Consultancy Agreement No. 9OC127
Consultancy Services for Construction of
Integrated Rehabilitation Services Complex
at Ex-Siu Lam Hospital Site in Tuen Mun

Decommissioning and Disposal of Clinical Waste Incinerator and Associated Chimney at ex-Siu Lam Hospital in Tuen Mun, New Territories

Project Profile

April 2016

Submitted by
Social Welfare Department

Table of Contents

Figures

Appendices

1. BASIC INFORMATION

1.1. Project Title

1.1.1 Decommissioning and disposal of clinical waste incinerator and associated chimney at ex-Siu Lam Hospital in Tuen Mun, New Territories (the "Project").

1.2. Purpose and Nature of the Project

1.2.1 The Social Welfare Department (SWD) is undertaking redevelopment of ex-Siu Lam Hospital site at Hong Fai Road, Tai Lam, Tuen Mun, New Territories (the "Site") to construct an Integrated Rehabilitation Services Complex (IRSC).

1.2.2 The Project is to demolish one abandoned clinical waste incinerator, one chimney, all associated flues, ducts and refractory lined ductworks at the Extension Block of ex-Siu Lam Hospital. This has to be demolished as part of the IRSC construction programme.

1.3. Name of the Project Proponent

The Social Welfare Department

1.4. Location and Scale of Project

1.4.1 The ex-Siu Lam Hospital is situated in Hong Fai Road, Tai Lam, Tuen Mun. The site has been vacated upon the relocation of Siu Lam Hospital to Tuen Mun since April 2012. **Figure 1.1** shows the location of the ex-Siu Lam Hospital.

1.4.2 The layout plan of ex-Siu Lam Hospital is shown in **Figure 1.2** and is comprised of Administration Block, North Block, South Block and Extension Block at the upper platform and Nurse Quarters, Sister Quarters, Menial Staff Quarters Block A and Block B at the lower platform.

1.4.3 The clinical waste incinerator and its associated flues, chimney, ducts and ductworks are located at the Upper G/F of Extension Block. The chimney goes vertically inside a void area from the Upper G/F to the roof top of the Extension Block. The Upper G/F of Extension Block layout plan and the layout of the incinerator are presented in **Figures 1.3** and **1.4**, respectively.

1.4.4 The dimension of the incinerator is approximately $3m^3$ (0.75m (W) x 2.5m (H) x 1.5m (D)) and consists of one combustion chamber with a furnace capacity of approximately $0.5m^3$.

1.4.5 The demolition works shall include the combustion chamber, the chimney, the associated panels and horizontal flue section. The incinerator and flue are constructed mainly of steel except the combustion chamber which is lined with ceramic fire bricks.

1.4.6 The incinerator was installed in 1992 and ceased operation in 1993. It has been shut down more than 20 years. The normal operation frequency was once per week and the quantity of waste incinerated each time was only a few red coloured bags. Waste incinerated included sharps, dressings, and unused drug waste. No recorded accidents or incidents occurred during the operation of the clinical waste incinerator.

1.5. Designated Projects to be covered by the Project Profile

1.5.1 The decommissioning of the incinerator is classified as a Designated Project under Item 3 of Part II, Schedule 2 of Environmental Impact Assessment Ordinance (EIAO). It is

required by the EIAO that an Environmental Permit (EP) is granted from the Environmental Protection Department (EPD) before the decommissioning and disposal works commence.

1.5.2 This Project Profile is prepared under Section 5(11) of EIAO to assess the environmental impacts and propose mitigation measures to meet the requirements of EIAO-TM for the direct application for Environmental Permit.

1.5.3 The Designated Project covered by this Project Profile includes one (1) clinical waste incinerator, one (1) chimney, all associated flues, ducts and refractory lined ductworks at the Extension Block.

1.6. Name and Telephone Number of Contact Person

1.6.1 The whole IRSC construction project at ex-Siu Lam Hospital is managed by Ronald Lu & Partners (Hong Kong) Ltd (RLP). Parsons Brinckerhoff (Asia) Ltd (PBA) has been commissioned as the Environmental Consultant.

1.6.2 The contact details for the relevant personnel at PBA are shown below:

Dr. Alex Cheung

Parsons Brinckerhoff (Asia), 7/F One Kowloon, 1 Wang Yuen Street, Kowloon Bay, Hong Kong

Telephone: +852 2579 8899

Fax: +852 2856 9902

2. OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME

2.1 Project Implementation

2.1.1 The decommissioning and disposal works will be carried out by a Specialist Contractor appointed by the project proponent or its representative.

2.2 Project Timetable and Programme

2.2.1 The project is targeted to commence in October 2016 and complete in December 2016. The actual work period is expected not to be exceed 14 days. A tentative project programme is shown in **Table 2.1**.

Table 2.1 Tentative Programme for the Decommissioning and Disposal of the Incinerator

Task	Time Required
Site Preparation and Containment Construction	
Preliminary site decontamination	0.5 day
Construction of containment	5 days
Smoke test	0.5 day
Removal	
Removal and decommissioning of clinical waste incinerator, chimney, ductworks and flue	5 days
Disposal of Waste	Within 1 day from obtaining waste disposal permit

2.3 Interactions with Broader Programme Requirements

2.3.1 The decommissioning of clinical waste incinerator, chimney, flue and associated ductworks will be carried out prior to other demolition works and site formation works, as part of the Work Stage 3 of IRSC Construction Programme.

3. MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Sensitive Receivers

3.1.1 Sensitive receivers, as identified by the EIAO Technical Memorandum (EIAO-TM), include residential developments; educational institutions; healthcare facilities; place of worship; agricultural areas; watercourses; beaches; groundwater resources; marine water resources; industries sensitive to pollution; airsheds with limited capacity to disperse pollution; areas of conservation value; place of high visual value; and sites of cultural heritage.

3.1.2 Representative Air Sensitive Receivers (ASRs) and Noise Sensitive Receivers (NSRs) in the vicinity of the Project have been identified and summarised in **Table 3.1**. Their locations are shown in **Figure 3.1**.

Table 3.1 Locations of Environmental Sensitive Receivers

No.	Name	Type of Use	Distance from the Project (m) 距離（米）	ASR	NSR
1	Siu Lam Psychiatric Centre	Clinic	90	✓	✓
2	CSD Quarters	Domestic	166	✓	✓
3	Siu Lam Psychiatric Centre Junior Staff Married Quarters	Domestic	232	✓	✓
4	Palatial Coast - Grand Pacific Views	Domestic	236	✓	✓
5	Luen On San Tsuen	Domestic	297	✓	✓
6	Palatial Coast - Grand Pacific Heights	Domestic	299	✓	✓
7	Tai Lam Chung Gov't Quarters	Domestic	332	✓	
8	Christian Cherith Ministry Institute	Education	399	✓	
9	Siu Lam Tsuen	Domestic	402	✓	

3.2 Major Elements of the Surrounding Environment

3.2.1 Major elements of the surrounding environment, as identified by the EIAO-TM include: existing pollution black spots; nearby, existing and/or discontinued industrial operations; nearby trunk roads, and primary or secondary distributors; nearby noisy commercial. community or recreational activities; aircraft noise, helicopter noise, rail noise; existing or planned waste handling, treatment and disposal facilities; potentially hazardous

installations; noisy or dusty open storage uses; existing and past land uses of the project site and environs.

3.2.2 Ex-Siu Lam Hospital site is situated on a hillside in Tai Lam. Tuen Mun Road which is a major trunk route and Castle Peak Road – Tai Lam are located from south to west of the Project, some 150m away, down the hillside. Siu Lam Psychiatric Centre is located to the immediate east of the Project. To the south-east of the Project is Luen On San Tsuen. Tam Lam Chung Gov't Quarters are located in the south-west of the Project across Tuen Mun Road and Castle Peak Road – Tai Lam. To the west of the Project are Siu Lam Psychiatric Centre Junior Staff Married Quarters across Hong Fai Road, Grand Pacific View, Palatial Coast, Grand Pacific Heights and Siu Lam Tsuen across Siu Lam Road. Christian Cherith Ministry Institute is situated at the north-west of the Project. CSD Quarters are located to the north of the Project. All the above major elements of the surrounding environment are unlikely to affect the Project.

3.2.3 The Site is within the 1km Consultation Zone of the Tai Lam Chung No. 2 Chlorination Station (TLCCS), which is a Potentially Hazardous Installation (PHI). A Quantitative Risk Assessment (QRA) as part of the Hazard Assessment Report (HAR) was conducted to evaluate the change of risk due to the change in population during the Technical Feasibility Stage. HAR was endorsed by CCPHI[1] Chairman on 31 December 2014. The endorsement notice is presented in **Appendix 3.1**. The results revealed that the risk of the IRSC is in the acceptable region, and the overall social risk level within the Consultation Zone is within the ALARP level. Both individual and social risk level are in compliance with the Hong Kong Planning Standards and Guidelines. It is envisaged that the PHI has no adverse impact to the Project. The maximum number of 700 construction workers working in this site assumed in the QRA will not be exceeded.

[1] CCPHI – Coordinating Committee on Land Use Planning and Control relating to Potentially Hazardous Installations

4. POSSIBLE IMPACTS ON THE ENVIRONMENT

4.1 Introduction

4.1.1 The nature and scale of the Project is considered to be small and the works will be limited to internal areas, therefore, the potential impacts are considered minimal.

4.1.2 The key environmental impacts associated with the decommissioning and disposal of the incinerator at the site are listed in **Table 4.1** and are discussed in the following sections.

Table 4.1 Potential Environmental Impacts

Source	Likely to occur (without mitigation measures)
Waste management	✓
Water quality	✓
Air quality (dust emission)	✓
Noise	x
Land contamination	x
Unsightly visual appearance	x
Gaseous emission	x
Odour	x
Night-time operations	x
Traffic generation	x
Disruption of water movement or bottom sediment	x
Ecological impact	x

4.2 Waste Management

4.2.1 A list of substance or chemical (in any form, quantity and concentration), including asbestos, dioxins, polychlorinated biphenyls (PCBs), petroleum hydrocarbons (TPHs), polyaromatic hydrocarbons (PAHs) and heavy metals (HMs), is specified under *Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation* of the *Waste Disposal Ordinance* (WDO) that would cause pollution or constitute a danger to health or risk of pollution to the environment. Potential chemical wastes to be generated from the decommissioning and demolition of the incinerator, chimney, flue and associated ductworks include residual ash, asbestos-containing materials, incinerator unit, flue and chimney.

4.2.2 The key environmental impacts are associated with the residual ash remaining in the incinerator unit and ash collector. Ash sampling and analysis was undertaken to identify the associated risks and enable environmental protection and mitigation measures to be proposed accordingly.

Residual Ash

4.2.3 Visual inspection of the clinical waste incinerator site was conducted on 9 December 2015. Photos of the incinerator and the associated ductworks are showed in **Appendix 4.1**.

4.2.4 To establish the conditions in relation to the residual ash, and there was sufficient residual ash inside the combustion chamber and from the bottom of chimney, detailed ash sampling was undertaken on 19 January 2016. There is no residual ash found inside other parts of the incinerator including flues and ductworks.

4.2.5 The contamination confirmatory investigation was undertaken by a Hong Kong Laboratory Accreditation Scheme (HOKLAS) accredited laboratory to examine the levels of Dioxins, PCBs, TPHs, PAHs and HMs in the residual ash.

4.2.6 The sampling locations are summarised in **Table 4.2**. Three (3) samples of residual ash were collected from the incinerator combustion chamber and bottom of chimney. A photographic log of the sampling is presented in **Appendix 4.2**.

Table 4.2 Ash Sampling Locations

Ash Sampling Number	Location
Ash#1	Bottom of combustion chamber
Ash#2	Bottom of chimney
Ash#3	Duplicate sample at the bottom of chimney

4.2.7 The testing results except dioxins were compared against the EPD's *Risk-Based Remediation Goals (RBRG)* which are based on the risk to human health. For dioxins, the clean-up level of 1 ppb for residential use as provided in *USEPA Office of Solid Waste and Emergency Response Directive of 1998* was adopted for assessment. **Tables 4.3** to **4.6** list the results of the analysis. Detailed analytical results are presented in **Appendix 4.3**.

Table 4.3 Heavy Metals (HMs) Analysis of Residual Ash Samples

Parameter	Reporting Limit (mg/kg)	Assessment Criteria (mg/kg)	Sampling Results (mg/kg)		
			Ash#1	Ash#2	Ash#3
Antimony	1	29.5	148	4	4
Arsenic	1	22.1	6	19	23
Barium	1	10,000	497	11	10
Cadmium	0.2	73.8	5.8	0.5	0.5
Chromium III	1	10,000	92	34	41
Chromium VI	1	221	<1	<1	<1
Cobalt	1	1,480	8	6	7
Copper	1	2,950	106	43	48
Lead	1	258	2,450	25	20
Manganese	1	10,000	477	2,710	3,720
Mercury	0.05	11	33.4	3.57	1.55

Parameter	Reporting Limit (mg/kg)	Assessment Criteria (mg/kg)	Sampling Results (mg/kg)		
			Ash#1	Ash#2	Ash#3
Molybdenum	1	369	27	11	12
Nickel	1	1,480	57	40	49
Tin	1	10,000	190	17	16
Zinc	1	10,000	20,000	50	40
Compliance			No	Yes	No

Table 4.4 Polyaromatic Hydrocarbons (PAHs) Analysis of Residual Ash Samples

Parameter	Reporting Limit (mg/kg)	Assessment Criteria (mg/kg)	Sampling Results (mg/kg)		
			Ash#1	Ash#2	Ash#3
Anthracene	0.5	10,000	<0.5	<0.5	<0.5
Benzo(a)pyrene	0.5	1.2	<0.5	0.907	0.632
Fluoranthene	0.5	2,400	1.94	1.91	1.36
Naphthalene	0.5	182	<0.5	<0.5	<0.5
Phenanthrene	0.5	10,000	5.81	1.48	1.24
Pyrene	0.5	1,800	1.28	2.11	1.56
Compliance			Yes	Yes	Yes

Table 4.5 Petroleum Hydrocarbons (TPHs) Analysis of Residual Ash Samples

Parameter	Reporting Limit (mg/kg)	Assessment Criteria (mg/kg)	Sampling Results (mg/kg)		
			Ash#1	Ash#2	Ash#3
C6-C9	2	C6-C8: 1,410 C9-C16: 2,240 C17-C35: 10,000	<2	<2	<2
C10-C14	50		60	<50	<50
C15-C28	100		2,010	<100	<100
C29-C36	100		1,520	<100	<100
Compliance			Yes	Yes	Yes

Table 4.6 Polychlorinated Biphenyls (PCBs) and Dioxins Analysis of Residual Ash Samples

Parameter	Reporting Limit (mg/kg)	Assessment Criteria (mg/kg)	Sampling Results (mg/kg)		
			Ash#1	Ash#2	Ash#3
Total PCBs	0.1	0.236	<0.1	<0.1	<0.1
Dioxins (I-TEQ)*		1 ppb	0.22 ppb	0.019 ppb	0.013 ppb
Compliance			Yes	Yes	Yes

Note: * Due to the uncertainties in the analysis results at low Dioxins content, upperbound values were used for assessment.

4.2.8 As shown in **Tables 4.3 – 4.6**, exceedance of antimony, lead, mercury and zinc for combustion chamber sample and arsenic for sample at the bottom of chimney within the heavy metal group were observed whilst PCBs, TPHs, PAHs and Dioxins were within the RBRG's requirement for all samples.

4.2.9 In summary, the residual ash remaining in the incinerator is contaminated with heavy metals. The ash does not belong to Part A Chemical Waste under Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation. Protective measures would be required when the incinerator is demolished.

4.2.10 As the incinerator was operated less than one (1) year with a normal operation frequency of once per week and has been shut down more than 20 years, it is expected that residual ash deposited inside the incinerator unit and associated ductworks are minimal. The total volume of contaminated residual ash to be removed for the incinerator and its associated ductworks is about 0.5m^3. Advice from the EPD was sought for disposal of the residual ash and waste generated from the demolition. The residual ash shall be regarded as chemical waste and disposed of at designated landfill under the surveillance of EPD's Admission Ticket System after Toxicity Characteristic Leaching Procedure (TCLP) confirmation. If necessary, cement solidification would be used to treat the waste. The solidified waste passing the TCLP limit would be disposed of at designated landfill under the surveillance of EPD's Admission Ticket System. The decommissioning and demolition of the incinerator, chimney and associated ductworks shall be carried out by a Specialist Contractor with care and precaution, in order to ensure all residual ash are handled, transported and disposed of properly waste.

Asbestos-containing Materials

4.2.11 An asbestos investigation was undertaken between October 2013 and April 2014 by a Registered Asbestos Consultant. No asbestos-containing materials (ACMs) were identified in the survey for the door seals of the incinerator, and flexible joints at chimney. In addition, no asbestos-containing materials were identified related to the incinerator and associated ductworks in the Extension Block.

4.2.12 Manufacturer of the incinerator unit was contacted on the use of asbestos containing materials for the construction of the incinerator. It is confirmed that no asbestos products was used in the construction of the incineration unit including door seals and gasket material on chimney. An email from Facultatieve Technologies Co. is provided in **Appendix 4.4**.

Incinerator Unit and Others

4.2.13 As ash deposited inside the combustion chamber as well as attached to its associated walls, flues, chimney and ductworks, the Specialist Contractor shall use a High Efficiency Particulate Air (HEPA) vacuum to clean these materials, wet wiping before wrap them in polythene and dispose of at a designated landfill site.

4.2.14 It is estimated that 40m^3 of this contaminated waste would be generated from the Project. With implementation of appropriate mitigation measures as described in **Section 5.1**, no adverse impact is anticipated.

4.3 Water Quality Impact

4.3.1 Wastewater generated from the decommissioning and demolition works will be limited to general cleaning works, water used in dust suppression and workers. The Specialist Contractor should take precautionary measures to minimise the quantity of wastewater generated.

4.3.2 In order to estimate the wastewater volume will be generated, the flow rate of 0.150 (for construction activity) +0.080 (for commercial employee) m^3 per day per construction worker in accordance with Table T-2 of EPD's Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning was adopted. At this planning stage, eight (8) workers are expected to work for the project each day and the demolition work will be completed in 14 days. A volume of 25.76m^3 would be produced from the project.

4.3.3 The floor drain in the incinerator room shall be covered with a temporary seal during the decommissioning and demolition works. The top of the chimney should be sealed with polyethylene sheets at least twenty-four (24) hours before the works commence.

4.3.4 In addition, cloths which have been used for wet wiping will not be re-used therefore the only wastewater generated by this cleaning process will limited to that on the surfaces of the equipment; it is anticipated that this water will evaporate and no contaminated wastewater will be generated.

4.3.5 All wastewater (if any) generated from the Project will be treated in accordance with *Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters* issued under the Water Pollution Control Ordinance (WPCO), *Practical Note for Professional Persons on Construction Site Drainage (PN1/94) issued by the EPD,* and the conditions of the Wastewater Discharge License.

4.3.6 Following the implementation of the above control measures, no unacceptable impact on water quality is anticipated.

4.4 Air Quality Impact

4.4.1 The Project would not involve any demolition works for structures. The decommissioning of the incinerator will be carried out in an air-tight condition under negative pressure, and hand-held tools and small electric equipment will be used for the decommissioning works, no significant dust emissions are expected.

4.5 Noise Impact

4.5.1 The demolition activities are not expected to give rise to any significant noise impacts as the demolition of incinerator, flue, chimney and associated ductworks will be taken inside the Extension Block and a covered structure, using hand tools and small powered tools. It is unlikely that the demolition activities would affect the nearby NSRs. All demolition works will only be carried out between 07:00 and 19:00 on any day. If any use of power mechanical equipment between 19:00 and 07:00 on weekdays and any time on Sundays and Public Holidays, a construction noise permit will be applied from EPD.

4.5.2 As the amount of waste generated from the demolition activities is limited and the duration is short, the traffic flow of nearby roads is not expected to be significantly affected by the additional traffic generated. The issue of road traffic noise on nearby NSRs is not significant.

4.6 Land Contamination

4.6.1 The incinerator furnace of approximately 3m^3 (0.75m (W) x 2.5m (H) x 1.5m (D)), consisted of one combustion chamber. The incinerator was constructed with a durable steel fabrication structure with a high temperature resistance lining and insulating refractory ceramic bricks on solid concrete base which built on top of a concrete slab in the incinerator room. The concrete base and slab are considered are to be in good condition.

4.6.2 The incinerator has been shut down more than 20 years. It was installed since 1992 and operated less than 1 year. The normal operation frequency was 1 time per week and the quantity of waste was only a few red coloured bags containing sharps, dressings, unused drug waste, etc.

4.6.3 Given the above conditions, land contamination arising from the past operation of the incinerator is not considered to be significant.

4.7 Unsightly Visual Appearance

4.7.1 The decommissioning and demolition of the incinerator, flue, chimney and associated ductworks will be undertaken inside the Extension Block except the top of the chimney. Minimal visual impact is anticipated.

4.8 Risk Of Accidents which Results in Pollution or Hazard

4.8.1 As with any project, there are risks involved with the Project which if not managed could result in a pollution event or hazard.

4.8.2 The key potential accidents and hazards and control measures are identified in **Table 4.7.**

Table 4.7 Potential Risks and Control Measures

Risk	Control Measure
Accidents associated with disconnecting the fuel oil supply – potential impact to human health	A qualified technician will be employed to undertake this work.
Release of dust (ash) into the environment – potential impacts to human health	The decommissioning and demolition work will be carried out in full containment, a Specialist Contractor will be employed with adequate health and safety protection measures in place.
Release of chemical waste during transport – potential impacts to human health and/or the environment	A suitably licensed waste carrier will be used to transport the chemical wastes to the designated landfill under the EPD's Admission Ticket System after TCLP confirmation.

4.9 Other Environmental Impacts Not Likely to Occur

4.9.1 This section details the other environmental impacts which are not likely to occur in undertaken the Project.

Gaseous Emission

4.9.2 No process will be undertaken in the decommissioning and demolition works which will generate gaseous emissions.

Odour

4.9.3 No odours are expected as the majority of waste materials which will be generated by the Project are of solid residues and no odour generating process will be undertaken in the decommissioning and demolition works.

Night-time Operations

4.9.4 Decommissioning and demolition works will be undertaken between the hours of 0800 and 1900; hence, there will be no night-time operations associated with the Project.

Traffic Generation

4.9.5 Only limited quantity of demolition waste associated with the decommissioning and demolition works, traffic-associated environmental impact is not anticipated to be significant.

Disruption of Water Movement or Bottom Sediment

4.9.6 No discharge to surface water, dredging or reclamation will be undertaken during the Project, therefore, no disruption of water movement or bottom sediment is anticipated.

Ecological Impact

4.9.7 There are no nearby areas of ecological or conservation value. The Project will not have any ecological impact.

5. ENVIRONMENTAL PROTECTION MEASURES

5.1 Waste Management

5.1.1 Decommissioning of the incinerator room shall be conducted under full containment to avoid the release of any residual ash to the environment, which could be generated during the decommissioning works. The following sections detail the approach.

Site Preparation and Containment Construction

5.1.2 Preliminary site decontamination of all debris shall be carried out using High Efficiency Particulate Air (HEPA) vacuum cleaner. Except the incineration units, all other existing items shall be removed from the incinerator room as far as practicable to avoid obstructing work activities.

5.1.3 All openings shall be sealed with three-layers of fire retardant polythene sheets.

5.1.4 A temporary structure shall be built from the incinerator room to enclose the flue (located immediately outside the incinerator room in the Upper G/F of the Extension Block). A three-compartment decontamination unit shall be constructed for entry and exit in to the works area. The unit shall comprise a dirty room, a shower room and a clean room or at least 2m high with 1m x 1m base each with three-layers of fire retardant polythene sheet where all workers shall carry out decontamination procedures before leaving the work area.

5.1.5 Air movers shall be provided at the incinerator room to exhaust air from the works area. A stand-by air mover shall also be installed. Sufficient air movers shall be maintained to give a minimum of six (6) air changes per hour (ACH) to the works area and, maintain a negative pressure of 1.5 to 4 mm of water within the works area throughout the entire course of the decommissioning works. A pressure monitor shall print out records and audible alarm shall be installed at an easily accessible location to demonstrate that negative pressure is maintained. New pre-filters and HEPA filters shall be used on the air movers.

5.1.6 A copy of the maintenance records of the air movers shall be kept on site for inspection upon request. The appointed Specialist Contractor shall also check the differential pressure of the air mover to ensure that the filter is not blocked. A differential pressure of above 5 mm of water indicates that the filters will need to be changed. All items remain inside the containment shall be covered with at least two (2) layers of fire retardant polythene sheets before the decommissioning works proceed.

5.1.7 Warning signs in both Chinese and English shall be put in conspicuous locations outside the temporary decontamination unit and displayed throughout the entire course of the decommissioning and demolition works.

Smoke Test

5.1.8 Prior to commencement of the decommissioning works, a smoke test with non-toxic smoke shall be carried out to ensure the tightness of the containment and to check whether there are any stagnant pockets of air (indicated by an aggregate of smoke that cannot be effectively extracted).

5.1.9 After a successful test, the air mover shall be switched on to exhaust smoke from the containment and to give a minimum of 6 ACH, and visually check that the absolute filters screen out the smoke effectively and that the pressure gauges read normal. The normal reading of the pressure range for maintaining six (6) air changes per hour shall be 1.5 to 4 mm of water (negative pressure). The audible alarm's integrity shall also be checked, and the trigger shall be at least 1.5 mm of water (negative pressure).

Demolition Works

5.1.10 The residual ash inside the incinerator shall be removed by scrabbling. All inner walls of incinerator shall be cleaned using a HEPA vacuum cleaner and the wet wipes. The scrabbled material and the filtered materials from the HEPA vacuum cleaner shall be packed on site and stored in polythene-lined steel drums for disposal of at the designated landfill under the surveillance of EPD's Admission Ticket System after TCLP confirmation. If necessary, cement solidification would be used to treat the waste. The solidified waste passing the TCLP limit would be disposed of at designated landfill under the surveillance of EPD's Admission Ticket System.

5.1.11 The chimney shall be removed from top down starting from the rooftop. Any residual ash attached to the flues, chimney and panels shall be removed by scrabbling and HEPA vacuuming.

5.1.12 The detached sections of the incinerator, chimney and flues shall be wet wiped before wrap them with three layers of fire retardant polythene with a third layer secured with duct tape, and segregated from the chemical waste.

5.1.13 The insulation-lined combustion furnace shall be dismantled to manageable size and wet wiped before wrap them with three layers of fire retardant polythene with a third layer secured with duct tape.

5.1.14 All outer layers of polythene sheets shall be decontaminated by wet wipes before leaving the work area.

5.1.15 A qualified technician shall be employed to disconnect the fuel oil supply to minimise the potential risk.

5.1.16 All workers shall wear full PPE which should include disposable protective overall (such as Tyvek) with hood, nitrile gloves, shoe covers, and full-face positive pressure respirators equipped with a combination cartridge that filters particulate and removes organic vapour.

5.1.17 Following completion of the demolition work, all surfaces in the incinerator room shall be decontaminated by HEPA vacuuming and wet wiping. Then the innermost polythene sheet shall be sprayed with Polyvinyl Alcohol (PVA) and upon drying, the inner polythene sheet shall be peeled off. The PVA decontamination process shall then be repeated for the second and third layers of the polythene sheets. All polythene sheets used shall be disposal of at the designated landfill under the surveillance of EPD's Admission Ticket System after TCLP confirmation. If necessary, cement solidification would be used to treat the waste. The solidified waste passing the TCLP limit would be disposed of at designated landfill under the surveillance of EPD's Admission Ticket System.

Disposal Method

5.1.18 All residual ash collected from the incinerator, used HEPA filters, scrabbled materials and the HEPA filtered materials shall be disposal of at the designated landfill under the surveillance of EPD's Admission Ticket System after TCLP confirmation. If necessary, cement solidification would be used to treat the waste. The solidified waste passing the TCLP limit would be disposed of at designated landfill under the surveillance of EPD's Admission Ticket System. For the disposal of chemical waste produced from the Project, the Specialist Contractor is required to register with the EPD as a Chemical Waste Producer and to follow the requirements stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes shall be used. Appropriate labels shall be affixed securely on each chemical waste container indicating the chemical characteristics of the chemical waste, such as explosives, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Specialist Contractor should engage a licensed waste collector to transport and disposed of the contaminated wastes in accordance with the *Waste Disposal (Chemical Waste) (General) Regulation* of WDO.

5.1.19 Other wastes such as the combustion chamber and its associated panels, flues and chimney, polythene wrapping sheets, used PPE, waste generated from the dismantling work of the containment and cloths used for wet wiping are considered as contaminated wastes and shall be stored in appropriate containers such as drums and jerricans for disposal of at designated landfill site.

5.2 Wastewater

5.2.1 All wastewater arise (if any) from the Project should be treated in compliance with the standards for effluent discharged into the North Western Water Control Zone (WCZ). Furthermore, any discharges into the inshore waters of the North Western WCZ are required to comply with Table 10a of *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters*. The treated effluent shall also comply with the conditions of the Wastewater Discharge License.

5.2.2 The *Practical Note for Professional Persons on Construction Site Drainage* (PN1/94) issued by the EPD provides guidelines for the handling and disposal of construction site discharges and shall be adopted to minimise impacts on water quality.

6. USE OF PREVIOUSLY APPROVED EIA REPORTS

6.1.1 In terms of the decommissioning method and the size of the incinerator involved, the nature of this project is found to be similar to the following approved Project Profiles:

- Decommissioning of Clinical Waste Incinerators and Associated Chimneys at the Min Block of Pamela Youde Nethersole Eastern Hospital, Chai Wan, Hong Kong (Project Profile ref. PP-521/2015, DEP's decision ref. DIR-240/2015 and Environmental Permit ref. EP-498/2015)
- Decommissioning and Disposal of incinerator at Yan Chai Hospital (Project Profile ref. DIR-186/2009, DEP's decision ref. DIR 186/2009 and Environmental Permit ref. EP-374/2009)
- Decommissioning and Disposal of Clinical Waste Incinerator at Wai Oi Block of Caritas Medical Centre (Project Profile ref. PP-312/2007, DEP's decision ref. DIR-149/2007 and Environmental Permit ref. EP-278/2007)
- Decommission and Disposal of Clinical Waste incinerator at Tang Shiu Kin Hospital (Project Profile ref. PP-180/2002, DEP's decision ref. DIR-074/2002 and Environmental Permit ref. EP-154/2003)
- Decommissioning of a Clinical Waste Incinerator at Pok Oi Hospital (Project Profile ref. PP-150/2001, DEP's decision ref. DIR-062/2001 and Environmental Permit ref. EP-117/2002)

6.1.2 The above Project Profiles shall serve as references for this Project at ex-Siu Lam Hospital. The findings of these Project Profiles suggested that it was not necessary to carry out a full-scale EIA Study for the decommissioning of the clinical waste incinerator at the respective hospitals.

7. CONCLUSIONS

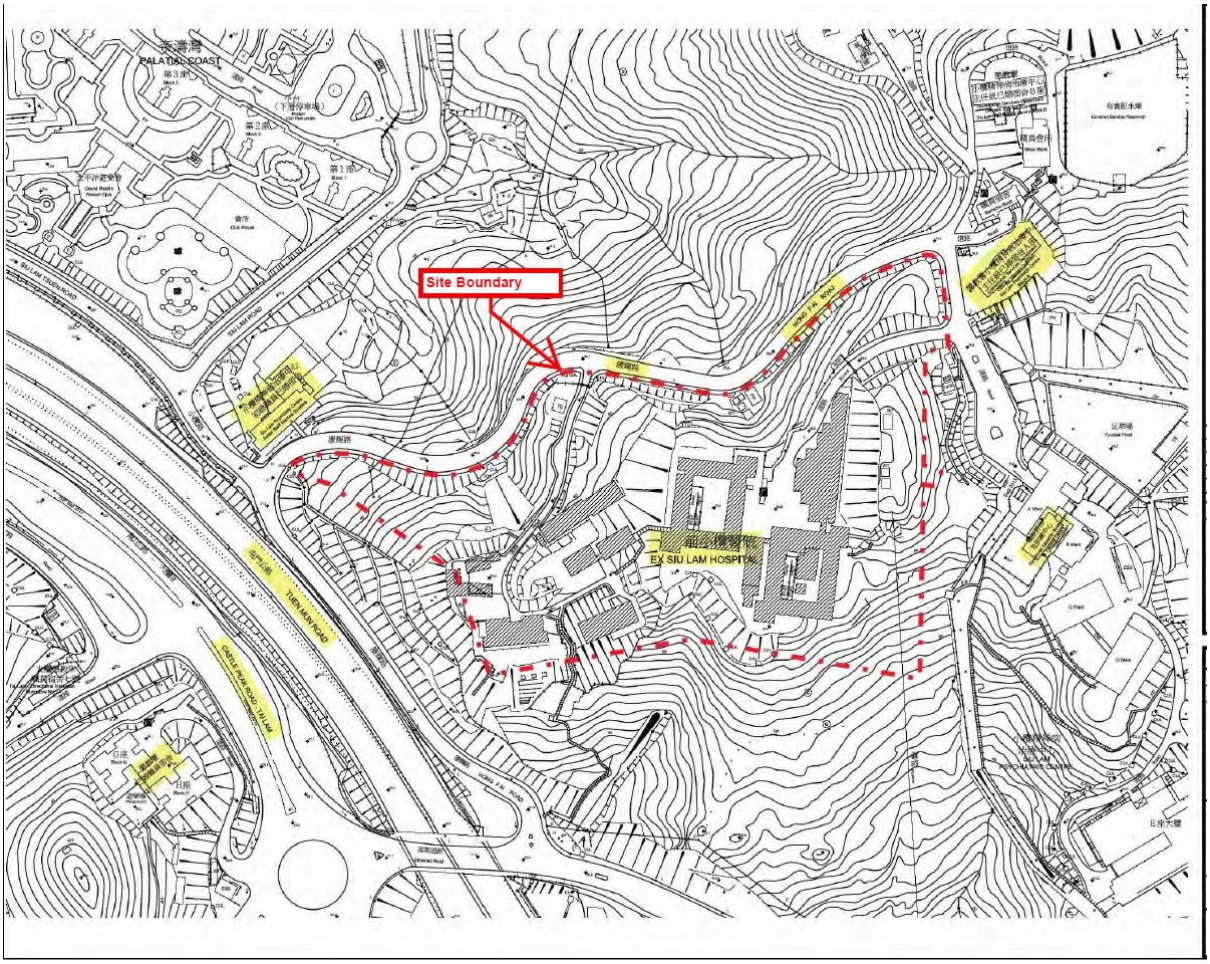
7.1.1 With reference to EIAO-TM, the potential environmental impacts of the decommissioning works of the clinical waste incinerator unit have been discussed and the appropriate mitigation measures to implement environmental control measures have been detailed.

7.1.2 The key focus from an environmental perspective is to avoid release of residue ash to the environment and to avoid contamination of the on-site facilities. Given the small size of the clinical waste incinerator, decommissioning and disposal is not expected to generate any significant environmental impact to the surrounding environment.

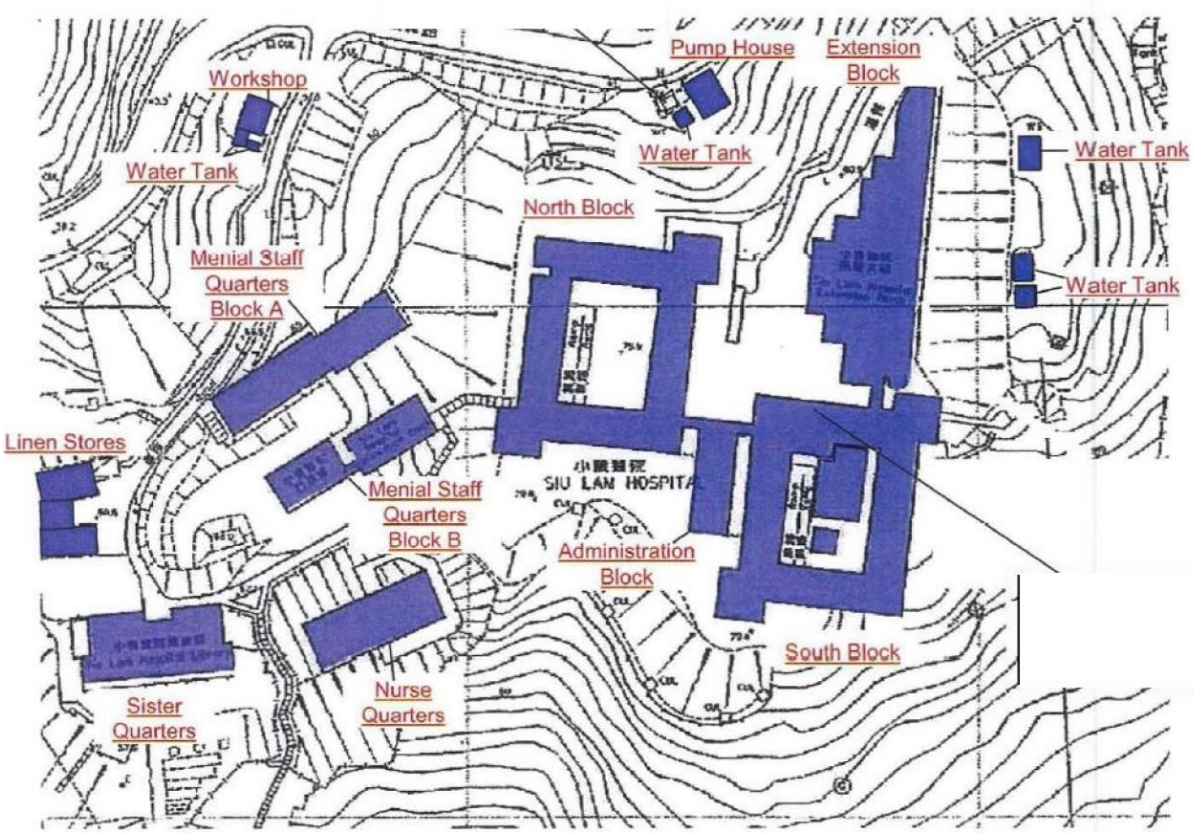
7.1.3 Other previously approved Project Profiles for similar projects have been referenced. It was suggested in these Project Profiles that it was not necessary to carry out a full-scale EIA study for the decommissioning of the clinical waste incinerators in hospitals.

7.1.4 This Project Profile has demonstrated that the decommissioning and disposal of the clinical waste incinerator and associated chimney at ex-Siu Lam Hospital (Designated Project) meet the requirements under EIAO-TM for a direct application for Environmental Permit under Section 5(11) of EIAO.

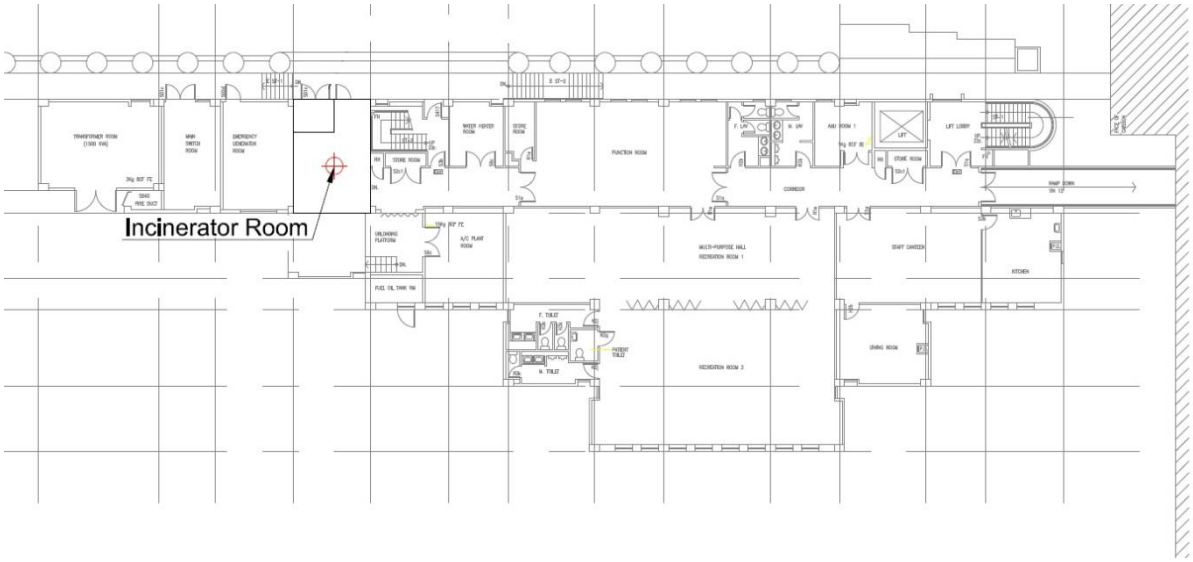
Figures



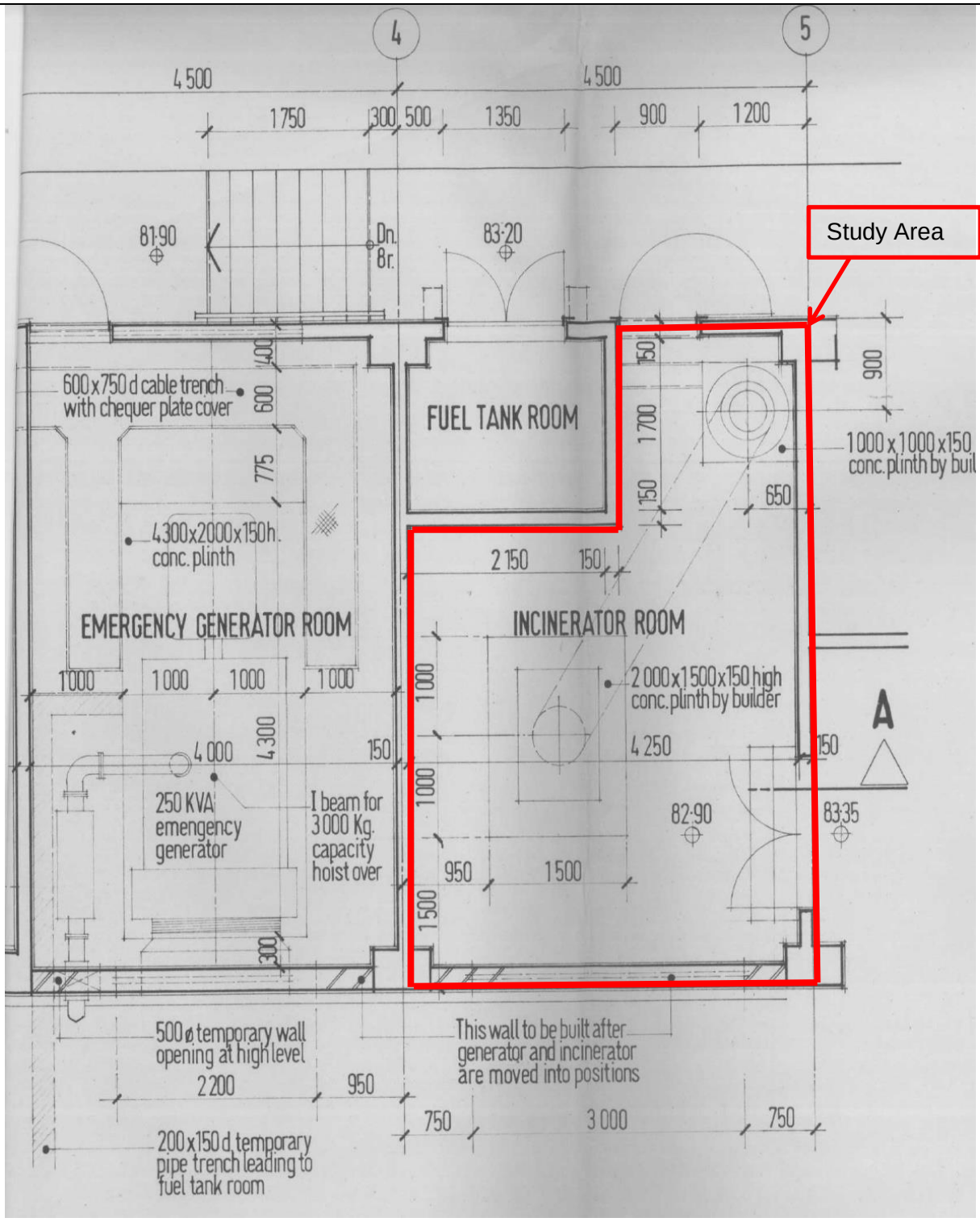
Decommissioning and Disposal of Clinical Waste Incinerator and Associated Chimney at ex-Siu Lam Hospital Site Location of ex-Siu Lam Hospital	Figure No. 1.1	Rev.: 0 Date: Feb 2016	



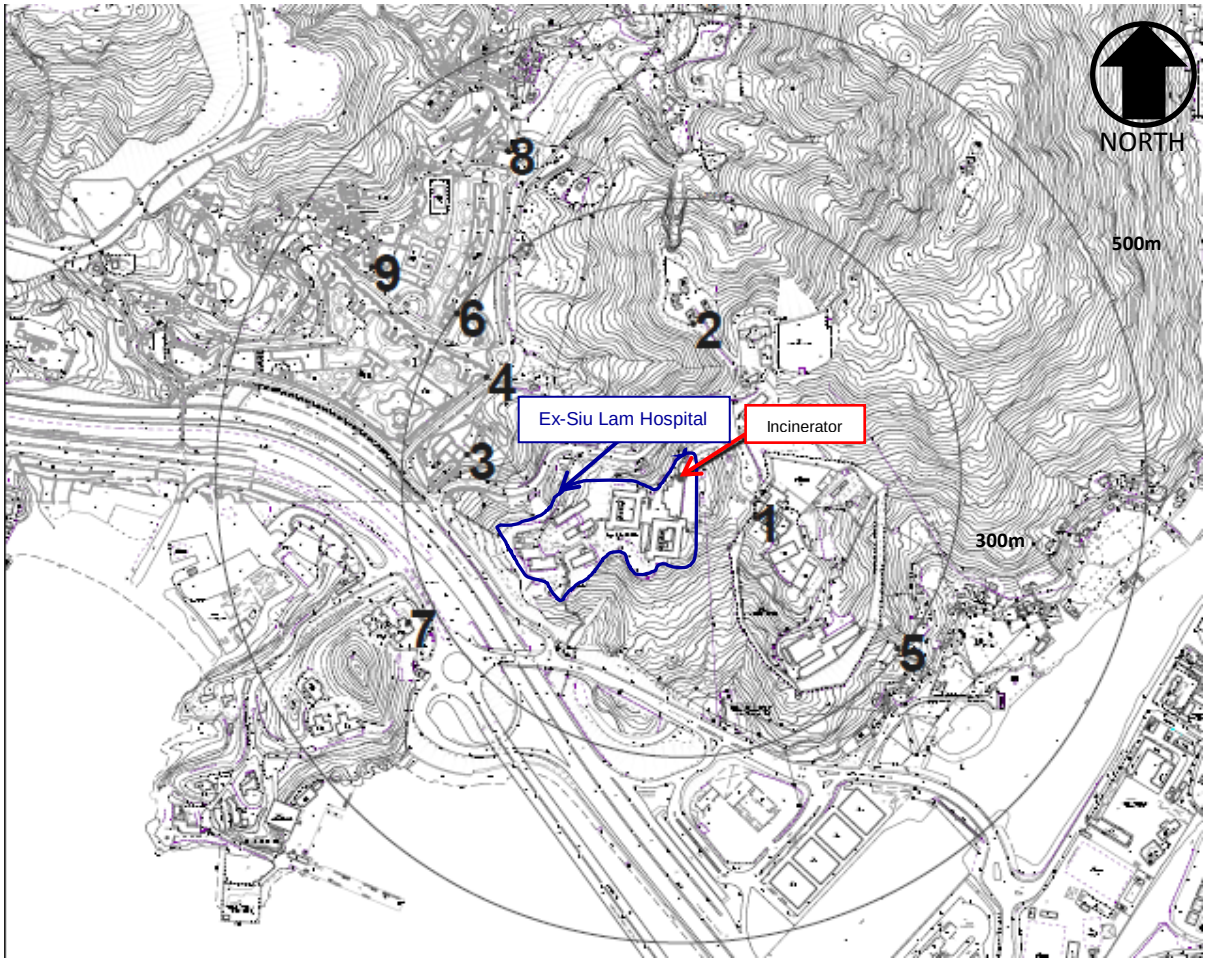
Decommissioning and Disposal of Clinical Waste Incinerator and Associated Chimney at ex-Siu Lam Hospital Layout plan of ex-Siu Lam Hospital	Figure No. 1.2	Rev.: 0 Date: Feb 2016	



Decommissioning and Disposal of Clinical Waste Incinerator and Associated Chimney at ex-Siu Lam Hospital Upper G/F Plan of the Extension Block showing the location of the Incinerator Room	Figure No. 1.3	Rev.: 1 Date: Apr 2016	



Decommissioning and Disposal of Clinical Waste Incinerator and Associated Chimney at ex-Siu Lam Hospital Layout plan of the Incinerator Room with the Study Area highlighted in red	Figure No. 1.4	Rev.: 1 Date: Apr 2016	



Decommissioning and Disposal of Clinical Waste Incinerator and Associated Chimney at ex-Siu Lam Hospital Locations of Representative Air Sensitive Receivers (ASRs) and Noise Sensitive Receivers(NSRs)	Figure No. 3.1	Rev.: 0 Date: Dec 2015	

Appendix 3.1

Endorsement Notice of the Hazard Assessment Report

A706/2S 頁1/共1 ← insert in report

政府總部
發展局
規劃地政科

香港添馬添美道二號
政府總部西翼十七樓

Planning and Lands Branch
Development Bureau
Government Secretariat

17/F, West Wing,
Central Government Offices,
2 Tim Mei Avenue, Tamar, Hong Kong

電話 Tel.: 3509 8833

傳真 Fax : 2845 3489

本局檔號 Our Ref. DEVB (PL-L) 25/96/05

來函檔號 Your Ref. A706/2S/001L

AD+RG
10/F, 111 Leighton Road
Causeway Bay
Hong Kong
(Attn: Mr Eugene Chung)

By Fax and by Post

6 January 2015

Dear Mr Chung,

Re: Hazard Assessment Report
for the Proposed Integrated Rehabilitation Service Complex
at Ex-Siu Lam Hospital, Tuen Mun

I refer to your letter of 10 January 2014 enclosed with hard copies of the Hazard Assessment Report to the Coordinating Committee on Land Use Planning and Control relating to Potentially Hazardous Installations (CCPHI) with regard to the proposed integrated rehabilitation service complex at Ex-Siu Lam Hospital, Tuen Mun.

Please note that the CCPHI Chairman endorsed the submitted Hazard Assessment Report regarding the proposed development on 31 December 2014.

Yours sincerely,

(Jeremy POON)
Secretary, CCPHI

RECEIVED
- 6 JAN 2015

Appendix 4.1

Photos of the Incinerator, Chimney and the Associated Ductworks

Plate 1 Clinical waste incinerator

Plate 2 Horizontal flue

Plate 3 Horizontal flue to chimney

Plate 4 Upper part of the incinerator

Plate 5 Fuel oil connection

Plate 6 Combustion chamber

Plate 7 Ground slab for the incinerator

Plate 8 Chimney of the incinerator

Appendix 4.2

Photographic Log of Ash Sampling

Plate 1 Residual ash sample at the combustion chamber

Plate 2 Residual ash sample at the bottom of chimney

Appendix 4.3

Laboratory Results of Residual Ash Samples

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

CERTIFICATE OF ANALYSIS

Client	: PARSONS BRINCKERHOFF	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 12
Contact	: MR ALEX CHEUNG	Contact	: Fung Lim Chee, Richard	Work Order	: HK1602933
Address	: 7/F, ONE KOWLOON, 1 WANG YUEN STREET, KOWLOON BAY, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: cheung.waihung@pbworld.com	E-mail	: Richard.Fung@alsglobal.com		
Telephone	: +852 3900 2021	Telephone	: +852 2610 1044		
Facsimile	: +852 2856 9902	Facsimile	: +852 2610 2021		
Project	: 2523153B - AGREEMENT 9OC127 IRSC AT EX-SIU LAM HOSPITAL	Quote number	: ----	Date Samples Received	: 19-JAN-2016
Order number	: ----			Issue Date	: 12-FEB-2016
C-O-C number	: ----			No. of samples received	: 4
Site	: EX-SIU LAM HOSPITAL			No. of samples analysed	: 4

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Chan Ka Yu, Karen	**Manager - Organics**	**Organics**
Fung Lim Chee, Richard	**General Manager**	**Inorganics**

General Comments

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. The completion date of analysis is: 05-FEB-2016

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK1602933

Sample(s) were collected by ALS Technichem (HK) staff.
Sample(s) analysed and reported on an as received basis.
Water sample(s) were filtered prior to dissolved metal analysis.
Sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.
Dioxins was subcontracted to and analysed by ALS Czech Republic.

Analytical Results

Sub-Matrix: **ASH**

Compound	CAS Number	LOR	Unit	Client sample ID: ASH #1	ASH #2	ASH #3		
				Client sampling date / time: 19-JAN-2016 10:15	19-JAN-2016 10:30	19-JAN-2016 11:00		
				HK1602933-001	HK1602933-002	HK1602933-003		
EG: Metals and Major Cations								
EG020: Antimony	7440-36-0	1	mg/kg	**148**	**4**	**4**		
EG020: Arsenic	7440-38-2	1	mg/kg	**5**	**19**	**23**		
EG020: Barium	7440-39-3	1	mg/kg	**497**	**11**	**10**		
EG020: Cadmium	7440-43-9	0.2	mg/kg	**5.8**	**0.5**	**0.5**		
EG020: Cobalt	7440-48-4	1	mg/kg	**8**	**6**	**7**		
EG020: Copper	7440-50-8	1	mg/kg	**106**	**43**	**48**		
EG020: Lead	7439-92-1	1	mg/kg	**2450**	**25**	**20**		
EG020: Manganese	7439-96-5	1	mg/kg	**477**	**2710**	**3720**		
EG020: Mercury	7439-97-6	0.05	mg/kg	**33.4**	**3.57**	**1.55**		
EG020: Molybdenum	7439-98-7	1	mg/kg	**27**	**11**	**12**		
EG020: Nickel	7440-02-0	1	mg/kg	**57**	**40**	**49**		
EG020: Tin	7440-31-5	1	mg/kg	**190**	**17**	**16**		
EG020: Zinc	7440-66-6	1	mg/kg	**20000**	**50**	**40**		
EG049: Trivalent Chromium	16065-83-1	1	mg/kg	**92**	**34**	**41**		
EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	<1		
EP-066: Polychlorinated Biphenyls								
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	<0.1		
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)								
Naphthalene	91-20-3	0.500	mg/kg	<0.500	<0.500	<0.500		
Phenanthrene	85-01-8	0.500	mg/kg	**5.81**	**1.48**	**1.24**		
Anthracene	120-12-7	0.500	mg/kg	<0.500	<0.500	<0.500		
Fluoranthene	206-44-0	0.500	mg/kg	**1.94**	**1.91**	**1.36**		
Pyrene	129-00-0	0.500	mg/kg	**1.28**	**2.11**	**1.56**		
Benzo(a)pyrene	50-32-8	0.500	mg/kg	<0.500	**0.907**	**0.632**		
EP-071_SR: Total Petroleum Hydrocarbons (TPH)								
C6 - C9 Fraction	----	2	mg/kg	<2	<2	<2		
C10 - C14 Fraction	----	50	mg/kg	**60**	<50	<50		
C15 - C28 Fraction	----	100	mg/kg	**2010**	<100	<100		
C29 - C36 Fraction	----	100	mg/kg	**1520**	<100	<100		
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates							Surrogate control limits listed at end of this report.	
2-Fluorobiphenyl	321-60-8	0.1	%	**87.5**	**96.8**	**91.9**		
4-Terphenyl-d14	1718-51-0	0.1	%	**79.0**	**95.6**	**94.3**		
EP-066S: PCB Surrogate							Surrogate control limits listed at end of this report.	
Tetrachlorometaxylene	877-09-8	0.1	%	**58.4**	**82.2**	**66.6**		
Dibutylchlorendate	1770-80-5	0.1	%	**119**	**117**	**117**		
EP-080_SRS: TPH(Volatile)/BTEX Surrogate							Surrogate control limits listed at end of this report.	
Dibromofluoromethane	1868-53-7	0.1	%	**89.6**	**90.7**	**90.6**		
Toluene-D8	2037-26-5	0.1	%	**99.1**	**100**	**100**		

Sub-Matrix: **ASH**			Client sample ID	**ASH #1**	**ASH #2**	**ASH #3**		
			Client sampling date / time	19-JAN-2016 10:15	19-JAN-2016 10:30	19-JAN-2016 11:00		
Compound	*CAS Number*	*LOR*	*Unit*	**HK1602933-001**	**HK1602933-002**	**HK1602933-003**		
EP-080_SRS: TPH(Volatile)/BTEX Surrogate - Continued								Surrogate control limits listed at end of this report.
4-Bromofluorobenzene	460-00-4	0.1	%	**104**	**106**	**105**		

Sub-Matrix: WATER				Client sample ID	FIELD BLANK				
				Client sampling date / time	19-JAN-2016 10:00				
Compound	CAS Number	LOR	Unit		HK1602933-004				
EG: Metals and Major Cations - Filtered									
EG020: Antimony	7440-36-0	1	µg/L		<1				
EG020: Arsenic	7440-38-2	10	µg/L		<10				
EG020: Barium	7440-39-3	1	µg/L		<1				
EG020: Cadmium	7440-43-9	0.2	µg/L		<0.2				
EG020: Cobalt	7440-48-4	1	µg/L		<1				
EG020: Copper	7440-50-8	1	µg/L		<1				
EG020: Lead	7439-92-1	1	µg/L		<1				
EG020: Manganese	7439-96-5	1	µg/L		<1				
EG020: Mercury	7439-97-6	0.1	µg/L		<0.1				
EG020: Molybdenum	7439-98-7	1	µg/L		<1				
EG020: Nickel	7440-02-0	1	µg/L		<1				
EG020: Tin	7440-31-5	10	µg/L		<10				
EG020: Zinc	7440-66-6	10	µg/L		<10				
EG049: Trivalent Chromium	16065-83-1	20	µg/L		<20				
EG050: Hexavalent Chromium	18540-29-9	20	µg/L		<20				
EP-066: Polychlorinated Biphenyls									
Total Polychlorinated biphenyls	----	1	µg/L		<1				
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs)									
Naphthalene	91-20-3	2.0	µg/L		<2.0				
Phenanthrene	85-01-8	2.0	µg/L		<2.0				
Anthracene	120-12-7	2.0	µg/L		<2.0				
Fluoranthene	206-44-0	2.0	µg/L		<2.0				
Pyrene	129-00-0	2.0	µg/L		<2.0				
Benzo(a)pyrene	50-32-8	2.0	µg/L		<2.0				
EP-071_SR: Total Petroleum Hydrocarbons (TPH)									
C6 - C9 Fraction	----	20	µg/L		<20				
C10 - C14 Fraction	----	50	µg/L		<50				
C15 - C28 Fraction	----	100	µg/L		<100				
C29 - C36 Fraction	----	50	µg/L		<50				
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates									Surrogate control limits listed at end of this report.
2-Fluorobiphenyl	321-60-8	0.1	%		**58.6**				
4-Terphenyl-d14	1718-51-0	0.1	%		**116**				
EP-066S: PCB Surrogate									Surrogate control limits listed at end of this report.
Tetrachlorometaxylene	877-09-8	0.1	%		**52.0**				
Dibutylchlorendate	1770-80-5	0.1	%		**123**				
EP-080_SRS: TPH(Volatile)/BTEX Surrogate									Surrogate control limits listed at end of this report.
Dibromofluoromethane	1868-53-7	0.1	%		**94.9**				
Toluene-D8	2037-26-5	0.1	%		**103**				
4-Bromofluorobenzene	460-00-4	0.1	%		**100**				

Laboratory Duplicate (DUP) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations (QC Lot: 4120773)								
HK1602933-002	ASH #2	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
HK1603387-003	Anonymous	EG3060: Hexavalent Chromium	18540-29-9	1	mg/kg	<1	<1	0.0
EG: Metals and Major Cations (QC Lot: 4129143)								
HK1602933-002	ASH #2	EG020: Mercury	7439-97-6	0.05	mg/kg	3.57	3.31	7.6
		EG020: Cadmium	7440-43-9	0.2	mg/kg	0.5	0.5	0.0
		EG020: Antimony	7440-36-0	1	mg/kg	4	4	0.0
		EG020: Arsenic	7440-38-2	1	mg/kg	19	20	8.4
		EG020: Barium	7440-39-3	1	mg/kg	11	12	0.0
		EG020: Cobalt	7440-48-4	1	mg/kg	6	6	0.0
		EG020: Copper	7440-50-8	1	mg/kg	43	48	11.5
		EG020: Lead	7439-92-1	1	mg/kg	25	26	0.0
		EG020: Manganese	7439-96-5	1	mg/kg	2710	2750	1.4
		EG020: Molybdenum	7439-98-7	1	mg/kg	11	12	0.0
		EG020: Nickel	7440-02-0	1	mg/kg	40	44	9.1
		EG020: Tin	7440-31-5	1	mg/kg	17	19	8.6
		EG020: Zinc	7440-66-6	1	mg/kg	50	50	0.0
EP-066: Polychlorinated Biphenyls (QC Lot: 4114823)								
HK1601799-001	Anonymous	Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	<0.1	0.0
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4119624)								
HK1602772-002	Anonymous	Naphthalene	91-20-3	500	µg/kg	<500	<500	0.0
		Phenanthrene	85-01-8	500	µg/kg	<500	<500	0.0
		Anthracene	120-12-7	500	µg/kg	<500	<500	0.0
		Fluoranthene	206-44-0	500	µg/kg	<500	<500	0.0
		Pyrene	129-00-0	500	µg/kg	<500	<500	0.0
		Benzo(a)pyrene	50-32-8	500	µg/kg	<500	<500	0.0
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4119626)								
HK1602933-001	ASH #1	C15 - C28 Fraction	----	100	mg/kg	2010	2090	3.8
		C29 - C36 Fraction	----	100	mg/kg	1520	1610	5.6
		C10 - C14 Fraction	----	50	mg/kg	60	64	4.8
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4119627)								
HK1602933-001	ASH #1	C6 - C9 Fraction	----	2	mg/kg	<2	<2	0.0

Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 4120740)								
HK1549908-001	Anonymous	EG020: Mercury	7439-97-6	0.1	µg/L	<0.1	<0.1	0.0
		EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	0.0
		EG020: Antimony	7440-36-0	1	µg/L	1	<1	0.0
		EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	0.0

Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Filtered (QC Lot: 4120740) - Continued								
HK1549908-001	Anonymous	**EG020: Copper**	7440-50-8	1	µg/L	<1	<1	0.0
		EG020: Lead	7439-92-1	1	µg/L	<1	<1	0.0
		EG020: Manganese	7439-96-5	1	µg/L	<1	<1	0.0
		EG020: Molybdenum	7439-98-7	1	µg/L	12	11	0.0
		EG020: Nickel	7440-02-0	1	µg/L	4	4	0.0
		EG020: Barium	7440-39-3	10	µg/L	11	<10	0.0
		EG020: Tin	7440-31-5	10	µg/L	<10	<10	0.0
		EG020: Arsenic	7440-38-2	100	µg/L	<100	<100	0.0
		EG020: Zinc	7440-66-6	100	µg/L	<100	<100	0.0
HK1602912-003	Anonymous	**EG020: Cadmium**	7440-43-9	0.2	µg/L	<0.2	<0.2	0.0
		EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	0.0
		EG020: Antimony	7440-36-0	1	µg/L	<1	<1	0.0
		EG020: Barium	7440-39-3	1	µg/L	<1	<1	0.0
		EG020: Cobalt	7440-48-4	1	µg/L	<1	<1	0.0
		EG020: Copper	7440-50-8	1	µg/L	<1	<1	0.0
		EG020: Lead	7439-92-1	1	µg/L	<1	<1	0.0
		EG020: Manganese	7439-96-5	1	µg/L	<1	<1	0.0
		EG020: Molybdenum	7439-98-7	1	µg/L	<1	<1	0.0
		EG020: Nickel	7440-02-0	1	µg/L	<1	<1	0.0
		EG020: Tin	7440-31-5	1	µg/L	<1	<1	0.0
		EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	0.0
		EG020: Zinc	7440-66-6	10	µg/L	<10	<10	0.0
EG: Metals and Major Cations - Filtered (QC Lot: 4120748)								
HK1602912-003	Anonymous	**EG050: Hexavalent Chromium**	18540-29-9	20	µg/L	<20	<20	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations (QC Lot: 4120773)											
EG3060: Hexavalent Chromium	18540-29-9	0.5	mg/kg	<0.5	2.5 mg/kg	98.0	----	92	122	----	----
EG: Metals and Major Cations (QC Lot: 4129143)											
EG020: Antimony	7440-36-0	1	mg/kg	<1	5 mg/kg	85.9	----	77	107	----	----
EG020: Arsenic	7440-38-2	1	mg/kg	<1	5 mg/kg	81.8	----	75	111	----	----
EG020: Barium	7440-39-3	1	mg/kg	<1	5 mg/kg	93.8	----	79	113	----	----
EG020: Cadmium	7440-43-9	0.2	mg/kg	<0.2	5 mg/kg	88.5	----	79	109	----	----
EG020: Cobalt	7440-48-4	1	mg/kg	<1	5 mg/kg	88.6	----	75	117	----	----
EG020: Copper	7440-50-8	1	mg/kg	<1	5 mg/kg	95.0	----	79	109	----	----
EG020: Lead	7439-92-1	1	mg/kg	<1	5 mg/kg	89.3	----	81	109	----	----
EG020: Manganese	7439-96-5	1	mg/kg	<1	5 mg/kg	87.8	----	78	122	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg	<0.05	0.1 mg/kg	86.8	----	75	113	----	----

Matrix: SOIL

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%) LCS	Spike Recovery (%) DCS	Recovery Limits (%) Low	Recovery Limits (%) High	RPD (%) Value	RPD (%) Control Limit
EG: Metals and Major Cations (QC Lot: 4129143) - Continued											
EG020: Molybdenum	7439-98-7	1	mg/kg	<1	5 mg/kg	88.2	----	81	107	----	----
EG020: Nickel	7440-02-0	1	mg/kg	<1	5 mg/kg	85.5	----	77	111	----	----
EG020: Tin	7440-31-5	1	mg/kg	<1	5 mg/kg	90.8	----	78	110	----	----
EG020: Zinc	7440-66-6	1	mg/kg	<1	5 mg/kg	98.2	----	80	122	----	----
EP-066: Polychlorinated Biphenyls (QC Lot: 4114823)											
Total Polychlorinated biphenyls	----	0.1	mg/kg	<0.1	0.5 mg/kg	123	----	45	150	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4119624)											
Naphthalene	91-20-3	25	µg/kg	<50	500 µg/kg	80.6	----	80	114	----	----
Phenanthrene	85-01-8	25	µg/kg	<50	500 µg/kg	87.8	----	82	116	----	----
Anthracene	120-12-7	25	µg/kg	<50	500 µg/kg	82.4	----	39	126	----	----
Fluoranthene	206-44-0	25	µg/kg	<50	500 µg/kg	86.0	----	78	119	----	----
Pyrene	129-00-0	25	µg/kg	<50	500 µg/kg	86.5	----	72	122	----	----
Benzo(a)pyrene	50-32-8	25	µg/kg	<50	500 µg/kg	78.0	----	40	109	----	----
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4119626)											
C10 - C14 Fraction	----	50	mg/kg	<50	22.5 mg/kg	98.5	----	63	108	----	----
C15 - C28 Fraction	----	100	mg/kg	<100	52.5 mg/kg	106	----	66	108	----	----
C29 - C36 Fraction	----	100	mg/kg	<100	30 mg/kg	94.5	----	46	97	----	----
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4119627)											
C6 - C9 Fraction	----	2	mg/kg	<2	6 mg/kg	86.5	----	80	125	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%) LCS	Spike Recovery (%) DCS	Recovery Limits (%) Low	Recovery Limits (%) High	RPD (%) Value	RPD (%) Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 4120740)											
EG020: Antimony	7440-36-0	1	µg/L	<1	100 µg/L	89.5	----	77	109	----	----
EG020: Arsenic	7440-38-2	10	µg/L	<10	100 µg/L	87.7	----	74	120	----	----
EG020: Barium	7440-39-3	1	µg/L	<1	100 µg/L	88.8	----	78	112	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	100 µg/L	86.0	----	78	112	----	----
EG020: Cobalt	7440-48-4	1	µg/L	<1	100 µg/L	87.3	----	75	115	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	100 µg/L	88.5	----	75	115	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	100 µg/L	93.0	----	80	110	----	----
EG020: Manganese	7439-96-5	1	µg/L	<1	100 µg/L	87.4	----	75	115	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	2 µg/L	101	----	76	118	----	----
EG020: Molybdenum	7439-98-7	1	µg/L	<1	100 µg/L	90.7	----	78	112	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	100 µg/L	95.1	----	73	119	----	----
EG020: Tin	7440-31-5	10	µg/L	<10	100 µg/L	87.5	----	74	116	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	100 µg/L	85.4	----	73	121	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4120748)											
EG050: Hexavalent Chromium	18540-29-9	20	µg/L	<20	100 µg/L	91.3	----	80	106	----	----

Matrix: WATER

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EP-066: Polychlorinated Biphenyls (QC Lot: 4114817)											
Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	64.1	----	49	143	----	----
EP-076HK: Polycyclic Aromatic Hydrocarbons (PAHs) (QC Lot: 4116778)											
Naphthalene	91-20-3	0.2	µg/L	<0.2	0.5 µg/L	45.3	----	36	124	----	----
Phenanthrene	85-01-8	0.2	µg/L	<0.2	0.5 µg/L	84.0	----	45	117	----	----
Anthracene	120-12-7	0.2	µg/L	<0.2	0.5 µg/L	80.2	----	46	105	----	----
Fluoranthene	206-44-0	0.2	µg/L	<0.2	0.5 µg/L	102	----	64	121	----	----
Pyrene	129-00-0	0.2	µg/L	<0.2	0.5 µg/L	96.7	----	64	121	----	----
Benzo(a)pyrene	50-32-8	0.2	µg/L	<0.2	0.5 µg/L	90.8	----	42	114	----	----
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4114596)											
C6 - C9 Fraction	----	20	µg/L	<20	40 µg/L	94.2	----	76	115	----	----
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4114814)											
C10 - C14 Fraction	----	50	µg/L	<50	150 µg/L	55.9	----	31	105	----	----
C15 - C28 Fraction	----	100	µg/L	<100	350 µg/L	85.6	----	64	114	----	----
C29 - C36 Fraction	----	50	µg/L	<50	200 µg/L	77.0	----	63	113	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: SOIL

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations (QC Lot: 4120773)										
HK1602933-001	ASH #1	**EG3060: Hexavalent Chromium**	18540-29-9	2.5 mg/kg	103	----	75	125	----	----
EG: Metals and Major Cations (QC Lot: 4129143)										
HK1602933-001	ASH #1	**EG020: Antimony**	7440-36-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Arsenic	7440-38-2	5 mg/kg	82.3	----	75	125	----	----
		EG020: Barium	7440-39-3	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Cadmium	7440-43-9	5 mg/kg	103	----	75	125	----	----
		EG020: Cobalt	7440-48-4	5 mg/kg	101	----	75	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Manganese	7439-96-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Tin	7440-31-5	5 mg/kg	# Not Determined	----	75	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75	125	----	----
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4119626)										
HK1602933-002	ASH #2	**C10 - C14 Fraction**	----	22.5 mg/kg	92.9	----	50	130	----	----
		C15 - C28 Fraction	----	52.5 mg/kg	72.7	----	50	130	----	----
		C29 - C36 Fraction	----	30 mg/kg	62.8	----	50	130	----	----
EP-071_SR: Total Petroleum Hydrocarbons (TPH) (QC Lot: 4119627)										
HK1602933-002	ASH #2	**C6 - C9 Fraction**	----	6 mg/kg	98.6	----	50	130	----	----

Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 4120740)										
HK1549908-001	Anonymous	**EG020: Antimony**	7440-36-0	100 µg/L	85.6	----	75	125	----	----

Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report: Spike Concentration	Spike Recovery (%): MS	Spike Recovery (%): MSD	Recovery Limits (%): Low	Recovery Limits (%): High	RPD (%): Value	RPD (%): Control Limit
EG: Metals and Major Cations - Filtered (QC Lot: 4120740) - Continued										
HK1549908-001	Anonymous	**EG020: Arsenic**	7440-38-2	100 µg/L	85.0	----	75	125	----	----
		EG020: Barium	7440-39-3	100 µg/L	95.9	----	75	125	----	----
		EG020: Cadmium	7440-43-9	100 µg/L	85.2	----	75	125	----	----
		EG020: Cobalt	7440-48-4	100 µg/L	98.1	----	75	125	----	----
		EG020: Copper	7440-50-8	100 µg/L	89.0	----	75	125	----	----
		EG020: Lead	7439-92-1	100 µg/L	81.2	----	75	125	----	----
		EG020: Manganese	7439-96-5	100 µg/L	103	----	75	125	----	----
		EG020: Mercury	7439-97-6	2 µg/L	96.4	----	75	125	----	----
		EG020: Molybdenum	7439-98-7	100 µg/L	108	----	75	125	----	----
		EG020: Nickel	7440-02-0	100 µg/L	93.4	----	75	125	----	----
		EG020: Tin	7440-31-5	100 µg/L	87.4	----	75	125	----	----
		EG020: Zinc	7440-66-6	100 µg/L	77.6	----	75	125	----	----
EG: Metals and Major Cations - Filtered (QC Lot: 4120748)										
HK1602912-002	Anonymous	**EG050: Hexavalent Chromium**	18540-29-9	100 µg/L	85.3	----	75	125	----	----

Surrogate Control Limits

Sub-Matrix: ASH

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			
Dibromofluoromethane	1868-53-7	80	120
Toluene-D8	2037-26-5	81	117
4-Bromofluorobenzene	460-00-4	74	121

Sub-Matrix: WATER

Compound	CAS Number	Recovery Limits (%): Low	Recovery Limits (%): High
EP-076S: Polycyclic Aromatics Hydrocarbons (PAHs) Surrogates			
2-Fluorobiphenyl	321-60-8	50	130
4-Terphenyl-d14	1718-51-0	50	130
EP-066S: PCB Surrogate			
Tetrachlorometaxylene	877-09-8	50	130
Dibutylchlorendate	1770-80-5	50	130
EP-080_SRS: TPH(Volatile)/BTEX Surrogate			

Sub-Matrix: **WATER**

Compound	*CAS Number*	*Recovery Limits (%) Low*	*High*
EP-080_SRS: TPH(Volatile)/BTEX Surrogate - Continued			
Dibromofluoromethane	1868-53-7	86	118
Toluene-D8	2037-26-5	88	110
4-Bromofluorobenzene	460-00-4	86	115

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR ALEX CHEUNG	**WORK ORDER**	: **HK1602933**
CLIENT	: **PARSONS BRINCKERHOFF**		
ADDRESS	: 7/F, ONE KOWLOON, 1 WANG YUEN STREET, KOWLOON BAY, HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 19-JAN-2016 : 12-FEB-2016
PROJECT	: 2523153B - AGREEMENT 9OC127 IRSC AT EX-SIU LAM HOSPITAL	NO. OF SAMPLES CLIENT ORDER	: 4 : ----

General Comments

- **Sample(s) were collected by ALS Technichem (HK) staff.**
- **Sample(s) analysed and reported on an as received basis.**
- **Water sample(s) were filtered prior to dissolved metal analysis.**
- **Sample(s) as received, digested by In-house method E-ASTM D3974-09 prior to determination of metals. The In-house method is developed based on ASTM D3974-09 method.**
- **Dioxins was subcontracted to and analysed by ALS Czech Republic.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*
PP Richard Fung	General Manager

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1602933
SUB-BATCH	: 1
CLIENT	: PARSONS BRINCKERHOFF
PROJECT	: 2523153B - AGREEMENT 9OC127 IRSC AT EX-SIU LAM HOSPITAL

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1602933-001	ASH #1	ASH	19-JAN-2016 10:15	PR1603753001
HK1602933-002	ASH #2	ASH	19-JAN-2016 10:30	PR1603753002
HK1602933-003	ASH #3	ASH	19-JAN-2016 11:00	PR1603753003
HK1602933-004	FIELD BLANK	WATER	19-JAN-2016 10:00	PR1603753004

CERTIFICATE OF ANALYSIS

Work Order	: **PR1603753**	Issue Date	: 03-FEB-2016
Client	: **ALS Technichem (HK) Pty Ltd.**	Laboratory	: ALS Czech Republic, s.r.o.
Contact	: Mannix Chan	Contact	: Client Service
Address	: 11/F, Chung Shun Knitting Centre 1-3 Wing Yip Street Kwai Chung Hong Kong	Address	: Na Harfe 336/9 Prague 9 - Vysocany Czech Republic 190 00
E-mail	: mannix.chan@alsglobal.com	E-mail	: customer.support@alsglobal.com
Telephone	: ----	Telephone	: +420 226 226 228
Facsimile	: ----	Facsimile	: +420 284 081 635
Project	: ----	Page	: 1 of 3
Order number	: ----	Date Samples Received	: 22-JAN-2016
C-O-C number	: ----	Quote number	: PR2011ALSTE-HK0268
Site	: ----	Date of test	: 25-JAN-2016 - 03-FEB-2016
Sampled by	: Client	QC Level	: ALS CR Standard Quality Control Schedule

General Comments

This report shall not be reproduced except in full, without prior written approval from the laboratory.
The laboratory declares that the test results relate only to the listed samples.

Responsible for accuracy

Testing Laboratory Accredited by CAI according to CSN EN ISO/IEC 17025:2005

Signatories		*Position*
Zdenek Jirak		Environmental Business Unit Manager

L 1163

Analytical Results

Sub-Matrix: **ASH**

				Client sample ID	HK1602933-001 ASH #1		HK1602933-002 ASH #2		HK1602933-003 ASH #3	
				Laboratory sample ID	PR1603753001		PR1603753002		PR1603753003	
				Client sampling date / time	19-JAN-2016 10:15		19-JAN-2016 10:30		19-JAN-2016 11:00	
Parameter	*Method*	*LOR*	*Unit*		**Result**	**MU**	**Result**	**MU**	**Result**	**MU**
Physical Parameters										
Dry matter @ 105°C	S-DRY-GRCI	0.10	%		**90.6**	±6.0 %	**82.0**	±6.0 %	**85.3**	±6.0 %
PCDDs and PCDFs (Dioxins and Furans)										
2378-TCDD	S-DFHMS01	-	ng/g DW		**0.0110**	±30.0 %	<0.0016	----	<0.0012	----
12378-PeCDD	S-DFHMS01	-	ng/g DW		**0.0140**	±30.0 %	<0.0029	----	<0.0022	----
123478-HxCDD	S-DFHMS01	-	ng/g DW		**0.0130**	±30.0 %	<0.0025	----	<0.0033	----
123678-HxCDD	S-DFHMS01	-	ng/g DW		**0.0160**	±30.0 %	<0.0025	----	<0.0033	----
123789-HxCDD	S-DFHMS01	-	ng/g DW		<0.0029	----	<0.0025	----	<0.0033	----
1234678-HpCDD	S-DFHMS01	-	ng/g DW		**0.0730**	±30.0 %	<0.02	----	<0.013	----
OCDD	S-DFHMS01	-	ng/g DW		**0.170**	±30.0 %	<0.056	----	<0.051	----
2378-TCDF	S-DFHMS01	-	ng/g DW		**0.380**	±30.0 %	**0.0200**	±30.0 %	**0.0100**	±30.0 %
12378-PeCDF	S-DFHMS01	-	ng/g DW		**0.220**	±30.0 %	**0.0190**	±30.0 %	**0.00530**	±30.0 %
23478-PeCDF	S-DFHMS01	-	ng/g DW		**0.220**	±30.0 %	**0.0130**	±30.0 %	**0.0120**	±30.0 %
123478-HxCDF	S-DFHMS01	-	ng/g DW		**0.110**	±30.0 %	**0.0170**	±30.0 %	<0.0027	----
123678-HxCDF	S-DFHMS01	-	ng/g DW		**0.110**	±30.0 %	**0.0170**	±30.0 %	<0.0054	----
123789-HxCDF	S-DFHMS01	-	ng/g DW		<0.0033	----	<0.0032	----	<0.0027	----
234678-HxCDF	S-DFHMS01	-	ng/g DW		**0.0960**	±30.0 %	**0.0100**	±30.0 %	<0.0027	----
1234678-HpCDF	S-DFHMS01	-	ng/g DW		**0.250**	±30.0 %	**0.0480**	±30.0 %	<0.043	----
1234789-HpCDF	S-DFHMS01	-	ng/g DW		**0.0190**	±30.0 %	<0.0053	----	<0.021	----
OCDF	S-DFHMS01	-	ng/g DW		<0.016	----	**0.0450**	±30.0 %	<0.047	----
TEQ-Lowerbound	S-DFHMS01	-	ng/g DW		**0.22**	----	**0.014**	----	**0.0073**	----
TEQ-Upperbound	S-DFHMS01	-	ng/g DW		**0.22**	----	**0.019**	----	**0.013**	----

Sub-Matrix: **WATER**

				Client sample ID	HK1602933-004 FIELD BLANK		----		----	
				Laboratory sample ID	PR1603753004		----		----	
				Client sampling date / time	19-JAN-2016 10:00		----		----	
Parameter	*Method*	*LOR*	*Unit*		**Result**	**MU**	----	----	----	----
PCDDs and PCDFs (Dioxins and Furans)										
2378-TCDD	W-DFHMS01	-	pg/L		<0.91	----	----	----	----	----
12378-PeCDD	W-DFHMS01	-	pg/L		<1.2	----	----	----	----	----
123478-HxCDD	W-DFHMS01	-	pg/L		<2.7	----	----	----	----	----
123678-HxCDD	W-DFHMS01	-	pg/L		<2.7	----	----	----	----	----
123789-HxCDD	W-DFHMS01	-	pg/L		<2.7	----	----	----	----	----
1234678-HpCDD	W-DFHMS01	-	pg/L		<9.8	----	----	----	----	----
OCDD	W-DFHMS01	-	pg/L		<24	----	----	----	----	----
2378-TCDF	W-DFHMS01	-	pg/L		<1.1	----	----	----	----	----
12378-PeCDF	W-DFHMS01	-	pg/L		<3	----	----	----	----	----
23478-PeCDF	W-DFHMS01	-	pg/L		<1.5	----	----	----	----	----
123478-HxCDF	W-DFHMS01	-	pg/L		<2.6	----	----	----	----	----
123678-HxCDF	W-DFHMS01	-	pg/L		<2.6	----	----	----	----	----
123789-HxCDF	W-DFHMS01	-	pg/L		<2.6	----	----	----	----	----
234678-HxCDF	W-DFHMS01	-	pg/L		<2.6	----	----	----	----	----
1234678-HpCDF	W-DFHMS01	-	pg/L		<5.2	----	----	----	----	----
1234789-HpCDF	W-DFHMS01	-	pg/L		<5.2	----	----	----	----	----
OCDF	W-DFHMS01	-	pg/L		<17	----	----	----	----	----
TEQ-Lowerbound	W-DFHMS01	-	pg/L		**0**	----	----	----	----	----
TEQ-Upperbound	W-DFHMS01	-	pg/L		**4.6**	----	----	----	----	----

If the client does not specify the date and time of sample collection, the laboratory will specify the date on sample delivery in parentheses, instead. If the

time of sample collection is specified as 0:00 it means that the client did specify the date but not the time. Measurement uncertainty is expressed as expanded measurement uncertainty with coverage factor k = 2, representing 95% confidence level.
Key: LOR = Limit of reporting, MU = Measurement Uncertainty

The end of result part of the certificate of analysis

Brief Method Summaries

Analytical Methods	*Method Descriptions*
Location of test performance: V Raji 906 Pardubice - Zelene Predmesti Czech Republic 530 02	
S-DFHMS01	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B,8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.1, 11.2.3.6, 11.2.3.7, 11.2.5 (US EPA1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.
S-DRY-GRCI	CZ_SOP_D06_01_045, CZ_SOP_D06_07_046 (CSN ISO 11465) Determination of dry matter by gravimetry and determination of moisture by calculation from measured values.
W-DFHMS01	CZ_SOP_D06_06_175 - except chap. 8.2.1.1 B, 8.2.1.3 B, 8.2.1.5 B,C,D, 11.2.3.2- 11.2.3.7, 11.2.4, 11.2.5 (US EPA 1613): Determination of tetra- to octa-chlorinated dioxins and furanes by isotope dilution method using HRGC-HRMS and calculation of TEQ parameters from measured values. The samples were stored in laboratory in the darkness and under temperature <4°C. Actual LOQ are noticed in the annex.

A '*' symbol preceeding any method indicates non-accredited test. In the case when a procedure belonging to an accredited method was used for non-accredited matrix, would apply that the reported results are non-accredited. Please refer to General Comment section on front page for information.
The calculation methods of summation parameters are available on request in the client service.

Attachment no. 1 to the Certificate of Analysis for work order PR1603753

Sample: HK1602933-001 ASH #1

Measurement results:

Sample:	HK1602933-001 ASH #1				
			Final extract [µl]:		75
Sample weight [g]:	1.319		Injection volume [µl]:		3
Dry matter [%]:	90.6		Acquisition date [d.m.y h:m]:		27.1.16 20:23
2,3,7,8-PCDD/Fs	Result	Limit of Detection	Limit of Quantification	[1]I-TEFs	I-TEQ Upperbound
	[ng/g dw]	[ng/g dw]	[ng/g dw]		[ng/g dw]
2,3,7,8-TCDD	0.011	0.0012	0.0024	1	0.011
1,2,3,7,8-PeCDD	0.014	0.0017	0.0035	0.5	0.0068
1,2,3,4,7,8-HxCDD	0.013	0.0029	0.0058	0.1	0.0013
1,2,3,6,7,8-HxCDD	0.016	0.0029	0.0058	0.1	0.0016
1,2,3,7,8,9-HxCDD	< 0.0029	0.0029	0.0058	0.1	0.00029
1,2,3,4,6,7,8-HpCDD	0.073	0.0088	0.018	0.01	0.00073
OCDD	0.17	0.02	0.04	0.001	0.00017
2,3,7,8-TCDF	0.38	0.00072	0.0014	0.1	0.038
1,2,3,7,8-PeCDF	0.22	0.0011	0.0023	0.05	0.011
2,3,4,7,8-PeCDF	0.22	0.0011	0.0023	0.5	0.11
1,2,3,4,7,8-HxCDF	0.11	0.0033	0.0066	0.1	0.011
1,2,3,6,7,8-HxCDF	0.11	0.0033	0.0066	0.1	0.011
1,2,3,7,8,9-HxCDF	< 0.0033	0.0033	0.0066	0.1	0.00033
2,3,4,6,7,8-HxCDF	0.096	0.0033	0.0066	0.1	0.0096
1,2,3,4,6,7,8-HpCDF	0.25	0.0039	0.0078	0.01	0.0025
1,2,3,4,7,8,9-HpCDF	0.019	0.0039	0.0078	0.01	0.00019
OCDF	< 0.016	0.016	0.032	0.001	0.000016
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"					0.22
I-TEQ from 2,3,7,8-PCDD/Fs -„Mediumbound"					0.22
Maximum possible I-TEQ -"Upperbound"					**0.22**

PCDDs	Result [ng/g dw]	**PCDFs**	Result [ng/g dw]
Tetra-CDDs	1.3	Tetra-CDFs	11
Penta-CDDs	0.31	Penta-CDFs	2.9
Hexa-CDDs	0.17	Hexa-CDFs	0.38
Hepta-CDDs	0.15	Hepta-CDFs	0.27
OCDD	0.17	OCDF	< 0.016

[1]I-TEF according to NATO.

The limit of quantification is defined as double of the detection limit.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are bellow limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 589/2014.

Attachment no. 1 to the Certificate of Analysis for work order PR1603753

Sample: HK1602933-002 ASH #2

Measurement results:

Sample:	HK1602933-002 ASH #2				
			Final extract [µl]:		75
Sample weight [g]:	1.324		Injection volume [µl]:		3
Dry matter [%]:	82.0		Acquisition date [d.m.y h:m]:		27.1.16 21:25
2,3,7,8-PCDD/Fs	Result	Limit of Detection	Limit of Quantification	[1]I-TEFs	I-TEQ Upperbound
	[ng/g dw]	[ng/g dw]	[ng/g dw]		[ng/g dw]
2,3,7,8-TCDD	< 0.0016	0.00082	0.0016	1	0.0016
1,2,3,7,8-PeCDD	< 0.0029	0.0015	0.0029	0.5	0.0015
1,2,3,4,7,8-HxCDD	< 0.0025	0.0025	0.0051	0.1	0.00025
1,2,3,6,7,8-HxCDD	< 0.0025	0.0025	0.0051	0.1	0.00025
1,2,3,7,8,9-HxCDD	< 0.0025	0.0025	0.0051	0.1	0.00025
1,2,3,4,6,7,8-HpCDD	< 0.02	0.0098	0.02	0.01	0.0002
OCDD	< 0.056	0.028	0.056	0.001	0.000056
2,3,7,8-TCDF	0.02	0.00077	0.0015	0.1	0.002
1,2,3,7,8-PeCDF	0.019	0.0016	0.0031	0.05	0.00097
2,3,4,7,8-PeCDF	0.013	0.0016	0.0031	0.5	0.0065
1,2,3,4,7,8-HxCDF	0.017	0.0032	0.0065	0.1	0.0017
1,2,3,6,7,8-HxCDF	0.017	0.0032	0.0065	0.1	0.0017
1,2,3,7,8,9-HxCDF	< 0.0032	0.0032	0.0065	0.1	0.00032
2,3,4,6,7,8-HxCDF	0.01	0.0032	0.0065	0.1	0.001
1,2,3,4,6,7,8-HpCDF	0.048	0.0053	0.011	0.01	0.00048
1,2,3,4,7,8,9-HpCDF	< 0.0053	0.0053	0.011	0.01	0.000053
OCDF	0.045	0.022	0.045	0.001	0.000045
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"					0.014
I-TEQ from 2,3,7,8-PCDD/Fs -„Mediumbound"					0.017
Maximum possible I-TEQ -"Upperbound"					**0.019**

PCDDs	Result [ng/g dw]	**PCDFs**	Result [ng/g dw]
Tetra-CDDs	< 0.018	Tetra-CDFs	0.51
Penta-CDDs	< 0.02	Penta-CDFs	0.25
Hexa-CDDs	< 0.025	Hexa-CDFs	0.19
Hepta-CDDs	< 0.02	Hepta-CDFs	0.077
OCDD	< 0.056	OCDF	0.045

[1]I-TEF according to NATO.

The limit of quantification is defined as double of the detection limit.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are bellow limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 589/2014.

Attachment no. 1 to the Certificate of Analysis for work order PR1603753

Sample: HK1602933-003 ASH #3

Measurement results:

Sample:	HK1602933-003 ASH #3				
			Final extract [µl]:		75
Sample weight [g]:	1.530		Injection volume [µl]:		3
Dry matter [%]:	85.3		Acquisition date [d.m.y h:m]:		27.1.16 22:27
2,3,7,8-PCDD/Fs	Result	Limit of Detection	Limit of Quantification	[1]I-TEFs	I-TEQ Upperbound
	[ng/g dw]	[ng/g dw]	[ng/g dw]		[ng/g dw]
2,3,7,8-TCDD	< 0.0012	0.0012	0.0023	1	0.0012
1,2,3,7,8-PeCDD	< 0.0022	0.0022	0.0043	0.5	0.0011
1,2,3,4,7,8-HxCDD	< 0.0033	0.0033	0.0065	0.1	0.00033
1,2,3,6,7,8-HxCDD	< 0.0033	0.0033	0.0065	0.1	0.00033
1,2,3,7,8,9-HxCDD	< 0.0033	0.0033	0.0065	0.1	0.00033
1,2,3,4,6,7,8-HpCDD	< 0.013	0.0065	0.013	0.01	0.00013
OCDD	< 0.051	0.026	0.051	0.001	0.000051
2,3,7,8-TCDF	0.01	0.00061	0.0012	0.1	0.001
1,2,3,7,8-PeCDF	0.0053	0.0009	0.0018	0.05	0.00026
2,3,4,7,8-PeCDF	0.012	0.0009	0.0018	0.5	0.006
1,2,3,4,7,8-HxCDF	< 0.0027	0.0027	0.0054	0.1	0.00027
1,2,3,6,7,8-HxCDF	< 0.0054	0.0027	0.0054	0.1	0.00054
1,2,3,7,8,9-HxCDF	< 0.0027	0.0027	0.0054	0.1	0.00027
2,3,4,6,7,8-HxCDF	< 0.0027	0.0027	0.0054	0.1	0.00027
1,2,3,4,6,7,8-HpCDF	< 0.043	0.021	0.043	0.01	0.00043
1,2,3,4,7,8,9-HpCDF	< 0.021	0.021	0.043	0.01	0.00021
OCDF	< 0.047	0.023	0.047	0.001	0.000047
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"					0.0073
I-TEQ from 2,3,7,8-PCDD/Fs -„Mediumbound"					0.01
Maximum possible I-TEQ -"Upperbound"					**0.013**

PCDDs	Result [ng/g dw]	**PCDFs**	Result [ng/g dw]
Tetra-CDDs	< 0.026	Tetra-CDFs	0.25
Penta-CDDs	< 0.03	Penta-CDFs	0.18
Hexa-CDDs	< 0.033	Hexa-CDFs	0.094
Hepta-CDDs	< 0.013	Hepta-CDFs	< 0.086
OCDD	< 0.051	OCDF	< 0.047

[1]I-TEF according to NATO.

The limit of quantification is defined as double of the detection limit.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are bellow limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 589/2014.

Attachment no. 1 to the Certificate of Analysis for work order PR1603753

Sample: HK1602933-004 FIELD BLANK

Measurement results:

Sample:	HK1602933-004 FIELD BLANK				
			Final extract [µl]:		75
Sample volume [ml]:	960		Injection volume [µl]:		4
			Acquisition date [d.m.y h:m]:		28.1.16 6:26
2,3,7,8-PCDD/Fs	Result	Limit of Detection	Limit of Quantification	[1]I-TEFs	I-TEQ Upperbound
	[pg/l]	[pg/l]	[pg/l]		[pg/l]
2,3,7,8-TCDD	< 0.91	0.91	1.8	1	0.91
1,2,3,7,8-PeCDD	< 1.2	1.2	2.3	0.5	0.58
1,2,3,4,7,8-HxCDD	< 2.7	2.7	5.4	0.1	0.27
1,2,3,6,7,8-HxCDD	< 2.7	2.7	5.4	0.1	0.27
1,2,3,7,8,9-HxCDD	< 2.7	2.7	5.4	0.1	0.27
1,2,3,4,6,7,8-HpCDD	< 9.8	9.8	20	0.01	0.098
OCDD	< 24	24	48	0.001	0.024
2,3,7,8-TCDF	< 1.1	1.1	2.2	0.1	0.11
1,2,3,7,8-PeCDF	< 3	1.5	3	0.05	0.15
2,3,4,7,8-PeCDF	< 1.5	1.5	3	0.5	0.76
1,2,3,4,7,8-HxCDF	< 2.6	2.6	5.2	0.1	0.26
1,2,3,6,7,8-HxCDF	< 2.6	2.6	5.2	0.1	0.26
1,2,3,7,8,9-HxCDF	< 2.6	2.6	5.2	0.1	0.26
2,3,4,6,7,8-HxCDF	< 2.6	2.6	5.2	0.1	0.26
1,2,3,4,6,7,8-HpCDF	< 5.2	5.2	10	0.01	0.052
1,2,3,4,7,8,9-HpCDF	< 5.2	5.2	10	0.01	0.052
OCDF	< 17	17	34	0.001	0.017
I-TEQ from quantified 2,3,7,8-PCDD/Fs - "Lowerbound"					0
I-TEQ from 2,3,7,8-PCDD/Fs -„Mediumbound"					2.3
Maximum possible I-TEQ -"Upperbound"					**4.6**

PCDDs	Result [pg/l]	**PCDFs**	Result [pg/l]
Tetra-CDDs	< 20	Tetra-CDFs	< 42
Penta-CDDs	< 16	Penta-CDFs	< 42
Hexa-CDDs	< 27	Hexa-CDFs	< 42
Hepta-CDDs	< 20	Hepta-CDFs	< 21
OCDD	< 24	OCDF	< 17

[1]I-TEF according to NATO.

The limit of quantification is defined as double of the detection limit.

The limit of detection is defined as the amount of analyte producing a signal with S/N≥3.

The value of detection limit is mentioned as the actual value at the acquisition date.

Measurement uncertainty is expressed as a double (k=2) relative standard deviation (RSD%), and corresponds to 95% confidence interval.

Estimation of uncertainty of each 2,3,7,8-PCDD/F congener is 30% and total TEQ is 20%.

These values were ensured by analyses of certified reference material under conditions of internal reproducibility.

Results marked "<" are bellow limit of detection or quantification.

"Lowerbound" and "Upperbound" are levels defined in Regulation 589/2014 and EN 1948-4.

"Mediumbound" is levels defined in Regulation 589/2014.

Appendix 4.4

Correspondence with the Incinerator Manufacturer

Cheung, Alex Wai-Hung

From:	James Riley <james.riley@facultatieve-technologies.co.uk>
Sent:	Friday, December 11, 2015 8:35 PM
To:	Cheung, Alex Wai-Hung
Cc:	fanny.cheung@stihgroup.com
Subject:	JWR to AC : C3453 (ordered Oct 1991) - Maximaster (via Swedish Trading)
Follow Up Flag:	Follow up
Flag Status:	Flagged

Dear Dr. Alex,

We have not used any asbestos products at Evans Universal now Facultatieve Technologies Ltd (FTL) since 1979.

This means that when contract order no C3453 left our factory in late 1991 / early 1992 it contained no asbestos products.

This goes for all materials supplied by FTL including door seals and gasket material on chimney stacks.

Please double check that if after leaving our factory any installation / maintenance or repair work by any 3rd party has involved any asbestos products.

We think this unlikely however better safe than sorry.

As you can see for possible further assurance we copied this email to Fanny Cheung - Medical Department Manager at Swedish Trading Co., Ltd who are our long standing agent for Hong Kong.

Finally do you require a replacement for this incinerator? Where is the clinical waste being treated now?

Please let us know if we can help.

Best Regards

James W. Riley
B.Eng (Hons) - Fuel & Energy Eng
Sales Manager – Incineration Equipment

Facultatieve Technologies
Cremation & Incineration Equipment

Moor Road
Leeds
LS10 2DD
England, U.K
Tel Direct: +44 (0) 113 2768883
Fax Direct: +44 (0) 113 2774558
Mobile (SMS / Facetime / What's App): +44 (0) 7887 755506
Skype: ratsriley29
Email: james.riley@facultatieve-technologies.co.uk
Web : www.facultatieve-technologies.co.uk

-----Oorspronkelijk bericht-----
Van: no-reply@iburo.nl [mailto:no-reply@iburo.nl]
Verzonden: donderdag 10 december 2015 10:29
Aan: Info Technologies Holding <info@facultatieve-technologies.com>
Onderwerp: Facultatieve Technologies UK - Vragen, opmerkingen en suggesties

AANHEF:Mr.
VOORLETTERS:A

ACHTERNAAM:Cheung
ADRES:
POSTCODE:
PLAATS:Hong Kong
TELEFOONNUMMER:+852 39002021
FAXNUMMER:
EMAIL:cheung.waihung@pbworld.com
CONTACT:E-mail
BETREFT:Evans Universal Pathological Maxi Incinerator OPMERKING:Dear Sirs,

We are in preparation of decommissioning and disposal of a clinical waste incinerator (Evans Universal Pathological Maxi) installed in the local hospital on March 1992 (Machine No. 1545, Contract No. C3453). We would like to enquire whether asbestos has been used as insulation material for the machine.

Regards,
Dr Alex W.H. Cheung
RESPONSEPAGE:vragen
RESPONSEIP:210.6.231.118
RESPONSEDATE:10-12-2015 10:29:15
RESPONSEHOST:www.facultatieve-technologies.com