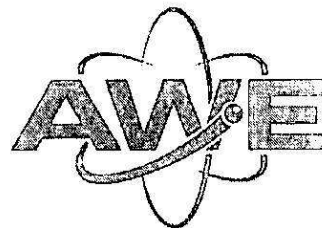


Reply to: RICC, [REDACTED]  
Direct Dial: [REDACTED]  
Direct Fax: [REDACTED]  
E-mail: [REDACTED]  
Our Ref: RSA 11- 187N  
Your Ref: BZ1994/PP3790SZ



Mr S Parr  
Lead Nuclear Regulator  
Nuclear Regulation Group (South)  
Environment Agency  
Red Kite House  
Howbery Park  
Wallingford  
Oxfordshire OX10 8BD

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

14<sup>th</sup> September 2012

Dear Mr Parr,

**ENVIRONMENTAL PERMITTING REGULATIONS 2010 SI No 675  
Permit References BZ1994 and PP3790SZ,  
AWE Aldermaston and Burghfield Routine Environmental Monitoring  
Environment Monitoring Report April – June 2012.**

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

The only result of note is that for the Contractors Gate High Volume Air Sampler R009H. This recorded a confirmed result of 6028nBq/m<sup>3</sup> for the 3<sup>rd</sup> May to the 17<sup>th</sup> May. No other HVAS's regulatory or otherwise have shown an elevated result in this period and there were no abnormal activities/discharges for the period. Our investigations have been inconclusive as to the source of this result and as yet there has been no repeat result in this location.

You have been already been made aware of access and power problems associated with the Basingstoke HVAS which manifest themselves in this quarterly report.

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]

Head of Environment

Encs.

AWE/ASc/L4/PG/EM/EPR/12/Q2

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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 APRIL TO JUNE 2012**

**SUMMARY**

This report contains results from the AWE Environmental Permitting Regulations (EPR) Environmental Monitoring Programme for the period April to June 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

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

Prepared by:



Name (Print)



Date: 11/09/12

Results  
Authorised by:



Authorised Person (Print)



Date: 11/09/12

Issue of Report  
Authorised by:



Nominated Person (Print)



Date: 11/09/12

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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 APRIL TO JUNE 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:

	HVAS
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 APRIL TO JUNE 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	22/03/12 - 04/04/12	<30	645 ± 59	15.54
N		04/04/12 - 19/04/12	<30	176 ± 32	6.29
N		19/04/12 - 03/05/12	<30	87 ± 22	5.97
N		03/05/12 - 17/05/12	<30	130 ± 40	7.08
N		17/05/12 - 31/05/12	<30	1346 ± 100	16.24
N		31/05/12 - 14/06/12	<30	138 ± 28	7.30
N		14/06/12 - 28/06/12	<30	197 ± 31	10.84
N	R002H	22/03/12 - 04/04/12	<30	914 ± 70	26.06
N		04/04/12 - 19/04/12	<30	234 ± 39	10.06
N		19/04/12 - 03/05/12	<30	100 ± 25	6.65
N		03/05/12 - 17/05/12	<30	129 ± 27	6.36
N		17/05/12 - 31/05/12	32 ± 46	597 ± 72	18.18
N		31/05/12 - 14/06/12	<30	113 ± 33	7.41
N		14/06/12 - 28/06/12	<30	173 ± 31	9.84
N	R004H #	22/03/12 - 04/04/12	<30	79 ± 16	2.00
N		04/04/12 - 19/04/12	<30	<40	1.01
N	R006H	22/03/12 - 04/04/12	<30	641 ± 56	14.33
N		04/04/12 - 19/04/12	<30	172 ± 32	5.74
N		19/04/12 - 03/05/12	<30	96 ± 23	5.37
N		03/05/12 - 17/05/12	<30	71 ± 25	5.09
N		17/05/12 - 31/05/12	<30	639 ± 55	16.81
N		31/05/12 - 14/06/12	<30	149 ± 44	6.42
N		14/06/12 - 28/06/12	<30	380 ± 46	12.14
N	R007H	22/03/12 - 04/04/12	<30	1268 ± 94	28.57
N		04/04/12 - 19/04/12	<30	316 ± 48	12.27
N		19/04/12 - 03/05/12	<30	134 ± 32	8.35
N		03/05/12 - 17/05/12	<30	162 ± 38	6.89
N		17/05/12 - 31/05/12	33 ± 28	783 ± 83	28.56
N		31/05/12 - 14/06/12	<30	205 ± 35	9.37
N		14/06/12 - 28/06/12	<30	284 ± 45	13.18
N	R009H	22/03/12 - 04/04/12	<30	799 ± 68	18.43
N		04/04/12 - 19/04/12	<30	259 ± 40	8.98
N		19/04/12 - 03/05/12	<30	155 ± 29	7.64
N		03/05/12 - 17/05/12	6028 ± 179*	191 ± 36	7.20
N		17/05/12 - 31/05/12	<30	680 ± 58	14.50
N		31/05/12 - 14/06/12	<30	153 ± 28	7.47
N		14/06/12 - 28/06/12	<30	249 ± 37	11.43

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## HIGH VOLUME AIR SAMPLER RESULTS FOR APRIL TO JUNE 2012

## INTERNAL 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	R011H #	19/04/12 - 03/05/12	<30	170 ± 31	8.37
N		03/05/12 - 17/05/12	<30	N/R	8.47
N		17/05/12 - 31/05/12	<30	884 ± 89	18.44
N		31/05/12 - 14/06/12	<30	150 ± 36	9.35
N		14/06/12 - 28/06/12	<30	309 ± 47	11.99
N	R072H	22/03/12 - 04/04/12	47 ± 26	915 ± 66	23.31
N		04/04/12 - 19/04/12	<30	263 ± 35	7.05
N		19/04/12 - 03/05/12	<30	144 ± 28	6.71
N		03/05/12 - 17/05/12	<30	147 ± 26	6.05
N		17/05/12 - 31/05/12	54 ± 61	908 ± 78	37.41
N		31/05/12 - 14/06/12	<30	N/R	7.10
N		14/06/12 - 28/06/12	<30	173 ± 31	8.81

**Comment:** \* Denotes result exceeded the AWE EPR Arrangements for Environmental Monitoring for Radioactivity, threshold level for notification to the Environment Agency for total plutonium in HVAS samples of 100 nBq.m<sup>-3</sup>. The result was formally notified to the Environment Agency.

# R004H was removed from the programme on 19/04/12 and a new version HVAS sampler (High Vol 3000) at a new location (R011H) became operational on 19/04/12. This regulatory location; R011H, (approved by the Environment Agency) now replaces R004H and results appear in this report and will feature in all subsequent reports.

N/R Denotes No Result. No result was obtained for uranium at R011H (for the collection period 03/05/12-17/05/12) and R072H (for the collection period 31/05/12-14/06/12) as both the original result and repeat analysis had low recovery. Therefore the result was not viable.

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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## HIGH VOLUME AIR SAMPLER RESULTS FOR APRIL TO JUNE 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	22/03/12 - 04/04/12	<30	589 ± 53	12.25
N		04/04/12 - 19/04/12	<30	95 ± 23	5.04
N		19/04/12 - 03/05/12	<30	80 ± 21	2.24
N		03/05/12 - 17/05/12	<30	95 ± 23	4.70
N		17/05/12 - 31/05/12	<30	<40	11.02
N		31/05/12 - 14/06/12	<30	74 ± 43	5.78
N		14/06/12 - 28/06/12	<30	114 ± 32	6.81
N	Thatcham	22/03/12 - 04/04/12	<30	744 ± 60	16.06
N		04/04/12 - 19/04/12	<30	415 ± 46	5.61
N		19/04/12 - 03/05/12	<30	88 ± 20	6.51
N		03/05/12 - 17/05/12	<30	156 ± 28	6.55
N		17/05/12 - 31/05/12	<30	710 ± 78	20.52
N		31/05/12 - 14/06/12	<30	212 ± 31	8.72
N		14/06/12 - 28/06/12	<30	294 ± 48	10.92
N	Reading	22/03/12 - 04/04/12	<30	684 ± 59	20.40
N		04/04/12 - 19/04/12	<30	245 ± 40	8.18
N		19/04/12 - 03/05/12	<30	103 ± 22	6.39
N		03/05/12 - 17/05/12	<30	204 ± 34	8.21
N		17/05/12 - 31/05/12	<30	669 ± 55	37.60
N		31/05/12 - 14/06/12	N/R	339 ± 68	13.38
N		14/06/12 - 28/06/12	<30	208 ± 33	10.06
N	Basingstoke	22/03/12 - 04/04/12	<30	799 ± 58	18.95
N		04/04/12 - 19/04/12	<30	407 ± 52	14.30
N		19/04/12 - 03/05/12	<30	960 ± 77	38.35
N		03/05/12 - 17/05/12	<30	<40	0.89
N		17/05/12 - 31/05/12	N/S	N/S	-
N		31/05/12 - 14/06/12	N/S	N/S	-
N		14/06/12 - 28/06/12	N/S	N/S	-
N	Tadley	22/03/12 - 10/04/12	<30	431 ± 49	11.89
N		04/04/12 - 19/04/12	<30	101 ± 36	5.52
N		19/04/12 - 03/05/12	<30	<40	2.37
N		03/05/12 - 17/05/12	<30	42 ± 20	2.33
N		17/05/12 - 31/05/12	<30	788 ± 66	12.76
N		31/05/12 - 14/06/12	<30	91 ± 44	6.05
N		14/06/12 - 28/06/12	<30	135 ± 27	8.44
N	Silchester	22/03/12 - 04/04/12	<30	48 ± 15	1.53
N		04/04/12 - 19/04/12	<30	141 ± 32	6.65
N		19/04/12 - 03/05/12	<30	118 ± 27	5.63
N		03/05/12 - 17/05/12	<30	110 ± 28	5.68
N		17/05/12 - 31/05/12	<30	576 ± 79	15.43
N		31/05/12 - 14/06/12	<30	114 ± 23	6.25
N		14/06/12 - 28/06/12	<30	145 ± 27	8.30

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## HIGH VOLUME AIR SAMPLER RESULTS FOR APRIL TO JUNE 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	Mortimer	22/03/12 - 04/04/12	<30	606 ± 56	17.76
N		04/04/12 - 19/04/12	<30	192 ± 36	7.27
N		19/04/12 - 03/05/12	<30	122 ± 27	6.60
N		03/05/12 - 17/05/12	<30	153 ± 37	6.98
N		17/05/12 - 31/05/12	<30	801 ± 67	14.98
N		31/05/12 - 14/06/12	<30	152 ± 29	7.96
N		14/06/12 - 28/06/12	<30	169 ± 32	11.04
N	Aldermaston	22/03/12 - 04/04/12	<30	965 ± 85	22.06
N		04/04/12 - 19/04/12	<30	358 ± 55	10.44
N		19/04/12 - 03/05/12	<30	122 ± 26	6.26
N		03/05/12 - 17/05/12	<30	240 ± 51	7.10
N		17/05/12 - 31/05/12	<30	634 ± 65	16.17
N		31/05/12 - 14/06/12	<30	208 ± 37	8.35
N		14/06/12 - 28/06/12	46 ± 25	205 ± 35	9.41
N	AWE Burghfield	22/03/12 - 04/04/12	<30	1089 ± 76	26.06
N		04/04/12 - 19/04/12	<30	301 ± 44	10.96
N		19/04/12 - 03/05/12	<30	200 ± 36	9.84
N		03/05/12 - 17/05/12	<30	249 ± 50	9.92
N		17/05/12 - 31/05/12	<30	813 ± 85	19.34
N		31/05/12 - 14/06/12	<30	224 ± 45	10.16
N		14/06/12 - 28/06/12	<30	311 ± 46	14.42

**Sampling problem:** N/R Denotes No Result. No result was obtained for plutonium at R133H (for the collection period 31/05/12-14/06/12) as both the original result and repeat analysis had low recovery. Therefore the result was not viable.

N/S Denotes No Sample. Due to construction work near the Basingstoke HVAS the power to the machine was cut between 03/05/12 - 17/05/12. The power issue to the HVAS continued for a number of weeks and therefore there are no results from this location for the last three collection periods in this quarter.

Tadley HVAS filter was left on for an extended period (22/03/12-10/04/12) due to access issues to the HVAS.

The HVAS filters were collected a day earlier than scheduled (22/03/12-04/04/12) due to the Easter Bank Holiday weekend (a total of 13 days). This meant that the subsequent collection (04/04/12-19/04/12) was out for a slightly longer time period (15 days) to enable collections to go back to the routine fortnightly filter change.

**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 APRIL TO JUNE 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 APRIL TO JUNE 2012**

**Table 1 HTO Tritium Results**

UKAS	Location	Period	Tritium (as HTO) mBqm <sup>-3</sup>
N	AWE – North	Mar – Apr (22/03/12 – 19/04/12)	35 ± 5
N		Apr – May (19/04/12 – 17/05/12)	30 ± 5
N		May – June (17/05/12 – 14/06/12)	25 ± 5
N	AWE – East	Mar – Apr (22/03/12 – 19/04/12)	15 ± 5
N		Apr – May (19/04/12 – 17/05/12)	<25
N		May – June (17/05/12 – 14/06/12)	<25
N	AWE – South	Mar – Apr (22/03/12 – 19/04/12)	<20
N		Apr – May (19/04/12 – 17/05/12)	<25
N		May – June (17/05/12 – 14/06/12)	<25
N	AWE – West	Mar – Apr (22/03/12 – 19/04/12)	35 ± 10
N		Apr – May (19/04/12 – 17/05/12)	<25
N		May – June (17/05/12 – 14/06/12)	<30
N	AWE – H (Old)	Mar – Apr (22/03/12 – 19/04/12)	<20
N		Apr – May (19/04/12 – 17/05/12)	30 ± 10
N		May – June (17/05/12 – 14/06/12)	<30
N	AWE – L (New)	Mar – Apr (22/03/12 – 19/04/12)	40 ± 10
N		Apr – May (19/04/12 – 17/05/12)	35 ± 10
N		May – June (17/05/12 – 14/06/12)	40 ± 10
N	Tadley	Mar – Apr (22/03/12 – 19/04/12)	20 ± 5
N		Apr – May (19/04/12 – 17/05/12)	<25
N		May – June (17/05/12 – 14/06/12)	<30
N	Control	Mar – Apr (22/03/12 – 19/04/12)	<20
N		Apr – May (19/04/12 – 17/05/12)	<25
N		May – June (17/05/12 – 14/06/12)	<30

**Table 2 HT Tritium Results**

UKAS	Location	Period	Tritium (as HT) mBqm <sup>-3</sup>
N	AWE – To	Mar – Apr (22/03/12 – 19/04/12)	>15 <95 <sup>†</sup>
N		Apr – May (19/04/12 – 17/05/12)	10 ± 15
N		May – June (17/05/12 – 14/06/12)	<65
N	AWE – Tn	Mar – Apr (22/03/12 – 19/04/12)	235 ± 30
N		Apr – May (19/04/12 – 17/05/12)	30 ± 15
N		May – June (17/05/12 – 14/06/12)	15 ± 15

<sup>†</sup> HT is calculated by subtracting the HTO value from the combined HTO and HT measurement. Where HTO is at the limit of detection (LOD), the HT results are presented as a range based on the value and associated uncertainty, 3 sigma and the minimum and maximum values of the LOD value for the HTO measurement subtracted.

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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 APRIL TO JUNE 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, R006W 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  $40 \text{ Bq.m}^{-3}$  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	$20 \text{ Bq.m}^{-3}$
Gross beta	$40 \text{ Bq.m}^{-3}$
Total uranium	$3.0 \text{ Bq.m}^{-3}$
Total plutonium	$2.5 \text{ Bq.m}^{-3}$
Tritium	$6 \text{ kBq.m}^{-3}$
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/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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**SURFACE WATER RESULTS FOR APRIL TO JUNE 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	Apr	668 ± 161	1086 ± 50	<6	<2.5	132 ± 6
		May	<125	995 ± 48	<6	<2.5	187 ± 10
		Jun*	302 ± 85	562 ± 41	<6	<2.5	111 ± 7
	R002W	Apr*	<20	149 ± 25	<6		
		May*	21 ± 13	212 ± 29	<6		
		Jun*	<20	134 ± 25	<6		
	R003W	Apr*	20 ± 11	146 ± 33	<6		
		May	<20	259 ± 32	<6		
		Jun	<20	60 ± 26	<6		
	R004W	Apr*	<20	83 ± 29	<6		
		May*	31 ± 13	287 ± 30	<6		
		Jun	<20	73 ± 29	<6		
	R005W	Apr*	<116	376 ± 36	<6	<2.5	3 ± 1
		May*	<49	201 ± 31	<6	N/A	N/A
		Jun	<210	465 ± 38	<6	<2.5	8 ± 1
	R006W	Apr*	22 ± 12	174 ± 27	<6		
		May	33 ± 14	180 ± 31	<6		
		Jun	<20	158 ± 27	<6		
	R008W	Apr*	<20	124 ± 24	<6		
		May	45 ± 16	284 ± 31	<6	<2.5	<3
		Jun	<20	75 ± 24	<6		
	R009W	Apr	77 ± 23	274 ± 31	<6	<2.5	8 ± 1
		May	35 ± 22	271 ± 31	<6		
		Jun	27 ± 15	194 ± 30	<6		
	R010W	Apr	21 ± 17	195 ± 33	<6		
		May	<20	254 ± 30	<6		
		Jun*	20 ± 14	175 ± 32	<6		
	R019W	Apr	23 ± 15	95 ± 25	<6		
		May	202 ± 33	924 ± 45	<6	<2.5	9 ± 2
		Jun	39 ± 12	189 ± 30	<6		
	South Road Sewer	Apr	1328 ± 285	813 ± 43	<6	<3	3 ± 2
		May	151 ± 37	959 ± 45	<6	<2.5	4 ± 1
		Jun	<20	271 ± 32	<6		

Sampling problem: N/A Denotes sample not sent on for further analysis.

\*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 April, May and June 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.

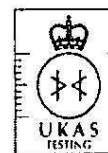
Uranium detected in all other samples had a <sup>238</sup>U / <sup>234</sup>U ratio = 1, which indicated that the two isotopes were in equilibrium, implying a natural origin.

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**SURFACE WATER RESULTS FOR APRIL TO JUNE 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	Apr	<20	210 ± 30	<6		
		May*	<20	195 ± 30	<6		
		Jun*	<20	200 ± 33	<6		
	Burghfield Outlet R202W	Apr	28 ± 19	332 ± 36	<6		
		May	<20	259 ± 32	<6		
		Jun	46 ± 17	278 ± 31	<6	<2.5	16 ± 2
	Burghfield Outfall 1 ROF01W	Apr	N/S	N/S	N/S	N/S	N/S
		May	N/S	N/S	N/S	N/S	N/S
		Jun	61 ± 42	229 ± 34	<6	<2.5	23 ± 2
	Burghfield Outfall 2 ROF02W	Apr	39 ± 17	231 ± 28	<6		
		May	<20	260 ± 31	<6		
		Jun	41 ± 15	396 ± 35	<6	<2.5	29 ± 3
	Burghfield Outfall 3 ROF03W	Apr	95 ± 37	671 ± 45	<6	<2.5	23 ± 3
		May	40 ± 31	475 ± 36	<6	<2.5	47 ± 4
		Jun	42 ± 18	297 ± 31	<6	<2.5	25 ± 3
	Burghfield Outfall 4 ROF04W	Apr	54 ± 18	296 ± 35	<6	<2.5	20 ± 2
		May	<20	192 ± 29	<6		
		Jun	62 ± 18	246 ± 33	<6	<2.5	34 ± 3
	Burghfield Outfall 5 ROF05W	Apr	88 ± 33	190 ± 32	<6	<2.5	37 ± 3
		May	<20	120 ± 33	<6		
		Jun	52 ± 15	137 ± 31	<6	<2.5	25 ± 2
	Burghfield Outfall 6 ROF06W	Apr	62 ± 22	109 ± 25	<6	<2.5	13 ± 2
		May	<20	75 ± 30	<6		
		Jun	30 ± 14	139 ± 27	<6		
	Burghfield Outfall 7 ROF07W	Apr	N/S	N/S	N/S	N/S	N/S
		May	N/S	N/S	N/S	N/S	N/S
		Jun	40 ± 14	318 ± 35	<6	<2.5	19 ± 2
	Burghfield Outfall 8 ROF08W	Apr	158 ± 64	248 ± 28	<6	<2.5	106 ± 5
		May	32 ± 33	271 ± 32	<6		
		Jun	73 ± 21	269 ± 31	<6	<2.5	35 ± 3

**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 ROF05W and ROF08W in April, ROF03W in May and ROF02W in June 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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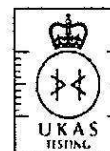
**SURFACE WATER RESULTS FOR APRIL TO JUNE 2012**

**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	Apr	<20	155 ± 30	<6		
	Aldermaston Bridge	Apr	21 ± 14	103 ± 25	<6		
	Aldermaston Soke	Apr	<20	160 ± 29	<6		
	Silchester Sewage Works	Apr	<20	459 ± 35	<6		
	Red Lane	Apr	<20	183 ± 31	<6		
	Fobney Works	Apr	24 ± 13	141 ± 30	<6		
	Stratfield Mortimer	Apr	<20	303 ± 31	<6		

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**DRINKING WATER DEEP BOREHOLE RESULTS FOR APRIL TO JUNE 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	Apr	30 ± 14	117 ± 26	<6	<2.5	<3
	AWE(A) R020W	Apr	N/S	N/S	N/S	N/S	N/S
	AWE(B) R203W	Apr	26 ± 16	327 ± 30	<6	<2.5	<3
	AWE(B) R204W	Apr	26 ± 14	300 ± 31	<6	<2.5	<3

Sampling problem: N/S Denotes No Sample. Borehole R020W was not in use.

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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 2012

FRESHWATER SEDIMENT ANNUAL SURVEY

1. Sediments are collected annually from most surface water monitoring locations, both internal and external. Samples are taken six monthly at locations close to discharge points.
2. Sediments are routinely analysed for gross alpha, gross beta, and isotopes of uranium and plutonium. Results are reported as activity concentrations in the dried sediment samples.
3. The indicative Limits of Detection (LoD) for sediment analyses are as follows:

Gross alpha	0.30 kBq.kg <sup>-1</sup>
Gross beta	0.25 kBq.kg <sup>-1</sup>
Total uranium	0.0015 kBq.kg <sup>-1</sup>
Total plutonium	0.001 kBq.kg <sup>-1</sup>

1. 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.
2. Errors for the data represent 2 sigma counting statistics only.
3. Results are with respect to dry mass.

UKAS ACCREDITATION

The results for sediment samples, contained in the following 3 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/E115, 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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## FRESHWATER SEDIMENT RESULTS FOR ANNUAL SURVEY APRIL 2012

## INTERNAL LOCATIONS TO AWE(A)

UKAS	Location	Date of Sample	Total Alpha kBq.kg <sup>-1</sup>	Total Beta kBq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu kBq.kg <sup>-1</sup>	Total Uranium in dry kBq.kg <sup>-1</sup>
	R001S	Apr	1.23 ± 0.22	0.95 ± 0.04	0.012 ± 0.002	0.111 ± 0.005
	R002S	Apr	0.43 ± 0.08	0.30 ± 0.01	0.001 ± 0.0003	0.077 ± 0.003
	R003S	Apr	0.71 ± 0.20	0.97 ± 0.05	<0.001	0.013 ± 0.002
	R004S	Apr	0.61 ± 0.18	0.62 ± 0.04	<0.001	0.011 ± 0.001
	R005S	Apr	1.46 ± 0.24	0.78 ± 0.04	0.005 ± 0.001	0.132 ± 0.005
	R006S ( <i>six monthly</i> )	Apr	1.08 ± 0.22	0.71 ± 0.04	0.004 ± 0.001	0.018 ± 0.002
	R008S	Apr	0.80 ± 0.19	0.80 ± 0.04	<0.001	0.020 ± 0.002
	R009S	Apr	0.85 ± 0.16	0.66 ± 0.03	0.015 ± 0.002	0.041 ± 0.002
	R010S	Apr	1.36 ± 0.24	0.66 ± 0.04	0.001 ± 0.0004	0.02 ± 0.002
	R019S	Apr	1.61 ± 0.26	0.81 ± 0.04	0.003 ± 0.001	0.048 ± 0.003

**Comments:**

R002S sampling location was approximately 80 metres from that stated in the EPR Arrangements Document.  
R003S sampling location was approximately 65 metres from that stated in the EPR Arrangements Document.  
R005S sampling location was approximately 170 metres from that stated in the EPR Arrangements Document.  
R006S sampling location was approximately 14 metres from that stated in the EPR Arrangements Document.  
R010S sampling location was approximately 55 metres from that stated in the EPR Arrangements Document.  
R019S sampling location was approximately 775 metres from that stated in the EPR Arrangements Document.

A number of monitoring locations listed above have no sediment present (for example: some of the locations are manholes). Where this is the case, AWE has taken a sample from the closest accessible location downstream of the collection location (stated in the EPR Arrangements Document).

**Comments:** Plutonium was detected marginally above detection level in the majority of samples.

Uranium detected in the sample collected from R001S 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 the samples collected from R002S and R005S 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.

(*six monthly*). Samples are collected from these locations biannually.

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## FRESHWATER SEDIMENT RESULTS FOR ANNUAL SURVEY APRIL 2012

## INTERNAL LOCATIONS TO AWE(B)

UKAS	Location	Date of Sample	Total Alpha kBq.kg <sup>-1</sup>	Total Beta kBq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239-240</sup> )Pu kBq.kg <sup>-1</sup>	Total Uranium in dry kBq.kg <sup>-1</sup>
	Burghfield Inlet R201S	Apr	0.91 ± 0.21	0.81 ± 0.04	<0.001	0.028 ± 0.003
	Burghfield Outlet R202S	Apr	0.81 ± 0.19	0.89 ± 0.04	<0.001	0.034 ± 0.003
	ROF01S	Apr	N/S	N/S	N/S	N/S
	ROF02S	Apr	N/S	N/S	N/S	N/S
	ROF03S	Apr	N/S	N/S	N/S	N/S
	ROF04S	Apr	N/S	N/S	N/S	N/S
	ROF05S	Apr	0.84 ± 0.20	0.85 ± 0.04	<0.001	0.035 ± 0.003
	ROF06S	Apr	N/S	N/S	N/S	N/S
	ROF07S	Apr	0.81 ± 0.21	0.64 ± 0.04	<0.001	0.018 ± 0.002
	ROF08S	Apr	0.93 ± 0.21	0.87 ± 0.04	<0.001	0.057 ± 0.004

Sampling problem: N/S. No sample was obtained. No sediment was present at these locations.

ROF07S sampling location was approximately 15 metres from that stated in the EPR Arrangements Document.

The monitoring location listed above had no sediment present. Where this is the case, AWE has taken a sample from the closest accessible location downstream of the collection location (stated in the EPR Arrangements Document).

Comments: Uranium detected in the samples collected from R202S and ROF05S 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.

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## FRESHWATER SEDIMENT RESULTS FOR ANNUAL SURVEY APRIL 2012

## EXTERNAL LOCATIONS

UKAS	Location	Date of Sample	Total Alpha kBq.kg <sup>-1</sup>	Total Beta kBq.kg <sup>-1</sup>	<sup>238</sup> Pu + ( <sup>239</sup> + <sup>240</sup> )Pu kBq.kg <sup>-1</sup>	Total Uranium in dry kBq.kg <sup>-1</sup>
	Aldermaston Sewage Works (Six Monthly)	Apr	0.76 ± 0.20	0.64 ± 0.04	0.001 ± 0.0004	0.02 ± 0.002
	Aldermaston Bridge	Apr	0.40 ± 0.15	0.43 ± 0.03	<0.001	0.008 ± 0.001
	Aldermaston Soke	Apr	0.64 ± 0.19	0.41 ± 0.03	0.001 ± 0.0004	0.016 ± 0.002
	Silchester Sewage Works (Six Monthly)	Apr	0.79 ± 0.20	0.53 ± 0.04	<0.001	0.015 ± 0.002
	South Road Sewer	Apr	N/S	N/S	N/S	N/S
	Red Lane	Apr	0.97 ± 0.20	0.68 ± 0.04	<0.001	0.019 ± 0.002
	Fobney Works	Apr	0.47 ± 0.16	0.48 ± 0.03	<0.001	0.017 ± 0.002
	Stratfield Mortimer	Apr	0.91 ± 0.20	0.70 ± 0.04	<0.001	0.015 ± 0.002

Sampling problem: N/S. No sample was obtained. No sediment was present at this location.

Comments: 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.

(six monthly). Samples are collected from these locations biannually.

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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 APRIL TO JUNE 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  $40 \text{ Bq.m}^{-3}$  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	$20 \text{ Bq.m}^{-3}$
Gross Beta	$40 \text{ Bq.m}^{-3}$
Total uranium	$3.0 \text{ Bq.m}^{-3}$
Total plutonium	$2.5 \text{ Bq.m}^{-3}$
Tritium	$6 \text{ kBq.m}^{-3}$
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 APRIL TO JUNE 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	Apr	<20	49 ± 27	<6		
	BH0054	Apr	<20	88 ± 25	<6		
	BH0141	Apr	<20	105 ± 26	<6		
	BH0145	Apr	<20	131 ± 27	27 ± 3		
	BH0165	Apr	24 ± 26	142 ± 34	<6		
	BH0170	Apr	<20	75 ± 30	<6		
	BH0178	Apr	25 ± 14	189 ± 30	<6		
	BH0201RD	Apr	41 ± 14	108 ± 27	<6	<2.5	53 ± 3
	BH0242	Apr	<20	100 ± 28	<6		
	BH0302	Apr	<20	111 ± 33	<6		
	BH0372	Apr	29 ± 14	146 ± 27	<6		
	BH0398	Apr	55 ± 18	164 ± 25	<6	<2.5	26 ± 2
	BH0404	Apr	79 ± 23	80 ± 24	<6	<2.5	115 ± 5
	BH0495	Apr	32 ± 18	291 ± 35	<6		
	BH0550	Apr	43 ± 25	145 ± 29	<6	<2.5	24 ± 3
	BH0576	Apr	33 ± 13	90 ± 25	19 ± 3		
	BH43	Apr	<20	39 ± 24	<6		
	GRIFFRDBH3	Apr	<20	77 ± 30	<6		

**Comment:** Uranium detected in the samples collected from BH201RD 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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**SHALLOW GROUNDWATER BOREHOLE RESULTS FOR APRIL TO JUNE 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</sup> + <sup>240</sup> )Pu Bq.m <sup>-3</sup>	Total Uranium Bq.m <sup>-3</sup>
	BB11	May	168 ± 53	143 ± 31	<6	<2.5	271 ± 8
	BH111	May	52 ± 20	105 ± 30	<6	<2.5	67 ± 4
	BH115	May	97 ± 37	116 ± 25	<6	<2.5	79 ± 4
	BH117	May	44 ± 12	38 ± 25	<6	<2.5	3 ± 1
	BH123	May	71 ± 28	836 ± 46	<6	<2.5	99 ± 6
	BH201S	May	745 ± 190	646 ± 42	<6	<2.5	275 ± 9
	BH203S	May	71 ± 28	275 ± 31	<6	<2.5	71 ± 4
	BH225S	May	176 ± 93	479 ± 36	<6	<2.5	144 ± 6
	BHCMR009	May	102 ± 24	232 ± 31	<6	<2.5	129 ± 5
	BHOCT001	May	166 ± 61	423 ± 38	<6	<2.5	224 ± 9

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

PERMIT REFERENCES: BZ1994 AND PP3790SZ

RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD APRIL TO JUNE 2012

SILCHESTER SEWAGE WORKS SAMPLING

- Liquid and Solid sewage samples are collected quarterly from Silchester Sewage Works.
- 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.
- 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>	6 kBq.m <sup>-3</sup>
	Water-bound tritium	

- 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.
- 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

APRIL TO JUNE 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	12/04/12	$0.002 \pm 0.0004$	$0.01 \pm 0.001$
	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	12/04/12	$<2.5$	$4 \pm 1$	$12 \pm 3$

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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RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD APRIL TO JUNE 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 APRIL TO JUNE 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	17/04/12	<6	<2.5	<3
	Compton	17/04/12	<6	<2.5	<3
	Farley Hill	17/04/12	<6	<2.5	<3
	Padworth	17/04/12	<6	<2.5	<3
	Sherfield on Loddon	17/04/12	<6	<2.5	<3

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ATOMIC WEAPONS ESTABLISHMENT ALDERMASTON AND BURGHFIELD**

**PERMIT REFERENCES: BZ1994 AND PP3790SZ**

**RESULTS OF ENVIRONMENTAL MONITORING FOR THE PERIOD APRIL TO JUNE 2012**

**SAMPLER DOWNTIME**

**Automatic Water Samplers**

The following table details the automatic water samplers which, experienced downtime during the period March to May 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>
R010W	21/03/12 – 22/03/12	Sampler not drawing up a sample	Battery replaced
R003W	21/03/12 - 26/03/12	Sampler not drawing up a sample	Sampler refurbished and new non return valve fitted
R004W	11/04/12 - 18/04/12	Sampler not drawing up a sample	Pipe and check valve replaced

**High Volume Air Samplers**

The following table details the high volume air samplers which, experienced downtime during the period April to June 2012 (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	17/05/12 - 28/06/12	Power failure	Discussions ongoing with landowner to restore power