

**Safety Performance Overview of the Major UK Nuclear Licensees
Annual update - Jan 2006 - covering the period 2004/05****By A W Clarke**

(on behalf of Review Group 1)

SUMMARY

This is the seventh 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 fifth year that data from the Defence Licensees are also included. The conclusions are that the substantial improvements reported over the last decade for the Civil Licensees in the parameters listed have been broadly maintained, albeit with greater variability among Licensees this year in the number of RIDDOR major injuries recorded. At the Defence Sites, performance on dose management continues to show good results with no employee or contractor experiencing a dose in excess of 5mSv. The non radiological parameters show a large spread across sites as in previous years, but overall, they display an encouraging trend. It is recommended that NuSAC should obtain further information with respect to certain aspects of the Licensees Industrial Safety management programmes and that a further review should be undertaken next year unless either NDA or NII have the resources to undertake the work.

1) INTRODUCTION

This is the seventh 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 fifth 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.

For the first time this year, BNFL data have been separated out to show Sellafield (BNG SL), Springfields and Magnox reactor sites (BNG Magnox) individually. Whilst this could make comparisons with previous years more difficult in this year's report, the change is welcomed because it will help facilitate future comparisons of site performance under NDA contractual arrangements. Data from the Urenco Site Licensee are also included this year for the first time.

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. The original broad observations made in NuSAC's first review continue to be supported by the latest set of data. Specifically, there was a progressive and substantial improvement in all parameters monitored between 1990 and 1997 which is broadly being maintained.

We have previously placed a caveat on this broad statement of improvement, noting a slower rate of improvement for Major Injuries. This year, there is a greater variability across Licensees and it is not possible to make any general comments. Some specific comments are made in section 4 below.

Last year, we commented that the information available from Licensee's web sites was disappointing when compared with previous years. We are pleased to note that (with one exception) all Licensee web sites (including Defence Licensees) contained their most recent health and safety information on the date of searching (18/12/05). Whilst most Licensees give less detailed information than used to be the case, several give high level targets and comment on progress against these targets.

To illustrate the magnitude of the changes since 1990, we list in table 1 below a selection of data for BNFL employees - the other Licensee's figures reflect a similar pattern, particularly in relation to the reduction in employee dose rates. There are greater variations in industrial safety performance figures as illustrated in table 2, which may be found at the end of this report as it includes data for both civil and defence Licensees.

Table 1 BNFL Employee Data

(a range in the 2004/05 column, shows the variation among the BNG SL, Springfields and BNG Magnox groupings)

Year	1990	1997/98	2000/01	2001/02	2002/03	2003/04	2004/05
Parameter							
RIDDOR injuries/100,000 hours	1.0	0.20	0.14	0.13	0.14	0.06	0.03-0.14
Collective Dose (man Sv)	33.8	13.5	10.4	11.9	10.7	9.43	6.6
Average Dose (mSv)	3.1	1.4	0.77	0.85	0.77	0.71	0.2-0.75
Employees in Dose Ranges (mSv)							
0-5	8602	9011	13150	13678	13698	13205	12083
5-10	1602	608	322	324	215	134	76
10-15	712	45	14	2	3	0	0
>15	122	1	0	0	0	0	0
Number of Major Injuries	12	8	5	2	7	1	10
INES Level 1 Events			32	25	11	5	13
INES Level 2+ Events			1 (L2)	0	0	0	1 (L3)

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). For all Licensees, their contractor industrial safety performance is inferior to that for their own employees (in some cases, marginally so). Contractors generally receive the highest individual doses, albeit well within the legal maximum. Last year, NuSAC commented that “Overall, the data do suggest that the achievement of "best in class" performance by contractors is a greater challenge for Licensees than for their own employees.” We reiterate that comment this year. NuSAC will continue to interact with Licensees to understand what is being done to maintain and improve performance in this very important area.

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. UKAEA, for example, note an adverse trend in employee absence rates and have programmes in place to address the issue. Absolute values remain below the national average as they do for other Licensees that give these data. NuSAC may wish to seek further information from individual Licensees.

2.2 Defence Nuclear Licensees

This is the fifth year that information from AWE, Rolls Royce, BAE, Devonport and Rosyth has been provided and the fourth set of data from Vulcan.

Performance on dose management remains particularly noteworthy with no employee or contractor receiving a dose of greater than 5mSv). Industrial safety performance also displays an encouraging trend this year with most sites showing significant improvement over the previous year. With one exception, this is reflected in a reduction in the number of major injuries as well as the RIDDOR and OSHA rates.

3. INES Events and Regulatory Enforcement.

This is the fifth year that data on the INES scale has been included for Civil Nuclear Licensees and the fourth 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”

There has been an increase in the number of INES 1 events reported by BNFL compared with the previous 2 years (13 cf 5 in 2003/04 and 11 in 2002/03). The Company declared target was 12. The numbers remain low and might only be of direct safety significance if they represented the beginning of an adverse trend. Of greater concern is the level 3 event reported at the THORP plant. Nevertheless NuSAC is pleased to note that BNFL chose to publish its Board of Inquiry report on its web site.

The British Energy number of INES 1 events reported (82) is identical to the previous year. As indicated in last year's report, the absolute numbers should not be compared with other Licensee figures. However, it is surprising that there has not been a reduction as the British Energy web site reports a much lower number of reportable events.

The number of events reported at level 1 at the Defence Sites remains small, with no event reported at level 2 or above.

The number of Enforcement Notices and Prosecutions has again remained essentially constant taken across the Civil Nuclear Licensees as a whole. 3 enforcement notices were issued this year at Rosyth, but as the data are for the site as a whole, it is not clear if any related to nuclear operations. There were no enforcement notices or prosecutions at any other Defence Licensee site.

4. Some Detailed Items

The following notable items from the 2004/05 data are drawn to Member's attention.

- The number of RIDDOR major injuries at BNFL sites (employees and contractors) was 15 compared with 5 in the previous year.
- The British Energy industrial safety performance is the best recorded in recent times.
- The GE Healthcare industrial safety data are considerably worse than in recent years and are inferior to the 1990 baseline figure.
- The industrial safety performance data for Urenco are inferior to other Civil Nuclear Licensees
- It is encouraging to note that the recent adverse trend in RIDDOR injuries at AWE has been reversed this year.
- The adverse trend in RIDDOR injuries noted last year at DML Devonport has been reversed. This is accompanied by an encouraging reduction in the number of major injuries.
- The RIDDOR injury rate at BAE shows a fourfold reduction although the number of major injuries has increased.

5. Conclusions

The major observation from the most recent set of data for the Civil Nuclear Licensees is that the substantial improvements reported over the last decade in the parameters listed have been broadly maintained. Caveats to this general statement are listed in section 4 above.

- Performance on dose management continues to be good.
- Contractor industrial safety performance continues to be inferior to the corresponding employee data; in some instances, the differences are marginal.

This is the fifth 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.
- The non radiological parameters continue to show a large spread across sites, but taken overall, they display an encouraging trend this year.

6. Recommendations

- 1) NuSAC should continue to seek information from the Civil Licensees on the steps they are taking to improve contractor management arrangements
- 2) NuSAC should undertake a further review of Licensees data next year, unless NDA or NII indicate that they now have the resources to undertake such an exercise.

A W Clarke 14/01/06

Table 2 Licensee Employee RIDDOR Injuries per 100,000 hours

Year	1990	2000/01	2001/02	2002/03	2003/04	2004/05
BNFL UK *	1.0	0.14	0.13	0.14	0.06	
BNG SL						0.10
BNG Magnox	0.59	0.10	0.08	0.20	0.03	0.14
Springfields						0.03
UKAEA	0.35	0.14	0.27	0.23	0.02	0.21
British Energy Generation	0.59	0.22	0.25	0.19	0.23	0.11
Urenco						0.65
GE Healthcare Ltd (UK)	0.41	0.26	0.28	0.13	0.17	0.58
AWE		0.26	0.16	0.39	0.41	0.20
Rolls-Royce		0.12	0.55	0.58	0.11	0.15
BAE				1.02	2	0.55
Vulcan				1	0.2	0
DML-Devonport		1.32	0.79	0.54	0.90	0.69
Rosyth				0.89	1	1.06

* includes Magnox except for 1990

SAFETY DIRECTORS FORUM

**NUCLEAR INDUSTRY
ACCIDENT AND DOSE
DATA 2004-5**

Compiled by

L A Campbell
Secretary

January 2006

FOREWORD

This report is a compilation of accident and dose data for the nuclear licensees in Great Britain and the MOD-authorized site at Vulcan near Dounreay in Scotland. Data are presented for either the calendar year January to December 2004, or financial year April 2004 to March 2005, as appropriate. The report also includes data on unplanned power reactor trips, formal environment health and safety 'notices', and prosecutions.

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Table 2: Defence Nuclear Licensees Accident and Dose Data 2004-5

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General notes to all tables

Data is for either calendar year 2004 or financial year 2004-5.

All accident rates are stated per **100,000 hours** (not 200,000 hours).

RIDDOR injuries include deaths, major injuries and more than 3 day absences, which are required to be reported to HSE.

RIDDOR major injuries are as defined in RIDDOR, which are required to be reported to HSE.

OSHA DACR = Days Away Case Rate, triggered when the next day of scheduled work is missed.

OSHA TRIR = Total Recordable Incident Rate, includes DACR plus specified accidents causing injury plus specified diseases.

N/A = Not Applicable.

n/a = Not Available.

E = employees.

C = contractors.

Table 1: Civil Nuclear Licensees Accident and Dose Data 2004-5

	Urenco	BNG SL		BNG Magnox		Springfields		UKAEA		British Energy Generation		GE Healthcare Ltd(UK)
	E	E	C	E	C	E	C	E	C	E	C	E
RIDDOR injuries / 100,000 hours	0.65	0.10	0.16	0.14	0.22	0.03	0.37	0.21	0.29	0.11	0.23	0.58
OSHA DACR / 100,000 hours	0.81	0.13	0.22	0.20	0.22	0.10	0.74	0.35	0.48	0.11	0.28	0.82
OSHA TRIR / 100,000 hours	0.97	0.15	0.32	0.21	0.44	0.20	1.11	n/a	n/a	n/a	n/a	0.82
RIDDOR Major Injuries/No. Of persons	0/385	5/ 10046	3/ 3425	4/ 3573	2/ 1803	1/ 1450	0	0/ 2348	1/ 2935	1/ 5470	2/ 2634	1/ 1546
Collective Dose (Sv)	0.092	5.983	3.250	0.626	0.529	1.0	0.12	0.19	0.57	0.269	0.123	0.56
Average Dose (mSv)	0.31	0.75	0.79	0.198	0.088	0.67	0.30	0.10	0.17	0.06	0.02	0.6
Employees in dose ranges (mSv)												
0-5	301	7431	3814	3160	6022	1492	397	1788	3391	4605	5719	911
5-10	0	75	105	0	3	1	0	0	4	0	0	18
10-15	0	0	1	0	0	0	0	0	0	0	0	0
> 15	0	0	0	0	0	0	0	0	0	0	0	0
Unplanned trips / Reactor year (7000 hrs critical)	N/A	N/A		0.28		N/A		N/A		1.02		N/A
INES Level 1 Events	0	5		7		1		0		82		Not assessed
INES Level 2+	0	1		0		0		0		0		0
Enforcement Notices	1	6		5		1		2		2		2
Prosecutions	0	1*		0		0		0		0		0

Notes to Table 1:

Urenco

The data reported is for the calendar year 2004 and relates solely to the operations undertaken by the licensee Urenco (Capenhurst) Limited. Urenco (Capenhurst) Limited is part of Urenco Enrichment Company, which in turn is part of the Urenco Limited group of companies.

RIDDOR Injuries: The 385 persons reported represents 364 Urenco (Capenhurst) Limited employees and 21 hired/fixed term contract personnel working under UCL's direct supervision.

Dose information: 301 persons reported represents those employees who are designated as Radiation Workers (i.e. those who routinely work with ionising radiation and are subject to routine dose assessments and recording). 23 of the 301 are formally designated as Classified Persons

Enforcement Notices:

The Environment Agency issued UCL with an Enforcement Notice on 2 April 2004, to formalise the requirement for the company to complete the recommendations arising from its Inquiry into the discovery that the radioactive gaseous discharges from one of its centrifuge enrichment plants had been under-reported due to an incorrect calculation.

BNG SL (British Nuclear Group Sellafield Limited)

Figures include Capenhurst site but not Spent Fuel Services

No RIDDOR/DACR/TRIR events occurred on Capenhurst site during 2004/05

No major injuries occurred on Capenhurst site during 2004/05

Dose information is stated for the calendar year; all other information is stated for the financial year.

INES level 1 events (all events occurred at Sellafield site):

- WTC drums compacted without authorisation
- Leak of PuN in pumping cabinet
- Fractured pipe and corrosion in Thorp feed clarification cell
- Personal contamination during thermocouple replacement
- Breach of operating rule

INES level 2+ events:

- Fractured pipe and corrosion in Thorp feed clarification cell categorised as level 3

Enforcement notices:

An enforcement notice was formally issued by the EA on 6th June 2005 following their aqueous team inspection that took place 21-25 February on Sellafield Site.

This detailed 3 Category 3 Non-Compliances and 3 Category 4 Non-Compliances with Environmental Discharge Authorisation Limits and Conditions.

Prosecutions:

* This event at Calder Hall occurred during FY 03/04 however, the hearing occurred 27th May 2004.

BNFL Magnox

Dose information is stated for the calendar year; all other information is stated for the financial year.

UKAEA

The information on Lost Time Accidents and Major Injuries is for 2004/05.

Radiation dose information is for 2004 for both UKAEA and those of its contractors who are either RWE Nukem as the ADS or who are "double badged", and also figures for the Maximum Annual Dose to a single worker. These figures clarify the data given for the number of monitored workers in the dose bands.

Radiation dose data for employees of some contracting companies is not retained centrally by UKAEA – however the data presented here reflects the major proportion of radiation workers on UKAEA sites.

Data relating to tenants is not included in the Contractor AFR and RIDDOR Major Injury data, although some Contractor events which have been included may have occurred when the Contractor was undertaking work other than for UKAEA (i.e. acting as Tenants).

Data relating to some Tenants is included in and extremely difficult to separate out from the “Contractor” radiation dose data.

RIDDOR/DACR figures for employees exclude collated events which involve UKAEA Constabulary (on UKAEA or non-UKAEA sites), and sports/leisure events which are not work-related.

RIDDOR/DACR figures for contractors – since the number of hours worked by Contractors is not recorded centrally by UKAEA, the Accident Frequency Rates have been calculated using an approximate figure, for full time equivalent, of 2935 employees of Contractors (based on information to hand for the Financial Year 2001/2002), and an assumed value of 1850 working hours per man year.

Maximum annual dose to a single employee was 2.77mSv; Maximum annual dose to a Contractor was 5.38mSv.

Improvement Notices:

Dounreay – Improvement Notice – Janetstown Offsite Test Facility (JOST), sodium-related operations

Dounreay – SEPA Impediment - DMTR Monitoring Tanks

British Energy Generation

RIDDOR/DACR contractor figures are for station-based contractors only;

RIDDOR major injuries figure for contractors is estimated FTEs based on reported total man-hours worked

Dose information is stated for the calendar year; all other information is stated for the financial year

Unplanned trips figure is the WANO Unplanned Automatic Trip Rate

Enforcement notices:

Hinkley Point B – The NII issued an improvement notice requiring the station to review their arrangements for managing defects and tech spec surveillances.

Sizewell B – The Environment Agency issued an enforcement notice requiring the station to conduct a review of the maintenance and operating arrangements for discharge and monitoring of radioactive waste.

GE Healthcare Ltd (UK)

Enforcement notices issued by EA

Table 2: Defence Nuclear Licensees Accident and Dose Data 2004-5

	AWE		Rolls-Royce		BAE		Vulcan		DML-Devonport		Rosyth	
	E	C	E	C	E	C	E	C	E	C	E	C
RIDDOR injuries / 100,000 hrs	0.20	0.52	0.15	n/a	0.55	n/a	0	0	0.69		1.06	1.42
OSHA DACR / 100,000 hrs	0.35	n/a	n/a	n/a	0.41	n/a	n/a	n/a	0.97		n/a	n/a
OSHA TRIR / 100,000 hrs	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0.97		n/a	n/a
RIDDOR Major Injuries/No. of persons	3/ 3596	2/ 600	0/405	n/a	4/3450	n/a	0	0	8/5395		8/ 1805	3/ 600
Collective Dose (Sv)	0.193	0.066	0.061	0.002	0.004	0	0.039	0.004	0.634	0.115	0.026	0.009
Average Dose (mSv)	0.086	0.099	0.33	0.9	0.114	0	0.16	0.07	0.45	0.13	0.170	0.093
Employees in dose ranges												
0-5 (mSv)	2236	648	185	2	52	10	247	58	1690	906	155	93
5-10	0	0	0	0	0	0	0	0	0	0	0	0
10-15	0	0	0	0	0	0	0	0	0	0	0	0
> 15	0	0	0	0	0	0	0	0	0	0	0	0
Unplanned trips / Reactor year (7000 hours critical)	N/A		0		N/A		N/A		N/A		N/A	
INES Level 1 Events	1		0		0		0		5		2	
INES Level 2+	0		0		0		0		0		0	
Enforcement Notices	0		0		0		0		0		3	
Prosecutions	0		0		0		0		0		0	
Notes	RIDDOR major injuries figure – 600 contractors estimated on site at any time. INES ratings only assigned to severity level 2 and above events.		Dose data based on calendar year 2004. Ave dose based on persons with non-zero doses. Includes both classified and written systems workers.		RIDDOR/DACR based on all employees – staff & production				Dose data is for calendar year 2004. Average dose is calculated on all radiation workers (Classified and Written Systems Persons) with non zero doses in 2004.		Accident and enforcement data are for whole site. Collective and average doses are based on all individuals with non-zero doses in 2003 (calendar). Includes both classified and Written System workers.	

Appendix 1: Safety Directors Forum Members

Civil Nuclear Operators

Peter Webster	British Energy
John Crofts	UK Atomic Energy Authority
Paul Thomas	BNFL Plc
Roger Coates	British Nuclear Group
Alan Brandwood	Magnox Electric Plc
David Mason	British Nuclear Group (Sellafield)
Anthony Webb	GE Healthcare (International)
Terry George	GE Healthcare (UK)
Jenny Chalmers	Urenco

Defence Nuclear Operators

Capt Mike Wareham	HM Naval Base Clyde
Andrew Jupp	AWE, Aldermaston
Tony Burbridge	BAE Systems, Barrow
A H (Frank) Francis	Devonport Management Ltd
Capt John Coulthard	HM Naval Base Devonport
Stuart Fowell	Babcock, Rosyth Royal Dockyard
Andy Gordon	Rolls Royce Marine Power Operations, Derby
Cdr Charles Hume	Vulcan Naval Reactor Test Establishment

Secretary

Lindsey Campbell	British Nuclear Group (Sellafield) Capenhurst Site
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Notes:

1. The above were the members of the Safety Directors Forum at the time this report was written.
2. Since the previous report:
Capt Mike Wareham replaces Capt Gerry Costello at Devonport
Andrew Jupp replaces Angela Jenkins at AWE Aldermaston
Jenny Chalmers at Urenco has joined the Safety Directors Forum
Amersham is now owned by GE Healthcare