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Radiological Survey Support to Excavation Works at the former HMS Daedalus Site, Lee on Solent for Mildren Construction Limited

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Report Title:	Radiological Survey Support to Excavation Works at the former HMS Daedalus Site, Lee on Solent for Mildren Construction Limited
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1. INTRODUCTION

Aurora Health Physics Services Ltd (Aurora) were commissioned by Mildren Construction Limited (Mildren) to carry out radiological reassurance monitoring during intrusive excavation works at the former HMS Daedalus site, Lee on Solent. The intrusive works comprised of the machine digging of trial and soakaway pits, windowless sampling to enable the installation of borehole gas sampling points and the diamond coring of concrete hard standing at the site.

The work was carried out from 30th to 31st March 2015. Previous survey work carried out at HMS Daedalus by the Defence Radiological Protection Service (DRPS) and Entec identified radiological contamination within the site. The contamination comprised of radium-226, likely to have come from luminised aircraft components.

Prior to work commencing Health and Safety documents were reviewed and endorsed by the Soiltechnics Site Manager. A radiation awareness toolbox talk was also provided by the Aurora Health Physicist to all staff involved with the work.

2. RADIOLOGICAL SURVEY

2.1 Instruments used

Hand held instruments were used to check soil and concrete cores removed during the intrusive excavations. Details of all the instruments used are provided below in Table 1.

Table 1. Instruments Used

Instrument	Used For	Serial number	Calibration Date	Background Reading on Site
Thermo Electra/BP19	Beta Contamination	AHP0230	19/03/2015	7-8 counts per second (cps) β
Thermo Electra/DP6	Alpha Contamination	AHP0098	13/02/2015	< 0.1 cps α
Exploranium GR-135	Gamma Radiation	AHP0053	24/03/2015	80-90 cps γ

The background radiation readings measured on site are provided in Table 1 above. All organic materials contain some level of radioactivity. Naturally occurring radionuclides include the uranium (^{238}U and ^{235}U) and thorium (^{232}Th) decay chains commonly found in soils and rock and radioactive potassium (^{40}K) commonly found in wood, clay and brick. These background levels vary between different materials (e.g. rock and soil) and in different areas of the UK. The

background readings for different instruments are detailed in this report as measured on the site however they are also typical of average background levels found throughout the UK.

2.2 Trial Pits, Boreholes and Soakaways

Trial pits, boreholes and soakaways were excavated at various locations around the site as directed by the Soiltechnics Site Manager. Prior to work commencing a pre-works radiological survey was carried out at the surface of each location. During the works radiological reassurance monitoring was undertaken of the spoil arising, core samples, chemical analysis samples and excavation trenches (where possible). Photos of the features typically produced are shown in Figures 1 to 3 below.

The following numbers of features were surveyed:

- Trial Pits – 20 off
- Borehole gas sampling points – 5 off
- [1]Soakaways – 4 off

[1]These formed part of the 20 off trial pits.



Figure 1. Trial pit excavation at the HMS Daedalus site.



Figure 2. Borehole works prior to gas sampling point installation at the HMS Daedalus site.



Figure 3. Soakaway excavation at the HMS Daedalus site.

2.3 Hard Standing Diamond Coring

Diamond coring of the concrete hard standing was undertaken at two locations on the site as directed by the Soiltechnics Site Manager. Prior to work commencing a pre-works radiological survey was carried out at the surface of each location. During the works radiological reassurance monitoring was undertaken of the concrete cores, chemical analysis samples and associated underlying ground materials. A photo showing the on-site concrete coring is shown in Figure 4 below.

The following numbers of features were surveyed:

- Concrete coring locations – 2 off



Figure 4. Diamond coring of the concrete hard standing at the HMS Daedalus site.

3. RESULTS

Radiation readings at all locations varied from 80 - 120 cps using the Exploranium GR-135 and contamination readings were 0 cps alpha and 8 - 12 cps beta using the Thermo Electra

ratemeter with DP6 and BP19 probes. These readings are entirely consistent with normal variations in background radiation levels.

No enhanced radiation was detected at any of the intrusive investigation locations, excavated materials, physical samples, newly formed excavations or associated equipment used during the works.

4. CONCLUSIONS

Radiological survey support has been provided during the excavation of trial and soakaway pits, borehole gas sampling testing points and concrete hardstanding diamond coring at the former HMS Daedalus site, Lee on Solent.

No evidence of contamination with radioactive materials was found during the work.