

## ISOE INFORMATION SHEET

### PRELIMINARY EUROPEAN DOSIMETRIC RESULTS FOR 2004

ISOE European Technical Centre - Information Sheet No. 39 (2005)

This ISOE Information Sheet presents the average collective doses per reactor in the European countries participating in ISOE. The averages over the past three years (2002-2004) for operating PWRs and BWRs respectively are presented in Tables 1 and 2.

The European PWR average collective dose per reactor continues to decrease reaching the lowest value, 0.66 man·Sv per reactor (0.71 PWR, VVER excluded). Half of the reduction of the annual collective dose from 2003 to 2004 might be explained by the increase of the cycle length and the reduction of the number of outages (see Table 3). In France, there were a steam generator replacement and a reactor vessel head replacement; in the UK, no outage was performed.

It should also be noted that in the Czech Republic, two new VVER reactors, Temelin 1 and 2, have been put into commercial operation and that there is one PWR less in Germany in 2004 (Stade was shutdown in November 2003).

After the increase in 2003, the BWR average show a significant decrease (from 1.17 to 0.81 man·Sv) which is mainly due to the good results in Sweden (corresponding to the end of

the modernisation programme of several reactors) and in Spain (no outages in 2004).

The following Figures show VVER, PWR (VVER excluded) and BWR three-years rolling average collective dose trend per reactor by country from 1993 to 2004.

Table 1. PWRs average collective dose per reactor by country from 2002 to 2004

Country	Average coll. dose per reactor (man·Sv)		
	2002	2003	2004
Belgium	0.42	0.38	0.39
France	0.97	0.89	0.79
Germany	1.23	1.04	0.90
Netherlands	0.34	0.26	0.79
Slovenia	0.58	0.80	0.69
Spain	0.49	0.43	0.30
Sweden	0.51	0.54	0.58
Switzerland	0.51	0.34	0.48
United Kingdom	0.30	0.35	0.03
<b>Sub-Total</b>	<b>0.88</b>	<b>0.80</b>	<b>0.71</b>
Czech Republic	0.20	0.20	0.16
Finland	1.31	0.47	1.25
Hungary	0.80	0.76	0.38
Slovakia	0.29	0.31	0.29
<b>VVER Sub-Total</b>	<b>0.52</b>	<b>0.42</b>	<b>0.37</b>
<b>All PWRs</b>	<b>0.83</b>	<b>0.74</b>	<b>0.66</b>

Table 2. BWRs average collective dose per reactor by country from 2002 to 2004

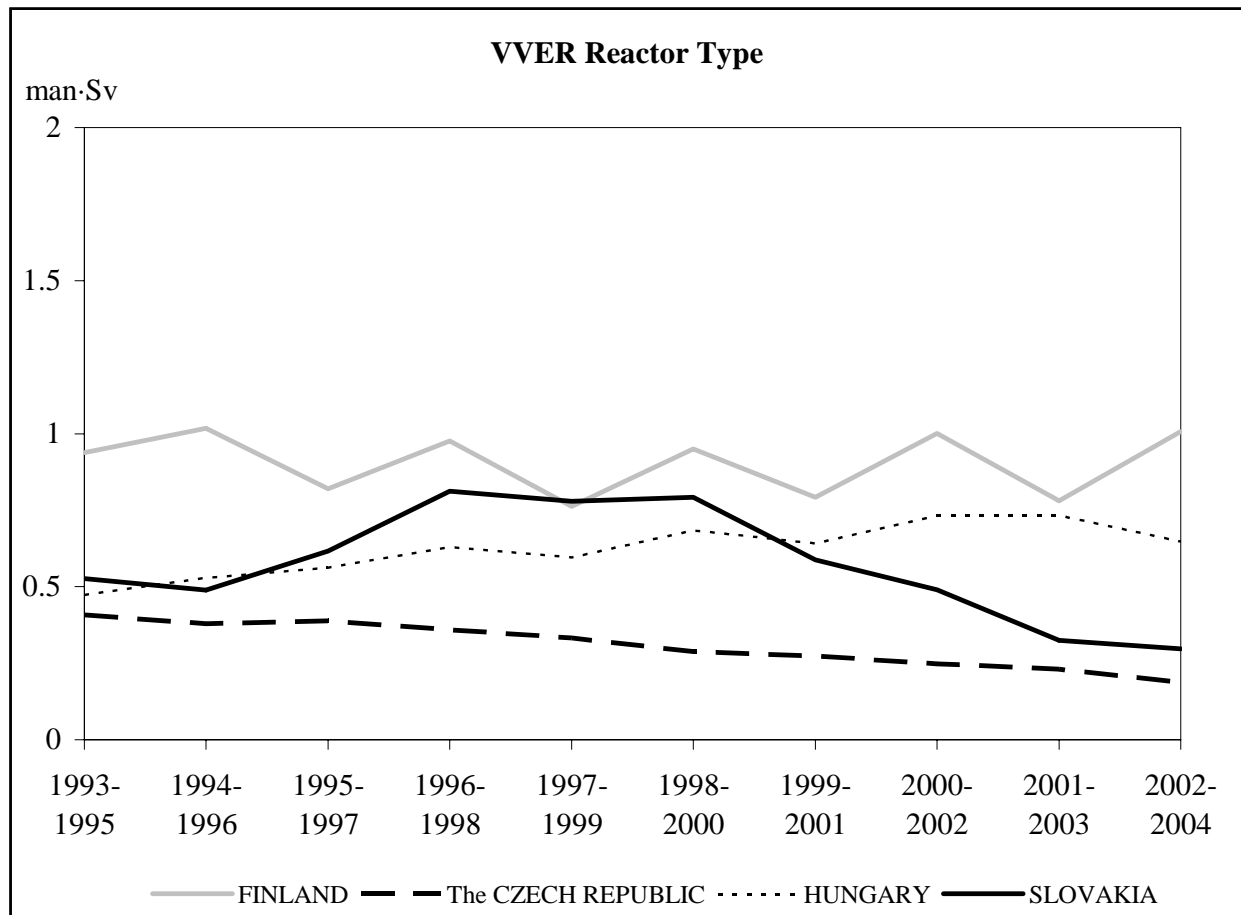
Country	Average coll. dose per reactor (man·Sv)		
	2002	2003	2004
Finland	0.56	0.69	0.74
Germany	0.76	0.93	1.06
Spain	1.52	2.22	0.46
Sweden	1.34	1.23	0.57
Switzerland	1.03	1.04	1.44
<b>All BWRs</b>	<b>1.08</b>	<b>1.17</b>	<b>0.81</b>

Table 3. Number of outages versus number of operating PWR and BWR reactors from 2002 to 2004

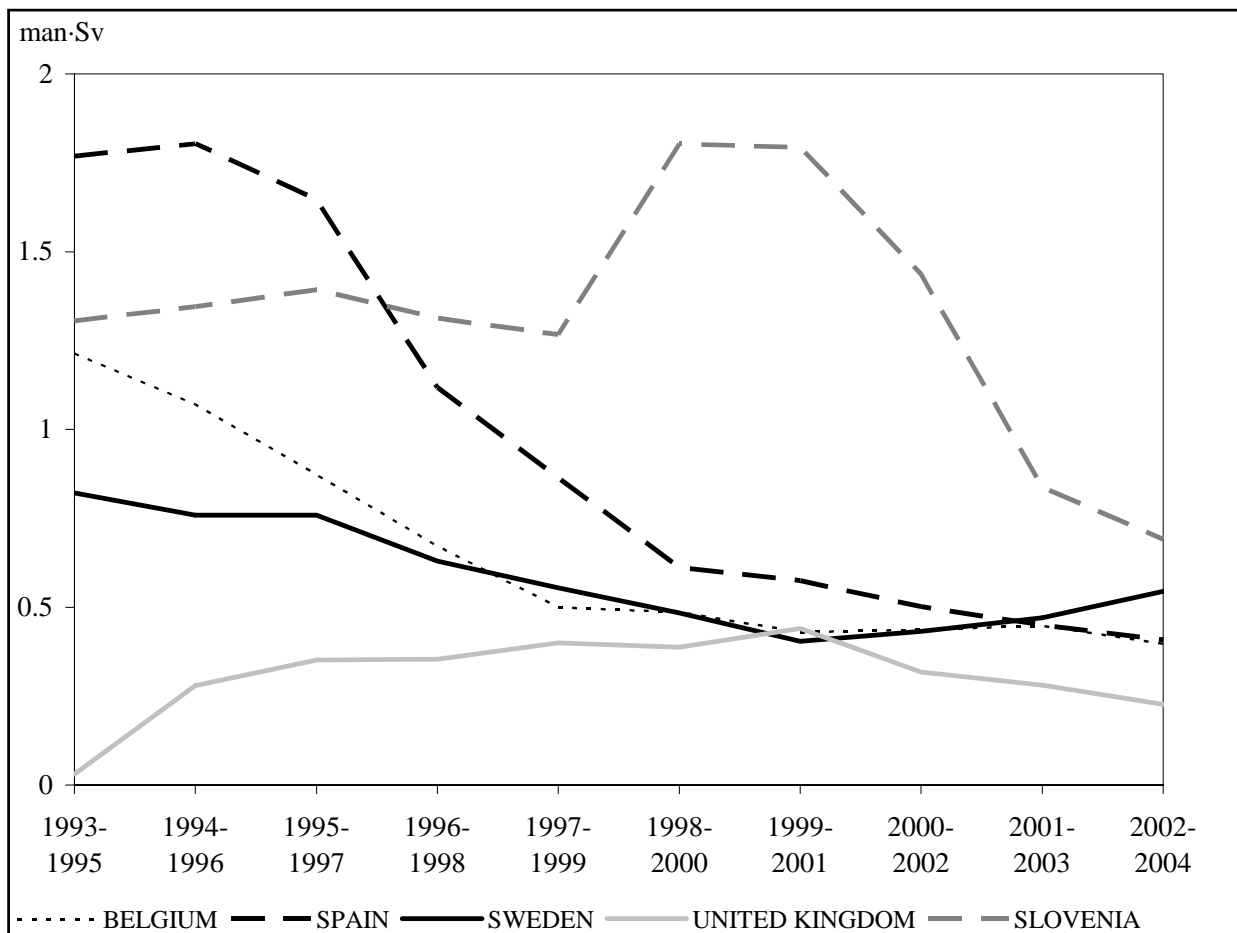
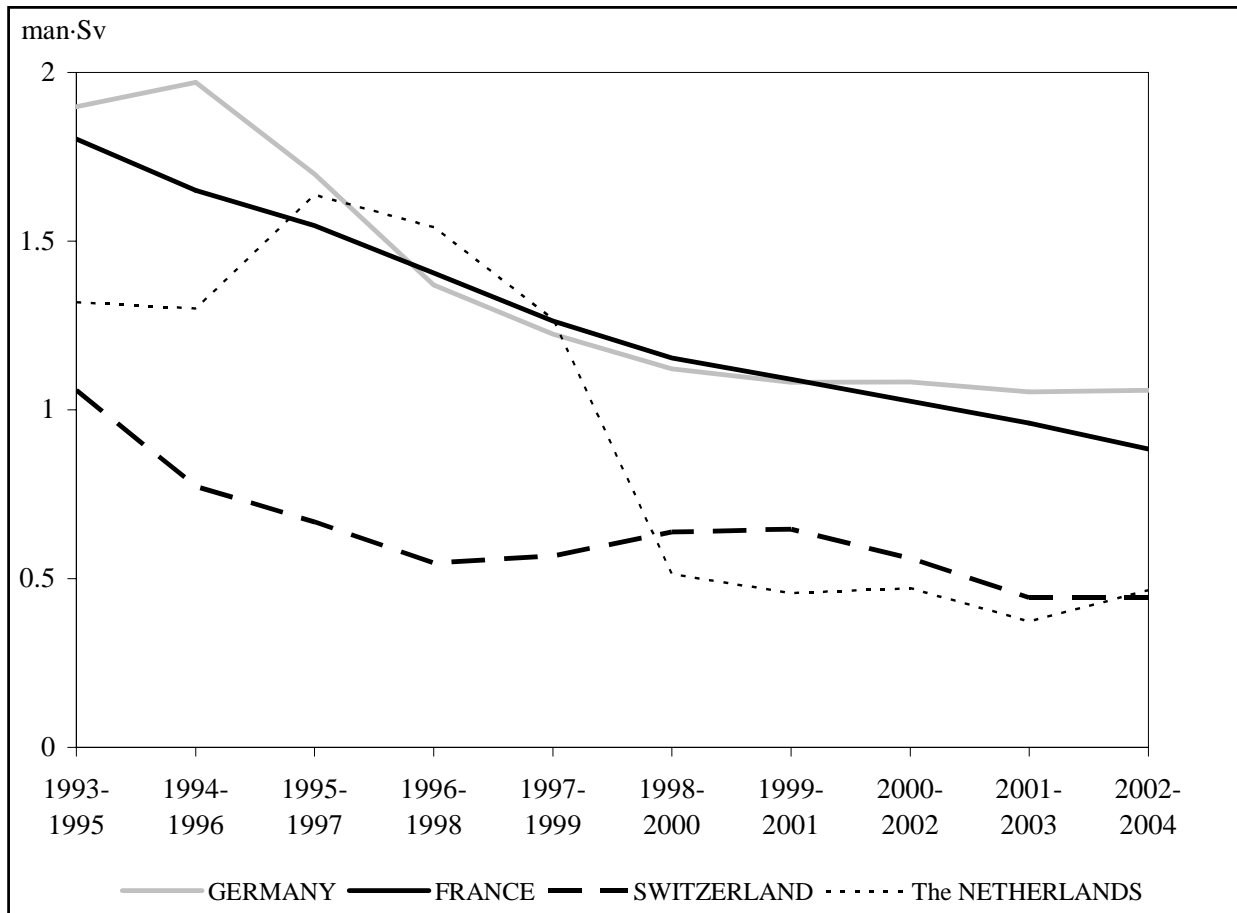
Country	Number of outages / Number of reactors		
	2002	2003	2004
<b>PWR:</b>			
Belgium	6/7	6/7	6/7
France	49/56	48/58	47/58
Germany	13/13	12/13	11/12
Netherlands	1/1	1/1	1/1
Slovenia	1/1	1/1	1/1
Spain	5/7	6/7	4/7
Sweden	3/3	3/3	3/3
Switzerland	3/3	3/3	3/3
United Kingdom	1/1	1/1	0/1
<b>Total</b>	<b>82/92</b>	<b>81/93</b>	<b>76/93</b>
<b>BWR:</b>			
Finland	2/2	2/2	2/2
Germany	5/6	5/6	6/6
Spain	1/2	2/2	0/2
Sweden	7/8	8/8	8/8
Switzerland	2/2	2/2	2/2
<b>Total</b>	<b>17/20</b>	<b>19/20</b>	<b>18/20</b>

Note: All VVER reactors have had outages every year.

### Evolution of the PWRs 3-Years Rolling Average Collective Dose per Reactor by Country



### Evolution of the PWRs 3-Years Rolling Average Collective Dose per Reactor by Country



### Evolution of the BWRs 3-Years Rolling Average Collective Dose per Reactor by Country

