

REQUEST FOR TENDERS

File: AP_6/5/8/4
Date: 6 November, 2019
To: Interested contractors
From: Sela Soakai-Simamao, PacWastePlus Finance & Procurement Officers

Subject: Request for tenders: Healthcare Incinerator Repair Maintenance for the PacWastePlus programme.

1. Background

- 1.1. The Secretariat of the Pacific Regional Environment Programme (SPREP) is an intergovernmental organisation charged with promoting cooperation among Pacific islands countries and territories to protect and improve their environment and ensure sustainable development.
- 1.2. For more information, see: www.sprep.org.

2. Specifications: statement of requirement

- 2.1. SPREP would like to call for tenders from qualified and experienced contractors who can offer their services to undertake repair maintenance activities required for healthcare waste incinerators deployed by the Pac Waste programme to operate optimally.
- 2.2. The Terms of Reference of the consultancy are set out in Annex A.

3. Conditions: information for applicants

- 3.1. To be considered for this tender, interested contractors must meet the following conditions:
 - Submit a detailed Curriculum vitae detailing qualification and previous relevant experience for each proposed personnel.
 - Provide at least 3 references as part of the tender application.
 - Provide examples of past related work outputs
 - Complete the **tender application form** – (note you are required to complete all areas in full as requested, particularly the statements to demonstrate you meet the selection criteria. **DO NOT** refer us to your CV or Technical proposal. Failure to do so will result in the application **NOT** being considered)
 - Financial Proposal should provide a schedule of priced tasks in accordance with sub-headings under each site.

4. Submission guidelines

- 4.1. Tender documentation should demonstrate that the interested contractors satisfies the conditions stated above and is capable of meeting the specifications and timeframes. Documentation must also include supporting examples to address the evaluation criteria.
- 4.2. Tender documentation should outline the interested consultant's complete proposal :
 - Personnel (individual CV's which highlight relevant qualification and experience)
 - Technical Proposal (details to achieve tasks outlined in Annex A)
 - Financial Proposal (include timeframe and costs, proposal to remain valid for 90 days and quoted in USD)
- 4.3. Tenderers/Bidders must insist on an acknowledgement of receipt of tenders/proposals/bids.

5. Tender Clarification

- 5.1. Any clarification questions from applicants must be submitted by email to Siniva Tuuau-Enosa on sinivat@sprep.org and copy selas@sprep.org before 25th November 2019. A summary of all questions received with an associated response will be posted on the SPREP website www.sprep.org/tender by 27nd November 2019.

6. Evaluation criteria

- 6.1. SPREP will select a preferred contractor on the basis of SPREP's evaluation of the extent to which the documentation demonstrates that the tenderer offers the best value for money, and that the tenderer satisfies the following criteria:
- (a) Demonstrated skills and experience of each member of the proposed team (outline for each person) to provide repair and maintenance services for high temperature health waste incinerators.
 - (b) Strong working knowledge and experience in dealing with incinerator type (matching the manufacturer, model and size is preferable) and operation of such incinerators in the Pacific environment outlined in the Terms of Reference in the Pacific region.
 - (c) Demonstrated experience in delivering capacity building on the use and maintenance of healthcare waste incinerators to incinerator operators and relevant hospital staff.
 - (d) Detailed plan showing timeframe and deployment schedule for repair maintenance activities.
 - (e) Detailed financial proposal (specific itemised proposal for each site).

7. Deadline

- 7.1. **The due date for submission of the tender is: 04th December 2019**
- 7.2. Late submissions will be returned unopened to the sender.
- 7.3. Please send all tenders clearly marked **'TENDER: Healthcare Incinerator Repair Maintenance for the PacWastePlus Programme'** to one of the following methods:

Mail: SPREP
Attention: Procurement Officer
PO Box 240
Apia, SAMOA
Email: tenders@sprep.org
Fax: 685 20231
Person: Submit by hand in the tenders box at SPREP reception,
Vailima, Samoa.

SPREP reserves the right to reject any or all tenders and the lowest or any tender will not necessarily be accepted.

For any complaints regarding the Secretariat's tenders please refer to the Complaints section on the SPREP website
<http://www.sprep.org/accountability/complaints>

TERMS OF REFERENCE
Healthcare Incinerator Repair Maintenance
for
The PacWastePlus programme

1. BACKGROUND

The Secretariat of the Pacific Regional Environment Programme (SPREP) is working with the European Union's Delegation to the Pacific, and 14 Pacific Island Countries and Timor-Leste to undertake the PacWastePlus Programme, which seeks to improve and enhance waste management activities and the capacity of governments, industry and communities to manage waste to reduce the impact on human health and the environment.

PacWastePlus seeks to generate improved economic, social, health and environmental benefits for Pacific Island Countries arising from stronger regional economic integration and the sustainable management of natural resources and the environment. The programme activities will be designed to assist Countries to ensure the safe and sustainable management of waste with due regard for the conservation of biodiversity, reduction of marine litter, health and well-being of Pacific island communities, and climate change mitigation and adaptation requirements.

The PacWastePlus Programme has a specific Key Result Area (KRA) which requires providing corrective actions and repairs for healthcare incinerators that were deployed by the PacWaste Programme to various hospitals around the Pacific region.

Specifically, the engagement seeks to undertake repair and maintenance activities required to ensure healthcare waste incinerators deployed by the PacWaste programme operate optimally.

PROJECT OBJECTIVES

This engagement seeks the required repair work completed for healthcare incinerators.

Site	Location	Country	Manufacturer	Model
1	Tungaru Hospital	Kiribati	Inciner8	i8-75A
2	Balau National Hospital	Palau	Inciner8	i8-75A
3	Helena Goldie Hospital	Solomon Islands	Inciner8	i8-75A
4	National Referral Hospital Honiara	Solomon Islands	Advanced Combustion Engineering	CA30
5	Norsup Hospital	Vanuatu	Inciner8	18M-15
6	Prince Ngu Hospital	Tonga	Inciner8	i8-75A

2.PROJECT SCOPE

The PacWastePlus programme is seeking to engage a suitably qualified contractor to undertake maintenance activities on the following healthcare incinerators.

STATUS OF INCINERATION PLANTS REQUIRING REPAIR WORK

SITE	MODEL	SUMMARY OF ISSUES
Tungaru Hospital, Kiribati	i8-75A	Installed, commissioned, burners damaged on power failure. Incorrect and dangerous operating procedure. No spares provided. PPE Requested. NOT IN USE
Balau National Hospital, Palau	i8-75A	Never Installed. Exposed to weather, needs site inspection to assess and plan installation. Some components have been reported as missing. No spares provided. PPE Requested. NOT IN USE
Helena Goldie Hospital, Solomon Islands	i8-75A	Installed but never commissioned. Issues with secondary burner failure. Not used since installation engineer left site. No spares provided. PPE Requested. NOT IN USE
NRH Honiara, Solomon Islands	CA30	Installed and Operational. Requires a replacement temperature controller which is resulting in intermittent smoke emissions and also replacement of the original oil nozzles. HRH requests assistance with operational and maintenance costs. Spares provided 3 yrs ago but more required. PPE Requested. Requested additional waste management training. OPERATIONAL
Norsup Hospital, Vanuatu	18M-15	Placed in Enclosure but not installed or commissioned. Fuel Tank Missing. NOT IN USE
Prince Ngu Hospital, Tonga	i8-75A	Installed, commissioned. Fuel tank gauge broken. Discharge of smoke when in operation. Likely failure of Secondary Burner. No longer used due to excessive smoking. No spares provided. PPE Requested. NOT IN USE

3.1 Project Delivery

The required project activities are outlined per site of incineration plant.

SITE 1 - Tungaru Hospital, Kiribati Inciner8 i8-75A

Fuel Tank & Oil Burners

- Supply and Install Replacement Ecoflam Primary & Secondary Chamber diesel burners in accordance with OEM specification. Each burner is to be equipped with an inlet fuel filter and pressure gauge.
- Fit Burners with capillary type thermostat/Heat Switches to automatically activate the burner fan when the burner temperature exceeds 60 Degrees Celsius. Modify Control panel wiring to ensure heat switches activate burner fan even when Control Switch is in the OFF position. Replace wiring between the control panel and the burners as required. Final as built wiring diagrams must be supplied to the hospital and a laminated copy retained in the incinerator control panel.
- Supply and Install a galvanized steel frame that elevates the existing diesel fuel a minimum of 1 metre above ground level.

- Supply and install flow and return piping to the primary and secondary burners from the fuel tank. All piping and fittings shall be of rigid copper or stainless steel with flexible lines permitted for use only as an immediate connection to the burner.

Replacement of Incinerator Stack

- Supply and Install Replacement Incinerator stack to a total height of 6 metres above ground level. The replacement stack shall be equipped with cooling air entry slots as per the design of the existing incinerator stack.
- The new stack shall be provided with guy wires and fixed to the incinerator enclosure during installation.
- The new stack shall also be provided with a cowl to prevent the ingress of water from the roof into the building enclosure

Mild Steel Incinerator Body & Painting

- All mild steel surfaces are to be cleaned and any corrosion or paint or salt residue removed by either manual or powered wire brushing.
- Apply two coats of inorganic zinc primary followed by two coats of high temperature enamel paint using commercially available aerosols cans.

Incinerator Start-Up & Operation

- At the conclusion of installation of all new components and prior to the incineration of any waste materials the incinerator refractory must be dried out in accordance with the original refractory curing procedure as specified by the incinerator manufacturer.
- If free water is observed within the incinerator chamber the dry out process shall be extended, and the incinerator maintained at a temperature of 100 degrees Celsius until all free waste is evaporated.
- Documented proof of the completion of the curing procedure in the form of a manual temperature log and timed and dated photographs of the system temperature controller must be available for review if requested by SPREP.
- At the conclusion of the refractory curing process waste incineration operations can commence. A minimum of two trial burns over two separate days must be performed. As the conclusion of this process the maximum batch size, burn time and combustion air settings must be confirmed and documented in an as commissioned data sheet which is to be provided to the hospital and SPREP for future reference.

Incinerator Theory and Operational Training

- A minimum of 3 OFF informal training sessions for a duration of not less than 30 Minutes duration shall be performed for the incinerator operational staff. The first session shall be performed at the conclusion of plant installation either after or during the refractory curing procedure.
- Two more training sessions shall be performed on two separate days simultaneously with the incinerator start up trial burns. Training shall address the theory of operation of the incineration plant, identification and maintenance of all incineration plant components and operation of the incineration plant in an effective and environmentally sound manner.

Provision of Spare Parts

The following spare parts are to be provided -

Parts	Description	Quantity
Primary & Secondary Burner Parts	Oil Nozzle	2 sets per burner
	Oil Valve, Oil Pump & Coupling	1 set per burner
	Diffisuer, Blast Tube & Ignition Electrodes	1 set per burner
	Burner Motor, Capacitor & Fan Impellar	1 set per burner
Common Burner Parts	Burner Controller	1 off
	Flame Sensor	4 off
	Burner Heat Switch	2 off
Thermocouples	Secondary Chamber Thermocouple	2 off
Door Sealing Ceramic Rope		1 set

Provision of PPE

The following PPE are to be provided:

- 3 x Leather Gloves and Full-face shields

SITE 2 - Balau National Hospital, Palau Inciner8 i8-75A

Incinerator Installation

- Visit site and assess the condition of the incineration plant and all available components. Review proposed installation location and present a works action plan report to SPREP detailing technical information in regards to the condition of the incinerator to be installed, services required to be provided by the hospital, a site layout plan, proposed slab and building details, proposed installation and commissioning plan and a proposed works schedule.
- This visit should also be used to meet with local contractors to assist with the transportation of required components, supply and installation of the required incinerator slab and building work and the physical installation of the incinerator which shall require a mobile crane or crane truck to lift the primary and secondary combustion chambers into position.

Fuel Tank & Oil Burners

- Supply and Install Replacement Ecoflam Primary & Secondary Chamber diesel Burners in accordance with OEM Specification. Each Burner is to be equipped with a pressure gauge and an inlet fuel filter. If the existing burners are still in a serviceable condition they shall be stripped and components retained on site as additional spares.
- Fit Burners with capillary type thermostat/Heat Switches to automatically activate the burner fan when the burner temperature exceeds 60 Degrees Celsius. Modify Control panel wiring to ensure heat switches activate burner fans even when Control Switch is on the OFF position. Supply new wiring between the control panel and the burners as required. Final as built wiring diagrams must be supplied to the hospital and a laminated copy retained in the incinerator control panel.
- Supply and Install a galvanized steel frame that elevates the existing diesel fuel a minimum of 1 metre above ground level.
- Supply and install flow and return piping to the primary and secondary burners from the fuel tank. All piping and fittings shall be of rigid copper or stainless steel with flexible lines permitted for use only as an immediate connection to the burner.

Replacement of Incinerator Stack

- Supply and Install Replacement Incinerator stack to a total height of 6 metres above ground level. The replacement stack shall be equipped with cooling air entry slots as per the design of the existing incinerator stack.
- The new stack shall be provided with guy wires and fixed to the incinerator enclosure during installation.
- The new stack shall also be provided with a cowl to prevent the ingress of water from the roof into the building enclosure

Mild Steel Incinerator Body & Painting

- All mild steel surfaces are to be cleaned and any corrosion or paint or salt residue removed by either manual or powered wire brushing. Any missing bolts shall be replaced with similar bolts.
- Apply two coats of inorganic zinc primary followed by two coats of high temperature enamel paint using commercially available aerosols cans.

Incinerator Start Up & Operation

- At the conclusion of installation of all new components and prior to the incineration of any waste materials the incinerator refractory must be dried out in accordance with the original refractory curing procedure as specified by the incinerator manufacturer.
- If free water is observed within the incinerator chamber the dry out process shall be extended and the incinerator maintained at a temperature of 100 degrees Celsius until all free waste is evaporated.
- Documented proof of the completion of the curing procedure in the form of a manual temperature log and timed and dated photographs of the system temperature controller must be available for review if requested by SPREP.
- At the conclusion of the refractory curing process waste incineration operations can commence. A minimum of two trial burns over two separate days must be performed. As the conclusion of this process the maximum batch size, burn time and combustion air settings must be confirmed and documented in an as commissioned data sheet which is to be provided to the hospital and SPREP for future reference.

Incinerator Theory and Operational Training

- A minimum of 3 OFF informal training sessions for a duration of not less than 30 Minutes duration shall be performed for the incinerator operational staff. The first session shall be performed at the conclusion of plant installation either after or during the refractory curing procedure.
- Two more training sessions shall be performed on two separate days simultaneously with the incinerator start up trial burns. Training shall address the theory of operation of the incineration plant, identification and maintenance of all incineration plant components and operation of the incineration plant in an effective and environmentally sound manner.

Provision of Spare Parts

The following spare parts are to be provided -

Parts	Description	Quantity
Primary & Secondary Burner Parts	Oil Nozzle	2 sets per burner
	Oil Valve, Oil Pump & Coupling	1 set per burner
	Diffuser, Blast Tube & Ignition Electrodes	1 set per burner
	Burner Motor, Capacitor & Fan Impellar	1 set per burner
Common Burner Parts	Burner Controller	1 off
	Flame Sensor	4 off
	Burner Heat Switch	2 off
Thermocouples	Secondary Chamber Thermocouple	2 off
Door Sealing Ceramic Rope		1 set

Provision of PPE

The following PPE are to be provided:

- 3 x Leather Gloves and Full-face shields

SITE 3 - Helena Goldie Hospital, Solomon Islands Inciner8 i8-75A

Fuel Tank & Oil Burners

- Supply and Install Replacement Ecoflam Primary & Secondary Chamber diesel Burners in accordance with OEM Specification. Each Burner is to be equipped with a pressure gauge and an inlet fuel filter.
- Fit Burners with capillary type thermostat/Heat Switches to automatically activate the burner fan when the burner temperature exceeds 60 Degrees Celsius. Modify Control panel wiring to ensure heat switches activate burner fan even when Control Switch is in the OFF position. Replace wiring between the control panel and the burners as required. Final as built wiring diagrams must be supplied to the hospital and a laminated copy retained in the incinerator control panel.
- Supply and Install a galvanized steel frame that elevates the existing diesel fuel a minimum of 1 metre above ground level.
- Supply and install flow and return piping to the primary and secondary burners from the fuel tank. All piping and fittings shall be of rigid copper or stainless steel with flexible lines permitted for use only as an immediate connection to the burner.

Replacement of Incinerator Stack

- Supply and Install Replacement Incinerator stack to a total height of 6 metres above ground level. The replacement stack shall be equipped with cooling air entry slots as per the design of the existing incinerator stack.
- The new stack shall be provided with guy wires and fixed to the incinerator enclosure during installation.
- The new stack shall also be provided with a cowl to prevent the ingress of water from the roof into the building enclosure

Mild Steel Incinerator Body & Painting

- All mild steel surfaces are to be cleaned and any corrosion or paint or salt residue removed by either manual or powered wire brushing.
- Apply two coats of inorganic zinc primary followed by two coats of high temperature enamel paint using commercially available aerosols cans.

Incinerator StartUp & Operation

- At the conclusion of installation of all new components and prior to the incineration of any waste materials the incinerator refractory must be dried out in accordance with the original refractory curing procedure as specified by the incinerator manufacturer.
- If free water is observed within the incinerator chamber the dryout process shall be extended and the incinerator maintained at a temperature of 100 degrees Celsius until all free water is evaporated.
- Documented proof of the completion of the curing procedure in the form of a manual temperature log and timed and dated photographs of the system temperature controller must be available for review if requested by SPREP.
- At the conclusion of the refractory curing process waste incineration operations can commence. A minimum of two trial burns over two separate days must be performed. As the conclusion of this process the maximum batch size, burn time and combustion air settings must be confirmed and documented in an as commissioned data sheet which is to be provided to the hospital and SPREP for future reference.

Incinerator Theory and Operational Training

- A minimum of 3 OFF informal training sessions for a duration of not less than 30 Minutes duration shall be performed for the incinerator operational staff. The first session shall be performed at the conclusion of plant installation either after or during the refractory curing procedure.
- Two more training sessions shall be performed on two separate days simultaneously with the incinerator start up trial burns. Training shall address the theory of operation of the incineration plant, identification and maintenance of all incineration plant components and operation of the incineration plant in an effective and environmentally sound manner.

Provision of Spare Parts

The following spare parts are to be provided -

Parts	Description	Quantity
Primary & Secondary Burner Parts	Oil Nozzle	2 sets per burner
	Oil Valve, Oil Pump & Coupling	1 set per burner
	Diffuser, Blast Tube & Ignition Electrodes	1 set per burner
	Burner Motor, Capacitor & Fan Impellar	1 set per burner
Common Burner Parts	Burner Controller	1 off
	Flame Sensor	4 off
	Burner Heat Switch	2 off
Thermocouples	Secondary Chamber Thermocouple	2 off
Door Sealing Ceramic Rope		1 set

Provision of PPE

The following PPE are to be provided:

- 3 x Leather Gloves and Full-face shields

SITE 4 - Honiara Referral Hospital, Solomon Islands, Advanced Combustion Engineering CA30

Incinerator Service

- Remove, inspect and clean both primary and secondary chamber burners. Replace the burner nozzles and any other required components with new items. Lubricate and check operation of the secondary burner modulating air damper.
- Check operation of both underfire air and secondary combustion air fans. If required remove fans and clean dust buildup from impellers.
- Clean incinerator underfire combustion air holes.
- Lubricate all incinerator door hinges.
- Check condition of Refractory structure
- Check condition of Stainless steel stack.
- Supply, install and configure a replacement Omron E5AC Secondary Burner Controller and ensure the burner modulates between low to high fire in accordance with the controller set value.

Incinerator Trial Burns and Operation

- At the conclusion of the incinerator service a minimum of two trial burns over two separate days must be performed. These burns shall ensure that the incinerator controls are correctly configured so that the incinerator operates in an effective smoke free and environmentally sound manner.
- If the waste properties and quantities have changed from the initial commissioning and the incinerator smokes then the primary and secondary combustion air settings may need to be modified accordingly. This shall require knowledge and the ability to modify the existing Omron PLC program and also the fixed speed settings of the Siemens V20 series variable speed drives. Any changes made shall be documented and a final soft and hard copy of the PLC program provided to the hospital as a component of a detailed site service and inspection report.

Incinerator Theory and Operational Training

- A minimum of 2 OFF training sessions for a duration of not less than 60 Minutes duration shall be performed for the incinerator operational staff.
- These training sessions shall be performed simultaneously with the incinerator trial burns. Training shall address the theory of operation of the incineration plant. Identification and maintenance of all incineration plant controls and components and finally the operation of the incineration plant in an effective and environmentally sound manner.

Provision of Spare Parts

The following spare parts are to be provided –

Parts	Description	Quantity
Primary & Secondary Burner Parts	Oil Nozzle	2 sets per burner
	Oil Valve, Oil Pump & Coupling	1 set per burner
	Diffisuer, Blast Tube & Ignition Electrodes	1 set per burner
	Burner Motor, Capacitor & Fan Impellar	1 set per burner
Common Burner Parts	Burner Controller	1 off
	Flame Sensor	4 off
	Burner Heat Switch	2 off
	Temperature Controller	1 off Omron E5AC, 240 VAC
Thermocouples	Secondary Chamber Thermocouple	2 off
Door Sealing Ceramic Rope		1 set

Provision of PPE

The following PPE are to be provided:

- 4 x Leather Gloves and Full-face shields

SITE 5 - Norsup Hospital, Vanuatu Inciner8 18M-15

Incinerator Installation

- Visit site and assess the condition of the incineration plant and all available components. Review proposed installation location and present a works action plan report to SPREP detailing technical information describing the condition of the incinerator, services required to be provided by the hospital, a site layout plan, existing slab and building details, proposed installation and commissioning plan and a proposed works schedule.
- This visit should also be used to meet with local contractors to assist with the transportation of required components.

Fuel Tank & Oil Burners

- Supply and Install Replacement 200 Litre diesel fuel tank, complete with fuel level gauge. The tank shall be elevated to a minimum of 800mm above ground level and fabricated from mild steel to suitable international standards for the storage of diesel fuel. The fuel tank and support stand shall be sandblasted and painted using a paint system acceptable for use in a coastal or marine environment.
- Supply and Install Replacement Ecoflam Primary & Secondary Chamber diesel Burners in accordance with OEM Specification. Each Burner is to be equipped with a pressure gauge and an inlet fuel filter. If the existing burners are still in a serviceable condition they shall be stripped and components retained on site as additional spares.
- Fit Burners with capillary type thermostat/Heat Switches to automatically activate the burner fan when the burner temperature exceeds 60 Degrees Celsius. Modify Control panel wiring to ensure heat switches activate burner fans even when Control Switch is on the OFF position. Supply new wiring between the control panel and the burners if required. Final as built wiring diagrams must be supplied to the hospital and a laminated copy retained in the incinerator control panel.
- Supply and install flow and return piping to the primary and secondary burners from the fuel tank. All piping and fittings shall be of rigid copper or stainless steel with flexible lines permitted for use only as an immediate connection to the burner.

Replacement of Incinerator Stack

- Supply and Install Replacement Incinerator stack to a total height of 5.5 metres above ground level. The replacement stack shall be equipped with cooling air entry slots as per the design of the existing incinerator stack.
- The new stack shall be provided with guy wires and fixed to the incinerator enclosure during installation.
- The new stack shall also be providing with a cowl to prevent the ingress of water from the roof into the building enclosure

Mild Steel Incinerator Body & Painting

- All mild steel surfaces are to be cleaned and any corrosion or paint or salt residue removed by either manual or powered wire brushing. Any missing bolts shall be replaced with similar bolts.
- Apply two coats of inorganic zinc primary followed by two coats of high temperature enamel paint using commercially available aerosols cans.

Incinerator StartUp & Operation

- At the conclusion of installation of all new components and prior to the incineration of any waste materials the incinerator refractory must be dried out in accordance with the original refractory curing procedure as specified by the incinerator manufacturer.
- Documented proof of the completion of the curing procedure in the form of a manual temperature log and timed and dated photographs of the system temperature controller must be available for review if requested by SPREP.
- At the conclusion of the refractory curing process waste incineration operations can commence. A minimum of two trial burns over two separate days must be performed. As the conclusion of this process the maximum batch size, burn time and combustion air settings must be confirmed and documented in an as commissioned data sheet which is to be provided to the hospital and SPREP for future reference.

Incinerator Theory and Operational Training

- A minimum of 3 OFF informal training sessions for a duration of not less than 30 Minutes duration shall be performed for the incinerator operational staff. The first session shall be performed at the conclusion of plant installation either after or during the refractory curing procedure.
- Two more training sessions shall be performed on two separate days simultaneously with the incinerator start up trial burns. Training shall address the theory of operation of the incineration plant, identification and maintenance of all incineration plant components and operation of the incineration plant in an effective and environmentally sound manner.

Provision of Spare Parts

The following spare parts are to be provided -

Parts	Description	Quantity
Primary & Secondary Burner Parts	Oil Nozzle	2 sets per burner
	Oil Valve, Oil Pump & Coupling	1 set per burner
	Diffuser, Blast Tube & Ignition Electrodes	1 set per burner
	Burner Motor, Capacitor & Fan Impellar	1 set per burner
Common Burner Parts	Burner Controller	1 off
	Flame Sensor	4 off
	Burner Heat Switch	2 off
Thermocouples	Secondary Chamber Thermocouple	2 off
Door Sealing Ceramic Rope		1 set

Provision of PPE

The following PPE are to be provided:

- 3 x Leather Gloves and Full-face shields

SITE 6 -Prince Ngu Hospital, Tonga Inciner8 i8-75A

Fuel Tank & Oil Burners

- Supply and Install Replacement Ecoflam Primary & Secondary Chamber diesel Burners in accordance with OEM Specification. Each Burner is to be equipped with a pressure gauge and an inlet fuel filter.
- Fit Burners with capillary type thermostat/Heat Switches to automatically activate the burner fan when the burner temperature exceeds 60 Degrees Celsius. Modify Control panel wiring to ensure heat switches activate burner fan even when Control Switch is in the OFF position. Replace wiring between the control panel and the burners if required. Final as built wiring diagrams must be supplied to the hospital and a laminated copy retained in the incinerator control panel.
- Supply and Install a galvanized steel frame that elevates the existing diesel fuel a minimum of 1 metre above ground level.
- Supply and install flow and return piping to the primary and secondary burners from the fuel tank. All piping and fittings shall be of rigid copper or stainless steel with flexible lines permitted for use only as an immediate connection to the burner.

Replacement of Incinerator Stack

- Supply and Install Replacement Incinerator stack to a total height of 6 metres above ground level. The replacement stack shall be equipped with cooling air entry slots as per the design of the existing incinerator stack.
- The new stack shall be provided with guy wires and fixed to the incinerator enclosure during installation.
- The new stack shall also be provided with a cowl to prevent the ingress of water from the roof into the building enclosure

Mild Steel Incinerator Body & Painting

- All mild steel surfaces are to be cleaned and any corrosion or paint or salt residue removed by either manual or powered wire brushing.
- Apply two coats of inorganic zinc primary followed by two coats of high temperature enamel paint using commercially available aerosols cans.

Incinerator StartUp & Operation

- At the conclusion of installation of all new components and prior to the incineration of any waste materials the incinerator refractory must be dried out in accordance with the original refractory curing procedure as specified by the incinerator manufacturer.
- Documented proof of the completion of the curing procedure in the form of a manual temperature log and timed and dated photographs of the system temperature controller must be available for review if requested by SPREP.
- At the conclusion of the refractory curing process waste incineration operations can commence. A minimum of two trial burns over two separate days must be performed. As the conclusion of this process the maximum batch size, burn time and combustion air settings must be confirmed and documented in an as commissioned data sheet which is to be provided to the hospital and SPREP for future reference.

Incinerator Theory and Operational Training

- A minimum of 3 OFF informal training sessions for a duration of not less than 30 Minutes duration shall be performed for the incinerator operational staff. The first session shall be performed at the conclusion of plant installation either after or during the refractory curing procedure.
- Two more training sessions shall be performed on two separate days simultaneously with the incinerator start up trial burns. Training shall address the theory of operation of the incineration plant, identification and maintenance of all incineration plant components and operation of the incineration plant in an effective and environmentally sound manner.

Provision of Spare Parts

The following spare parts are to be provided -

Parts	Description	Quantity
Primary & Secondary Burner Parts	Oil Nozzle	2 sets per burner
	Oil Valve, Oil Pump & Coupling	1 set per burner
	Diffuser, Blast Tube & Ignition Electrodes	1 set per burner
	Burner Motor, Capacitor & Fan Impellar	1 set per burner
Common Burner Parts	Burner Controller	1 off
	Flame Sensor	4 off
	Burner Heat Switch	2 off
Thermocouples	Secondary Chamber Thermocouple	2 off
Door Sealing Ceramic Rope		1 set

Provision of PPE

The following PPE are to be provided:

- 3 x Leather Gloves and Full-face shields

3.2 Project Schedule

The activities are to be completed no later than **1 May 2020** with a preference for the activities to be completed much earlier.

Expected project activity is detailed in Table 2, it is expected that tender responses will detail how and when each of these steps will be delivered.

Table 2: Project Schedule

Activity
<i>Notification of Successful Consultant</i>
1. Teleconference Meeting between Successful Consultant and PacWastePlus Team
<i>Contract Signing</i>
2. Approval of methodology and repair schedule
3. Repair work completed for first site; repair report submitted.
4. Repair work completed for 2 nd site, repair report submitted
5. Repair work completed for 3 rd site, repair report submitted
6. Repair work completed for 4 th site, repair report submitted
7. Repair work completed for 5 th site, repair report submitted
8. Repair work completed for final site; repair report submitted.
<ul style="list-style-type: none"><i>Please note, each site repair report will be submitted to both the PMU as well as relevant country department/hospital for review and approval before payment is released.</i>

3.3 Budget

Submissions are required to itemise all financial elements of their proposal **per site**, including, but not limited to, the following:

- Salary costs (hourly rate and proposed hours for each team member, allocated to role)
- Travel Costs & other disbursements
- All applicable taxes

Each site's proposal should be structured according to the sub-heading tasks of each site as outlined in 3.1 – Project Delivery.

Please note: All proposals are to be provided in **USD**, with a proposed payment schedule (please note an initial payment on contract signing cannot exceed 30% of the contract value).

3. Other Information

The successful consultant will be provided with any appropriate documents identified and saved by the PacWastePlus programme team as part of the preparation for the activity.

All in country arrangements and support from country counterparts will be initially arranged through SPREP and no direct contact should be made until introductions are made.

Attachment 1 : DESCRIPTION OF PACWASTE INCINERATORS

The PacWaste Incinerators were originally classified as small, medium, large and extra-large in accordance with the expected waste generation rates from the proposed healthcare facilities.

The small and medium incinerators were supplied by the UK company Inciner8 whereas the large and extra-large incinerators were provided by Advanced Combustion Engineering.

All incinerators are of a two-chamber design consisting of a primary combustion chamber for the combustion of solid wastes and a secondary combustion chamber/afterburner for the combustion of smoke, soot, odour and any other combustible products generated from the primary combustion chamber.

Whilst both the Inciner8 and Advanced Combustion Engineering incinerators were designed to achieve the same outcome they vary significantly in construction, methods of operation and design control complexity.

Incinerator Classification		Original Waste Specification			Equipment Provided	
Category	Size	Kg waste per load	Kg waste treated/day	Kg waste treated per 5-day Week	Primary Chamber Volume (m3)	Incinerator Brand Model
Category 1	Small	10	20	100	0.13	Inciner8 I8-M15
Category 2	Medium	50	100	500	0.75	Inciner8 I8-75a
Category 3	Large	100	200	1000	1.5	Adv Comb Eng Model CA15
Category 4	Extra Large	250	500	2500	3.0	Adv Comb Eng Model CA30

INCINER8 SMALL & MEDIUM INCINERATORS

The Inciner8 units subject to this review are a two chambered incinerator and of relatively lightweight construction using thin gauge steel and a cast refractory structure.



Inciner8 i8-75a primary and secondary combustion chambers

Process controls consist of a simple control panel utilising timers and relay-based controls with a single thermocouple and temperature controller, a run time counter and ON/OFF switches for the primary and secondary chamber burners.



Inciner8 i8-75a control panel. External and internal Views.

Each incinerator chamber is equipped with a diesel fired auxiliary fuel packaged type burner which is operated on an ON/OFF basis. Diesel fuel is supplied from a ground mounted plastic fuel tank. To permit both burners to operate from a single fuel source, without the use of both supply and return fuel lines Inciner8 utilise a deaeration device called a tiger loop.



Ground mounted fuel tank and dearation device on Inciner8 i8-75a.

The control of the process combustion air necessary for the incineration process is manually adjusted by manipulating the air settings on the primary and secondary burners.



Inciner8 i8-75a primary and secondary burners.

Once successfully commissioned and waste throughput and combustion air settings have been determined, the incinerator is operated by filling the primary chamber with waste and then activating the control switch and the primary and secondary burner on/off switches.

Once the ignition of the wastes is achieved the primary burner is turned off and the secondary burner remains on for the duration of the timed burn cycle. At the completion of the burn cycle the burner combustion air fans continue to operate for an extended period of time to burnout the residue ashes, cool the incinerator and protect the burners from heat damage.

ADVANCED COMBUSTION ENGINEERING INCINERATOR

The Advanced Combustion Engineering CA30 incinerator, located at Honiara Referral Hospital, is a much larger and heavier duty incinerator. The incinerator consists of a horizontally orientated cylindrical primary combustion chamber, vertical secondary combustion chamber and finally a stainless-steel discharge stack. This incinerator is constructed from thick plate mild steel and internally lined with refractory fire brick.



Honiara Referral Hospital CA30 Incinerator

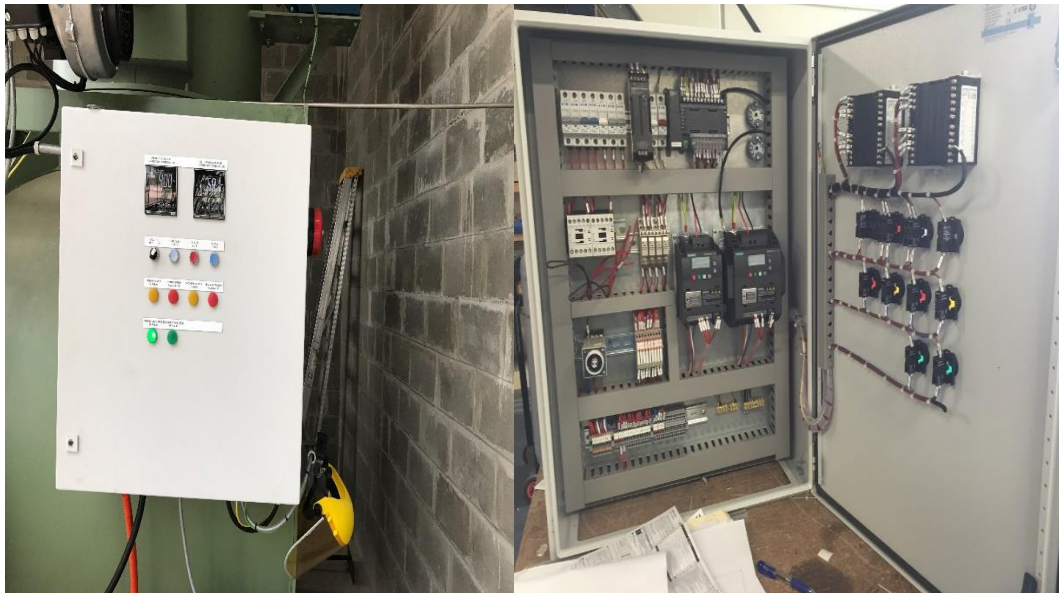
Process controls for the HRH Model CA30 incinerator are significantly more complex than the Inciner8 units

Like the smaller units this incinerator uses a packaged ON/OFF primary burner. The secondary chamber is also equipped with a packaged burner however this burner operates on a Low/High/OFF basis in accordance with the actual secondary chamber temperature.

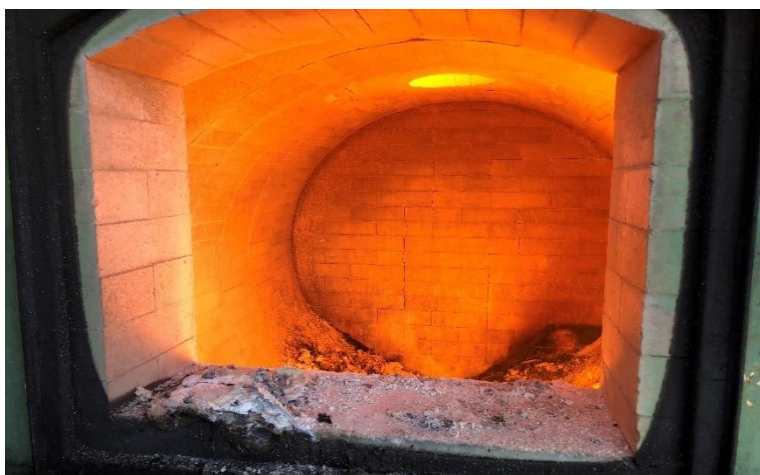
Combustion air to both the primary and secondary combustion chambers is provided by two separate combustion air fans each of which is equipped with a variable speed drive. The speed and therefore and combustion air supplied by these fans is controlled throughout the combustion process stages of plant heat up, initial combustion and final combustion by utilising a programmable logic controller.



Typical CA Model Incinerator. Showing Loading and ash Removal doors. Primary and Secondary Burners, Combustion Air fans and Control Panel.



HRH CA30 Control Panel with 2 Off Temp Controllers, 2 Off VSD's and Omron PLC



HRH CA30 Primary Chamber, Refractory

Brick Lining.

The Honiara CA30 incinerator is a fully commissioned and operational unit.

GENERAL OPERATING PROCEDURE:

1. **Turn Control Switch to OFF position.**
 - Remove Ash from Incinerator.
 - Load Incinerator and Close doors Tightly.
2. **Turn Control Switch to back to ON position.**
 - Underfire Combustion Air Fan Starts.
 - Secondary Combustion Air Fan Starts.
 - Burner Fans Start.
 - After approximately 3 minutes Combustion Air Fan Stops.
 - Secondary Burner Starts.
 - After approximately 10 minutes the siren pulses briefly every 60 seconds.
3. **Press the Burn Cycle Start Button**
 - Primary Burners operate on an ON/OFF basis at a preset temperature of 700°C.
 - Approximately 15 minutes after the "BURN CYCLE" commences the combustion air fan will start automatically.
 - At end of "BURN CYCLE" the Primary Burner will stop.
 - Secondary Burner Stops after an additional 10 minutes.
 - Secondary Combustion Air Fan & Burner Fans Stop after an additional 10 minutes.
 - Underfire Air Fan Stops after "BURN OUT CYCLE" of 8 hrs duration

Attachment 2 : DISCUSSION OF INCINERATOR ISSUES

FAILURE OF SECONDARY CHAMBER BURNERS

The Inciner8 units all feature a ground mounted fuel tank with a single supply oil line to feed both the primary chamber and secondary chamber burners. A deaeration device called a tiger loop is used to permit the burners to run as a more conventional supply and return line system without having an actual return line back to the fuel tank.

This system, as installed, can result in the secondary burner, which is at a higher elevation than the primary burner, being starved of oil which rapid results in the degradation and failure of the secondary burner oil pump.

This is an issue with Helena Goldie Hospital incinerator and possibly also the Prince Ngu Hospital incinerator.

The Inciner8 I8-75a Installation and operations manual clearly shows that the fuel tank be elevated by a minimum of 1000mm which unfortunately is contrary to how the tanks have actually been installed. We require the elevation of the fuel tank an essential requirement for all Inciner8 units.

Further, we require all Inciner8 units be installed or modified to incorporate a conventional two pipe system, with an oil supply line and return back to the fuel tank in place of the tigerloop device.

Please note: The Advanced Combustion Engineering HRH CA30 already incorporates an elevated fuel oil and a 2-line system.

HEAT DAMAGE TO BURNERS

The Tungaru Hospital, Kiribati i8-75a incinerator is out of service due to heat damage of both burners which occurred during a power failure.

Inciner8's operations manuals states that the burners must be physically removed from the incinerator to prevent damage in the event of a power failure.

Whilst this may be an effective solution if the incinerators were to be constantly monitored during the both the burn and cooling cycles and the operator immediately removed the burners upon a power failure it would only take a few minutes of delay to result in burner damage.

Power failures are a known issue in the South Pacific and we would consider the requirement to physically remove the burners from the incinerator unacceptable.

We therefore propose that consideration to given to replacing the discharge stacks with a new stack of sufficient height so that the natural draft provided is sufficient to prevent damage to the burners in the event of a power failure.

We would also propose that all the Inciner8 burners be equipped with burner heat switches which would automatically activate the burner fan in the case of an overtemperature regardless of whether the incinerator control switch was turned on or off.

Whilst these changes would represent a moderate cost and the need to ship replacement stacks to the Inciner8 sites it would certainly be cheaper than continually replacing the Inciner8 burners.

The HRH CA 30 incinerator already incorporates burner heat switches and the vertical arrangement of the secondary chamber which provides sufficient draft to prevent damage to the burners in the case of a total power failure.

CORROSION OF INCINERATORS

All the incinerators are subject to severely corrosive conditions. The Inciner8 units, particularly the uninstalled units exposed to weather such as the i8-75A in Palau, need to clean and painted.

It is strongly recommended; these units are wire brushed to remove any scale or residue and then spray painted using commercially available aerosols cans in two coats or inorganic zinc primer and finally two coats of a high temperature top coat.

The HRH have requested assistance in painting the incinerator. This incinerator is still in very good condition being sandblasted and undercoated in a corrosion resistant inorganic zinc. A 20-litre drum of high temperature top coat was provided along with the operational spares so painting of this particular incinerator should not be an issue. We would suggest that this is something the hospital can readily perform not the responsibility of the contractor.

INCINERATOR COMMISSIONING AND REFRACTORY DRYOUT

The five Inciner8 units have either not been installed or have been out of service for an extended period of time.

It is recommended that as a component of commissioning or recommissioning, these units undergo a refractory dry out procedure in accordance with the manufacturer's instructions as specified in the operations manual. Where the incinerators are found to contain free water within the chambers this dry out period shall utilise an extended low temperature period so that all free water is evaporated prior to achieving elevated temperatures.

INCINERATOR OPERATIONS TRAINING

It is recommended, that additional incinerator theory and operations training be performed at all six sites subject to this review.

Of particular concern is the i8-75A located at Kiribati. This hospital is concerned about the dangers of loading wastes through the top loading door suggesting a redesign and also the provision fire resistant personal protective equipment.

All of the PacWaste incinerators are a controlled air incinerator concept. They need to be loaded prior to the start of the burn cycle and remain closed for the duration of the burn cycle. Opening the door during the burn cycle is contrary to the operational concept of these incinerators and as determined by the operations staff at Kiribati an extremely dangerous process.

Whilst the Inciner8 manual refers to the loading of additional wastes this is in order to determine the maximum incineration batch size and set combustion air settings. This is a once off commissioning procedure and not normal operation. The Inciner8 manual states that the loading door is to remain closed for the duration of the burn cycle.

We are not aware of how the Kiribati operational staff were actually instructed to operate this incinerator however it appears that this site is one of the units commissioned by an external consultant following the departure of Inciner8 from the PacWaste project. Incineration is an extremely specialised process and we would certainly advise against general contractors being engaged to install and commission these plants.

PROVISION OF SPARE PARTS

Whilst the provision of spare parts was a requirement of the PacWaste supply contract it appears that the Inciner8 units were not supplied with any parts and the HRH in Honiara has already consumed the bulk of the spare parts originally provided.

Unfortunately, due to budgetary constraints the lack of a single and relatively inexpensive part can result in an incinerator being offline for a considerable period of time.

We would therefore recommend that all incinerators be provided with sufficient spare parts to address consumable components and most likely failures. In Section 4 of this document where we detail the proposed scope of work, we identify the recommended spare parts for each site.

PROVISION OF PPE

The original PacWaste project did not specify that PPE be provided and accordingly all hospitals sites now require PPE.

The sets of PPE requested from the hospitals vary from 2 to 12. We would recommend that three full sets of PPE be provided to each of the small and medium incinerator sites and 4 full sets be provided to the extra-large incinerator site in Honiara.

Specialised PPE should consist of leather gloves and full-face shields.

Safety boots, long-sleeved shirts and long pants should always also be worn when operating an incinerator.