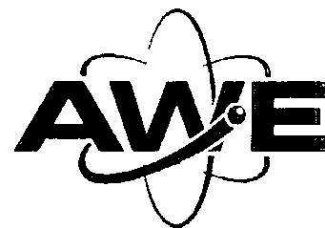


Unclassified

Reply to: RICC, [REDACTED]  
Direct Dial: [REDACTED]  
e-mail: [REDACTED]



RICC Ref: RSA 11- 201N  
EA Ref:

Aldermaston • Reading  
Berkshire • RG7 4PR  
Tel 0118 981 4111

Nuclear Regulation Group (South)  
Environment Agency  
Red Kite House  
Howbery Park  
Wallingford  
Oxfordshire OX10 8BD  
6<sup>th</sup> December 2012

For the Attention of Mr Stuart Parr, Lead Nuclear Regulator

Dear Mr Parr,

**ENVIRONMENTAL PERMITTING REGULATIONS 2010 SI No 675**  
**Permit References QB3535DR and PP3790SZ,**  
**AWE Aldermaston and Burghfield Routine Environmental Monitoring**  
**Environment Monitoring Report July – September 2012.**

I enclose the latest results from our Environmental Monitoring programme for Air, Surface Water, Groundwater, Sediment, Soil, Vegetation, Sewage and Milk.

There are no results of particular note and AWE continues to operate with no discernible impact on the local environment. Please note the Basingstoke High Volume Air Sampler has been reinstated following issues previously advised to you

It has also been impossible to take samples of sediment in some locations where there has been no sediment present.

Please contact me if you have any concerns or matters arising from the reports.

Yours sincerely

[REDACTED SIGNATURE]

Head of Environment

Encs.  
AWE/ASc/L4/PG/EM/EPR/12/Q3



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**ENVIRONMENTAL PERMITTING REGULATIONS 2010**

**ENVIRONMENT AGENCY REQUIREMENT FOR THE  
ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGHFIELD**

**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012**

**SUMMARY**

This report contains results from the AWE Environmental Permitting Regulations (EPR) Environmental Monitoring Programme for the period July to September 2012. The monitoring programme is specified in document, AWE Environmental Permitting Regulations Arrangements Document for Environmental Monitoring for Radioactivity within and around AWE Sites Aldermaston and Burghfield (Ref: AWE Report 98/10, AWE/ASc/GE/MAN/GEN/TR/11/216).

The results presented in this report are generally consistent with previously measured values from the defined matrices and locations. There is no evidence to suggest any measurable change in the radiological condition of the matrices sampled and therefore in the environment near to the AWE sites at Aldermaston and Burghfield.

The following are presented in this report

<b>Media</b>	<b>Matrix</b>	<b>Present</b>
Air	HVAS	X
Air	Tritium	X
Surface Water		X
Sediment	Annual	
Sediment	Bi-annual	
Groundwater		X
Drinking water		X
Soil		X
Vegetation		X
Sewage		X
Milk		X
Fish		

**Prepared by:** [Redacted]

**Name (Print)**  
[Redacted]

**Date:** 05/12/12.

**Results Authorised by:** [Redacted]

**Authorised Person (Print)**  
[Redacted]

**Date:** 05/12/12

**Issue of Report Authorised by:** [Redacted]

**Nominated Person (Print)**  
[Redacted]

**Date:** 05/12/12.

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ENVIRONMENTAL PERMITTING REGULATIONS 2010

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ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGHFIELD

PERMIT REFERENCES: BZ1994 AND PP3790SZ

RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012

AIRBORNE PARTICULATE SAMPLING

1. Monitoring is primarily carried out using High Volume Air Sampling (HVAS).
2. HVAS are located in Hannington, Thatcham, Reading, Basingstoke, Tadley, Silchester, Mortimer and Aldermaston. There are seven located on-site around the perimeter fence at AWE Aldermaston, and one within AWE Burghfield.
3. HVAS filters are changed fortnightly and routinely analysed for uranium and plutonium isotopes. Results are calculated as mean activity concentrations in air during the sampling period.
4. The indicative Limits of Detection (LoD) for HVAS radiochemistry are:

	<u>HVAS</u>
Total uranium ( $U^{234} + U^{235} + U^{238}$ )	40 nBq.m <sup>-3</sup>
$Pu^{238} + Pu^{(239+240)}$	30 nBq.m <sup>-3</sup>

5. Where the level of radioactivity is less than the LoD, the indicative LoD value is tabulated as a positive result with a < (less than) sign in front of it.
6. Errors in the data are presented as 2 sigma based on counting statistics only.

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**HIGH VOLUME AIR SAMPLER RESULTS FOR JULY TO SEPTEMBER 2012  
INTERNAL LOCATIONS TO AWE(A)**

UKAS	Location	Period	$^{238}\text{Pu} + (^{239+240})\text{Pu}$ nBq.m <sup>-3</sup> (air)	Total Uranium nBq.m <sup>-3</sup> (air)	Dust Loading on Filter µg.m <sup>-3</sup>
N	R001H	28/06/12 - 12/07/12	<30	96 ± 23	6.16
N		12/07/12 - 26/07/12	<30	147 ± 26	5.42
N		26/07/12 - 09/08/12	<30	168 ± 27	9.26
N		09/08/12 - 23/08/12	<30	242 ± 32	10.30
N		23/08/12 - 06/09/12	<30	131 ± 26	8.35
N		06/09/12 - 20/09/12	<30	214 ± 31	9.67
N	R002H	28/06/12 - 12/07/12	<30	145 ± 37	6.46
N		12/07/12 - 26/07/12	<30	177 ± 31	6.67
N		26/07/12 - 09/08/12	<30	233 ± 34	10.75
N		09/08/12 - 23/08/12	<30	188 ± 32	10.64
N		23/08/12 - 06/09/12	<30	154 ± 34	9.98
N		06/09/12 - 20/09/12	<30	235 ± 37	10.70
N	R006H	28/06/12 - 12/07/12	<30	443 ± 46	8.39
N		12/07/12 - 26/07/12	<30	324 ± 60	7.22
N		26/07/12 - 09/08/12	<30	438 ± 45	12.06
N		09/08/12 - 23/08/12	<30	787 ± 67	15.71
N		23/08/12 - 06/09/12	<30	271 ± 38	9.94
N		06/09/12 - 20/09/12	<30	974 ± 72	18.56
N	R007H	28/06/12 - 12/07/12	<30	157 ± 33	8.03
N		12/07/12 - 26/07/12	<30	392 ± 51	12.32
N		26/07/12 - 09/08/12	<30	422 ± 54	15.42
N		09/08/12 - 23/08/12	<30	393 ± 47	14.50
N		23/08/12 - 06/09/12	<30	439 ± 54	14.57
N		06/09/12 - 20/09/12	<30	499 ± 54	16.24
N	R009H	28/06/12 - 12/07/12	<30	192 ± 35	6.97
N		12/07/12 - 26/07/12	<30	176 ± 34	7.01
N		26/07/12 - 09/08/12	<30	302 ± 41	10.84
N		09/08/12 - 23/08/12	45 ± 17	293 ± 39	10.58
N		23/08/12 - 06/09/12	<30	248 ± 36	9.68
N		06/09/12 - 20/09/12	<30	389 ± 42	14.53
N	R011H	28/06/12 - 12/07/12	<30	196 ± 35	9.01
N		12/07/12 - 26/07/12	47 ± 26	289 ± 41	9.37
N		26/07/12 - 09/08/12	<30	285 ± 37	12.53
N		09/08/12 - 23/08/12	<30	360 ± 42	13.85
N		23/08/12 - 06/09/12	<30	235 ± 48	11.88
N		06/09/12 - 20/09/12	<30	306 ± 38	13.58

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**HIGH VOLUME AIR SAMPLER RESULTS FOR JULY TO SEPTEMBER 2012**

**INTERNAL LOCATIONS - Continued**

<b>UKAS</b>	<b>Location</b>	<b>Period</b>	<b><sup>238</sup>Pu + (<sup>239</sup>+<sup>240</sup>)Pu nBq.m<sup>-3</sup> (air)</b>	<b>Total Uranium nBq.m<sup>-3</sup> (air)</b>	<b>Dust Loading on Filter µg.m<sup>-3</sup></b>
N	<b>R072H</b>	28/06/12 - 12/07/12	<30	128 ± 28	5.59
N		12/07/12 - 26/07/12	<30	143 ± 27	5.69
N		26/07/12 - 09/08/12	<30	226 ± 35	9.05
N		09/08/12 - 23/08/12	<30	232 ± 35	9.60
N		23/08/12 - 06/09/12	<30	193 ± 31	9.59
N		06/09/12 - 20/09/12	<30	311 ± 40	12.43

**Comment:** Uranium detected in all samples had a <sup>238</sup>U / <sup>234</sup>U ratio = 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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## HIGH VOLUME AIR SAMPLER RESULTS FOR JULY TO SEPTEMBER 2012

## EXTERNAL LOCATIONS

UKAS	Location	Period	$^{238}\text{Pu} + (^{239}+^{240})\text{Pu}$ nBq.m <sup>-3</sup> (air)	Total Uranium nBq.m <sup>-3</sup> (air)	Dust Loading on Filter µg.m <sup>-3</sup>
N	Hannington	28/06/12 - 12/07/12	<30	63 ± 20	4.11
N		12/07/12 - 26/07/12	<30	88 ± 23	4.65
N		26/07/12 - 09/08/12	<30	95 ± 25	6.81
N		09/08/12 - 23/08/12	<30	165 ± 28	7.97
N		23/08/12 - 06/09/12	<30	131 ± 25	7.96
N		06/09/12 - 20/09/12	<30	178 ± 29	9.13
N	Thatcham	28/06/12 - 12/07/12	<30	120 ± 28	7.86
N		12/07/12 - 26/07/12	<30	593 ± 63	10.59
N		26/07/12 - 09/08/12	<30	465 ± 45	11.54
N		09/08/12 - 23/08/12	<30	612 ± 69	17.52
N		23/08/12 - 06/09/12	<30	251 ± 39	10.39
N		06/09/12 - 20/09/12	<30	603 ± 56	15.49
N	Reading	28/06/12 - 12/07/12	<30	388 ± 44	4.93
N		12/07/12 - 26/07/12	<30	249 ± 36	8.34
N		26/07/12 - 09/08/12	<30	311 ± 37	11.42
N		09/08/12 - 23/08/12	<30	239 ± 48	12.42
N		23/08/12 - 06/09/12	<30	184 ± 30	9.08
N		06/09/12 - 20/09/12	<30	230 ± 33	9.60
N	Basingstoke	28/06/12 - 12/07/12	N/S	N/S	-
N		12/07/12 - 26/07/12	<30	223 ± 33	8.64
N		26/07/12 - 09/08/12	<30	401 ± 44	18.67
N		09/08/12 - 23/08/12	<30	414 ± 50	18.40
N		23/08/12 - 06/09/12	<30	215 ± 36	11.64
N		06/09/12 - 20/09/12	<30	404 ± 48	15.42
N	Tadley	28/06/12 - 12/07/12	<30	88 ± 21	4.91
N		12/07/12 - 26/07/12	<30	141 ± 27	5.59
N		26/07/12 - 13/08/12	<30	198 ± 26	8.34
N		13/08/12 - 23/08/12	<30	147 ± 33	8.89
N		23/08/12 - 06/09/12	<30	132 ± 28	8.46
N		06/09/12 - 20/09/12	<30	166 ± 29	9.52
N	Silchester	28/06/12 - 12/07/12	<30	83 ± 22	5.10
N		12/07/12 - 26/07/12	<30	135 ± 25	5.56
N		26/07/12 - 09/08/12	<30	112 ± 24	7.33
N		09/08/12 - 23/08/12	<30	119 ± 24	7.39
N		23/08/12 - 06/09/12	<30	122 ± 26	7.35
N		06/09/12 - 20/09/12	<30	180 ± 29	8.28
N	Mortimer	28/06/12 - 12/07/12	<30	150 ± 27	7.17
N		12/07/12 - 26/07/12	<30	198 ± 40	7.33
N		26/07/12 - 09/08/12	<30	190 ± 30	9.70
N		09/08/12 - 23/08/12	<30	200 ± 29	10.16
N		23/08/12 - 06/09/12	<30	192 ± 33	10.15
N		06/09/12 - 20/09/12	<30	335 ± 39	13.97

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## HIGH VOLUME AIR SAMPLER RESULTS FOR JULY TO SEPTEMBER 2012

## EXTERNAL LOCATIONS - Continued

UKAS	Location	Period	$^{238}\text{Pu} + (^{239+240})\text{Pu}$ nBq.m <sup>-3</sup> (air)	Total Uranium nBq.m <sup>-3</sup> (air)	Dust Loading on Filter µg.m <sup>-3</sup>
N	Aldermaston	28/06/12 - 12/07/12	<30	193 ± 30	7.15
N		12/07/12 - 26/07/12	<30	349 ± 41	12.44
N		26/07/12 - 09/08/12	<30	325 ± 39	10.13
N		09/08/12 - 23/08/12	<30	350 ± 40	12.23
N		23/08/12 - 06/09/12	<30	169 ± 28	9.15
N		06/09/12 - 20/09/12	<30	483 ± 46	16.51
N	AWE Burghfield	28/06/12 - 12/07/12	<30	386 ± 63	11.85
N		12/07/12 - 26/07/12	<30	424 ± 47	13.19
N		26/07/12 - 09/08/12	<30	508 ± 48	16.87
N		09/08/12 - 23/08/12	<30	666 ± 59	22.31
N		23/08/12 - 06/09/12	<30	319 ± 45	13.71
N		06/09/12 - 20/09/12	<30	781 ± 64	24.22

**Sampling problem:** N/S Denotes No Sample. There was no power to the HVAS at Basingstoke between 28/06/12-20/07/12.

Tadley HVAS filter was left on for an extended period (26/07/12-13/08/12) due to access issues to the HVAS.

**Comment:** Uranium detected in all samples had a  $^{238}\text{U} / ^{234}\text{U}$  ratio 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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**ENVIRONMENTAL PERMITTING REGULATIONS 2010**  
**ENVIRONMENT AGENCY REQUIREMENT FOR THE**  
**ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGHFIELD**

**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012**

**TRITIUM IN AIR MONITORING**

1. Sampling is by a passive tritium in air sampling system.
2. There are eight tritium in air samplers located at AWE(A). Six samplers are for the analysis of tritium as HTO and two samplers are for the analysis of tritium as HT. Four HTO samplers are located at northerly, easterly, southerly and westerly on site locations respectively and samplers are located close to major tritium facilities "H" (old facility) and "L" (new facility). The two HT samplers are located at AWE(A) close to major tritium facilities "H" and "L". There is one HTO sampler located in Tadley and one at an external control location in Newbury.
3. The tritium samplers are changed every four weeks and routinely analysed for tritium as HTO and HT as specified, results reported are expressed as  $\text{mBq.m}^{-3}$ .
4. The indicative Limit of Detection (LoD) for the determination of tritium in air using the passive method is:

Tritium (as HTO)	$35 \text{ mBq.m}^{-3}$
Tritium (as HT)	$35 \text{ mBq.m}^{-3}$
5. Where the level of radioactivity is less than the LoD, the indicative LoD value is tabulated as a positive result with a < (less than) sign in front of it.
6. Errors in the data are presented as  $\pm 1$  standard deviation.



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**TRITIUM IN AIR SAMPLING RESULTS FOR JULY TO SEPTEMBER 2012**

**Table 1 HTO Tritium Results,**

UKAS	Location	Period	Tritium (as HTO) mBqm <sup>-3</sup>
N	AWE – North	Jun- Jul (14/06/12 - 12/07/12)	35 ± 10
N		Jul- Aug (12/07/12 to 09/08/12)	<30
N		Aug- Sep (09/08/12 to 06/09/12)	<30
N	AWE – East	Jun- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 09/08/12)	<30
N		Aug- Sep (09/08/12 to 06/09/12)	<30
N	AWE – South	Jun- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 09/08/12)	35 ± 10
N		Aug- Sep (09/08/12 to 06/09/12)	<30
N	AWE – West	June- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 09/08/12)	<30
N		Aug- Sep (09/08/12 to 06/09/12)	<30
N	AWE – H (Old)	Jun- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 09/08/12)	<35
N		Aug- Sep (09/08/12 to 06/09/12)	<35
N	AWE – L (New)	Jun- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 09/08/12)	<30
N		Aug- Sep (09/08/12 to 06/09/12)	45 ± 10
N	Tadley	Jun- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 13/08/12)	<35
N		Aug- Sep (13/08/12 to 06/09/12)	<30
N	Control	Jun- Jul (14/06/12 - 12/07/12)	<35
N		Jul- Aug (12/07/12 to 09/08/12)	<30
N		Aug- Sep (09/08/12 to 06/09/12)	<35

**Table 2 HT Tritium Results**

UKAS	Location	Period	Tritium (as HT) mBqm <sup>-3</sup>
N	AWE – To	Jun- Jul (14/06/12 - 12/07/12)	<70
N		Jul- Aug (12/07/12 to 09/08/12)	<35
N		Aug- Sep (09/08/12 to 06/09/12)	<75
N	AWE – Tn	Jun- Jul (14/06/12 - 12/07/12)	<70
N		Jul- Aug (12/07/12 to 09/08/12)	<75
N		Aug- Sep (09/08/12 to 06/09/12)	20 ± 20

Tadley location was left on for an extended period (12/07/12-13/08/12) due to access issues to the sampler.

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**ENVIRONMENT AGENCY REQUIREMENT FOR THE  
ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGHFIELD**

**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012**

**SURFACE WATER AND DRINKING WATER**

1. All major surface water outfalls at AWE(A) are sampled close to the site boundary by automatic samplers (with the exception of South Road Sewer and R019W which are collected by grab sample) which collect a composite sample over a monthly period. At AWE(B). The Burghfield Brook is sampled where it enters and leaves the site by automatic samplers (as above). Major surface water outfalls, which either enter the Burghfield Brook within the site boundary or outfall from the site perimeter are sampled monthly by grab sampling.
2. Grab samples are collected quarterly from water courses external to AWE(A) and AWE(B).
3. The AWE plc premises of Aldermaston and Burghfield each contain two deep drinking water boreholes which are sampled quarterly.
4. All water samples are routinely analysed for total alpha, total beta and tritium activity. If the total alpha activity exceeds 40 Bq.m<sup>-3</sup> the sample undergoes radiochemical analysis and alpha spectrometry for plutonium and uranium isotopes.
5. The indicative Limits of Detection (LoD) for surface water analyses are as follows:

Gross alpha	20 Bq.m <sup>-3</sup>
Gross beta	40 Bq.m <sup>-3</sup>
Total uranium	3.0 Bq.m <sup>-3</sup>
Total plutonium	2.5 Bq.m <sup>-3</sup>
Tritium	6 kBq.m <sup>-3</sup>
6. Where the level of radioactivity is less than the LoD, the indicative LoD value is tabulated as a positive result with a < (less than) sign in front of it.
7. Errors for the data represent 2 sigma counting statistics only.

**UKAS ACCREDITATION**

The results for surface water and drinking water samples, contained in the following 4 tables, were produced within the scope of UKAS accreditation.

The following accredited methods were used: Gross Alpha and Beta Activity AWE/ASc/L3/RCS/EM/AB/OP/E114, Tritium Activity AWE/ASc/L3/RCS/EM/31H/OP/E102, Uranium and Plutonium Activity AWE/ASc/L3/RCS/EM/ACT/OP/E103.

Any interpretations, opinions and comments presented are not within the scope of UKAS accreditation.

Any reported values in these tables outside the scope of the stated accredited methods are marked with the symbol N in the first column of data table, (or for individual values adjacent to the excluded value, (eg 1.234 N\*))

For other general information concerning UKAS accreditation see Appendix 1.

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**SURFACE WATER RESULTS FOR JULY TO SEPTEMBER 2012  
INTERNAL LOCATIONS TO AWE(A)**

UKAS	Location	Period	Total Alpha Bq.m <sup>-3</sup>	Total Beta Bq.m <sup>-3</sup>	Tritium kBq.m <sup>-3</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	R001W	Jul	391 ± 158	659 ± 43	<6	<2.5	97 ± 6
		Aug	375 ± 125	929 ± 48	<6	<2.5	170 ± 6
		Sep	227 ± 104	599 ± 44	<6	<2.5	77 ± 4
	R002W	Jul*	67 ± 17	597 ± 39	<6	<2.5	4 ± 1
		Aug	<20	148 ± 29	<6		
		Sep	20 ± 13	183 ± 31	<6		
	R003W	Jul	23 ± 11	259 ± 30	<6		
		Aug	<20	126 ± 32	<6		
		Sep	23 ± 10	174 ± 29	<6		
	R004W	Jul	50 ± 15	336 ± 35	<6	<2.5	3 ± 1
		Aug*	<20	116 ± 35	<6		
		Sep*	<20	148 ± 33	<6		
	R005W	Jul*	54 ± 25	166 ± 32	<6	<2.5	7 ± 1
		Aug	<111	359 ± 35	<6	<2.5	10 ± 1
		Sep	251 ± 142	584 ± 40	<6	<2.5	9 ± 1
	R006W	Jul	36 ± 14	200 ± 28	<6		
		Aug	<20	168 ± 29	<6		
		Sep	22 ± 13	184 ± 31	10 ± 2		
	R008W	Jul	24 ± 11	205 ± 32	<6		
		Aug	24 ± 12	137 ± 31	<6		
		Sep	<20	152 ± 33	<6		
	R009W	Jul	64 ± 20	381 ± 34	<6	<2.5	7 ± 1
		Aug	24 ± 17	221 ± 36	<6		
		Sep	26 ± 16	214 ± 32	<6		
	R010W	Jul*	46 ± 18	346 ± 37	<6	<2.5	7 ± 1
		Aug	<20	183 ± 31	<6		
		Sep	26 ± 14	218 ± 36	<6		
	R019W	Jul	24 ± 12	103 ± 25	29 ± 3		
		Aug	21 ± 16	122 ± 29	6 ± 2		
		Sep	<20	148 ± 29	6 ± 2		
	South Road Sewer	Jul	116 ± 25	812 ± 44	<6	<2.5	<3
		Aug	<24	732 ± 48	<6		
		Sep	35 ± 19	776 ± 46	<6		

\*Indicates sample obtained using automatic sampler and supplemented by grab sample to obtain required sample volume.

**Comment:** Uranium detected in the samples collected from R001W in August and September had a <sup>238</sup>U / <sup>234</sup>U ratio <1, which indicated that the two isotopes were not in equilibrium. This may indicate the trace presence of uranium due to AWE's discharges in addition to uranium already present naturally.

Uranium detected in all other samples had a <sup>238</sup>U / <sup>234</sup>U ratio = 1, which indicated that the two isotopes were in equilibrium, implying a purely natural origin.

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**SURFACE WATER RESULTS FOR JULY TO SEPTEMBER 2012  
INTERNAL LOCATIONS TO AWE(B)**

UKAS	Location	Period	Total Alpha Bq.m <sup>-3</sup>	Total Beta Bq.m <sup>-3</sup>	Tritium kBq.m <sup>-3</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	Burghfield Inlet R201W	Jul*	<20	219 ± 30	<6		
		Aug*	<20	181 ± 30	<6		
		Sep	21 ± 13	261 ± 36	<6		
	Burghfield Outlet R202W	Jul	<20	468 ± 41	<6		
		Aug	<20	275 ± 37	<6		
		Sep	<20	416 ± 42	<6		
	Burghfield Outfall 1 ROF01W	Jul	N/S	N/S	N/S	N/S	N/S
		Aug	N/S	N/S	N/S	N/S	N/S
		Sep	N/S	N/S	N/S	N/S	N/S
	Burghfield Outfall 2 ROF02W	Jul	<20	492 ± 37	<6		
		Aug	21 ± 12	241 ± 30	<6		
		Sep	23 ± 16	298 ± 35	<6		
	Burghfield Outfall 3 ROF03W	Jul	20 ± 30	793 ± 41	<6		
		Aug	67 ± 33	615 ± 39	<6	<2.5	35 ± 3
		Sep	41 ± 27	663 ± 44	<6	<2.5	26 ± 2
	Burghfield Outfall 4 ROF04W	Jul	<20	202 ± 29	<6		
		Aug	<20	247 ± 32	<6		
		Sep	<20	356 ± 37	<6		
	Burghfield Outfall 5 ROF05W	Jul	45 ± 21	512 ± 40	<6	<2.5	28 ± 3
		Aug	21 ± 21	143 ± 33	<6		
		Sep	37 ± 22	196 ± 37	<6		
	Burghfield Outfall 6 ROF06W	Jul	55 ± 20	407 ± 37	<6	<2.5	11 ± 1
		Aug	<20	109 ± 27	<6		
		Sep	<20	68 ± 28	<6		
	Burghfield Outfall 7 ROF07W	Jul	N/S	N/S	N/S	N/S	N/S
		Aug	N/S	N/S	N/S	N/S	N/S
		Sep	N/S	N/S	N/S	N/S	N/S
	Burghfield Outfall 8 ROF08W	Jul	44 ± 26	261 ± 30	<6	<2.5	32 ± 3
		Aug	80 ± 34	237 ± 31	<6	<2.5	47 ± 3
		Sep	37 ± 25	329 ± 35	<6		

**Sampling problem:** N/S Denotes No Sample. Outfall ROF01W and ROF07W had no flow at time of sampling.

\*Indicates sample obtained using automatic sampler and supplemented by grab sample to obtain required sample volume.

**Comment:** Uranium detected in the samples collected from ROF03W in August and September and ROF08W in August had a <sup>238</sup>U / <sup>234</sup>U ratio <1, which indicated that the two isotopes were not in equilibrium. This may indicate the trace presence of uranium due to AWE's discharges in addition to uranium already present naturally.

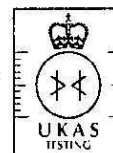
Uranium detected in all other samples had a <sup>238</sup>U / <sup>234</sup>U ratio = 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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**SURFACE WATER RESULTS FOR JULY TO SEPTEMBER 2012**

**EXTERNAL LOCATIONS**

UKAS	Location	Period	Total Alpha Bq.m <sup>-3</sup>	Total Beta Bq.m <sup>-3</sup>	Tritium kBq.m <sup>-3</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	Aldermaston Fishermans Lane	Jul	<20	327 ± 36	<6		
	Aldermaston Bridge	Jul	<20	87 ± 24	<6		
	Aldermaston Soke	Jul	<20	135 ± 28	<6		
	Silchester Sewage Works	Jul	<20	307 ± 35	<6		
	Red Lane	Jul	<20	125 ± 30	<6		
	Fobney Works	Jul	<20	121 ± 26	<6		
	Stratfield Mortimer	Jul	<20	274 ± 31	<6		

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**DRINKING WATER DEEP BOREHOLE RESULTS FOR JULY TO SEPTEMBER 2012**

UKAS	Sample ID	Period	Total alpha Bq.m <sup>-3</sup>	Total beta Bq.m <sup>-3</sup>	Tritium kBq.m <sup>-3</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	AWE(A) R017W	Jul	<20	165 ± 29	<6	<2.5	<3
	AWE(A) R020W	Jul	N/S	N/S	N/S	N/S	N/S
	AWE(B) R203W	Jul	<20	333 ± 36	<6	<2.5	<3
	AWE(B) R204W	Jul	N/S	N/S	N/S	N/S	N/S

Sampling problem: N/S Denotes No Sample. Boreholes R020W and R204W were not in use

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PERMIT REFERENCES: BZ1994 AND PP3790SZ

RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012

GROUNDWATER

1. Groundwater samples are taken quarterly from shallow boreholes located on-site at AWE(A) and AWE(B).
2. The Programme comprises 28 lined boreholes; 18 at AWE(A) and 10 at AWE(B) designed for monitoring purposes, and uses purging operations and dedicated tubing to prevent cross contamination.
3. All groundwater samples are analysed for total alpha, total beta and tritium activity. If the total alpha activity exceeds 40 Bqm<sup>-3</sup> and there is sufficient sample, it undergoes radiochemical analysis and alpha spectrometry for plutonium and uranium isotopes.
4. The indicative Limits of Detection (LoD) for groundwater activities are as follows:

Gross alpha	20 Bq.m <sup>-3</sup>
Gross Beta	40 Bq.m <sup>-3</sup>
Total uranium	3.0 Bq.m <sup>-3</sup>
Total plutonium	2.5 Bq.m <sup>-3</sup>
Tritium	6 kBq.m <sup>-3</sup>
5. Where the level of radioactivity is less than the LoD, the LoD value is tabulated as a positive result with a < (less than) sign in front of it.
6. Errors for the data represent 2 sigma counting statistics only.
7. A map of tritium concentration contours in shallow groundwater will be produced for this data if this is possible and if it is required.

UKAS ACCREDITATION

The results for groundwater samples, contained in the following table, were produced within the scope of UKAS accreditation.

The following accredited methods were used: Gross Alpha and Beta Activity AWE/ASc/L3/RCS/EM/AB/OP/E114, Tritium Activity AWE/ASc/L3/RCS/EM/3H/OP/E102, Uranium and Plutonium Activity AWE/ASc/L3/RCS/EM/ACT/OP/E103.

Any interpretations, opinions and comments presented are not within the scope of UKAS accreditation.

Any reported values in these tables outside the scope of the stated accredited methods are marked with the symbol N in the first column of data table, (or for individual values adjacent to the excluded value, (eg 1.234 N\*))

For other general information concerning UKAS accreditation see Appendix 1.

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**SHALLOW GROUNDWATER BOREHOLE RESULTS FOR JULY TO SEPTEMBER 2012  
INTERNAL LOCATIONS TO AWE(A)**

UKAS	Internal Location	Date of Sample	Total alpha Bq.m <sup>-3</sup>	Total beta Bq.m <sup>-3</sup>	Tritium kBq.m <sup>-3</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	BH0049	Jul	<20	50 ± 24	<6		
	BH0054	Jul	<20	61 ± 24	7 ± 2		
	BH0141	Jul	<20	89 ± 27	<6		
	BH0145	Jul	<20	103 ± 32	27 ± 3		
	BH0165	Jul	41 ± 24	125 ± 32	<6	<2.5	<3
	BH0170	Jul	<20	74 ± 26	<6		
	BH0178	Jul	23 ± 11	152 ± 28	<6		
	BH0201RD	Jul	27 ± 12	95 ± 27	<6		
	BH0242	Jul	<20	97 ± 32	<6		
	BH0302	Jul	35 ± 14	271 ± 35	<6		
	BH0372	Jul	<20	147 ± 26	<6		
	BH0398	Jul	45 ± 15	107 ± 27	<6	<2.5	34 ± 3
	BH0404	Jul	53 ± 20	38 ± 28	<6	<2.5	55 ± 4
	BH0495	Jul	<20	206 ± 32	<6		
	BH0550	Jul	47 ± 24	185 ± 28	<6	<2.5	41 ± 3
	BH0576	Jul	<20	71 ± 24	<6		
	BH43	Jul	<20	65 ± 26	<6		
	GRIFFRDBH3	Jul	<20	57 ± 29	<6		

Comment: Uranium detected in all samples had a <sup>238</sup>U / <sup>234</sup>U ratio = 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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**SHALLOW GROUNDWATER BOREHOLE RESULTS FOR JULY TO SEPTEMBER 2012  
INTERNAL LOCATIONS TO AWE(B)**

UKAS	Internal Location	Date of Sample	Total alpha Bq.m <sup>-3</sup>	Total beta Bq.m <sup>-3</sup>	Tritium kBq.m <sup>-3</sup>	<sup>238</sup> Pu + <sup>(239+240)</sup> Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	BB11	Aug	592 ± 129	301 ± 30	<6	<2.5	397 ± 18
	BH111	Aug	76 ± 22	126 ± 28	8 ± 3	<2.5	78 ± 5
	BH115	Aug	61 ± 29	54 ± 28	8 ± 3	<2.5	86 ± 5
	BH117	Aug	<20	203 ± 32	<6		
	BH123	Aug	61 ± 24	632 ± 39	<6	<2.5	38 ± 3
	BH201S	Aug	281 ± 134	723 ± 41	<6	<2.5	171 ± 7
	BH203S	Aug	100 ± 27	477 ± 37	10 ± 3	<2.5	10 ± 2
	BH225S	Aug	172 ± 90	414 ± 38	<6	<2.5	121 ± 11
	BHCMR009	Aug	41 ± 28	183 ± 29	<6	<2.5	128 ± 6
	BHOCT001	Aug	151 ± 75	397 ± 33	<6	<2.5	204 ± 7

**Comment:** Isotopic ratios in uranium from AWE(B) boreholes are consistent with previously measured values. Deviations observed are believed to be a result of secular disequilibrium as no additional anthropogenic isotopes were found to be present in previous samples sent on for further analysis (see QTR 3 2011 report for more detailed information).

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PERMIT REFERENCES: BZ1994 AND PP3790SZ

RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012

SILCHESTER SEWAGE WORKS SAMPLING

1. Liquid and Solid sewage samples are collected quarterly from Silchester Sewage Works.
2. Samples are routinely analysed for gross alpha, gross beta, isotopes of uranium and plutonium, and tritium. For the solid samples, results are reported as activity concentrations per unit mass in the dried samples. For the liquid samples, results are reported as activity concentrations per unit volume of the sample.
3. The indicative Limits of Detection (LoD) for analyses are as follows:

	Solid sample		Liquid sample
Gross alpha	0.10 kBq.kg <sup>-1</sup>		20 Bq.m <sup>-3</sup>
Gross beta	0.10 kBq.kg <sup>-1</sup>		40 Bq.m <sup>-3</sup>
Total uranium	0.0015 kBq.kg <sup>-1</sup>		3 Bq.m <sup>-3</sup>
Total plutonium	0.001 kBq.kg <sup>-1</sup>		2.5 Bq.m <sup>-3</sup>
Total tritium	20 Bq.kg <sup>-1</sup>	Water-bound tritium	6 kBq.m <sup>-3</sup>

4. Where the level of radioactivity is less than the LoD, the LoD value is tabulated as a positive result with a < (less than) sign in front of it.
5. Errors for the data represent 2 sigma counting statistics only.

UKAS ACCREDITATION

The results for sewage samples, contained in the following table, were produced within the scope of UKAS accreditation.

The following accredited methods were used: Tritium Activity AWE/ASc/L3/RCS/EM/3H/OP/E102, Uranium and Plutonium Activity AWE/ASc/L3/RCS/EM/ACT/OP/E102 (solid sample) and AWE/ASc/L3/RCS/EM/ACT/OP/E103 (liquid sample).

Any interpretations, opinions and comments presented are not within the scope of UKAS accreditation.

Any reported values in these tables outside the scope of the stated accredited methods are marked with the symbol N in the first column of data table, (or for individual values adjacent to the excluded value, (eg 1.234 N\*))

For other general information concerning UKAS accreditation see Appendix 1.

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**RESULTS OF SILCHESTER SEWAGE WORKS SAMPLING FOR THE PERIOD  
JULY TO SEPTEMBER 2012**

UKAS	Location	Date of Sample	$^{238}\text{Pu} + ^{(239+240)}\text{Pu}$ dry sample $\text{kBq}\cdot\text{kg}^{-1}$	Total Uranium dry sample $\text{kBq}\cdot\text{kg}^{-1}$	Total Tritium dry sample $\text{Bq}\cdot\text{kg}^{-1}$
		Silchester Sewage Works Solid Sample	05/07/12	<0.001	$0.03 \pm 0.002$
	Location	Date of Sample	$^{238}\text{Pu} + ^{(239+240)}\text{Pu}$ $\text{Bq}\cdot\text{m}^{-3}$	Total Uranium $\text{Bq}\cdot\text{m}^{-3}$	Water-bound Tritium $\text{kBq}\cdot\text{m}^{-3}$
	Silchester Sewage Works Liquid Sample	05/07/12	<2.5	$6 \pm 1$	<6

**Comments:** Uranium detected had a  $^{238}\text{U} / ^{234}\text{U}$  ratio = 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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PERMIT REFERENCES: BZ1994 AND PP3790SZ

RESULTS OF ENVIRONMENTAL MONITORING FOR THE YEAR 2012

SOIL SAMPLING ANNUAL SURVEY

1. Soil samples are collected annually from 7 external locations including one on-site at AWE(B). A further 13 sites are located internally near the perimeter fence and collections made annually. The samples were collected during the period 23<sup>rd</sup> - 25<sup>th</sup> July 2012.
2. A square turf is dug out and analyses are conducted on a composite layer (0-5cm).
3. Samples are routinely analysed for gross alpha, gross beta, tritium activity in free water, and isotopes of plutonium and uranium.
4. The indicative Limits of Detection (LoD) for dried soil activities are as follows:

Gross alpha	0.10 kBq.kg <sup>-1</sup>
Gross beta	0.10 kBq.kg <sup>-1</sup>
Total uranium	1.50 Bq.kg <sup>-1</sup>
Total plutonium	0.50 Bq.kg <sup>-1</sup>
Tritium	6.0 kBq.m <sup>-3</sup>
5. Where the level of radioactivity is less than the LoD, the LoD value is tabulated as a positive result with a < (less than) sign in front of it.
6. Errors for the data are presented as 2 sigma based on counting statistics only.

UKAS ACCREDITATION

The results for soil samples, contained in the following table, were produced within the scope of UKAS accreditation.

The following accredited methods were used: Gross Alpha and Beta Activity AWE/ASc/L3/RCS/EM/AB/OP/E115, Tritium Activity AWE/ASc/L3/RCS/EM/3H/OP/E103, Uranium and Plutonium Activity AWE/ASc/L3/RCS/EM/ACT/OP/E102.

Any interpretations, opinions and comments presented are not within the scope of UKAS accreditation.

Any reported values in these tables outside the scope of the stated accredited methods are marked with the symbol N in the first column of data table, (or for individual values adjacent to the excluded value, (eg 1.234 N\*))

For other general information concerning UKAS accreditation see Appendix 1.

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## SOIL SAMPLING RESULTS FOR THE ANNUAL SURVEY 2012

INTERNAL LOCATIONS TO AWE(A)  
SOIL DEPTH 0-5cm

UKAS	Location	Date of Sample	Soil Depth cm	Total Alpha in dry soil kBq.kg <sup>-1</sup>	Total Beta in dry soil kBq.kg <sup>-1</sup>	Tritium in free water kBq.m <sup>-3</sup>	Total uranium alpha in dry soil Bq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu in dry soil Bq.kg <sup>-1</sup>
	R001E	Jul	0-5 cm	0.64 ± 0.19	0.51 ± 0.04	9 ± 2	18.7 ± 2.0	<1.0
	R002E	Jul	0-5 cm	0.47 ± 0.16	0.49 ± 0.03	<6	13.4 ± 1.6	0.8 ± 0.4
	R009E	Jul	0-5 cm	0.46 ± 0.16	0.43 ± 0.03	<6	13.9 ± 1.5	0.6 ± 0.5
	R010E	Jul	0-5 cm	0.63 ± 0.16	0.64 ± 0.03	<6	20.2 ± 1.9	0.5 ± 0.4
	R012E	Jul	0-5 cm	0.56 ± 0.17	0.59 ± 0.04	<6	15.1 ± 1.6	<1.1
	R013E	Jul	0-5 cm	0.69 ± 0.18	0.51 ± 0.03	<6	17.4 ± 1.9	<0.8
	R014E	Jul	0-5 cm	0.76 ± 0.19	0.51 ± 0.03	<6	14.1 ± 1.5	0.7 ± 0.4
	R015E	Jul	0-5 cm	0.74 ± 0.19	0.58 ± 0.04	<6	28.6 ± 2.2	0.5 ± 0.4
	R016E	Jul	0-5 cm	<0.10	0.19 ± 0.02	<6	11.9 ± 1.4	<0.5
	R017E	Jul	0-5 cm	0.81 ± 0.20	0.57 ± 0.04	<6	22.1 ± 2.0	<0.5
	R018E	Jul	0-5 cm	0.72 ± 0.18	0.70 ± 0.04	<6	21.6 ± 2.1	0.9 ± 0.8
	R019E	Jul	0-5 cm	0.60 ± 0.18	0.56 ± 0.04	<6	17.7 ± 1.8	<1.7
	R020E	Jul	0-5 cm	0.61 ± 0.17	0.60 ± 0.04	<6	13.5 ± 1.7	0.7 ± 0.4

Comment: Uranium detected in all samples had a <sup>238</sup>U / <sup>234</sup>U ratio – 1, which indicated that the two isotopes were in equilibrium, implying a purely natural origin.

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**EXTERNAL LOCATIONS  
SOIL DEPTH 0-5cm**

UKAS	Location	Date of Sample	Soil Depth cm	Total Alpha in dry soil kBq.kg <sup>-1</sup>	Total Beta in dry soil kBq.kg <sup>-1</sup>	Tritium in free water kBq.m <sup>-3</sup>	Total uranium alpha in dry soil Bq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu in dry soil Bq.kg <sup>-1</sup>
	Reading	Jul	0-5 cm	0.54 ± 0.17	0.55 ± 0.04	<6	17.0 ± 1.7	<1.5
	Basingstoke	Jul	0-5 cm	0.59 ± 0.16	0.57 ± 0.03	<6	12.4 ± 1.4	<1.1
	Hannington	Jul	0-5 cm	0.75 ± 0.18	0.57 ± 0.03	<6	13.1 ± 1.5	<1.2
	Thatcham	Jul	0-5 cm	0.82 ± 0.19	0.56 ± 0.03	<6	17.7 ± 1.8	<1.0
	AWE Burghfield	Jul	0-5 cm	0.67 ± 0.17	0.78 ± 0.04	<6	13.6 ± 1.7	<0.7
	Silechester	Jul	0-5 cm	0.71 ± 0.17	0.71 ± 0.04	<6	14.7 ± 1.7	<0.5
	Aldermaston	Jul	0-5 cm	0.97 ± 0.21	0.67 ± 0.04	<6	13.9 ± 1.6	<1.1

**Comment:** Uranium detected in all samples had a <sup>238</sup>U / <sup>234</sup>U ratio = 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE YEAR 2012**

**VEGETATION SAMPLING ANNUAL SURVEY**

1. Vegetation samples are taken annually from a delineated area of approximately one square metre at the soil sampling locations.
2. Samples are routinely analysed for gross alpha, gross beta and tritium activity in free water. If the total alpha activity exceeds  $0.06 \text{ kBq.kg}^{-1}$  the sample undergoes radiochemical analysis and alpha spectrometry for plutonium and uranium isotopes. Results are reported as activity concentrations in the dried samples or free water as appropriate.
3. The indicative Limits of Detection for vegetation activities are as follows:-

Total alpha	$0.03 \text{ kBq.kg}^{-1}$
Total beta	$0.25 \text{ kBq.kg}^{-1}$
Total uranium	$0.30 \text{ Bq.kg}^{-1}$
Total plutonium	$0.10 \text{ Bq.kg}^{-1}$
Tritium	$6 \text{ kBq.m}^{-3}$

4. Where the level of radioactivity is less than the LoD, the LoD value is tabulated as a positive result with a < (less than) sign in front of it.
5. Errors in the data are presented as 2 sigma based on counting statistics only.

**UKAS ACCREDITATION**

The results for vegetation samples, contained in the following table, were produced within the scope of UKAS accreditation.

The following accredited methods were used: Gross Alpha and Beta Activity AWE/ASc/L3/RCS/EM/AB/OP/E115, Tritium Activity AWE/ASc/L3/RCS/EM/3H/OP/E103, Uranium and Plutonium Activity AWE/ASc/L3/RCS/EM/ACT/OP/E102.

Any interpretations, opinions and comments presented are not within the scope of UKAS accreditation.

Any reported values in these tables outside the scope of the stated accredited methods are marked with the symbol N in the first column of data table, (or for individual values adjacent to the excluded value, (eg 1.234 N\*))

For other general information concerning UKAS accreditation see Appendix 1.

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## VEGETATION SAMPLING RESULTS FOR ANNUAL SURVEY 2012

## INTERNAL LOCATIONS TO AWE(A)

UKAS	Location	Date of Sample	Total Alpha in dry sample kBq.kg <sup>-1</sup>	Total Beta in dry sample kBq.kg <sup>-1</sup>	Tritium in free water kBq.m <sup>-3</sup>	Total uranium alpha in dry sample Bq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu in dry sample Bq.kg <sup>-1</sup>
	R001V	Jul	<0.03	0.38 ± 0.01	<6		
	R002V	Jul	<0.03	0.37 ± 0.01	<6		
	R009V	Jul	<0.03	<0.25	12 ± 3		
	R010V	Jul	<0.03	0.38 ± 0.01	<6		
	R012V	Jul	<0.03	0.43 ± 0.01	7 ± 2		
	R014V	Jul	<0.03	0.25 ± 0.01	<6		
	R015V	Jul	<0.03	0.63 ± 0.01	<6		
	R016V	Jul	<0.03	0.45 ± 0.01	<6		
	R017V	Jul	<0.03	0.27 ± 0.01	<6		
	R018V	Jul	<0.03	0.29 ± 0.01	<6		
	R019V	Jul	<0.03	0.27 ± 0.01	<6		
	R020V	Jul	<0.03	0.29 ± 0.01	<6		

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## VEGETATION SAMPLING RESULTS FOR THE ANNUAL SURVEY 2012

## EXTERNAL LOCATIONS

UKAS	Location	Date of Sample	Total Alpha in dry sample kBq.kg <sup>-1</sup>	Total Beta in dry sample kBq.kg <sup>-1</sup>	Tritium in free water kBq.m <sup>-3</sup>	Total uranium alpha in dry sample Bq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu in dry sample Bq.kg <sup>-1</sup>
	Reading	Jul	<0.03	0.48 ± 0.01	<6		
	Basingstoke	Jul	<0.03	0.48 ± 0.01	<6		
	Hannington	Jul	<0.03	0.50 ± 0.01	<6		
	Thatcham	Jul	<0.03	0.36 ± 0.01	<6		
	AWE Burghfield	Jul	<0.03	0.47 ± 0.01	<6		
	Silchester	Jul	<0.03	0.32 ± 0.01	<6		
	Aldermaston	Jul	<0.03	0.57 ± 0.01	<6		

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**ENVIRONMENTAL PERMITTING REGULATIONS 2010**

**ENVIRONMENT AGENCY REQUIREMENT FOR THE  
ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGHFIELD**

**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012**

**MILK SAMPLING**

1. Subject to continuing availability, one litre of unprocessed milk is taken quarterly from six farms. Two farms are located to the south east, two to the east, one farm is located to the north east of AWE Aldermaston and one more distant from the AWE Aldermaston site in Compton acts as a control (background reference) location.
2. Samples are routinely analysed for tritium activity in free water, and isotopes of uranium and plutonium. Results are reported as activity concentrations in the free water of unprocessed milk as appropriate.
3. The indicative Limit of Detection (LoD) for activities in milk are:

Total uranium	3.0 Bq.m <sup>-3</sup>
Total plutonium	2.5 Bq.m <sup>-3</sup>
Tritium	6 kBq.m <sup>-3</sup>
4. Where the level of radioactivity is less than the LoD, the LoD value is tabulated as a positive result with a < (less than) sign in front of it.
5. Errors in the data are presented as 2 sigma based on counting statistics only.

**UKAS ACCREDITATION**

The results for milk samples, contained in the following table, were produced within the scope of UKAS accreditation.

The following accredited methods were used: Tritium Activity AWE/ASc/L3/RCS/EM/3H/OP/E103, Uranium and Plutonium Activity AWE/ASc/L3/RCS/EM/ACT/OP/E119.

Any interpretations, opinions and comments presented are not within the scope of UKAS accreditation.

Any reported values in these tables outside the scope of the stated accredited methods are marked with the symbol N in the first column of data table, (or for individual values adjacent to the excluded value, (eg 1.234 N\*))

For other general information concerning UKAS accreditation see Appendix I.

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**MILK SAMPLING RESULTS FOR JULY TO SEPTEMBER 2012**

UKAS	Location	Date taken	Tritium Activity in Free Water kBq.m <sup>-3</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> ) Pu Bq.m <sup>-3</sup> (milk)	Total uranium alpha Bq.m <sup>-3</sup> (milk)
		Tadley	17/07/12	<6	<2.5
	Compton	17/07/12	<6	<2.5	<3
	Farley Hill	17/07/12	<6	<2.5	<3
	Padworth	17/07/12	<6	<2.5	<3
	Sherfield on Loddon	17/07/12	<6	<2.5	<3

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**ENVIRONMENTAL PERMITTING REGULATIONS 2010**

**ENVIRONMENT AGENCY REQUIREMENT FOR THE  
ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGFIELD**

**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD JULY TO SEPTEMBER 2012**

**SAMPLER DOWNTIME**

**Automatic Water Samplers**

The following table details the automatic water samplers which, experienced downtime during the period June to August 2012 (the period surface water samples in this report were collected).

<b>Location</b>	<b>Estimated Period of Sampler Downtime</b>	<b>Sampler Fault</b>	<b>Corrective Action</b>
R009W	25/07/12-26/07/12	No Power	Power reinstated and sampler reset
R201W	01/08/12-08/08/12	Unit not sampling	Reset sampler

**High Volume Air Samplers**

The following table details the high volume air samplers which, experienced downtime during the period July to September (the period high volume air filter samples in this report were collected).

<b>Location</b>	<b>Estimated Period of Sampler Downtime</b>	<b>Sampler Fault</b>	<b>Corrective Action</b>
Basingstoke	28/06/12 – 20/07/12	Power failure	Power reinstated

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Appendix 1.

General Notes on UKAS Accreditation

Results within the scope of UKAS accreditation are clearly marked as such within the text of the report. In addition the relevant data tables are marked with the UKAS accreditation symbol.

The accredited methods used, and exclusions to these, are as stated in the report.

Results outside the scope of UKAS accreditation are marked *N*.

The errors and detection limits presented in this report are based on counting errors only and with a confidence limit of 1.96 sigma (95%). A full uncertainty estimation is available from the laboratory on request.

The address of the accredited laboratory is:

Analytical Sciences  
HTS/ DS  
Building [REDACTED]  
AWE Aldermaston, Reading, Berks. RG7 4 PR

Tritium in Air monitoring results have been provided under contract by Radio Carbon Dating. These results as indicated in the report table are not UKAS accredited.

These results are produced on behalf of the Head of Environment (HoE), Assurance Directorate, AWE.

These results shall not be reproduced without the permission of HoE and the originator.

The reported measurement results, only, are within the scope of accreditation. Opinions, comments and interpretations are not part of the scope of accreditation

Those results, not contained in tables marked with the accreditation symbol, or so stated, are not within the scope of accreditation's currently held by the laboratory.