ATKINS

Olympic Park

Construction Zone 6A

Review of procedures relating to the discovery of radioactive substances

For Information

18th October 2007

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OLYMPIC PARK

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Notice

Document History

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Contents

EXECUTIVE SUMMARY

Documentation relating to the discovery of low levels of radioactivity in Zone CZ6a of the Olympic Park Development has been reviewed. Documentary review was supplemented by site visits, field data, and discussions with relevant personnel on site.

The terms of reference for the review were to provide an expert opinion on three questions:

- Has anybody (worker or member of the public) been unnecessarily exposed to ionising radiation?
- Are measures in place to ensure that no worker or member of the public will be so exposed as a consequence of any current or planned activity?
- Have any relevant regulations been breached, or are any likely to be breached?

The documentation includes reports of events ('finds') during late September 2007, and procedures prepared for the eventuality of such an event prior to the event itself. The 'finds' were of three types:

- Areas of contaminated soil with slightly elevated concentrations of radium-226, in the excavation zone.
- An old instrument, apparently luminised with radium-226, in the excavation zone.
- Several mildly radioactive rocks, at the waste sorter.

The review concludes that neither site workers nor the general public have been unnecessarily exposed to ionising radiation as a consequence of activities at the site. Furthermore, measures are in place to ensure that no worker or member of the public will be so exposed as a consequence of any current or planned activity, and no relevant regulations have been breached or are likely to be breached. The documents reviewed are comprehensive and correct in detail.

This report sets out a number of recommendations for minor enhancements to procedures and related matters to ensure that the documentation and work practices at the site continue, as now, to meet the needs of worker and public protection and to ensure continuing compliance with all legal requirements.

1 INTRODUCTION

ODA have set review objectives in relation to the discovery of low levels of radioactivity[1] in Zone CZ6a of the Olympic Park. These are:

- To review the latest developments in relation to the discovery of above-background levels of radiation (measured both by count-rate and dose-rate) in Zone CZ6a.
- To review the site procedures and other documentation associated with the above.
- To make recommendations for necessary improvement to the above, if any.

Three questions have been asked:

[1] The material in question is likely to be designated as Low Level Radioactive Waste (LLW) or Very Low Level Radioactive Waste (VLLW) as defined in the most recent Government Statement of Low Level Radioactive Waste Policy (April 2007) if it is separated and stored in preparation for disposal.

- Has anybody (worker or member of the public) been unnecessarily exposed to ionising radiation?
- Are measures in place to ensure that no worker or member of the public will be so exposed as a consequence of any current or planned activity?
- Have any relevant regulations been breached, or are any likely to be breached?

2 FRAMEWORK FOR THE REVIEW

2.1 Background

The site under consideration is in an area of East London which was once heavily industrialised. There is a range of possible industrial activities which could have lead to contamination by radioactive wastes, either at the point of production or in landfills in use at the time. The main possibilities for the source of radioactive contamination in the landfill area of zone CZ6a are detailed in Defra's Industry Profile Series [Ref. 1]. From this document, three possibilities have been investigated – thorium, radium and phosphatic substances.

Thorium had widespread uses, some of which continue to the present day, including the manufacture of electronic valves, and in alloys for aircraft engines. However, the most prevalent use, and the one most likely to have lead to any residual thorium contamination in East London, was the now redundant practice of using thorium oxide in gas mantles for private and public lighting. It should be noted that thorium was not used, in this instance, for its radioactive properties, but rather its chemical properties. To date, no evidence of thorium contamination has been found at the site, but monitoring and sampling for thorium isotopes continues.

Radium had extensive uses in the luminising industry from the time of its discovery in the early twentieth century until alternatives became available during the 1960s. There were luminised domestic artefacts (clocks and watches), but by far the most prevalent uses were in instrumentation designated for the military, with heavy demand during the period 1935 – 1945. The luminising industry almost assumed the status of a 'cottage industry'. In certain parts of the country, particularly dock areas, and most particularly in the East London dockland boroughs, small workshops were engaged in the luminising of military and domestic artefacts, and the repair of such artefacts. These workshops generated radium wastes – paint scrapings, contaminated paintbrushes, and bottles with traces of radium salts. Some of the wastes will have been disposed of local to the workshops themselves; others will have gone to landfill via dustbins. This report shows that radium contamination is the most likely at the site, based on analytical evidence. For this reason, the data sheet for radium from [Ref. 1] is included as an appendix to this report.

A further possibility for contamination in the area is phosphatic material, with slightly enriched levels of naturally-occurring uranium and associated uranium decay-chain products ('daughters'). A large number of industrial processes, for instance the manufacture of fertilisers, lead to the generation of wastes with these slightly elevated levels. Ash from combustion plant is also known to contain elevated levels of the same naturally-occurring radioisotopes.

Full controls on the accumulation and disposal of radioactive waste were not in place in the UK until the introduction of the Radioactive Substances Act in 1960 (although some controls were introduced on radium disposal by way of the Luminising Regulations of 1947). The landfill at Zone CZ6a was closed during the 1950s. It is therefore not surprising that some radioactive wastes were deposited there during the 1940s and 50s.

In anticipation of this eventuality, site management implemented a recommendation from a report concerned with the potential presence of thorium contamination in the eastern end of the zone:

'A protocol should be written for use by site managers …. This protocol should set out the measures which need to be taken to recognise the presence of radioactive material, and subsequently to protect the workforce, other persons and the environment if necessary'.

Although this recommendation was written with potential thorium contamination in mind, it applies equally to other potential radioactive contamination in other areas of the site.

At the centre of this review and report is a commentary on the way in which this recommendation was implemented (Section 3 below). The review was commissioned when the possibility of discovering radioactive contamination was actually realised. Before embarking on a review of this implementation and the associated procedures, a number of more general considerations have been set out below, in order to explain the context in which the review was conducted.

2.2 Summary of events

Low level radioactive contamination was discovered on site during excavation and waste sorting from 17 September 2007. The contamination is of three types:

- Several above-background levels of radiochemically contaminated soil, detected in excavated spoil and exposed excavation faces. Dose rates of up to 7µSv per hour [2] have been measured close to the areas of contamination. The contamination is contained in a number of 'hot-spots'. Dose rates fall to background levels at a very short distance from these hot-spots (less than 1µSv/hr). Initial gamma spectrometer surveys indicated the presence of radium-226, at a maximum concentration of 1Bq/g. This is not a significant concentration for radium isotopes[3].

- The remains of a radium-luminised instrument, found in the excavated area.

- Mildly radioactive phosphatic rock, found at the waste sorter during routine operations.

Analytical results and supporting Radiological Protection Advisor (RPA) advice are to the effect that radium-226 is the main contaminant of concern, with the highest measured concentration (60Bq/g) being associated with the instrument remains referred to above.

2.3 Relevant legislation

Four pieces of legislation may be of relevance. These are:

1. The Ionising Radiations Regulations 1999 (IRR99). These concern the protection of a workforce from the adverse effects of ionising radiation. They apply to any 'practice', defined (in part) as:

'work involving (a) the production, processing, handling, use, holding, storage, transport or disposal of radioactive substances…'

Any planned remediation of the site would constitute a 'practice' as defined above. The enforcing authority is the Health and Safety Executive (HSE). HSE have been contacted and consulted on notification requirements, and worker protection generally. The relevant expertise for worker radiation protection issues resides in an RPA. Such an advisor (NUKEM) was appointed to the

[2] Radiation dose is measured in Sieverts (Sv), a modified energy measure. For everyday purposes, 1 Sievert (Sv) is a very large unit. It is usual to quote doses in terms of microsieverts (µSv – or millionths of a Sievert) or millisieverts (mSv – or thousandths of a Sievert).

[3] The Radioactive Substances Act 1993 states that concentrations of radium up to 0.37Bq/g are not considered to be radioactive for the purposes of the Act. The measured value is therefore 'radioactive' according to legal definition, but not significantly so.

project and is providing advice. This current report will refer to the RPA, HSE and IRR99, but its main focus is on the remaining legislation listed below.

2. The Radioactive Substances Act 1993 (RSA93). This act concerns the keeping and use of radioactive material, and the accumulation and disposal of radioactive waste. It is not invoked simply as a consequence of the presence of radioactive waste in the ground; it only comes into play when an activity (a 'practice') leads to the need for an accumulation (on-site storage) or disposal of waste.

3. The Radioactive Contaminated Land Regulation 2006 (RCL2006). These regulations require a local authority to conduct investigations if there are 'reasonable grounds' for believing that 'harm' is occurring or there is the 'significant possibility of harm' occurring as a consequence of land contaminated with radioactivity. 'Harm' is defined using dose criteria, the most appropriate criterion in the current case being a dose of 3000 μSv per year above background[4]. 'Reasonable grounds' have not been established at this time.

4. The Town and Country Planning Acts (various). Planning permission is required for any 'change of use' of land or other property in certain defined categories. If the land or property in question is contaminated with radioactivity such that radiation doses of 300 μSv per year could result, then remediation is required.

2.4 Dose limits

Worker dose limits[5] are covered by HSE and IRR99 (Schedule 4). Various limits apply, depending upon age and other factors but, in general, a dose limit of 20,000 μSv per year is the appropriate limit. However, NUKEM have implemented a dose constraint for workers of 1000 μSv per year[6] at the Olympics site; that is, significantly below the limit for classified radiation workers.

The government has established dose limits for members of the public. These are:

- 1000 μSv per year as the total contribution from any anthropogenic sources.
- 500 μSv per year from any single site.
- 300 μSv per year from any single source.

For the purposes of the current situation, the distinction between 'site' and 'source' is not perfectly clear. To avoid any ambiguity, it is recommended that the 300 μSv per year limit be adopted.

(Recommendation 1).

2.5 The optimisation principle

As will be seen below, the limits set out in the above section are highly unlikely to be approached. However, a more important feature of the legislation concerns optimisation, which is usually stated as the ALARA (As Low As Reasonably Achievable) principle:

[4] Use of the correct terminology is important in the current case. 'Radioactive Contaminated Land' has a specific meaning in law, and is defined in regulations. Unless and until a designation of 'Radioactive Contaminated Land' is made, the term 'land contaminated with radioactivity' should be used to describe the current situation in Zone CZ6a.

[5] Dose limits as set out here should be put in the context of natural background. In most of East London, natural background is likely to be between 1800 and 2500 μSv per year. Natural background can be 3-4 times this level in some parts of the UK.

[6] At the highest external dose rate measured - 7 μSv per hour – a worker would therefore have to be in very close contact with the material for ~ 143 hours before this dose limit was breached. This is not credible.

'Doses should be as low as reasonably achievable, economic and social factors being taken into account'.

That is to say, even though a site is operating so as to meet the appropriate limits, further work is always needed to ensure no unnecessary exposure to ionising radiation. This applies down to a deminimus level, sometimes quoted as 'a few tens of microsieverts' and sometimes specifically as 10 or 20 μSv per year, below which doses are not considered to be of regulatory concern.

In summary, for members of the public, the ALARA principle applies between doses of 300 and 10 μSv per year.

(Recommendation 1, continued).

2.6 Internal and external radiation

The radioisotopes under consideration in this report are alpha/gamma emitters (there has been no instance of discoveryof a beta/gamma emitter). The gamma component is considered to be an *external* hazard, and can be (and in this case, has been) measured, with dose rates at or only marginally above background levels. The alpha component is an *internal* hazard, and can not be measured; it can only be estimated or calculated, using models and modelling assumptions. An internal radiation dose can be realised by a number of pathways:

- Dissolution of radioisotopes in groundwaters which subsequently enter drinking water aquifers: Radium is relatively immobile; recent investigations have shown negligible presence of radium in surface or groundwaters; and the age of the disposal (< 100 years) all lead to a conclusion that contaminated drinking water is extremely unlikely.

- Inhalation of airborne dusts containing radium contamination. The alpha-in-air monitors installed at the waste sorter have given no indication of any issue – all results since the commencement of waste sorting have shown background levels only. This location is the most likely one for such detection if there was any problem in this regard. At the highest concentration of radium found to date in the ground, calculations indicate that gram quantities would need to be inhaled by any individual before any dose limits were approached. This scenario is not credible.

- Ingestion of radium-contaminated material. With no public access to the site, this issue is most likely to be one of worker protection. Measures such as the wearing of disposable gloves and smoking restrictions are put in place to reduce the risk of ingestion.

(The above considerations relate to hazards to the general public; for workers on site, there can be a fourth pathway, this being the introduction of radioactive material direct into the bloodstream by way of cuts or abrasions).

3 REVIEW OF PROCEDURES

With the above introduction sections framing the review, the relevant risk assessment and method statement have been reviewed. The overall conclusion is that these documents are comprehensive and correct in detail, *based on the information known at the time they were written*. Furthermore, when the method statement was called into play (that is, when evidence of radioactive contamination first came to light), it was implemented fully and correctly. Of particular note are:

- Gamma monitoring at the waste sorter.

- Personal gamma dose-rate monitoring.

- Identification and mapping of abnormal levels of radioactivity.
- Dust monitoring (alpha-in-air) at the waste sorter.
- Segregation of areas and the implementation of hold points.

Implementation of these documents, and the monitoring information available to date, leads to a conclusion that neither site workers nor the general public have been unnecessarily exposed to ionising radiation as a consequence of activities at the site. Doses received are several orders of magnitude below any appropriate limits, and furthermore, the ALARA principle appears to have been implemented.

Notwithstanding the above, the risk assessment and method statement now require review in the light of recent information. The following points should be considered for review.

- The documents are predicated mainly (and quite rightly) on worker protection. With the discovery of radioactive contamination, other legislation as set out in section 2.3 above needs to be considered in more detail.
- In particular, the procedures following the identification of what becomes 'radioactive waste' need to be developed further, to include waste segregation and storage, authorisation requirements etc.
- The documents focus on thorium isotopes, because the presence of thorium contamination on site was once suspected. However, with the evidence now pointing to radium-226 (and although reference is made to this isotope within the document) the risk assessment needs to be reviewed accordingly.
- The provision of portable gamma spectroscopy and a trained Health Physics surveyor may enable more rapid 'on-the-spot' analysis of radioactive contamination.

(Recommendation 2)

4 OTHER CONSIDERATIONS

4.1 Radioactive waste

Analytical results and Health Physics advice have been reviewed. The radioactive waste implications are as follows.

The luminised instrument might constitute radioactive waste as defined by the Radioactive Substances Act. If removed from the excavation area, this will constitute an 'accumulation and disposal' of radioactive waste and thus require authorisation under the Act. An authorisation should be prepared in any case, as this find may not be the last.

The remaining radium contaminated material in the excavation, although defined as radioactive under the Act, will probably be exempt from the authorisation requirements of the Act, being covered by the Phosphatic Substances and Rare Earths Exemption Order. If removed from site, then authorisation will not be required (it can go to landfill without prior authorisation). If the material is to remain on site, then different considerations apply (see below for references to the Site Remediation Strategy).

The phosphatic rock material found at the waste sorter will almost certainly not be defined as radioactive waste (it will be 'excluded' from the provisions of RSA93); and even if not, it will be exempt for the same reasons as in the above paragraph.

Discussions with the environmental regulators should continue in relation to RSA93 authorisation requirements.

(Recommendation 3)

4.2 Waste monitoring

Gamma monitoring has been set up at the waste sorting centre to detect any radioactive material on the conveyor. The monitoring arrangement is doing the task intended (and certain items have already been detected). However, the equipment used – Type 44B gamma instrument – although sensitive and of proven reliability, was not designed specifically for this duty. There is a variety of equipment on the market which has been designed specifically for the type of duty intended in the waste sorter.

(Recommendation 4).

4.3 Public doses

Based on the information available to date, and as stated above, it is highly unlikely that any member of the public has been unnecessarily exposed to ionising radiation. However, two measures could be implemented to provide further public reassurance.

- A gamma dose-rate perimeter survey; that is, a survey at all the fences at which the closest public access is possible. This has already been carried out and has shown nothing unusual which could be attributed to the radium on-site. Repeat measurements at regular intervals would be advisable.

- An alpha-in-air survey at one or two perimeter locations. Again, based on currently-available alpha-in-air monitoring at the waste sorter, this will show background. The waste sorter is the location at which the maximum disturbance of waste materials on site occurs, and would therefore be expected to show the presence, if any, of radioactivity in dust. All results to date have shown only background levels of radioactivity in air.

(Recommendation 5).

4.4 Regulatory interface

HSE are now apprised of recent developments, and have advised the RPA on IRR99 issues, including notification and any other regulatory submissions.

The Environment Agency has been informed that an application for accumulation and disposal of radioactive waste will be made.

The Environmental Health Officer (EHO) from Newham has been briefed.

The site remediation strategy (SSRS) has been reviewed. It is likely that this remediation strategy – involving surface cover - will suffice for the purposes of guaranteeing the dose requirements set out in section 2.4 above. However, the SSRS does not explicitly cover radiological risk in the assessment. A new addendum to the SSRS should be prepared and submitted to the planning authority. Site gamma surveys at various stages will be of use in the SSRS in this regard.

(Recommendation 6).

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Current and planned activities at the site have not and will not lead to unnecessary public and worker radiation dose provided that the finds of radioactive contamination, if any, are of the same general nature as those finds to date. No regulations have been breached, and steps have been taken to ensure that this remains the case. Procedures are robust and properly implemented. However, in the light of recent events, review of documentation and, if necessary, modification to activities needs to be implemented to ensure that they continue (as now) to meet the requirements of worker and public protection.

5.2 Recommendations

Recommendation 1: The appropriate dose limit resulting from on-site activities for members of the public is 300 μSv per year. However, the ALARA principle is of greater relevance in this case. All procedures and practices at the site should be designed so as to demonstrate the application of this principle if any doses to members of the public are likely to be greater than 10 μSv per year.

Recommendation 2: A review of the risk assessment and method statement should be undertaken with the considerations listed in section 3 taken into account.

Recommendation 3: Discussions with the environmental regulators should be continued in relation to RSA93 authorisation requirements. A radioactive waste advisor should review the RSA93 application when prepared by NUKEM on behalf of ODA.

Recommendation 4: Monitoring for radioactive material at the waste sorter should be carried out using equipment specifically designed for the purpose.

Recommendation 5: Additional Public reassurance measures, as described in section 4.3, should be enacted.

Recommendation 6: The SSRS requires review and an addendum relating to radiological risk prepared.

5.3 Timetable

Recommendations 1 and 2 are ongoing requirements, and apply continuously as new information comes to light about the site condition.

An application under RSA93 should be ready for review on or before 19.10.07.

The installation of specialist waste monitoring equipment is in hand; it will be in place by 29.10.07.

Recommendation 5 has been completed in part (perimeter gamma survey). The equipment for perimeter alpha-in-air monitoring has been ordered, and will be in place on or before 19.10.07. It has been decided to utilise four such monitors, and to review the results before deciding on the need for a permanent protocol.

Recommendation 6 should be completed on or before 31.12.07.

6 REFERENCES

[1] Department of the Environment, Food and Rural Affairs. Industry profile. Industrial activities which have used materials containing radioactivity. 2006.

Appendix A

DATA SHEET NUMBER B1: RADIUM LUMINISING WORKS

From [Ref. 1]

1. Background

The activity of applying luminising paint to scientific and electronic equipment so that they could be read in the dark or with low light began in the 1920s. The paint containing radium was mostly manufactured by one firm in the UK, but small quantities were also imported.

Organisations registered under the Luminising Regulations 1947 ranged from producers of radium powders/paint, through distributors to instrument and watchmakers and repairers. In the late 1950s, there were 37 factories registered under the regulations to carry out luminising works. Of these, 14 were owned by the MOD. Twelve of the civilian registered sites have been identified from government archives.

The MOD were the major customer for this type of work and the radium luminising operations of the MOD are also covered under data sheets B3 and B4. Luminising paint was used on equipment such as dials to be used in military vehicles, aircraft and ships, as well as on some sites to mark kerbstones to aid night-time movements. Since the 1960s, less radiotoxic shorter-lived isotopes such as promethium-147 and tritium have been used for this purpose. They have not, to date, been found to have caused significant ground contamination.

Some MOD sites, themselves, contained luminising workshops where instruments were painted and maintained as necessary. Radium luminising paints were used primarily for military purposes between the 1930s and the 1960s; the time of greatest use being during the Second World War.

2. Activities

The factory that produced most of the radium paint used in the UK was based in East London and also produced thorium salts and rare earth salts, as well as a number of organic products. The factory produced the radium luminising compound from radium purified at another site.

Instrument and watchmakers had luminising workshops where the dials of the instrument/watches were painted with the radium luminising compound. A cottage industry was also in operation, with watches and instrument dials being painted by workers at home.

Prior to painting, removal of old luminising residues from instruments undergoing refurbishment was often required.

3. Waste Management

Primary waste products from the luminising workshops included empty paint vials or capillaries, brushes and broken instruments. Where refurbishment activities were undertaken, radium paint scrapings were also generated.

Prior to controls being imposed under the Radioactive Substances Act in 1963, many such wastes would have either been buried directly in a waste disposal area on the site, or they would have been incinerated in an on-site boiler house or incinerator and the residues buried. The ad hoc burial at localised disposal points around the site was generally confined to soft areas around workshops and maintenance areas. Incinerating the waste materials did not remove the radioactive element of the waste, but concentrated it into a

reduced volume of material. The resulting ash and cinders from incineration was either used as a granular fill for raising levels, infilling holes or forming paths/hardstandings within the site or buried in waste disposal areas.

Former luminising workshop buildings may be contaminated with residual levels of radium. Workbenches, walls and floors, sinks where articles were cleaned, associated pipe work and drainage systems, light switches, door handles, window sills, radiators, broom cupboards, storerooms and cloakrooms have been found to be contaminated. Many facilities on MOD sites have already been remediated by MOD and other organisations, but some are likely to remain affected by contamination. This applies in particular to facilities which were never under direct MOD control.

Areas external to the buildings may also have been affected by informal disposal of waste paints and residues, and this may include areas within throwing distance of windows and small burial sites in the soft ground surrounding buildings.

The radium factory in East London disposed of contaminated material in an on-site disposal area, which included radium contaminated material and thorium contaminated material from the production of thorium salts. Organic and inorganic contaminants were also disposed of on site. The contaminated materials were either released directly onto the land or buried. There have also been cases where instruments and instrument dials have been found in the ground and in burial areas, indicating that not all sites followed the same waste management procedures.

Prior to the introduction of the Radioactive Substances Act in 1963, in many cases, records of the location of waste disposal areas were not kept, making identification difficult. One of the main sources of information allowing identification will be local knowledge of the practices and operations carried out during disposal activities. Geophysical survey techniques are also useful in identifying buried structures such as old foundations, as well as areas of waste disposal and disturbance. The condition of vegetation can also indicate the areas of waste disposal. However, waste disposal areas may contain waste to a significant depth, which may inhibit the ability to detect radioactive contamination due to the shielding effects of overlying materials. Generally, handheld instruments can only detect radioactive sources such as radium luminised instruments to a depth of about 0.3 metres.

There is little information on the disposal practices of watch and instrument repair workshops or the luminising cottage industry. However, the likelihood is that these wastes were disposed of with normal refuse.

4. Prevalence and Potential Impacts

There were only a few large luminising sites in the UK and most of these have already been identified. The degree of contamination at these sites could be significant but this will largely be dependent upon their form and function. A large proportion of the sites, and the hardest to identify, will be the cottage luminising industry. There have been cases in the past of garden sheds and rooms in houses containing old dials being contaminated by large amounts of radium-226.

Radium-226 is a naturally occurring radionuclide and is a daughter product from the decay of uranium. Radium is an alpha emitter also releasing some low energy gamma radiation. As an alpha emitter there is only a low risk of a significant dose being received by direct

irradiation. The main exposure pathway to a human receptor is from an indirect dose received from the ingestion of radium contaminated material.

Radium contamination on former luminising works and workshops using luminised instruments would have been contained within a relatively non mobile form, with there being little to no leaching to soils and limited solubility within groundwater. Transport of radium-226 in the ground is most likely to occur through the movement of finer sediments in water (eg. run off to drains) or through human activity.

5. Implications for the Part 2A Regime

Concentrations of radioactive contaminants on radium luminising works, including waste pits, are such that they are **capable of giving rise to** an individual effective dose of 3 millisieverts/year above local natural background levels under some scenarios.

6. References and further information

Radioactive Waste Management Advisory Committee. Advice to Ministers on the MOD Arrangements for dealing with Radioactively Contaminated land. 2002.

K.J.Gibbs. Radium Contamination, An Overview of UK Ministry of Defence Experience. DRPS. 1993.

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A C Baker. A review of the potential for radium from luminising activities to migrate in the environment. J. Radiol. Prot. 25 (2005) 127-140.

Indicators for Land Contamination. Environment Agency, Defra, Welsh Assembly Government. 2005.

http://publications.environment-agency.gov.uk/pdf/SCHO0805BJMD-e-e.pdf

In the event that radioactive contamination of MOD land is suspected, the best solution is to formally ask MOD for information. It should be noted that all MOD sites where contamination is suspected would be classed as special sites under the Part 2A regime.

Appendix B

PHOTOGRAPHS

1. 'Find', believed to be a radium-luminised instrument

2. Mildly radioactive rock, detected at and removed from the waste sorter

Atkins is one of the world's leading providers of professional, technology based consultancy and support services. In recent years, it has expanded from its historical base in traditional engineering, management consultancy and property services into related technological consultancy and the management of outsourced facilities. With over 14,000 staff, Atkins has enormous expertise, providing both breadth and depth of knowledge in an extremely diverse range of disciplines.

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