Large and ASSOCIATES

OUTLINE BRIEFING & QUOTATION

PROPOSAL FOR THE

i) **EVALUATION OF THE INFORMATION AND DOCUMENTATION OBTAINED VIA THE FREEDOM OF INFORMATION ACT RELATING THE LEVELS OF RADIOACTIVE CONTAMINATION ON THE LONDON OLYMPIC DEVELOPMENT SITE**

ii) **ASSESSMENT OF THE RADIOLOGICAL IMPACT OF THE PAST PRESENCE, CONSTRUCTION ACTIVITIES, AND FUTURE MANAGEMENT OF RADIOACTIVE WASTE ARISINGS ON AND AROUND THE LONDON OLYMPIC DEVELOPMENT SITE**

INSTRUCTING CLIENT: [redacted]

REF N^{O} [redacted]

RADIOLOGICAL IMPACT OF RADIOACTIVE CONTAMINATION OF THE LONDON OLYMPIC DEVELOPMENT SITE

BACKGROUND

The preparation and development of the London Olympic Park requires site preparation, sub-structure construction and landscaping involving, generally, the reduction of site levels by up to 5 metres. Since site works commenced construction activities have progressed apace to remove and/or relocate about 150,000 cubic metres of various materials comprising past landfill from the so-called West Ham Tip that had received mixed industrial and domestic wastes for many a year, previously imported materials used for past capping of areas of the site, and more generally, debris arising from the clearance of buildings, roads and services infrastructures across the site.

During the progression of site construction activities considerable quantities of soils and fill materials have been identified to be contaminated with radioactive substances and a number of specific items of radioactive materials and wastes have been found buried on at a number of locations across the site. For example, to date about 8,000 tonnes of radioactive contaminated soils, etc., have been identified and 'managed' on site; a number of drums of thorium based wastes originally disposed of in the 1950s have been located buried at depth, although it is unclear whether these have been recovered; and from under the main stadium about 200 tonnes of unidentified radioactive material has been removed for relocation elsewhere on the Olympic Park.

The presence of radioactive materials, even when undisturbed, can present a not insignificant radiological risk when, for example, the original packaging containment (if indeed packaged at the time of disposal) degrades; if the material migrates from its original disposal location, not unusually via local site hydrology; and/or if the natural radioactive decay processes results in the generation of more (radio)toxic daughter products. Construction activities, involving earth moving operations, heavy construction vehicle movement, excavation, compaction and similar surface and subsurface working can generate fine dusts, aerosols and particulates that can disperse over the site and beyond windborne to potentially expose individual and groups of receptors off-site (ie members of public) who are not subject to radiological health controls at the workplace. The packaging, relocation, storage and eventual disposal on- or off-site may also introduce interim and longer term radiological risks to construction workers and future users of the Olympic Park.

The Radioactive Substances Act 1960 (RSA - enacted 1963) provides the basis of the legislative and regulatory framework for the management of radiologically contaminated sites, particularly that before any significant construction works commence on a site believed to be contaminated with radioactive substances there has to be undertaken a Prior Radiological Risk Assessment (PRRA). Moreover, as the works progress, the PRRA has to be updated usually to include for a probabilistic risk assessment (PRA) which accounts for site-specific hazards and control measures to maintain an acceptable level of radiation dose exposure as specified by the Ionising Radiations Regulations (IRR) 1999. The relationship between the radioactive source, its circumstances and how human receptors might be possibly affected, particularly for contaminated land and sites, is defined by Part IIA of the Environmental Protection Act (EPA) 1990.[1]

The administrative means of implementing the legislation and approved codes of practice is via the appointment of a competent person or Radiation Protection Adviser (RPA), usually engaged by the principal contractor for construction sites prior to the development and site works commencing.

LARGE & ASSOCIATES PROPOSAL – GENERAL AIM

The objective of the work is to provide the basis of Expert Opinion should further action be contemplated in the fields of health and safety of the public, adherence to national strategies and policies on the management of radioactive waste, and possible breaches of local planning and environmental protection legislation.

1 The Part 2A approach is based upon the principles of risk assessment, including the concept of a contaminant, a receptor and an uptake pathway, which, if combined, form a pollutant linkage. The existence of a significant pollutant linkage forms the basis of a formal determination that land is contaminated land and its management must include for risk assessment of the risks, hazards and detriment.

Essentially, at the time that the locality was adopted for the Olympic Park development it should have been recognised, from the existence of the West Ham Tip and mixed nature of the industrial developments that had prospered in the area since Victorian and earlier times,[2] that it was likely that heavy site contamination (including sources of radioactivity) would be encountered during construction. So, it follows, the developer of the site should have put in place a competent means of assessment (ie PRRA) to determine the nature and extent of radiological hazard present on the site, how this might be disturbed by workings on the site, and how the radiological impact might be minimised and/or eliminated to an acceptable level - this composite of predetermined knowledge of the radioactive contamination and practical means by which its radiological impact was to be minimised, forms the underlying basis of the legislative and regulatory frameworks determining the management of radioactive wastes in the United Kingdom.

The detailed objective of the work is to resolve whether this composite has been achieved during the development of the Olympic Park development site.

LARGE & ASSOCIATES PROPOSAL – DETAILED OBJECTIVE

This is a two-part proposal, comprising:

1) **ASSESSMENT OF THE FOI DOCUMENTATION AND RECORDS**

Large & Associates will examine and assess each of the documents so far recovered under the Freedom of Information Act and the Environmental Regulations (FoI).

Where appropriate, detailed comments and observations will be added to the text of each FoI sourced document and each document will be summarised in itself and in the context of other related documents. As this document review progresses any further documents and/or records will be identified and appropriately cited for retrieval under FoI, although Large & Associates will not be responsible for managing the FoI request process with the Olympic Development Authority or any other party.

2) **EVALUATION OF THE RADIOLOGICAL RISK AND HEALTH IMPACT**

With the Review of 1) foregoing and providing the FoI sourced information is sufficiently comprehensive, Large & Associates will embark upon assessment of the methods and controls adopted across the Olympic Park development site to minimise the radiological impact of the practical implementation of radioactive waste recovery and management operations. This assessment will include the following.

a) Generally:

- that the management of radioactive wastes at the Olympic Park fully complies with Government policy in that radioactive wastes are
  - i) not being unnecessarily created and/or dispersed;
  - ii) created, recovered, etc., are safely and appropriately managed and treated; and
  - iii) safely managed, stored and disposed of at appropriate times and in appropriate ways.

and that, overall,

- the waste recovery and management strategies are *Sustainable* and adhere to the *Precautionary Principle* being *Best Practicable Means* (BPM) and *Best Practicable Environmental Option* (BEPO).

b) That the system of radiation protection relating to past, present and future exposure of members of public adheres[3] to the principles recommended by International Committee on Radiological Protection (ICRP), particularly:

- that the benefits arising from the waste management strategy outweigh the associated risk and that each component part of the management practice has *Justified*[4] resulting in a net benefit;
- that all radiation protection measures (past, present and future) are *Optimal*, that is *As Low As Reasonably Practicable* (ALARP); and that
- radiation *Dose Limitation* has and will be achieved compliant with the dose and risk to individuals as specified by the IRRs.

2 *'West Ham: Industries', A History of the County of Essex: Volume 6* (1973), pp. 76-89. URL: http://www.british-history.ac.uk/report.aspx?compid=42755

3 Council Directive 96/29/EURATOM - Council Directive of 13 May 1996 laying down basic safety standards for the health protection of the general public and workers against the dangers of ionizing radiation.

4 The Justification of Practices Involving Ionising Radiation Regulations 2004 (SI 2004/1769)

c) In terms of compliance with the UK legislative and regulatory framework, if the radioactive waste strategy and practices are compliant, generally with the Health and Safety at Work etc Act (HASAWA) 1974, and more specifically for the management of contaminated land by Part IIA of the Environmental Protection Act (EPA) 1990,[5] and particularly:

- if the wastes retained on site qualify for exemption from *S13* and *14* of the RSA (1993) for so-called *'controlled burial'* at landfill;
- if the appropriate *Transfer Authorisations* have been complied with where wastes have been disposed of from one contractor to another;
- that there is sufficient evidence to demonstrate that the radioactive waste recovered and/or located about the Olympic Park is *Low Level Waste* (LLW)[6] and *Very Low Level Waste* (VLLW),[7] etc;
- that present and future site monitoring programmes have been and will be adequate, that the monitoring processes and dutyholder are authorised and compliant with Environment Agency requirements and have and will be published in the Radioactivity in Food and Environment (RIFE) report and have been coordinated with the Local Authority Radiation Network (LARNET – as it may or may not exist locally); and that generally
- to determine if all management practices have been granted approval under the Local Authority planning regime, such a compliance with *Planning Policy Statement 23: Planning and Pollution Control*.

LARGE & ASSOCIATES DELIVERABLES

TABLE 1 – PROGRESS AND REPORTING SCHEDULE

PROJECT STAGE	WEEK NO	REPORTING STAGE	FORMAT	NOTES
STAGE 1	Ongoing	Document by Document	Microsoft WORD Track Changes Editor and Excel Spreadsheet Summary	Ongoing throughout project
STAGE 2	Commence at completion of STAGE 1 4 weeks	Assessment of Olympic Park Management of Radioactive Wastes	Draft & Final Report suitable for public release	Dependent upon information available in the public domain and that a procured via the FoI Act – may be delayed or staged by FoI delays
PRESS & MEDIA		As Required		
PRESENTATION		If Required	Illustrated Slide Presentation	

LARGE & ASSOCIATES QUALIFICATION AND EXPERIENCE

John Large[8] and Large & Associates have previously completed a number of projects relating specifically to the management of contaminated land, radioactive waste management and, generally, dealing with toxic wastes. Amongst these are evidence to the House of Commons Environment Committee on radioactive waste;[9] acting as the Retained Consultant to Lincolnshire County Council on the then proposed National radioactive waste dump at Fulbeck;[10] for East Sussex County Council;[11] for Cleveland County Council on a planning matter;[12] for Somerset County Council at the

5 The Part 2A approach is based upon the principles of risk assessment, including the concept of a contaminant, a receptor and a pathway, which, if combined, form a pollutant linkage. The existence of a significant pollutant linkage forms the basis of a formal determination that land is contaminated land and its management must include for risk assessment of the risks, hazards and detriment.

6 Low level wastes are wastes containing radioactive material, other than those acceptable for disposal with ordinary refuse, but not exceeding 4 gigabecquerels per tonne (GBq/te) of alpha or 12 GBq/te of beta/gamma activity. (1 GBq = 1000 million becquerels; Bq = 1 disintegration per second. Becquerel is the unit of radioactivity).

7 Radioactive waste which can be safely disposed of to an *unspecified* destination with municipal, commercial or industrial waste ("dustbin" disposal), each 0.1m3 of waste containing less than 400 kilobecquerels (kBq) of total activity or single items containing less than 40 kBq of total activity. Radioactive waste with maximum concentrations of four megabecquerels per tonne (MBq/te) of total activity which can be disposed of to *specified* landfill sites.

8 John H Large is a Consulting Engineer, Chartered Engineer, Fellow of the Institution of Mechanical Engineers, Graduate Member of the Institution Civil Engineers, Member of the British Nuclear Society, Member of the Nuclear Institute and a Fellow of the Royal Society of Arts. From the late1960s through to the late 1980s John Large was a full-time member of the academic research staff at Brunel University on behalf of the United Kingdom Atomic Energy Authority (UKAEA) and other government agencies undertaking research in the nuclear area.

John Large has given evidence to the Court of Human Rights Strasbourg on the exposure to atmospheric nuclear testing on British services personnel; he selected and headed up the team of UK specialists responsible for the hazards assessment of the nuclear reactor plant and nuclear weapons on board the sunken nuclear powered and armed submarine *Kursk* during the salvage operations of 2001, for which he received a commemorative medal for the Russian Federation Authorities; he has visited North Korea on inspection tours and presented to the Parliamentary Assembly of the South Korea on nuclear developments in the region; and most recently he was invited to lecture and has published to the Emirates Strategic Studies Centre on Iran's nuclear weapons aspirations, and in the year following presented on nuclear proliferation risks in the Middle East.

9 *Radioactive Waste and Long Term Storage* - Evidence to House of Commons Environment Committee, August 1986

10 Preliminary Report - Lincolnshire County Council, LA1555-1/4, April 1986:

Supplement 1: Structure of the UK Nuclear Industry

Supplement 2: Volumes of Waste

Supplement 3: Policies and Source References

Supplement 4: BPEO Assessment

11 Definitions of Radioactivity and Radioactive Waste - LA1578-4, East Sussex County Council, July 1986 - Radiation Monitoring in East Sussex - LA1578-6, East Sussex County Council, December 1986

Hinkley Point C Public Inquiry;[13] for Plymouth City Council;[14] for Greenpeace International on the assessment of the Swedish repository proposal;[15] on the radioactive contamination at Tuwaitha during the invasion of Iraq;[16] on the Swiss repository scheme;[17] and on the aftermath of the Chernobyl accident.[18]

Publications include the use of best available technology when managing radioactive waste;[19] sources of radioactive waste arisings;[20] waste handling;[21] international transfers of waste;[22] and more generally on the structure of waste management in the United Kingdom.[23] A complete list of Large & Associates's publications in the radioactive and nuclear fields is available at http://www.largeassociates.com/PapersReports.htm.

OUTLINE FEES & EXPENSES AND TERMS OF ENGAGEMENT

As policy, Large & Associates does not undertake work on a fixed price basis and, in line with this, the work is to be charged at quantum with costs and essential disbursement in addition. All reasonable travel expenses and disbursements (fares, accommodation, etc) will be charged as incurred – the travel programme will be agreed with the Client) in advance. Subject to final negotiation and agreement, the following ex VAT (Reg N° 697 3287 77) quantum hourly, per man unit expenses and day rates apply:

R&D	[redacted]	FULL DAY	[redacted]
ANALYSIS	[redacted]	HALF DAY	[redacted]
ADMIN/e-MAIL	[redacted]		
REPORT	[redacted]	e-MAIL	[redacted]
MEETING	[redacted]	PHONE LOCAL	[redacted]
SITE VISIT	[redacted]	PHONE TRUNK	[redacted]
TRAVEL	[redacted]	FAXES	[redacted]
LETTER	[redacted]	PHOTOCOPIES	[redacted]
MEMO	[redacted]	MILES	[redacted]

Subject to further discussions to determine the required scope of the project, Large & Associates will provide a budget ceiling for the fees likely to accrue from completion of this project, although the following estimated and tentative fee structure might be adopted as a guide:

TABLE 2 – TENTATIVE FEE STRUCTURE

PROJECT STAGE	WEEK NO	REPORTING STAGE	FEES	NOTES
STAGE 1	4	Document Briefing Notes	[redacted]	Time Scale Dependent on FoI Response
STAGE 2	8-12	Report Assessment	[redacted]	Largely Determined by FoI
PRESS & MEDIA		As Required	say [redacted]	As Required
PRESENTATION		If Required	[redacted]	Covers Project Overall

This quotation and offer remains open for 30 days from the closing date of 07 September 2009 – the contract, instruction and responsibility for payment of fees and charges will be with the instructing Client or its agents, as appropriate.

Terms are net monthly E&OE and interest is charged at 5% above Barclays Bank rate for accounts over 1 month

12 Planning Application C/S/1105/84: Disposal of Radioactive Chemical Sludge - LA1656-1, Cleveland County Council, March 1987

13 Radioactive Waste Management in the United Kingdom - Preliminary Advice prepared for Somerset County Council, LA1804-1, August 1988 - Radioactive Waste Management in the United Kingdom - Modelling the Radiological Containment of Waste Repositories, Somerset County Council, LA1804-2, August 1988 - *Proof of Evidence - On Site Generation and Storage of Radioactive Wastes.* Evidence to Hinkley Point C Public Enquiry. Somerset County Council - Consortium of Opposing Local Authorities (COLA) - March 1989

14 Review of Other Radioactive Waste Stores and Repositories - Plymouth City Council, Devonport Radioactive Waste Repository, LA1B29-1, August 1988 - Proposal to Construct and Operate a HM Royal Naval Radioactive Waste Store at HM Royal Naval Devonport Dockyard - Plymouth City Council, LA1829-2, October 1988

15 *Evaluation of the SKB High- and Intermediate-Level Radioactive Waste at Aspo, Sweden, KBS-3*, SKI, Stockholm, October 1997 - http://www.largeassociates.com/3016/R3016-A4.pdf

16 Video and Other Material and Data acquired by Greenpeace International at and around the Iraq Tuwaitha Nuclear Site During 2003 - http://www.largeassociates.com/3099%20Iraq%20Sampling/r3099-a2.pdf

17 *Waste Not, Want Not, Assessment of Switzerland's proposed Radioactive Waste Disposal System* - Analysis of the Long Term Implications, 25 May 2005 - http://www.largeassociates.com/waste_not_want_not.pdf

18 *Chernobyl - A Nuclear Catastrophe 20 Years On*, April 2006, Int Conf Chernobyl +20, Kiev 22-24 April 2006 - http://www.largeassociates.com/3143%20Chernobyl/R3143-A3%2022%20April%202006.pdf

19 *The Use of Best Available Technology in Radioactive Waste Management*, published in proceedings of the Institution of Mechanical Engineers (IMechE) Seminar, 7-8 December 1989

20 Comparison of the Radioactive Waste Arisings Generated by Reprocessing. Encapsulation and Storage of LWR and AGR Irradiated Fuels. RL2032-A, November, 1992

21 *Nuclear Wastes in the Republics of the Former Soviet Union, Waste: Handling, Processing and Recycling*, IMechE Sem, April, 1993 London

22 *Export of Radioactive Waste from Taiwan to North Korea, TOPI, Taiwan State University, Taipai*, June 1997 -http://archive.greenpeace.org/pressreleases/nucwaste/1997may15.html

23 *Carry On at CoRWM* - Critical Review of the Deliberations of the Committee on Radioactive Waste Management, Nuclear Engineering International, April 2005 - http://www.largeassociates.com/CoRWM%20Review.pdf

outstanding - no further work will be undertaken on overdue projects until outstanding accounts are settled – a fully detailed breakdown of times and expenses is generated with each invoice, together with a statement of the carbon emissions generated by the L&A involvement with the project.

UK VAT is charged at the appropriate rate to UK-based clients, for consultancy services invoices to EU and overseas based clients are subject to 0% VAT rate.

Accounts to be rendered for electronic transfer payment via

BANK ETR [redacted]
IBAN [redacted] BARC [redacted]
SWIFTBIC [redacted]

REFERENCES

An illustrative listing of clients is available at http://www.largeassociates.com/clients.htm and. if requested, referees drawn from past government and the local authority clients will be provided.

CONFIDENTIALITY

Client confidentiality is paramount with all reported work, etc., being transferred to full copyright and intellectual ownership of the instructing Client (unless otherwise agreed) upon full and final settlement of the agreed invoice amounts.

PROFESSIONAL INDEMNITY COVER

Projects involving high hazardous products are not covered by professional indemnity insurance. If required, professional indemnity cover will be obtained for the requisite period into the future (usually the statute barred period) at an extra-over cost to the project.

FREEDOM OF INFORMATION ACT 2000

The information made available in this quotation Ref [redacted] is considered to be exempt from disclosure under the *Freedom of Information Act 2000*, it is to be treated as *Reserved Information* on the grounds for exemption that its disclosure to third parties would prejudice the commercial interests of Large & Associates and it must remain reserved information until the closure date specified previously or until the completion of the contract by whichever organisation/person has undertaken and completed the contract, whichever date is the later.

APPLICABILITY

This issue supersedes all earlier revisions and issue dates of Quotation Ref N° Q3182-A1.

JOHN H LARGE
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1ST ISSUE	REVISION NO	APPROVED	CURRENT ISSUE DATE
10 JULY 2009	[redacted]		**7 SEPTEMBER 2009**