

**Safety Performance Overview of the Major UK Nuclear Licensees  
Annual update - Jan 2007 - covering the period 2005/06**

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(on behalf of Review Group 1)

## 1) INTRODUCTION

This is the eighth annual report produced by NuSAC examining the relative performance of the major UK Nuclear Licensees in a range of safety related parameters - this is the sixth year that data from the Defence Licensees are also included. Note that the review is based on data provided by the Licensees (included as an Annex to this paper) together with information included by Licensees on their web sites. NuSAC would like to thank the Licensees for their efforts in producing the information and, in particular, Lindsay Campbell for its compilation.

Data for the Nuclear Authorised Sites at HMNB Clyde and HMNB Devonport are included for the first time this year and data for dockyards refers only to nuclear operations rather than the dockyards as a whole.

NuSAC has now been provided with 10 years of data from the Civil Licensee sites (including the base year of 1990). This year, therefore, we have included tables to demonstrate trends in those data items which have prompted the most comment from NuSAC over this period. These are industrial safety (RIDDOR and Major Injuries) for Employees and Contractors and Individual and Collective Dose, again for Employees and Contractors. Other items are commented upon by exception.

## 2) KEY FEATURES

### 2.1 Civil Licensees

The original data supplied by the Licensees was for the period 1997/98 accompanied by a selection of 1990 data to provide historical context. In each subsequent review NuSAC has observed that, with some caveats, *“there has been a progressive and substantial improvement in all parameters monitored between 1990 and 1997 which is broadly being maintained”*.

Tables 1 and 2 indicate the basis of these observations (and one caveat) for industrial safety performance. Table 1 (RIDDOR injury rate per 100,000 hours) shows a significant improvement in performance **for employees** between 1990 and 1997 followed by a plateau that has persisted for nearly a decade. Individual companies exhibit performance above, and sometimes significantly better than, the plateau, but none have been able to maintain the level of performance year upon year that characterises “best in class”. The OSHA DACR and TRIR data have not been available for as long, but would show a similar pattern.

Table 1 also shows data for **Contractor** performance (but note that some of the data for the early years of the table were stated to be of limited accuracy). Contractor data was not available for 1990, but, since 1997, appear to display a similar plateau to the employee data for each Licensee. Contractor safety performance remains a topic of great interest to NuSAC,

particularly in the light of the introduction of the new contractual arrangements implemented by the Nuclear Decommissioning Authority (NDA). It is of concern that contractor injury rate generally remains worse than that for the corresponding Licensee by a factor two to three. It is well known that there are many contractors used by the nuclear industry that require, and achieve, excellent performance in this area, so the contractor data must disguise considerable variability. NuSAC will continue to interact with Licensees and NDA to understand what is being done to maintain and improve performance in this very important area.

Table 2 (RIDDOR reportable major injuries) shows a less satisfactory picture overall. It is not appropriate to compare absolute numbers among Licensees, because the number of people varies. But overall, it is not obvious that there has been any sustained improvement in this statistic since 1990. Unlike the RIDDOR injury rate, there is no obvious difference between Employee and Contractor data.

Tables 3, 4 and 5 display trends in worker dose for employees and contractors. All Licensees show a substantial reduction in cumulative, average and maximum doses since 1990, reflecting improvements in working practices and the introduction of more modern plant and equipment. It is clear that the majority of worker dose in the UK is accrued at the Sellafield Site. NuSAC notes that the average and maximum dose for contractors staff at that site has increased in the last two years without a proportionate increase in cumulative dose. Unless working practices have changed, the same amount of dose intensive work is being accomplished with fewer people. It is noted that the average contractor dose is now the same as it was in 1990. Whilst, there is no suggestion that accrued doses are approaching statutory limits, NuSAC will be seeking further assurance from the Licensee that working practices remain ALARP.

We are pleased to note that all Licensee (or Parent Company) web-sites contained their most recent health and safety information. This is in a variety of forms. Several Licensees now produce an annual Corporate Social Responsibility Report which gives information about achievement against plans for a range of parameters including health and safety. NuSAC is pleased to note that Licensees continue to participate in recognised safety award schemes (e.g. ROSPA, ISRS) and continue to compete successfully for the top awards in their category.

In previous years, Members have commented on the importance of good Occupational Health programmes and NuSAC review groups have received information about these when discussing specific topics with Licensees. Some Licensees have included information on occupational health programmes and absence rates on their web sites. NDA also collects and publishes Licensee absence rates on a site by site basis on their web-site and have discerned no overall trends so far.

## **2.2 Defence Nuclear Licensees**

Tables 6 and 7 indicate trends in industrial safety performance (cf tables 1 and 2 for the Civil Nuclear Licensees). Table 6 displays an improving RIDDOR injury trend in recent years with the best sites indistinguishable from the Civil Licensee population. NuSAC encourages the Defence Licensed sites to continue to share best practices and to seek progressive improvement in performance. This comment also applies to RIDDOR major injuries

displayed in table 7. As for the Civil Licensees, no overall trends in this parameter are evident over the period covered by the data.

Performance on dose management remains particularly noteworthy with no employee or contractor receiving a dose of greater than 5mSv ). Trends (or lack of them) in this parameter are displayed in table 8. Data for collective and average individual dose are not displayed for the Defence Nuclear Licensees since they simply show universally low values throughout the period.

### **3. INES Events and Regulatory Enforcement.**

This is the sixth year that data on the INES scale has been included for Civil Nuclear Licensees and the fifth report including these data for the Defence Nuclear Licensees. Members are reminded that INES level 1 is "an anomaly beyond the authorised operating regime". INES level 2 is "an incident for example involving (modest) overexposure of a site worker or significant failures of safety provisions". INES level 3 is "a serious incident for example involving a very small public exposure, severe spread of contamination or a near accident with no defensive layers remaining"

The number of INES 1 events reported by BNFL Companies is 12 compared with 13 last year (i.e. essentially unchanged). NuSAC is pleased to note that NDA is also monitoring some lower level nuclear safety indicators provided by their Licensees which may give advance warning of any adverse trends in INES 1 (or higher ) rated events

The British Energy number of INES 1 events reported (72) is a reduction on the value of 82 recorded in the two previous years. As indicated in last year's report, the absolute numbers should not be compared with other Licensee figures.

No trends are apparent in the number of events reported at level 1 at the Defence Sites which remain small. However, it is noted that one event classified at level 2 is recorded for AWE and that this was the subject of both an NII Improvement Notice and an EA Enforcement Notice.

We are pleased to note that no Prosecutions were deemed necessary at any Nuclear Licensed Site during the year .The number of Enforcement Notices at Civil Nuclear Licensee Sites was reduced from 19 in 2004/05 to 7 this year. Conversely, the number of enforcement notices at Defence Nuclear Licensed Sites increased from 3 in 2004/05 to 5 this year.

### **4. Some Detailed Items**

The following additional items from the 2005/06 data are drawn to Member's attention.

- Last year we noted that The British Energy industrial safety performance for employees is the best recorded in recent times. This good performance has been maintained with a further slight improvement in RIDDOR injury rate.
- The number of RIDDOR major injuries for UKAEA is the highest recorded by the Company since at least 1997.
- Unplanned reactor trip rate for both Magnox Electric and British Energy reactors is among the lowest (i.e. good) recorded. This is a measure of plant reliability and is

important to safety because every automatic demand to trip a reactor places demands on the safety systems to respond.

- The GE Healthcare industrial safety data are improved from last year's figure, but are still worse than the data from other Civil Licensees. The Health and Safety performance data on the Parent Company web-site gives very little U.K. specific information.
- It is encouraging to note that the improving trend in RIDDOR injuries at AWE noted last year has been maintained.
- The improving trend in RIDDOR injuries noted last year at DML Devonport has been maintained. However, the number of RIDDOR major injuries has increased again to the level noted two years ago.

## **5. Conclusions**

The major observations from the most recent set of data for the Civil Nuclear Licensees are:

- With the exception of the RIDDOR major injury category, the improvements previously noted in industrial safety injury rates have been maintained.
- With the caveat noted in section 2.1 above, performance on dose management continues to be good.
- Contractor industrial safety performance continues to be inferior to the corresponding employee data.

This is the sixth set of data received from the Defence Nuclear Licensees.

- Performance on dose management continues to show good results with no employee or contractor experiencing an individual dose in excess of 5mSv.
- With the exception of RIDDOR major injuries, the non radiological parameters show an improving trend with the best sites indistinguishable from the population of Civil Nuclear Licensees

## **6. Recommendations**

- 1) NuSAC should continue to seek information from the Civil Licensees on the steps they are taking to secure improvements in contractor safety performance.
- 2) NuSAC should seek assurance from Licensees and NDA that accrued worker doses remain ALARP
- 3) NuSAC should undertake a further review of Licensees data next year.

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**TABLE 1 Civil Nuclear Licensees- RIDDOR Injury Trends per 100,000 hours**

	Urengo		BNFL UK(1)		BNG SL		Magnox Elec		Springfields		UKAEA		Brit Energy		G E Health	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	0.15	-			0.08	0.26	0.04	0.08	0.14	0	0.14	0.33	0.09	0.32	0.26	-
<b>04/05</b>	0.65				0.10	0.16	0.14	0.22	0.03	0.40	0.21	0.29	0.11	0.23	0.58	-
<b>03/04</b>			0.06	0.22							0.02	0.28	0.23	0.32	0.37	-
<b>02/03</b>			0.14	-							0.23	0.26	0.19	0.33	0.13	-
<b>01/02</b>			0.13	-							0.27	0.26	0.25	0.41	0.28	-
<b>00/01</b>			0.14	-							0.14	0.8	0.22	0.35	0.26	-
<b>99/00</b>			0.16	0.45							0.12	0.8	0.29	-	0.25	-
<b>98/99</b>			0.18	0.25			0.32	0.16			0.10	0.6	0.26	-	0.24	-
<b>97/98</b>			0.20	0.15			0.29	-			0.21	0.9	0.19	-	0.37	-
<b>1990</b>			1.0	0.59			0.59				0.35	-	0.59	-	0.41	-

**TABLE 2 Civil Nuclear Licensees- RIDDOR Major Injury Trends**

	Urengo		BNFL UK(1)		BNG SL		Magnox Elec		Springfields		UKAEA		Brit Energy		G E Health	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	1	-			1	3	1	1	0	0	4	2	2	4	0	-
<b>04/05</b>	0				5	3	4	2	1	0	0	1	1	2	1	-
<b>03/04</b>			1	4							0	1	4	4	0	-
<b>02/03</b>			7	-							2	0	3	4	0	-
<b>01/02</b>			2	-							1	2	2	4	0	-
<b>00/01</b>			5	-							0	3	4	6	0	-
<b>99/00</b>			10	6							2	2	5	6	2	-
<b>98/99</b>			9	4			2	3			1	1	2	3	1	-
<b>97/98</b>			8	1			1	-			1	2	1	1	3	-
<b>1990</b>			12	-			2	-			3	-	Inc in Magnox	2	2	-

(1) BNFL includes BNG SL and Springfield Fuels up to 2003/04 and Magnox Electric from 2000 to 2003/04

**TABLE 3 Civil Nuclear Licensees- Collective Dose (Sv) Trends**

	Urengo		BNFL UK(1)		BNG SL		Magnox Elec		Springfields		UKAEA		Brit Energy		G E Health	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	0.07	0.03			6.7	3.7	0.6	0.7	1.2	0.2	0.2	0.6	0.3	0.8	0.7	-
<b>04/05</b>	0.1				6.0	3.2	0.6	0.5	1.0	0.1	0.2	0.6	0.3	0.1	0.6	-
<b>03/04</b>			9.4	3.5							0.2	0.6	0.4	1.0	0.7	-
<b>02/03</b>			10.7	3.4							0.2	0.7	0.5	1.2	0.8	-
<b>01/02</b>			11.9	4.6							0.2	0.5	0.6	1.2	0.8	-
<b>00/01</b>			10.4	4.1							0.1	0.5	0.8	1.8	0.9	-
<b>99/00</b>			11.9	5.0							0.1	-	1.1	1.8	1.1	-
<b>98/99</b>			11.9	3.7			1.6	1.5			0.2	0.7	0.9	0.6	1.2	-
<b>97/98</b>			13.5	3.9			1.9	1.4			0.4	0.9	1.0	1.4	1.1	-
<b>1990</b>			33.8	6.8			8.7	2.5			4.0	0.4	Inc in Magnox		3.3	-

**TABLE 4 Civil Nuclear Licensees- Average Dose (mSv) Trends**

	Urengo		BNFL UK(1)		BNG SL		Magnox Elec		Springfields		UKAEA		Brit Energy		G E Health	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	0.2	0.2			0.8	1.1	0.1	0.1	0.8	0.4	0.1	0.2	0.1	0.1	0.7	-
<b>04/05</b>	0.3	-			0.7	0.8	0.2	0.1	0.7	0.3	0.1	0.2	0.1	<0.1	0.6	-
<b>03/04</b>			0.7	0.5							0.1	0.2	0.1	0.1	0.7	-
<b>02/03</b>			0.8	0.5							0.1	0.2	0.1	0.2	0.7	-
<b>01/02</b>			0.9	0.5							0.1	0.1	0.2	0.2	0.7	-
<b>00/01</b>			0.8	0.4							0.1	0.2	0.2	0.2	0.8	-
<b>99/00</b>			1.0	0.5							0.1	-	0.4	0.3	0.9	-
<b>98/99</b>			1.3	1.0			0.5	0.2			0.1	0.2	0.2	0.1	1.1	-
<b>97/98</b>			1.4	1.0			0.6	0.2			0.2	0.3	0.2	0.2	0.9	-
<b>1990</b>			3.1	1.1			0.6	0.2			1.2	0.3	Inc in Magnox		2.4	-

(1) BNFL includes BNG SL and Springfield Fuels up to 2003/04 and Magnox Electric from 2000 to 2003/04

**TABLE 5 Civil Nuclear Licensees- Maximum Dose (numbers in excess of 5 mSv) Trends (2)**

	Urengo		BNFL UK(1)		BNG SL		Magnox Elec		Springfields		UKAEA		Brit Energy		G E Health	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	0	0			97	171	0	0	4	0	0	0	4	45	16	-
<b>04/05</b>	0	-			75	106	0	3	1	0	0	4	0	0	18	-
<b>03/04</b>			134	87							1	12	3	29	23	-
<b>02/03</b>			218	74							0	5	4	58	25	-
<b>01/02</b>			326	163							0	0	3	110	25	-
<b>00/01</b>			336	113							0	8	7	85	32	-
<b>99/00</b>			547	230							0	-	22	41	45	-
<b>98/99</b>			634	222			19	9			0	10	0	1	72	-
<b>97/98</b>			654	124			27	36			1	21	8	48	67	-
<b>1990</b>			2436	175			162	51			154	-	Inc in Magnox	217	-	-

(1) BNFL includes BNG SL and Springfield Fuels up to 2003/04 and Magnox Electric from 2000 to 2003/04

(2) No person exceeded the legal maximum (now 20mSv pa.) The majority of doses recorded above 5mSv were in the range 5mSv-10mSv.

**TABLE 6 Defence Nuclear Licensees- RIDDOR Injury Trends per 100,000 hours**

	AWE		BAE		Rolls Royce		Vulcan		HMNB Clyde		DML D'port		HMNB D'pt		Rosyth	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	0.13	0.35	0.41	-	0.17	-	0.32	-	0.45	-	0.59	-	0.05	-	0.57	-
<b>04/05</b>	0.20	0.52	0.55	-	0.15	-	0	0			0.69	-			1.06	1.42
<b>03/04</b>	0.41	0.79	2	-	0.11	-	0.2	-			0.90	-			1.0	0.7
<b>02/03</b>	0.39	0.42	1.02	-	0.58	-	1	-			0.54	-			0.89	-
<b>01/02</b>	0.16	0.47			0.55	-	0	0			0.79	-				
<b>00/01</b>	0.36	-			0.12						1.32	-				

**TABLE 7 Defence Nuclear Licensees- RIDDOR Major Injury Trends**

	AWE		BAE		Rolls Royce		Vulcan		HMNB Clyde		DML D'port		HMNB D'pt		Rosyth	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	3	0	2	0	2	-	0	0	2	-	14	-	0	0	1	1
<b>04/05</b>	3	2	4	-	0	-	0	0			8	-			8	3
<b>03/04</b>	4	8	1	-	0	-	0	-			15	-			3	2
<b>02/03</b>	3	1	2	-	0	-	0	-			8	-			0	0
<b>01/02</b>	2	1			0	-	0	-			6	-				
<b>00/01</b>	5	2			1	-					6					

**TABLE 8 Defence Nuclear Licensees- Maximum Dose (Numbers above 5 mSv) Trends**

	AWE		BAE		Rolls Royce		Vulcan		HMNB Clyde		DML D'port		HMNB D'pt		Rosyth	
	E	C	E	C	E	C	E	C	E	C	E	C	E	C	E	C
<b>05/06</b>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<b>04/05</b>	0	0	0	0	0	0	0	0			0	0			0	0
<b>03/04</b>	0	0	0	-	0	-	0	-			1	0			0	0
<b>02/03</b>	0	0	1	-	0	-	0	-			0	0			0	0
<b>01/02</b>	0	0	0	-	0	-	0	-			0	0			10	17
<b>00/01</b>	0	0	0	-	0	-	0	-			0	0			20	-