3E-06	7.7E-06	2.0E-06	1.5E-09	4.5E-10	2.6E-09	6.8E-10
	P-32	5.5E-04	5.3E-04	5.6E-04	1.3E-05	1.5E-12	4.7E-13	3.5E-12	1.0E-12	1.1E-07	3.5E-08	2.6E-07	7.8E-08
	Se-75	6.3E-09	3.0E-09	9.5E-09	2.0E-09	3.1E-08	9.9E-09	5.2E-08	1.3E-08	1.4E-09	4.6E-10	2.4E-09	6.0E-10
	Sr-89	4.9E-07	2.6E-07	5.8E-07	1.0E-07	3.9E-10	1.6E-11	1.4E-09	4.3E-10	3.8E-07	1.5E-08	1.3E-06	4.2E-07
	Tc-99m	2.7E-07	2.6E-07	2.7E-07	2.2E-09	1.8E-08	9.6E-10	6.7E-08	3.9E-08	5.5E-13	2.9E-14	2.0E-12	1.2E-12
	TI-201(Cd)	1.3E-09	3.7E-10	2.1E-09	5.6E-10	1.3E-09	5.6E-11	2.7E-09	9.0E-10	4.7E-13	2.0E-14	9.8E-13	3.3E-13
	TI-201(Pb)	3.8E-10	2.4E-10	5.6E-10	1.0E-10	2.9E-09	2.6E-09	3.1E-09	1.5E-10	1.0E-12	9.4E-13	1.1E-12	5.6E-14
	TI-201(Sn)	1.2E-09	5.4E-10	1.8E-09	4.0E-10	1.5E-09	4.4E-10	2.5E-09	6.5E-10	5.5E-13	1.6E-13	9.1E-13	2.4E-13
	Total	**8.6E-04**	**8.3E-04**	**8.9E-04**	**2.0E-05**	**1.7E-05**	**9.7E-06**	**3.6E-05**	**1.1E-05**	**5.4E-07**	**1.3E-07**	**1.5E-06**	**4.3E-07**
Ryaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.0E-08	2.0E-09	1.5E-08	4.0E-09	1.8E-07	2.4E-09	5.4E-07	1.7E-07	7.3E-10	9.7E-12	2.2E-09	7.0E-10
	I-123	2.2E-08	2.1E-08	2.2E-08	6.5E-10	9.1E-10	8.9E-11	3.1E-09	1.2E-09	5.9E-14	5.8E-15	2.0E-13	8.0E-14
	I-125	4.5E-09	4.3E-09	4.6E-09	1.2E-10	1.3E-11	1.4E-12	4.3E-11	1.6E-11	3.7E-11	4.1E-12	1.2E-10	4.6E-11
	I-131	1.0E-04	9.6E-05	1.0E-04	2.7E-06	3.0E-06	3.4E-07	9.7E-06	3.8E-06	1.6E-08	1.8E-09	5.2E-08	2.0E-08
	In-111(Cd)	1.1E-05	2.0E-06	1.8E-05	5.1E-06	1.5E-06	7.7E-08	3.5E-06	1.1E-06	5.2E-10	2.6E-11	1.2E-09	3.8E-10
	In-111(Pb)	2.9E-06	1.5E-06	4.8E-06	1.0E-06	3.5E-06	3.1E-06	3.8E-06	2.3E-07	1.2E-09	1.0E-09	1.3E-09	7.6E-11
	In-111(Sn)	1.0E-05	4.0E-06	1.6E-05	3.6E-06	1.8E-06	4.9E-07	3.1E-06	8.1E-07	5.9E-10	1.7E-10	1.0E-09	2.7E-10
	P-32	4.4E-04	4.3E-04	4.5E-04	8.6E-06	1.3E-12	4.2E-13	2.8E-12	8.3E-13	9.5E-08	3.1E-08	2.1E-07	6.2E-08
	Se-75	8.4E-09	3.4E-09	1.3E-08	2.8E-09	4.7E-08	1.4E-08	8.5E-08	2.2E-08	1.2E-08	3.7E-09	2.3E-08	5.7E-09

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	Sr-89	1.2E-07	6.9E-08	1.5E-07	2.5E-08	1.1E-10	4.5E-12	4.0E-10	1.3E-10	1.1E-07	4.3E-09	3.9E-07	1.3E-07
	Tc-99m	2.3E-07	2.3E-07	2.3E-07	2.0E-09	6.1E-09	4.5E-10	2.1E-08	1.1E-08	1.8E-13	1.3E-14	6.1E-13	3.2E-13
	TI-201(Cd)	9.0E-07	1.6E-07	1.4E-06	4.0E-07	9.4E-07	3.9E-08	2.1E-06	6.8E-07	3.4E-10	1.4E-11	7.7E-10	2.5E-10
	TI-201(Pb)	2.3E-07	1.2E-07	3.8E-07	8.1E-08	2.1E-06	1.9E-06	2.3E-06	1.4E-07	7.8E-10	6.9E-10	8.5E-10	4.9E-11
	TI-201(Sn)	8.3E-07	3.2E-07	1.3E-06	2.9E-07	1.1E-06	3.1E-07	1.9E-06	4.9E-07	3.9E-10	1.1E-10	7.0E-10	1.8E-10
	Total	**5.6E-04**	**5.4E-04**	**5.7E-04**	**1.0E-05**	**8.8E-06**	**6.1E-06**	**1.6E-05**	**3.9E-06**	**2.3E-07**	**8.2E-08**	**5.3E-07**	**1.4E-07**
Ön	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.7E-08	9.5E-09	5.2E-08	1.4E-08	7.1E-07	9.5E-09	2.0E-06	6.8E-07	2.9E-09	3.9E-11	8.3E-09	2.8E-09
	I-123	7.6E-07	7.3E-07	7.8E-07	2.1E-08	4.0E-08	4.0E-09	1.3E-07	5.2E-08	2.6E-12	2.6E-13	8.5E-12	3.4E-12
	I-125	1.6E-08	1.6E-08	1.7E-08	4.2E-10	4.9E-11	4.9E-12	1.7E-10	6.3E-11	1.4E-10	1.4E-11	4.8E-10	1.8E-10
	I-131	2.0E-04	1.9E-04	2.0E-04	5.2E-06	7.1E-06	7.6E-07	2.2E-05	1.3E-05	3.8E-08	4.0E-09	1.2E-07	6.8E-08
	In-111(Cd)	4.9E-05	9.3E-06	7.7E-05	2.2E-05	8.3E-06	3.4E-07	1.8E-05	6.0E-06	2.8E-09	1.1E-10	6.2E-09	2.0E-09
	In-111(Pb)	1.3E-05	6.4E-06	2.2E-05	4.7E-06	1.9E-05	1.7E-05	2.1E-05	1.3E-06	6.3E-09	5.5E-09	6.9E-09	4.3E-10
	In-111(Sn)	4.5E-05	1.9E-05	6.9E-05	1.5E-05	9.5E-06	2.7E-06	1.6E-05	4.3E-06	3.2E-09	9.1E-10	5.5E-09	1.4E-09
	P-32	2.5E-04	2.4E-04	2.5E-04	4.7E-06	7.6E-13	2.4E-13	1.8E-12	5.0E-13	5.6E-08	1.8E-08	1.3E-07	3.7E-08
	Se-75	3.8E-08	1.7E-08	5.8E-08	1.2E-08	2.3E-07	6.4E-08	4.0E-07	1.0E-07	6.0E-08	1.7E-08	1.1E-07	2.7E-08
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.7E-06	1.7E-06	1.7E-06	1.4E-08	5.8E-08	4.0E-09	2.2E-07	1.1E-07	1.7E-12	1.2E-13	6.7E-12	3.2E-12
	TI-201(Cd)	5.1E-08	8.6E-09	8.0E-08	2.3E-08	6.6E-08	3.1E-09	1.5E-07	4.8E-08	2.4E-11	1.1E-12	5.4E-11	1.8E-11
	TI-201(Pb)	1.3E-08	6.9E-09	2.2E-08	4.6E-09	1.5E-07	1.3E-07	1.6E-07	9.5E-09	5.4E-11	4.7E-11	5.9E-11	3.5E-12
	TI-201(Sn)	4.8E-08	2.2E-08	7.2E-08	1.5E-08	7.2E-08	2.0E-08	1.3E-07	3.3E-08	2.6E-11	7.2E-12	4.7E-11	1.2E-11
	Total	**5.0E-04**	**4.6E-04**	**5.3E-04**	**2.4E-05**	**2.7E-05**	**2.0E-05**	**4.4E-05**	**1.3E-05**	**1.6E-07**	**8.0E-08**	**2.9E-07**	**8.1E-08**
Kungsängsverket	Co-58	7.7E-11	2.7E-11	1.2E-10	3.0E-11	2.0E-09	2.8E-10	4.0E-09	1.2E-09	8.6E-11	1.2E-11	1.8E-10	5.3E-11
	Cr-51	4.3E-09	8.9E-10	6.4E-09	1.9E-09	7.3E-08	1.0E-09	1.9E-07	6.7E-08	3.0E-10	4.2E-12	7.7E-10	2.7E-10
	I-123	1.4E-08	1.3E-08	1.4E-08	4.6E-10	1.8E-09	1.6E-10	6.7E-09	2.9E-09	1.2E-13	1.0E-14	4.4E-13	1.9E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.6E-04	2.4E-04	2.6E-04	1.0E-05	9.2E-06	8.2E-07	3.1E-05	1.3E-05	4.9E-08	4.4E-09	1.7E-07	7.0E-08
	In-111(Cd)	3.5E-04	6.1E-05	5.8E-04	1.8E-04	6.5E-05	3.0E-06	1.4E-04	4.6E-05	2.2E-08	1.0E-09	4.6E-08	1.6E-08

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	In-111(Pb)	7.3E-05	3.7E-05	1.2E-04	2.6E-05	1.4E-04	1.3E-04	1.5E-04	6.8E-06	4.7E-08	4.3E-08	5.0E-08	2.3E-09
	In-111(Sn)	3.1E-04	1.2E-04	5.1E-04	1.2E-04	7.6E-05	2.2E-05	1.3E-04	3.3E-05	2.5E-08	7.3E-09	4.3E-08	1.1E-08
	P-32	2.3E-03	2.2E-03	2.3E-03	6.5E-05	7.6E-12	2.2E-12	1.8E-11	5.5E-12	5.6E-07	1.6E-07	1.3E-06	4.1E-07
	Se-75	6.9E-09	6.9E-09	6.9E-09	8.4E-23	3.0E-08	3.0E-08	3.0E-08	4.4E-17	8.0E-09	8.0E-09	8.0E-09	1.2E-17
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.3E-07	1.3E-07	1.3E-07	1.3E-09	2.5E-08	1.2E-09	9.1E-08	5.9E-08	7.4E-13	3.4E-14	2.7E-12	1.8E-12
	TI-201(Cd)	2.0E-06	4.2E-07	3.4E-06	1.0E-06	2.8E-06	1.3E-07	5.8E-06	2.0E-06	1.0E-09	4.8E-11	2.1E-09	7.3E-10
	TI-201(Pb)	4.3E-07	2.2E-07	7.2E-07	1.5E-07	6.1E-06	5.5E-06	6.5E-06	2.9E-07	2.2E-09	2.0E-09	2.4E-09	1.1E-10
	TI-201(Sn)	1.8E-06	7.1E-07	3.0E-06	7.2E-07	3.3E-06	9.3E-07	5.5E-06	1.4E-06	1.2E-09	3.4E-10	2.0E-09	5.3E-10
	Total	**2.9E-03**	**2.6E-03**	**3.2E-03**	**1.9E-04**	**1.6E-04**	**1.4E-04**	**1.8E-04**	**1.5E-05**	**6.7E-07**	**2.6E-07**	**1.4E-06**	**4.1E-07**
Källby	Co-58	3.9E-11	1.5E-11	5.8E-11	1.4E-11	9.5E-10	1.2E-10	2.0E-09	6.1E-10	4.1E-11	5.4E-12	8.7E-11	2.7E-11
	Cr-51	3.4E-10	7.1E-11	4.9E-10	1.4E-10	5.0E-09	6.2E-11	1.4E-08	4.8E-09	2.0E-11	2.5E-13	5.6E-11	1.9E-11
	I-123	1.7E-07	1.6E-07	1.8E-07	5.2E-09	1.0E-08	9.1E-10	3.5E-08	1.5E-08	6.6E-13	5.9E-14	2.3E-12	9.8E-13
	I-125	2.7E-08	2.6E-08	2.8E-08	9.1E-10	7.0E-11	6.6E-12	2.3E-10	1.0E-10	2.0E-10	1.9E-11	6.7E-10	2.9E-10
	I-131	9.6E-04	9.0E-04	9.8E-04	3.0E-05	2.3E-05	2.3E-06	7.8E-05	3.2E-05	1.2E-07	1.2E-08	4.1E-07	1.7E-07
	In-111(Cd)	1.2E-04	1.9E-05	1.9E-04	5.7E-05	1.4E-05	5.2E-07	3.0E-05	1.0E-05	4.8E-09	1.8E-10	1.0E-08	3.5E-09
	In-111(Pb)	2.7E-05	1.3E-05	4.5E-05	1.0E-05	3.1E-05	2.8E-05	3.4E-05	1.8E-06	1.1E-08	9.4E-09	1.1E-08	6.1E-10
	In-111(Sn)	1.1E-04	4.3E-05	1.7E-04	3.9E-05	1.6E-05	4.7E-06	2.8E-05	7.3E-06	5.4E-09	1.6E-09	9.4E-09	2.4E-09
	P-32	5.0E-03	4.8E-03	5.1E-03	1.2E-04	1.2E-11	3.6E-12	2.8E-11	8.7E-12	9.1E-07	2.6E-07	2.1E-06	6.5E-07
	Se-75	4.7E-09	1.9E-09	7.4E-09	1.7E-09	2.4E-08	7.2E-09	4.2E-08	1.1E-08	6.5E-09	1.9E-09	1.1E-08	2.9E-09
	Sr-89	3.1E-06	1.6E-06	3.7E-06	6.8E-07	2.4E-09	7.8E-11	8.5E-09	2.8E-09	2.4E-06	7.6E-08	8.2E-06	2.7E-06
	Tc-99m	7.7E-07	7.6E-07	7.8E-07	6.3E-09	4.9E-08	2.6E-09	1.8E-07	1.0E-07	1.5E-12	7.6E-14	5.4E-12	3.0E-12
	TI-201(Cd)	5.6E-07	9.1E-08	9.2E-07	2.7E-07	5.1E-07	2.2E-08	1.1E-06	3.8E-07	1.9E-10	8.0E-12	4.1E-10	1.4E-10
	TI-201(Pb)	1.3E-07	6.2E-08	2.2E-07	4.9E-08	1.1E-06	1.0E-06	1.2E-06	6.6E-08	4.1E-10	3.7E-10	4.4E-10	2.4E-11
	TI-201(Sn)	5.1E-07	2.2E-07	8.2E-07	1.9E-07	5.8E-07	1.5E-07	1.0E-06	2.7E-07	2.1E-10	5.6E-11	3.7E-10	9.8E-11
	Total	**6.1E-03**	**5.8E-03**	**6.2E-03**	**1.4E-04**	**5.6E-05**	**3.5E-05**	**1.1E-04**	**3.2E-05**	**3.4E-06**	**7.7E-07**	**9.2E-06**	**2.8E-06**

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
Centrala Reningsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	4.2E-09	3.5E-10	8.3E-09	2.8E-09	3.0E-08	1.6E-09	5.6E-08	1.9E-08	1.2E-10	6.4E-12	2.3E-10	7.8E-11
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	9.0E-09	7.2E-09	9.8E-09	8.9E-10	2.0E-11	2.6E-12	6.2E-11	2.1E-11	5.8E-11	7.5E-12	1.8E-10	6.0E-11
	I-131	1.1E-04	9.1E-05	1.2E-04	1.2E-05	2.3E-06	3.0E-07	7.0E-06	2.4E-06	1.2E-08	1.6E-09	3.7E-08	1.3E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	8.6E-07	2.0E-07	1.3E-06	3.6E-07	4.2E-10	3.3E-11	9.9E-10	3.1E-10	4.1E-07	3.2E-08	9.6E-07	3.0E-07
	Tc-99m	4.9E-07	4.7E-07	5.0E-07	1.8E-08	2.3E-08	1.7E-09	8.2E-08	3.8E-08	7.0E-13	5.0E-14	2.5E-12	1.1E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.2E-04**	**9.3E-05**	**1.2E-04**	**1.2E-05**	**2.4E-06**	**3.4E-07**	**7.0E-06**	**2.4E-06**	**4.2E-07**	**4.0E-08**	**9.7E-07**	**3.0E-07**
Duvbacken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.6E-10	4.4E-11	2.1E-10	5.6E-11	3.7E-09	3.7E-11	1.2E-08	4.0E-09	1.5E-11	1.5E-13	4.9E-11	1.6E-11
	I-123	1.5E-08	1.5E-08	1.5E-08	2.8E-10	1.1E-09	1.1E-10	3.7E-09	1.6E-09	7.1E-14	7.0E-15	2.4E-13	1.1E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.6E-04	2.5E-04	2.6E-04	4.9E-06	8.8E-06	9.3E-07	3.0E-05	1.2E-05	4.7E-08	5.0E-09	1.6E-07	6.5E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	8.5E-04	8.3E-04	8.7E-04	1.2E-05	2.8E-12	8.3E-13	6.6E-12	1.9E-12	2.1E-07	6.2E-08	4.9E-07	1.4E-07
	Se-75	1.3E-07	6.8E-08	1.8E-07	3.6E-08	8.1E-07	2.0E-07	1.6E-06	4.4E-07	2.2E-07	5.3E-08	4.2E-07	1.2E-07
	Sr-89	7.5E-07	4.8E-07	8.5E-07	1.2E-07	8.0E-10	2.5E-11	3.1E-09	1.0E-09	7.7E-07	2.4E-08	3.0E-06	9.9E-07
	Tc-99m	4.0E-07	4.0E-07	4.0E-07	1.9E-09	2.4E-08	1.5E-09	8.6E-08	4.6E-08	7.0E-13	4.6E-14	2.6E-12	1.4E-12

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.1E-03**	**1.1E-03**	**1.1E-03**	**1.2E-05**	**9.7E-06**	**1.7E-06**	**3.1E-05**	**1.2E-05**	**1.2E-06**	**3.4E-07**	**3.4E-06**	**1.0E-06**
Ekeby	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	5.1E-09	4.9E-09	5.1E-09	8.4E-11	1.8E-10	1.5E-11	6.3E-10	2.8E-10	1.2E-14	9.9E-16	4.1E-14	1.9E-14
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.5E-04	2.4E-04	2.5E-04	4.4E-06	4.8E-06	4.0E-07	1.6E-05	7.1E-06	2.5E-08	2.1E-09	8.6E-08	3.8E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	2.5E-04	2.5E-04	2.6E-04	3.3E-06	5.1E-13	1.3E-13	1.2E-12	3.9E-13	3.8E-08	9.7E-09	9.1E-08	2.9E-08
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.3E-07	9.3E-08	1.5E-07	1.8E-08	9.9E-11	2.9E-12	4.0E-10	1.3E-10	9.7E-08	2.8E-09	3.8E-07	1.3E-07
	Tc-99m	4.2E-07	4.2E-07	4.2E-07	1.9E-09	1.4E-08	7.9E-10	4.8E-08	2.9E-08	4.0E-13	2.3E-14	1.4E-12	8.6E-13
	TI-201(Cd)	9.5E-08	4.5E-08	1.3E-07	2.7E-08	6.4E-08	1.9E-09	1.7E-07	5.6E-08	2.4E-11	7.0E-13	6.2E-11	2.0E-11
	TI-201(Pb)	4.6E-08	3.6E-08	5.9E-08	6.8E-09	1.6E-07	1.4E-07	1.8E-07	1.4E-08	6.0E-11	5.0E-11	6.8E-11	5.3E-12
	TI-201(Sn)	9.1E-08	5.5E-08	1.2E-07	2.0E-08	7.2E-08	1.5E-08	1.5E-07	4.1E-08	2.6E-11	5.5E-12	5.4E-11	1.5E-11
	Total	**5.0E-04**	**4.9E-04**	**5.0E-04**	**5.4E-06**	**4.9E-06**	**5.8E-07**	**1.6E-05**	**7.1E-06**	**1.6E-07**	**3.5E-08**	**4.7E-07**	**1.4E-07**
Fillanverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.9E-08	8.0E-09	5.9E-08	1.8E-08	5.6E-07	1.1E-08	1.4E-06	5.0E-07	2.3E-09	4.3E-11	5.7E-09	2.0E-09
	I-123	1.8E-07	1.7E-07	1.8E-07	6.4E-09	9.1E-09	8.1E-10	3.2E-08	1.3E-08	5.9E-13	5.3E-14	2.1E-12	8.5E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	4.5E-04	4.2E-04	4.6E-04	1.9E-05	1.3E-05	1.2E-06	4.5E-05	1.8E-05	6.9E-08	6.5E-09	2.4E-07	9.6E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.4E-06	6.1E-07	1.7E-06	3.6E-07	1.1E-09	3.8E-11	3.8E-09	1.2E-09	1.1E-06	3.7E-08	3.7E-06	1.2E-06
	Tc-99m	1.5E-06	1.5E-06	1.5E-06	1.5E-08	6.0E-08	3.2E-09	2.2E-07	1.2E-07	1.8E-12	9.4E-14	6.5E-12	3.6E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**4.6E-04**	**4.2E-04**	**4.7E-04**	**1.9E-05**	**1.4E-05**	**1.7E-06**	**4.6E-05**	**1.8E-05**	**1.1E-06**	**8.3E-08**	**3.7E-06**	**1.2E-06**
Gässlösa	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-08	1.5E-08	2.9E-08	4.9E-09	3.4E-07	5.2E-09	9.8E-07	3.4E-07	1.4E-09	2.1E-11	4.0E-09	1.4E-09
	I-123	1.1E-09	1.1E-09	1.1E-09	1.8E-11	4.4E-11	4.0E-12	1.5E-10	7.0E-11	2.9E-15	2.6E-16	9.6E-15	4.6E-15
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	1.0E-04	9.8E-05	1.0E-04	1.6E-06	2.5E-06	2.5E-07	8.5E-06	3.5E-06	1.3E-08	1.3E-09	4.5E-08	1.9E-08
	In-111(Cd)	1.4E-07	8.2E-08	1.7E-07	3.1E-08	1.4E-08	3.9E-10	3.4E-08	1.1E-08	4.6E-12	1.3E-13	1.1E-11	3.7E-12
	In-111(Pb)	7.8E-08	6.8E-08	9.2E-08	7.5E-09	3.5E-08	3.0E-08	3.9E-08	2.7E-09	1.2E-11	1.0E-11	1.3E-11	9.1E-13
	In-111(Sn)	1.3E-07	9.2E-08	1.6E-07	2.2E-08	1.6E-08	4.0E-09	3.0E-08	8.2E-09	5.3E-12	1.3E-12	1.0E-11	2.7E-12
	P-32	8.8E-04	8.6E-04	8.9E-04	1.1E-05	2.2E-12	6.0E-13	5.2E-12	1.6E-12	1.6E-07	4.4E-08	3.8E-07	1.2E-07
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	5.0E-07	3.7E-07	5.4E-07	5.7E-08	3.9E-10	1.2E-11	1.5E-09	4.8E-10	3.8E-07	1.2E-08	1.4E-06	4.6E-07
	Tc-99m	2.5E-07	2.5E-07	2.5E-07	1.0E-09	7.0E-09	4.2E-10	2.6E-08	1.4E-08	2.1E-13	1.2E-14	7.6E-13	4.3E-13
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**9.8E-04**	**9.6E-04**	**9.9E-04**	**1.1E-05**	**2.9E-06**	**5.1E-07**	**8.6E-06**	**3.5E-06**	**5.6E-07**	**1.1E-07**	**1.6E-06**	**4.9E-07**
Göviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	6.9E-09	1.7E-09	9.9E-09	2.9E-09	1.2E-07	1.4E-09	3.1E-07	1.1E-07	4.7E-10	5.8E-12	1.3E-09	4.5E-10
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	I-131	8.7E-05	8.2E-05	8.9E-05	3.0E-06	2.7E-06	2.5E-07	9.3E-06	4.0E-06	1.4E-08	1.3E-09	4.9E-08	2.1E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	2.6E-04	2.5E-04	2.7E-04	6.6E-06	7.9E-13	2.1E-13	1.9E-12	5.9E-13	5.8E-08	1.6E-08	1.4E-07	4.3E-08
	Se-75	1.1E-08	4.3E-09	1.6E-08	3.9E-09	5.6E-08	1.6E-08	9.8E-08	2.6E-08	1.5E-08	4.4E-09	2.6E-08	6.9E-09
	Sr-89	4.8E-06	2.4E-06	5.6E-06	1.1E-06	4.1E-09	1.3E-10	1.5E-08	4.7E-09	4.0E-06	1.3E-07	1.5E-05	4.6E-06
	Tc-99m	2.2E-07	2.1E-07	2.2E-07	1.6E-09	1.8E-08	9.3E-10	6.9E-08	3.9E-08	5.3E-13	2.8E-14	2.1E-12	1.2E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**3.6E-04**	**3.4E-04**	**3.6E-04**	**7.3E-06**	**2.9E-06**	**4.2E-07**	**9.6E-06**	**4.0E-06**	**4.1E-06**	**2.1E-07**	**1.5E-05**	**4.6E-06**
Käppalaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.8E-09	3.1E-10	2.6E-09	7.9E-10	3.3E-08	4.3E-10	9.1E-08	3.1E-08	1.3E-10	1.7E-12	3.7E-10	1.3E-10
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.1E-09	4.3E-10	1.8E-09	4.2E-10	6.5E-09	2.0E-09	1.1E-08	2.9E-09	1.7E-09	5.3E-10	3.0E-09	7.7E-10
	Sr-89	6.8E-08	3.4E-08	8.1E-08	1.5E-08	6.1E-11	2.3E-12	2.2E-10	7.0E-11	6.0E-08	2.2E-09	2.1E-07	6.8E-08
	Tc-99m	6.6E-08	6.5E-08	6.6E-08	5.2E-10	6.5E-09	3.6E-10	2.4E-08	1.4E-08	1.9E-13	1.1E-14	7.1E-13	4.1E-13
	TI-201(Cd)	2.0E-12	3.2E-13	2.6E-12	7.5E-13	5.1E-16	1.9E-18	2.2E-15	7.0E-16	1.9E-19	6.9E-22	8.0E-19	2.6E-19
	TI-201(Pb)	8.0E-13	3.8E-13	1.3E-12	3.0E-13	1.6E-15	9.8E-16	2.1E-15	3.4E-16	5.8E-19	3.6E-19	7.7E-19	1.3E-19
	TI-201(Sn)	1.9E-12	8.2E-13	2.5E-12	5.5E-13	5.1E-16	3.9E-17	1.6E-15	4.8E-16	1.9E-19	1.4E-20	5.7E-19	1.8E-19
	Total	**1.4E-07**	**1.0E-07**	**1.5E-07**	**1.5E-08**	**4.6E-08**	**8.1E-09**	**1.0E-07**	**3.4E-08**	**6.1E-08**	**4.0E-09**	**2.1E-07**	**6.8E-08**

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
Koholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.0E-08	3.5E-09	3.8E-08	1.1E-08	6.1E-07	6.0E-10	2.7E-06	8.8E-07	2.5E-09	2.5E-12	1.1E-08	3.6E-09
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	4.0E-05	3.6E-06	5.5E-05	1.8E-05	8.2E-06	4.4E-08	2.7E-05	9.3E-06	2.8E-09	1.5E-11	9.2E-09	3.1E-09
	In-111(Pb)	1.2E-05	4.7E-06	2.2E-05	5.5E-06	2.3E-05	1.7E-05	2.7E-05	2.9E-06	7.7E-09	5.8E-09	9.0E-09	9.9E-10
	In-111(Sn)	3.8E-05	1.2E-05	5.3E-05	1.3E-05	9.5E-06	1.0E-06	2.3E-05	6.9E-06	3.2E-09	3.5E-10	7.7E-09	2.3E-09
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	3.7E-06	2.0E-06	4.1E-06	6.9E-07	3.6E-09	2.5E-11	1.8E-08	6.2E-09	3.5E-06	2.4E-08	1.8E-05	6.1E-06
	Tc-99m	2.9E-07	2.9E-07	3.0E-07	2.4E-09	4.6E-08	1.2E-09	1.8E-07	1.1E-07	1.4E-12	3.6E-14	5.5E-12	3.3E-12
	TI-201(Cd)	4.9E-06	4.4E-07	6.8E-06	2.1E-06	7.5E-06	4.0E-08	2.5E-05	8.4E-06	2.7E-09	1.4E-11	9.1E-09	3.1E-09
	TI-201(Pb)	1.5E-06	5.7E-07	2.8E-06	6.8E-07	2.1E-05	1.6E-05	2.4E-05	2.7E-06	7.7E-09	5.8E-09	9.0E-09	9.8E-10
	TI-201(Sn)	4.6E-06	1.5E-06	6.5E-06	1.6E-06	8.6E-06	9.5E-07	2.1E-05	6.3E-06	3.1E-09	3.5E-10	7.6E-09	2.3E-09
	Total	**4.9E-05**	**1.2E-05**	**6.6E-05**	**1.8E-05**	**4.5E-05**	**3.8E-05**	**5.1E-05**	**4.0E-06**	**3.5E-06**	**4.2E-08**	**1.8E-05**	**6.1E-06**
Öresundsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	2.3E-09	9.5E-10	3.4E-09	7.4E-10	1.4E-08	3.7E-09	2.7E-08	7.2E-09	3.7E-09	9.7E-10	7.3E-09	1.9E-09
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	2.2E-07	2.2E-07	2.2E-07	1.7E-09	1.2E-08	9.1E-10	4.3E-08	2.7E-08	3.7E-13	2.7E-14	1.3E-12	8.2E-13

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	TI-201(Cd)	2.4E-06	3.8E-07	3.6E-06	1.0E-06	3.1E-06	1.1E-07	7.4E-06	2.4E-06	1.1E-09	4.1E-11	2.7E-09	8.9E-10
	TI-201(Pb)	6.3E-07	3.1E-07	1.1E-06	2.4E-07	7.5E-06	6.4E-06	8.2E-06	5.5E-07	2.7E-09	2.3E-09	3.0E-09	2.0E-10
	TI-201(Sn)	2.2E-06	9.5E-07	3.2E-06	7.2E-07	3.5E-06	9.1E-07	6.3E-06	1.7E-06	1.3E-09	3.3E-10	2.3E-09	6.2E-10
	Total	**2.6E-06**	**6.1E-07**	**3.8E-06**		**7.5E-06**	**6.5E-06**	**8.2E-06**		**6.5E-09**	**3.6E-09**	**1.0E-08**	
Simsholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.2E-08	5.5E-09	1.5E-08	3.2E-09	1.1E-07	1.7E-09	4.2E-07	1.4E-07	4.5E-10	6.9E-12	1.7E-09	5.7E-10
	I-123	1.8E-08	1.8E-08	1.8E-08	3.6E-10	9.3E-10	8.3E-11	3.3E-09	1.5E-09	6.0E-14	5.4E-15	2.2E-13	9.8E-14
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.8E-04	2.7E-04	2.9E-04	7.2E-06	6.6E-06	6.7E-07	2.3E-05	1.0E-05	3.5E-08	3.5E-09	1.2E-07	5.6E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	1.3E-03	1.2E-03	1.3E-03	2.4E-05	2.9E-12	7.9E-13	7.4E-12	2.3E-12	2.2E-07	5.8E-08	5.5E-07	1.7E-07
	Se-75	4.9E-09	2.9E-09	6.6E-09	1.2E-09	1.6E-08	2.5E-09	3.2E-08	9.4E-09	4.1E-09	6.6E-10	8.5E-09	2.5E-09
	Sr-89	1.4E-06	8.5E-07	1.5E-06	2.1E-07	7.7E-10	3.1E-11	3.4E-09	1.1E-09	7.5E-07	3.0E-08	3.3E-06	1.1E-06
	Tc-99m	3.9E-07	3.8E-07	3.9E-07	2.5E-09	1.9E-08	1.0E-09	7.2E-08	5.1E-08	5.8E-13	3.0E-14	2.1E-12	1.5E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.5E-03**	**1.5E-03**	**1.6E-03**	**2.5E-05**	**6.8E-06**	**8.2E-07**	**2.4E-05**	**1.0E-05**	**1.0E-06**	**1.8E-07**	**3.5E-06**	**1.1E-06**
Sjölunda	Co-58	1.2E-11	5.2E-12	1.7E-11	3.7E-12	2.8E-10	3.6E-11	5.7E-10	1.7E-10	1.2E-11	1.6E-12	2.5E-11	7.6E-12
	Cr-51	3.1E-09	9.8E-10	4.4E-09	1.2E-09	4.7E-08	5.5E-10	1.2E-07	4.4E-08	1.9E-10	2.2E-12	5.0E-10	1.8E-10
	I-123	3.8E-08	3.6E-08	3.8E-08	1.2E-09	1.9E-09	1.6E-10	6.5E-09	2.9E-09	1.2E-13	1.0E-14	4.2E-13	1.9E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	1.2E-04	1.1E-04	1.2E-04	3.8E-06	3.3E-06	3.5E-07	1.1E-05	4.6E-06	1.7E-08	1.8E-09	6.0E-08	2.5E-08
	In-111(Cd)	2.9E-05	8.0E-06	4.5E-05	1.2E-05	3.5E-06	1.6E-07	7.6E-06	2.5E-06	1.2E-09	5.4E-11	2.6E-09	8.6E-10
	In-111(Pb)	8.0E-06	4.9E-06	1.2E-05	2.2E-06	7.8E-06	7.0E-06	8.4E-06	4.5E-07	2.6E-09	2.3E-09	2.8E-09	1.5E-10
	In-111(Sn)	2.6E-05	1.2E-05	4.0E-05	8.8E-06	4.0E-06	1.1E-06	6.9E-06	1.8E-06	1.4E-09	3.6E-10	2.3E-09	6.2E-10

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	P-32	1.2E-04	1.1E-04	1.2E-04	2.8E-06	3.3E-13	9.5E-14	7.7E-13	2.4E-13	2.4E-08	7.1E-09	5.7E-08	1.7E-08
	Se-75	1.5E-09	7.0E-10	2.3E-09	4.9E-10	7.4E-09	2.1E-09	1.3E-08	3.3E-09	2.0E-09	5.5E-10	3.4E-09	8.8E-10
	Sr-89	2.6E-08	1.3E-08	3.0E-08	5.3E-09	2.0E-11	7.0E-13	7.5E-11	2.3E-11	2.0E-08	6.8E-10	7.3E-08	2.3E-08
	Tc-99m	5.8E-07	5.7E-07	5.8E-07	5.1E-09	2.2E-08	1.2E-09	8.1E-08	4.7E-08	6.6E-13	3.5E-14	2.4E-12	1.4E-12
	TI-201(Cd)	1.8E-08	5.3E-09	2.9E-08	7.8E-09	1.7E-08	7.6E-10	3.6E-08	1.2E-08	6.2E-12	2.8E-13	1.3E-11	4.4E-12
	TI-201(Pb)	5.1E-09	3.1E-09	7.6E-09	1.4E-09	3.7E-08	3.3E-08	4.0E-08	2.1E-09	1.4E-11	1.2E-11	1.5E-11	7.8E-13
	TI-201(Sn)	1.7E-08	7.8E-09	2.5E-08	5.5E-09	1.9E-08	5.6E-09	3.3E-08	8.7E-09	7.1E-12	2.0E-12	1.2E-11	3.2E-12
	Total	**2.7E-04**	**2.5E-04**	**2.9E-04**	**1.3E-05**	**1.1E-05**	**8.0E-06**	**1.9E-05**	**4.7E-06**	**6.6E-08**	**2.5E-08**	**1.3E-07**	**3.8E-08**
Sjöstadsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	6.1E-09	2.0E-09	9.2E-09	2.6E-09	6.4E-08	1.3E-09	1.5E-07	5.3E-08	2.6E-10	5.2E-12	6.1E-10	2.2E-10
	I-123	1.7E-08	1.6E-08	1.8E-08	8.1E-10	1.1E-09	9.2E-11	3.7E-09	1.5E-09	6.9E-14	6.0E-15	2.4E-13	9.7E-14
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.8E-04	2.5E-04	2.9E-04	1.4E-05	7.9E-06	8.2E-07	2.7E-05	1.0E-05	4.2E-08	4.3E-09	1.4E-07	5.4E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.9E-03	3.6E-03	4.1E-03	1.7E-04	1.1E-11	3.1E-12	2.7E-11	7.9E-12	8.2E-07	2.3E-07	2.0E-06	5.8E-07
	Se-75	1.6E-08	7.1E-09	2.6E-08	5.9E-09	6.1E-08	2.4E-08	9.2E-08	2.1E-08	1.6E-08	6.4E-09	2.4E-08	5.6E-09
	Sr-89	1.9E-05	9.0E-06	2.3E-05	4.7E-06	1.2E-08	5.1E-10	3.5E-08	1.1E-08	1.1E-05	4.9E-07	3.4E-05	1.1E-05
	Tc-99m	5.9E-07	5.8E-07	6.0E-07	8.3E-09	3.3E-08	1.6E-09	1.3E-07	6.8E-08	9.9E-13	4.8E-14	3.9E-12	2.0E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**4.2E-03**	**3.9E-03**	**4.4E-03**	**1.7E-04**	**8.0E-06**	**9.6E-07**	**2.7E-05**	**1.0E-05**	**1.2E-05**	**1.3E-06**	**3.5E-05**	**1.1E-05**
Skansverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	1.6E-05	3.9E-06	2.8E-05	8.4E-06	2.2E-06	1.1E-07	4.5E-06	1.5E-06	7.4E-10	3.6E-11	1.5E-09	5.1E-10
	In-111(Pb)	3.1E-06	1.8E-06	4.9E-06	9.8E-07	4.6E-06	4.2E-06	4.8E-06	1.9E-07	1.5E-09	1.4E-09	1.6E-09	6.4E-11
	In-111(Sn)	1.4E-05	4.8E-06	2.3E-05	5.8E-06	2.6E-06	8.6E-07	4.3E-06	1.1E-06	8.8E-10	2.9E-10	1.4E-09	3.6E-10
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	2.5E-08	8.7E-09	4.3E-08	1.1E-08	1.3E-07	4.0E-08	2.0E-07	5.1E-08	3.3E-08	1.1E-08	5.3E-08	1.3E-08
	Sr-89	1.3E-06	5.6E-07	1.7E-06	3.5E-07	1.0E-09	3.7E-11	3.6E-09	1.1E-09	1.0E-06	3.6E-08	3.4E-06	1.1E-06
	Tc-99m	3.9E-07	3.8E-07	3.9E-07	4.7E-09	2.1E-08	9.8E-10	7.5E-08	5.1E-08	6.1E-13	2.9E-14	2.2E-12	1.5E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**1.7E-05**	**5.5E-06**	**2.9E-05**	**8.4E-06**	**4.7E-06**	**4.3E-06**	**5.0E-06**	**2.1E-07**	**1.0E-06**	**7.1E-08**	**3.5E-06**	**1.1E-06**
Sundet	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	9.0E-09	1.5E-09	1.3E-08	3.8E-09	1.7E-07	2.1E-09	4.6E-07	1.5E-07	6.7E-10	8.7E-12	1.9E-09	6.1E-10
	I-123	4.6E-08	4.3E-08	4.6E-08	1.4E-09	2.9E-09	3.3E-10	9.7E-09	3.8E-09	1.9E-13	2.1E-14	6.3E-13	2.5E-13
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.2E-04	2.1E-04	2.2E-04	6.8E-06	7.4E-06	8.4E-07	2.4E-05	9.4E-06	3.9E-08	4.5E-09	1.3E-07	5.0E-08
	In-111(Cd)	7.7E-06	1.1E-06	1.3E-05	3.8E-06	1.3E-06	6.7E-08	2.7E-06	9.1E-07	4.4E-10	2.3E-11	9.1E-10	3.0E-10
	In-111(Pb)	1.6E-06	7.8E-07	2.8E-06	6.2E-07	2.9E-06	2.6E-06	3.1E-06	1.5E-07	9.6E-10	8.7E-10	1.0E-09	5.0E-11
	In-111(Sn)	6.9E-06	2.3E-06	1.1E-05	2.7E-06	1.5E-06	4.5E-07	2.6E-06	6.5E-07	5.0E-10	1.5E-10	8.6E-10	2.2E-10
	P-32	3.4E-03	3.3E-03	3.5E-03	7.7E-05	1.1E-11	3.7E-12	2.4E-11	7.2E-12	8.2E-07	2.7E-07	1.8E-06	5.3E-07
	Se-75	2.6E-08	9.7E-09	4.2E-08	1.0E-08	1.5E-07	5.0E-08	2.7E-07	6.8E-08	4.1E-08	1.3E-08	7.1E-08	1.8E-08
	Sr-89	1.5E-06	7.4E-07	1.8E-06	3.5E-07	1.4E-09	5.1E-11	5.0E-09	1.6E-09	1.3E-06	5.0E-08	4.8E-06	1.5E-06
	Tc-99m	6.5E-07	6.5E-07	6.6E-07	6.0E-09	3.3E-08	2.2E-09	1.2E-07	6.4E-08	9.9E-13	6.6E-14	3.5E-12	1.9E-12
	TI-201(Cd)	6.5E-06	8.7E-07	1.1E-05	3.2E-06	8.3E-06	3.6E-07	1.8E-05	5.9E-06	3.0E-09	1.3E-10	6.4E-09	2.1E-09
	TI-201(Pb)	1.4E-06	6.7E-07	2.4E-06	5.3E-07	1.8E-05	1.6E-05	1.9E-05	9.7E-07	6.7E-09	6.0E-09	7.1E-09	3.6E-10
	TI-201(Sn)	5.8E-06	2.1E-06	9.4E-06	2.2E-06	9.6E-06	3.1E-06	1.6E-05	4.1E-06	3.5E-09	1.1E-09	6.0E-09	1.5E-09
	Total	**3.7E-03**	**3.5E-03**	**3.8E-03**	**7.8E-05**	**2.9E-05**	**2.2E-05**	**4.5E-05**	**9.4E-06**	**2.3E-06**	**6.0E-07**	**5.7E-06**	**1.6E-06**

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
Tegelviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	6.0E-09	6.6E-10	1.1E-08	3.4E-09	8.5E-08	3.2E-09	1.8E-07	6.1E-08	3.5E-10	1.3E-11	7.3E-10	2.5E-10
	I-123	4.1E-08	3.6E-08	4.4E-08	2.9E-09	4.5E-09	5.6E-10	1.4E-08	5.2E-09	2.9E-13	3.6E-14	9.3E-13	3.4E-13
	I-125	5.7E-09	4.9E-09	5.9E-09	3.7E-10	1.7E-11	2.0E-12	5.5E-11	1.9E-11	5.0E-11	5.7E-12	1.6E-10	5.5E-11
	I-131	1.9E-04	1.7E-04	2.0E-04	1.3E-05	8.3E-06	1.1E-06	2.6E-05	9.1E-06	4.4E-08	5.8E-09	1.4E-07	4.8E-08
	In-111(Cd)	6.2E-06	5.7E-07	1.3E-05	4.2E-06	1.1E-06	8.1E-08	1.9E-06	6.0E-07	3.7E-10	2.7E-11	6.5E-10	2.0E-10
	In-111(Pb)	6.4E-07	3.5E-07	1.1E-06	2.5E-07	1.3E-06	6.0E-07	1.9E-06	3.9E-07	6.6E-10	6.4E-10	6.8E-10	1.3E-11
	In-111(Sn)	4.6E-06	9.6E-07	9.7E-06	2.7E-06	2.0E-06	1.9E-06	2.0E-06	4.0E-08	4.5E-10	2.0E-10	6.3E-10	1.3E-10
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.6E-06	5.5E-07	2.2E-06	5.6E-07	1.3E-09	7.2E-11	3.5E-09	1.1E-09	1.2E-06	7.0E-08	3.4E-06	1.1E-06
	Tc-99m	5.0E-07	4.8E-07	5.0E-07	1.1E-08	5.2E-08	3.8E-09	1.9E-07	8.7E-08	1.5E-12	1.1E-13	5.6E-12	2.6E-12
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**2.0E-04**	**1.8E-04**	**2.2E-04**	**1.3E-05**	**1.0E-05**	**3.2E-06**	**2.8E-05**	**9.1E-06**	**1.3E-06**	**1.0E-07**	**3.4E-06**	**1.1E-06**
Uddebo	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.4E-08	1.3E-08	4.5E-08	1.1E-08	3.0E-07	7.4E-10	9.1E-07	3.3E-07	1.2E-09	3.0E-12	3.7E-09	1.3E-09
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.0E-04	1.9E-04	2.1E-04	9.8E-06	6.7E-06	3.3E-07	2.5E-05	1.0E-05	3.5E-08	1.8E-09	1.3E-07	5.4E-08
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.2E-06	1.2E-06	1.2E-06	1.6E-08	4.8E-08	1.3E-09	1.9E-07	1.2E-07	1.4E-12	3.7E-14	5.5E-12	3.5E-12

Sewage plant name	Nuclide	Dose for ingestion water and fish, Sv/a				Dose to worker, Sv/a				Dose to agricultural, Sv/a			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Total	**2.1E-04**	**1.9E-04**	**2.1E-04**		**7.0E-06**	**5.8E-07**	**2.6E-05**	**1.0E-05**	**7.0E-08**	**2.2E-08**	**1.7E-07**	**5.6E-08**

Table C-7. Effective dose factors relating doses to unit concentrations of the different radionuclides in the influx water of the sewage plants based on results of probabilistic simulation for all relevant pathways.

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
Henriksdal	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.7E-10	5.0E-11	2.4E-10	6.4E-11	2.5E-09	3.2E-11	6.7E-09	2.3E-09	1.0E-11	1.3E-13	2.7E-11	9.3E-12
	I-123	1.1E-10	1.1E-10	1.1E-10	3.3E-12	7.9E-12	6.6E-13	2.7E-11	1.2E-11	5.1E-16	4.3E-17	1.8E-15	7.9E-16
	I-125	2.6E-08	2.5E-08	2.7E-08	7.8E-10	7.0E-11	7.4E-12	2.2E-10	9.0E-11	5.5E-11	5.7E-12	1.7E-10	7.0E-11
	I-131	3.4E-08	3.3E-08	3.5E-08	1.1E-09	9.8E-10	1.1E-10	3.3E-09	1.3E-09	5.2E-12	5.8E-13	1.8E-11	7.0E-12
	In-111(Cd)	4.0E-08	1.1E-08	6.3E-08	1.7E-08	5.2E-09	2.5E-10	1.1E-08	3.6E-09	1.7E-12	8.3E-14	3.8E-12	1.2E-12
	In-111(Pb)	1.1E-08	7.1E-09	1.7E-08	3.1E-09	1.2E-08	1.0E-08	1.2E-08	6.4E-10	3.9E-12	3.5E-12	4.2E-12	2.1E-13
	In-111(Sn)	3.6E-08	1.7E-08	5.6E-08	1.2E-08	6.0E-09	1.7E-09	1.0E-08	2.6E-09	2.0E-12	5.8E-13	3.4E-12	8.8E-13
	P-32	3.3E-06	3.1E-06	3.3E-06	7.6E-08	9.1E-15	2.8E-15	2.1E-14	6.2E-15	6.8E-10	2.1E-10	1.5E-09	4.6E-10
	Se-75	9.7E-09	4.6E-09	1.5E-08	3.1E-09	4.8E-08	1.5E-08	8.0E-08	2.0E-08	2.2E-09	7.0E-10	3.7E-09	9.3E-10
	Sr-89	6.1E-09	3.2E-09	7.2E-09	1.3E-09	4.8E-12	1.9E-13	1.7E-11	5.4E-12	4.7E-09	1.9E-10	1.7E-08	5.2E-09
	Tc-99m	3.3E-12	3.3E-12	3.3E-12	2.7E-14	2.3E-13	1.2E-14	8.3E-13	4.9E-13	6.8E-18	3.5E-19	2.5E-17	1.5E-17
	TI-201(Cd)	1.4E-09	3.8E-10	2.1E-09	5.8E-10	1.3E-09	5.7E-11	2.8E-09	9.2E-10	4.8E-13	2.1E-14	1.0E-12	3.4E-13
	TI-201(Pb)	3.9E-10	2.4E-10	5.8E-10	1.0E-10	2.9E-09	2.6E-09	3.2E-09	1.6E-10	1.1E-12	9.6E-13	1.2E-12	5.8E-14
	TI-201(Sn)	1.2E-09	5.5E-10	1.9E-09	4.1E-10	1.5E-09	4.5E-10	2.6E-09	6.7E-10	5.6E-13	1.6E-13	9.4E-13	2.4E-13
Ryaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.8E-10	3.4E-11	2.5E-10	6.8E-11	3.1E-09	4.1E-11	9.2E-09	2.9E-09	1.2E-11	1.7E-13	3.7E-11	1.2E-11
	I-123	2.5E-10	2.4E-10	2.6E-10	7.5E-12	1.1E-11	1.0E-12	3.6E-11	1.4E-11	6.9E-16	6.7E-17	2.3E-15	9.3E-16
	I-125	2.6E-08	2.5E-08	2.7E-08	6.8E-10	7.4E-11	8.3E-12	2.5E-10	9.3E-11	2.1E-10	2.4E-11	7.1E-10	2.7E-10
	I-131	3.8E-08	3.6E-08	3.8E-08	1.0E-09	1.1E-09	1.3E-10	3.6E-09	1.4E-09	5.9E-12	6.7E-13	1.9E-11	7.6E-12
	In-111(Cd)	5.0E-08	9.0E-09	7.9E-08	2.3E-08	6.9E-09	3.4E-10	1.6E-08	5.1E-09	2.3E-12	1.2E-13	5.3E-12	1.7E-12
	In-111(Pb)	1.3E-08	6.6E-09	2.2E-08	4.6E-09	1.6E-08	1.4E-08	1.7E-08	1.0E-09	5.3E-12	4.6E-12	5.7E-12	3.4E-13
	In-111(Sn)	4.6E-08	1.8E-08	7.1E-08	1.6E-08	7.9E-09	2.2E-09	1.4E-08	3.6E-09	2.7E-12	7.4E-13	4.6E-12	1.2E-12
	P-32	3.4E-06	3.3E-06	3.5E-06	6.6E-08	1.0E-14	3.2E-15	2.2E-14	6.4E-15	7.4E-10	2.4E-10	1.6E-09	4.8E-10

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	Se-75	1.0E-08	4.1E-09	1.5E-08	3.3E-09	5.5E-08	1.7E-08	1.0E-07	2.5E-08	1.5E-08	4.4E-09	2.7E-08	6.8E-09
	Sr-89	6.3E-09	3.5E-09	7.3E-09	1.3E-09	5.6E-12	2.3E-13	2.0E-11	6.5E-12	5.4E-09	2.2E-10	1.9E-08	6.3E-09
	Tc-99m	1.2E-11	1.2E-11	1.2E-11	1.0E-13	3.2E-13	2.4E-14	1.1E-12	5.7E-13	9.6E-18	7.0E-19	3.2E-17	1.7E-17
	TI-201(Cd)	1.7E-09	3.0E-10	2.7E-09	7.5E-10	1.8E-09	7.4E-11	3.9E-09	1.3E-09	6.5E-13	2.7E-14	1.4E-12	4.7E-13
	TI-201(Pb)	4.3E-10	2.2E-10	7.2E-10	1.5E-10	4.0E-09	3.5E-09	4.3E-09	2.5E-10	1.5E-12	1.3E-12	1.6E-12	9.3E-14
	TI-201(Sn)	1.5E-09	6.0E-10	2.4E-09	5.3E-10	2.0E-09	5.8E-10	3.6E-09	9.1E-10	7.3E-13	2.1E-13	1.3E-12	3.3E-13
Ön	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.8E-10	4.5E-11	2.5E-10	6.7E-11	3.4E-09	4.5E-11	9.7E-09	3.2E-09	1.4E-11	1.8E-13	3.9E-11	1.3E-11
	I-123	2.2E-10	2.1E-10	2.2E-10	6.1E-12	1.1E-11	1.2E-12	3.7E-11	1.5E-11	7.4E-16	7.5E-17	2.4E-15	9.8E-16
	I-125	2.6E-08	2.5E-08	2.7E-08	6.8E-10	7.8E-11	7.8E-12	2.7E-10	1.0E-10	2.2E-10	2.2E-11	7.7E-10	2.9E-10
	I-131	3.7E-08	3.5E-08	3.8E-08	1.4E-09	1.3E-09	1.4E-10	4.2E-09	2.4E-09	7.0E-12	7.5E-13	2.2E-11	1.3E-11
	In-111(Cd)	4.9E-08	9.2E-09	7.7E-08	2.2E-08	8.3E-09	3.3E-10	1.8E-08	6.0E-09	2.8E-12	1.1E-13	6.2E-12	2.0E-12
	In-111(Pb)	1.3E-08	6.4E-09	2.1E-08	4.7E-09	1.9E-08	1.6E-08	2.0E-08	1.3E-09	6.3E-12	5.5E-12	6.9E-12	4.3E-13
	In-111(Sn)	4.5E-08	1.9E-08	6.8E-08	1.5E-08	9.4E-09	2.7E-09	1.6E-08	4.3E-09	3.2E-12	9.0E-13	5.5E-12	1.4E-12
	P-32	3.4E-06	3.3E-06	3.5E-06	6.2E-08	1.1E-14	3.3E-15	2.5E-14	6.9E-15	7.8E-10	2.5E-10	1.8E-09	5.1E-10
	Se-75	1.0E-08	4.5E-09	1.5E-08	3.2E-09	5.9E-08	1.7E-08	1.0E-07	2.7E-08	1.6E-08	4.4E-09	2.8E-08	7.1E-09
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	9.3E-12	9.2E-12	9.4E-12	7.6E-14	3.2E-13	2.2E-14	1.2E-12	5.8E-13	9.4E-18	6.6E-19	3.6E-17	1.7E-17
	TI-201(Cd)	1.6E-09	2.8E-10	2.6E-09	7.4E-10	2.1E-09	9.9E-11	4.8E-09	1.6E-09	7.7E-13	3.6E-14	1.7E-12	5.7E-13
	TI-201(Pb)	4.3E-10	2.2E-10	7.2E-10	1.5E-10	4.8E-09	4.2E-09	5.2E-09	3.1E-10	1.7E-12	1.5E-12	1.9E-12	1.1E-13
	TI-201(Sn)	1.6E-09	6.9E-10	2.3E-09	5.0E-10	2.3E-09	6.3E-10	4.1E-09	1.1E-09	8.4E-13	2.3E-13	1.5E-12	3.9E-13
Kungsängsverket	Co-58	4.3E-09	1.5E-09	6.6E-09	1.7E-09	1.1E-07	1.5E-08	2.3E-07	6.9E-08	4.8E-09	6.8E-10	9.9E-09	3.0E-09
	Cr-51	1.6E-10	3.3E-11	2.4E-10	7.2E-11	2.7E-09	3.9E-11	7.1E-09	2.5E-09	1.1E-11	1.6E-13	2.9E-11	1.0E-11
	I-123	7.6E-11	7.1E-11	7.7E-11	2.6E-12	1.0E-11	8.7E-13	3.8E-11	1.6E-11	6.7E-16	5.7E-17	2.5E-15	1.0E-15
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.3E-08	3.1E-08	3.4E-08	1.3E-09	1.2E-09	1.1E-10	4.0E-09	1.7E-09	6.3E-12	5.6E-13	2.1E-11	9.0E-12
	In-111(Cd)	3.4E-08	6.1E-09	5.8E-08	1.7E-08	6.4E-09	3.0E-10	1.4E-08	4.6E-09	2.1E-12	9.9E-14	4.6E-12	1.5E-12

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	In-111(Pb)	7.2E-09	3.6E-09	1.2E-08	2.5E-09	1.4E-08	1.3E-08	1.5E-08	6.7E-10	4.7E-12	4.2E-12	5.0E-12	2.3E-13
	In-111(Sn)	3.1E-08	1.2E-08	5.1E-08	1.2E-08	7.5E-09	2.2E-09	1.3E-08	3.3E-09	2.5E-12	7.2E-13	4.2E-12	1.1E-12
	P-32	3.2E-06	3.0E-06	3.3E-06	9.2E-08	1.1E-14	3.1E-15	2.5E-14	7.7E-15	7.9E-10	2.3E-10	1.9E-09	5.7E-10
	Se-75	9.7E-09	9.7E-09	9.7E-09	8.4E-23	4.2E-08	4.2E-08	4.2E-08	6.2E-17	1.1E-08	1.1E-08	1.1E-08	1.6E-17
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.6E-12	1.6E-12	1.6E-12	1.5E-14	3.0E-13	1.4E-14	1.1E-12	7.1E-13	8.9E-18	4.1E-19	3.3E-17	2.1E-17
	TI-201(Cd)	1.2E-09	2.4E-10	2.0E-09	6.0E-10	1.6E-09	7.6E-11	3.4E-09	1.2E-09	6.0E-13	2.8E-14	1.2E-12	4.2E-13
	TI-201(Pb)	2.5E-10	1.2E-10	4.2E-10	8.7E-11	3.5E-09	3.2E-09	3.7E-09	1.7E-10	1.3E-12	1.2E-12	1.4E-12	6.2E-14
	TI-201(Sn)	1.0E-09	4.1E-10	1.7E-09	4.2E-10	1.9E-09	5.4E-10	3.2E-09	8.4E-10	6.9E-13	2.0E-13	1.2E-12	3.1E-13
Källby	Co-58	4.5E-09	1.7E-09	6.7E-09	1.6E-09	1.1E-07	1.4E-08	2.3E-07	7.1E-08	4.8E-09	6.3E-10	1.0E-08	3.1E-09
	Cr-51	1.7E-10	3.5E-11	2.4E-10	7.1E-11	2.5E-09	3.1E-11	6.9E-09	2.4E-09	1.0E-11	1.2E-13	2.8E-11	9.7E-12
	I-123	1.0E-10	9.5E-11	1.0E-10	3.0E-12	5.8E-12	5.3E-13	2.0E-11	8.7E-12	3.8E-16	3.4E-17	1.3E-15	5.7E-16
	I-125	2.6E-08	2.5E-08	2.7E-08	8.6E-10	6.7E-11	6.2E-12	2.2E-10	9.5E-11	1.9E-10	1.8E-11	6.3E-10	2.7E-10
	I-131	3.4E-08	3.3E-08	3.5E-08	1.1E-09	8.4E-10	8.4E-11	2.8E-09	1.2E-09	4.5E-12	4.5E-13	1.5E-11	6.2E-12
	In-111(Cd)	3.8E-08	6.3E-09	6.2E-08	1.9E-08	4.7E-09	1.7E-10	9.9E-09	3.4E-09	1.6E-12	5.7E-14	3.3E-12	1.1E-12
	In-111(Pb)	8.8E-09	4.1E-09	1.5E-08	3.3E-09	1.0E-08	9.1E-09	1.1E-08	5.9E-10	3.4E-12	3.1E-12	3.7E-12	2.0E-13
	In-111(Sn)	3.5E-08	1.4E-08	5.5E-08	1.3E-08	5.3E-09	1.5E-09	9.2E-09	2.4E-09	1.8E-12	5.1E-13	3.1E-12	8.0E-13
	P-32	3.3E-06	3.1E-06	3.3E-06	7.7E-08	8.0E-15	2.3E-15	1.8E-14	5.7E-15	5.9E-10	1.7E-10	1.4E-09	4.2E-10
	Se-75	9.4E-09	3.8E-09	1.5E-08	3.4E-09	4.9E-08	1.4E-08	8.5E-08	2.2E-08	1.3E-08	3.8E-09	2.3E-08	5.8E-09
	Sr-89	6.1E-09	3.2E-09	7.2E-09	1.3E-09	4.8E-12	1.5E-13	1.7E-11	5.5E-12	4.7E-09	1.5E-10	1.6E-08	5.3E-09
	Tc-99m	2.5E-12	2.5E-12	2.5E-12	2.1E-14	1.6E-13	8.3E-15	6.0E-13	3.3E-13	4.7E-18	2.5E-19	1.8E-17	9.8E-18
	TI-201(Cd)	1.3E-09	2.1E-10	2.1E-09	6.4E-10	1.2E-09	5.1E-11	2.6E-09	8.7E-10	4.3E-13	1.9E-14	9.4E-13	3.2E-13
	TI-201(Pb)	3.0E-10	1.4E-10	5.1E-10	1.1E-10	2.6E-09	2.3E-09	2.8E-09	1.5E-10	9.6E-13	8.5E-13	1.0E-12	5.6E-14
	TI-201(Sn)	1.2E-09	5.0E-10	1.9E-09	4.4E-10	1.3E-09	3.6E-10	2.3E-09	6.2E-10	4.9E-13	1.3E-13	8.6E-13	2.3E-13
Centrala Reningsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.2E-10	1.0E-11	2.4E-10	7.8E-11	8.5E-10	4.5E-11	1.6E-09	5.4E-10	3.4E-12	1.8E-13	6.5E-12	2.2E-12
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	I-125	2.4E-08	1.9E-08	2.6E-08	2.4E-09	5.5E-11	7.0E-12	1.7E-10	5.6E-11	1.6E-10	2.0E-11	4.8E-10	1.6E-10
	I-131	3.2E-08	2.6E-08	3.5E-08	3.3E-09	6.5E-10	8.5E-11	2.0E-09	6.8E-10	3.5E-12	4.5E-13	1.1E-11	3.6E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	4.6E-09	1.1E-09	7.1E-09	1.9E-09	2.3E-12	1.8E-13	5.4E-12	1.7E-12	2.2E-09	1.7E-10	5.2E-09	1.6E-09
	Tc-99m	2.7E-12	2.6E-12	2.8E-12	1.0E-13	1.3E-13	9.2E-15	4.5E-13	2.1E-13	3.8E-18	2.7E-19	1.3E-17	6.2E-18
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Duvbacken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.9E-10	5.1E-11	2.5E-10	6.4E-11	4.3E-09	4.3E-11	1.4E-08	4.6E-09	1.7E-11	1.7E-13	5.6E-11	1.8E-11
	I-123	1.6E-10	1.5E-10	1.6E-10	2.9E-12	1.1E-11	1.1E-12	3.8E-11	1.7E-11	7.4E-16	7.3E-17	2.5E-15	1.1E-15
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.6E-08	3.5E-08	3.7E-08	6.9E-10	1.2E-09	1.3E-10	4.2E-09	1.7E-09	6.6E-12	7.0E-13	2.2E-11	9.2E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.4E-06	3.3E-06	3.4E-06	4.6E-08	1.1E-14	3.3E-15	2.6E-14	7.7E-15	8.2E-10	2.5E-10	1.9E-09	5.7E-10
	Se-75	1.1E-08	5.8E-09	1.6E-08	3.1E-09	6.9E-08	1.7E-08	1.4E-07	3.7E-08	1.8E-08	4.5E-09	3.6E-08	9.8E-09
	Sr-89	6.5E-09	4.1E-09	7.3E-09	1.1E-09	6.9E-12	2.1E-13	2.7E-11	8.8E-12	6.7E-09	2.1E-10	2.6E-08	8.6E-09
	Tc-99m	5.4E-12	5.4E-12	5.5E-12	2.6E-14	3.2E-13	2.1E-14	1.2E-12	6.3E-13	9.6E-18	6.3E-19	3.5E-17	1.9E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
Ekeby	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	1.7E-10	1.7E-10	1.7E-10	2.8E-12	6.1E-12	5.1E-13	2.1E-11	9.6E-12	4.0E-16	3.4E-17	1.4E-15	6.3E-16
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	3.6E-08	3.7E-08	6.5E-10	7.2E-10	6.0E-11	2.4E-09	1.1E-09	3.8E-12	3.2E-13	1.3E-11	5.7E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.4E-06	3.3E-06	3.5E-06	4.5E-08	6.9E-15	1.8E-15	1.7E-14	5.2E-15	5.1E-10	1.3E-10	1.2E-09	3.9E-10
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	6.7E-09	4.6E-09	7.3E-09	9.1E-10	4.9E-12	1.4E-13	2.0E-11	6.5E-12	4.8E-09	1.4E-10	1.9E-08	6.3E-09
	Tc-99m	5.7E-12	5.7E-12	5.7E-12	2.6E-14	1.8E-13	1.1E-14	6.5E-13	3.9E-13	5.5E-18	3.2E-19	1.9E-17	1.2E-17
	TI-201(Cd)	1.9E-09	8.9E-10	2.5E-09	5.3E-10	1.3E-09	3.7E-11	3.3E-09	1.1E-09	4.6E-13	1.4E-14	1.2E-12	4.0E-13
	TI-201(Pb)	9.0E-10	7.1E-10	1.1E-09	1.3E-10	3.2E-09	2.7E-09	3.6E-09	2.8E-10	1.2E-12	9.8E-13	1.3E-12	1.0E-13
	TI-201(Sn)	1.8E-09	1.1E-09	2.3E-09	3.9E-10	1.4E-09	3.0E-10	2.9E-09	8.0E-10	5.2E-13	1.1E-13	1.1E-12	2.9E-13
Fillanverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.6E-10	3.4E-11	2.5E-10	7.4E-11	2.3E-09	4.5E-11	5.9E-09	2.1E-09	9.5E-12	1.8E-13	2.4E-11	8.5E-12
	I-123	1.8E-10	1.7E-10	1.9E-10	6.5E-12	9.2E-12	8.3E-13	3.3E-11	1.3E-11	6.0E-16	5.4E-17	2.1E-15	8.6E-16
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.6E-08	3.4E-08	3.7E-08	1.5E-09	1.0E-09	9.8E-11	3.6E-09	1.4E-09	5.6E-12	5.2E-13	1.9E-11	7.7E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	6.0E-09	2.6E-09	7.3E-09	1.5E-09	4.6E-12	1.6E-13	1.6E-11	5.0E-12	4.4E-09	1.6E-10	1.5E-08	4.9E-09
	Tc-99m	6.8E-12	6.7E-12	6.8E-12	6.7E-14	2.7E-13	1.4E-14	9.7E-13	5.4E-13	7.9E-18	4.2E-19	2.9E-17	1.6E-17

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Gässlösa	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.1E-10	1.3E-10	2.5E-10	4.1E-11	2.8E-09	4.4E-11	8.3E-09	2.8E-09	1.2E-11	1.8E-13	3.4E-11	1.2E-11
	I-123	2.1E-10	2.0E-10	2.1E-10	3.3E-12	8.1E-12	7.3E-13	2.7E-11	1.3E-11	5.3E-16	4.8E-17	1.8E-15	8.4E-16
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	3.6E-08	3.8E-08	6.0E-10	9.2E-10	9.3E-11	3.2E-09	1.3E-09	4.9E-12	4.9E-13	1.7E-11	6.9E-12
	In-111(Cd)	5.9E-08	3.6E-08	7.6E-08	1.3E-08	6.0E-09	1.7E-10	1.5E-08	4.9E-09	2.0E-12	5.7E-14	4.9E-12	1.6E-12
	In-111(Pb)	3.4E-08	2.9E-08	4.0E-08	3.2E-09	1.5E-08	1.3E-08	1.7E-08	1.2E-09	5.1E-12	4.3E-12	5.6E-12	4.0E-13
	In-111(Sn)	5.7E-08	4.0E-08	7.1E-08	9.7E-09	6.9E-09	1.7E-09	1.3E-08	3.5E-09	2.3E-12	5.8E-13	4.4E-12	1.2E-12
	P-32	3.4E-06	3.4E-06	3.5E-06	4.2E-08	8.7E-15	2.4E-15	2.0E-14	6.4E-15	6.4E-10	1.7E-10	1.5E-09	4.8E-10
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	6.7E-09	5.0E-09	7.3E-09	7.7E-10	5.3E-12	1.6E-13	2.0E-11	6.5E-12	5.1E-09	1.6E-10	1.9E-08	6.3E-09
	Tc-99m	8.4E-12	8.3E-12	8.4E-12	3.5E-14	2.4E-13	1.4E-14	8.7E-13	4.9E-13	7.1E-18	4.2E-19	2.6E-17	1.5E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Göviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.7E-10	4.3E-11	2.4E-10	7.1E-11	2.9E-09	3.5E-11	7.6E-09	2.7E-09	1.2E-11	1.4E-13	3.1E-11	1.1E-11
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.5E-08	3.3E-08	3.5E-08	1.2E-09	1.1E-09	1.0E-10	3.7E-09	1.6E-09	5.7E-12	5.3E-13	2.0E-11	8.4E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.3E-06	3.1E-06	3.4E-06	8.1E-08	9.8E-15	2.6E-15	2.4E-14	7.2E-15	7.2E-10	1.9E-10	1.7E-09	5.4E-10

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	Se-75	9.5E-09	3.9E-09	1.5E-08	3.5E-09	5.1E-08	1.5E-08	8.8E-08	2.3E-08	1.3E-08	3.9E-09	2.3E-08	6.2E-09
	Sr-89	6.1E-09	3.0E-09	7.2E-09	1.4E-09	5.2E-12	1.7E-13	1.9E-11	6.1E-12	5.1E-09	1.7E-10	1.9E-08	5.9E-09
	Tc-99m	3.1E-12	3.1E-12	3.1E-12	2.4E-14	2.5E-13	1.3E-14	9.8E-13	5.6E-13	7.6E-18	4.0E-19	2.9E-17	1.7E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Käppalaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.6E-10	2.8E-11	2.4E-10	7.1E-11	3.0E-09	3.9E-11	8.2E-09	2.8E-09	1.2E-11	1.6E-13	3.3E-11	1.1E-11
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	9.3E-09	3.5E-09	1.5E-08	3.5E-09	5.4E-08	1.6E-08	9.3E-08	2.4E-08	1.4E-08	4.4E-09	2.5E-08	6.4E-09
	Sr-89	6.1E-09	3.0E-09	7.2E-09	1.3E-09	5.5E-12	2.1E-13	2.0E-11	6.3E-12	5.3E-09	2.0E-10	1.9E-08	6.1E-09
	Tc-99m	2.2E-12	2.2E-12	2.2E-12	1.7E-14	2.2E-13	1.2E-14	8.0E-13	4.6E-13	6.6E-18	3.7E-19	2.4E-17	1.4E-17
	TI-201(Cd)	8.1E-17	1.3E-17	1.1E-16	3.1E-17	2.1E-20	7.7E-23	8.9E-20	2.9E-20	7.6E-24	2.8E-26	3.3E-23	1.0E-23
	TI-201(Pb)	3.3E-17	1.6E-17	5.5E-17	1.2E-17	6.5E-20	4.0E-20	8.6E-20	1.4E-20	2.4E-23	1.5E-23	3.1E-23	5.1E-24
	TI-201(Sn)	7.9E-17	3.4E-17	1.0E-16	2.2E-17	2.1E-20	1.6E-21	6.3E-20	2.0E-20	7.6E-24	5.9E-25	2.3E-23	7.2E-24
Koholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.9E-10	2.2E-11	2.4E-10	7.0E-11	3.8E-09	3.8E-12	1.7E-08	5.5E-09	1.5E-11	1.5E-14	6.9E-11	2.2E-11
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	4.2E-08	3.8E-09	5.8E-08	1.8E-08	8.6E-09	4.6E-11	2.9E-08	9.7E-09	2.9E-12	1.5E-14	9.6E-12	3.3E-12

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	In-111(Pb)	1.3E-08	4.9E-09	2.4E-08	5.8E-09	2.4E-08	1.8E-08	2.8E-08	3.1E-09	8.1E-12	6.1E-12	9.4E-12	1.0E-12
	In-111(Sn)	3.9E-08	1.3E-08	5.6E-08	1.4E-08	9.9E-09	1.1E-09	2.4E-08	7.3E-09	3.3E-12	3.6E-13	8.1E-12	2.4E-12
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	6.5E-09	3.6E-09	7.2E-09	1.2E-09	6.5E-12	4.4E-14	3.2E-11	1.1E-11	6.3E-09	4.3E-11	3.1E-08	1.1E-08
	Tc-99m	2.1E-12	2.0E-12	2.1E-12	1.6E-14	3.3E-13	8.5E-15	1.3E-12	7.7E-13	9.7E-18	2.5E-19	3.8E-17	2.3E-17
	TI-201(Cd)	1.4E-09	1.3E-10	2.0E-09	6.3E-10	2.2E-09	1.2E-11	7.3E-09	2.5E-09	8.0E-13	4.2E-15	2.7E-12	9.1E-13
	TI-201(Pb)	4.3E-10	1.7E-10	8.1E-10	2.0E-10	6.1E-09	4.7E-09	7.2E-09	7.9E-10	2.2E-12	1.7E-12	2.6E-12	2.9E-13
	TI-201(Sn)	1.3E-09	4.3E-10	1.9E-09	4.7E-10	2.5E-09	2.8E-10	6.1E-09	1.9E-09	9.3E-13	1.0E-13	2.2E-12	6.8E-13
Öresundsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.1E-08	4.3E-09	1.5E-08	3.4E-09	6.4E-08	1.7E-08	1.2E-07	3.3E-08	1.7E-08	4.4E-09	3.3E-08	8.7E-09
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	3.8E-12	3.8E-12	3.8E-12	2.9E-14	2.1E-13	1.6E-14	7.5E-13	4.7E-13	6.4E-18	4.7E-19	2.2E-17	1.4E-17
	TI-201(Cd)	1.5E-09	2.4E-10	2.3E-09	6.5E-10	1.9E-09	7.0E-11	4.6E-09	1.5E-09	7.1E-13	2.5E-14	1.7E-12	5.6E-13
	TI-201(Pb)	4.0E-10	1.9E-10	6.7E-10	1.5E-10	4.7E-09	4.0E-09	5.2E-09	3.5E-10	1.7E-12	1.5E-12	1.9E-12	1.3E-13
	TI-201(Sn)	1.4E-09	5.9E-10	2.0E-09	4.5E-10	2.2E-09	5.7E-10	4.0E-09	1.1E-09	8.0E-13	2.1E-13	1.5E-12	3.9E-13
Simsholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.0E-10	9.0E-11	2.4E-10	5.2E-11	1.8E-09	2.8E-11	6.8E-09	2.3E-09	7.4E-12	1.1E-13	2.7E-11	9.3E-12
	I-123	1.3E-10	1.3E-10	1.4E-10	2.7E-12	6.9E-12	6.2E-13	2.5E-11	1.1E-11	4.5E-16	4.0E-17	1.6E-15	7.3E-16

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.6E-08	3.4E-08	3.6E-08	9.1E-10	8.3E-10	8.4E-11	2.9E-09	1.3E-09	4.4E-12	4.4E-13	1.5E-11	7.0E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.3E-06	3.2E-06	3.4E-06	6.3E-08	7.8E-15	2.1E-15	2.0E-14	6.2E-15	5.8E-10	1.5E-10	1.4E-09	4.6E-10
	Se-75	1.2E-08	7.2E-09	1.6E-08	2.9E-09	3.9E-08	6.1E-09	8.0E-08	2.4E-08	1.0E-08	1.6E-09	2.1E-08	6.2E-09
	Sr-89	6.6E-09	4.2E-09	7.3E-09	1.0E-09	3.8E-12	1.5E-13	1.7E-11	5.4E-12	3.6E-09	1.5E-10	1.6E-08	5.2E-09
	Tc-99m	4.1E-12	4.0E-12	4.1E-12	2.6E-14	2.0E-13	1.1E-14	7.6E-13	5.4E-13	6.1E-18	3.1E-19	2.2E-17	1.6E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sjölunda	Co-58	4.7E-09	2.1E-09	6.7E-09	1.5E-09	1.1E-07	1.5E-08	2.3E-07	7.1E-08	4.9E-09	6.4E-10	1.0E-08	3.1E-09
	Cr-51	1.8E-10	5.5E-11	2.5E-10	6.7E-11	2.6E-09	3.1E-11	7.0E-09	2.5E-09	1.1E-11	1.3E-13	2.8E-11	1.0E-11
	I-123	1.9E-10	1.8E-10	1.9E-10	5.8E-12	9.2E-12	7.7E-13	3.2E-11	1.4E-11	6.0E-16	5.0E-17	2.1E-15	9.3E-16
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.6E-08	3.4E-08	3.7E-08	1.2E-09	1.0E-09	1.1E-10	3.5E-09	1.4E-09	5.3E-12	5.6E-13	1.8E-11	7.5E-12
	In-111(Cd)	4.6E-08	1.3E-08	7.3E-08	2.0E-08	5.6E-09	2.6E-10	1.2E-08	4.1E-09	1.9E-12	8.7E-14	4.1E-12	1.4E-12
	In-111(Pb)	1.3E-08	7.9E-09	2.0E-08	3.6E-09	1.3E-08	1.1E-08	1.4E-08	7.3E-10	4.2E-12	3.8E-12	4.6E-12	2.4E-13
	In-111(Sn)	4.2E-08	2.0E-08	6.5E-08	1.4E-08	6.5E-09	1.8E-09	1.1E-08	3.0E-09	2.2E-12	5.9E-13	3.8E-12	1.0E-12
	P-32	3.4E-06	3.2E-06	3.4E-06	7.9E-08	9.3E-15	2.7E-15	2.2E-14	6.7E-15	6.8E-10	2.0E-10	1.6E-09	4.9E-10
	Se-75	9.9E-09	4.6E-09	1.5E-08	3.2E-09	4.9E-08	1.4E-08	8.4E-08	2.2E-08	1.3E-08	3.6E-09	2.2E-08	5.8E-09
	Sr-89	6.2E-09	3.3E-09	7.3E-09	1.3E-09	5.0E-12	1.7E-13	1.8E-11	5.7E-12	4.8E-09	1.7E-10	1.8E-08	5.5E-09
	Tc-99m	7.5E-12	7.4E-12	7.5E-12	6.6E-14	2.9E-13	1.5E-14	1.0E-12	6.1E-13	8.5E-18	4.6E-19	3.1E-17	1.8E-17
	TI-201(Cd)	1.5E-09	4.6E-10	2.5E-09	6.7E-10	1.4E-09	6.5E-11	3.1E-09	1.0E-09	5.3E-13	2.4E-14	1.1E-12	3.8E-13
	TI-201(Pb)	4.4E-10	2.7E-10	6.5E-10	1.2E-10	3.2E-09	2.9E-09	3.5E-09	1.8E-10	1.2E-12	1.1E-12	1.3E-12	6.7E-14
	TI-201(Sn)	1.4E-09	6.7E-10	2.2E-09	4.7E-10	1.7E-09	4.8E-10	2.8E-09	7.4E-10	6.1E-13	1.8E-13	1.0E-12	2.7E-13

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m³)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m³)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m³)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
Sjöstadsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.6E-10	5.2E-11	2.4E-10	6.9E-11	1.7E-09	3.4E-11	3.9E-09	1.4E-09	6.9E-12	1.4E-13	1.6E-11	5.7E-12
	I-123	1.5E-10	1.3E-10	1.5E-10	7.0E-12	9.1E-12	7.9E-13	3.2E-11	1.3E-11	5.9E-16	5.2E-17	2.1E-15	8.3E-16
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.5E-08	3.2E-08	3.6E-08	1.8E-09	9.9E-10	1.0E-10	3.3E-09	1.3E-09	5.2E-12	5.5E-13	1.8E-11	6.9E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.2E-06	3.0E-06	3.4E-06	1.4E-07	9.2E-15	2.5E-15	2.2E-14	6.5E-15	6.8E-10	1.9E-10	1.7E-09	4.8E-10
	Se-75	8.3E-09	3.7E-09	1.4E-08	3.1E-09	3.2E-08	1.3E-08	4.8E-08	1.1E-08	8.5E-09	3.4E-09	1.3E-08	3.0E-09
	Sr-89	5.8E-09	2.8E-09	7.2E-09	1.5E-09	3.6E-12	1.6E-13	1.1E-11	3.6E-12	3.5E-09	1.5E-10	1.1E-08	3.5E-09
	Tc-99m	5.1E-12	5.0E-12	5.1E-12	7.2E-14	2.9E-13	1.4E-14	1.1E-12	5.9E-13	8.6E-18	4.1E-19	3.3E-17	1.8E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Skansverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	4.0E-08	9.9E-09	7.1E-08	2.2E-08	5.6E-09	2.7E-10	1.2E-08	3.9E-09	1.9E-12	9.2E-14	3.9E-12	1.3E-12
	In-111(Pb)	7.9E-09	4.7E-09	1.3E-08	2.5E-09	1.2E-08	1.1E-08	1.2E-08	4.9E-10	3.9E-12	3.6E-12	4.1E-12	1.7E-13
	In-111(Sn)	3.5E-08	1.2E-08	6.0E-08	1.5E-08	6.7E-09	2.2E-09	1.1E-08	2.8E-09	2.2E-12	7.4E-13	3.7E-12	9.3E-13
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	8.2E-09	2.9E-09	1.4E-08	3.6E-09	4.1E-08	1.3E-08	6.6E-08	1.7E-08	1.1E-08	3.5E-09	1.8E-08	4.4E-09
	Sr-89	5.9E-09	2.5E-09	7.3E-09	1.5E-09	4.6E-12	1.6E-13	1.6E-11	4.9E-12	4.4E-09	1.6E-10	1.5E-08	4.8E-09
	Tc-99m	5.6E-12	5.5E-12	5.7E-12	6.8E-14	3.0E-13	1.4E-14	1.1E-12	7.4E-13	8.9E-18	4.2E-19	3.3E-17	2.2E-17

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sundet	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.7E-10	2.8E-11	2.4E-10	7.1E-11	3.1E-09	4.0E-11	8.7E-09	2.8E-09	1.3E-11	1.6E-13	3.5E-11	1.1E-11
	I-123	1.5E-10	1.4E-10	1.5E-10	4.7E-12	9.7E-12	1.1E-12	3.2E-11	1.3E-11	6.3E-16	7.1E-17	2.1E-15	8.2E-16
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.6E-08	3.4E-08	3.7E-08	1.1E-09	1.2E-09	1.4E-10	3.9E-09	1.5E-09	6.4E-12	7.3E-13	2.1E-11	8.1E-12
	In-111(Cd)	4.2E-08	6.0E-09	7.0E-08	2.1E-08	7.1E-09	3.7E-10	1.5E-08	5.0E-09	2.4E-12	1.2E-13	5.0E-12	1.7E-12
	In-111(Pb)	8.7E-09	4.2E-09	1.5E-08	3.4E-09	1.6E-08	1.4E-08	1.7E-08	8.2E-10	5.3E-12	4.8E-12	5.6E-12	2.7E-13
	In-111(Sn)	3.8E-08	1.2E-08	6.1E-08	1.5E-08	8.2E-09	2.5E-09	1.4E-08	3.6E-09	2.8E-12	8.3E-13	4.7E-12	1.2E-12
	P-32	3.3E-06	3.2E-06	3.4E-06	7.5E-08	1.1E-14	3.6E-15	2.4E-14	6.9E-15	8.0E-10	2.6E-10	1.7E-09	5.1E-10
	Se-75	9.2E-09	3.4E-09	1.5E-08	3.5E-09	5.3E-08	1.7E-08	9.3E-08	2.4E-08	1.4E-08	4.6E-09	2.5E-08	6.3E-09
	Sr-89	6.1E-09	3.0E-09	7.3E-09	1.4E-09	5.6E-12	2.1E-13	2.0E-11	6.4E-12	5.4E-09	2.0E-10	1.9E-08	6.2E-09
	Tc-99m	5.0E-12	5.0E-12	5.0E-12	4.6E-14	2.6E-13	1.7E-14	9.1E-13	4.9E-13	7.6E-18	5.1E-19	2.7E-17	1.5E-17
	TI-201(Cd)	1.4E-09	1.9E-10	2.4E-09	7.1E-10	1.8E-09	7.8E-11	3.8E-09	1.3E-09	6.6E-13	2.9E-14	1.4E-12	4.7E-13
	TI-201(Pb)	3.0E-10	1.5E-10	5.2E-10	1.2E-10	4.0E-09	3.6E-09	4.3E-09	2.1E-10	1.5E-12	1.3E-12	1.6E-12	7.8E-14
	TI-201(Sn)	1.3E-09	4.5E-10	2.1E-09	4.9E-10	2.1E-09	6.7E-10	3.6E-09	9.0E-10	7.7E-13	2.4E-13	1.3E-12	3.3E-13
Tegelviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.4E-10	1.5E-11	2.4E-10	7.7E-11	2.0E-09	7.3E-11	4.1E-09	1.4E-09	7.9E-12	3.0E-13	1.7E-11	5.7E-12
	I-123	1.3E-10	1.2E-10	1.4E-10	9.4E-12	1.4E-11	1.8E-12	4.6E-11	1.7E-11	9.4E-16	1.2E-16	3.0E-15	1.1E-15
	I-125	2.5E-08	2.2E-08	2.7E-08	1.7E-09	7.7E-11	8.9E-12	2.4E-10	8.6E-11	2.2E-10	2.6E-11	7.0E-10	2.5E-10
	I-131	3.5E-08	3.0E-08	3.6E-08	2.3E-09	1.5E-09	2.0E-10	4.7E-09	1.6E-09	7.9E-12	1.0E-12	2.5E-11	8.6E-12
	In-111(Cd)	3.1E-08	2.9E-09	6.7E-08	2.1E-08	5.5E-09	4.1E-10	9.7E-09	3.0E-09	1.8E-12	1.4E-13	3.3E-12	1.0E-12
	In-111(Pb)	3.2E-09	1.8E-09	5.5E-09	1.2E-09	9.9E-09	9.5E-09	1.0E-08	2.0E-10	3.3E-12	3.2E-12	3.4E-12	6.7E-14
	In-111(Sn)	2.3E-08	4.8E-09	4.9E-08	1.4E-08	6.7E-09	3.0E-09	9.4E-09	2.0E-09	2.3E-12	1.0E-12	3.1E-12	6.6E-13
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to worker / Concentration in Water, [(Sv/a) / Bq/m^3)]				Dose to agricultural / Concentration in Water, [(Sv/a) / Bq/m^3)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	5.2E-09	1.8E-09	7.2E-09	1.8E-09	4.1E-12	2.3E-13	1.1E-11	3.6E-12	4.0E-09	2.3E-10	1.1E-08	3.5E-09
	Tc-99m	4.0E-12	3.8E-12	4.0E-12	9.0E-14	4.2E-13	3.0E-14	1.5E-12	7.0E-13	1.2E-17	9.0E-19	4.5E-17	2.1E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Uddebo	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.9E-10	7.2E-11	2.5E-10	6.3E-11	1.6E-09	4.1E-12	5.0E-09	1.8E-09	6.7E-12	1.7E-14	2.0E-11	7.3E-12
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.7E-08	3.4E-08	3.8E-08	1.8E-09	1.2E-09	6.0E-11	4.6E-09	1.8E-09	6.4E-12	3.2E-13	2.4E-11	9.8E-12
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	9.6E-12	9.5E-12	9.7E-12	1.3E-13	3.8E-13	1.0E-14	1.5E-12	9.5E-13	1.1E-17	3.0E-19	4.5E-17	2.8E-17
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Table C-8. Effective dose factors relating doses to unit releases of the different radionuclides based on results of probabilistic simulation for all relevant pathways.

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
Henriksdal	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.2E-18	6.5E-19	3.1E-18	8.4E-19	3.3E-17	4.2E-19	8.7E-17	3.0E-17	1.3E-19	1.7E-21	3.5E-19	1.2E-19
	I-123	1.4E-18	1.4E-18	1.5E-18	4.3E-20	1.0E-19	8.6E-21	3.5E-19	1.6E-19	6.7E-24	5.6E-25	2.3E-23	1.0E-23
	I-125	3.4E-16	3.2E-16	3.4E-16	1.0E-17	9.1E-19	9.6E-20	2.9E-18	1.2E-18	7.1E-19	7.5E-20	2.3E-18	9.1E-19
	I-131	4.5E-16	4.2E-16	4.6E-16	1.4E-17	1.3E-17	1.4E-18	4.3E-17	1.7E-17	6.8E-20	7.5E-21	2.3E-19	9.1E-20
	In-111(Cd)	5.2E-16	1.4E-16	8.1E-16	2.2E-16	6.7E-17	3.2E-18	1.5E-16	4.7E-17	2.2E-20	1.1E-21	4.9E-20	1.6E-20
	In-111(Pb)	1.5E-16	9.2E-17	2.3E-16	4.1E-17	1.5E-16	1.3E-16	1.6E-16	8.3E-18	5.0E-20	4.5E-20	5.4E-20	2.8E-21
	In-111(Sn)	4.7E-16	2.2E-16	7.2E-16	1.6E-16	7.8E-17	2.3E-17	1.3E-16	3.4E-17	2.6E-20	7.6E-21	4.4E-20	1.1E-20
	P-32	4.2E-14	4.1E-14	4.3E-14	9.8E-16	1.2E-22	3.6E-23	2.7E-22	8.1E-23	8.8E-18	2.7E-18	2.0E-17	6.0E-18
	Se-75	1.3E-16	6.0E-17	1.9E-16	4.0E-17	6.2E-16	2.0E-16	1.0E-15	2.6E-16	2.8E-17	9.1E-18	4.8E-17	1.2E-17
	Sr-89	8.0E-17	4.2E-17	9.4E-17	1.6E-17	6.3E-20	2.5E-21	2.2E-19	7.0E-20	6.1E-17	2.4E-18	2.2E-16	6.8E-17
	Tc-99m	4.3E-20	4.2E-20	4.3E-20	3.5E-22	3.0E-21	1.5E-22	1.1E-20	6.3E-21	8.8E-26	4.6E-27	3.2E-25	1.9E-25
	TI-201(Cd)	1.8E-17	4.9E-18	2.8E-17	7.5E-18	1.7E-17	7.4E-19	3.6E-17	1.2E-17	6.3E-21	2.7E-22	1.3E-20	4.4E-21
	TI-201(Pb)	5.0E-18	3.2E-18	7.5E-18	1.4E-18	3.8E-17	3.4E-17	4.1E-17	2.1E-18	1.4E-20	1.2E-20	1.5E-20	7.5E-22
	TI-201(Sn)	1.6E-17	7.2E-18	2.5E-17	5.3E-18	2.0E-17	5.8E-18	3.3E-17	8.7E-18	7.3E-21	2.1E-21	1.2E-20	3.2E-21
Ryaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.5E-18	2.9E-19	2.1E-18	5.9E-19	2.6E-17	3.5E-19	7.9E-17	2.5E-17	1.1E-19	1.4E-21	3.2E-19	1.0E-19
	I-123	2.2E-18	2.1E-18	2.2E-18	6.5E-20	9.1E-20	8.9E-21	3.1E-19	1.2E-19	5.9E-24	5.8E-25	2.0E-23	8.0E-24
	I-125	2.3E-16	2.2E-16	2.3E-16	5.8E-18	6.4E-19	7.2E-20	2.1E-18	8.0E-19	1.8E-18	2.1E-19	6.2E-18	2.3E-18
	I-131	3.2E-16	3.1E-16	3.3E-16	8.8E-18	9.5E-18	1.1E-18	3.1E-17	1.2E-17	5.1E-20	5.8E-21	1.7E-19	6.6E-20
	In-111(Cd)	4.3E-16	7.7E-17	6.8E-16	1.9E-16	6.0E-17	3.0E-18	1.4E-16	4.4E-17	2.0E-20	1.0E-21	4.5E-20	1.5E-20
	In-111(Pb)	1.1E-16	5.7E-17	1.9E-16	4.0E-17	1.4E-16	1.2E-16	1.5E-16	8.7E-18	4.5E-20	4.0E-20	4.9E-20	2.9E-21
	In-111(Sn)	4.0E-16	1.6E-16	6.1E-16	1.4E-16	6.8E-17	1.9E-17	1.2E-16	3.1E-17	2.3E-20	6.4E-21	4.0E-20	1.0E-20
	P-32	3.0E-14	3.0E-14	3.0E-14	3.0E-14	8.6E-23	2.8E-23	1.9E-22	5.5E-23	6.4E-18	2.1E-18	1.4E-17	4.1E-18

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	Se-75	8.6E-17	3.5E-17	1.3E-16	2.8E-17	4.8E-16	1.4E-16	8.7E-16	2.2E-16	1.3E-16	3.8E-17	2.3E-16	5.8E-17
	Sr-89	5.4E-17	3.0E-17	6.3E-17	1.1E-17	4.8E-20	1.9E-21	1.7E-19	5.6E-20	4.7E-17	1.9E-18	1.7E-16	5.5E-17
	Tc-99m	1.1E-19	1.0E-19	1.1E-19	9.0E-22	2.8E-21	2.0E-22	9.4E-21	4.9E-21	8.3E-26	6.0E-27	2.8E-25	1.5E-25
	TI-201(Cd)	1.4E-17	2.6E-18	2.3E-17	6.5E-18	1.5E-17	6.3E-19	3.4E-17	1.1E-17	5.6E-21	2.3E-22	1.2E-20	4.0E-21
	TI-201(Pb)	3.7E-18	1.9E-18	6.2E-18	1.3E-18	3.4E-17	3.0E-17	3.7E-17	2.2E-18	1.3E-20	1.1E-20	1.4E-20	8.0E-22
	TI-201(Sn)	1.3E-17	5.2E-18	2.0E-17	4.6E-18	1.7E-17	5.0E-18	3.1E-17	7.9E-18	6.3E-21	1.8E-21	1.1E-20	2.9E-21
Ön	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.6E-17	4.1E-18	2.3E-17	6.1E-18	3.1E-16	4.1E-18	8.9E-16	3.0E-16	1.3E-18	1.7E-20	3.6E-18	1.2E-18
	I-123	2.0E-17	1.9E-17	2.0E-17	5.5E-19	1.0E-18	1.1E-19	3.4E-18	1.4E-18	6.8E-23	6.9E-24	2.2E-22	8.9E-23
	I-125	2.4E-15	2.3E-15	2.4E-15	6.2E-17	7.1E-18	7.2E-19	2.4E-17	9.3E-18	2.0E-17	2.1E-18	7.0E-17	2.7E-17
	I-131	3.4E-15	3.2E-15	3.5E-15	1.3E-16	1.2E-16	1.3E-17	3.8E-16	2.2E-16	6.4E-19	6.8E-20	2.0E-18	1.1E-18
	In-111(Cd)	4.4E-15	8.4E-16	7.0E-15	2.0E-15	7.6E-16	3.0E-17	1.7E-15	5.5E-16	2.5E-19	1.0E-20	5.6E-19	1.8E-19
	In-111(Pb)	1.2E-15	5.9E-16	2.0E-15	4.3E-16	1.7E-15	1.5E-15	1.9E-15	1.2E-16	5.8E-19	5.0E-19	6.3E-19	3.9E-20
	In-111(Sn)	4.1E-15	1.7E-15	6.3E-15	1.4E-15	8.6E-16	2.5E-16	1.5E-15	3.9E-16	2.9E-19	8.2E-20	5.0E-19	1.3E-19
	P-32	3.1E-13	3.0E-13	3.2E-13	5.6E-15	9.7E-22	3.0E-22	2.3E-21	6.3E-22	7.1E-17	2.2E-17	1.7E-16	4.7E-17
	Se-75	9.1E-16	4.1E-16	1.4E-15	3.0E-16	5.4E-15	1.5E-15	9.5E-15	2.4E-15	1.4E-15	4.0E-16	2.5E-15	6.5E-16
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	8.5E-19	8.4E-19	8.6E-19	6.9E-21	2.9E-20	2.0E-21	1.1E-19	5.3E-20	8.6E-25	6.0E-26	3.3E-24	1.6E-24
	TI-201(Cd)	1.5E-16	2.5E-17	2.3E-16	6.8E-17	1.9E-16	9.0E-18	4.3E-16	1.4E-16	7.1E-20	3.3E-21	1.6E-19	5.2E-20
	TI-201(Pb)	4.0E-17	2.0E-17	6.5E-17	1.4E-17	4.3E-16	3.8E-16	4.7E-16	2.8E-17	1.6E-19	1.4E-19	1.7E-19	1.0E-20
	TI-201(Sn)	1.4E-16	6.3E-17	2.1E-16	4.6E-17	2.1E-16	5.8E-17	3.8E-16	9.8E-17	7.7E-20	2.1E-20	1.4E-19	3.6E-20
Kungsängsverket	Co-58	2.6E-16	8.9E-17	3.9E-16	9.9E-17	6.6E-15	9.2E-16	1.3E-14	4.1E-15	2.9E-16	4.0E-17	5.9E-16	1.8E-16
	Cr-51	9.6E-18	2.0E-18	1.4E-17	4.3E-18	1.6E-16	2.3E-18	4.2E-16	1.5E-16	6.6E-19	9.4E-21	1.7E-18	6.1E-19
	I-123	4.5E-18	4.2E-18	4.6E-18	1.5E-19	6.1E-19	5.2E-20	2.2E-18	9.5E-19	4.0E-23	3.4E-24	1.5E-22	6.2E-23
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.0E-15	1.9E-15	2.0E-15	7.7E-17	7.1E-17	6.3E-18	2.4E-16	1.0E-16	3.7E-19	3.3E-20	1.3E-18	5.4E-19
	In-111(Cd)	2.0E-15	3.6E-16	3.4E-15	1.0E-15	3.8E-16	1.8E-17	8.1E-16	2.7E-16	1.3E-19	5.9E-21	2.7E-19	9.2E-20

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	In-111(Pb)	4.3E-16	2.2E-16	7.1E-16	1.5E-16	8.3E-16	7.5E-16	8.8E-16	4.0E-17	2.8E-19	2.5E-19	3.0E-19	1.3E-20
	In-111(Sn)	1.8E-15	6.9E-16	3.0E-15	7.2E-16	4.4E-16	1.3E-16	7.5E-16	2.0E-16	1.5E-19	4.3E-20	2.5E-19	6.6E-20
	P-32	1.9E-13	1.8E-13	2.0E-13	5.4E-15	6.3E-22	1.9E-22	1.5E-21	4.6E-22	4.7E-17	1.4E-17	1.1E-16	3.4E-17
	Se-75	5.8E-16	5.8E-16	5.8E-16	9.3E-30	2.5E-15	2.5E-15	2.5E-15	3.7E-24	6.7E-16	6.7E-16	6.7E-16	9.7E-25
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	9.4E-20	9.2E-20	9.4E-20	9.0E-22	1.8E-20	8.2E-22	6.5E-20	4.2E-20	5.3E-25	2.5E-26	1.9E-24	1.3E-24
	TI-201(Cd)	6.9E-17	1.5E-17	1.2E-16	3.6E-17	9.8E-17	4.5E-18	2.0E-16	6.9E-17	3.6E-20	1.7E-21	7.3E-20	2.5E-20
	TI-201(Pb)	1.5E-17	7.4E-18	2.5E-17	5.2E-18	2.1E-16	1.9E-16	2.2E-16	1.0E-17	7.7E-20	6.9E-20	8.1E-20	3.7E-21
	TI-201(Sn)	6.2E-17	2.4E-17	1.0E-16	2.5E-17	1.1E-16	3.2E-17	1.9E-16	5.0E-17	4.1E-20	1.2E-20	6.9E-20	1.8E-20
Källby	Co-58	4.3E-16	1.7E-16	6.4E-16	1.5E-16	1.1E-14	1.4E-15	2.2E-14	6.8E-15	4.6E-16	6.0E-17	9.7E-16	2.9E-16
	Cr-51	1.6E-17	3.4E-18	2.3E-17	6.8E-18	2.4E-16	2.9E-18	6.6E-16	2.3E-16	9.7E-19	1.2E-20	2.7E-18	9.2E-19
	I-123	9.6E-18	9.1E-18	9.8E-18	2.9E-19	5.6E-19	5.0E-20	1.9E-18	8.3E-19	3.6E-23	3.3E-24	1.3E-22	5.4E-23
	I-125	2.5E-15	2.4E-15	2.5E-15	8.2E-17	6.4E-18	6.0E-19	2.1E-17	9.1E-18	1.8E-17	1.7E-18	6.1E-17	2.6E-17
	I-131	3.3E-15	3.1E-15	3.4E-15	1.0E-16	8.1E-17	8.0E-18	2.7E-16	1.1E-16	4.3E-19	4.3E-20	1.4E-18	5.9E-19
	In-111(Cd)	3.6E-15	6.1E-16	6.0E-15	1.8E-15	4.5E-16	1.6E-17	9.5E-16	3.3E-16	1.5E-19	5.5E-21	3.2E-19	1.1E-19
	In-111(Pb)	8.4E-16	3.9E-16	1.4E-15	3.2E-16	9.8E-16	8.8E-16	1.1E-15	5.7E-17	3.3E-19	2.9E-19	3.6E-19	1.9E-20
	In-111(Sn)	3.3E-15	1.3E-15	5.3E-15	1.2E-15	5.1E-16	1.5E-16	8.8E-16	2.3E-16	1.7E-19	4.9E-20	2.9E-19	7.6E-20
	P-32	3.1E-13	3.0E-13	3.2E-13	7.4E-15	7.7E-22	2.2E-22	1.8E-21	5.5E-22	5.7E-17	1.6E-17	1.3E-16	4.0E-17
	Se-75	9.0E-16	3.7E-16	1.4E-15	3.3E-16	4.7E-15	1.4E-15	8.1E-15	2.1E-15	1.2E-15	3.7E-16	2.2E-15	5.5E-16
	Sr-89	5.8E-16	3.1E-16	6.9E-16	1.3E-16	4.6E-19	1.5E-20	1.6E-18	5.2E-19	4.5E-16	1.4E-17	1.6E-15	5.1E-16
	Tc-99m	2.4E-19	2.4E-19	2.4E-19	2.0E-21	1.5E-20	8.0E-22	5.7E-20	3.2E-20	4.5E-25	2.4E-26	1.7E-24	9.4E-25
	TI-201(Cd)	1.2E-16	2.0E-17	2.0E-16	6.1E-17	1.1E-16	4.9E-18	2.5E-16	8.4E-17	4.2E-20	1.8E-21	9.0E-20	3.1E-20
	TI-201(Pb)	2.9E-17	1.4E-17	4.9E-17	1.1E-17	2.5E-16	2.2E-16	2.7E-16	1.5E-17	9.2E-20	8.2E-20	9.9E-20	5.3E-21
	TI-201(Sn)	1.1E-16	4.8E-17	1.8E-16	4.2E-17	1.3E-16	3.4E-17	2.2E-16	5.9E-17	4.7E-20	1.2E-20	8.2E-20	2.2E-20
Centrala Reningsverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.6E-17	1.4E-18	3.2E-17	1.1E-17	1.2E-16	6.1E-18	2.2E-16	7.4E-17	4.7E-19	2.5E-20	8.8E-19	3.0E-19
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	I-125	3.3E-15	2.7E-15	3.6E-15	3.3E-16	7.4E-18	9.6E-19	2.3E-17	7.7E-18	2.1E-17	2.7E-18	6.5E-17	2.2E-17
	I-131	4.4E-15	3.5E-15	4.8E-15	4.5E-16	8.9E-17	1.2E-17	2.7E-16	9.2E-17	4.7E-19	6.1E-20	1.4E-18	4.9E-19
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	6.3E-16	1.5E-16	9.6E-16	2.7E-16	3.1E-19	2.4E-20	7.3E-19	2.3E-19	3.0E-16	2.4E-17	7.1E-16	2.2E-16
	Tc-99m	3.7E-19	3.5E-19	3.8E-19	1.4E-20	1.8E-20	1.3E-21	6.2E-20	2.8E-20	5.2E-25	3.7E-26	1.8E-24	8.4E-25
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Duvbacken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.5E-17	4.0E-18	1.9E-17	5.1E-18	3.4E-16	3.4E-18	1.1E-15	3.6E-16	1.4E-18	1.4E-20	4.4E-18	1.5E-18
	I-123	1.3E-17	1.2E-17	1.3E-17	2.3E-19	9.0E-19	8.9E-20	3.0E-18	1.4E-18	5.9E-23	5.8E-24	2.0E-22	8.9E-23
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.9E-15	2.8E-15	2.9E-15	5.5E-17	9.9E-17	1.0E-17	3.3E-16	1.4E-16	5.3E-19	5.6E-20	1.8E-18	7.3E-19
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	2.7E-13	2.6E-13	2.7E-13	3.7E-15	8.8E-22	2.6E-22	2.1E-21	6.1E-22	6.5E-17	1.9E-17	1.5E-16	4.5E-17
	Se-75	9.0E-16	4.6E-16	1.2E-15	2.4E-16	5.5E-15	1.3E-15	1.1E-14	2.9E-15	1.5E-15	3.6E-16	2.9E-15	7.8E-16
	Sr-89	5.2E-16	3.3E-16	5.8E-16	8.5E-17	5.5E-19	1.7E-20	2.1E-18	7.0E-19	5.3E-16	1.6E-17	2.0E-15	6.8E-16
	Tc-99m	4.3E-19	4.3E-19	4.3E-19	2.1E-21	2.6E-20	1.7E-21	9.3E-20	5.0E-20	7.6E-25	5.0E-26	2.8E-24	1.5E-24
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
Ekeby	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	1.2E-17	1.1E-17	1.2E-17	1.9E-19	4.1E-19	3.5E-20	1.4E-18	6.5E-19	2.7E-23	2.3E-24	9.3E-23	4.2E-23
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.5E-15	2.4E-15	2.5E-15	4.4E-17	4.8E-17	4.0E-18	1.6E-16	7.2E-17	2.6E-19	2.1E-20	8.6E-19	3.8E-19
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	2.3E-13	2.2E-13	2.3E-13	3.0E-15	4.6E-22	1.2E-22	1.1E-21	3.5E-22	3.4E-17	8.8E-18	8.3E-17	2.6E-17
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	4.5E-16	3.1E-16	4.9E-16	6.1E-17	3.3E-19	9.7E-21	1.3E-18	4.4E-19	3.2E-16	9.4E-18	1.3E-15	4.3E-16
	Tc-99m	3.8E-19	3.8E-19	3.8E-19	1.8E-21	1.2E-20	7.1E-22	4.4E-20	2.6E-20	3.7E-25	2.1E-26	1.3E-24	7.8E-25
	TI-201(Cd)	1.2E-16	6.0E-17	1.7E-16	3.6E-17	8.5E-17	2.5E-18	2.2E-16	7.3E-17	3.1E-20	9.2E-22	8.2E-20	2.7E-20
	TI-201(Pb)	6.0E-17	4.8E-17	7.7E-17	9.0E-18	2.2E-16	1.8E-16	2.4E-16	1.9E-17	7.9E-20	6.6E-20	8.9E-20	7.0E-21
	TI-201(Sn)	1.2E-16	7.3E-17	1.6E-16	2.6E-17	9.5E-17	2.0E-17	1.9E-16	5.4E-17	3.5E-20	7.3E-21	7.1E-20	2.0E-20
Fillanverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.7E-17	7.7E-18	5.6E-17	1.7E-17	5.3E-16	1.0E-17	1.4E-15	4.8E-16	2.2E-18	4.1E-20	5.5E-18	1.9E-18
	I-123	4.1E-17	3.9E-17	4.2E-17	1.5E-18	2.1E-18	1.9E-19	7.5E-18	3.0E-18	1.4E-22	1.2E-23	4.9E-22	2.0E-22
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	8.3E-15	7.7E-15	8.5E-15	3.5E-16	2.4E-16	2.2E-17	8.3E-16	3.3E-16	1.3E-18	1.2E-19	4.4E-18	1.8E-18
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.4E-15	5.8E-16	1.7E-15	3.4E-16	1.0E-18	3.7E-20	3.6E-18	1.1E-18	1.0E-15	3.6E-17	3.5E-15	1.1E-15
	Tc-99m	1.6E-18	1.5E-18	1.6E-18	1.5E-20	6.1E-20	3.2E-21	2.2E-19	1.2E-19	1.8E-24	9.5E-26	6.6E-24	3.7E-24

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Gässlösa	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.1E-17	7.0E-18	1.4E-17	2.3E-18	1.6E-16	2.4E-18	4.5E-16	1.6E-16	6.3E-19	9.8E-21	1.8E-18	6.3E-19
	I-123	1.1E-17	1.1E-17	1.1E-17	1.8E-19	4.4E-19	4.0E-20	1.5E-18	7.0E-19	2.9E-23	2.6E-24	9.6E-23	4.6E-23
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	2.0E-15	2.0E-15	2.1E-15	3.3E-17	5.1E-17	5.1E-18	1.7E-16	7.1E-17	2.7E-19	2.7E-20	9.2E-19	3.8E-19
	In-111(Cd)	3.3E-15	2.0E-15	4.2E-15	7.3E-16	3.3E-16	9.3E-18	8.0E-16	2.7E-16	1.1E-19	3.1E-21	2.7E-19	8.9E-20
	In-111(Pb)	1.9E-15	1.6E-15	2.2E-15	1.8E-16	8.3E-16	7.1E-16	9.2E-16	6.5E-17	2.8E-19	2.4E-19	3.1E-19	2.2E-20
	In-111(Sn)	3.1E-15	2.2E-15	3.9E-15	5.3E-16	3.8E-16	9.4E-17	7.2E-16	1.9E-16	1.3E-19	3.2E-20	2.4E-19	6.5E-20
	P-32	1.9E-13	1.8E-13	1.9E-13	2.3E-15	4.7E-22	1.3E-22	1.1E-21	3.5E-22	3.5E-17	9.5E-18	8.3E-17	2.6E-17
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	3.7E-16	2.7E-16	4.0E-16	4.2E-17	2.9E-19	8.8E-21	1.1E-18	3.5E-19	2.8E-16	8.5E-18	1.1E-15	3.4E-16
	Tc-99m	4.6E-19	4.6E-19	4.6E-19	1.9E-21	1.3E-20	7.8E-22	4.7E-20	2.7E-20	3.9E-25	2.3E-26	1.4E-24	8.0E-25
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Göviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.4E-17	6.2E-18	3.5E-17	1.0E-17	4.1E-16	5.0E-18	1.1E-15	3.9E-16	1.7E-18	2.0E-20	4.4E-18	1.6E-18
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	5.0E-15	4.7E-15	5.1E-15	1.7E-16	1.5E-16	1.4E-17	5.3E-16	2.3E-16	8.2E-19	7.6E-20	2.8E-18	1.2E-18
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	4.7E-13	4.5E-13	4.8E-13	1.2E-14	1.4E-21	3.8E-22	3.4E-21	1.0E-21	1.0E-16	2.8E-17	2.5E-16	7.7E-17

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	Se-75	1.4E-15	5.6E-16	2.1E-15	5.0E-16	7.3E-15	2.1E-15	1.3E-14	3.4E-15	1.9E-15	5.7E-16	3.4E-15	8.9E-16
	Sr-89	8.8E-16	4.4E-16	1.0E-15	2.0E-16	7.6E-19	2.5E-20	2.8E-18	8.8E-19	7.3E-16	2.4E-17	2.7E-15	8.5E-16
	Tc-99m	4.5E-19	4.4E-19	4.5E-19	3.4E-21	3.7E-20	1.9E-21	1.4E-19	8.0E-20	1.1E-24	5.7E-26	4.2E-24	2.4E-24
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Käppalaverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.4E-18	5.8E-19	4.9E-18	1.5E-18	6.1E-17	8.0E-19	1.7E-16	5.8E-17	2.5E-19	3.2E-21	6.8E-19	2.3E-19
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.9E-16	7.2E-17	3.0E-16	7.1E-17	1.1E-15	3.4E-16	1.9E-15	4.9E-16	2.9E-16	8.9E-17	5.1E-16	1.3E-16
	Sr-89	1.2E-16	6.2E-17	1.5E-16	2.8E-17	1.1E-19	4.2E-21	4.0E-19	1.3E-19	1.1E-16	4.1E-18	3.9E-16	1.2E-16
	Tc-99m	4.6E-20	4.5E-20	4.6E-20	3.6E-22	4.5E-21	2.5E-22	1.6E-20	9.5E-21	1.3E-25	7.5E-27	4.9E-25	2.8E-25
	TI-201(Cd)	1.7E-24	2.7E-25	2.2E-24	6.3E-25	4.3E-28	1.6E-30	1.8E-27	5.9E-28	1.6E-31	5.8E-34	6.7E-31	2.1E-31
	TI-201(Pb)	6.7E-25	3.2E-25	1.1E-24	2.5E-25	1.3E-27	8.2E-28	1.8E-27	2.9E-28	4.8E-31	3.0E-31	6.4E-31	1.0E-31
	TI-201(Sn)	1.6E-24	6.9E-25	2.1E-24	4.5E-25	4.2E-28	3.3E-29	1.3E-27	4.0E-28	1.6E-31	1.2E-32	4.7E-31	1.5E-31
Koholmen	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	3.2E-17	3.7E-18	4.1E-17	1.2E-17	6.5E-16	6.5E-19	2.9E-15	9.4E-16	2.6E-18	2.6E-21	1.2E-17	3.8E-18
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	7.1E-15	6.4E-16	9.9E-15	3.1E-15	1.5E-15	7.8E-18	4.9E-15	1.7E-15	4.9E-19	2.6E-21	1.6E-18	5.6E-19

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	In-111(Pb)	2.1E-15	8.3E-16	4.0E-15	9.9E-16	4.1E-15	3.1E-15	4.8E-15	5.2E-16	1.4E-18	1.0E-18	1.6E-18	1.8E-19
	In-111(Sn)	6.7E-15	2.1E-15	9.5E-15	2.3E-15	1.7E-15	1.8E-16	4.1E-15	1.2E-15	5.7E-19	6.2E-20	1.4E-18	4.2E-19
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	1.1E-15	6.2E-16	1.2E-15	2.1E-16	1.1E-18	7.5E-21	5.5E-18	1.9E-18	1.1E-15	7.3E-18	5.3E-15	1.8E-15
	Tc-99m	3.5E-19	3.5E-19	3.5E-19	2.8E-21	5.5E-20	1.4E-21	2.2E-19	1.3E-19	1.6E-24	4.3E-26	6.5E-24	3.9E-24
	TI-201(Cd)	2.4E-16	2.2E-17	3.4E-16	1.1E-16	3.7E-16	2.0E-18	1.2E-15	4.2E-16	1.4E-19	7.2E-22	4.6E-19	1.5E-19
	TI-201(Pb)	7.4E-17	2.9E-17	1.4E-16	3.4E-17	1.0E-15	7.9E-16	1.2E-15	1.3E-16	3.8E-19	2.9E-19	4.5E-19	4.9E-20
	TI-201(Sn)	2.3E-16	7.4E-17	3.3E-16	8.0E-17	4.3E-16	4.7E-17	1.0E-15	3.2E-16	1.6E-19	1.7E-20	3.8E-19	1.2E-19
Öresundsverket plant	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	5.2E-16	2.1E-16	7.6E-16	1.7E-16	3.2E-15	8.2E-16	6.2E-15	1.6E-15	8.4E-16	2.2E-16	1.6E-15	4.3E-16
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.9E-19	1.9E-19	1.9E-19	1.4E-21	1.1E-20	7.8E-22	3.7E-20	2.4E-20	3.2E-25	2.3E-26	1.1E-24	7.0E-25
	TI-201(Cd)	7.4E-17	1.2E-17	1.1E-16	3.2E-17	9.7E-17	3.5E-18	2.3E-16	7.6E-17	3.5E-20	1.3E-21	8.4E-20	2.8E-20
	TI-201(Pb)	2.0E-17	9.7E-18	3.3E-17	7.4E-18	2.3E-16	2.0E-16	2.6E-16	1.7E-17	8.5E-20	7.3E-20	9.4E-20	6.3E-21
	TI-201(Sn)	6.9E-17	3.0E-17	1.0E-16	2.2E-17	1.1E-16	2.9E-17	2.0E-16	5.3E-17	4.0E-20	1.0E-20	7.2E-20	1.9E-20
Simsholmen plant	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.9E-17	8.2E-18	2.2E-17	4.8E-18	1.7E-16	2.5E-18	6.2E-16	2.1E-16	6.7E-19	1.0E-20	2.5E-18	8.4E-19
	I-123	1.2E-17	1.2E-17	1.2E-17	2.5E-19	6.3E-19	5.6E-20	2.3E-18	1.0E-18	4.1E-23	3.7E-24	1.5E-22	6.6E-23

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	5%	95%	St Dev	Mean	5%	95%	St Dev	Mean	5%	95%	St Dev
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.3E-15	3.1E-15	3.3E-15	8.3E-17	7.6E-17	7.6E-18	2.6E-16	1.2E-16	4.0E-19	4.1E-20	1.4E-18	6.4E-19
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.1E-13	2.9E-13	3.1E-13	5.8E-15	7.1E-22	1.9E-22	1.8E-21	5.7E-22	5.3E-17	1.4E-17	1.3E-16	4.2E-17
	Se-75	1.1E-15	6.6E-16	1.5E-15	2.6E-16	3.5E-15	5.6E-16	7.3E-15	2.1E-15	9.4E-16	1.5E-16	1.9E-15	5.7E-16
	Sr-89	6.0E-16	3.8E-16	6.6E-16	9.2E-17	3.4E-19	1.4E-20	1.5E-18	4.9E-19	3.3E-16	1.3E-17	1.5E-15	4.8E-16
	Tc-99m	3.7E-19	3.7E-19	3.7E-19	2.4E-21	1.9E-20	9.6E-22	6.9E-20	4.9E-20	5.5E-25	2.9E-26	2.1E-24	1.5E-24
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sjölunda	Co-58	1.3E-16	5.8E-17	1.8E-16	4.1E-17	3.1E-15	4.0E-16	6.4E-15	1.9E-15	1.3E-16	1.8E-17	2.8E-16	8.4E-17
	Cr-51	4.8E-18	1.5E-18	6.7E-18	1.8E-18	7.2E-17	8.5E-19	1.9E-16	6.8E-17	2.9E-19	3.5E-21	7.8E-19	2.7E-19
	I-123	5.1E-18	4.8E-18	5.2E-18	1.6E-19	2.5E-19	2.1E-20	8.7E-19	3.9E-19	1.6E-23	1.4E-24	5.7E-23	2.5E-23
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	1.0E-15	9.4E-16	1.0E-15	3.2E-17	2.8E-17	2.9E-18	9.5E-17	3.9E-17	1.5E-19	1.5E-20	5.0E-19	2.1E-19
	In-111(Cd)	1.3E-15	3.5E-16	2.0E-15	5.5E-16	1.5E-16	7.1E-18	3.4E-16	1.1E-16	5.2E-20	2.4E-21	1.1E-19	3.8E-20
	In-111(Pb)	3.6E-16	2.2E-16	5.4E-16	9.9E-17	3.5E-16	3.1E-16	3.7E-16	2.0E-17	1.2E-19	1.0E-19	1.3E-19	6.7E-21
	In-111(Sn)	1.2E-15	5.4E-16	1.8E-15	3.9E-16	1.8E-16	4.8E-17	3.1E-16	8.1E-17	6.0E-20	1.6E-20	1.0E-19	2.7E-20
	P-32	9.2E-14	8.8E-14	9.4E-14	2.2E-15	2.5E-22	7.4E-23	5.9E-22	1.8E-22	1.9E-17	5.4E-18	4.4E-17	1.3E-17
	Se-75	2.7E-16	1.3E-16	4.1E-16	8.9E-17	1.3E-15	3.7E-16	2.3E-15	6.0E-16	3.6E-16	9.9E-17	6.1E-16	1.6E-16
	Sr-89	1.7E-16	8.9E-17	2.0E-16	3.5E-17	1.4E-19	4.7E-21	5.0E-19	1.6E-19	1.3E-16	4.5E-18	4.9E-16	1.5E-16
	Tc-99m	2.0E-19	2.0E-19	2.1E-19	1.8E-21	7.8E-21	4.2E-22	2.9E-20	1.7E-20	2.3E-25	1.2E-26	8.5E-25	5.0E-25
	TI-201(Cd)	4.2E-17	1.2E-17	6.7E-17	1.8E-17	4.0E-17	1.8E-18	8.4E-17	2.8E-17	1.5E-20	6.5E-22	3.1E-20	1.0E-20
	TI-201(Pb)	1.2E-17	7.4E-18	1.8E-17	3.4E-18	8.8E-17	7.9E-17	9.5E-17	5.0E-18	3.2E-20	2.9E-20	3.5E-20	1.8E-21
	TI-201(Sn)	3.9E-17	1.8E-17	6.0E-17	1.3E-17	4.5E-17	1.3E-17	7.8E-17	2.0E-17	1.7E-20	4.8E-21	2.8E-20	7.5E-21

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.8E-17	5.7E-18	2.7E-17	7.5E-18	1.9E-16	3.7E-18	4.3E-16	1.5E-16	7.6E-19	1.5E-20	1.8E-18	6.3E-19
	I-123	1.6E-17	1.5E-17	1.7E-17	7.7E-19	9.9E-19	8.7E-20	3.5E-18	1.4E-18	6.5E-23	5.7E-24	2.3E-22	9.1E-23
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	3.9E-15	3.5E-15	4.0E-15	2.0E-16	1.1E-16	1.1E-17	3.7E-16	1.4E-16	5.7E-19	6.0E-20	1.9E-18	7.5E-19
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sjöstadsverket p	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	3.6E-13	3.3E-13	3.7E-13	1.5E-14	1.0E-21	2.8E-22	2.4E-21	7.1E-22	7.5E-17	2.1E-17	1.8E-16	5.3E-17
	Se-75	9.1E-16	4.1E-16	1.5E-15	3.4E-16	3.5E-15	1.4E-15	5.3E-15	1.2E-15	9.3E-16	3.7E-16	1.4E-15	3.2E-16
	Sr-89	6.4E-16	3.1E-16	7.9E-16	1.6E-16	4.0E-19	1.7E-20	1.2E-18	3.9E-19	3.9E-16	1.7E-17	1.2E-15	3.8E-16
	Tc-99m	5.6E-19	5.5E-19	5.6E-19	7.9E-21	3.2E-20	1.5E-21	1.2E-19	6.4E-20	9.4E-25	4.5E-26	3.6E-24	1.9E-24
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Skansverket	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Cd)	6.1E-15	1.5E-15	1.1E-14	3.3E-15	8.6E-16	4.2E-17	1.8E-15	6.0E-16	2.9E-19	1.4E-20	5.9E-19	2.0E-19
	In-111(Pb)	1.2E-15	7.2E-16	1.9E-15	3.8E-16	1.8E-15	1.6E-15	1.9E-15	7.5E-17	6.0E-19	5.5E-19	6.3E-19	2.5E-20
	In-111(Sn)	5.3E-15	1.9E-15	9.1E-15	2.2E-15	1.0E-15	3.4E-16	1.7E-15	4.2E-16	3.4E-19	1.1E-19	5.7E-19	1.4E-19
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	1.3E-15	4.3E-16	2.2E-15	5.4E-16	6.3E-15	2.0E-15	1.0E-14	2.5E-15	1.7E-15	5.3E-16	2.7E-15	6.7E-16
	Sr-89	9.0E-16	3.8E-16	1.1E-15	2.3E-16	7.0E-19	2.5E-20	2.4E-18	7.5E-19	6.8E-16	2.4E-17	2.3E-15	7.3E-16
	Tc-99m	8.6E-19	8.4E-19	8.6E-19	1.0E-20	4.5E-20	2.2E-21	1.7E-19	1.1E-19	1.4E-24	6.5E-26	5.0E-24	3.4E-24

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Sundet	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.2E-17	3.6E-18	3.2E-17	9.3E-18	4.0E-16	5.2E-18	1.1E-15	3.7E-16	1.6E-18	2.1E-20	4.6E-18	1.5E-18
	I-123	2.0E-17	1.9E-17	2.0E-17	6.2E-19	1.3E-18	1.4E-19	4.2E-18	1.6E-18	8.2E-23	9.2E-24	2.7E-22	1.1E-22
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	4.7E-15	4.4E-15	4.8E-15	1.4E-16	1.6E-16	1.8E-17	5.1E-16	2.0E-16	8.4E-19	9.5E-20	2.7E-18	1.1E-18
	In-111(Cd)	5.5E-15	7.8E-16	9.1E-15	2.7E-15	9.3E-16	4.8E-17	1.9E-15	6.5E-16	3.1E-19	1.6E-20	6.5E-19	2.2E-19
	In-111(Pb)	1.1E-15	5.5E-16	2.0E-15	4.4E-16	2.0E-15	1.9E-15	2.2E-15	1.1E-16	6.9E-19	6.2E-19	7.3E-19	3.6E-20
	In-111(Sn)	4.9E-15	1.6E-15	8.0E-15	1.9E-15	1.1E-15	3.2E-16	1.8E-15	4.6E-16	3.6E-19	1.1E-19	6.2E-19	1.6E-19
	P-32	4.4E-13	4.2E-13	4.5E-13	9.8E-15	1.4E-21	4.7E-22	3.1E-21	9.1E-22	1.0E-16	3.5E-17	2.3E-16	6.7E-17
	Se-75	1.2E-15	4.4E-16	1.9E-15	4.6E-16	6.9E-15	2.3E-15	1.2E-14	3.1E-15	1.8E-15	6.0E-16	3.2E-15	8.2E-16
	Sr-89	8.0E-16	3.9E-16	9.5E-16	1.8E-16	7.3E-19	2.7E-20	2.6E-18	8.4E-19	7.1E-16	2.6E-17	2.5E-15	8.1E-16
	Tc-99m	6.5E-19	6.5E-19	6.6E-19	6.0E-21	3.3E-20	2.2E-21	1.2E-19	6.4E-20	9.9E-25	6.6E-26	3.5E-24	1.9E-24
	TI-201(Cd)	1.9E-16	2.5E-17	3.1E-16	9.2E-17	2.4E-16	1.0E-17	5.0E-16	1.7E-16	8.6E-20	3.7E-21	1.8E-19	6.1E-20
	TI-201(Pb)	3.9E-17	1.9E-17	6.8E-17	1.5E-17	5.2E-16	4.6E-16	5.6E-16	2.8E-17	1.9E-19	1.7E-19	2.0E-19	1.0E-20
	TI-201(Sn)	1.7E-16	5.9E-17	2.7E-16	6.4E-17	2.7E-16	8.7E-17	4.7E-16	1.2E-16	1.0E-19	3.2E-20	1.7E-19	4.3E-20
Tegelviken	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	1.7E-17	1.9E-18	3.0E-17	9.6E-18	2.4E-16	9.1E-18	5.1E-16	1.7E-16	9.9E-19	3.7E-20	2.1E-18	7.1E-19
	I-123	1.7E-17	1.4E-17	1.7E-17	1.2E-18	1.8E-18	2.2E-19	5.7E-18	2.1E-18	1.2E-22	1.5E-23	3.7E-22	1.4E-22
	I-125	3.1E-15	2.7E-15	3.3E-15	2.1E-16	9.6E-18	1.1E-18	3.0E-17	1.1E-17	2.8E-17	3.2E-18	8.7E-17	3.1E-17
	I-131	4.3E-15	3.8E-15	4.5E-15	2.8E-16	1.9E-16	2.4E-17	5.8E-16	2.0E-16	9.8E-19	1.3E-19	3.1E-18	1.1E-18
	In-111(Cd)	3.9E-15	3.6E-16	8.3E-15	2.6E-15	6.9E-16	5.1E-17	1.2E-15	3.8E-16	2.3E-19	1.7E-20	4.1E-19	1.3E-19
	In-111(Pb)	4.0E-16	2.2E-16	6.8E-16	1.5E-16	1.2E-15	1.2E-15	1.3E-15	2.5E-17	4.1E-19	4.0E-19	4.2E-19	8.4E-21
	In-111(Sn)	2.9E-15	6.0E-16	6.0E-15	1.7E-15	8.4E-16	3.8E-16	1.2E-15	2.5E-16	2.8E-19	1.3E-19	3.9E-19	8.3E-20
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

Sewage plant name	Nuclide	Dose for ingestion water and fish / Release, [(Sv/a) / Bq/a)]				Dose to worker / Release, [(Sv/a) / Bq/a)]				Dose to agricultural / Release, [(Sv/a) / Bq/a)]			
		Mean	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**	**Mean**	**5%**	**95%**	**St Dev**
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	6.5E-16	2.2E-16	9.0E-16	2.3E-16	5.1E-19	2.9E-20	1.4E-18	4.5E-19	5.0E-16	2.8E-17	1.3E-15	4.3E-16
	Tc-99m	5.0E-19	4.8E-19	5.0E-19	1.1E-20	5.2E-20	3.8E-21	1.9E-19	8.7E-20	1.5E-24	1.1E-25	5.6E-24	2.6E-24
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Uddebo	Co-58	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Cr-51	2.1E-17	8.1E-18	2.8E-17	7.1E-18	1.9E-16	4.6E-19	5.7E-16	2.0E-16	7.5E-19	1.9E-21	2.3E-18	8.3E-19
	I-123	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-125	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	I-131	4.2E-15	3.8E-15	4.3E-15	2.0E-16	1.4E-16	6.8E-18	5.2E-16	2.1E-16	7.5E-19	1.9E-21	2.3E-18	8.3E-19
	In-111(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	In-111(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	P-32	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Se-75	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Sr-89	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	Tc-99m	1.1E-18	1.1E-18	1.1E-18	1.4E-20	4.3E-20	1.1E-21	1.7E-19	1.1E-19	1.3E-24	3.4E-26	5.0E-24	3.2E-24
	TI-201(Cd)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Pb)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
	TI-201(Sn)	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00

SSI-rapporter 2007

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SSI report

STATENS STRÅLSKYDDSINSTITUT, SSI, är en central tillsynsmyndighet som verkar för ett gott strålskydd för människan och miljön, nu och i framtiden.

SSI sätter gränser för stråldoser till allmänheten och för dem som arbetar med strålning, utfärdar föreskrifter och kontrollerar att de efterlevs. SSI håller beredskap dygnet runt mot olyckor med strålning. Myndigheten informerar, utbildar och utfärdar råd och rekommendationer samt stöder och utvärderar forskning. SSI bedriver även internationellt utvecklingssamarbete.

Myndigheten, som sorterar under Miljödepartementet, har 110 anställda och är belägen i Solna.

THE SWEDISH RADIATION PROTECTION AUTHORITY (SSI) is a central regulatory authority charged with promoting effective radiation protection for people and the environment today and in the future.

SSI sets limits on radiation doses to the public and to those that work with radiation. SSI has staff on standby round the clock to respond to radiation accidents. Other roles include information, education, issuing advice and recommendations, and funding and evaluating research.

SSI is also involved in international development cooperation. SSI, with 110 employees located at Solna near Stockholm, reports to the Ministry of Environment.

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